# The secret life of hardy ferns

Text by Martin Rickard / Foreword by Peter Janke Photographs by Josh Westrich

EDITION Art & Nature

*Athyrium filix-femina*
'Plumosum Cristatum Coke'

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*Cyrtomium fortunei*

# Foreword

Peter Janke

The wired-glass window in the upper quarter of the rusty steel door was so high that I could not see through it. And it took a special knack to open this door and pass through into the shadowy realm beyond. As soon as I was alone in the nursery, I would slip through the door, pulling it closed behind me as swiftly as I could, and then I was in my childhood paradise. In the hazy atmosphere, a comforting warmth and an almost indescribable scent would surround me. Broken clay pots and old watering cans, long since discarded, lay all around. A green patina had spread out across this unused greenhouse, covering the chaos of collapsed storage racks and ancient shipping crates. Here, in the gloomy humidity, mosses and ferns had taken over.

The "Sprengerihaus", as it was known then, was the oldest of my family's greenhouses, constructed by my great-grandfather for the cultivation of orchids and later used for all kinds of ornamental foliage. Here, my grandmother cultivated everything that was green. And besides *Asparagus densiflorus* 'Sprengeri', that meant ferns. Our favourite fern was doubtless the tropical *Adiantum raddianum*, which in my childhood still clung to the warm brick walls. I could not help but marvel at the picture formed by the fern fronds against the hazy backlight. Like polished ebony, the thin, wiry stalks would taper off and intertwine, opening out into a delicately veined delta of glossy ink strokes. From each stalk sprung a butterfly wing-like leaf of the greatest delicacy.

It must have been on one of those childhood days in the Sprengerihaus that a fern spore found its way into my gardener's heart because today ferns are firmly rooted there.

Of course, it took some time before my childlike admiration for these plants grew into a full-blown passion. Today, I know that anyone who specializes in ferns must be a patient soul. Most species and varieties need a long time, often many years, to achieve their full potential.

It was Veronica Cross who said to me many years ago, "Peter, I am going into ferns now, and you should do the same!" Well, I thought then that I was already "into ferns", but when she introduced me to Martin Rickard I soon realised how little I knew. My knowledge up to that point was based solely on my love of the unique aesthetic of this primeval group of plants.

"The fern king", as Veronica introduced Martin Rickard, was in a different league. His specialist knowledge, the wealth of literary sources on which he could draw and his innate feeling for this group of plants crowned him as the undisputed king of pteridology.

When Josh Westrich, whose distinctive photographic art I have appreciated for so many years, told me that he was working on a book of ferns, I had a feeling of déjà vu. Yes, perhaps Josh's eye for detail and the depth of focus in his imagery could capture on paper the childish joy I had felt when gazing at a backlit *Adiantum* frond in the Sprengerihaus. I urged him to send me some of his photographs as soon as he could. He did so, and I understood then that, without a doubt, a fern spore had also found its way into his photographer's heart.

Josh Westrich is no plant breeder; he is a photographic artist. And he has what many a gardener does not: a love of the aesthetics of nature. I know of only one other photographer who comes close to him in this regard: Karl Blossfeldt. Blossfeldt was not a gardener either, he simply recognised the utter ingenuity of nature. Today, his silver gelatin prints depicting fern fronds hang in some of the most important museums in the world.

The fact that Josh Westrich has now met the Martz family in Fürth, who have been collecting ferns for two generations, is an added bonus for this unique book. It takes a lot of trust and affection to allow a photographer access to one's precious plants, let alone offering them up wholesale in the service of photography, as the Martz family were happy to do for this magnificent book.

This book is to be recommended to anyone who keeps art and nature close to their heart. I have never before seen the threshold between visual art and the patterns of nature so tangibly depicted. And if that were not enough, "the fern king" – Martin Rickard – invites the reader to accompany him on an eloquent and informative tour through the unique world of hardy ferns.

**Technical preface**

**Parts of a fern:**

**Rootstock:**
Usually a rhizome which may be erect or creeping.

**Frond:**
The basal part of the frond stalk is called the stipe; the upper part of the frond stalk along the section carrying foliage is called the rachis.

The leafy part is first divided into pinnae (singular pinna), i.e. the first branches attached to the rachis.

The pinnae are divided to pinnules, the secondary branches attached to the pinnae.

The pinnules are sometimes divided into pinnulets, the tertiary branches attached to the pinnules.

**Cresting:**
If a frond has a terminal crest and all the pinnae are crested, it is called Cristatum.

If a frond has a terminal crest wider than the frond, it is called Grandiceps.

If the frond has a terminal crest, pinna crests and pinnule crests, it is called Percristatum.

If the frond has a terminal crest but no crests on the pinnae, it is called Capitatum.

**Spore production:**
Spores are generally round and are formed in sporangia, 64 at a time.

Sporangia are bags of spores on a short stalk produced in large numbers of up to 100 or more in a tuft, usually on the underside of the frond.

Sori (singular sorus) are tufts of sporangia, usually covered by an indusium.

The indusium (plural indusia) is the flap of tissue which protects the developing sorus in most species.

**Frond division:**
A frond with undivided pinnae is called pinnate.

A frond with pinnae once divided is called bipinnate.

A frond with pinnae twice divided is called tripinnate



# Introduction - an explanation

Martin Rickard

The fabulous photographs in this book were all taken by Josh Westrich. I wrote the text in English. I don't think I have ever met Josh, so how did I get involved? It is a strange story!

The story begins with a mutual friend, Veronica Cross. Veronica is an avid plant collector and garden designer with a property in Herefordshire containing one of the most comprehensive private collections of plants. She grows about 150 types of Magnolia, a similar number of tree Peonies, somewhere between 500 and 1000 types of snowdrops.... and a huge collection of *Helleborus orientalis* hybrids among much else. Her love of hellebores took her inevitably to Colwall near Malvern in Worcestershire, England 40 or 50 years ago to buy hellebores from an old friend, Helen Ballard. Subsequently, Helen Ballard's entire hellebore collection was bought by Gisela Schmiemann in Germany. Later still, in 1997, Gisela and Josh collaborated on a wonderful book on the subject of Helen`s hellebores. I grow a few hellebores and bought a copy of the book which featured Josh's magnificent photographs. Years later I met Gisela once or twice over supper at Veronica's. Sadly Gisela died far too young but Josh, her son-in-law, and her daughter, Viola, have continued preparing fabulous books on different groups of plants. Hence here we have ferns. I still don't think I have ever met Josh!

I was attending a private meeting of fern growers at Veronica's house last year and found everyone pouring over a stunning book which was completely new to me. In time, Veronica explained that she had a mock-up of this book, with no text, purely as a sample. The idea apparently was to ask me if I would write the text. My first thought was, why me? I think the reason was Josh wanted it in English. Anyway, via emails, I agreed to write it and here you see the result. I still don't think I had ever met Josh!

To be honest my text is irrelevant compared with the photographic art here displayed. I'm expecting very few people will read my comments. This is not a fern flora it is an art book, superbly produced to the highest standards. In my writing, I have often recounted anecdotes about different species and cultivars, and have only occasionally, or never, given technical details like hardiness zone, full geographic range, height, etc. I have discussed nomenclature where I think it relevant and tried to explain some of the more technical terms as I've gone along. These I have repeated in the 'Technical Preface', but I expect most readers will skip this! By the way I still don't think I've met Josh!

*Adiantum aleuticum* or
*A.pedatum*

Deciduous. Fully hardy in central Europe. Fronds up to 50 cm long. What a beauty! This stunningly beautiful fern is a frequent feature in wooded sites in the northern regions of the USA and Canada. It also occurs in Japan, although the Japanese plant might be a different species. It is now recognised that there are at least three very similar species, maybe more, in the USA and Canada. On the western side of the USA we have *Adiantum aleuticum* while in the east the true *Adiantum pedatum*. The two species are separated on minor technicalities of no great significance to the gardener. Suffice it to say that the pinnae of *A. pedatum* tend to be larger and flatter than those of A.aleuticum. The frond needs to be fully expanded to appreciate the difference. The plant in the pictures here may be *A. pedatum* or *A. aleuticum*. These days the ranges of the two species do not overlap.

Both species are excellent plants in temperate gardens. Fronds can be up to 50 cm long, although usually less. As can be seen in the photograph, the frond is 'hand-shaped', perhaps rather like a bird's foot. This form is rare in garden ferns making *A. pedatum* or *A. aleuticum* definitely worth growing. It is a deciduous species seemingly indifferent to soil acidity. I have it looking splendid on a soil mainly consisting of mushroom compost, which is alkaline, while I have seen it flourishing in acidic soil on Exmoor in North Devon in a high rainfall area. At this latter site it has self-set itself in numerous sites in the garden.

All species of *Adiantum* produce spores in a sorus formed by the underturned distal part of each pinnule. One or two other species have somewhat similar sori, e.g. *Onychium*, but there should not be any risk of confusing *Adiantum* with any of the other more common fern genera (groups of species).

*Adiantum pedatum*
'Imbricatum'

Very similar to the normal species but the pinnules, the smallest leaf segments, overlap the next pinnule along the stem of the frond. Deservedly this form is quite widely grown. Usually its fronds are shorter than the normal species. Given shorter fronds this form can stand slightly windier more exposed sites.

*Adiantum aleuticum*
'Imbricatum'

*Adiantum aleuticum*
'Imbricatum'

For some years this cultivar slipped under my radar, I did not really notice it. It is in fact intermediate between normal *A. aleuticum* and *A. aleuticum var subpumilum*. The var. *subpumilum* is a real gem. Extremely rare in the wild, it is surprisingly fairly common in horticulture. It is essentially a dwarf form of the species. Fronds are usually held almost flat to the ground and they are rarely more than 15 cm long, usually less. It is native to the far west of Canada in British Columbia. Its small stature makes it a very popular plant when available since it will fit into small corners, the front of a border or even in a Wardian case or bottle garden.

There are not too many hardy maidenhair ferns so we need to make good use of these North American species in the garden. The species used as house plants are generally not hardy in Northern Europe. In warmer areas maidenhair ferns can become very common, with a large number of species found in the tropics.

*Adiantum pedatum*
'Miss Sharples'

*Adiantum pedatum*
'Miss Sharples'

Fully hardy in central Europe. This cultivar has been widely distributed over recent years. Although, I believe this to be a straight forward A. pedatum, not a cultivar at all! Reginald Kaye, owner of one of the foremost fern nurseries in the middle of the twentieth century, had this plant on the nursery with the label 'Miss Sharples' in the pot, so he could remember who had given it to him. Subsequently, Dutch nurserymen visiting the nursery harvested spore wherever they could find it. Of course, one of the sources was this plant of Adiantum pedatum labelled 'Miss Sharples', not as a cultivar, but just for the convenience of Reg!

As noted under *Adiantum pedatum/A. aleuticum* on pages 4 and 5, *A. pedatum* differs rather subtly from *A. aleuticum*, but one useful clue to *A. pedatum* is larger pinnules. In 'Miss Sharples' the larger pinnules are usually well developed, the frond on page 10 illustrates this quite well.

*Adiantum venustum*

Almost evergreen. This fern is fully hardy in central Europe. In nature it grows at over 4000 metres altitude in the Himalayan Mountains. Fronds are usually up to 30 cm long. Really no shady garden can afford to be without this beautiful fern. The photographs shown here make further description of the beauty of the individual fronds unnecessary. It is a fern with a creeping rhizome and, once established, will give solid ground cover because the fronds are not produced in an upright crown as is common in so many other ferns. Until recently this species was only rarely available commercially but fortunately there has been a breakthrough in its tissue culture in Texas, USA and it is now appearing in garden centres both in the US and Europe.

*Adiantum venustum*

Is almost evergreen. In autumn and winter it can give charming autumn colours as shown here. In early spring, i.e. March/April, it is a good idea to cut off the old fronds. At this point the plant can be easily cropped back to ground level before new fronds begin to emerge. This is a good idea as the new season's fronds are deep red and beautiful in their own right. While not conspicuous at this stage, the pleasure of watching them emerge is enhanced by the lack of old fronds. Don't worry if late frosts are still a possibility, the 'tender' young croziers of this fern are actually very tough and always seem to be unaffected.

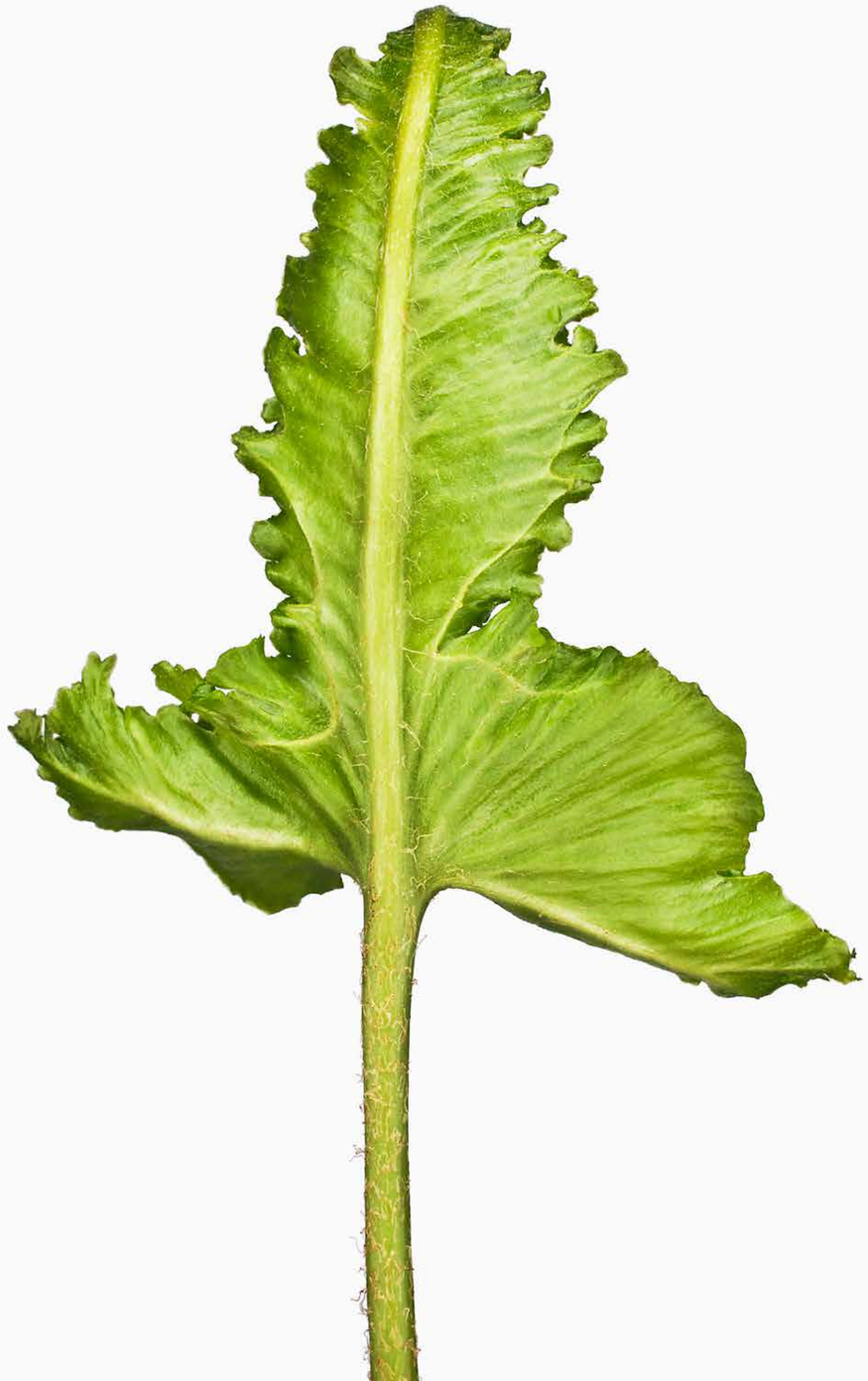
*Arachniodes standishii*

Semi-evergreen. This fern is a welcome addition to the garden. However, I have not succeeded with it! I was amazed to see magnificent specimens in virtually every garden I visited in Germany while it is not common in England. In theory, English winters are less severe than in continental Europe yet I think it is the winter weather which is the problem. Perhaps not the extreme cold but winter damp, or maybe the frequency of late frosts, killing young croziers just as they are beginning to unfurl.

This fern is one of the most common components of the flora of roadsides and woods in Japan. Fronds can grow to 1 metre long and rarely possibly more. Usually evergreen but can be rather untidy before the new fronds appear the next spring. There are about 700 fern species native to Japan but this is one of the most conspicuous out and about in the countryside. The English common name is the Upside Down Fern, reputed to refer to its tendency to produce sori (sporing structures) only towards the base of the frond.

## *Asplenium scolopendrium* 'Sagittatum Marginatum'

A curious cultivar of the common hart's tongue fern. Sagittatum refers to the pair of extensions at the base of the lamina (leaf blade), it might equally be called 'Brachiatum Marginatum'. These extensions are branch-like with a strong midrib. Marginatum refers to the fold of tissue on the underside of the frond running intermittently along the margin of most of the frond. The frond illustrated shows the cultivar characters well but in the garden a mature plant with many fronds in a crown the brachiate nature can be obscured. The fold of tissue shown here occurs quite widely in garden cultivars of *Asplenium scolopendrium*, each would thus be placed in the Marginatum Group of cultivars.





## *Asplenium scolopendrium* 'Kaye's Lacerated'

The correct name of this cultivar is often disputed. When the new rules for nomenclature of garden plants came into force in 1959, this plant was already legally known and the name published as 'Laceratum'. Sadly after 1959 new cultivar names could not use Latin so when it was considered of sufficient merit to associate it with Reginald Kaye by upgrading the name to 'Laceratum Kaye' it was illegal under the rules of nomenclature. If, however, evidence of the name being published as 'Laceratum Kaye' before 1959 could be found, the name would stand, but otherwise it has to be 'Kaye's Lacerated'. Unfortunately this does not have the elegance of the Latin name! There are quite a few cultivars in the Laceratum Group. Kaye's form differs by being somewhat deltate, that is the frond is broadest at the base or triangular, and it is also shorter with the lamina usually only 1 ½ times as long as wide. It first appeared as two chance sporelings on the walls in his nursery. It probably arose as a sporeling from 'Sagittato-projectum Sclater'.

## *Asplenium ruta-muraria*

Wall Rue. Evergreen. This pretty little spleenwort is occasional on old walls even in dry areas of Europe, but in high rainfall regions it becomes very common. Fronds are evergreen and usually only 10 cm long. Strangely, it is much less common on natural rock, often quite unknown in wet regions. In one county in Wales (a very wet country!) it was, as usual, abundant on old walls but completely unknown on natural rock. It was therefore considered a denizen, i.e. a non-native fern only present due to the influence of man. More recently it has been found on native rock so, happily, it can now be considered native! This is a fern to enjoy in the wild, it is virtually impossible to grow under garden conditions. It needs very good drainage.

I was very fortunate to order some limestone for a rockery in my garden and I got a surprise present! In one of the chinks in the rock was a small plant of *A. ruta-muraria*. I've since moved house but I hope the fern is still alive and well!



## *Asplenium trichomanes*

Evergreen. Maidenhair Spleenwort. Like *Asplenium ruta-muraria, A. trichomanes* is very common on old walls in higher rainfall zones. It thrives with its roots running through the cracks in the stone or brickwork. Old mortar also helps it prosper, but it will grow on walls lacking lime. This species is evergreen with fronds usually 10 - 15 cm long although exceptionally frond length can reach 30 cm. Unlike *A. ruta-muraria, A. trichomanes* is a splendid garden plant. It can be grown in a well-drained bed of neutral to limey soil. It is also excellent featured in stone troughs. There are several subspecies and botanical varieties within the species. Some are very beautiful, for example subsp. *pachyrachis* 'Trogyense', while others cannot be separated from the standard plant unless you count the chromosomes. Not an issue likely to concern the gardener!!

*Asplenium scolopendrium*

Hart`s tongue fern. Evergreen. Some authorities prefer the old Latin name of *Phyllitis scolopendrium*. One of the most common ferns in temperate parts of Europe, frequent on limestone rocks, walls and soils. It does not occur in alpine situations or in the far north of Europe. It is less common towards the south of Europe. An almost identical fern also occurs very sparingly in North America from Canada to Mexico. It is also called *Asplenium scolopendrium* but differs by having four sets of chromosomes as opposed to two sets in the European species! Although the American species has more chromosomes, the European species tends to be a larger plant with fronds usually 30 to 60 cm long or up to 1 metre long in very favourable sites.

Hart's tongue fern is great in a fern garden or fern corner. It is very freely available, either from the wild or through the nursery trade, it is evergreen, and the simple strap shaped frond provides wonderful contrast against the normal filigree form of other ferns or flowering plants. Ferns are often considered to be plants for acid soils but like many other species (e.g. *Polystichum setiferum, Polypodium australe (P. cambricum)* the hart's tongue actually prefers lime.

The spores are produced in double-sided linear sori. In this specimen the sori are clearly visible but they are immature. Later in the season the indusium (the flap protecting the sporangia), will peel back and the spore (in the sporangia) will turn brown as they ripen. At this stage, the indusia are very readily visible.

Like almost all ferns, the hart's tongue leaves unroll as they grow. Initially they are quite scaly but with maturity the scales are shed.

*Asplenium scolopendrium*
'Capitatum', synonym
'Cristatum'



*Asplenium scolopendrium*
'Capitatum', synonym
'Cristatum'

Crested hart's tongue. Cresting is one of the most common forms of variation found in hart's tongues. Having said that it is possible to look carefully at thousands of plants in the wild and see no cresting at all, maybe if lucky the odd frond may split at the tip but such minor variants are not gathered by any fern growers these days. Curiously cresting seems to occur slightly more frequently in colonies struggling on old brickwork. Strictly speaking this cultivar is a form of Capitatum. That is, the frond tip only is crested but, as there is nowhere else that could be crested, the term Cristatum is more widely used. Cristatum usually means crested at the tips of pinnae and tips of fronds.

To be strictly accurate, because the crests here are on branches of the main axis this cultivar can be called 'Ramo-cristatum', but it is not a name applied very often these days.

Following page:

*Asplenium scolopendrium*
'Cristatum'
and 'Brachiatum'

The first frond from the left, plus the second and fourth are all varying forms of Cristatum, all in autumn or winter foliage. The third frond from the left is a brachiate form with the lamina branching at its base.

*Asplenium scolopendrium* 'Cristatum' and 'Brachiatum'

## *Asplenium scolopendrium* 'Crispum'

Crisped hart's tongue. One of the most beautiful native European fern cultivars. There is strange over-production of the leafy part of the frond while the rachis (leaf stem) remains the usual length. The extra tissue has no choice but to repeatedly fold back on itself. The end result is beautiful goffering, not unlike neckwear common in the sixteenth century in Europe. Sadly it is extremely rare in the wild. Over 50 years looking out for Crispums I have only ever seen two, and I have looked at thousands of plants, maybe hundreds of thousands! Where they occur just occasionally more than one Crispum will be found, so if you find one keep looking in the same vicinity. Virtually every plant found differs slightly from all others, as a consequence each is named after the finder, and within a generation the finder's name is forgotten unless the find is something really special. The fronds shown here may be from 'Crispum Bolton's Nobile'. A particularly broad form. One of the best forms found in the English Lake District around 1900.

Almost all true Crispums are sterile. No spores are produced at all. Propagation is however, possible by separating the frond bases from the caudex and keeping them humid on a sandy or gritty compost. In about 3 months in summer conditions, small plantlets should be seen. These can be planted out a year or two later.

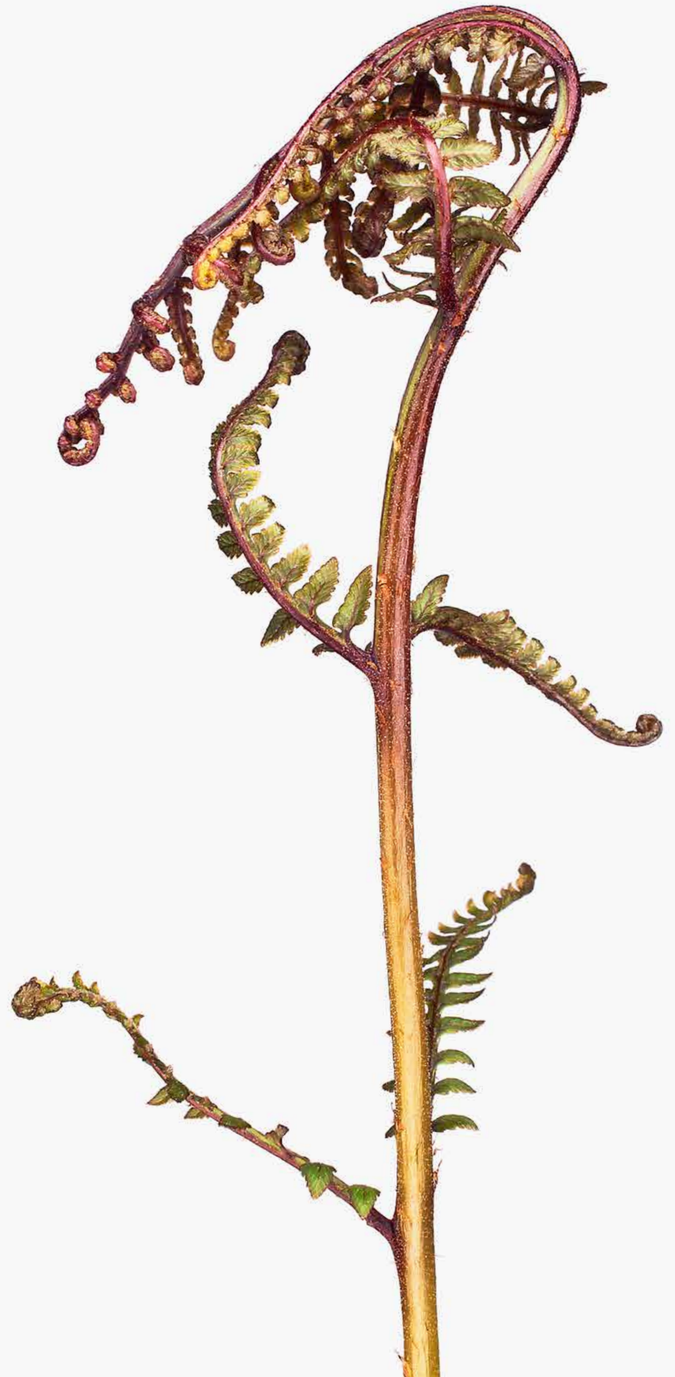


*Asplenium scolopendrium* 'Crispum'

Even in very young croziers, the crispum character can be clearly seen.

*Athyrium angustatum*
*f. rubellum* 'Lady in Red'





*Athyrium angustatum*
*f. rubellum* 'Lady in Red'

Deciduous. Like *A. filix-femina* in Europe, this species of North American Lady Fern tends to produce progeny with a red stem. 'Lady in Red' is a particularly good selection. In some examples the red colour can be even stronger than shown in the example here. If anything *A. angustatum* is a more graceful species than *A. filix-femina*. Typically it reaches 50 - 70 cm. Like the European Lady fern this species requires a moist site in the garden.

Lady Fern. Deciduous. One of the most common ferns in Europe, it is frequent in damp shady places, mainly in woods and on the banks of streams. It is a beautifully delicate almost feminine species, hence the name ´Lady Fern´. It is not related to the Male Fern *(Dryopteris filix-mas)*, nor does it breed with it, but both are common in similar sites. The Lady Fern is elegant and the Male Fern, by comparison, rather coarse in appearance. In perfect conditions, it can reach up to 2 metres tall but is usually much shorter. The fronds flush quite early in spring and if frost damage does not occur it can look rather beautiful for 3 or 4 months but by late summer it tends to look rather tired, and the fronds die down completely in autumn. This unfurling frond shows the stipe and rachis can be reddish but the green form is by far the more common.





Lady Fern. Here you can see the detail of the frond. The first side branch is called a pinna, each side branch from the pinna is called a pinnule. Here the pinnules are tending to be further divided and each of these divisions are called pinnulets. This photograph is of the underside of the frond, if you look carefully you might make out a pale structure. This is the indusium, said to be J-shaped, which protects the developing sporangia and spores. Quite frequently the name of the Lady Fern is misspelt as ´felix´ instead of ´filix´. This is quite a significant mistake as felix is a cat, while filix is a fern!

*Athyrium filix-femina*

Lady Fern. A sad picture. Autumn is upon us. The Lady Fern is shutting down until next spring.



*Athyrium filix-femina*
'Plumosum'

Despite the sad autumn colours in this frond you can still make out the beauty of the group of cultivars we class as Plumosum. The pinnules and pinnulets referred to on page 33 are here considerably longer and broader giving the frond a beautiful foliose look. Some plumose forms are quite readily available as they can be propagated from spores but others are sterile or do not breed true.

*Athyrium filix-femina*
Cruciatum Group

*Athyrium filix-femina*
Cruciatum Group

Deciduous, usually only about 50 cm tall. In 1861 an extraordinary cultivar of Lady Fern was found by a medical student named Cosh in Scotland. His plant was percruciate. That is, the pinnae and the pinnules formed crosses. The crossing effect was achieved by each pinna and each pinnule branching at their point of attachment to the rachis and pinna midrib respectively. The plant caused a sensation and was eventually named after Queen Victoria as 'Victoriae'. It is fertile but unfortunately the spore raised progeny are virtually never as good as the original. Some are, however, still very good plants and the fronds shown on these two pages are from a spore raised progeny, probably many, many generations removed from the original. Here the pinnae have a tendency to fork into three or four lobes near the point of attachment to the main rachis (leaf stem), perhaps this is a hint of ancestry from 'Fieldiae'? The pinnules are not cruciate. The frond is much narrower than the normal species, it is thus angustate (narrow). There is also a broad terminal crest; hence it is a Grandiceps form. In fact, the range of form produced from a single spore sowing of any member of the Cruciatum Group seems to be infinite. Naming individual plants is not therefore normal. They are simply referred to as the Cruciatum Group.

*Athyrium filix-femina*
Grandiceps Group

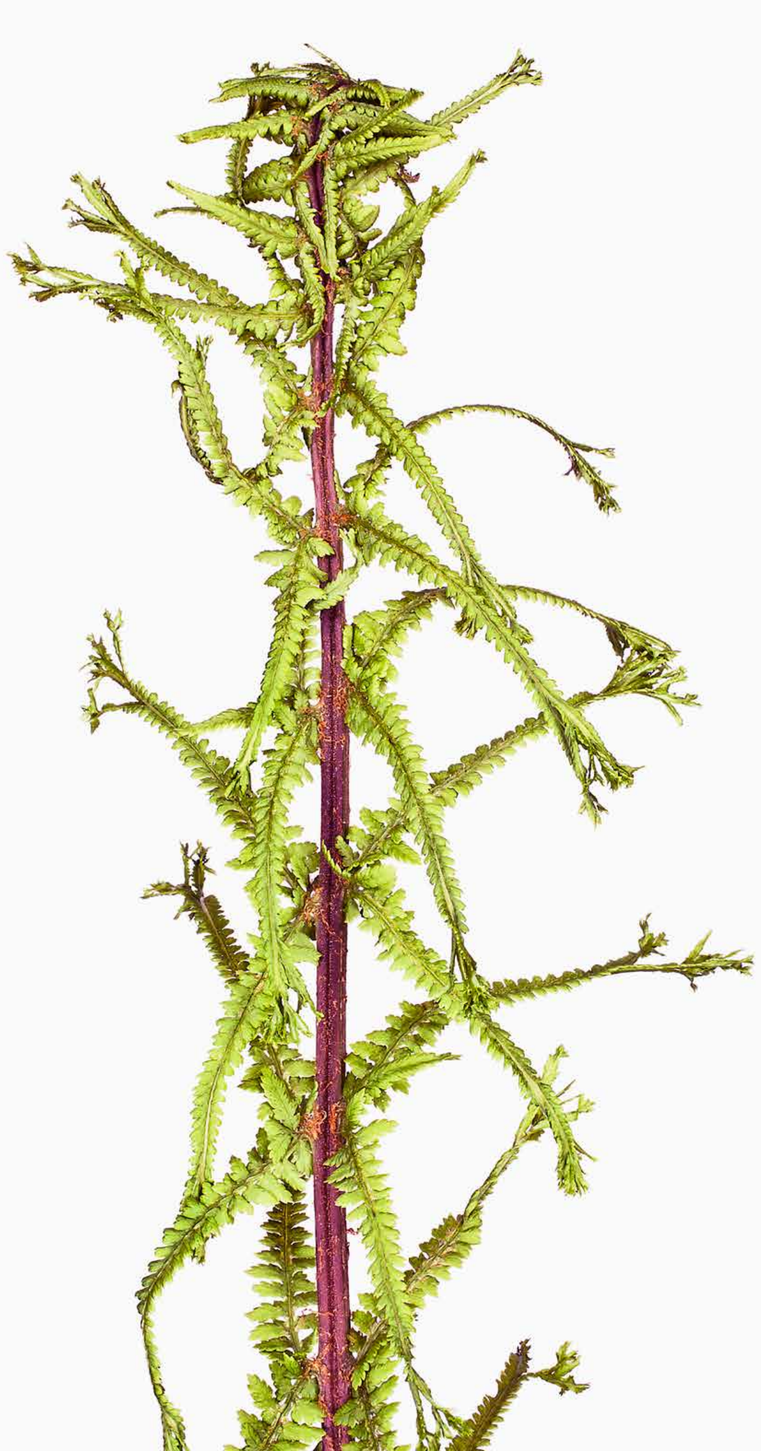
Grandiceps means ´big head´, and all cultivars in this group certainly have big heads. Fronds are usually fairly short, perhaps 30 cm long. The pinnae are often malformed, erratically crested, or even missing, perhaps most of the plant´s energy goes into the huge terminal crest. The rachis often noticeably thickens at the point where the branching is concentrated. This is clearly visible here. A well grown example of this type of cultivar can be quite extraordinary; it can look like a large ball of parsley. It is quite an eye-catcher in a fern garden.



*Athyrium filix-femina*
'Rotstiel Cristatum'

Rotstiel is the red stemmed (red rachis) form of Lady Fern, not uncommon in the wild it is nevertheless a useful addition to the garden. As with the green stemmed (green rachised) type, most cultivars at some stage produce red stemmed forms. The crozier is beautiful while the opened frond is a fine example of lacy delicacy so frequent in garden ferns.

*Athyrium filix-femina*
'Dre`s Dagger'



*Athyrium filix-femina*
'Dre`s Dagger'

As far as I know this cultivar normally has a red stem (rachis). It is probably progeny, many generations removed, of *A. filix-femina* 'Victoriae' (see under Cruciatum Group). It is percruciate, i.e. the pinnae form a cross and so do some of the pinnules, particularly those at the base of the pinnae. This is a fairly recent introduction. So far it seems to be quite short with fronds rarely exceeding 50 cm, unlike 'Victoriae' which typically reaches 90 or 100 cm. I don´t know who Dre is, nor do I know how this resembles a dagger. I suspect it originated from America.

*Athyrium filix-femina*
Fieldiae type

*Athyrium filix-femina*
'Fieldiae'

The appearance of true'Fieldiae' is open to some question. In principle it is a more foliose (leafy) form of 'Victoriae'. The frond should be narrow and the cruciations should apparently continue to the tip of the frond. The frond should not terminate in a crest. All the forms are strong growing plants, with fronds up to 120 cm long, but they lack the delicacy of true 'Victoriae'. 'Fieldiae' has the distinction of being the first cruciate cultivar discovered. It pipped 'Victoriae' by one year! The fronds shown here are extremely close to genuine 'Fieldiae'. They are uncrested, the pinnae are leafy, ie. not reduced in width and they are divided into two, or sometimes three, at the point where the pinna meets the rachis. I doubt these fronds have come from the original clone of 'Fieldiae' but I think they are close enough to share that name.

*Athyrium filix-femina*
'Plumosum Cristatum Coke'

*Athyrium filix-femina*
'Plumosum Cristatum Coke'

I am delighted to see these pictures as evidence that this cultivar is still in cultivation. I was shown it by Philip Coke in his garden in Gloucestershire. I was immediately struck by its beauty and suggested the name. Eventually, persuaded by Jimmy Dyce and me, Philip Coke published this name along with others for ferns he had raised, in the Pteridologist (1986). Unfortunately at that time we were unaware of changes in the Code for naming new cultivars and sadly this name is illegal under the revised code. Its legal name could be (Plumosum Group) 'Philip Coke' but that name could apply to other cultivars raised by Philip, so the jury is out until a legal name is devised or the Code revises its rules - the second is my preferred option! Philip did not buy ferns, he raised them in huge quantity, so there is little doubt this is not an old cultivar refound. 'Plumosum Cristatum Coke' is a real beauty. Red stem, almost tripinnate fronds, beautifully lacey and neatly crested to boot! It is a strong grower forming multiple crowns, with fronds about 60cm. Unfortunately it does not come true from spores. I'm delighted that these photographs are evidence this elegant cultivar is still in cultivation.

*Athyrium filix-femina*
'Rotstiel Cristatum'



*Athyrium filix-femina*
'Rotstiel Cristatum'

Another form of cresting with the red rachis. Here the frond is tending towards plumosum, but it is not in the same class as 'Plumosum Cristatum Coke' on page 45.

*Athyrium filix-femina*
'Pseudovictoriae'

I am not familiar with this cultivar. I fear it might be a name which could be applied to a group of cultivars in which case this fern could me more accurately called Pseudovictoriae Group. It is almost certainly another descendant of 'Victoriae' but this is a handsome selection; the pinnules are neatly flabbelate, that is like miniature fans. The cruciate ancestry is still discernible. It is a nice thing, equally at home in the Cruciate Group.

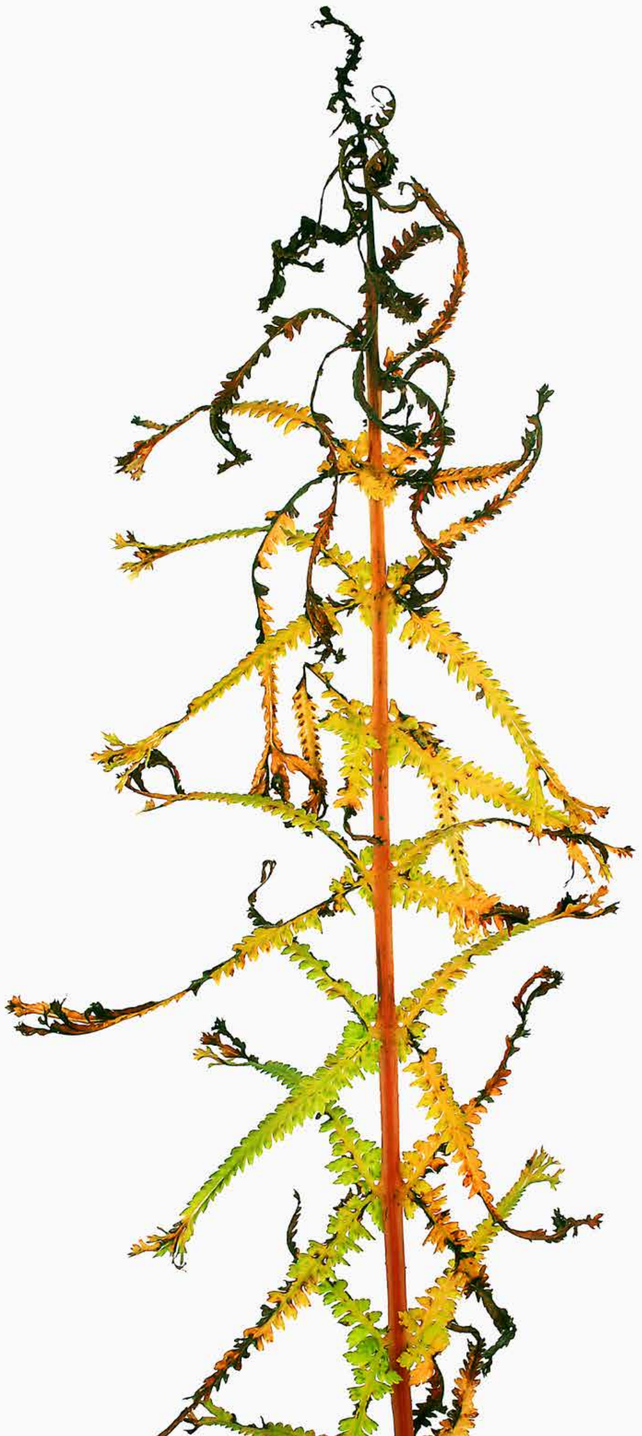


*Athyrium filix-femina*
'Pseudovictoriae'

Here we see the red stemmed form. Note the delightful pattern created by the pinnae rolled in the heart of the crozier.

*Athyrium filix-femina*
'Pseudovictoriae'

A sad reminder of the inevitability of autumn!





*Athyrium filix-femina*
Grandiceps Group

In autumn, a different clone from that shown on page 38. The pinnae are regularly reducing in size towards the frond apex.

*Athyrium filix-femina*
Depauperatum Group

Ferns considered to be depauperate, in other words irregular with bits missing, are usually not worth growing. However, some do have an appeal and this selection has an airy appearance in the garden. The pinnules are sometimes cruciate, i.e. forking near the pinna midrib, but most are simply irregular, hence depauperatum.



*Athyrium filix-femina*
Grandiceps Group

Yet another selection along the same lines as the illustrations on pages 38, 39 and 51. In fact this frond could be from the same plant as the frond on page 38. The illustration shown on page 55 shows the complexity of the structure in the crozier.

*Athyrium filix-femina*
Cristatum Group

The rachis is slightly red in this example but it is not a key character. It is a pleasantly crested form of Lady Fern. Such plants are very common in cultivation with sporeling plants frequently self-setting in established collections.



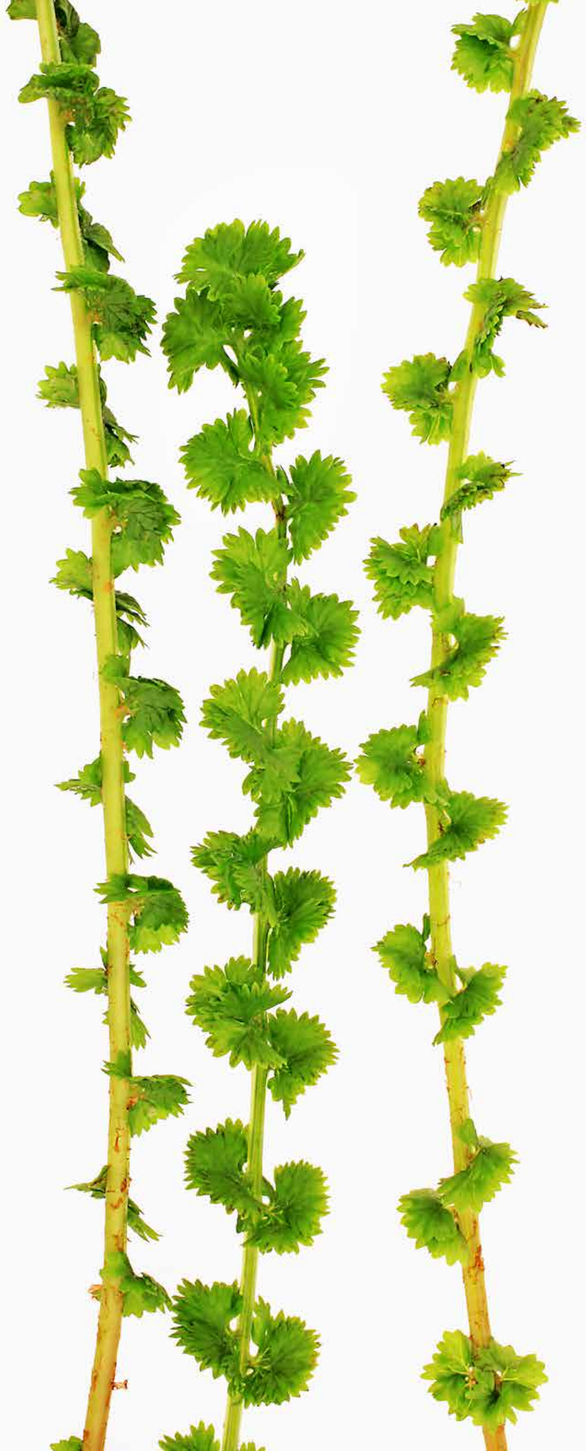
*Athyrium filix-femina*
Cristatum Group

This close-up of the unfurling crozier shows the extraordinary detail in the tightly compacted developing tissue. This plant may turn out to be a Grandiceps form when the crozier has fully expanded, it looks like there is quite a big crest raring to go!

*Athyrium filix-femina*
'Frizelliae Ramosum'

One of the 'imperfect' forms of Tatting fern alluded to by my comments about the photograph on page 57. Imperfect it may be to the purist but it is still a very attractive plant. Under normal garden conditions it will grow slightly taller than the base form, with fronds perhaps 25 cm long.





*Athyrium filix-femina*
'Frizelliae'

Tatting fern. This is one of the classic cultivars. Well known in cultivation since soon after its discovery in 1857 in Wicklow, Ireland. The pinnae are reduced to little green fans. In the true cultivar the fronds are unbranched and quite short, perhaps 20 cm long, small for a Lady Fern. It comes fairly true from spores but some offspring will almost certainly be imperfect with branching, cresting and expansion of the fan-shaped pinnae into erratically produced normal pinnae. Because of its small size and much reduced leaf surface, water loss in dry conditions is not as severe as with normal forms of the Lady Fern. This enables it to be used in a wider range of habitats, and it is even suitable for shady alpine troughs!

Cultivar names ending '-iae' are named after ladies. Examples are Frizelliae, Fieldiae, Thompsoniae, Oakleyae, Vernoniae, Victoriae, etc.

*Athyrium niponicum*
'Pictum'

Deciduous. When first introduced into western gardens this was quite a sensation. A fern with striking red and white colours conspicuous on its leaves, and yes, some parts are green too! In this picture during early development of the frond the colour is predominantly red. On maturity this frond will be of a similar colour to the crested specimen on page 59, without the crests. Selected colour forms have been developed, see pages 60 and 61, but they do not always vary much from the original. Unfortunately cultural conditions can affect the colours. Keep moist to see the best effects. Fronds usually about 30 cm long.



*Athyrium niponicum*
'Pictum'

A fully expanded crested frond is shown. This fern is more commonly uncrested but several crested forms have arisen in spore sowings. One of the best known is 'Apple Court'. Generally this is a tidy form, not too big and fairly compact. Fronds are normally up to 30 cm long. An attractive plant for a shady border.

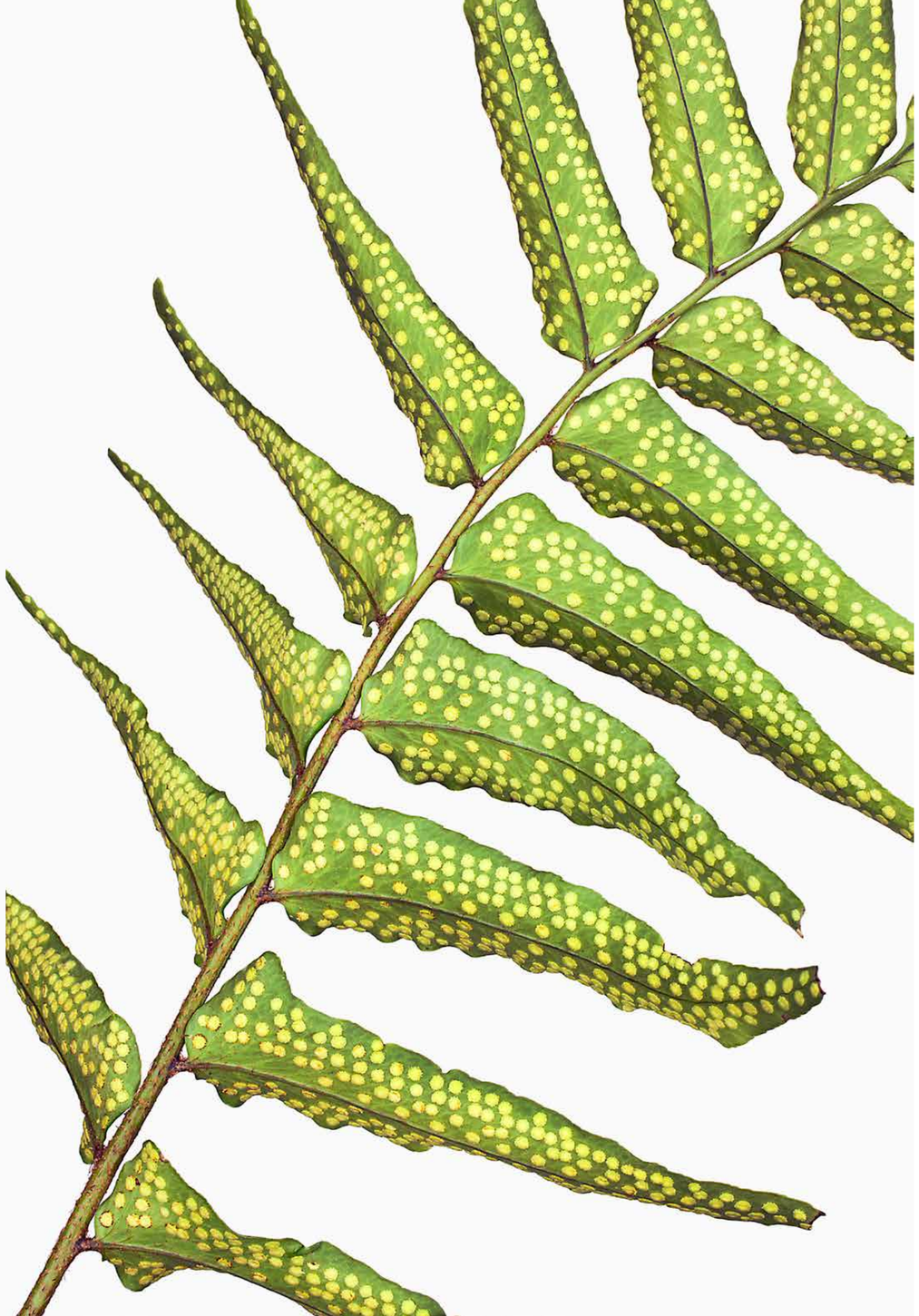
*Athyrium niponicum*
'Red Lace'

*Athyrium niponicum*
'Red Lace'

Several colour selections of *A. niponicum* have been micro-propagated. Progeny produced by the normal sexual process (spores) would be very variable, probably colourful but not necessarily like the chosen parent. In these two pictures we have the under and upper surface of the same frond. The colour is remarkably similar on both but close examination does show differences. Both are spectacular but not very different from the crested form of *A. niponicum* shown on page 59.

*Blechnum penna-marina*

Evergreen. A southern hemisphere fern native to New Zealand, Australia and South America. Perfectly hardy in temperate Western Europe. There are several forms recognised by botanists but suffice it to say there are large leafy forms with 25 cm fronds as shown here, and also a smaller form, 15-25 cm tall. If given neutral to acid soil both forms spread quite rapidly by their creeping rhizome. Both forms flush with a charming orangey-red colour as they unfurl in spring - shown by all the fronds photographed here. The sporing fronds are different from the vegetative fronds. The frond segments (pinnae) are much reduced in width and wider spaced on the rachis (frond stem). The spores are produced along the margins on the undersides of the pinnae. Sporing fronds are held erect on the plant and quite a bit longer than the sterile ones. They thus stand out and create a very beautiful effect in spring. In a small garden with ideal conditions for B. penna-marina it can become a bit invasive. If this happens it can easily be peeled off the surface from areas where it is unwelcome. Chunks of rhizomes given to friends are usually welcomed warmly! There is also a delightful crested form to look out for.



*Cyrtomium fortunei*

*Cyrtomium* is a genus of several very similar evergreen species from Eastern Asia, mainly Japan. It is closely related to *Polystichum* and some authors lump them together. The most popular species is *C. fortunei*. It is very easy to grow and one of the exotic species which sometimes self-sets in UK gardens. I particularly like it in a landscaping situation as the simple pinnae form a pleasing textural contrast with the more standard filigree types of ferns. In favourable conditions this can be 60 - 70 cm tall. Quite a striking plant. Unfortunately, in my opinion, the fronds are a matt green, that is they are not very shiny and do not reflect light as much as some other less filigree species, eg. *Asplenium scolopendrium*, the harts tongue fern. There is a variety of *C. fortunei* called 'Clivicola', it differs from the species by having wavy-edged pinna margins. Other species of *Cyrtomium* less widely grown than *C. fortunei* are often more attractive. For example *C. caryotideum* and *C. macrophyllum*. Both are a brighter yellowy green and their shiny surfaces reflect light much more strongly. They have larger pinnae.

*Cystopteris bulbifera*

This is a quite remarkable deciduous species. It produces chunky bulbils at random on veins on the underside of the frond. In this photograph three bulbils are clearly visible. At the slightest touch these can fall off and produce a new plant very quickly on the spot. While this is a fascinating species, its tendency to produce a lot of offspring can be a bit daunting! *Cystopteris* is characterised by the lopsided cup-shape indusium protecting the sporangia and spores. These can be very clearly seen here, in all cases the cups are pointing away from the base of the pinna. *C. bulbifera* is native to North America where it has hybridised with other *Cystopteris* species to produce a series of new species, one of the most common is *Cystopteris tennesseensis*, this too produces bulbils quite freely. Both species can reproduce sexually as evidenced by the plentiful supply of spores.



*Cystopteris bulbifera*

This frond is atypically well developed at the base but it shows well the reddish stipe and rachis frequent with this species, particularly on young fronds.



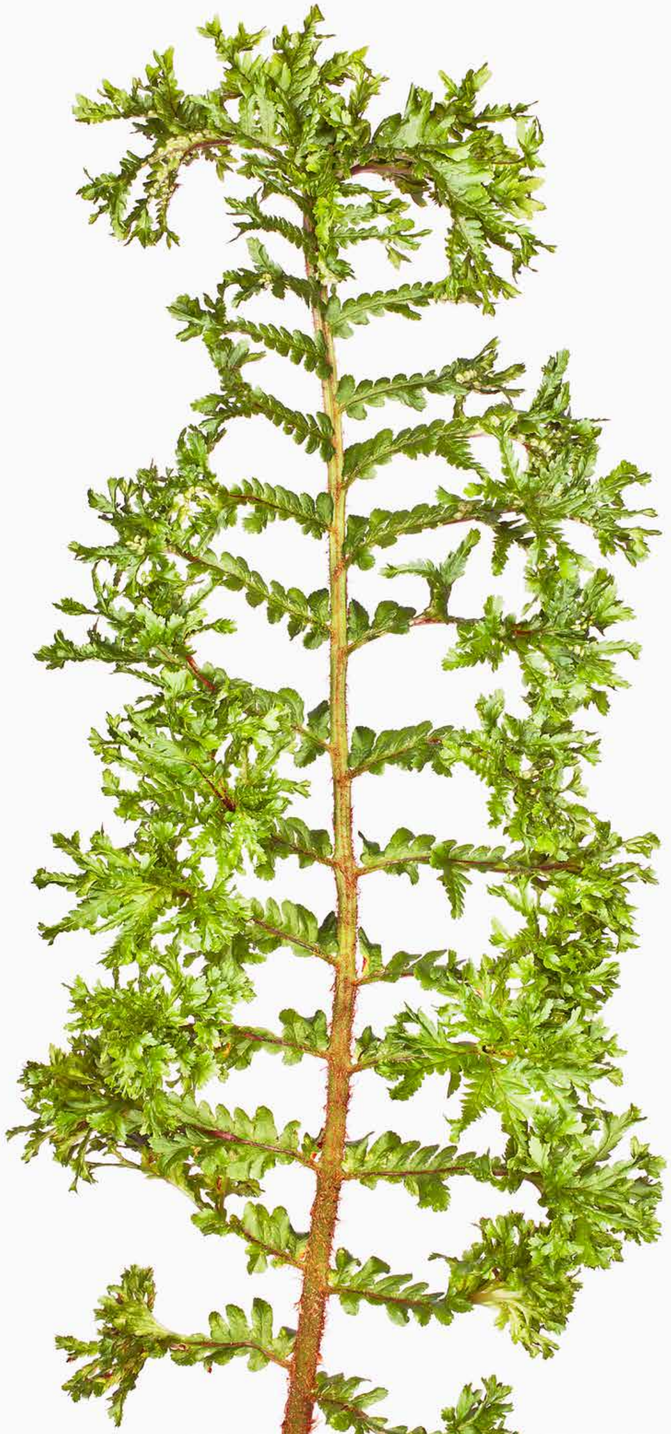
Alpine Bladder Fern. Deciduous, sometimes called *C. regia* or *C. fragilis var. regia*, but *C. alpina* seems to be the preferred name today. It is native to and quite common on limestone mountains in central Europe. It rarely grows below 1500m altitude in nature but is perfectly happy at much lower altitudes as a garden plant. It is deciduous with new fronds appearing soon after the snow recedes in spring. It is a beautiful fresh green. This species was recorded over 100 years ago in Britain but appears to be extinct now although intermediate forms between this and the very common *C. fragilis* do rarely occur. The existence of these intermediate forms gives some weight to the use of the name *C. fragilis* var. On a recent British Pteridological Society excursion into the French Alps *C. alpina* was recorded, but the plants were not as finely dissected as those shown here. This form perfectly exemplifies the finely dissected nature of this beautiful species. Common Brittle Bladder Fern, *C. fragilis*, has recently been the centre of quite a botanical sensation! It has been proven to hybridise with *Gymnocarpium robertianum*, obviously in a completely different genus. The hybrid was discovered in the foothills of the Pyrenees by a Dutch grower, Harry Roskam. In the animal world this would perhaps be similar to finding a hybrid between a human being and an ape! Perish the thought!

*Dryopteris filix-mas*
Cristata Group

*Dryopteris filix-mas*
Cristata Group

*Dryopteris filix-mas* is probably the most common fern in nature throughout Europe, it is, however, rather rare in North America. Only *Pteridium aquilinum*, Bracken, is possibly more common! It is deciduous dying down soon after the first frosts. It often reaches heights of 1 metre but can exceed that in really favourable sites. Crested forms of *Dryopteris filix-mas* are quite numerous. Many have been named in the past but today their true names are often blurred. The problem arises because spore sowings of crested forms do not necessarily yield progeny identical to the parent. This results in a huge number of slightly different forms, I therefore prefer to lump the majority of plants in cultivation under the group name Cristata. The illustrations shown here are of a type similar to 'Cristata Jackson' so for convenience there is some value in using that name. At least it alludes to a certain type of cresting. Despite these issues this is an excellent garden fern. It grows well in almost any situation, with the cresting giving it an aura much more interesting than the straight species of *Dryopteris filix-mas*. In fact the normal species is often considered a garden weed popping up where not wanted! I hope cultivars of the crested type never receive such harsh treatment!

*Dryopteris filix-mas*
Grandiceps Group



*Dryopteris filix-mas*
Grandiceps Group

I have placed this fern as a cultivar of *D. filix-mas*, although it might be a form of *Dryopteris affinis*. *D. affinis* differs in several ways from *D. filix-mas*. The most notable difference is the presence of a dark 'spot', about 1 mm across at the base of the pinna. In many collections this fern is referred to as 'Grandiceps Askew' but I have never seen the darkened area in plants shown me as 'Grandiceps Askew'. The plant first named as 'Grandiceps Askew' grew proudly at the front of the house of nurseryman Askew. When I saw it circa 1970 it did not excite me as a fern collector, so I have never grown it, but I could see it had good value as a garden plant. Plants in cultivation are no doubt progeny of this plant.

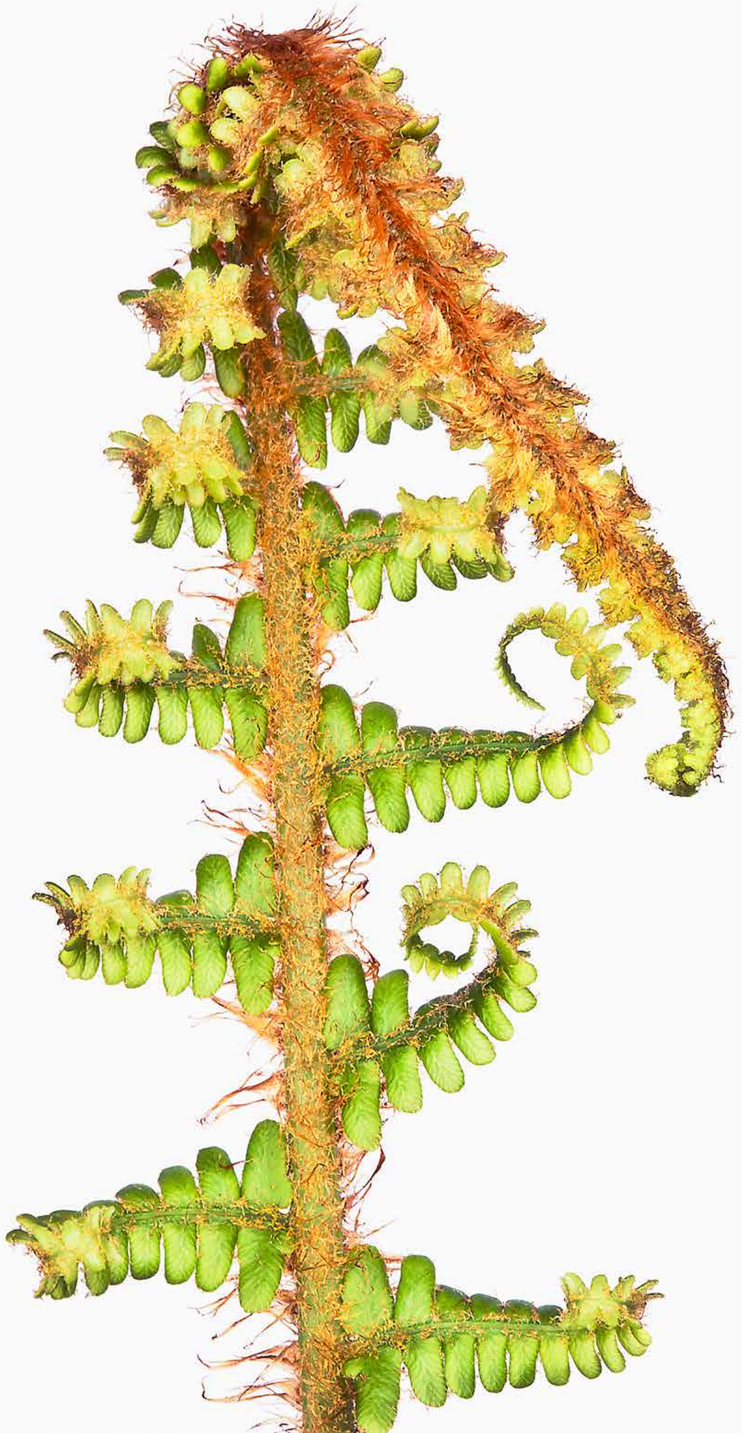
As explained under *Dryopteris filix-mas* Cristata Group, spore progeny do not always look the same as the parent, so a range of forms rejoice in this name! The plant shown here does have a big head, thus just about qualifying as a Grandiceps, but the head is relatively small compared with other forms of Grandiceps, eg. *D. filix-mas* 'Grandiceps Wills'. Like most other crested forms of *D. filix-mas* this fern will get one metre plus tall.

Most easily separated from *D. filix-mas* by the darkened spot at the base of each pinna as explained on pages 72-73. Other differences are the rachis (main leaf stem) is covered with brown scales - in *D. filix-mas* the scales are much paler. The pinnae segments (pinnules) are almost squared off, whereas in D. filix-mas they are rounded at their tips. The sides of the pinnules are not conspicuously serrated, in *D. filix-mas* they are usually toothed. Finally unlike *D. filix-mas*, *D. affinis* does not die down with first frost; it is almost evergreen, although fronds do get broken by winter winds and snow, spoiling its architectural form.

While beyond the scope of this book it is worth mentioning that there are several subspecies and varieties of *D. affinis*. The differences between them are difficult to distinguish for keen botanists and well-nigh impossible for the average gardener! See also pages 84 and 85.

The frond illustrated here shows the simple beauty of a single frond, the more scaly rachis is obvious (hence one of its common names in English - Scaly Male Fern), also the much neater pinnules are obvious. Sadly the dark patch is not obvious here, it is better seen from the underside of the frond.

All subspecies and cultivars of *D. affinis* are apogamous, this means they do not reproduce in a fully sexual way and virtually all progeny are identical to the parent. This is the reverse of the situation with *D. filix-mas*.





In spring, when the new fronds unfurl, *D. affinis* is at its most beautiful state. This photograph well illustrates why it is sometimes called the Golden scale male fern. Unfortunately the brilliant golden colour only lasts for three or four weeks but to see a hillside covered with this fern in spring is a delight to behold. It is a particular feature of acid soils in upland areas, many hillsides in the English Lake District are particularly good sites. The colour tends to be stronger in sunny spots. It is not so dramatically beautiful in deep shade. In the frond illustrated here the darkened zone at the base of each pinna is just discernible. It would be more easily seen on the underside of the frond and when the scales are scraped off. This frond is showing split ends to its pinnae, small crests will therefore develop with maturity.

## *Dryopteris affinis*

Variably evergreen, but most are untidy by the following spring. In most ferns the way the fronds unroll as they mature is called circinate vernation. *Dryopteris affinis* is no exception as can be seen in this photograph, however, towards the end of the unrolling process the final section of frond is released as a straight section, as shown on page 75. This is quite typical and most commonly seen in *D. filix-mas* and *D. affinis*.

## *Dryopteris affinis* 'Crispa Gracilis'

Happily this fascinating dwarf fern is quite common in cultivation. It rarely exceeds 25 cm in height. The rachis is reduced in length causing the pinnae to overlap strongly. It is also very scaly. The name of this fern is often given incorrectly by nurseries as 'Crispa Cristata' or 'Congesta'. 'Crispa Congesta' would be a good name except 'Crispa Gracilis' has been in use for well over 100 years! Unlike most other cultivars of *D. affinis* the small stature allows it to be used in many situations where space is limited. Due to its size it lasts longer through the winter as an attractive plant because the fronds are tough and normally do not get badly damaged by wind.

## *Dryopteris affinis*

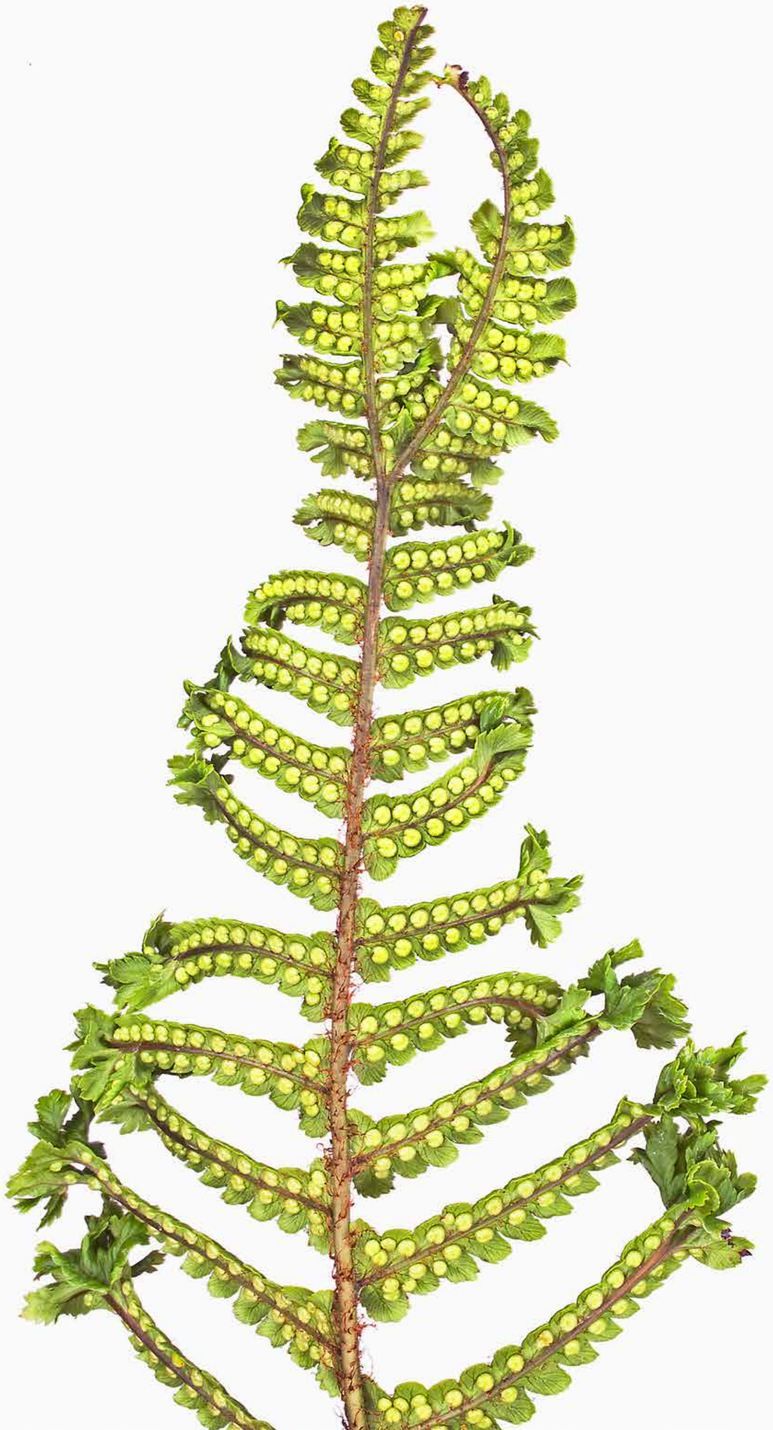
As mentioned on page 74 there are several subspecies of *D. affinis*. It would be dangerous to attempt to assign this to a particular subspecies, but this photograph beautifully showcases the rich golden scales at the beginning of the season on young fronds.



## *Dryopteris affinis* 'Crispa'

Perhaps the same as 'Crispa Barnes'. This is actually not really a cultivar, but more properly another subspecies - *D. affinis* subspecies cambrensis. It is widely distributed in the cool mountainous areas of Central and North Western Europe. The tips of the pinnae are slightly crisped upwards giving the frond a more papery appearance and scales are more sparse on the rachis. Widely available from nurseries and garden centres, it is best described as somewhere intermediate between *D. filix-mas* and *D. affinis*.

*Dryopteris affinis*
'Cristata'

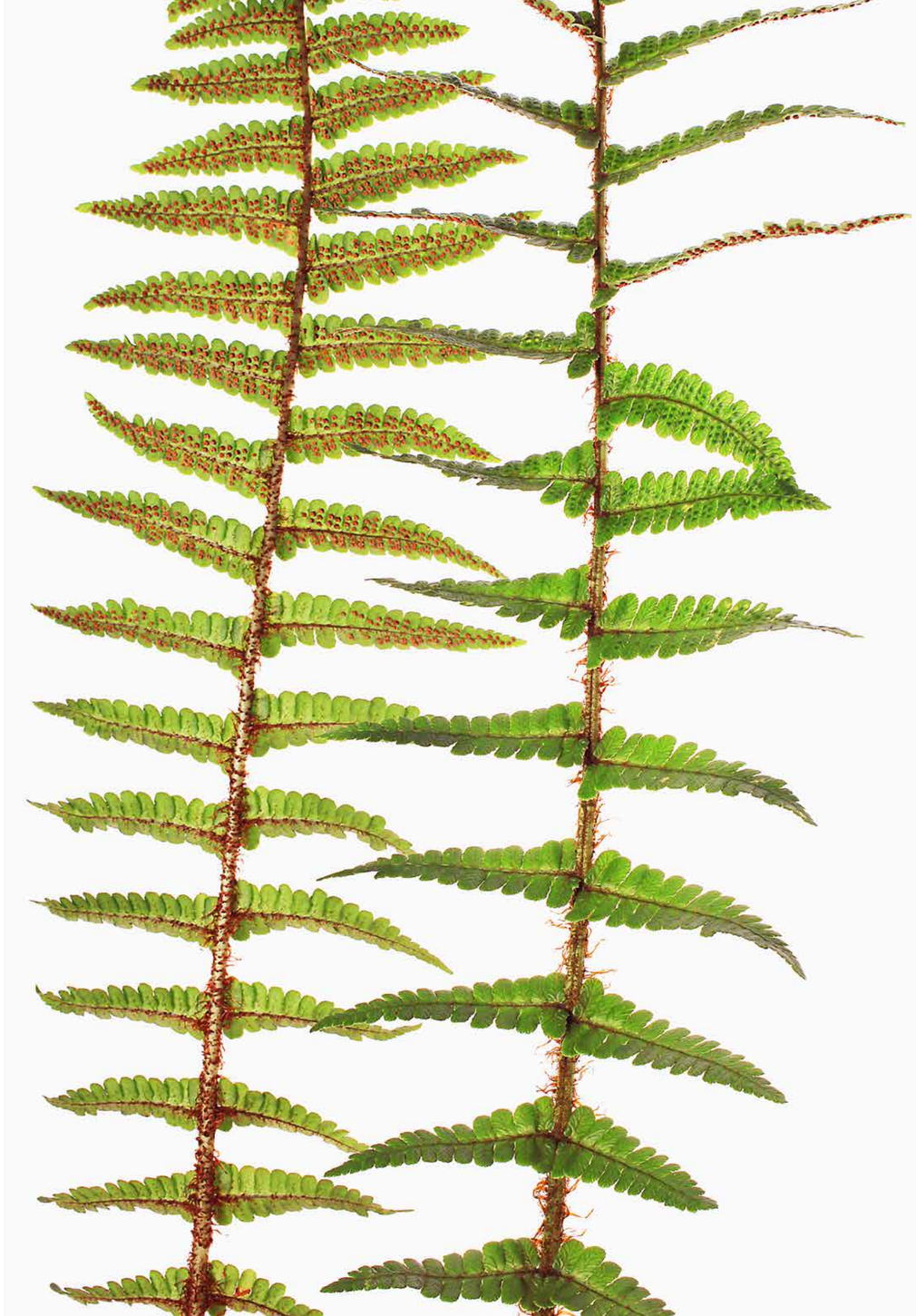


*Dryopteris affinis*
'Cristata'

One of the best garden ferns. Often called the king of the male ferns, hence the name often given as 'Cristata the King'. Correctly the name is simply 'Cristata' although in certain circles it is called 'Elvis'! This magnificent fern was found initially in Cornwall in South West England towards the end of the nineteenth century, and in one or two other places since. The pinnae are neatly crested and there is another neat crest at the tip of the frond. In time, a massive plant of several dozen crowns can develop making this a real statement plant with hundreds of fronds often over 90 cm long. It is currently recognised as a cultivar of *D. affinis* subspecies *affinis*.

*Dryopteris affinis*
'Pinderi'

This is a narrow form of *D. affinis*, otherwise it differs little from the normal species. It is not crested. It was found in 1855 in the English Lake District by the Rev. Pinder. As far as I know it was only found on that one occasion. This cultivar is one of three similar found within the two species, *D. filix-mas* and *D. affinis*. In *D. filix-mas* there is a tall slim form called 'Barnesii' which can reach 1.2 metres high, while the hybrid between the two species can also occur as a narrowed form, in this case called 'Stablerae'. This too can easily reach heights of 1.2 metres.





*Dryopteris affinis*
'Resendiana'

Not a great beauty, and rarely grown but Christopher Fraser-Jenkins, the great authority on all things *Dryopteris*, suggests this might be the source plant for some of the more popular cultivars of *D. affinis*. Christopher gave me a plant which got lost during house moving but I was very pleased to be given a plant by Herr Forster from his garden near Dresden in Germany. In effect this is a depauperate form (bits missing) but it does have a regularity about it as can be seen in the photograph.

*Dryopteris affinis*
subspecies

*Dryopteris affinis*
subspecies

Another example of the great beauty of unfurling fronds by one of the subspecies of *D. affinis*. This looks like it might be a subspecies of *cambrensis* or synonym subspecies *stilluppensis*. The frond on page 97 is showing the slightly upturned pinnules giving the pinna a slightly boat-shaped form.

*Dryopteris cycadina*

Semi-evergreen. A beautiful fern from Eastern Asia. It is one of a group of very similar species. A study of plants in cultivation might reveal more than one species in collections. Certainly botanising in Japan one can very quickly become confused by the similarity between species! An easy fern to grow, it is one for any collection. The stunning black scaled rachis is a wonderful feature. It is sometimes called *D. atrata* on nursery lists. This is possibly correct but unlikely to be true because *D. atrata* is not hardy in most northern European sites.

*Dryopteris erythrosora*

Deciduous but tatty by spring. One of the sensations of the fern world! Relatively unknown in Europe before 1960, it soon became a star plant. Reginald Kaye used it on the paper jacket of his book *Hardy Ferns* in 1968. Forms of *D. erythrosora* originally in cultivation in Europe were less strongly coloured than many seen today. The colour is strongest as the fronds expand in spring/early summer and gradually fades to a rather yellowish green. The frond shown here has reached this stage. The name ´erythrosora´ translates in English to red sori. This photograph perfectly shows this feature, it also shows perfectly the structure of the sorus. Each sorus is here covered by a kidney-shaped lid, called the indusium. Under the indusium, hundreds of sporangia are formed. In the photograph these can be seen protruding from under the edge of the indusium as they ripen. Careful examination will even reveal that the sporangia are a bit like a centurion´s helmet - dark brown cells form a linear feature across the top, while below the sides of the sporangia are whitish. Whitish because these cells are not heavily thickened. Each sporangia contains the spores. The thickening of the top cells is structured so that when the spores are ripe and the sporangia start to dry these cells pull the sporangia open and flick the spores a few millimetres - enough to get them away from the frond surface so they can disperse in natural air currents.

*Dryopteris erythrosora*
'Brilliance'

*Dryopteris erythrosora*
'Brilliance'

From time to time improved forms of any species can arise in a mass sowing. 'Brilliance' is such an example. It is normal *D. erythrosora* except the fronds are more brilliantly red than the normal species, especially when young. On maturity this form is not easily distinguished from the parent species, it is nevertheless a beautiful plant at spring time. As these are sometimes propagated from spores, i.e. by the sexual route, plants produced are not always identical to the best strain of 'Brilliance'. It is therefore wise to select the best plants if possible and buy in springtime.

*Dryopteris erythrosora*
'Prolifica'



*Dryopteris erythrosora*
'Prolifica'

Evergreen but usually untidy by spring. Much like the parent species, differing by sometimes producing bulbils on the frond. These can be laid on a moist peaty substrate and covered with glass or polythene. Then, with luck, they may grow into fresh plants. At a glance this can be separated from straight *D. erythrosora* by the smaller pinnules and the greater space between pinnae and pinnules. The plant is, in effect, more airy. I think this can be clearly seen by comparing with the photograph on page 88. The red sori are easily visible in both of these illustrations.

*Dryopteris filix-mas*

Deciduous. Although Bracken, Pteridium aquilinum, is no doubt more conspicuous I am sure Dryopteris filix-mas is the commonest fern in northern Europe, and possibly all Europe. With Bracken one plant can cover a huge area but with D. filix-mas each plant is distinct, hence there are surely more plants - but the biomass may well be smaller. The common name in Britain of ´Male Fern´ is nothing to do with sex. Simply it is a robust species, not very delicate, unlike the unrelated ´Lady Fern´. The German name of Wurmfarn (´worm fern´) no doubt refers to its use as an anthelmintic infusion. A friend for many years was infected by a tape worm. Reading of the anthelmintic properties of D. filix-mas he made himself an infusion and drank it. It nearly killed the tapeworm but it also nearly killed him. Happily the worm was eventually removed and my friend is once again in good health! D. filix-mas is the fern most likely to self-sow in most northern European gardens. Many gardeners are very keen to eliminate it but a glance at the pictures here show you during spring the unfurling fronds are fascinating with a beauty all of their own. The silvery white circular structures covering the underside of the frond, even at the beginning of the season, are the caps of the indusia. Beneath are the sporangia and, of course, the spores.

*Dryopteris filix-mas*
'Barnesii'



*Dryopteris filix-mas*
'Barnesii'

Of all the hardy ferns suited to cultivation in normal garden conditions this is one of the largest. A very useful fern in landscaping. The fronds are commonly 120 cm long and can, in favourable conditions, reach 150 cm. It differs from normal *D. filix-mas* by having narrower fronds and overall the fronds are lance-shaped. That is, the tip tapers more delicately to a point at the tip and at the base of the frond. Like all forms of *D. filix-mas* this fern is deciduous, usually not noticed after Christmas time. It is quite important to note that the species name is ´filix-mas´, not ´felix-mas´. The later would be more cat-like! Filix is a fern, and felix is cat! See also *Athyrium filix-femina* - p.33.

*Dryopteris filix-mas*
'Decomposita'



*Dryopteris filix-mas*
'Decomposita'

I love this fern! Sadly it is not met with that frequently. Decomposita means ´exceptionally divided´ or ´more than once divided´. In this case the pinnules which are usually only slightly lobed are deeply cut. This gives the fern an elegant and delicate appearance; however, it is no more delicate than any other form of *Dryopteris filix-mas*. Unfortunately it has a tendency to be slightly depauperate, with some pinnules missing, as shown here. I can forgive it that! The Linearis Group of cultivars are closely related, see pages 100 - 102. I have seen the name 'Erosa Crenata' given to this fern. I don`t think it is a very flattering name for a rather beautiful fern! ´Erosa´ means having an irregularly toothed, or gnawed, margin. ´Crenate´ means having rounded teeth, by implication symmetrical. The use of the two words to describe one cultivar seems to me to be an oxymoron!

*Dryopteris filix-mas*
'Linearis Polydactyla'

Justifiably a very common garden fern, churned out in its thousand by big nurseries. Don´t let this put you off growing it! It is handsome enough but has the great value in the garden of providing welcome contrast against the less finely divided cultivars. Frequently called 'Polydactylon', presumably an error which arose in one of the big nurseries, since exported to most gardens in the cool temperate world. 'Polydactyla' is the correct name for a *Dryopteris* cultivar, as far as I understand it, the male name equivalent would be 'Polydactylum' not 'Polydactylon'. The term polydactyla refers to the multifingered crests. It is a form of cresting but somewhat different from the form shown by most *D. filix-mas* cultivars (see pages 114 - 117). The pinnules are usually somewhat reduced as shown here.



*Dryopteris filix-mas*
'Linearis Polydactyla'

This sample comes under the same group name as the cultivar shown on page 100, but the pinnules are much more seriously reduced. In many cases not much more than a spine, which, remarkably, is still able to produce a sorus full of sporangia and spores! The small white dots scattered over the frond here are the sori.

*Dryopteris filix-mas*
'Linearis Polydactyla'

Like all *Dryopteris filix-mas* cultivars this 'Polydactyla' is of course deciduous. The frond photographed here has been caught just as autumn is setting in, providing a colourful interval.



*Dryopteris filix-mas*
'Crispata'

A very handsome cultivar with the pinnules all unevenly crisped. Quite common in collections it is usually not a tall fern, perhaps 50 cm high. This photograph again shows the autumn colouring effect. I like to refer to this cultivar as 'Crispata Hodgson', after the finder who first recognised it from a wild collected plant in the English Lake District in 1864. There is another very similar fern - *Dryopteris affinis* subspecies *cambrensis* 'Crispa Barnes'. Also a wild find first recognised in the English Lake District, this time in 1865 by Barnes. The pinnules of normal *D. affinis* subspecies *cambrensis* are always slightly crisped up, 'Crispa Barnes' is simply an exaggerated form.

*Dryopteris filix-mas*
Cristata Group

Slightly different crested forms of *D. filix-mas* have been found wild on several occasions. In addition mass production from spore sowing in the trade has also given some variation. As a result, at any one time several different crested forms are in cultivation. In general I prefer to refer to most of them as Cristata Group. The form shown here is a very striking example. The crests are heavy and uniform along the frond. The terminal crest is narrower than the frond (just!) hence it is a form of Cristata. Plants of this type are sometimes referred to as 'Parsley Crested', although the pinnules can be more crispy - as in the named form 'Crispa Cristata'. I do not know when the name 'Parsley Crested' was introduced but probably recently.

*Dryopteris filix-mas*
'Grandiceps Wills'

*Dryopteris filix-mas*
'Grandiceps Wills'

One of the best forms of *D. filix-mas*. The terminal crest can be very big, nearly always wider than the lower sections of the frond - thus a true Grandiceps. Curiously the crests on the pinnae tips are rather small. The pinnules reduce in size towards the tip of the frond. Wills was a Doctor on the Somerset/Devon border in South West England. We have him to thank for this splendid fern. Seemingly it comes true from spores. Happily it is a rare example of a good quality cultivar which self-sets in many gardens. I recently saw a wonderful 'hedge' of it in a garden in North England, its 50cm plus tall fronds perfectly providing a margin for a gravel path.

## *Dryopteris filix-mas* in autumn

Colour is not usually a feature associated with our common male fern but these photographs here skilfully illustrate the transient beauty sometimes visible in autumn. It is truly a short-lived effect because the fronds soon brown off and die back completely.

## *Dryopteris filix-mas* in autumn

Find more images of the colourful effect created by *D. filix-mas* in autumn on the following two pages.

*Dryopteris filix-mas*
in autumn

*Dryopteris filix-mas*
Cristata Group

*Dryopteris filix-mas*
Cristata Group

This pair of photographs illustrate a crested form of *D. filix-mas* subtly different from the one shown on pages 104 and 105. Here the pinnae are shorter and the crests bigger but the differences are not well defined. As a consequence modern thinking prefers to see such similar cultivars lumped into the Cultivar Group, in this case Cristata Group.

*Dryopteris filix-mas*
'Linearis'



*Dryopteris filix-mas*
'Linearis'

This is strictly a group of cultivars which also includes 'Linearis Polydactyla' and 'Decomposita'. The basic form shown here has narrowed pinnules, particularly towards the tip of the frond. The serrations along the pinnule sides are quite sharp sometimes causing this fern to be called 'Erosa'. Curiously this uncrested form of 'Linearis' is much less common than the polydactylous form shown on pages 100 to 102. Both forms are marvellous garden plants which will survive considerable neglect. They also have the benefit of creating a fabulous contrast between these skeletal forms and the more common leafy fern taxa.

*Dryopteris filix-mas*
Narrowed form

Evergreen, but tatty by spring. This form differs but little from the parent type and as such does not have a cultivar name. The pinnules are slightly narrowed sometimes suggesting 'Linearis' but a comparison with the illustration on pages 114 and 115 should soon show this form is nowhere near so well marked.



*Dryopteris dilatata*
'Grandiceps'

This heavily crested form of the broad buckler fern used to be rather uncommon, but happily several nurseries have started mass producing it. It in fact struggles to be a true 'Grandiceps' as the crest is not always as wide as the frond lamina. There are relatively few cultivars of the broad buckler considering it is one of our most common ferns. Another form is 'Lepidota Cristata', which narrowed pinnules and much smaller crests - it is nevertheless very pretty. In the wild *D. dilatata* can reach heights approaching 1.5 metres, however in garden situations the Grandiceps form rarely reaches one metre in height. The fronds of *D. dilatata* are produced in a shuttlecock form, as in *D. filix-mas*, but here the shuttlecock is more open as the fronds tend to be spreading rather than upright.



Deciduous. Of all the ferns one might see in a European garden this is the only species which carries its sori along the margins of the pinnules, hence 'marginalis' seems a pretty appropriate name! *D. marginalis* is quite common in woodland habitats in the eastern states of North America. It is not native to Europe. Fronds are usually about 70 - 80 cm tall. Fronds in an erect crown, the rhizome is also erect and slow to branch. In America it seems to have taken over the role of *D. filix-mas* in Europe. The illustration on page 119 shows very well how much it resembles *D. filix-mas* - until you turn over the frond and glance at the marginal sori.

*Dryopteris carthusiana*

Narrow buckler fern. Slowly deciduous, fronds can stand a few frosts. Superficially this fern much resembles the much commoner *Dryopteris dilatata*. With experience, however, the two species are usually easily separated. The scales on the stipe of *D. carthusiana* are pale brown, those of *D. dilatata* are darker brown with a prominent dark band running up to the scale tip. The frond of *D. carthusiana* is much narrower and has a longer stipe, it is lance shaped, hence the earlier name *D. lanceolato-cristata*. *D. carthusiana* has a short creeping rhizome which means the fronds do not form a regular crown unlike *D. dilatata*. In addition *D. carthusiana* likes damp, swampy places, *D. dilatata* generally prefers better drained site. There are other differences of course but I think these points should easily separate the two species. UNLESS you come across the hybrid between the two! This is *Dryopteris x deweveri* which is difficult to describe except to say it is intermediate in the characters given above. *D. carthusiana* is common in temperate North America and right across Asia. In North America it can easily be confused with *Dryopteris intermedia* (an American species).

## *Gymnocarpium robertianum*

Limestone fern. Deciduous. This fern is frequent right across Europe in limestone areas. In North America it is more restricted being confined to the North Eastern USA and South Eastern Canada. On limestone screes it can form carpets of pretty yellowish green foliage covering several square metres to the exclusion of all other plants. Fronds are normally 20 to 40 cm tall and triangular, but not so markedly triangular as in *G. dryopteris* (see opposite). It is easy to grow in shade or sun yet seems to be uncommon in the horticultural trade, and is rarely seen in gardens. It is very much at home on calcareous soils, so common in South East England, yet rarely grown there. It is very similar to *G. dryopteris* but differs by being glandular, particularly on the rachis. When well grown in shady conditions *G. robertianum* holds the lamina (the leafy part of the frond) almost level, presumably to catch more light, but in bright sun the fronds are almost upright. The sori in the genus *Gymnocarpium* are naked, that is to say there is no protection from an indusium.



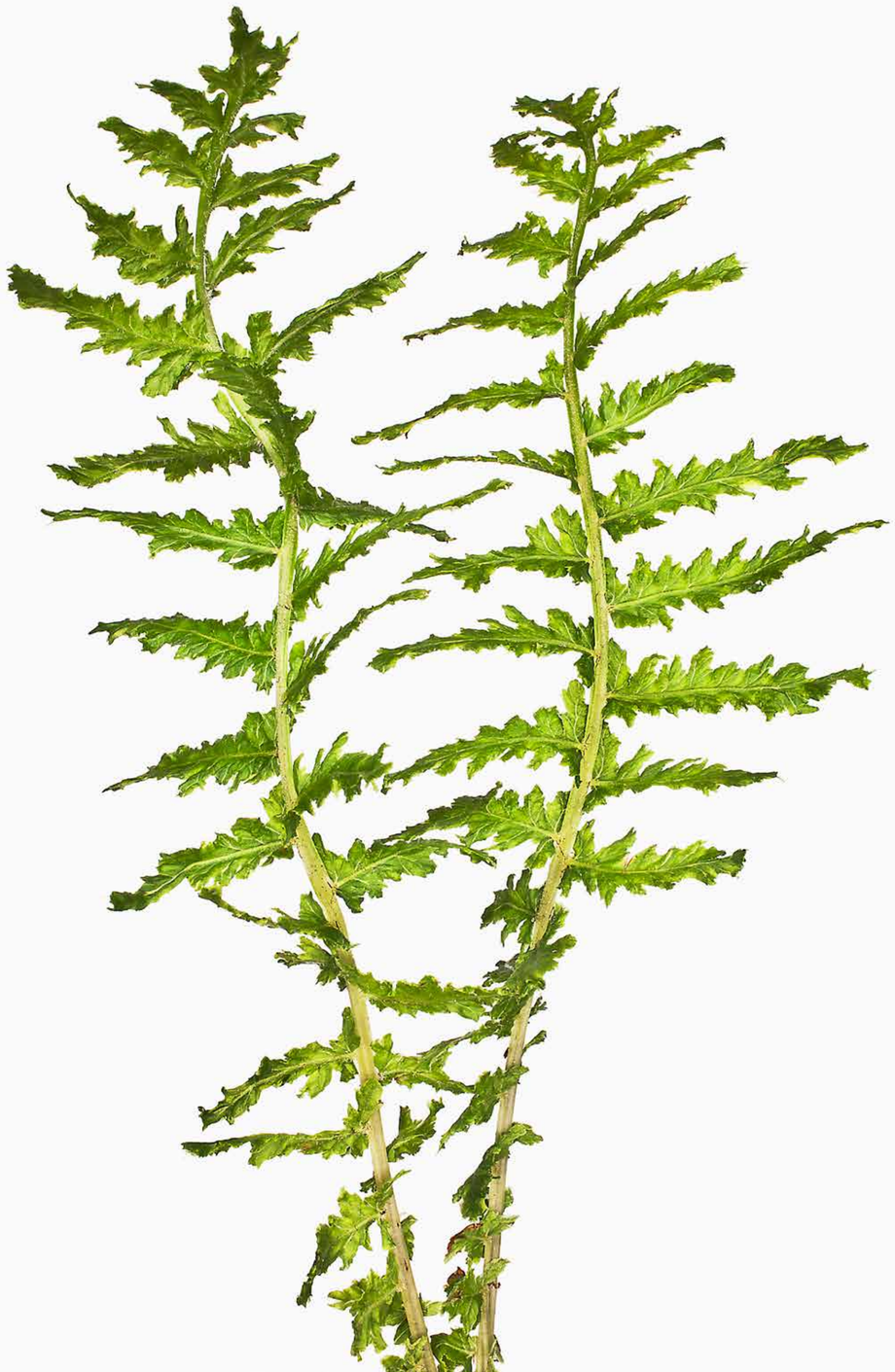
## *Gymnocarpium dryopteris*

Oak fern. Deciduous. Like its close relative, G. robertianum, this fern is frequent across much of Europe but oak fern differs by not liking limey soils, therefore the two species rarely grow in close proximity to one another. This may explain why the hybrid between the two is rare. I don't think it has ever been recorded in Britain. Fronds are a beautiful fresh blue/dark green when mature, much paler when young - as seen in the accompanying photograph. Like *G. robertianum* the lamina is triangular, much the broadest at the base. In *G. dryopteris* the frond is more leafy with the pinnules longer and broader than in *G. robertianum*. *G. dryopteris* lacks glands on the rachis or anywhere else on the fronds. It occurs across northern North America, particularly in the centre and east. Further south in Western USA it is replaced by the very similar but larger *G. disjunctum*. One of the best cultivars of any hardy fern is *G. dryopteris* 'Plumosum'. This was found in the English Lake District at the beginning of the nineteenth century by Mr Christopherson on limestone rocks - most unusual for this fern. It had been somewhat neglected until an observant visitor saw it lingering in an old sardine tin! It was rescued and propagated and is now widely grown worldwide.



*Matteuccia struthiopteris*
'Erosa'

Deciduous. This is a singularly ugly form of the shuttlecock fern (see page 125). The name is probably new as I have only come across it recently. I remember 4 plants of this coming up in one of my batches of *M. struthiopteris*. I threw them away! Others may like it and I suppose the two fronds depicted here are not completely without interest, but they are not to my taste. The varietal name 'Erosa' means irregularly toothed or gnawed. Seems appropriate, pity it does not mean ´fit only for the compost heap´!!





*Matteuccia struthiopteris*

Shuttlecock fern. Deciduous. A superb fern for waterside planting. It will even do quite well in dryish sites if well shaded, but inevitably the fronds are much shorter. The frond can be almost 2 metres tall in really favourable sites and the rootstock in such conditions starts to form a trunk a few centimetres tall adding to the height of the fern. As well as having upright rhizomes this fern produces runners, lots of them, rather like strawberries. The runners can be a few centimetres long to almost 1 metre. This means the fern has the potential to pop up in the garden some way from where it was first planted. I would not call it a weedy fern because it is truly beautiful in spring when a host of multi-fronded unfurling crowns can create a truly eye-catching sight. Unfortunately once spring is over this fern goes downhill. The first flush of fronds can prematurely die back in dry summers and if in full sun they will almost certainly go yellow unless provided with plentiful water. As a consequence I would always recommend planting in moist to wet shade. In the USA the croziers are canned and eaten like asparagus. After one trial tasting a few years ago I´ll be keeping to asparagus! The form in the USA differs slightly from the European form. Neither form is native to the British Isles. The sporing fronds are short and produced late in the season, they lack any green lamina. They persist until spring

*Onoclea sensibilis*

Sensitive fern. Deciduous. Quite closely related to the shuttlecock fern it has the similar habit of producing sporing fronds late in the season completely lacking a green lamina. These fronds persist most of the winter while the green fronds tend to disappear with the first frost - hence ´sensitive´ fern. A native of North America this fern is very widely grown in Europe. Once established it can take over, particularly in damp sites. It does not need to be carefully looked after, it looks after itself. The perfect plant for the lazy gardener perhaps? While it does look ´ferny´ it is not at all delicately divided like many ferns. The attached photographs show well the ´heavier´ or ´denser´ type of frond. The rhizome creeps quickly, hence its ability to take over, but unlike *Matteuccia struthiopteris* it does not produce regular crowns forming shuttlecocks, the fronds appear at irregular intervals along the rhizome. The form most commonly seen in gardens is completely green but there are selections in cultivation which flush quite a deep red in spring. Fronds are usually about 50 cm tall but clones have been selected which are much smaller, perhaps 10 cm tall, and correspondingly much less aggressive colonisers.

*Osmunda regalis*

Royal fern. Surely this must be one of the most popular ferns? To find it in the wild virtually anywhere in Europe is always a thrill. There are places where it is common but generally it has a very restricted distribution. It was probably always rare where wet acid ground was absent, however in regions of the British Isles like Cornwall and South West Ireland it can become very frequent. It obviously appreciates the higher rainfall as well as the acidic, somewhat boggy soil. When new fronds are uncurling there is often a hint of colour as seen in the adjacent photograph. This normally disappears in European plants but a cultivar, 'Purpurascens', has a red rachis which persists season long (see page 130).



*Osmunda regalis*

It is the largest native fern in Europe. Fronds can be two metres tall or more with mature crowns producing 100 or more a year. It can hybridise with other species of *Osmunda* producing sterile offspring, these can be even bigger than the parents showing hybrid vigour. At Wisley gardens near London, wonderful examples of this hybrid can be seen. All species of *Osmunda* grown out of doors in Northern Europe are deciduous. A plus here is the striking orange autumn colour produced somewhat transiently as the fronds get hit by the first hard frost (see page 132). This may persist for one week. Later in mid-winter when everything is dead, the leaf debris lies broken on the ground but it still has a distinctive yellowish colour which is quite appealing. *Osmunda regalis* is easily recognised by the large undivided pinnules, which can easily be 4 cm long. Notice in the photograph here that the rachis is green.

*Osmunda regalis*
'Purpurascens'

*Osmunda regalis*
'Purpurascens'

This is the red stemmed form referred to on page 128. The illustrations on these pages show the attractive red rachis and on page 131, the generally red tint of the foliage as the frond unfurls. The illustration on page 130 shows the sporing structures at the tip of the frond. They are the same in this species as in the 'Purpurascens' cultivar. Strangely, the leaf lamina is completely transformed in all Osmundas into sporing structures which change colour as they ripen. Here the basal sporangia are turning brown, while moving towards the tip of the frond the colour is almost white and merging into green at the tip. Once the spores are shed, the sporing structures all turn brown and a little shaggy while the rest of the frond remains green through to autumn. This contrast is striking, particularly on large plants earning all *Osmunda regalis* forms the common name of 'Flowering Fern'. Of course there are no flowers but the effect is comparable - especially at a distance. *Osmunda regalis* in any of its forms can be referred to as the Flowering Fern. I do not know where the original clone of 'Purpurascens' was found but it was more recently collected in South West Ireland by Philip Coke although sadly, years later, he could not remember where. I suggested it be called *O. regalis* 'Philip Coke'. It is a beauty in the garden. This plant is easily confused with the North American form of *Osmunda regalis* called var. *spectabilis* which is quite often red tinted, but the American form has smaller pinnules and is generally more delicate.

## *Osmunda regalis*

The frond illustrated here shows the orangey colour the fronds become after the first frost referred to on page 128. Other ferns do similarly pass through an orangey phase in autumn but none are more attractive than *Osmunda regalis*.



## *Polypodium vulgare agg*

Is this autumn, is this summer? In fact it is spring/summer. The three species of *Polypodium* native to mainland Europe all tend to lose their fronds in spring or summer. The frond illustrated here is either *Polypodium cambricum* or *P. interjectum*, probably the former, but not P. vulgare, the third species. Over winter they are all pleasantly green, making them most desirable plants for winter gardens. The best species in this respect is *Polypodium cambricum*. It actually loses its fronds on average in June as the weather warms up. New fronds appear in September or October with the onset of autumn rains. Typically it is beautiful and fresh on Christmas day and later in February it is the perfect accompaniment for snowdrops. The green foliage sets off the fresh white flowers beautifully. In all European species, the fronds are on average 25 cm long but can rarely reach 70 cm in cultivars such as *P. cambricum* 'Omnilacerum Oxford'.

## *Polypodium cambricum* 'Cambricum'

Plumose southern polypody. This is the best of all the forms and species of Polypodium. The deeply lacerated pinnae overlap quite densely throughout the frond. This cultivar is sterile but unfortunately it is the type plant for the species *P. cambricum*. This is because the renowned botanist Linnaeus made one of very few mistakes when he decided this cultivar was a species when in fact of course it is not, since it is sterile. As a result long accepted cultivar names such as 'Cambricum' become awkward applied to a species of the same name. The earlier species name for the southern polypody, *Polypodium australe*, was overruled in favour of *P. cambricum* by the committee responsible for the nomenclature of plants, causing much confusion in the horticultural world. This fern is probably my favourite hardy fern. It is also the oldest fern cultivar known, being first recorded way back in 1668 by Richard Kayse from Bristol, England - almost 350 years ago near Cardiff in Wales! Since 1668 this sterile form of *P. cambricum* has been found about eight times only - yet the normal species of which it is a cultivar is a very common fern on limestone in South and West Europe. Fortunately this stunningly beautiful cultivar is readily available from specialist nurseries. The eight original finds have mostly been perpetuated in cultivation by continually taking cuttings of the creeping rhizome over the centuries, although sadly some of the strains have been lost. I always hope that some of them may be uncovered in some long lost garden!



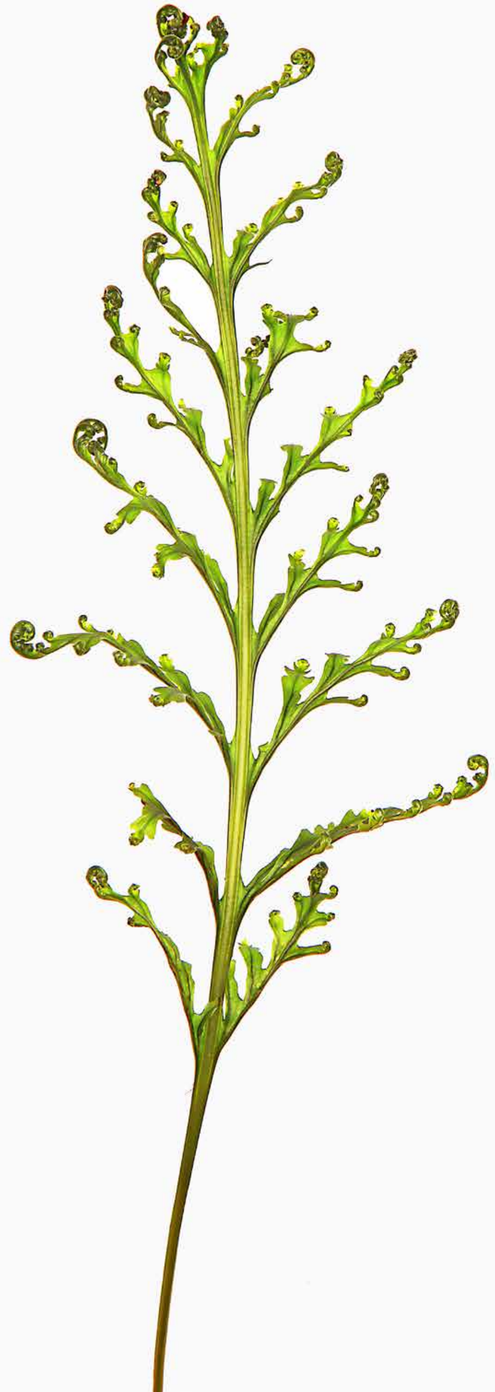
## *Polypodium vulgare* 'Bifido-grandiceps'

Sometimes called 'Bifido-cristatum', but as the crest is much wider than the frond it is better classed as a Grandiceps form. First recorded from North Lancashire, England in 1867, it has since been found in a few more places. Some plants are fertile, others sterile, because it has hybridised with *P. interjectum*, a closely related species. The sterile plants are thus *P. x mantoniae* 'Bifido-grandiceps'. It is one of the commoner cultivars of *Polypodium* but it is nonetheless an attractive garden plant. With its fronds 25cm long produced in a strong clump, it is a strong feature in any garden. As a cultivar of *P. vulgare* it differs from *P. cambricum* most notably by having narrower fronds and by producing its fronds in mid-summer.

*Polypodium vulgare agg.*
'Cornubiense'

This splendid cultivar was found growing on an old tree in Cornwall, England in 1867. As found it had three types of frond. Most were of the type shown here, but some were similar to the normal species, i.e. like those shown on page 135 without the cresting. The third type were similar to the first but more finely divided. Where all three types of frond occur on the same plant this cultivar is called *P. vulgare* 'Elegantissimum'. Unfortunately not everything is simple! As with 'Bifido-grandiceps' on page 135, this cultivar has hybridised with *P. interjectum* to again produce an excellent cultivar - *P. x mantoniae* 'Cornubiense'. This is an excellent grower but only has the first two kinds of fronds - it lacks the more finely cut third type mentioned above. From a single frond I cannot tell if this is *P. vulgare* 'Elegantissimum' or *P. x mantoniae* 'Cornubiense', it is probably the latter. I have called this frond *P. vulgare agg.* 'Cornubiense' to cover this uncertainty. This plant is a robust garden plant spreading perhaps 3 to 5 cm a year with its creeping rhizome, but never troublesomely invasive. Fronds are about 25 cm long as with most other polypods. Again, like most polypods, it is winter green.





*Polypodium vulgare agg.*
'Cornubiense'

This illustration shows well the delicacy of the young frond before it starts to expand. At maturity it will look the same as the frond on page 136. The comments above apply equally to this photograph.

*Polystichum aculeatum*

Hard shield fern. This photograph well illustrates the characteristic form of the crozier of any *Polystichum* species. The head of the frond arches out from the line of the rachis, perhaps it is caused by the weight of the frond tip, and perhaps it would arch anyway. Whatever the cause the shape is typical and is constantly admired through the spring season. The uncurling shown here is typical of almost all ferns, conversely such coiling is virtually unknown in other classes of plants.



*Polystichum aculeatum*

Hard shield fern or Harter Schildfarn. I know I've probably said it before but this is my favourite European fern species. The crisp beauty of the sharply pointed pinnules is unsurpassed in any other species - in my opinion! Here the frond is young, the immature sori can be seen through the frond. At maturity the frond gradually develops into a marvellous dark, glossy green. The pointed pinnules are a strong indication that this is a species of *Polystichum*. 'Poly' means many and 'stichum' means bristles. In this case the bristles are the spines on the tip of the pinnules. The indusium is somewhat like those found on a *Dryopteris* except here the indusium is a complete circle, whereas in *Dryopteris* the circle is broken creating a kidney shape.

*Polystichum aculeatum*

Hard shield fern, Harter Schildfarn. A more mature fern showing the sori arranged midway between the pinnule midrib and the edge.



*Polystichum aculeatum*

Hard shield fern or Harter Schildfarn. In this picture notice the way the pinnules do not normally have a distinct stalk and the angle created by the fleshy part of the pinnule is acute where it joins the pinna midrib, I.e. less than a right angle. Acute here tallies well with acul in aculeatum. This is the most reliable way of separating this fern from its close relative *P. setiferum*. In *P.setiferum* the angle at the base of the pinnule is obtuse, ie. more than 90 degrees.

*Polystichum aculeatum*

A close-up of the frond clearly showing the full circle of the indusium. The dark centre of each sorus is where the developing sporangia are visible through the indusium.

*Polystichum aculeatum*
'Cristatum Gracile'

In this cultivar the cresting is very light. The terminal crest is small and the tips of the pinnae are very slightly twisted with just a hint of cresting. 'Gracile' strictly means slender.

*Polystichum aculeatum*
'Zillertal'

On page 144 the frond is still in a tight crozier but the multi-toothed nature of the pinnules is already showing. This character is shown better on page 145 where the frond is fully extended. 'Zillertal' was found wild in the Austrian pre- Alps among a population of normal *Polystichum aculeatum*. In reality there are very few cultivars of *P. aculeatum*. The discovery of this relatively recently was quite a revelation! This is a plumose form, that is, it is sterile and more 'leafy' than the normal species. *Plumosum* forms of any *Polystichum* are very rare and none had ever been found in *P. aculeatum* before. It is stunningly beautiful! Compare this with the frond on page 141 to see the 'Plumosum' effect. The added leafiness contributes to, more or less, fill in the spaces between the pinnae and the pinnules. In addition, the pinnules are finely serrated with toothy spines around much of their margins. I've already said *P. aculeatum* is my favourite species. This cultivar is my favourite form of the species. It is truly something really special. I have seen it in very few collections in Germany but not yet elsewhere. I hope one day it becomes more widely available, it is certainly a fern I would warmly welcome into my collection!!

*Polystichum andersonii x*
*Polystichum munitum*



*Polystichum andersonii x*
*Polystichum munitum*

In the period around 1970 to 1980 a young research botanist, Ann Sleep, carried out an extensive hybridisation programme in the genus *Polystichum* at Leeds University. As a marking tool she used the species of *Polystichum* which naturally form bulbils on their leaves, the reasoning was that if one parent of a hybrid had a bulbil and the other didn´t it would make the hybrid easier to recognise. This plant, a synthesised hybrid between Polystichum andersonii and *P. munitum*, is a good example of her work. Both species are natives of North West America but I believe a hybrid between them is unknown in nature. This crozier is a thing of great beauty but the frond illustrated on page 147 shows the pinnae are deeply lobed, whereas in *P. munitum* the pinnae are not lobed. Some of the tendency towards a bipinnate frond is clearly contributed by the *P. andersonii* parent. Unfortunately the bulbil has not developed on this frond but the character of the pinnae is sufficient to show its hybrid character. This is not a common fern. It is unlikely to be encountered in many collections.



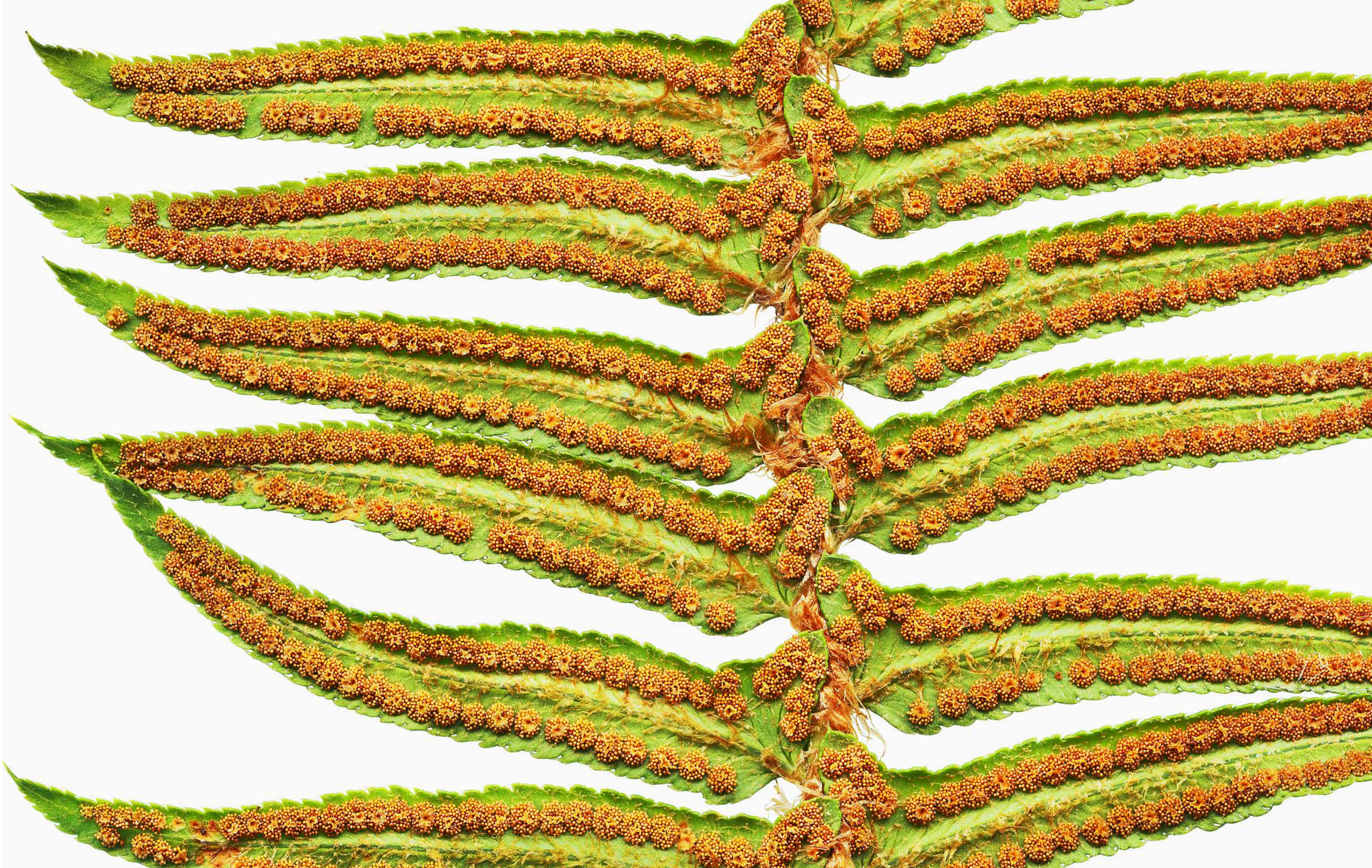
Braun´s shield fern. Fronds about 50 cm long forming a fairly flat crown. Not a common fern in practice but more common by name - because it is often mis-named! It is superficially rather similar to *P. setiferum* but this species has abundant hairy scales, as can be well seen in the photograph on page 147. The scales of *P. setiferum* are much broader, looking like typical scales. Another good character for separating the two species is the way the pinnae gradually shorten towards the base of the frond in *P. braunii*, while in *P. setiferum* the pinnae stop abruptly some way above the frond base. At present, *P. braunii* is recognised as occurring in Kamchatka, Europe and North America but plants from all three areas differ from one another. I suspect in time that the European plant will be recognised as the true species with the others eventually getting new names. In Europe it is a fern of warmer climes occurring on the southern slopes of the Alps. It has never been found growing wild in the British Isles although there have been a few erroneous records.



Another hybrid *Polystichum, P. lonchitis x P. aculeatum*, but this time one which occurs naturally in the wild throughout most of the regions where both parents grow. It is very rare in the British Isles, only added to the British flora about 40 years ago, from Inchnadamph in Scotland. I went there fairly recently and found four plants quite quickly, so there would surely be more. In the Alps, *Polystichum lonchitis* is relatively common and the hybrid correspondingly occurs much more frequently. Fronds can reach 50cm in length in favourable situations. Because this is a hybrid it is sterile and unfortunately it does not produce bulbils, propagation is virtually impossible. It is sadly rare in collections but it is a great beauty as the photograph on page 150 demonstrates. Unlike holly fern the hybrid is almost bipinnate (see also the hybrid between *P. andersonii* and *P. munitum*) but not quite as divided as the other parent, *P. aculeatum*. Even in crozier as shown on page 151 the divisions of the pinnae can already be seen, particularly on the top right hand side of the crozier.

*Polystichum munitum*

Sword fern. An evergreen fern native to the Pacific North West of the USA and Canada. It is a magnificent fern for the fern garden, or indeed any garden. As you can see from this magnificent photograph the pinnae are undivided. The dark green, glossy, arching fronds are really eye-catching, especially when a plant reaches maturity in ideal growing conditions. A plant I know in Shropshire, England has over 500 fronds each year, each about 90 cm tall. Stunning! The only problem with a plant like this is the length of time required to remove the previous season's fronds as they slowly die back! In this photograph each sorus is clearly seen. The tiny round structures are the sporangia, each contains 64 spores, each of which in turn is capable of producing a new plant. If there are 50 sporangia per sorus, 60 sori per pinna, 100 pinna per frond and 500 fronds per plant we have approximately a potential for 1,000,000,000 spores to be produced by just one plant. No wonder this is a common fern! Well grown this is one of the tallest evergreen ferns for the garden. On this frond the sorus is reaching maturity, and the spoangia have grown and pushed the normal mushroom shaped indusium up into the shape of an inverted umbrella.



*Polystichum munitum*

Sword fern. Here we see the tip of a frond from above. The sori beneath are just noticeable by the darker green circles along the length of the pinnae. On page 155 there are no sori, this is a frond from a younger plant in autumn.

## Polystichum retroso-paleaceum

This is one of a large number of rather similar evergreen *Polystichum* species in Japan. On a recent tour of Japan our hosts showed us a length of roadside forest where three species and three hybrids grew - all within about 20 metres. Superficially they all looked very similar but our hosts very patiently, despite obvious language difficulties, explained the differences. I'm somewhat ashamed to say I very quickly forgot the key characters! I hope I get another chance to try and learn more of this baffling complex of species in the future. Suffice to say these differences are of little consequence to the gardener. *P. retroso-paleaceum* is a very good representative of a handsome group of species. It does have a tendency to produce a sort of pseudo-trunk which is not necessarily good news as elevation of the crown leads to drought stress due to exposure of the 'trunk'. It is therefore a good idea to keep an eye on your plant and be prepared to plant it a little deeper every few years. Other species, not only polystichums, need to watched for the same reason.



## *Polystichum tsus-simense*

Tsus-shima shield fern. The name is correct as tsus-simense as opposed to tsus-sinense. It was not named from Chinese material (i.e. sinense) but from Tsus-shima a Japanese island between Japan and South Korea. Unlike *P. retroso-paleaceum* on page 156, it is not very scaly. The pinnae characteristically taper to a point more drawn out than most polystichums, giving the frond a more open, airy effect. This is a pretty little fern with a leathery texture; fronds are usually less than 25 cm long. Like most polystichums, it is evergreen and in my garden it is a welcome occasional uninvited 'weed'!

*Polystichum setiferum*
'Cristato-pinnulum'



*Polystichum setiferum*
'Cristato-pinnulum'

This fabulous fern was first discovered in Dorset in England in 1878 by Dr Wills. It is one of the more remarkable cultivars being clearly distinct from all other known cultivars of *P. setiferum*. The fronds can reach 80 or even 90 cm, but usually less. Some years the fronds are covered with bulbils along the rachis at the base of each pinna. Unfortunately this only happens sporadically as a result the cultivar is not propagated as often as it should. The pinnules are flabellate, i.e. fan-shaped, not crested. The name given here appears to be the correct name but I feel that the name 'Flabelli-pinnulum' is more appropriate, however, it appears 'Cristato-pinnulum' has precedence!

*Polystichum setiferum*
'Congestum'

*Polystichum setiferum*
'Congestum'

If you require a neat evergreen fern for your border, possibly at the front, this is the fern for you. *P. setiferum* 'Congestum' rarely grows much taller than 25 cm and the fronds are close to erect. There are numerous forms which have been raised from spores from the original find by Padley in 1865, or from other subsequent wild finds. Normally pinnules are not divided but in this example they are, making it a particularly handsome form. It might qualify to be called 'Tripinnatum Congestum'. Crested forms are common; the crests are flat and perhaps more like forks. Grandiceps forms are also occasionally seen. Here the pinnae and the pinnules are overlapping making it a genuine member of the Congestum Group of cultivars. If the pinnules overlap but the pinnae do not it is then considered an Imbricatum cultivar.

*Polystichum setiferum*
'Dambach'

*Polystichum setiferum*
'Dambach'

This is German name for a cultivar, the name is unfamiliar to me. It is a very handsome finely divided form along the lines of 'Tripinnatum' but rather more leafy. If I was shown it without a name, I would suggest it is a form of 'Latipes', an old Victorian cultivar name chosen by Thomas Moore, which means 'broad-footed' or broad at the base.

*Polystichum setiferum*
Tripinnatum Group



*Polystichum setiferum*
Tripinnatum Group

This is an intermediate between the plant illustrated on pages 162 and 163 and the plant coming up on pages 166 and 167. The frond is very pleasantly leafy and the pinnules are divided into several smaller sections, called pinnulets, but they are not narrowed like the pinnulets in *P. setiferum* 'Divisilobum'. The texture of the frond is soft, not stiff like most divisilobums. The divided pinnules make the frond tripinnate hence the group I have placed it in. Plants of this kind are not that uncommon in the wild. On British Pteridological Society meetings with the late Jimmy Dyce we all followed his lead and abbreviated the name to 'Tripe'!

*Polystichum setiferum*
Divisilobum Group

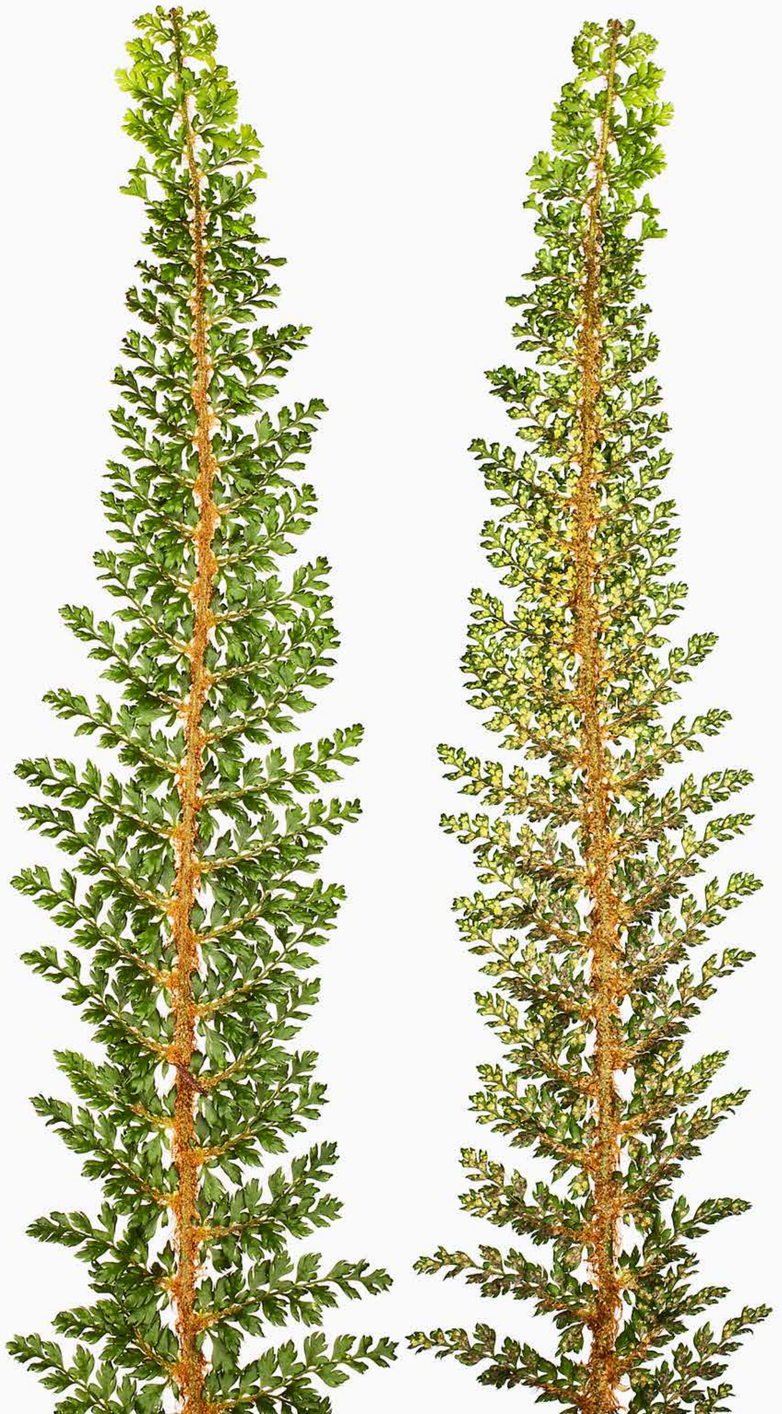
This clone has been named in Germany as 'Filigran', presumably a reference to the slender pinnulets, particularly at the base of the pinnule. It is a form of Divisilobum typified by the very slender pinnulets. This is a particularly attractive form with broad fronds. Of all the cultivars of *P. setiferum* the divisilobum type is surely the one most commonly seen. The plant selected here is indeed a beautiful fern. When the first divisilobe was discovered growing wild near Ottery St Mary in Devon, England, in 1848, it was originally considered a different species! Today we still think it quite unlike the parent *P. setiferum*.

Perhaps an explanation is due for using the group name here rather than the German name of 'Filigran'. There are very many different named forms of Divisilobum, sadly, however, the names have got lost over 160 years. It is sometimes possible to match a modern plant to a specimen in an old herbarium or book but it takes a lot of time and resources to do so. Therefore, until this can be done I prefer to apply the broad canvas name of Divisilobum Group.

## *Polystichum setiferum* 'Gracillimum'

This fern is among the greatest rarities of the fern cultivar world. It is not always easy to grow and is always very difficult to obtain. It is a sporeling of *P. setiferum* 'Bevis' (see pages 184 and 185). Traditionally 'Bevis' is sterile, however, extremely rarely it does produce a few spores. These spores are rarely in typical indusial, as seen on other polystichums, but they might occur as just a few sporangia scattered across a frond. Obviously these are very difficult to see. To have any real chance of finding them you really need a hand lens. Pioneer fern growers, notably Charles Druery, first found these sporangia and sowed the spores. He was astonished at the results! Many plants were like 'Bevis' but several were quite different. 'Gracillimum' was the best of these. No spores have ever been found on 'Gracillimum' so I think we can say it is sterile. It is an extremely elegant fern with arching fronds up to 60 cm long. The pinnules and pinnulets are all gracefully slim. The pinnules are falcate, that is sickle shape, particularly mid-pinna on the basiscopic side (the side pointing towards the frond base). When this cultivar was first raised by Druery he produced a range of plants all slightly different. The best he classed as 'Gracillimum' but there are differences between plants. This one is more strongly tripinnate that many others. The lack of the third tier of division is probably preferable as it gives the frond a more airy appearance.





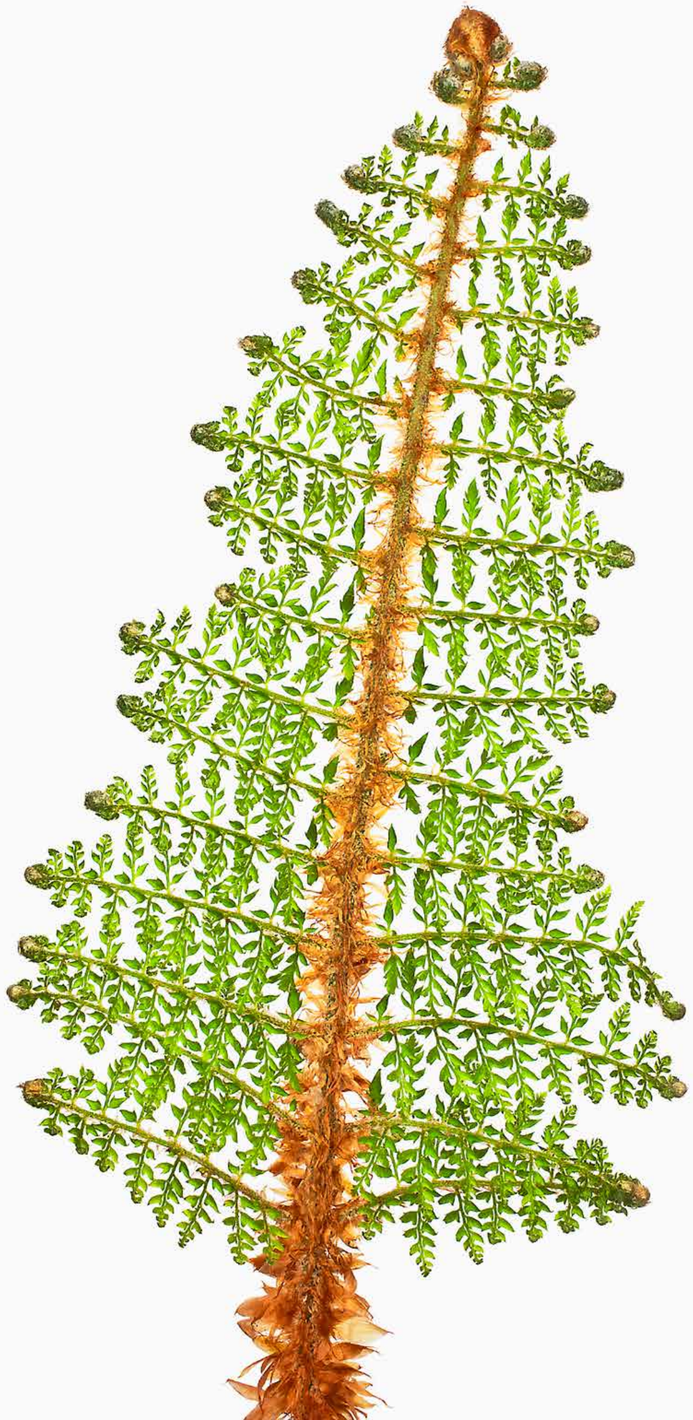
## *Polystichum setiferum* 'Ray Smith' or 'Smith`s Cruciate'

Ray Smith found this cultivar in an old garden north of Birmingham, England, in about 1970. It must be an old cultivar probably with a name but it has been very difficult to track it down until recently. There is one frond among the Jones Nature Prints which was never published but which Jimmy Dyce labelled 'Cruciato-proliferum Parsons'. I am now pretty sure this is the same fern but as the name 'Ray Smith' is in such wide use I think it best to leave it as it is for now. It is a superb proliferous (bulbil bearing) cultivar incorporating the divisilobum character and cruciate character with a narrow, erect frond. ´Cruciate´ means crossing. This cultivar produces forked pinnae with often some pinnae forking at the point of attachment to the rachis. It would appear to be a hybrid cultivar between 'Wakelyanum' and 'Divisilobum'. A name incorporating all the characters would be long and cumbersome, hence the decision to call it 'Ray Smith'.



Another super cultivar! There is no doubt this is a Grandiceps class of cultivar. The crest at the head of the frond is enormous. Rather like 'Ray Smith' on page 169 this cultivar is also one difficult to find in historical records. Surely it must be there somewhere. I first came across it when Judith Jones brought material to Britain from Washington State in the USA. We called it 'Trilobum' referring to its tendency to produce three lobes in the huge terminal crest. How could this, a cultivar of European *P. setiferum*, get to the USA? Well there is just a possibility that Wiper, one of the founder members of the British Pteridological Society, took it with him when he took the bulk of his collection to British Columbia when he emigrated early in the 20th century. This is just a guess! This cultivar is not particularly tall, perhaps 40 cm long fronds, the pinnae and pinnules are narrowed hinting at a type of Divisilobum and it is abundantly bulbiferous. This cultivar has everything!

*Polystichum setiferum*
'Herrenhausen'

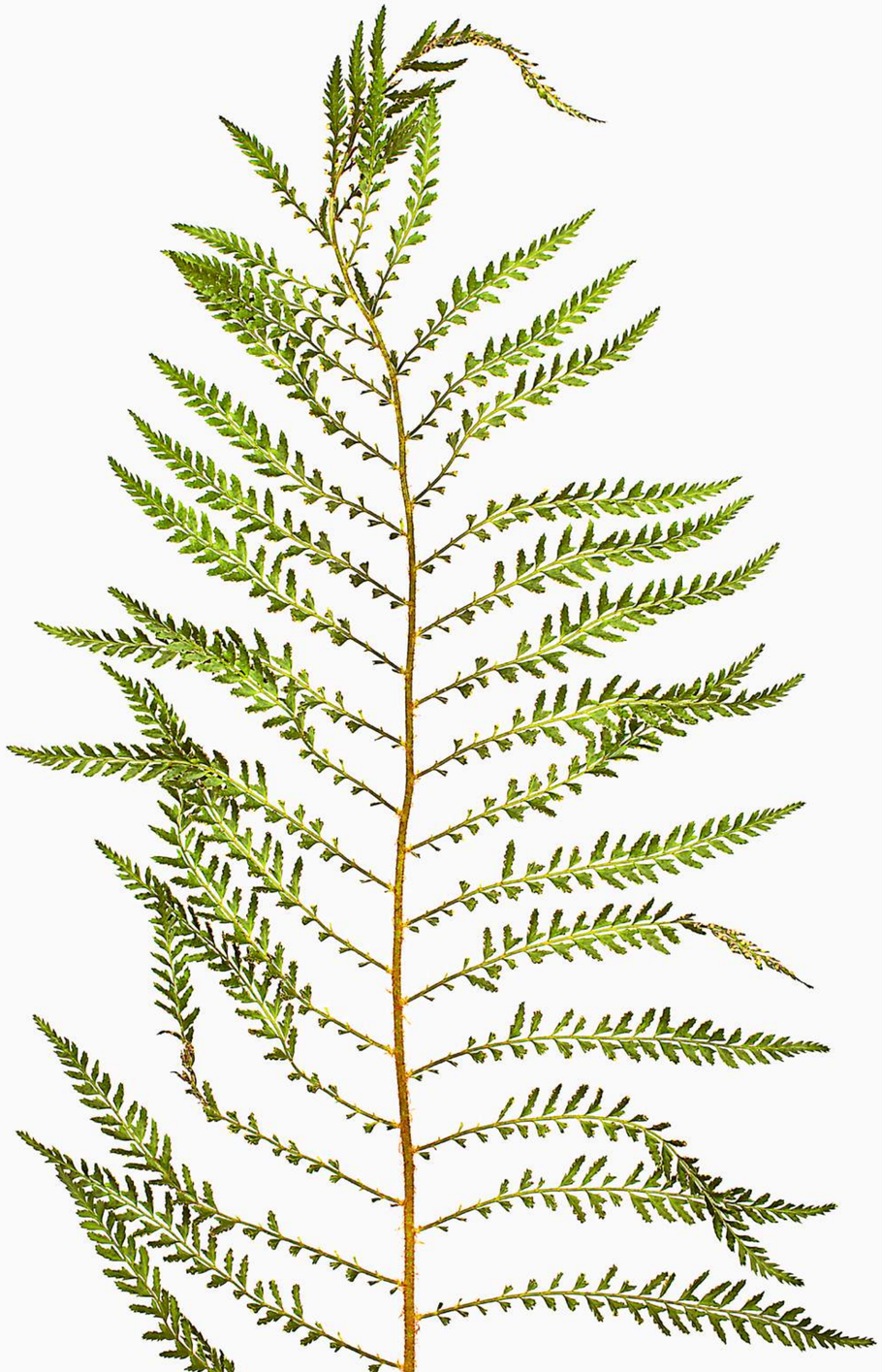




*Polystichum setiferum*
'Herrenhausen'

Another beautiful cultivar, one of the Divisilobum Group. This clone was selected at the Herrenhausen Gardens in Hanover, Germany, probably 30 or 40 years ago. It is a splendidly regular form of Divisilobum, it is not depauperate in any way, unlike some divisilobes which lack fully developed pinnules at the base of the pinnae. It is hard to separate from some old established plants in cultivation in the UK which certainly never came from Germany but the name of the clone has been lost and this form has been widely marketed recently. A word of caution: most plants on the market as 'Herrenhausen' are not the form you see here. If the plants in question have been raised from spores rather than by tissue culture they are likely to be poor substitutes.

*Polystichum setiferum*
'Lineare'



*Polystichum setiferum*
'Lineare'

A curious cultivar but not one of my favourites. It is usually not a strong growing plant and fronds tend to be few per crown and only 40 or 50 cm long. As can be seen in the photograph on page 174 the pinnules are missing or greatly reduced towards the base of the pinna. Other pinnules are much more attractive with a slender main lobe and quite a prominent thumb. If this character were developed throughout the pinna this cultivar would be approaching ´Hirondelle´, so called because an opposite pair of pinnules look much like a swallow in flight. Hirondelle being ´swallow´ in French. An alternative name for this cultivar is 'Confluens' because the pinnules are confluent or ´flowing together´.

*Polystichum setiferum*
'Nantes'

*Polystichum setiferum*
'Nantes'

Another cultivar to come from mainland Europe in recent years. It was presumably found at Nantes in France. Similar cultivars have been around for a long time referred to as rotundilobums, reflecting the rounded pinnules but they are not in the same class as true rotundatums in the sense of Victorian examples, where the pinnules are completely round with no lobing at all. I have been calling this Rotundilobum Group with this example 'Rotundilobum Ramosum'. The name came to me by word of mouth through Ray Coughlin about 1980. 'Nantes' and all of the Rotundifolium Group produce masses of bulbils along their rachis at the point where the pinnae are attached. Hence all are easily propagated.

*Polystichium setiferum*
Plumosum Densum
Group

*Polystichium setiferum*
Plumosum Densum
Group

This cultivar is a great favourite amongst gardeners. The fronds are very dense with the pinnules and pinnae rather crowded. Fronds are not normally very long, perhaps 50 cm, and generally they grow almost flat to the ground creating a star-like shape. Some forms produce fronds which all bend slightly the same way, when viewed from above this curvature gives a sensation of rotary movement. If that is not enough huge numbers of bulbils crowd every frond rachis, making propagation quite easy. If a frond is pegged to the ground below a plant in autumn and given a very shallow dressing with soil there is a very good chance some of the bulbils will strike roots and be suitable for planting out by the next autumn. A wonderful plant! There are a series of cultivars of this kind so it is easier to call them Plumosum Densum Group. They are thought to have been raised from a rather ordinary cultivar by Jones and Fox in the 1870s. Such an extraordinary leap from a mundane cultivar to this wonderful plant is hard to believe. I wonder if in fact these plants are sporelings of the ´Crawfordsburn fern´ which was found in Northern Ireland in 1861 and which would have been in the best collections during the 1870s. Other plants in the Jones and Fox series are even better than this, particularly 'Plumoso-divisilobum Baldwinii'.

*Polystichum setiferum*
Plumosum Densum
Group

*Polystichum setiferum*
Plumosum Densum
Group

Another pair of stunning photographs of a fern very similar to the one on pages 178 and 179. Here the frond has not been pressed flat, showing well the dense foliage. Here the pinnae are overlapping a great deal, an effect created because the pinnules are significantly longer. Careful examination of the base of the frond on page 180 shows the hint of bulbils forming even though the frond is quite young and still unfurling at the tip. The group Plumoso-densum merges into Plumoso-divisilobum. This plant is on the cusp between the two, it is a truly beautiful fern which every fern grower would love in their garden.

*Polystichum setiferum*
Plumosum Densum
Group



*Polystichum setiferum*
Plumosum Densum
Group

Here we have two more illustrations from the same plant as on pages 180 and 181. The crozier on page 182 speaks for itself. Imagine a crown full of fronds like this crowding together climbing to the light! The resultant frond shown on page 183 illustrates the extreme delicacy of the foliage. The pinnules are magnificent with often six pinnulets on each side.

*Polystichum setiferum*
'Plumosum Bevis'

*Polystichum setiferum*
'Plumosum Bevis'

This is one of the true classics of the fern world. The structure of the frond is light and airy with no depaupera-tions. The tip of the frond bunches a little with the pinnae near the tip be-coming increasingly falcate, i.e. sickle shaped, sweeping towards the tip. Well grown it can produce fronds 120 cm long. As a single flattened frond 'Bevis' perhaps looks rather unspectac-ular, but when seen as a multi-fronded mature plant it has a rare grace and elegance. 'Bevis', as it is affectionately known among fern lovers, was found as a wild plant on the Dorset/Devon borders near Hawkchurch by a hedge cutter called Jno. Bevis in 1876. He noticed the plant was different from the thousands of plants of *Polysti-chum setiferum* choking the hedges. He knew there was a Dr Wills in a nearby village who collected ferns so decided to take him the plant. Obvi-ously Dr Wills was delighted, whether or not he paid the hedge cutter is not recorded! Fortunately the fern tends to produce side crowns very eas-ily and when collected it had six or seven crowns. These were distributed among Dr Wills' contacts who in turn distributed it further. It had never been a common fern because it is virtually totally sterile, but then around 1990 mass propagation by tissue culture became possible and today the plant is tolerably common. It is grown in the garden of His Royal Highness Prince Charles, the heir to the British throne, at Highgrove. How sweet it is that 139 years after finding it even the heir to our throne knows who Bevis was! On page 168, in the discussion about *P. setiferum* 'Gracillimum', I give further details about 'Bevis'.

Today there is always discussion over the subject - should wild cultivars be collected from the wild? I believe they should. 'Bevis' was collected in 1876 and is now widely distributed among fern lovers. Not only that, in cultiva-tion tiny quantities of spores were found which eventually produced completely new cultivars. Had it been left in the hedge bank it would doubt-less by now be long gone - even if the hedge still exists!

*Polystichum setiferum*
Flexuosum Group

*Polystichum setiferum*
Flexuosum Group

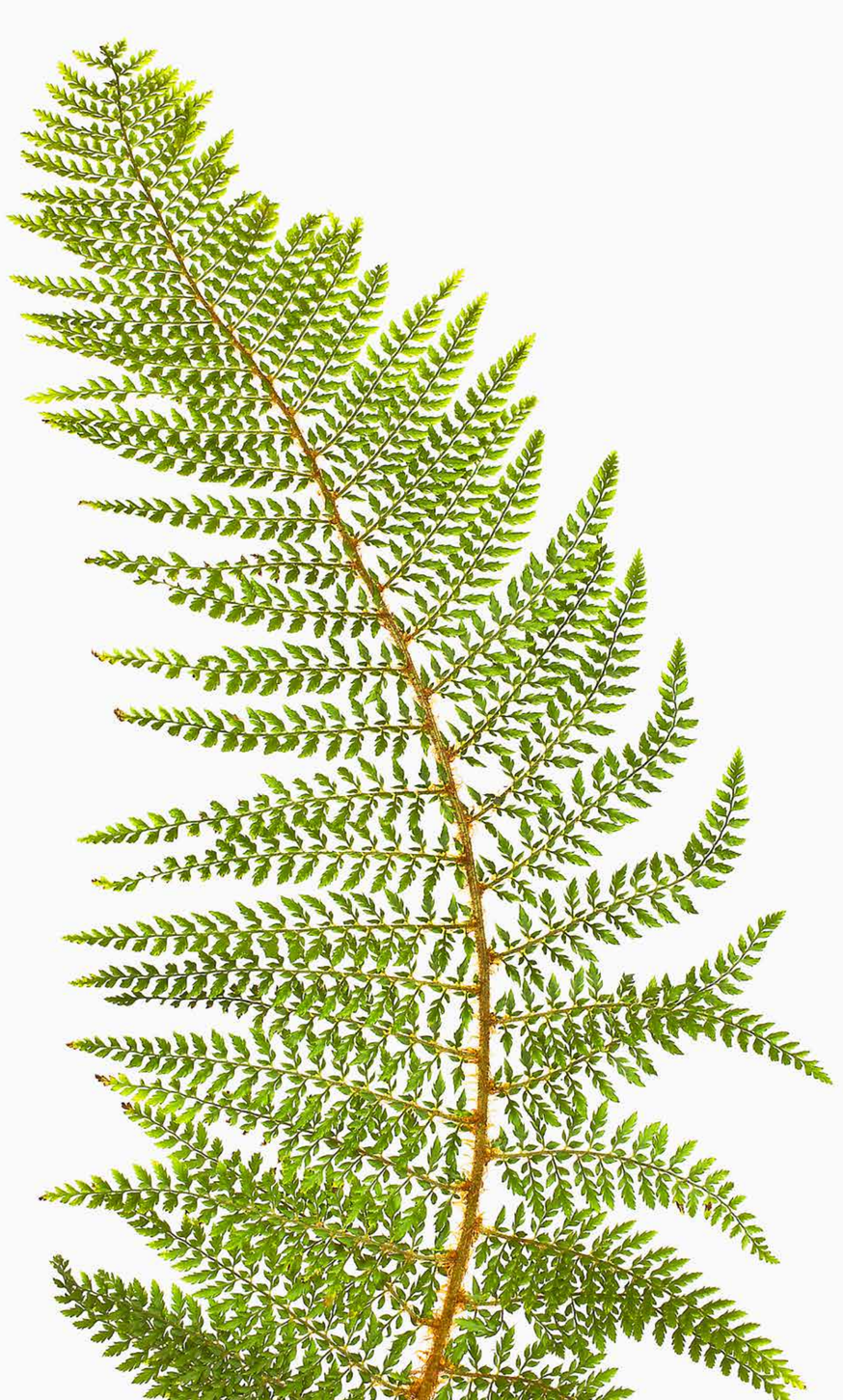
This plant is not a beauty, more a curiosity - quite a contrast to 'Bevis'! In Victorian times several forms of Flexuosum were known but they had apparently died out by late in the 20th century, perhaps they were considered too ugly to bother with. However, during a British Pteridological Society visit to the garden of E J Lowe in 1990, I collected spores from a curious plant in the garden. The progeny turned out to be this weird cultivar. It is easily recognised, the flexuose rachis, pinna midribs and pinnules are typical. It only grows to a height of about 50 cm, it´s fun, and I grow it!

*Polystichum setiferum*
Rotundilobum Group

This cultivar is rather like 'Nantes' on pages 176 and 177 except it is not crested or branched and it is not bulbiferous. The shape of the pinnules is rather similar and this is the main character which defines the group. The illustrations here are of young fronds, there is a hint they may develop into tripinnate forms.

*Polystichum setiferum*
Divisilobum Group





*Polystichum setiferum*
Divisilobum Group

This selection has been named 'Seestern' (starfish) in Germany, a name unfamiliar to me. It is a rather standard form of divisilobe, like all of its class it is rather beautiful and like many it looks like it will bear bulbils.

*Polystichum x luerssenii*

In the wild this is a very rare fern. So far as I know it is scattered through the southern, central and eastern mountainous areas of Europe. It is the hybrid produced as a cross between *Polystichum braunii* and *P. aculeatum*. I have seen it in the late Dr Reichstein´s garden in Basle and in one or two very special gardens in Germany, but that´s all. *Polystichum braunii* is not a common fern, while *P. aculeatum* is quite common but it is usually found in colder climates. As a consequence, their ranges rarely coincide. This is an attractive species looking more like *P. aculeatum*, to separate the two it would be easiest to look for the shrivelled spores of a hybrid.



*Pteridium aquilinum*

Bracken. Adlerfarn. Who wants to grow bracken in their garden, surely no one! I tried it once when a chance sporeling arrived in my nursery. Before long it produced the typical underground runners which enable it to take over vast areas - quite possibly as a single plant. Fortunately I managed to remove my foolish planting just in time without doing too much damage. I once heard an American speaker at a British symposium on the biology of bracken declare that there is quite possibly only one plant in the world. The American plant being connected to the European by rhizome across and under the Atlantic Ocean! A joke of course, but it is possible that a single plant could colonise a hillside. The spores of bracken have had a bad press. They are reputed to cause lung cancer. I think this could be true if regularly breathed in, much like any fine dust. Bracken also often harbours ticks in hilly districts so a quick check of one's lower body after hiking through it is sensible. Ideally avoid walking through it to avoid cancer and ticks!! I do actually currently grow a plant of bracken in my garden. Not the normal species but a plant called *P. aquilinum* 'Grandiceps', it is a cracking plant with huge terminal crests. I treasure it.

# Index





*Polystichum aculeatum*
'Zillertal'



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## Martin Rickard

Martin Rickard has been a fern enthusiast for almost 50 years. He has been president of the British Pteridological Society from 1997-2000 and was awarded the Society's Stansfield Medal in 2004. Martin has written or co-authored five books on ferns including the RHS Wisley handbook. Martin founded Rickards Hardy Ferns in 1989 and by 2002 had accumulated about 36 Royal Horticultural Society (RHS) Gold Medals including 12 consecutive Chelsea Flower Show Gold Medals. He has also won the Tudor Rose Award at Hampton Court Palace Flower Show and holds the Gold Veitch Memorial Medal awarded by the RHS in recognition of his advancement of science and the practice of horticulture. Today, while retired from the nursery, he enjoys continuing to learn about ferns by visiting them in gardens and in the wild, particularly in distant parts of the world.

## Peter Janke

Peter Janke, born in 1970 in Hilden, near Düsseldorf, grew up in his family's perennial, cut flower and potted plant nursery. At the age of 20, he was already a successful young entrepreneur, and he took over the family business two years later. From 2003 to 2004, he worked for and with Beth Chatto in Essex, England, and undertook plant research trips all over the world, studying plant communities in their natural locations. In 2006, he began designing his own 1.4 hectare garden kingdom with over 4,000 different plants. In April of 2008, Janke took over Helen Ballard and Gisela Schmiemann's famous *Helleborus* collection. In addition to his garden planning business, he manages a perennial nursery for rare and wild plants. Together with his husband, Michael Frinke, he has in recent years built up extensive collections of the genera *Helleborus, Galanthus, Polygonatum, Epimedium, Thalictrum, Libertia* and *Agapanthus*. As a garden designer, both ferns and grasses are particularly important to him. For many years, he has been a writer of gardening books, a gardening columnist for the daily press and has written articles on plants for professional journals.

## Josh Westrich

Josh Westrich studied theatre and film studies, and also music education, before he graduated with distinction from the Folkwang School in Essen as a qualified communications designer in the field of photography in 1985. Since then, he has been a freelancer in the field of still life photography, working in his own studio in Cologne. His clients include leading design and advertising agencies. In numerous publications and solo exhibitions, both at home and abroad, he has dedicated himself to his passion – flower portraits. In 2009, the Royal Horticultural Society (RHS) in London awarded him the Grenfell Medal for his floral works. In 2010 and 2014, he received this prestigious award for the second and third times. He has won first prize at the German Garden Book Awards in the category "Best illustrated book" four times with the following titles: "Alte Rosen" (2010), "For Galanthophiles" and third prize for "Alles Ausser Rosen" (2012), "Zwiebel-Blumen" (2013) and "Hepatica/Leberblümchen" (2014). For this work, he also received the STHIL Special Award for exceptional achievement.

*Polystichum braunii*

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