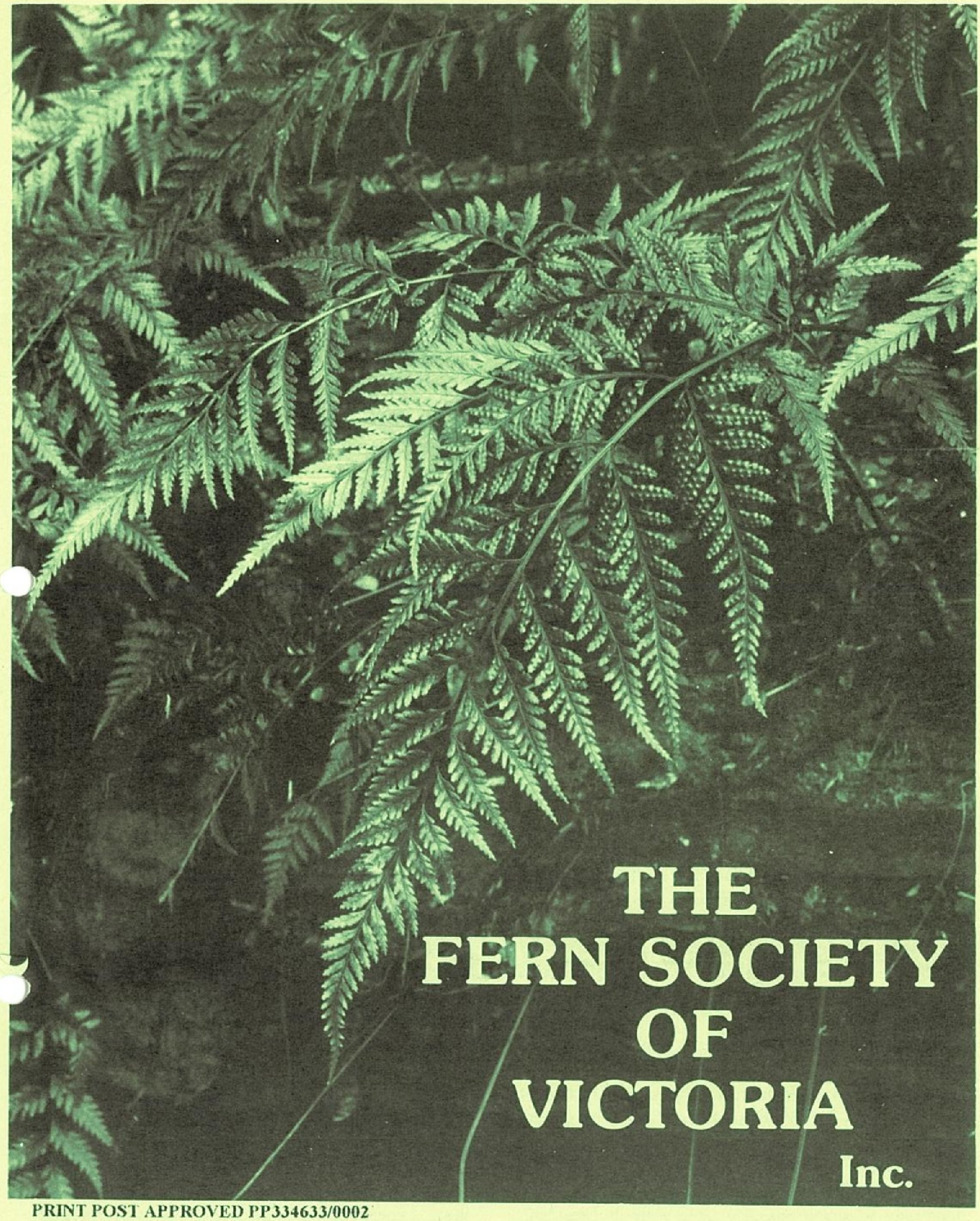

THE FERN SOCIETY OF VICTORIA Inc.

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NEWSLETTER

VOLUME 17, Number 5 July / August, 1995

FERN SOCIETY OF VICTORIA Inc.

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SUBSCRIPTIONS:

Single -	$15.00	(Pensioner/Student - $11.00)
Family -	$18.00	(Pensioners - $13.00)
Overseas -	A$30.00	(by Airmail)

Subscriptions fall due on 1st July each year.

PRESIDENT'S MESSAGE

It was good to see the well-attended meeting last month; having a well-known guest speaker like Jane Edmanson obviously helps to swell our numbers. Jane got the audience involved and gave a very entertaining talk despite some problems with a cold, and the failure of her publishing company to return her slides in time. I gave a talk to a garden group last week and was left floundering when the slide projector broke down, but Jane coped admirably.

The Annual General Meeting is coming up in August and it is likely to be a very important one with probable major implications for the future direction of the Society. The position of the Society is getting critical due partly to falling membership and partly to lack of persons willing and able to become involved in the running of the Society. We lack a President; I am only an acting one. My three years as President, the maximum allowed under the Constitution, expired last year. I have been away a bit this year and have not been able to give the job the attention it deserves. And I am aiming to be away even more next year. A similar situation also applies with our Editor. Bob Lee has given the Society tremendous service over the years but he is not in a position to continue to give the same degree of commitment. We are in serious need of new blood on the Committee, and at least a relief Editor who can take on the role when Bob is not able.

An interest in ferns does lead one into some beautiful areas of our bush. Last month after our trip to Marysville I was able to have a walk around Mount Buffalo, and then took in a number of fern walks around Hazelbrook and Mt Wilson in the Blue Mountains. Among the ferns spotted in Marysville was the filmy fern *Hymenophyllum peltatum*, which was the first time I had seen this fern, but having seen it once then found it again two days later on Mount Buffalo. One can also meet some nice members and see interesting ferneries when travelling about. I spent the best part of a day with both Kathy Goodall in Wodonga and Rose Bach in Sydney enjoying their ferns and hospitality.

Barry White
Acting President

FORTHCOMING MEETINGS

(1) THURSDAY - 20th JULY, 1995

Topic: NORFOLK ISLAND and TASMANIA

Speaker: KEITH HUTCHINSON

(2) THURSDAY - 17th AUGUST, 1995

(a) 16TH ANNUAL GENERAL MEETING

Agenda:
1. Minutes of 1994 AGM
2. President's Report
3. Treasurer's Report
4. General Business

(b) GENERAL MEETING

Topic: MARYSVILLE TRIP & ALBERT JENKIN'S RAINFOREST

Speaker: DON FULLER

VENUE: The National Herbarium, Royal Botanic Gardens
Birdwood Avenue, South Yarra. (Melway Ref. 2L A1)

MEETING TIMETABLE:

7.30 p.m. Pre-meeting Activities:- Sales of Ferns, Spore, Books and Special Effort Tickets. Library Loans.
8.00 p.m. General Meeting (AGM first in August)
8.30 p.m. Topic of the Evening
9.30 p.m. Fern Competition Judging
Fern Identification and Pathology
Special Effort Draw
9.45 p.m. Supper
10.00 p.m. Close

FERN COMPETITIONS

(1) July - A Fern Ally
(2) August - An *Asplenium*
(3) September - A Shield Fern

MEMBERSHIP SUBSCRIPTION RENEWAL

Membership subscriptions became due for renewal on 1st July. If you intend to continue your membership and have not already paid your subscription, please make sure to do so by the end of August, as payments made after this lead to considerable extra administrative work. Delivery of Newsletters will cease for memberships not renewed by the end of August.

SPEAKER REPORT - GENERAL MEETING, 18TH MAY, 1995

FERN FORUM - FERN GROWING FUNDAMENTALS

Leader: Bill Taylor

(The following report was kindly written by Simon Hardin.)

Member Bill Taylor chaired a forum on growing fundamentals. The discussion was divided into three sections: potting mixes, fertilisers, and pests and sprays. In each section Bill presented his own views on the topic and then invited members' contributions from the floor.

Potting Mixes:

Bill found the following basic ingredients useful in making up potting mixes:

1. Shredded leaves - these are shredded then immediately incorporated into the mix rather than composting first, although some other growers may prefer to use composted leaves. Bill shreds three types of leaves simultaneously - plane tree, liquidambar and oak.
2. Fine or coarse pine bark - the bark should be exposed to the weather for 2-3 months prior to use in a potting mix. This allows toxins such as pine resins to break down.
3. Coarse sand. This should be used with caution. Although sand does improve drainage in a mix, it also acts as a wetting agent, increasing the water-holding capacity of pine bark and leaf mould. Some experimentation is required to find the correct amount so that mix is not too soggy.

In addition, a number of other ingredients may be added:

- Shredded bracken.
- Sandy loam - a reputable source must be used since some loams may have a high salt content or a high pH (too basic) and can contain high calcium levels (e.g, as limestone). Such conditions will damage acid- or neutral-growing ferns. Testing salt and pH levels is desirable.
- Lignopeat - may be hard to find a source.
- Compost - not favoured by Bill since he does not turn his compost heap, which therefore does not reach high temperatures and may contain viable weed seeds. If used, compost should be well turned regularly to ensure good decomposition.

Bill uses a cement mixer to mix the ingredients in the potting medium. He then bags the mix and leaves it for 6 weeks before use. This results in a more homogeneous material.

Commercial potting mixes - a number of commercial mixes are satisfactory, either alone or mixed with up to 50% leaf mould. Commercial products should be checked for excessive sawdust content and for drainage. Some bags bear a label with black tick marks indicating that the product passes Australian Standards for drainage. Amongst satisfactory brands are K-Mart and Debco. Many of these mixes are now improved, using coarser pine bark and resulting in a more open material. Debco in particular are fussy about their standards and won't allow delivery in trailers or tipping on soil, lest the product is returned contaminated. Buying in bags is unfortunately much more expensive.

Other mixes - Don Fuller uses recipes found in the Fern Journal. Especially favoured are ones containing tree fern fibre (*Cyathea* or preferably *Dicksonia*). He uses two main types of potting mix: 1) A general-purpose mix containing fine pine peat and coarser pine bark and 2) An epiphyte mix with medium pine bark and orchid mix.

Fertilisers:

The type of fertiliser used depends on the fern and the growing conditions. Some fertilisers are:

- Blood and bone - a slow-acting nitrogenous fertiliser.
- Easily obtained and long-lasting.
- Osmocote - A slow release fertiliser in pellet form which can be purchased in a type specifically for ferns. Relatively expensive but long-lasting. Can be obtained in 3- or 9-month grades. Best placed in top layer of soil and near bottom (if potted). A typical amount would be about 12 grains at top and bottom in an 8-inch pot. The lifetime depends on the amount of watering and the temperature. If

used with manure, it should definitely not be mixed in the bulk medium since the heat from the manure may cause a rapid release of nutrients from the Osmocote, burning the plant. Osmocote may burn the foliage of plants if the granules are in direct contact (e.g. if placed in Platyceriums).

- Hoof and Horn - another fairly slow-acting nitrogenous fertiliser, similar to blood and bone.
- Aquasol - a faster-acting liquid fertiliser. As with most liquids, it must be applied more often than a solid product. As the potassium nitrate in the original formula has been replaced with urea, the nitrogen is not immediately accessible to the plant, so that Aquasol is not as good as formerly. Products with ammonia or urea must first have their nitrogen converted to nitrate before being accessible to the plant. This may take 2-3 weeks.
- Thrive - nearly all urea - not as good as a nitrate fertiliser. Rather alkaline.
- Maxicrop - an improved liquid product with nitrogen, phosphorus and potassium. May be used on its own or in a 1:1 mixture with Aquasol for hand watering every 1 or 2 months.
- Cow manure - can be used as a solid or applied as a liquid extract.
- Nitrosol - another liquid nitrogenous product.
- Fertiliser spikes - long-lasting and effective for reviving pot-bound plants.
- Dynamic Lifter - a compressed and pelletised fowl manure, shorter-lived than blood and bone. The lifetime depends on the watering frequency.
- Dynamic Lifter plus - as above but with extra nitrogen.
- Defender fertiliser pellets - also compressed fowl manure pellets. However, some batches were not compressed enough, so that they broke up rapidly (sometimes within 1 week), quickly releasing an excess of nutrients and burning the plants.
- Dried chicken or horse manures - also used by some growers.
- Ground eggshells, limestone, dolomite, gypsum - these supply calcium and increase the pH, resulting in a more alkaline medium. This may harm acid-loving or calcium-sensitive ferns such as *Blechnum spicant.*

Ferns generally should be fertilised sparingly as they are not gross feeders. Most ground ferns prefer a slightly acid fertiliser whereas some ferns (e.g. maidenhairs) prefer neutral to slightly alkaline conditions.

Pests and Sprays:

Bill found the main pests to be aphids, mealy bugs, caterpillars, slugs and snails and scale.

- **Slugs and snails** - these are difficult to control but can be deterred with snail baits. Sawdust spread around a fernery may offer some control.
- **Aphids, mealy bugs and caterpillars** - all readily controlled by a spray of full-strength Carbaryl containing 3-5 drops of Rogor or Folimat per litre of spray. These are both toxic and should be used with protective gear eg gloves, mask etc. Less effective but safer sprays are Garlic, Pyrethrum or Clensel. These usually need several applications at short intervals eg 2 to 3 times per week. Clensel is not effective for control of caterpillars. Dipel will kill looper and green caterpillars but not brown ones.
- Used pest strips may be used to fumigate individual potted plants. The pot is placed in a large rubbish bin. The pest strip is attached to the lid and the bin is sealed. The plant is removed after 2 to 4 hr. This method minimises damage to plants.
- **Staghorn beetle and passion vine hoppers** - controlled with systemic sprays such as Rogor. DDT is also effective, though no longer legal!
- **Scale** - over 90 species are known, but the main problem ones are soft brown scale, black or mussel scale, and coconut scale. May be controlled with the Carbaryl/Rogor (or Folimat) mixture. Repeated spraying is necessary to kill successive broods. White oil at fairly high dilution (half strength or less) will kill scale by suffocating them. It is less toxic than the other sprays. Once again, repeated spraying at around 2 week intervals is necessary to kill successive broods. If used at too high a strength, burning and stunting of new fronds on delicate species may occur (eg maidenhairs). Metasystox also is effective against scale. As ants often farm and protect scale for their sweet secretions, ant control is desirable. Remedies such as Ant-Rid or borax may be useful.
- **Fungus** - control may be difficult and badly affected plants may need to be destroyed. Particularly a problem with prothalli. Chemicals such as Kelthane may control fungal infections, but the best way is to prevent outbreaks by avoiding stagnant conditions and over-watering.

For potted plants, good advice is to handle the pots regularly. This allows one to check for pests and the weight of the pot will help to gauge whether the plant

is being over- or under-watered. In a larger collection, different species will have widely different water uptake rates and needs.

Most importantly, growers should adapt potting mixes, growing methods and pest control to their own situation. If a system works, don't change it!

SPEAKER REPORT - GENERAL MEETING, 15TH JUNE, 1995

JANE EDMANSON DELIGHTS AND INSPIRES

(The following report was kindly written by Ray Harrison)

Those who have enjoyed Jane on ABC TV and 3AK radio found it even more exciting to have her talking to them in person. It was not long before members found themselves taking part in lively discussion.

Jane had three main messages for the Fern Society. The first was in relation to an interest which she shares with the Society. Ferns for her are amongst the most beautiful of plants. They add lots of really cool lushness to a garden. With their different foliage, different textures, some with coloured new fronds and interesting spore patterns, they deserve much greater attention than they are currently receiving. Fashions in plants change over time and it seems that ferns are not "in" at present. Then she put it squarely in our lap. "What are we doing wrong?" she asked. Perhaps we could run "in service" workshops and invite nurseries to take part.

The second message was concerning the use of ferns in landscaping. Jane advocated the establishment of fern gullies in suburban gardens, creating different layered effects. Ferns are very well suited to shaded spots under trees, requiring only compost, and they can be kept moist with an automatic watering system. Many people are moving away from large gardens because of other interests and commitments, and these people may find their needs satisfied by baskets and pots, with ferns being ideal plants because they are generally evergreen and require relatively easy maintenance. The modern trend towards high density housing, as in dual occupancy and town houses, with very restricted open spaces, has led to much inappropriate planting, although regulations call for properly planned gardens. A judicious use of ferns might well help solve some of the problems now arising.

Of course, Jane's third message was in relation to the recent tour of Europe which she led. The highlight was obviously the Chelsea Flower Show in England, and the "piece de resistance" of that was the display by the City of Melbourne Parks and Gardens which won the gold medal. The British are not really aware of our wonderful native flora and were most impressed by our banksias, waratahs, kangaroo paws, bottle brushes and particularly our tree ferns (*Dicksonia antarctica*). They cannot grow tree ferns in most parts of Britain and the English were absolutely amazed by the marvellous specimens in the display.

Members took the opportunity to bring up a number of other topics. One was: how do you deal with aphids on ferns? Some methods given in the media tend to avoid the "harder" pesticides because they are not environmentally friendly. The use of sticky yellow strips is often recommended. Aphids and some other insects, are attracted by the yellow colour and they are then trapped. These strips are imported from England but a good substitute is petroleum jelly spread on a yellow strip. Hung in a glass house such a strip is very useful as a monitor, as well as a trap.

It was a stimulating evening.

Editor's Note: This Newsletter is a combined issue for July and August as I shall be away from Melbourne until early September. I was planning to make this a sixteen-page edition but I am afraid that with the pressure of other events I have run out of time. However, with apologies to the advertisers, I have made a small increase in the amount of text by using the back cover to complete an article.

FERNS WALKS IN THE BLUE MOUNTAINS

Barry White

The Blue Mountains just west of Sydney has many walks some of which have beautiful fern areas. Recently, I had the opportunity to look at three spots in the region of Hazelbrook and Lawson.

The first is in Hazelbrook, which is located on the Great Western Highway a little past Springwood. The particular walk is on the north side of town and commences from Oaklands Road just where the road bends to the left and changes its name to Hall Parade. The walk starts from the small open area on the right hand side of the road. The path more or less follows Hazelbrook Creek down past a series of waterfalls.

The first major waterfall is the Horseshoe Falls, followed a short distance further down by the Lyrebird Falls where the delicate Crepe Fern, *Leptopteris fraseri*, may be found. There is supposed to be a track from the region of the Lyrebird Falls around to the left to a natural rock feature called the Amphitheatre, but the track is ill-defined and locating the Amphitheatre involved a little bush-bashing.

Altogether 28 species of ferns were noted. The King Ferns (*Todea barbara*) were a feature of the area, and the Fork Fern (*Tmesipteris truncata*) was observed on one of the trunks. One interesting fern was the Comb Fern (*Schizaea rupestris*), an unimposing little fern resembling a clump of grass, but the presence of the spore-bearing "combs" is the tell-tale feature. *Lindsaea microphylla* was also common along the path. The track does not always follow the creek closely but there are regular sidetracks down to the creek and they are well worthwhile following. I highly recommend the walk; it is an easy walk which one could do in one or two hours, but because of the interest of the area my time was 4 1/2 hours.

There are two interesting walks in Lawson which is only a short distance from Hazelbrook. The first is on the south side of town and covers four falls the Adelina, Junction, Federal, and Cataract Falls. The walk starts in Honour Avenue near the junction with Livingstone St. Recent rains made the falls quite impressive, particularly Junction Falls, which is a pair of twin falls almost adjacent to each other and set on two creeks just before they join. The path is lined by ferns for most of the way. *Blechnum gregsonii*, which is mainly found in the Blue Mountains, was present at the Adelina and Cataract Falls, the ones at the latter spot having quite long semi-pendulous fronds. High cliffs were weeping a curtain of dripping water in several places. Twenty three species of ferns were observed. The walk does involve a reasonable number of steps and takes about three hours. However, picnic tables and benches at the Junction and Federal Falls provide handy rest spots.

The third walk is on the north side of Lawson and starts from the bottom of St Bernards Drive. One can do a short walk along the Dantes Glen walking track taking in St Michaels Falls and Fairy Falls. The ferns are not as prolific along this walk; 19 species were noted with *Lycopodium cernuum* being the only fern not seen during either of the earlier walks. Dantes Glen at the base of the high cliffs of St Michaels Falls is the main feature of the walk. The sunless nature of the area at the time I visited it was compounded by the lateness of the day. Again there is a moderate number of steps down and up from the falls. Being late in the day this walk was rushed and only took 1 1/4 hours.

All three walks are well worthwhile, though they are probably better spread over a couple of days to do them full justice.

Ferns observed in the Hazelbrook and Lawson areas were:

Species	Sites
Adiantum hispidulum	1,3
Asplenium bulbiferum	1
Asplenium flabellifolium	1,2,3
Blechnum ambiguum	1,2,3
Blechnum cartilagineum	1,2,3
Blechnum gregsonii	2
Blechnum minus	1,2,3
Blechnum nudum	1,2,3
Blechnum patersonii	1,2,3
Blechnum wattsii	1,2,3
Calochlaena dubia	1,2,3
Cyathea australis	1,2,3
Diplazium australe	1
Gleichenia dicarpa	1,2,3
Gleichenia microphyll	1,2,3
Grammitis billardieri	1,2
Histiopteris incisa	1

Hymenophyllum cupressiform	1,2,3	*Pteridium esculentum*	1,2,3
Leptopteris fraseri	2	*Pteris tremula*	1,2,3
Lindsaea linearis	1	*Pyrrosia rupestris*	1,2
Lindsaea microphylla	1,2,3	*Schizaea rupestris*	1,2
Lycopodium cernuum	3	*Sticherus flabellatus*	1,2,3
Pellaea falcata	2	*Tmesipteris truncata*	1
Pellaea falcata nana	1	*Todea barbara*	1,2,3

COMPETITION RESULTS

Congratulations to the following winners of the Fern Competition and the Special Effort draw for the June meeting. The Competition was judged by John Hodges.

FERN COMPETITION: (Category - Fern and Container)

First:	Keith Hutchinson	*Polypodium australe* 'Cambricum'
Second:	Terry Turney	*Pyrrosia lingua* cv.
Third:	Diana Mayne	*Asplenium aethiopicum*
Competitor's Draw:	Dorothy Forte	

SPECIAL EFFORT:

Lexie Hesketh, Joy Horman, Ivan Traverso, Margaret Radley, Brian Nicholls.

SUPPLEMENTARY SPORE LIST

Barry White

The spore listed below are additional to those listed in the June Newsletter.

HYPOLEPIS rugosula 5/95
CALOCHLAENA dubia 5/95
BLECHNUM nudum 5/95
CIBOTIUM glaucum 6/94
PTERIS umbrosa 2/95
PNEUMATOPTERIS pennigera 1/95
CYATHEA medullaris 1/95
PTERIS tremula 2/95
POLYSTICHUM richardii 2/95
POLYSTICHUM vestitum 2/95
DOODIA media 2/95
MIXED SPORE ex N.Z. 2/95
PTERIS comans 2/95
LASTREOPSIS velutina 2/95

The following spore are deleted: *Campylneuron angustifolium, Dryopteris filix-mas* 'Barnesii', *Cibotium regale* and *Athyrium niponicum* var. *pictum.*

My thanks to Sue MacLaurin and Mrs P.Johnstone for spore donations.

The following article is taken, with thanks, from the newsletter of the San Diego Fern Society, "The Fern World", XIX 2 (Feb. 1995)

NOTES ON STAGHORNS

This last month's meeting turned out to be about Staghorn ferns (Platyceriums). How to grow them, how to feed them, transplant them, and so on. This article includes some of that information and some tidbits from perhaps the best book on Platyceriums, Roy Vail's "Platycerium Hobbyist's Handbook".

Growing

Because Platyceriums come from different parts of the world, they have different growing habits. Some grow during our winter (December-March) and some grow in spring and summer. When the shield fronds turn brown, the plant usually isn't dying, but rather going dormant.

The most important part of the *Platycerium* is the growing tip. That growing tip is usually in the center of the plant and, if it dies, the plant dies. You can do a lot of damage to the sterile fronds (shield fronds) and fertile fronds without jeopardizing the plant, but if the growing tip gets killed (eaten, smashed, waterlogged), the whole plant will die.

In their native habit, Platyceriums are nature's garbage cans. They usually grow on other plants with their shield fronds designed to catch dead leaves, bird offal, dead insects, etc. As these decompose they provide food for the Staghorn. Although Platyceriums grow on other plants, they take no nourishment directly from their host; that is to say, staghorns are not parasitic, just epiphytic.

Many staghorns go a long time between rain storms and, generally, Platyceriums can withstand drying out. In fact, many hobbyists recommend letting the plant dry out and then just immersing the entire plant in a tub or pool of water for 20-30 minutes. This is very difficult to do with the larger staghorns (as they get very heavy, especially after being watered). For larger Platyceriums, it seems better to keep them moist as most are grown on sphagnum moss, which can be very hard to re-wet when it dries out.

Feeding

One of the favourite stories about Platyceriums is about people feeding them bananas. Bananas are a great source of phosphorous, but decaying bananas tend to attract ants .... and ants can bring scale, aphids and mealy bugs to your plants. The serious staghorn growers usually suggest using a good balanced fertilizer and skipping bananas.

Platyceriums tend to be heavy feeders, especially during the growing season. However, since some grow in winter and some in summer, it's good for you to know when each plant grows so that you don't overfeed.

Mounting and Transplanting

Generally people mount Platyceriums two ways:

- on trees with a little sphagnum moss behind the plant
- on boards with a little sphagnum moss behind the plant

There are some variations such as planting in baskets or in pots, but staghorns generally seem to do best when mounted in one of the two traditional ways.

As a general rule, there are two indicators when it is time to re-mount a *Platycerium*. The first is when the fronds start to overlap the edges of the board, especially the bottom. When this happens the plant doesn't look as handsome but, more important, it gets harder to get water to the plant roots or water will collect behind the plant and can actually drown the staghorn.

The second indicator is when the plant starts to grow away from the board. Succeeding years' sterile fronds will build up, layer on layer, and the plant can actually rip itself off the board or tree.

When you have decided to remount, you have other choices. If the plant reproduces from budding (pups), you can remove the pups and mount them, leaving the original plant on the old mounting. It's hard, but the easiest way to remove a pup is by carefully cutting it off the mother plant (stay away from the growing tip and main roots) with a sharp knife. If this leaves a hole, stuff the hole with sphagnum moss. Next year's sterile fronds should cover the hole.

If the plant reproduces only by sporing, you may have to trim off most of the back of the plant. Remember, the most active roots are just behind the current year's sterile fronds. So, for example, if you are remounting a *P. superbum*, you can use a large knife or saw to trim back about three inches.

When mounting a *Platycerium*, it seems that most people using monofilament (plastic fishing line). If you feel your plant is too heavy for fishing line you can use galvanized, aluminium or plastic-coated wire. Don't use copper wire as that can harm your plant.

Place your staghorn slightly below center on a board large enough to encompass the next year's growth (and then some if you don't want to remount your plant every other year). Wrap the monofilament or wire tightly around the plant both up and down and across. Be careful of the growing tip, but don't worry too much about the other fronds. Make sure the plant is solidly in place. Water the plant thoroughly and then hang it where you want it.

Tidbits

From the Introduction to Roy Vail's book, the "Platycerium Hobbyist's Handbook", here are a few slightly paraphrased bits of advice about growing Platyceriums.

1. Different people who grow the same species well may use different growing methods.

To me this means the plants themselves are adaptable and can be grown under different conditions. But this also means methods that work in one location may not work in another. Each of us needs to experiment with different growing methods. There may not be a best way of growing some *Platycerium* species.

But, most importantly it means that if you are already successfully growing a *Platycerium* species, do not change your method simply because it does not match what is described in a book. Keep doing what you are doing and tell others about it.

2. The difficult species are difficult for everyone.

Fewer than five people known to me keep *P. madagascariense* or *P. quadridichotomum* with any success. This does not mean keeping them is impossible. It may mean they require special care, and special environmental conditions, which few people are willing to provide year after year.

3. Please keep those labels.

There are many large and beautiful *Platycerium* whose labels have been lost. To the beginning hobbyist it seems plants take forever to become large or pup, but in a few years there are some giants and others have pups galore. But, where are the labels? Too often the *Platycerium* have overgrown them, or the pen faded, or the plastic label cracked and part of it fell off. The name is gone.

The solution is prevention. Use metal labels, non-fading nursery pens, nail labels to the front AND back of boards, or paint them, engrave them, or woodburn them. Do anything to make the label permanent. No one can remember the names of an entire collection. Please keep those labels.

4. Insist on correct labels and information.

It makes a collection of *Platycerium* more interesting if it has as much history as possible on each plant. In my collection one has a label that goes back through three people. The last on the list collected it in Madagascar.

But, if you buy a plant from a dealer with what you feel is incorrect information, take the dealer to task. One hobbyist had on the same wall three very different plants, all bought from the same dealer, all sold as *P. bifurcatum* cv. Majus. She thinks the dealer just labels plants with the name the customer is requesting. In my opinion, the dealer doesn't deserve to be in business. Incorrect information is worse than none at all.

5. Truly observe these interesting plants.

Taking notes on what your *Platycerium* are doing during the year adds dimensions to your hobby. What time of the year do different species form shield fronds? When are they growing fertile fronds? When are the shield fronds all dead? When are the shield fronds all green? When are the plants dormant? What species go dormant? How long do the fertile fronds live? How early can you tell where the spore patch will be? Share this information so it can be known if the answers to these questions are different in different localities.

The following article is taken, with thanks, from "Fiddlehead Forum" (July-October, 1994), the Bulletin of the American Fern Society.

THE FERN SPIKE

Robbin C. Moran (Department of Systematic Botany, University of Aarhus, Denmark)

About 40 kilometres south of Copenhagen lies Stevns Klint, a chalky limestone bluff overlooking the Baltic. The bluff is uninterrupted in its whiteness except for a one- to ten-centimetre thick, horizontal band of greyish-green clay. The Danes call this layer the "fish clay" because fish bones and scales are found in it, Geologists date its age at 65 million years and have designated it as the official boundary between two great periods of geological time: the Cretaceous and Tertiary.

The clay layer marks not only geological time but also one of the most prominent mass extinctions in the history of life on earth. This extinction occurred on land, air and sea, dooming an estimated 65 to 70 percent of the world's species . Its most famous victims were the dinosaurs, but hordes of lesser known creatures were also wiped out. Particularly hard hit were single-celled organisms: ninety percent of all genera of protozoans and algae disappeared, and most marine plankton vanished with such dramatic suddenness that they form an abrupt boundary -- easily seen in rocks -- referred to by geologists as the "plankton line."

What caused this mass extinction is hotly debated by scientists from many fields. The evidence with which they wrangle comes from disciplines as diverse as ballistics, climatology, vulcanology, mineralogy, palaeontology and astronomy. Particularly thought provoking has been evidence from palynology (the study of pollen and spores). This botanical subdiscipline has uncovered extraordinary evidence about the mass extinctions that is largely derived from fossil fern spores.

Before examining this evidence, it's necessary to review the theory that most researchers accept as the best explanation of what caused the mass extinction. This theory, called the Impact Theory, claims that an asteroid slammed into the earth, pulverising itself and nearby crustal rocks. The dust and smoke from the collision flew into the atmosphere and engulfed the entire planet for months or possibly years, blocking out all sunlight, According to computer simulations by scientists at the National Aeronautics and Space Administration, the earth was so dark that for months you could literally not see your hand in front of your face. Without sunlight, photosynthesis shut down and the existing vegetation perished. Food chains collapsed causing many animal species to become extinct. Upon settling, the dust cloud that enshrouded the planet formed the clay layer found at nearly all Cretaceous-Tertiary boundary sites around the world, such as the one at Stevns Klint. (The Impact Theory is strongly supported by two kinds of geological evidence within the clay layer. The first is an abundance of iridium, a metal rare in the earth's crust, but plentiful in asteroids, The second is the presence of "shocked" quartz grains -- tiny crystals with internal deformation bands caused by tremendous, sudden pressure. Besides in the boundary clay, such quartz grains are found only at meteorite craters and nuclear test sites.)

In addition to darkness, scientists postulate that wildfires raged around the globe. They calculate that some of the impact's ejecta were hurled above the earth's atmosphere and then re-entered the atmosphere hot enough to incandesce. The heat from this material would have touched off wildfires worldwide. Such a scenario might sound like unsubstantiated doom and gloom, but geologists have found soot in the clay layer which, if deposited in only one or two years, could only have been produced by a sudden burning equal to half of the world's present forests. In short, according to Impact Theory, the earth's vegetation at the close of the Cretaceous was decimated by wildfires and prolonged darkness. It looked like the charred landscape of a forest fire prevention poster.

The plants that came afterwards, at the beginning of the Tertiary, have been investigated by palynologists. By identifying the fossil pollen and spores entombed within the Late Cretaceous and Early Tertiary rocks, these researchers get clues about what the vegetation was like before and after the impact. These studies from around the world reveal a startling change. In the

Late Cretaceous, fossil fern spores account for about 15 to 30 percent of the total pollen and spore microfossil record, with seedplant pollen accounting for the rest. But immediately above the boundary, in the earliest Tertiary rocks, the number of fern spores jumps to as much as 99 percent of the total. Then, within the next 10 to 15 centimetres of overlying rock, the percentages drop to previous levels. Palynologists refer to this jump as the "fern spike" because of the sharp upward Pointing "V" that results when the percentages are plotted on a graph (Fig. 1).

The spike indicates that the first plants to revegetate the early Tertiary landscapes were ferns. Later, the ferns were replaced by more slow-growing and presumably longer-lived seed plants.

What could have caused such an explosion of the fern population? Ferns readily invade disturbed environments such as bare volcanic slopes or recently-burned forests. They colonise quickly and in large numbers by producing billions of spores carried by the wind. Given this rapidity, it seems likely that when the land lay ravaged after the asteroid impact, the ferns formed an advance guard for plant succession. They moved in, established a foothold, and prepared the landscape for other invading plants. For a while (scientists cannot say how long with certainty), ferns dominated the vegetation, turning the landscape green once again with the lush growth of their leaves. Their abundance in the post-impact vegetation accounted for the high percentage of spores in the rocks of that age.

The fern spike gives scientists a rare view of the extinction, Most other biological evidence about the extinction is taxonomic -- an accounting of the number of species, genera, and families that dropped out in the final stage of the Cretaceous. In contrast, the fern spike evinces changes at an ecological level. It tells of the reorganisations that occurred within plant communities and the fluctuations in the relative abundance of plants. Scientists rarely have this kind of ecological data in the study of extinctions.

In the public's mind, the end of the Cretaceous is associated with the demise of the dinosaurs; hardly anyone thinks about plants. But what revegetated the toasted remains of the early Tertiary tells a story just as crucial to understanding what happened 65 million years ago as the extinctions themselves. Critical evidence comes not only from organisms with box-office appeal, but also from more humble living things such as the ferns.

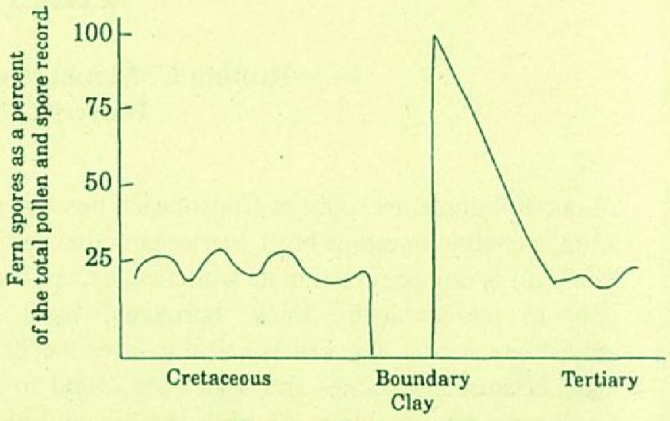

Figure 1: The fern spike

References:

Alvarez, W. and F. Asaro. 1990. What caused the mass extinction? An extraterrestrial impact. *Scientific American* 263:78-84.

Courtillot, V.E. 1990. What caused the mass extinction? A volcanic eruption. *Scientific American* 263:85-92.

Pillmore, C.L., R.H. Tschudy, C.J. Orth, J.S, Gilmore, J.D. Knight. 1984. Geologic framework of nonmarine Cretaceous-Tertiary boundary sites, Raton Basin, New Mexico and Colorado. *Science* 223: 1180- 1183.

Raup, D.M. 1991. *Extinction, Bad Genes or Bad Luck*? xvii+ 210 pp. W.W. Norton & Co., New York.

Saito T., T. Yamanoi and K. Kaiho. 1986. End-Cretaceous devastation of terrestrial flora in the boreal Far East. *Nature* 323: 253-255.

Tschudy, R.H. and B.D. Tschudy. 1986. Extinction and survival of plant life following the Cretaceous-Tertiary boundary, Western Interior, NorthAmerica. *Geology* 14: 667-670.

Ward, P.D. 1992. *On Methuselah's Trail, Living Fossils and the Great Extinctions*. xii + 212 pp. W. H. Freeman & Company, New York.

Wolback, W.S., R.S. Lewis, and E. Anders. 1985. Cretaceous extinctions: evidence for wildfires and search for meteoric material. *Science* 230: 167-170.