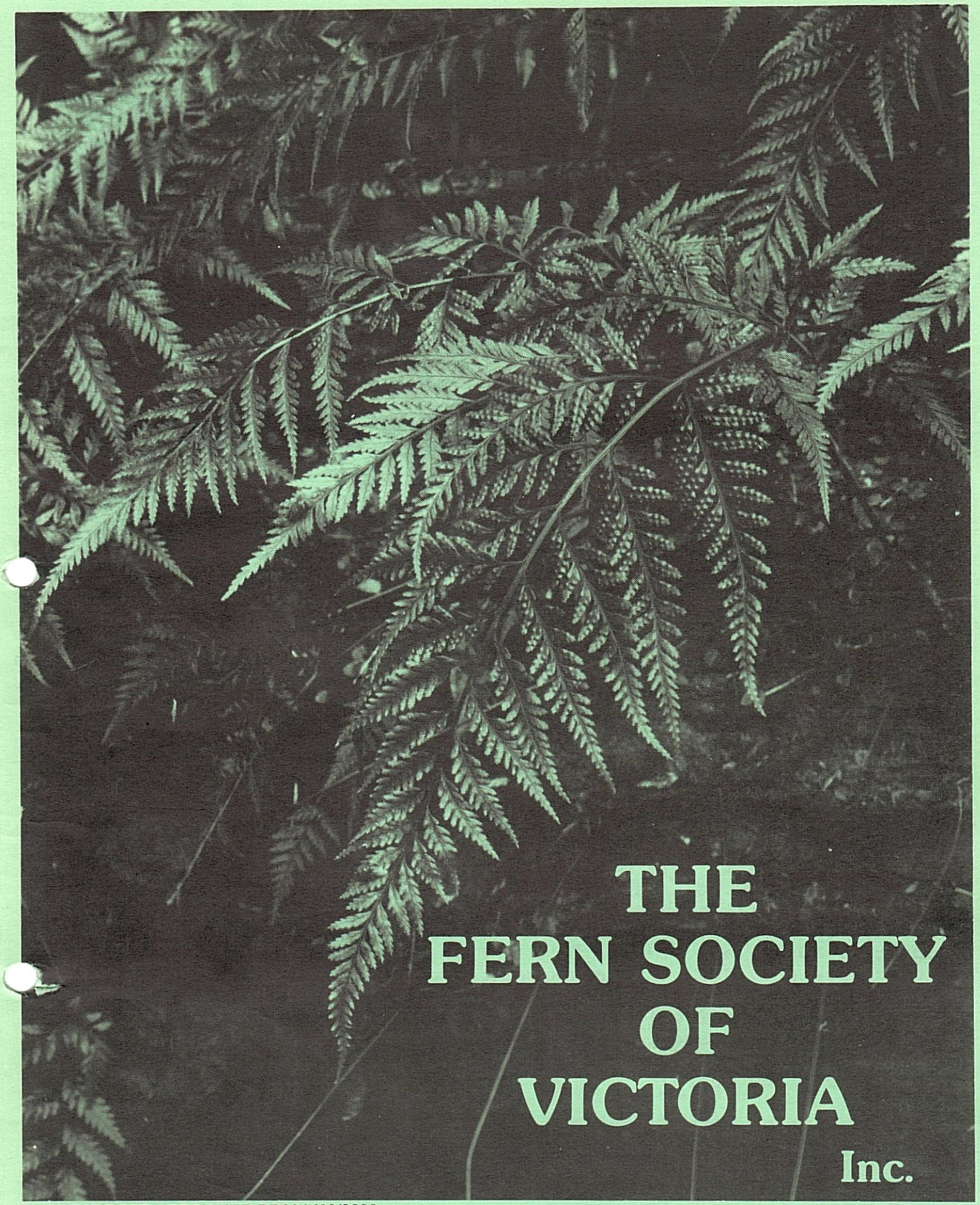

THE FERN SOCIETY OF VICTORIA Inc.

PRINT POST APPROVED PP334633/0002

NEWSLETTER

VOLUME 16, Number 11, Nov. / Dec. 1994

FERN SOCIETY OF VICTORIA Inc.

POSTAL ADDRESS: P.O. Box 45, Heidelberg West, Victoria, 3081.

OFFICE BEARERS:

President (Acting):	Barry White	Phone 337 9793
Imm. Past President:	Robert Lee	" 836 1528
Vice-President:	Terry Turney	" 807 4886
Secretary:	Bev Gouge	" 877 9107
Treasurer:	Don Fuller	" 306 5570
Membership Secretary:	John Oliver	" 879 1976
Spore Bank Manager:	Barry White	" 337 9793
Editor:	Robert Lee	" 836 1528
Book Sales:	Stephen Ziguras	" 388 1771
	(25 Ewing Street, Brunswick, Vic., 3056)	

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:

The visit to Arcadia and Avenel in October was well attended and was blessed with weather not usually associated with our excursions, hot and sunny. About forty members went along, and enjoyed the ferns and orchids of Andrew Francis, and the ferns of Dot Miniken and Lyn Gresham. Our thanks go to all three for making us welcome and also for the BBQ lunch and afternoon tea which were fully provided by our hosts.

Excursion to Lara: This month the excursion is to Chris and Lorraine Goudey's nursery at Lara on Sunday 27th. This is our last activity for the year. Details of the excursion were given in the President's Message in the October Newsletter. We will meet at their nursery at about 11.30 am, and it will be a B.Y.O. BBQ or picnic lunch with tea and coffee provided. Anyone who wants to check on other details can give me a ring. I hope as many members as possible can come. Chris's ferns stir the admiration and envy of all fern lovers, a fine day has been ordered, and special Christmas raffles will be run (I aim to win the Christmas cake this year but there will be other good prizes). I hope to see you there!

As there are no formal meetings for the last three months of this year and no activity in December, it has been decided to make this Newsletter a combined November/December issue. There is normally no January issue, therefore the next copy of the Newsletter will appear in February.

I take this opportunity to wish all members a happy Christmas and trust that the New Year will be a great one for members and for the Society. I thank all members for their contributions throughout the year.

Barry White
Acting President

FINAL ACTIVITY FOR 1994

EVENT: **NURSERY VISIT and LUNCH**

DATE: **Sunday, 27th November**

TIME: 11.30 a.m. onwards

LOCATION: **Chris and Lorraine Goudey**
25 Cozens Road, Lara
(Melway Ref. 222 J9)

Details on activities for the day and directions for reaching the venue were given in the President's Message in the October Newsletter.

Don Fuller will have bulk Maxicrop, baskets, labels and pens available for sale at discounted prices. Please bring your own container for the Maxicrop.

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FEBRUARY, 1995 MEETING

The first meeting for 1995 will be held at our regular venue in the National Herbarium hall. Guest speaker will be Jane Edmanson, who is well known to most members through her media work and public appearances. The subject of her talk will be the use of ferns in garden landscaping.

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FERN SHOW 1995 - ADVANCE NOTICE

The 1995 Fern Show will be held on Saturday, 1st April and Sunday, 2nd April at the National Herbarium, Royal Botanic Gardens, South Yarra. Show hours will be 10.00 am to 5.00 pm on both days.

The main function of the Show is to stimulate public interest in ferns but its success is also very important financially to our Society. We therefore urge all members to give it their utmost support. Here are some ways to help:

(1) Publicise the Show to your families and friends interested in ferns. If you belong to a Garden Club, or know people who do, let them know about it and urge them to attend. Advertising material will be available soon.

(2) Be involved in the organising and running of the Show. We need more people to serve on the Show Committee and also lots of helpers on the show days. Don Fuller on 306 5570 will be glad to hear from you.

(3) Provide ferns for the display. This is a great opportunity to display your favourite ferns and all members are urged to contribute to the display. This year we propose to have a special display of Australian ferns. So please start working towards selecting and preparing your ferns.

You can also sell your surplus ferns by way of the Fern Sales section.

Further details will be given in the next Newsletter.

PTERIDOPHYTES AS TREES

ROBBIN C. MORAN
University of Aarhus
Aarhus, Denmark

What's the answer to this riddle: A tree grows six inches taller per year. If you nail a sign to its trunk four feet above the ground and return two years later, how high will the sign be? Beguiled by the numbers involved, some people answer "five feet." But the correct response is "four feet." The sign remains at the same height because tree trunks grow only in girth, not in height.

Growth in girth is vital to becoming a tree. All trees must be able to widen their stems (trunks) in order to support the increasing weight from above. Without this ability, the stems become spindly weaklings and buckle under their own weight. Therefore, all plants that become trees must have a method of widening their stems.

The trees around us--mostly conifers and dicotyledonous flowering plants--widen their stems by producing wood from a thin layer of dividing cells (the "vascular cambium") located beneath the bark. Growing wide and woody is so common that we tend to think of it as the only way to become a tree. (Can you envision a thin tree without wood?) Yet many ferns--especially members of the Cyatheaceae, Dicksoniaceae, and *Blechnum* subgenus *Lomariocycas*--are trees even though they completely lack the ability to widen their stems by producing wood. How, then, do they become trees?

The ferns use two basic methods: First, they strengthen their stems internally with hardened tissue (this tissue, botanically speaking, cannot be called "wood" because it is not produced by the layer of dividing cells beneath the bark and it lacks conducting cells). Second, they prop up their stems with roots or leaf bases, which, in effect, increase the width of the stem.

The hardened tissues inside the stems of tree ferns consist of plates of black tissue called sclerenchyma (from the Greek *scleros*, meaning "hard"). These hardened plates surround the conducting tissues (xylem and phloem) that run lengthwise through the stem (Figs. 1 & 2). The plates reinforce the stem like steel rods used in concrete construction pillars. Because they are strong and resist rot, the plates make tree-fern trunks a choice material for building houses in the backwoods of the tropics. In the

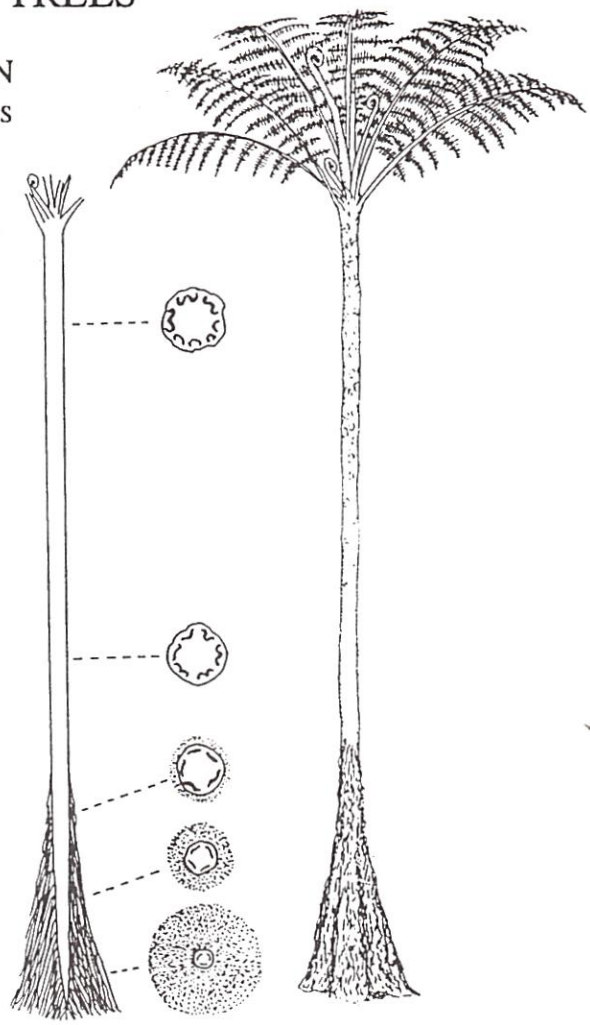

Figure 1. The structure of an idealized tree fern. *Right:* habit of plant; note root mantle at base of trunk. *Left:* longitudinal section of the plant at right; note how the trunk tapers basally. *Center:* cross section at various levels of the trunk. The stippling represents the root mantle, and the black, squiggly lines represent the sclerenchymatous plates that traverse the length of the trunk.

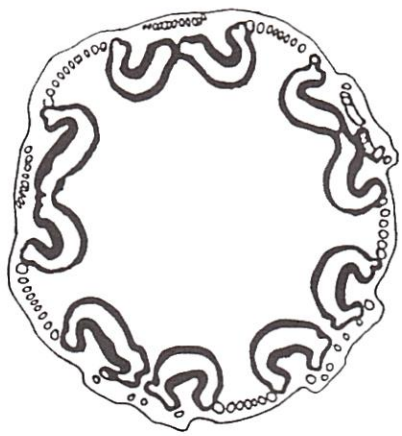

Figure 2. Cross section of a trunk of *Cyathea fulva* (after Adams, 1977). The black sclerenchymatous plates surround the vascular tissue (xylem and phloem). The open circles between the dark, sclerenchymatous plates are the vascular bundles (also surrounded by black sclerenchyma) that run out to the leaves.

American tropics, it is common to see the trunks supporting foundations of thatch-roofed houses or roofs of open porches.

In addition to the hardened plates, many ferns prop up their stems by surrounding them with a dense matrix of wiry, interlocking roots. This "root mantle" is usually two to five times wider than the diameter of the stem (Fig. 3). Rigid and durable, it protects the stem like a coat of mail and, more important, effectively widens the stem, enabling it to uphold the weight of the plant. In some species, the root mantle develops only at the base of the trunk, whereas in others it develops on the middle and upper parts as well.

The root mantles have some unusual economic uses. They can be cut into blocks called "tree-fern fiber" which are used as a substrate for growing orchids. Horticulturists treasure the blocks because they last a long time and orchids flourish on them (the blocks are becoming hard to find because of import restrictions on tree-fern trunks). The root mantle can also be carved into flower pots or statues

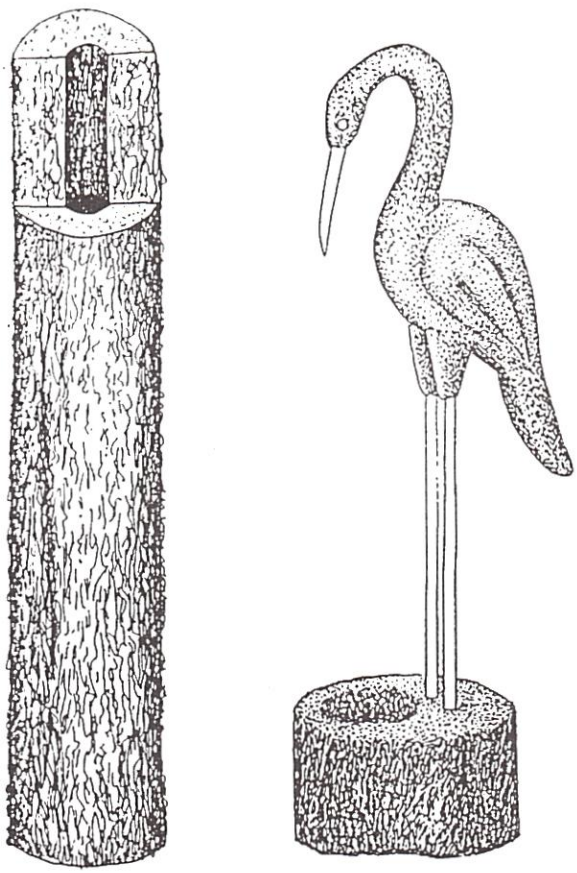

Figure 3. *Left:* a tree fern trunk cut to show the dark, hollow cylinder formerly occupied by the stem and the surrounding root mantle. *Right* (from Riba, 1978): an example of *maquique* from Mexico, carved from a root mantle of a tree-fern trunk.

of various forms (Fig. 3). These objects are more or less the equivalent of cement figurines used to adorn gardens and lawns in the United States. Along country roads in the American tropics, I often see tree-fern flower pots and statuary for sale. In Mexico, the statuary is called *maquique*. Both economic uses show the toughness of the root mantles, giving an idea of how well they serve in effectively widening the stem. (These uses are wiping out tree fern populations in many areas. Therefore, don't buy fiber or statuary made from tree ferns.)

Certain fossil ferns also used root mantles to support their stems. *Psaronius* (Marattiaceae), which thrived in the coal swamps of the Carboniferous 300 to 280 million years ago, had root mantles that buttressed stems up to three meters tall. The individual roots sprouted beneath the stem apex and grew downward around the stem and into the soil. Naturally, the base of the stem accumulated the thickest mass of roots.

Among my prized possessions are several fossils of *Psaronius* root mantles. I collected them for a graduate-level Paleobotany course, one of the most stimulating courses I ever took, taught by Dr. Tom L. Phillips of the University of Illinois, Champaign-Urbana. The fossils came from an abandoned coal mine near the town of Herrin in southeastern Illinois. They show the structure of the *Psaronius* root mantle which, unlike the mantle of all other tree ferns, was composed of two, distinct layers. The inner layer consisted of narrow (2-5 mm wide) hardened roots embedded in pithlike tissue. The outer layer had thicker (1-2 cm wide) free (non-imbedded) roots internally composed of soft tissue called *aerenchyma*. This tissue has large air spaces between the cells and is typically found today in plants of swamps and marshes.

Another ancient tree fern that used roots for support is *Tempskya*, a genus that thrived in North America, Europe, and Japan during the Cretaceous 140 to 65 million years ago. Its trunks grew up to six meters tall and half a meter wide. They are best described as a kind of composite trunk because they were composed of numerous branched stems bound together by a dense matrix of roots (Fig. 4). In some cross sections of the trunk, as many as 180 stems can be counted. These stems, however, contributed little support to the trunk--it was the roots that did the work. This is evident in trunks over 10 or 12 inches in diameter where the stems have completely rotted away at the base, leaving only the roots to uphold the above-ground weight of the plant (Fig. 4, lower right, on next page).

The many-stemmed construction of a *Tempskya* trunk imparted a peculiar appearance to the tree (Fig. 4, left). Unlike today's tree ferns that bear their leaves at the top of the trunk, *Tempskya* bore its leaves along the length of the trunk. (Nobody knows what fern family *Tempskya* belonged to. For convenience sake, it is usually placed in its own family, the Tempskyaceae.)

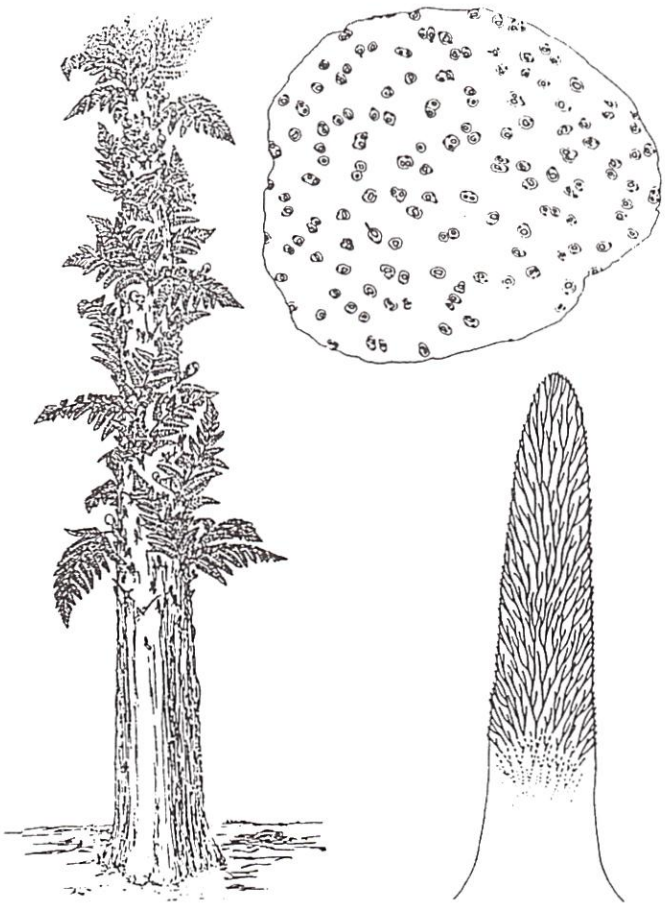

Figure 4. The fossil tree-fern genus *Tempskya*. *Left:* habit of plant showing leaves borne along the length of the trunk. *Upper right:* cross section of trunk showing the numerous, branching stems. Between the stems were hardened roots that bound the trunk together. *Lower right:* a longitudinal section through a trunk, showing the numerous branched stems (solid lines) and stems in various stages of decay (dotted lines). Note that at the base of the trunk, the stems have completely rotted away, leaving only the root mantle for support. (from Andrews & Kerns, 1947. Used with permission from the *Annals of the Missouri Botanical Garden*)

Another fern family with trees is the Osmundaceae. This family is widely known today by its non-tree species such as the cinnamon fern (*Osmunda cinnamomea*), interrupted fern (*O. claytoniana*, and royal fern (*O. regalis*). But during the Mesozoic, it contained genera that were trees, such as *Osmundicaulis*, *Palaeosmunda*, *Thamnopteris*, and *Zalesskya*. These ferns effectively widened and supported their stems with tightly overlapping, hardened leaf bases (petioles) and, to a lesser extent, with roots that ran between these. In some cases, hundreds of leaf bases surrounded the stem at a given point (Fig. 5).

I once got a lesson in how hard these leaf bases are and how well they might support a central stem. As a graduate student, I dug up an *Osmunda* rootstock and tried cutting it in cross section. I first used a new razor blade, but this barely nicked the surface of the hardened leaf bases. I then resorted to a carpenter's saw to accomplish the task. The result was worth the effort. The sectioned rootstock revealed a narrow, white stem dwarfed in the center by the surrounding armor of black, glistening leaf bases. In structure, it differed little from the fossil tree ferns of the family.

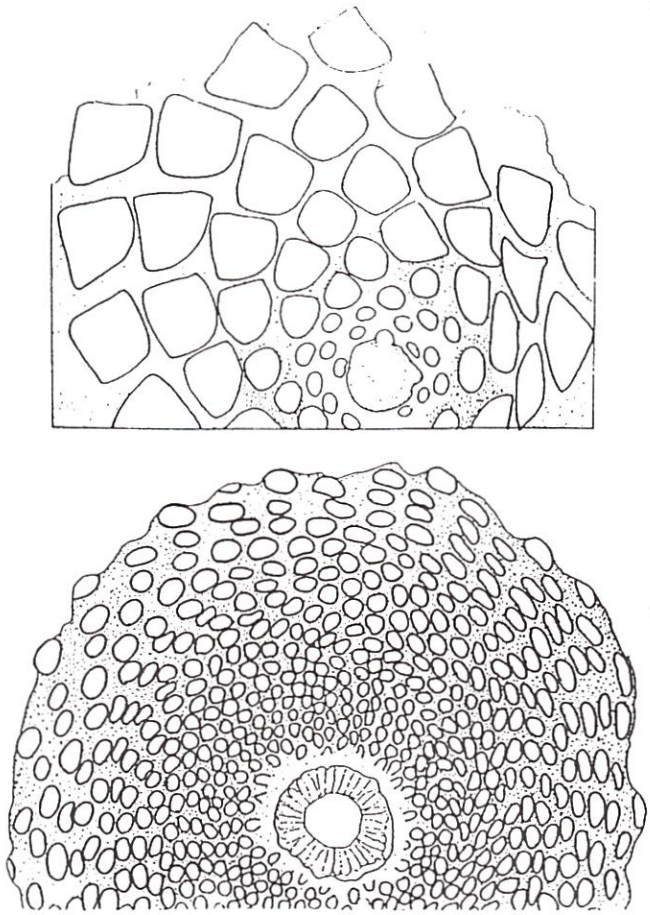

Figure 5. Cross sections of petrified trunks belonging to the Osmundaceae. The stem is in the center, surrounded by numerous, overlapping leaf bases. *Top: Thamnopteris schlechtendalii*, Permian (drawn from Bower, 1926). *Bottom: Palaeosmunda* sp., Tertiary of Australia (drawn from White, 1986).

Besides true ferns, trees have also evolved in the lycopods (Lycopodiopsida) and horsetails (Equisetopsida), two of the three classes of fern allies. (The third class is the whisk ferns, Psilotopsida, which has only eight herbaceous species.) Although the lycopods and horsetails lack tree species today, many of their relatives in the Carboniferous were trees of gigantic proportions.

Among the ancient tree lycopods were genera such as *Diaphorodendron*, *Lepidodendron*, *Lepidophloios*, *Paralycopodites*, and *Sigillaria*. They towered 10 to 54 meters tall and had trunks up to one meter wide--large sizes even by today's standards. Like today's trees, they also widened their trunks to support the increasing weight of the plant. But unlike today's trees, they widened their outer bark rather than their inner wood layer (Fig. 6). The lycopod trees produced bark in such large quantities that it forms one of the chief constituents of the coal in certain Illinois mines.

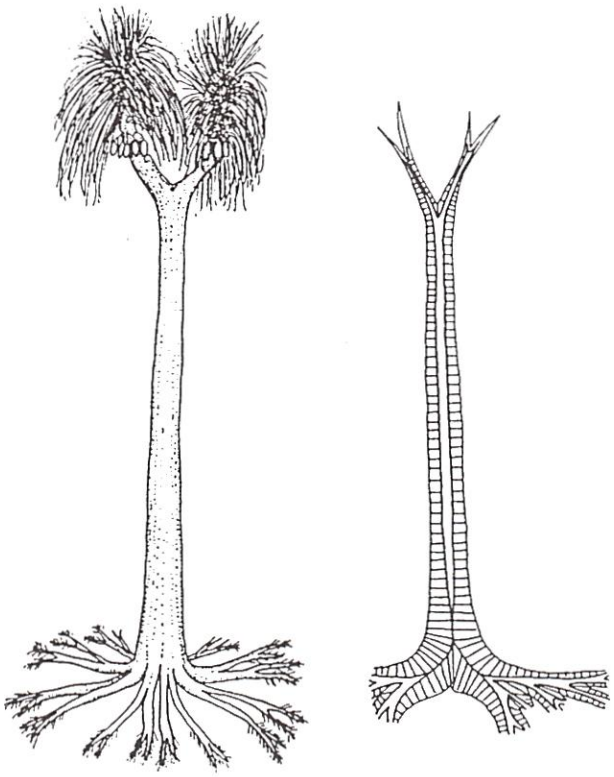

Figure 6. *Sigillaria*, a lycopod tree that grew in the coal swamps of the Carboniferous. *Left:* growth habit. *Right:* longitudinal section of a plant; the ruled area is the outer bark layer.

Growing alongside the lycopods were the calamites (Calamitaceae), the giant relatives of the modern horsetails (Equisetaceae). The calamites resembled horsetails in their jointed stems and whorled branches but differed by the presence of bracts (highly modified leaves) in their cones and the ability to widen their stems. Their trunks grew to 30 meters tall and 60 centimeters in diameter. Unlike the lycopods (but like the trees of flowering plants and conifers), the calamites widened their stems by increasing the wood layer of the trunk.

The ferns and lycopods prove that there's more than one way to become a tree. Not all plants have to widen their stems with copious amounts of wood in order to support their weight. Sclerenchymatous plates, root mantles, sheathing leaf bases, and enlarged outer bark work just as well. So toss out the old notion that all plants must become trees the same way as pines and pecans. If you don't, you'll be barking up the wrong tree!

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This article is copied from the journal of the American Fern Society, *Fiddlehead Forum*, 21, 2 (Mar./Apr. 1994)

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(The following article is taken, with thanks, from the April, 1994 edition of the Bulletin of the South Florida Fern Society Inc.)

COLOUR IN FERNS

Our speaker was Dr David Lee of Florida International University. Dr Lee has spent many years working in the jungles of Southeast Asia and has done extensive research in the area of tropical plants and their colour schemes.

Dr Lee is presently a professor of Botany at F.I.U. He mentioned that the University is in the final stages of completing a conservatory to house tropical plants, including those which can be found in montane rain forests. The 3,000 sq ft by 40 ft high conservatory is a gift from Herbert and Nicole Wertheim. The conservatory will also feature an auditorium that will be available to plant groups - free of charge.

He began his talk by cautioning us that while he would talk about colour in ferns, it was necessary to discuss other plants as well. His talk included an elaborate slide presentation showing plants in their natural settings and plants that had been grouped together for the purpose of presentation.

Light plays an important role in the colour of plants. What we think of as light is a very small portion of a spectrum that includes radio waves, microwaves, infrared, ultraviolet, X-rays and gamma rays. What we see as 'white' light is actually made up of different colours.

In order to understand leaf colour, it is important to understand the nature of light. It is then necessary to understand that pigments in plants and their capacity to absorb light help to create colour in plants. When light passes through the surface of a leaf, it is bounced around and different pigments absorb different types of light waves.

One example he showed was *Schefflera actinophylla*, the Umbrella Tree. He demonstrated how the leaf is glossy green on the upper surface and the lower surface has a muted green colour. Through a cross-section we looked at the middle section of the leaf, where there are special structures called chloroplasts which are responsible for the process photosynthesis, which is necessary for green growth. When light passes through the chloroplasts, the light is bounced around and then exits through the upper surface of the leaf. However, the under surface does not contain as much chloroplasts and though the light does pass through, it is not as radiant. It is not just the chlorophyll but the anatomy of the leaf as well which accounts for its colour.

Dr Lee presented slides of plants that are usually found in the understorey of tropical rainforests. He mentioned that these plants are usually a variety of colours.

The red colour in plants is due to pigments called **anthocyanins**. Anthocyanins absorb the blue and green wavelengths and very little in the reds. This creates a pinkish colour in plants.

Another type of pigment which causes orange and yellow colours in plants are pigments called the **carotenoid** pigments. They typically absorb the blue wavelengths to allow the orange and red wavelengths to pass through.

Another example of this is the phenomenon of "leaf flush". Frequently the young leaves of tropical plants are brilliant shades of red. This is thought to happen when the leaves are rapidly expanding. The interesting thing about this phenomenon he said is that no one fully understands why these leaves produce this colour when they are young and also why it happens in older dying leaves.

Other things that can affect colour in plants are hairs or scales. Looking at a slide of a close-up of one of the Platyceriums (Staghorns), we noticed that the fertile fronds were covered with tiny star-shaped hairs or stellate hairs. These form a dense mat covering the surface of the frond. This becomes an insulating layer to prevent an excessive loss of water by the plants. These plants are epiphytes and are quite frequently under a lot of stress due to a lack of moisture in their habitats. There are various adaptations to reduce water loss and one of these is the structure of stellate hairs which reduces the absorption of light energy, making the plant white in colour and producing insulation to reduce water loss.

Another factor in which light may play a role in the colour of leaves is the separation between the cells on the surface and the cells just beneath the surface.

This leads us to variegation in colour. We do know that the majority of these types of plants are found in the understorey of forests.

There are situations where the anthocyanins and chlorophyll are beneficial to the plants. One benefit is that these two elements help form a camouflage for the plant so that it is not eaten by insects or small animals.

The final mechanism for producing colour in plants is the phenomenon of blue iridescent colouring. As an example he showed a slide of a pendulous *Elaphoglossum herminieri*. He mentioned that when people collect it and try growing it in their own gardens, the plant usually loses its blue colour. He mentioned that lighting conditions may not be the same as was found in the plant's natural habitat.

He also noted that this colour is not due to pigmentation. It is caused by the structure of the cells, called "thin film interference". This is also responsible for the iridescent coloration in the feathers and wings of butterflies, such as the Morphos which has brilliant blue wings.

Another example was *Selaginella wildenovii*. When the frond was wet, the plant temporarily lost its blue colour and was primarily green. As the water evaporated, the frond regained its blue colour. This shows that the film that caused the interference is right on the surface of the cell walls and water does affect its activities. Other slides showing iridescent blue colour were *Trichomanes elegans*, an enormous filmy fern, and *Danaea nodosa*. The majority of plants that possess this iridescent blue colour are confined to the extreme shady conditions of the rainforest. He showed a beautiful *Diplazium* from Malaysia and a *Lindsaea rigidula* illustrating rich blue colour.

Dr. Lee discussed the various plants that were brought in by our members. These plants included *Adiantum tenerum*, *Adiantum tenerum 'Gloriosum'*, *Selaginella uncinata* and *Pteris tricolor*.

He concluded his very informative talk by stating that we are just beginning to understand colour in ferns. There are many facets of this phenomenon that have to be examined more closely.

THE FERN SOCIETY OF VICTORIA INC.
BALANCE SHEET
AS AT 30th JUNE 1994

1993 $			1994 $
	MEMBERS' FUNDS		
21,880.40	As 1993 Balance Sheet		19,659.71
(2,220.69)	Deficit		(1,644.16)
19,659.71			18,015.55
	REPRESENTED BY:		
	CURRENT ASSETS		
-	Cash on hand - book sales		45.70
	CASH AT BANK		
397.06	General Account	3,638.08	
7,714.67	Cash Management Account	-	
439.40	Book sales	584.77	4,222.85
596.58	STOCK - BOOKS		508.00
10,000.00	INVESTMENTS - TERM DEPOSIT		13,000.00
	FIXED ASSETS		
119.00	Library - Less depreciation	92.00	
393.00	Plant & Equip., Less depreciation	236.00	328.00
19,659.71			18,104.55
	CURRENT LIABILITIES		
-	Prepaid Fees		89.00
19,659.71	NET ASSETS		18,015.55

THE FERN SOCIETY OF VICTORIA INC.
STATEMENT OF INCOME & EXPENDITURE
FOR YEAR ENDED 30th JUNE 1994

1993 $	SUMMARY		1994 $
3,696.23	INCOME - GENERAL ACCOUNT		4,139.75
5,871.43	Less Expenditure		6,491.95
(2,175.20)	OPERATING DEFICIT		(2,352.20)
(12.12)	ADD DEFICIT - SHOW ACCOUNT		-
(2,187.32)			(2,352.20)
	LESS SURPLUS		
148.08	Book Sales	102.74	
-	Fern Show	605.30	708.04
(2,039.24)			(1,644.16)
	ADD ADJUSTMENTS		
(81.45)	1991/92 Accounts		-
(100.00)	W/off Fern Sales Cash-in-Hand		-
(2,220.69)	DEFICIT		(1,644.16)

AUDITOR'S REPORT

I have examined the books of account and associated records of the Fern Society of Victoria Inc. for the year ended 30th June 1994, and have been provided with all the information and explanations required.

I consider the Statements of Receipts and Payments and Balance Sheet reflects a true and proper view of the financial operations of the Society for the year and reflects the state of affairs at 30th June 1994.

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

R.T. Angwin, FCPA

THE FERN SOCIETY OF VICTORIA INC.
STATEMENT OF INCOME & EXPENDITURE
FOR YEAR ENDED 30th JUNE 1994

GENERAL ACCOUNT

1993 $	INCOME			1994 $
	SUBSCRIPTIONS			
2,302.63	Renewals		2,169.79	
	New Members		365.67	2,535.46
	SALES/COMMISSIONS			
52.40	S'pore Bank		83.00	
271.90	Commissions		252.25	
-	Miscellaneous Sales	292.20		
	Less Cost of Sales	218.55	73.65	408.90
	SPECIAL EFFORT			
	General		233.80	
123.15	Less Expenses		74.90	158.90
	OTHER INCOME			
332.00	Advertising		312.00	
57.50	Sundry Income		6.00	
	Excursion Receipts	610.00		
	Less Expenses	609.40	0.60	318.60
	ADD NON-OPERATING INCOME			
	BANK INTEREST			
26.05	General Account	26.04		
530.60	Cash Management		157.15	
-	Term Deposit		534.70	717.89
3,696.23				4,139.75

1993 $	EXPENDITURE			1994 $
	NEWSLETTERS			
2,002.00	Printing		2,241.50	
866.63	Postage		764.66	3,006.16
	ADMINISTRATION			
300.00	Honorariums		300.00	
148.39	Registrations/subscriptions		134.74	
68.00	Stationery		-	
1.75	Telephone		-	
261.90	Advertising		199.20	
257.65	Entertainment		130.00	
23.30	Executive/Secretary		179.42	
640.00	Hall Hire		615.00	
322.00	Audit Fee		250.00	
41.73	Bank Charges		54.17	
295.00	Depreciation		184.00	
60.00	Sundries		112.60	
205.58	Library Books		612.39	
78.00	Excursion expenses		-	
205.45	Guest speaker expenses		520.77	
94.05	Postage		-	
-	Insurance		137.50	
-	Donation		56.00	3,485.79
5,871.43				6,491.95

FERN SHOW

INCOME			
Door Receipts			574.25
Fern Sales		4,835.60	
Less Cost of Sales		4,241.70	
			593.90
			1,168.15
EXPENDITURE			
Insurance - R.H.S.V.		110.00	
Parking Permit			72.00
Administration Expenses		115.85	
Hire of Venue		265.00	562.85
SURPLUS			$ 605.30

BOOK SALES

1993 $				1994 $
	OPERTING INCOME			
	Net Sales		264.50	
	Less Cost of Sales		189.58	74.92
-	Postage			122.50
116.55				197.42
	ADD NON-OPERATING INCOME			
55.43	Bank Interest			12.78
171.98				210.20
	LESS EXPENSES			
23.90	Bank Charges		49.86	
-	Postage		57.60	107.46
148.08	SURPLUS			102.74

SPORE LIST

Ordering: The following spore is free to those who donate spore. Otherwise, members 20 cents each sample, non-members 50 cents, plus $1.00 to cover p. and p.. Available at meetings or by mail from Barry White, 24 Ruby St, West Essendon, Vic. 3040. - Ph. (03) 337 9793. There is no charge to overseas members, but to cover postage two International Reply Coupons would be appreciated.

A booklet on spore collection and cultivation is available for 40 cents or free to spore donors.

ADIANTUM concinnum 6/94
ADIANTUM hispidulum 8/94
ADIANTUM raddianum 'Bronze Glory' 6/94
ADIANTUM raddianum 'Legrand Morgan' 6/94
ANEMIA mexicana 7/94
ANEMIA phyllitidis 08/94
ANEMIA tomentosa 10/93
ARACHNIODES simplicior 05/94
ARACHNOIDES miguelliana 6/93
ASPLENIUM bulbiferum ssp.gracillimum 2/94
ASPLENIUM flabellifolium,lge pinnae 9/94
ASPLENIUM milnei 7/94
ASPLENIUM oblongifolium 7/94
ASPLENIUM obtusatum 7/94
ASPLENIUM scleroprium 1/94
ASPLENIUM scolopendrium 1/94
ASPLENIUM varians 7/94
ATHYRIUM niponicum var.pictum 4/94
ATHYRIUM nipponicum 'Metallicum' 08/94
BLECHNUM fluviatile 6/94
BLECHNUM sp.(West of Newcastle) 9/94
BLECHNUM watsii 5/94
CAMPYLONEURON angustifolium 1/94
CHEILANTHES austrotenuifolia 11/93
CHEILANTHES farinosa 10/93
CHRISTELLA parasitica 1/94
CIBOTIUM regale 4/94
CIBOTIUM scheidii 09/94
CONIOGRAMME intermedia 1/94
CULCITA dubia 09/94
CYATHEA australis 5/94
CYATHEA brownii 4/94
CYATHEA cooperi, blue form 7/93
CYATHEA cooperi 1/94
CYATHEA dealbata 10/93
CYATHEA intermedia (New Caledonia) 6/93
CYATHEA medullaris 11/93
CYATHEA princeps 9/93
CYATHEA woolsiana 6/93
DICKSONIA antarctica 5/94
DICKSONIA fibrosa 10/93
DOODIA aspera 1/94
DOODIA maxima 1/94
DRYNARIA sparsisora 4/94
DRYOPTERIS affinis 'cristata' 1/94
DRYOPTERIS atrata 1/94
DRYOPTERIS dilatata 10/94
DRYOPTERIS erythrosora 1/94
DRYOPTERIS filix-mas 'Barnesii' 7/94
DRYOPTERIS sieboldii 1/94
DRYOPTERIS wallichiana 1/94
ELAPHOGLOSSUM muelleri 7/93
ELAPHOGLOSSUM sartorii 08/94
FADYENIA hookeri 4/94
GLEICHENIA microphylla 09/94
GYMNOCARPIUM oyense 7/94
HEMIONITIS arifolia 08/94
HUMATA griffithiana 11/93
LASTREOPSIS microsora 09/94
LLAVEA cordifolia 4/94
MICROSORUM diversifolium 7/94
MICROSORUM parksii 7/94
PELLAEA cordifolia (Texas) 4/94
PELLAEA falcata 08/94
PELLAEA quadripinnata 4/94
PELLAEA rotundifolia 08/94
PELLAEA sagitata 7/93
PLATYCERIUM superbum 11/93
POLYSTICHUM lentum 4/94
POLYSTICHUM tsus-simense 4/94
PTERIS argyrae 7/94
PTERIS biaurita 5/94
PTERIS cretica 'Parkeri' 1/94
PTERIS dentata 11/93
PTERIS macilenta 7/94
PTERIS sp. (Nepal) 3/94
PTERIS tremula 1/94
PTERIS umbrosa 4/94
PTERIS vittata 1/94
PYRROSIA angustata 05/94
RUMOHRA adiantiformis (Cape form) 10/94
SELLIGUEA feei 8/93
STENOCHLAENA tenuifolia 7/94
THELYPTERIS navarrensis 4/94
WOODWARDIA orientalis 08/94

SPORE DONATIONS

Thank you to the following who have contributed spore: Don Fuller, Jim and Beryl Geekie, Stanislava Hoskova.

BUYERS' GUIDE TO NURSERIES

VICTORIA:

Andrew's Fern Nursery / Castle Creek Orchids - Retail.
Goulburn Valley Highway, Arcadia, 3613. (20 km south of Shepparton).
Large range of ferns and orchids for beginners and collectors.
Open daily 10 am - 5 pm except Christmas Day. Ph: (058) 26 7285.

Austral Ferns - Wholesale Propagators. Ph: (052) 82 3084.
Specialising in supplying retail nurseries with a wide range of hardy ferns; no tubes.

Coach Road Ferns - Wholesale. Monbulk. Ph: 756 6676.
Retail each Saturday and Sunday at the 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. Kinglake West, 3757. (On main road, opposite Kinglake West Primary School). Ph: (057) 86 5481.
Specialising in Stags, Elks and Bird's-nest Ferns.

Fern Glen - Wholesale and Retail. Visitors welcome.
D. & I. Forte, Garfield North, 3814. Ph: (056) 29 2375.

R. & M. Fletcher's Fern Nursery - Retail.
62 Walker Road, Seville, 3139. Ph: (059) 64 4680.
(Look for sign on Warburton Highway, 300m east of Seville shopping centre). Closed Tuesday, except on public holidays.

Kawarren Fernery - Wholesale and Retail.
Situated on the Colac - Gellibrand Road, Kawarren (20 km south of Colac). Ph: (052) 35 8444.

The Bush-House Nursery - Wholesale and Retail.
Cobden Road, Naringal (35 km east of Warrnambool). Ph: (055) 66 2331
Ferns - trays to advanced. Visitors welcome.

NEW SOUTH WALES:

Jim & Beryl Geekie Fern Nursery - Retail. By appointment.
6 Nelson Street, Thornleigh, 2120. Ph: (02) 484 2684.

Kanerley Fern Exhibition and Nursery - Wholesale and Retail.
204 Hinton Road, Osterley, via Raymond Terrace, 2324.
Ph: (049) 87 2781. Closed Thursdays and Saturdays.
Groups of more than 10 must book in advance, please.

Marley's Ferns - Wholesale.
5 Seaview Street, Mt. Kuring-Gai, 2080. Ph: (02) 457 9168.
All Fern Society members welcome. By appointment.

QUEENSLAND:

Moran's Highway Nursery - Wholesale and Retail.
Bruce Highway, Woombye (1 km north of Big Pineapple; turn right into Kiel Mountain Road). P.O. Box 47, Woombye, 4559. Ph: (074) 42 1613.