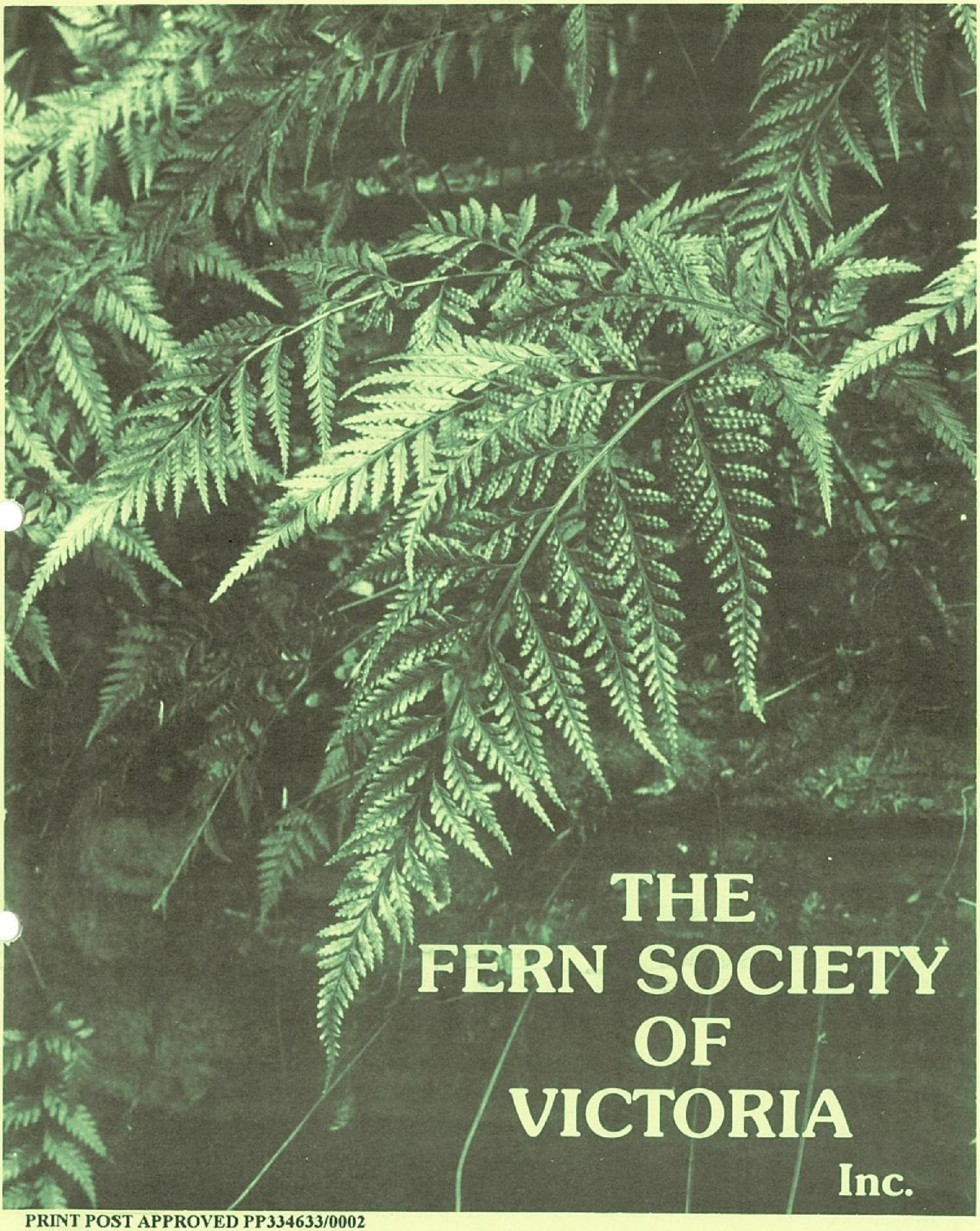

THE FERN SOCIETY OF VICTORIA Inc.

PRINT POST APPROVED PP334633/0002

NEWSLETTER

VOLUME 19, Number 5 - September / October, 1997

FERN SOCIETY OF VICTORIA Inc.

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SUBSCRIPTIONS:

Single -	$13.00	Pensioner/student $10.00
Family -	$15.00	Pensioner Family $12.00
Overseas -	A$20.00 (Magazine by airmail)	

Subscriptions fall due on 1st July each year.

OUR SOCIETY'S OBJECTIVES.

The objectives of the Society are;

*to bring together persons interested in ferns and allied plants
*to promote the gathering and dissemination of information about ferns
*to stimulate public interest in ferns and
*to promote the conservation of ferns and their habitats.

THE EDITOR WRITES....

Let me begin by thanking the kind people who have said nice things about the magazine lately. I do enjoy the work (and it is work!) that goes into each issue, the extra contact I have with fellow members, the opportunity to read the other societies' newsletters (bonus!!) and to learn about ferns all the time. Every job has its plusses and I love mine, even when deadlines loom large and the computer cracks up. Well...perhaps not then!

I'm always ready to hear your suggestions for improving the contents so please pass on your ideas - or your articles for publication. Kudos to the faithful writers who have regularly contributed articles, edited other peoples' and written up talks.

I would like to produce more pamphlets or booklets for the society to use as promotional handouts and would welcome your help and/or ideas in the form of suitable subject suggestions, short articles, original drawings etc.

In this issue we bring you news of a new fern added to the Victorian 'threatened species' list, Ian Broughton's secrets of success, a glossary of words used to describe ferns' habitats, a timely article on fern classification and genealogy, Barry White's account of a field trip in quest of the Lime Fern, and more. I trust you will find it all interesting reading.

Lyn Gresham

1997 FORTHCOMING MEETINGS & EVENTS

18th SEPTEMBER at 8 p.m.
18th ANNUAL GENERAL MEETING

Agenda:
1. Minutes of 1996 A.G.M.
2. President's report
3. Treasurer's report
4. General business.

GENERAL MEETING immediately following the A.G.M.
SPECTACULAR AUSTRALIA
with Roy Jacobs

A unique experience. An hour of spectacular views of Tasmania and the Kimberley region of W.A. displayed on four screens and enhanced by accompanying music.

GENERAL MEETING - 16th OCTOBER at 8 p.m.
DEMONSTRATION WORKSHOP NIGHT

Three or four of our experienced growers will present a short (15 - 20 minute) demonstration on different subjects relating to fern growing.

This will be an excellent introduction to our favourite form of gardening so will be a good meeting to bring guests to. Melbourne's garden clubs will be receiving invitations and if you would like your country garden club to receive one too, contact us at our P.O. box. Members are asked to bring a plate of supper for our visitors (and us!).

GENERAL MEETING TIMETABLE:

7.30	Pre-meeting activities - Sale of ferns, spore, books, merchandise and Special Effort tickets. Also library loans.
8.00	General Meeting.
8.15	Workshops and demonstrations.
9.15	Fern identification and pathology, Special Effort draw.
9.45	Supper.
10.00	Close.

VENUE: Victoria Bowling Club, 217 Grattan Street, Carlton. Melways ref. 2B: D-8.

MONTHLY COMPETITIONS:

SEPTEMBER **Lastreopsis and Microlepia**

OCTOBER **"My Most Stunning Fern" Non-competitive display.**

PNEUMATOPTERIS PENNIGERA (LIME FERN).

Barry White.

Acting on information in an old Newsletter of the Otways Group of the Society for Growing Australian Plants, I along with Joan and Bob Rowlands decided to look for the Lime Fern along the old railway line between Timboon and Camperdown. This line lies just west of the Otways. The starting point was the Kurdeez Lime Works which is about 6 km north of Timboon. The limestone quarry is still active and is a dusty noisy site. Just prior to the lime works is a lengthy stretch of an old railway trestle bridge. We had lunch there and were able to find a few unimpressive and miserable specimens of lime fern along the edge of the creek.

The old railway line continues north past the lime factory and forms an easy walking track. After a short walk the line crosses the creek providing ready access to the creek. Here and further up along the creek the lime fern was the major fern present. Some handsome specimens were about a metre and a half high and of a similar width. Duncan and Isaac stated thet the New Zealand form is often larger - if so they must be very impressive. Brownsey states that the New Zealand ones may have a trunk about a metre high and laminae 30 - 150 cm long.

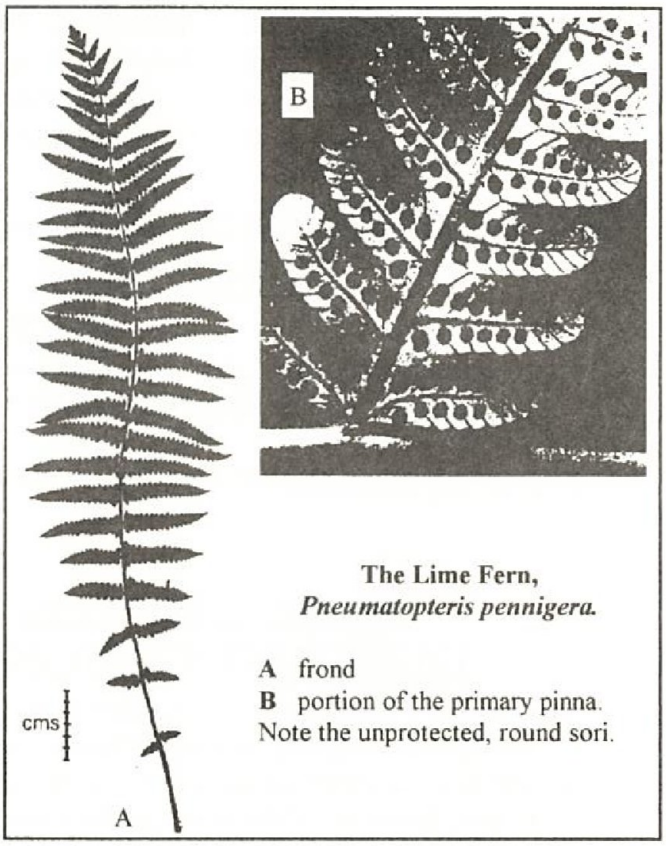
Also of interest was the presence of *Pteris comans* (netted brake) which is classified as rare in Victoria. It was growing intermingled with *Pteris tremular* and looking very similar, requiring close examination of the veins to be sure that it was *Pteris comans.* The *Pteris comans* which I have seen previously in Queensland, and now have growing, have much broader pinnae than *Pteris tremula* and the network of veins is quite obvious.

A number of other ferns was also noted in the area and listed below. We only walked up the line for about one kilometre but were subsequently informed by the forestry people that we should have gone on further in order to reach teh better fern spots - something to remember for next time. The walk did require crossing two railway bridges labelled "Danger, Keep Off Bridge".

Ferns noted in the area of the Kurdzee Lime Works.

Asplenium bulbiferum	Pneumatopteris pennigera
Azolla filiculoides	Polystichum proliferum
Blechnum chambersii	Pteris comans
Blechnum minus	Pteris tremula
Pellaea falcata	Pteridium esculentum

Pneumatopteris pennigera is a member of the thelipteridaceae family. Duncan and Isaac state that the Victorian species was placed in the pneumatopteris genus by Professor Holtum who pointed out that it came nearer to this genus than to any other. However the Victorian species differs from most other species in that the under surface of the dried lamina is smooth (not pustulate) and the sori are without indusia and lack both glands and hairs on the sporangia.



The Lime Fern,
Pneumatopteris pennigera.

A frond
B portion of the primary pinna.
Note the unprotected, round sori.

The fern is classified by the Department of Conservation and Natural Resources as "vulnerable" in Victoria. Vulnerable is defined as "not presently endangered, but likely to become so soon". It is also classified as "rare" in Australia which is defined as "not threatened but known from relatively few localities".

Pneumatopteris pennigera was first discovered in the Otways in 1943. It also occurs further west on the Glenelg River, and also in N.S.W., Tasmania, and in the Lamington area of Queensland. In New Zealand it is stated to be a common forest fern in damp places, largely in coastal regions in the southern South Island.

In Australia it is largely associated with limestone areas but the New Zealand form is said to be not confined to calcareous areas and is often a larger plant. In Chris Goudey's book it is stated that the Victorian form is very hard to grow in contrast to the New Zealand form which is different in appearance and is very hardy.

Sources
B. Duncan and G. Isaac "Ferns and Allied Plants of Victoria, Tasmania and South Australia"
P.J. Brownsey and J.C. Smith-Dodsworth "New Zealand Ferns and Allied Plants"
C. Goudey "A Handbook of Ferns for Australia and New Zealand".

SPEAKER REPORT - JULY 1997 GENERAL MEETING

THE PROPAGATION OF FERNS BY RHIZOME CUTTINGS

Ian Broughton

Ian, a commercial grower of ferns, has been a member of our society for 14 years. Until now he has resisted the many requests to speak at a meeting but Don somehow succeeded where many have failed - I think it was the opportunity to sell his ferns that did it!
He was obviously familiar with his subject, delighting his audience and I suspect surprising himself with a very interesting presentation. The hardest bit was getting him to stop!!

Once again we were treated to a two-part program. Before he launched into the rhizome talk and demonstration, Ian told us about a spot he loves - the Border Ranges National Park in New South Wales.

WHY BOTHER?

Ian propagates a lot of ferns by division. Why? It is time consuming and produces only small numbers of plants so its commercial value must be questioned.

There are many ferns which are either sterile or very reluctant to produce spore.
Sterile ferns can only be propagated by vegetative means; by either tissue culture or division.

Welsh Polypody (*Polypodium australe* 'Cambricum' is a sterile fern which occurs naturally in Wales.

Aglaomorpha 'Roberts' is thought to be a hybrid of *A. meyanianum* and *Pseudodrynaria coronans*. It too is sterile, as are a lot of hybrid ferns.

They do not produce viable spore.
Some ferns produce spore but that spore is not viable - that is, it will never grow fern plants.

Blechnum patersonii x *spicant* (Strap Water-fern x Ladder Fern) produces abundantly spore-laden fronds but examination under a microscope reveals that it is shrivelled and obviously unable to grow.

Lophosoria quadripinnata, dubbed "Jamaican Tree Fern" by Ian, is a member of the Dicksoniaceae family. It is native to Jamaica and North and South America. Plant division is the preferred method of increasing their numbers, though Ray Edwards got a few up from spore collected at the Adelaide Botanic Gardens.

L. quadripinnata is on Ian's shortlist of favourite ferns. It is beautiful, particularly as a young plant and is a manageable tree fern. It is large (2½ - 3 metres tall) but does not grow a trunk. It produces offsets so builds up quite a large crown, like the King Fern (*Todea barbara*). Despite its native countries it is extremely cold-hardy and is found at altitudes of well over 1,000 metres. It is not known to tolerate a lot of sun, though full morning sun would probably be all right.

They are too slow-growing.
There are many ferns which are just too slow growing to be commercial propositions. This long growing period also invites invasion by mosses, fungi, ring-ins etc.
An example would be the common Staghorn (*Platycerium superbum*). Others include the Canary Island Haresfoot (*Davallia canariensis*), Fan Ferns (*Sticherus spp.*), and the Wig Tree Fern (*Cyathea baileyana*), from the north east of Australia. The name refers to the hair-like leaflets which form a 'wig' in the crown of the plant.

To maintain a cultivated form that may not come true from spore.
Sometimes interesting or attractive forms of a fern pop up. These usually need to be reproduced by division in order to preserve the desirable appearance of the variant fern. Another point not often mentioned in relation to plant division is desirable properties such as unusual cold hardiness. Ian mentioned a form of Black Caterpillar Fern (a tropical fern which is hard to grow in Victoria, being quite cold-tender) which turned up in a batch, was kept because of its attractive frond form and proved to be cold-tolerant.

To produce smaller quantities than you would normally get from spore.
It is not always desirable to have hundreds (or thousands) of plants of one fern. Commercially, it is sometimes advantageous to have a limited supply so you can get a higher price for the ones that are available. Also, space is a consideration in both the

nursery and private garden. Very few of us have the luxury of too much room and not enough ferns!

To get a better plant than can be obtained from spore.
This applies to only a few ferns. Generally ferns grown from spore are lush and vigorous. A young plant with even growth growing in a 120cm pot is very attractive to customers. Just occasionally this is not the case. For example, the Rainbow Fern (*Culxita dubia*), which takes a number of years to produce the robust rhizome that is characteristic of a mature plant.

Fun!
A most important reason for dividing plants is simply the joy of doing it. We can enjoy playing in the dirt and find it personally rewarding to turn out something that is not commonly available. Try getting back to the grassroots (er...fernroots) of growing ferns, by spore cultivation or plant division.

TOOLS

Sharp secateurs for cutting back foliage and cutting any above-ground rhizomes. Never dig or cut into the potting mix with them.

Old secateurs to cut rhizomes which are in the potting mix and to divide tight root balls. Really old ones generally have better quality blades which tolerate abuse well.

Knife for when a cleaner cut is required, such as for the club-foot form of the Caterpillar Fern (*Polypodium formosanum*is cv. Cristatum), a fern whose rhizome rots easily when cut or broken. A very clean wound has a better chance of surviving.

Machete and chopping block for when all else fails! Used on large root balls or congested rhizome growth.

Sharp spade for dividing larger plants such as Lophosorias.

Hands, Ian's favourite tools and the ones to use whenever possible. With them, we can get a feel for how plants should be broken - their natural weak spots. Plant which are divided at these points will suffer less root damage. The risk of rotting of the rhizome is lessened, too.

HOW?

Know the plant and possible problems.

The Clubfoot Caterpillar Fern's problems have already been mentioned.

Fan Ferns (*Stichenus* spp.) and more so, Coral Ferns (*Gleichenia* spp.) and the Skeleton Fork Fern (*Psilotum nudum*) resent root disturbance so large divisions are essential.

Take pieces with established roots whenever possible. There are only a few ferns which will grow from bare rhizomes with any degree of success.

Replant rhizome cuttings at the right depth. Take note of the position of the rhizome before disturbing the plant. Does it grow above, in the surface of or buried below the ground? If you need to plant a surface-growing fern a bit deeper than normal to stabilise it in the pot, make sure that the growing point is not covered. If you cover it, the plant will probably grow but will take two or three times as long to reach a good size.

Look at the rhizome structure - it will tell you a lot about how to divide the plant. Aim for something with good roots, that will establish fairly quickly and easily.

A fern with a network of fine rhizomes can be roughly broken up into chunks. Some sections of rhizome will be damaged but there will be enough healthy ones to carry on.

The point at which a side rhizome branches off from the main one is often a logical place to make a division. It can be quite narrow just there and so the cut area is small and less likely to rot.

If a rhizome has small side shoots which look a bit like buds, the main one can be cut into sections containing a few 'buds' each. This may have better roots, helping the new plant to establish itself.

A long, creeping rhizome which doesn't have many side shoots can be removed from the plant whole and potted up without being further divided.

TIPS AND TRICKS.

1. **If your fern has;**

loose roots - divide the plant fron the top down. Do the rhizome first and the roots can be pulled apart fairly easily.

congested roots, as found in a rootbound pot - divide roots first to reduce the risk of breaking the roots off the rhizomes. You may then be able to pull the rhizomes apart, or may have to cut them.

a lot of underground rhizomes - (eg., Blackstem Maidenhair, White Grub) just divide the root ball into chunks with an appropriate amount of rhizome.

2. Unless commercial quantities are required, **be generous with your pieces**.

3. **Tip prune rhizomes** of appropriate species which have longer creeping rhizomes eg., some Davallias and Pyrrosias, to encourage side growth to develop.

Don't try this with Grub Ferns!

4. You may have to **sacrifice a basket** when dividing and repotting ferns which have rhizomes growing out through the sides. Cut the basket away from the fern rather than the other way around, and you will probably get four or more healthy pieces which will establish quickly. Plant these with the rhizome tips as flat as possible in their new pot, no matter which way up they have been growing. They won't mind at all and this encourages the new plant to grow evenly in the pot, rather than crawling down one side only.

5. **Reduce foliage** by about ½ to ¾, depending on the amount of intact root and the time of year. This is done to redirect the nutrients the plant is carrying to the growing tip of the rhizome. Sometimes all the foliage can be removed, if it is done at the right time of the year. A good time is just as the plant comes out of a period of slow, or no, growth and enters a time of rapid growth - commonly late spring to summer, though that depends on the particular species' growth pattern.

6. **Cut longer fronds back** to their lower pinnae to aid stability of the cutting in the potting mix.

7. **Don't inter a rhizome**. If it should be replanted below the surface, keep it fairly close to the top to allow new growth to emerge as quickly as possible.

8. **Use Benlate** on cut ends and damaged rhizomes. This is the secret of success with the Clubfoot Fern. It is a good idea for any ferns with large, fleshy rhizomes such as *Davallia canariensis* and *Aglaomorpha* 'Roberts' or any fern which tends to rot badly after being divided. Benlate was once available in powder form but is now sold commercially as granules here. Ian suggests making a thick paste with them and water and smearing that onto the injured surfaces.

9. **Water** freshly divided plants thoroughly and keep them extra moist for a while, until they begin to re-establish, but take care not to overdo the watering and cause problems.

10. **Don't divide plants** when the weather is particularly hot or cold.

11. A good container for a Caterpillar Fern is a **tree-fern pot**.

QUESTION TIME

Ian uses a standard potting mix containing 15 -20% sand, with water storing crystals added.

When asked about 'Envy' which is a product reputed to cut down frost damage (among other things) Ian replied that he had used it once and found it unsatisfactory in his fernery. Thge worst frost damage he had that year was to the plants that he had sprayed. Would you like to support or contradict this by telling of your experience with Envy? We are interested in hearing from you. Please post your comments to the address below or jot down your thoughts and give them to me at a meeting.

FERNS IAN PROPAGATES BY RHIZOME DIVISION.

Adiantum aethiopicum 'Lady Carrington'
A. cunninghamii - Large Maidenhair
A. formosum - Black Stem or Giant Maidenhair
Aglaomorpha cv. 'Roberts' - cv. of Bear's-paw
Blechnum patersonii
B. penna-marina ssp. alpina Alpine Water Fern
Calochlaena dubia (was Culcita dubia) -
False Bracken or Rainbow Fern
Colysis wrightii
Coniogramme japonica 'Variegata'
Variegated Bamboo Fern
Cyathea baileyana - Wig Tree Fern
Davallia canariensis -
Canary Islands Hare's Foot Fern
D. pyxidata - N.S.W. Hare's Foot Fern
D. tasmanii - Three Kings Island Hare's Foot Fern
Davallia sp. - Hare's Foot Fern
Lastreopsis tinerooensis -
a Shield Fern from Tineroo Hills, Q'ld.
L. microsota - Creeping Shield Fern
Lophosoria quadripinnata - Jamaican Tree Fern
Microsorum scandens Fragrant Fern
Polypodium australe 'Cambricum' -
Welsh Polypody
P. australe 'Elegantissimum' - Elizabethan Lace
P. fomosanum 'Cristatum' - Club Foot
Pyrrosia polydactyla
P. rupestris - Rock Felt Fern
P. serpens - New Zealand Felt Fern
Scyphularia cv. - Black Caterpillar Fern.
Selaginella sp
Sticherus tener - Silky Fan Fern.

- Lyn Gresham

Editor's address: Mrs. L. Gresham 20 Murchison Road Avenel Vic 3664

CHANGE TO FLORA AND FAUNA ACT 1988.

Mary Frost, a member from Wangaratta, has sent me a clipping from the 'Weekly Times" dated July 23rd which lists flora and fauna in Victoria that are now classified as threatened species. Included is *Asplenium hookerianum* or Maidenhair Spleenwort.

FROM THE COMMITTEE.....

RULES UPDATE

Your committee, in particular Ray Harrison, has been busy updating the "Objectives and Rules" and the changeare to be presented to the general meeting in November for ratification. They are minor changes;

a) to remove gender references to satisfy the requirements of the 1992 Regulations for Incorporated Associations,

b) to correct a minor error in numbering in the 1992 version of the Objectives and Rules, and

c) to simplify the language in a few instances.

The meaning is not affected by these changes.

Formal notice of our intention is made in this issue of the Newsletter. Copies of this document and the proposed amendments will be available at that meeting.

POSITIONS VACANT

You are asked to again consider taking the position of secretary of our management committee. The need is great as the other committee members cannot be expected to go on covering the secretary's work as well as their own.

Please direct enquiries to a committee member if the idea of joining a friendly team appeals to you. Of course, nominations come from any member.

SEPTEMBER SENSORY SPECTACULAR

The program following the A..G.M. on Sept. 18 will be well worth seeing and hearing. Roy Jacobs, a photographer and enthusiastic traveller through Australia, has arranged slides of some of his travels for us. It's a Fern Society program with a difference and a slide show with a difference - sufficient to say you shouldn't miss it. It is an hour long but the time will fly.

DO KEEP IN TOUCH

We are always pleased to welcome visitors and new members to our functions and to spread our newsletter and other services to country members and those who can't get to the meetings. It's also nice to hear from isolated members. Your news, questions, problems, hints and tips - anything you care to say - will always be welcomed and answered either by letter or via the newsletter.

SPECIAL EVENT

Our society has accepted an invitation to have a promotional stand at the Nat. Dahlia Society of Victoria's 1998 State Dahlia Championships to be held at the Mount Waverley Community Centre on Feb. 28 - March 1. This is seven weeks before our Show, not too close, and a good (free) opportunity to advertise it and the society among garden lovers. We will also get a close look at the venue in readiness for our show - and be dazzled by the dahlias on show.

The promotion will consist of a display of potted ferns, pamphlets to distribute and if possible some mini-workshops. Any offers and other ideas are welcome - see a committee member. People are needed to man the stand and generally be nice to visitors. Free admission will be arranged for workers.

Your Committee.

MEMBERSHIP SUBSCRIPTIONS OVERDUE.

We value the part you play in the Society and are sure you won't want to miss out on the benefits you can enjoy as a member. If you haven't yet done so, please send your cheque with the filled out **order form** SOON! If you have lost the form all we need is your name, address, type of membership and signature with your payment.

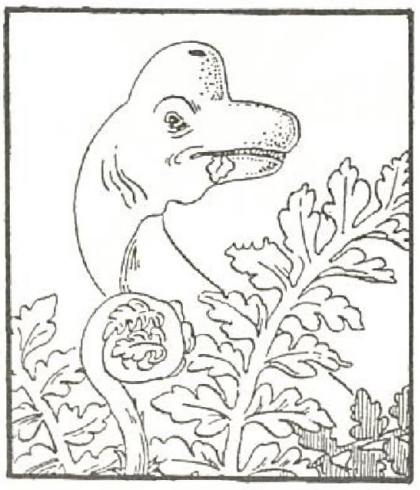
NEW MEMBERS' APPLICATIONS.

An **information pamphlet** which includes an application form for NEW membership is a useful handout to help you promote the Society. For free copies send an addressed, business size pre-stamped envelope when asking for up to six copies, or a C4 size envelope (available at Post Offices) prestamped to the value of $2.20 for larger quantities, to P.O. Box 45, Heidelberg West, Vic. 3081.

The following article is reproduced, with thanks, from "Pteridologist" 3, 1 (1996), published by the British Pteridological Society.

HANGERS-ON FROM THE MESOZOIC

Robbin C. Moran



In 1928, Oene Posthumus, a Dutch pteridologist and paleobotanist, made a startling discovery. While examining herbarium specimens at the Botanical Garden in Bogor, Java, he came across an unusual fern from New Guinea and realised that it represented a new species of *Dipteris* (family Dipteridaceae). But that wasn't all. From his knowledge of paleobotany he also realized that the specimen was a dead-ringer for a Mesozoic fossil fern, one that had presumably been extinct for millions of years (Fig. 1). As an expert in the taxonomy of living and fossil ferns, Posthumus must have been thrilled by this discovery, for he had simultaneously found a new species and a living fossil. He described his findings in an article titled "*Dipteris novo-guineensis*, ein 'Lebendes Fossil'".

Although Posthumus' discovery was remarkable, his chances of finding a living fossil among the Dipteridaceae were excellent, and they would have been equally good in the closely related Matoniaceae. These two families are represented by abundant fossils in rocks of the Mesozoic Era, a time popularly known as the Age of Dinosaurs (their fossils have not been found in older rocks). During that time, which lasted from 225 to 65 million years ago, the two fern families reached their zenith. They thrived as dominant, herbaceous, ground-layer plants and were very diverse: the Dipteridaceae boasted 6 genera and at least 60 species, the Matoniaceae 8 genera and 26 species (Fig. 2).

The Dipteridaceae and Matoniaceae flourished worldwide, occurring on all continents and extending from Greenland and Spitsbergen in the north to Tierra del Fuego and Antarctica in the south (Fig. 3). What better group in which to find a living fossil than one that was formerly abundant, diverse and widespread? (The past greatness of these ferns is reflected by the fact that about ten times more scientific papers have been published on the fossils than on the living plants).

But if paleobotanists are around millions of years from now, and if they are searching for fossils of present-day Dipteridaceae and Matoniaceae, they won't be as lucky as Posthumus. Nowadays the two families are an impoverished lot, a mere vestige of their former Mesozoic vigour. Taxonomically, the Dipteridaceae claims only six species in one genus (*Dipteris*), and the Matoniaceae only four species in two genera (*Matonia* and *Phanerosorus*). That means that for every one living species there are about nine fossil ones. Besides being fewer, the living species are far less diverse morphologically than the fossils, especially in the form and dissection of the leaf blades.

The families today are also less widespread geographically. They no longer occur worldwide but are restricted to southeastern Asia (Fig. 3, shaded areas). One genus, *Phanerosorus*, is found only on Borneo and several small islands off the west coast of New Guinea. Another genus, *Matonia*, is limited to the Philippines, the Malay Peninsula and Borneo. *Dipteris*, which has a range encompassing the others, occurs from northeastern India to Taiwan, the Fiji Islands, New Caledonia, northeastern Queensland, Malaya and Thailand. Given their reduced number of species with restricted ranges, the present-day Dipteridaceae and Matoniaceae are clearly depauperate compared to their former opulence in the Mesozoic. What could have caused their demise?

One explanation is suggested by the changes in species composition that occurred in Late Mesozoic forests and by the kinds of habitats where the Dipteridaceae and Matoniaceae occur today. The Early and Middle Mesozoic forests were dominated by gymnosperms such as conifers, ginkgoes, bennettites (cycadeioids) and cycads. Tree ferns representing the Dicksoniaceae were also present but fewer. These plants generally had either palm-like or spire-shaped crowns and did not cast a dense shade. They therefore tended to form semi-open forests where plenty of sunlight reached the ground, and it was in these forests that the Dipteridaceae and Matoniaceae luxuriated for millions of years. Besides forests, the two families probably dominated open habitats along with other ferns, forming a continuous cover to create veritable "fern prairies" (grasses and sedges, which abound in open areas today, had not yet evolved).

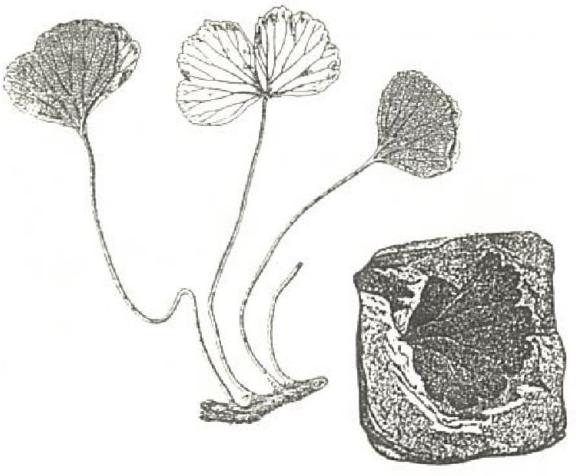


Fig. 1. *Dipteris novoguineensis* and the Triassic fossil *Hausmannia crenata* (lower right). The fossil shows only the right half of the leaf blade.

The present-day species of Dipteridaceae and Matoniaceae still grow in open or semi-open places as their ancestors did millions of years ago. For example, *Dipteris conjugata* and*Matonia pectinata* (Fig. 4), the two most widespread species in these families, flourish on exposed mountain ridges, forest edges and clearings. One place where these two species grow together, as their ancestors did during the Mesozoic, is Mt. Ophir in the Malay Peninsula. The ferns' habitat there was described by English naturalist Alfred Russel Wallace (co-developer with Darwin of the theory of evolution by natural selection) in narrating his ascent of the mountain:

> "After passing a little tangled jungle and swampy thickets, we emerged into a fine lofty forest pretty clear of undergrowth, and in which we could walk freely. We ascended steadily up a moderate slope for several miles, having a deep ravine on the left. We then had a level plateau or shoulder to cross, after which the ascent was steeper and the forest denser till we came out upon the "Padang-Bata", or stone-field..... Parts of it were quite bare, but where it was cracked or fissured there grew a luxuriant vegetation, among which the Pitcher plants were most remarkable..... A few Coniferae of the genus *Dacrydium* here first appeared, and in the thickets, just above the rocky surface, we walked through groves of those splendid ferns, *Dipteris Horsfieldii* [= *D. conjugata*] and *Matonia pectinata*, which bear large spreading palmate fronds on slender stems (petioles) 6 or 8 feet high".

Fig. 2. - **left** Reconstructions of the leaves of three fossil Dipteridaceae:
- top: *Clathopteris meniscoides*; - middle: *Hausmannia dentata*;
- bottom: *H. nariwaensis*. (from Oishi & Yamasita, 1935).
- **right** Reconstruction of *Phlebopteris smithii*, the oldest (Late Triassic) fossil species of the Matoniaceae. The distinctive division of the leaf blade allows the fossils to be assigned to the family with a high degree of certainty. (Redrawn from Ash *et al.*, 1982).

Like the *Dipteris* and *Matonia* observed by Wallace, the two species of *Phanerosorus* also grow in open habitats, usually limestone cliffs and often in full sun. In fact, nearly all species in the two families avoid shady habitats, preferring instead lightly shaded forests or sunny places.

But in the Late Mesozoic the forests began to change. The original gymnospermous trees were gradually replaced by newly evolved angiospermous ones, and the forest floor environment, where the Dipteridaceae and Matoniaceae had thrived, changed for ever.

Unlike earlier forests, the new angiosperm-dominated ones displayed multiple layers of vegetation that cast a dense shade. The uppermost layer, or canopy, was 30-40 metres high with broad tree crowns tightly packed to catch as much light as possible. Beneath it thrived an irregular layer of trees and shrubs, and beneath them a sparse herbaceous layer populated the forest floor. On trunks and canopy branches flourished flowering-plant epiphytes, vines and lianas, each intercepting their share of sunlight and helping create a dark world on the forest floor below. In tropical rainforests today, for example, the ground usually receives less than 1% of the

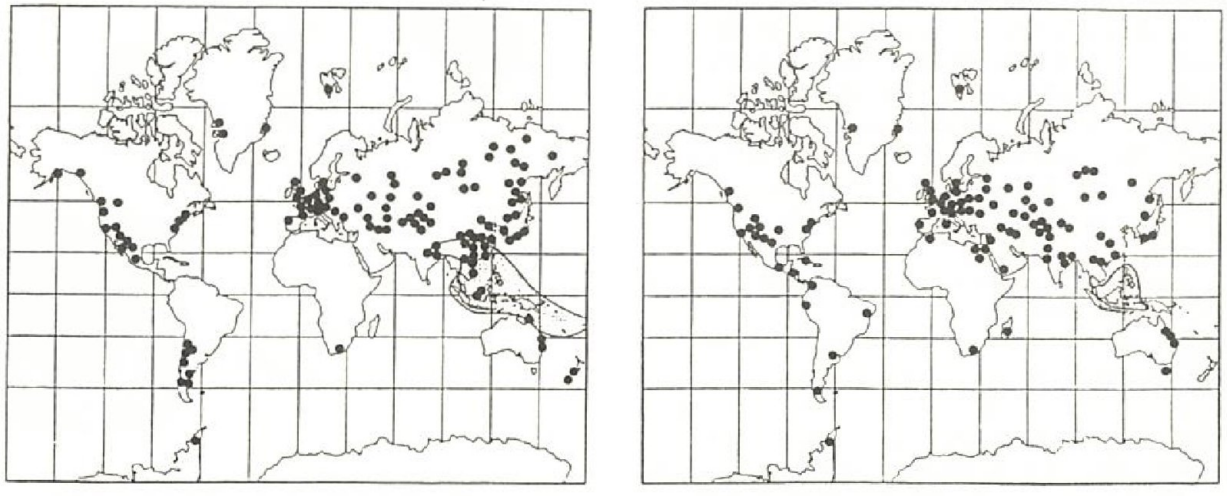


Fig. 3 The past and present distribution of the Dipteridaceae *left* and the Matoniaceae *right*. The dots are the Mesozoic fossil localities, the shaded areas the present day range

light above the trees. Thus, as angiosperms replaced gymnosperms in the Late Mesozoic, the open and semi-open forests were replaced by deeply shaded ones.

The time of this replacement corresponds to a decline in the fossil record of the Dipteridaceae and Matoniaceae. Their number of species and abundance in the vegetation plummets, so that during the last Period of the Mesozoic (the Late Cretaceous) and afterwards in the Cenozoic, they are virtually unknown. This suggests that the rise of the new, angiosperm-dominated forests fostered the decline of the two families. It's as if the two families, after having thrived for millions years in semi-open gymnospermous forests, could not adapt to the new forest environments.

But the rise of angiosperms alone is probably not the whole answer to the mystery of the ferns' decline. Such a drastic event as the limitation of a once abundant and worldwide group of ferns to a few species in south-eastern Asia, and not somewhere else, must have entailed other factors. Nevertheless, the family's preference for open and semi-open habitats provides persuasive evidence for granting a major role to the basic factor of shading by angiospermous trees.

If there's ever an example of the importance of fossils in understanding present-day life on earth, it is the Dipteridaceae-Matoniaceae story. Their past species richness, their former world-wide distribution and abundance in the vegetation, and their decline as angiosperms rose to dominance at the end of the Mesozoic - all this is revealed by fossils. Like Oene Posthumus, we too have reason to rejoice over plant fossils from the Mesozoic.

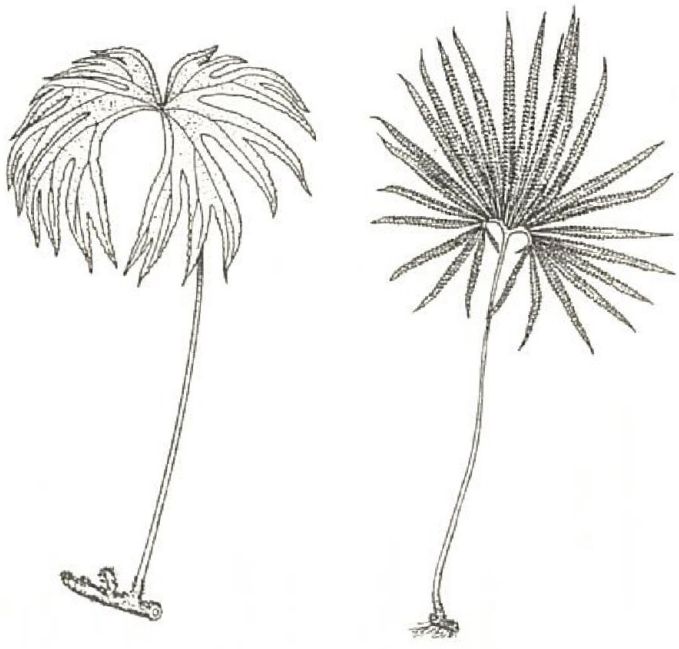


Fig. 4. **left** *Dipteris conjuga* and **right** *Matonia pectinata*, the most widespread, present-day species of the families Dipteridaceae and Matoniaceae.

Selected References and Notes

Oene Posthumus described his new species and compared it to the fossil *Hausmannia crenata* in "*Dipteris novo-guineensis*, ein 'Lebendes Fossil'", *Recueil des Travaux Botaniques Neerlandais* 24: 244-249 (1928).

The number of genera and species of Dipteridaceae was taken from **Wilson N. Stewart and Gar W. Rothwell**, *Paleobatany and the Evolution of Plants*, ed. 2 (Cambridge: Cambridge University Press, 1993); for the Matoniaceae from **Edouard Boreau**, *Traite de Paleobotanique*, tome 4, fascicule 1 (Paris: Masson et Cie., 1970).

The plants in Figure 2 (left) were taken from **Saburo Oishi and Kazuo Yamasita**, "On the Fossil Dipteridaceae", *Journal of the Faculty of Science Hokkaido Imperial University* series 4, Geology and Mineralogy 3(1): 135-184. Figure 2 (right) is redrawn from **Sidney Ash, Ronald J. Litwin and Alfred Traverse**, "The Upper Triassic Fern *Phlebopteris smithii* (Daugherty) Arnold and its Spores", *Palynology* 6: 203-219 (1982).

The change from gymnosperm- to angiosperm-dominated forests in the Late Mesozoic is discussed by **Peter R. Crane**, "Vegetational Consequences of the Angiosperm Diversification", in *The Origins of Angiosperms and Their Biological Consequences*, edited by **Else Marie Friis, William G. Chaloner and Peter R. Crane** (New York: Cambridge Univ. Press, 1987). Recent research has shown that pteridophytes prevailed at some sites in northern mid-latitudes during the Late Mesozoic: **Scott L. Wing, Leo J. Hickey and Carl C. Swisher**, "Implications of an Exceptional Fossil Flora for Late Cretaceous Vegetation", *Nature* 363: 342-344 (1993).

The distributions of fossil Dipteridaceae and Matoniaceae (Fig. 3) were compiled from **Paule Corsin and Michel Waterlot**, "Paleobiogeography of the Dipteridaceae and Matoniaceae of the Mesozoic", Fourth International Gondwana Symposium 1: 51-70 (1979).

The habitats of *Dipteris conjugata* and *Matonia pectinata* are described by **Richard E. Holttum**, *Flora of Malaya*, Volume 2, *Ferns*, ed. 2 (Singapore: Government Printing Office, 1968), The quotation of **Alfred Russel Wallace** was from his book *The Malay Archipelago* (London, 1886). The limestone cliff habitat of *Phanerosorus* was studied by **Trevor G. Walker and A. Clive Jermy**, "The Ecology and Cytology of *Phanerosorus* (Matoniaceae)", *Fern Gazette* 12: 209-213 (1982).

THE FERN SOCIETY OF VICTORIA INC.
STATEMENT OF INCOME & EXPENDITURE
FOR YEAR ENDED 30th JUNE 1997

BALANCE SHEET AS AT 30th JUNE1997

1996 $			1997 $
	MEMBERS FUNDS		
18458.41	As/1996 Balance Sheet		18925.26
466.85	Surplus		477.41
$18925.26	**TOTAL MEMBERS FUNDS**		$19402.67
	REPRESENTED BY		
	CURRENT ASSETS		
128.16	Cash on hand - Book Sales	209.16	
-	Prepaid Deposit	100.00	309.16
	CASH AT BANK		
3456.91	General Account		2676.75
	STOCK		
273.90	Books	441.30	
184.59	Glasses	150.11	591.41
	INVESTMENTS		
14735.70	Term Deposit		15706.35
	FIXED ASSETS		
124.00	Library - Less Dep'n	96.00	
85.00	Plant & Equip't - Less Dep'n	51.00	147.00
18988.26	**TOTAL ASSETS**		19430.67
	CURRENT LIABILITIES		
63.00	Prepaid Fees	28.00	
	TOTAL LIABILITIES		28.00
$18925.26	**TOTAL NET ASSETS**		$19402.67

GENERAL ACCOUNT

INCOME

1996 $			1997 $	
	SUBSCRIPTIONS			
1618.00	Renewals		1916.90	
231.00	New Members		111.00	2027.90
	SALES /COMMISSIONS			
284.85	Spore Bank		7.60	
-	Commissions		166.05	
438.30	Misc. Sales	420.70		
-339.01	Less Cost of Sales	-312.98	107.72	281.37
	SPECIAL EFFORTS			
231.50	General		242.50	
-48.00	Less - Expenses		-28.60	213.90
	OTHER INCOME			
262.00	Advertising		283.00	
50.00	Sundry Income		-	283.00
				2806.17
	ADD NON - OPER'G INCOME			
	Bank Interest			
116.82	General Account		114.83	
1008.92	Term Deposit		971.10	1085.93
$3854.38	**TOTAL INCOME**			$3892.10

EXPENDITURE

1996 $			1997 $	
	NEWSLETTERS			
1346.00	Printing	1219.00		
385.47	Postage	373.96		1592.96
	ADMINISTRATION			
200.00	Honorariums	200.00		
72.00	Regist'ns/Subs'ns	151.60		
203.09	Admin./Sect'l	317.96		
27.30	Advertising	-		
50.00	Entertainment	100.00		
610.00	Hall hire	500.00		
-	Guest Speaker Exp.	410.00		
275.00	Audit fee	280.00		
38.89	Bank Charges	37.67		
73.95	Depreciation	62.00		
84.94	Sundries	-		
121.00	Insurance	134.00		2193.23
$3487.64	**TOTAL EXPENDITURE**			$3786.19

FERN SHOW

1996 $			1997 $	
	INCOME			
343.00	Door Receipts			728.00
3931.00	Fern Sales	4049.00		
-3363.59	Less - Cost of Sales	-3495.10	553.90	
50.00	Donation		50.00	603.90
				1332.00
	EXPENDITURE			
27.30	Advertising			
110.00	Insurance		110.00	
	Parking Permit		72.00	
133.90	Admin'n Expenses		140.25	
560.00	Hire of Venue		540.00	
50.00	Travel		50.00	
42.70	Awards		50.25	962.50
$36.51	**SURPLUS**			$369.50

BOOK SALES

1996 $			1997 $	
	INCOME			
175.95	Sales		296.00	
-113.35	Less - Cost of Sales		-304.00	-8.00
-	Donation			10.00
				2.00
	EXPENDITURE			
-				-
$62.60	**SURPLUS**			$2.00

SUMMARY

1996 $			1997 $	
3854.38	Income - General Account		3892.10	
-3487.64	Less - Expenditure		-3786.19	105.91
	Operating Surplus			105.91
	Add - Surpluses			
62.60	Book Sales		2.00	
36.51	Fern Show		369.50	371.50
$466.85	**TOTAL SURPLUS**			$477.41

R. T. Angwin
6 Tenterden Street
SPOTSWOOD 3015

14 August 1997

AUDITORS REPORT

I have examined the books of account and associated records of the Fern Society of Victoria Inc. for the year ended 30th June 1997 and been provided with all the information and explanations required.

I consider the Statements of Receipts and Payments and Balance Sheet reflect a true and proper view of the financial operations of the Society for the year and the state of affairs at 30th June 1997.

I wish to thank the officers of the Society for their co-operation and assistance.

R. T. Angwin FCPA

NOTICE OF MOTION

TO BE PRESENTED FOR CONSIDERATION AND ACTION AT THE GENERAL MEETING
on November 20th, 1997.

"That the Objectives and Rules of the FSV in the consolidated form as presented at this General Meeting be approved by the meeting. This consolidation corrects a minor error in numbering in the amendments approved at the AGM 20 August 1992, and at the same time it brings the rules into line with administrative amendments to the Model Rules given in the 1992 Regulations;
and that this consolidation be submitted to the Registrar of Incorporated Associations as a formal statement of our Objectives and Rules presently current."

(*All proposed changes will be fully explained at the meeting. Also see the Committee's letter for details.*)

HINTS FROM THE WEST

***To clean gardener's hands,** pour a little sugar and a few drops of olive oil into your palm, rub over hands vigorously and rinse. Will moisturise your skin while it cleans.

***Don't grow Lycopodiums in wire baskets.** The coating on the wire is deadly to Tassel Ferns. They also need a very open mix with excellent drainage. A heavy mix will cause the fern to rot off.

***Sprinkle Epsom Salts** around the roots of Maidenhairs after you water them to encourage growth.

- from the Western Australian Fern Society newsletter.

FERN COMPETITION RESULTS

JULY 1997 GENERAL MEETING

COMPETITION CATEGORIES:

(a) *Cyrtomium*

1.	*Cyrtomium falcatum*	Don Fuller
2.	*Cyrtomium falcatum*	Barry White
3.	*Cyrtomium macrophyllum*	Barry White

(b) Fern with a large rhizome

1.	*Davallia canariensis* (Canary Islands Hares Foot)	Fran Harrison
2.	*Pseudodrynaria coronans*	Don Fuller
3.	*Drynaria rigidula* cv. 'Knightii' (Basket Fern cv.)	Don Fuller

EXHIBITORS' DRAW: Gay Stagoll
SPECIAL EFFORT: Jean Boucher, Mary Kenealy, Margaret Raddon, Nancy Perry.

AUGUST GENERAL MEETING

COMPETITION CATEGORY: Blechnum

1.	*Blechnum spicant* 'Lobatum'	Dorothy Forte
2.	*Blechnum cartilagineum* (Forked form)	Dorothy Forte
3.	*Blechnum minus*	John Hodges

EXHIBITORS' DRAW: Dorothy Forte
SPECIAL EFFORT: Nancy Perry, Dick Kissane, George Start, Mavis Potter.

LEARNING YOUR WAY AROUND FERNS

4. HABITATS.

Lyn Gresham

An understanding of the words used to describe a fern's natural habitat will help you provide good growing conditions for it in your fernery. To that end, you may find the following iterms and their meanings helpful.

BOTANICAL ADJECTIVES DESCRIBING HABITAT

alpine	belonging to high mountains
amphiphytic	growing in mud, either seasonally or permanently wet
aquatic	growing in water, wholly or partially submerged
areniculous	living in sand
chasmophytic	growing in soil pockets in rocks, cliff faces, gorges etc.
epigeous	growing above ground
epipetric	growing on rocks
estuarine	growing in estuaries or river mouths, usually in brackish conditions
geophytic	firmly anchored to the soil
halophytic	growing in saline soils
heliophilic	sun- and light-loving
hydrophytic	growing free-floating in water
hygromorphic	adapted to wet conditions
hygrophilous	preferring a wet climate
hypogeous	growing underground
lacustrine	living in lakes
lithophilic, lithophylic	growing on rocks
maritime	growing near the sea
mesoclinal	growing on the side of a slope where most rain falls
mesomorphic	adapted to a moist climate
mesophytic	favouring a moist climate
montane	referring to or occurring in mountains
petrophilous	rock-loving; growing on rocks
rheophytic	living between the high and low water levels of a floodprone waterway
riparian	growing on river banks
rupestral	rock loving; growing on rocks, cliffs, walls etc.
saxicolous	growing on or among rocks
sciophilous	favouring shady conditions
semixeric, semi-xeric	able to grow in semi-arid conditions
terrestrial	growing on the ground
umbraticolous	growing in shady places
umbrophytic	favouring shady conditions
xeroclinal	growing on the dry side of slopes
xeromorphic	adapted to dry conditions
xerophytic	drought resistant
xerophilous	growing in dry places
xerotherous	adapted to a dry summer or rainless period

Once again I am indebted to **Terry Turney** for his help with this series.

Sources

A Short Botanical Glossary (Croft)
Encyclopaedia of Ferns (Jones)
The Fern Dictionary (Olson)
Fern Names and their Meanings (Dyce)

BUYERS' GUIDE TO NURSERIES.

VICTORIA:

Andrew's Fern Nursery / Castle Creek Orchids - Retail. Phone (03)5826 7285.
Goulburn Valley Highway, Arcadia 3813 (20 km south of Shepparton).
Large range of ferns and orchids for beginners and collectors. Open daily 10am - 5pm except Christmas Day.

Austral Ferns - Wholesale Propagators.
Phone (03)5282 3084.
Specialising in supplying retail nurseries with a wide range of hardy ferns; no tubes.

Coach Road Ferns - Wholesale.
Phone (03) 9758 6878. Monbulk 3793.
Retail each Saturday and Sunday at Upper Ferntree Gully Market (railway station car park) Melway Ref. 74 F5.
Wide selection of native and other ferns. Fern potting mix also for sale.

Fern Acres Nursery - Retail
Phone (03)5786 5031. 1052 Whittlesea-Kinglake Road, Kinglake West 3757. On main road, opposite Kinglake Primary School.
Specialising in Stags, Elks and Bird's-nest Ferns.

Fern Glen - Wholesale and Retail
Phone (03)5629 2375,
D & I, Forte, Garfield North 3814. Visitors welcome.

Kawarren Fernery - Wholesale and Retail.
Phone (03)5235 8444.
Situated on the Colac-Gellibrand Road, Kawarren (20 km south of Colac),

The Bush-House Nursery - Wholesale and Retail.
Phone (03)5566 2331.
Cobden Road, Naringal (35 km east of Warnambool),
Ferns - trays to advanced. Visitors welcome.

NEW SOUTH WALES:

Kanerley Fern Exhibition and Nursery - Wholesale and Retail. Phone (049) 872 781.
204 Hinton Road, Osterley, via Raymond Terrace, 2324.
By appointment.

Marley's Ferns - Wholesale.
Phone (02) 9457 9188. 5 Seaview Street, Mt. Kuring-Gai, 2081.
All Fern Society members welcome. By appointment.

QUEENSLAND:

Moran's Highway Nursery
Wholesale and Retail.
Phone (07) 442 1613.
Bruce Hwy, Woombye (1 km north of Big Pineapple; turn right into Kiel Mountain Road).
P.O. Box 47, Woombye, 4559.