ASSOCIATION of

S.G.A.P. Fern Study Group

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Some News from the Spore Bank Curator

Contributed by Dulcie Buddee

When I first took over as Spore Bank Curator at the beginning of this year, I made a point of going through the past correspondence, i.e.,. orders for spore, etc. By far the most orders came from a member in Sweden, Thomas Carlsson. Thomas had averaged almost one order every month since joining some two years previously. I was very curious as to what he did with all the spore we sent him, so I decided to write. I asked if he had a fern nursery, how he germinated his spore and what success rate he had. His reply has proved to be very interesting and other members might like to know what he said.

Thomas wrote, no, he did not have a nursery - he was simply germinating and growing ferns for his own pleasure. He added that, as far as he knew, he was the only person in Sweden to do this privately, although the Botanic Gardens in Sweden does grow and display tree ferns and others. He explained that he germinates his spore in seed trays filled with a pot plant medium, which he described as consisting of sand, "what's under sphagnum moss" - by this I take he means peatmoss, and humus. This mixture is sterilized before use. The ferns are germinated and grown under artificial lights, and the growing temperature in the glass house is not allowed to to drop below 15 degrees Celcius at any time, although it may reach 40 degrees in the warmer months of the year. He uses thermostatically controlled electric room heaters in his growing areas. (He sent a picture of them - one looks very much like the small fan heater I use to heat my own glasshouse in winter). He commented that it often gets to 10 degrees below zero in winter where he lives.

After growing under lights for 1 to 2 years, the ferns are potted on and moved into his glasshouse, which measures 45 square metres - wish mine was half that size! He also enclosed a small sketch of the layout of the area (house, glasshouse, light-room etc) - it all looked very efficient. I was particularly interested in the botanical gardens he mentioned and I have written to him asking if he could send me some more information about them. I will pass it on to you, via the Newsletter, in due course.

NEW DISTRIBUTION RECORDS FOR QUEENSLAND FERNS

Peter D. Bostock
Queensland Herbarium

Asplenium normale - Eungella National Park, R.J. Chinnock, P.D. Bostock and S.G. Pearson, April 1993. First collection outside Wet Tropics (Herberton area) and only the third for Australia. A small colony near summit of a mountain, growing on small boulders under rainforest, at about 1100 m altitude.

Dryopteris sparsa - Eungella National Park, R.J. Chinnock, P.D. Bostock & S.G. Pearson, April 1993. First collection outside wet tropics (mainly Bellenden Ker/Bartle Frere area). Rarely collected. Small group of plants in two locations, at about 900m altitude. Both colonies appeared to be suffering from drought, although conditions when seen were extremely wet!

Blechnum wattsii - Eungella National Park, P.D. Bostock & R.J. Chinnock, April 1993. Common along creeks between Mt. David and Mt. Dalrymple at about 900m altitude. First collection north of Kroombit Tops (about 300 km to south).

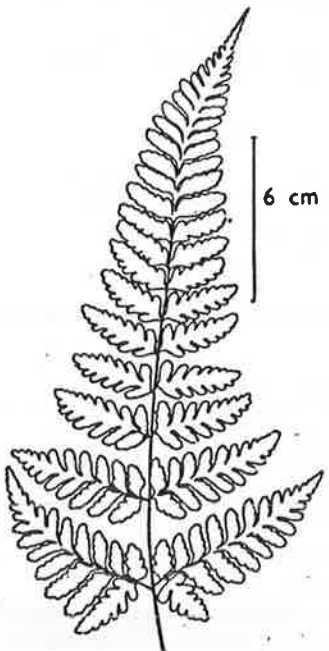
Elaphoglossum queenslandicum - Eungella National Park, S.G. Pearson & P.D. Bostock. Very extensive single colony on steep escarpment below summit of mountain at about 1000m altitude. Hundreds of plants present, growing with *Boea hygroscopica*. First collection south of Wet Tropics.

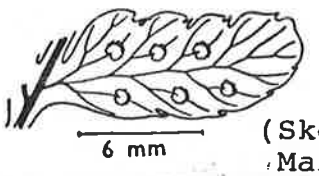
Actinostachys digitata - Byfield National Park, R. Melzer, March 1993. Small colony in littoral rainforest on sand, alongside spring-fed creek. First collection in Qld south of Hinchinbrook Island.

Cyathea rebeccae - Byfield National Park, R. Melzer, April 1993. Single plant (?) near *Actinostachys digitata* site. Ca 300km south of nearest previous known limit (Mackay/Proserpine area).

Chingia australis - Russell River valley, R. Jago, December 1992. Previously known only from type collection by R. Chinnock and P. Brownsey in 1982, from Johnstone River area. A small colony of about 50 plants, along a 100 metre of creek bank.

Plesioneuron tuberculatum - Russell River valley, R.L. Jago and others, 1992. Previously known only from a single cultivated specimen in Atherton (the origin was unknown although assumed to be field-collected). Quite common along certain creeks!





Dryopteris sparsa

(Sketch taken from "Flora of Malaya" by Holttum)

A fern with tufted fronds to 40 cm long. Easily cultivated when grown in a protected position. This fern grows naturally on Mt Bartle Frere in North Queensland and is not affected by frost. It is also found in Malayasia, India and China, but generally not easy to grow in the lowland tropical conditions.

AZOLLA
THE WATER FERN
By Calder Chaffey

During the last unusually dry summer in Northern NSW and Queensland there have been numerous outbreaks of blue-green algae. These have occurred in stagnant pools and in some river systems. The simplistic cause was lack of rain so that waterways were not flushed out .Fertilisers which had found their way into dams, pools and rivers became concentrated enough to foster this growth. Phosphates were chiefly to blame.

So when a green scum appeared on Wilson River in Lismore a minor panic was started when someone suggested "blue-green algae". However this growth was due to ferns of the genus Azolla. There are two species of Azolla in Australia and both can be found normally in Wilson River. No doubt relative stagnation and the presence of fertilisers caused the alarming increase.

Azolla is an interesting genus of little ferns belonging to the family Azollaceae. The name comes from the Greek *azo*, to dry, and *ollyo*, to kill, meaning plants killed by drying. Azolla is the only genus of the family and its species are free floating, growing only in water or in the wet mud at the waterside. Worldwide there are six species widely distributed, but only two are found in Australia where they often occur together. Whereas the individuals are only a couple of centimetres across they reproduce so quickly and so efficiently that in a short time the whole surface of a river or pool can be completely covered. They essentially only grow in relatively still water.

The plants are 2 or 3 cm. across and appear roughly triangular in shape. Each consists of a horizontal main stem, which tends to be zigzag, with several lateral branches lying on the surface of the water. Numerous roots take off from the branches at some of the nodes and protrude down through the water. They are up to 6 cm. in length.

Leaves are alternate and very small- about 2 mm. Each leaf is two lobed and the surface of the upper lobe is recurved and papillose. The centre is thickened and the lower lobe is flat and submerged. The upper lobes overlap so that they cover the horizontal stem and branches. While the lower lobes are colourless and to a degree transparent the upper lobes are coloured. They are usually green but become red on exposure to direct and long hours of sunlight. In a cavity at the base of each leaf is a colony of blue-green algae (*Anabaena*), living in a symbiotic relationship with their host. These algae fix atmospheric nitrogen and make it available to the Azolla.

The fern increases by fragmentation and by the development of spores. When it gets more than 3 to 5 cm. in size it becomes brittle so that the movement of water, wind or birds fracture the branched stems. Each individual so formed goes on growing and continues to fragment. This is the common and quick method of spread. Spore development is rarely seen and is similar to spore production by the family Marsiliaceae. These are the only two families of ferns to produce separate male and female prothalli. This places Azollaceae amongst the two most advanced families of ferns. Sporocarps develop in pairs on the submerged lower leaf lobes. These are of two types. Megasporocarps which contain one sporangium and are pear-shaped and less than 1 mm in size. The sporangium contains one large spore and on germination forms one female prothallus. The other type of sporocarp is a microsporocarp which is larger and spherical and contains many sporangia each of which contain many small spores. On germination these produce male prothalli. The male prothalli produce sperms which swim in the water towards female prothalli. When one sperm enters a

female prothalus fertilisation occurs and it goes on to develop into a sporophyte and ultimately a new fern.

The two Australian species are Azolla filiculoides and Azolla pinnata. Azolla filiculoides is irregularly branched and vaguely triangular in shape. Roots are long and entire. Azolla pinnata is clearly triangular and regularly branched. Its roots have numerous lateral rootlets.

Both ferns quickly cover still water. Growth rate is so fast that each plant doubles in size in about 7 days. At times its presence can cause economic problems covering the water surface and blocking drains and pump inlets. Having such a small root system it never develops the problems produced by Salvinia molesta (Salvinia) or Eichhornia crassipes (Water Hyacinth). However at times it has to be removed. This can be done by spraying with herbicides but an interesting and less damaging method is by sinking. A specific wetting agent is mixed with kerosene and sprayed over the infestation. Within one minute the ferns sink just below the water surface where they remain for a day or two when they sink to the bottom and rot. Water lilies, reeds and rushes are not effected so it can be used for selective control.

Recently there has been some investigation of harvesting the fern from the top of the water for the production of mulch and fertiliser. If found to be economical perhaps it will become an effective control measure of this interesting little fern. The current move to reduce farm run-off and other excessive fertilising chemicals from entering the river systems will further reduce it's exotic growth.

A Member's Fern — Presented by Les Taylor

At the July meeting Les spoke about Lycopodiums which can be either terrestrial, epiphytic or grow on rocks. The talk by Les was on the epiphytics or tassels and how to grow them. Les prefaced his talk by saying that if you are having success with other methods, disregard his comments. Les said that he had received somewhat conflicting hints from nurseries. Les had recently purchased tassels from the Illawarra Nursery (paradoxically situated in Dungog) and they had advised using a soil mixture of elk peat, pine bark fines and charcoal, aim for a very shady position, water then leave dry out completely before next watering; the Ph should be about 5 to 6, and finally, fertilize every 2 weeks with WUXAL Growth Hormone at half strength. Les reported buying 5 litres of WUXAL from a wholesale nursery and using it at the rate of 1.25 ml to 1 litre of water and given that meagre usage, he said that one of his SGAP mates had urged him to leave the WUXAL to him in his will! So far Les is pleased with the appearance of the tassels since applying the fertilizer.

The following advice was given to Les by G & F Nursery, Smithfield, Queensland: Soil 5 parts peat moss and one part sand with 4 to 5 months slow release fertilizer, keep moist and out of the wind, spray with Diazinon 800, fertilize with Nitrosol, Fish

Emulsion or Wuxal. Les stressed the importance of keeping the tassels out of the wind and said that they are sun sensitive even through some shade cloths.

Propagate from tip cuttings (look for roots forming along tips). When the tips start to turn up they can be pinned to the ground. Jan Fairley puts tip pieces in plastic bags under the bench to strike them).

"Cyatheaceae"

Contributed by Ray Best

My interest in tree ferns was renewed recently when two friends of mine both nursery owners with large fern collections both sent me plants of a new species from the highlands of New Guinea being retailed under the title Cyathea tomentosissima. These two ferns were kept in my fernhouse until one became mature bearing scales and spores.

Obviously the title Cyathea tomentosissima was incorrect as (in my understanding) Cyatheas all bore scales and not hairs as the title tomentosimma indicated. At a Fern Group meeting I raised this question with a request for the authors name. Our President suggested that Dr Holttum had provided the title. So as a fellow member of the British Pteridological Society, I sent the Doctor a letter. He stated in reply that he had not named this fern and at no time in his study of Cyatheaceae had he covered any Cyatheas which had hairs.

In my early study of the Australian species of tree ferns I had consulted the first edition of Jones and Clemesha's "Australian Ferns & Fern Allies", 1971. Now in the light of recent research most of the original titles have been changed.

In relation to Cyathea tomentosissima, I forwarded to Sydney Botanic Gardens samples of fronds scales and details for reclassification (also to Kew Botanic Gardens in England). Two replies were received with promises of a correct re-classification in the near future (no correspondence has been received to date).

On my property here at Kenthurst, N.S.W., I have grown most of the Australian species to maturity. Recently, a species of Cyatheaceae arose on my property that I cannot classify. Now mature and sporing proliferically, I forwarded spores to a propagator who has produced a large number of sporelings one of which has been returned to me; not mature as yet but growing well.

Another friend, an owner of a large nursery and an expert propagator requested me to attempt to classify a number of tree ferns growing on her land that were there when she purchased the property. So I requested her to provide, if possible, fronds, spores, scales or hairs of the species.

This she did very efficiently numbering the many species and providing details. Unfortunately, I was unable to name most of them as they appeared to differ from most of the species that I had contacted. So this I fully explained to her, suggesting that

they may all be Alsophila hybrids. Local botanical authorities suggested that until such time as some accepted authority produced a detailed study of the tree ferns, most of the questions would remain unanswered.

In recent classification such as that of Tryon & Tryon, Copeland, etc., many name changes have occurred and have been accepted by local authorities. So rather than give details that are rather involved, for the sake of lay persons, I shall attempt to list most of these accepted changes along with their original titles.

In 1976 David L. Jones and Stephen C. Clemesha produced their first edition of "Australian Ferns & Fern Allies". So as most of these early titles have now been changed, I shall use this work as a basis for the early names.

Jones & Clemesha First Edition 1976	Recent Re-classification
Cyathea australis (R.Br) Domin.	Alsophila australis
Cyathea baileyana (Domin) Domin.	Alsophila baileyana
Cyathea celebica Bl.	Sphaeropteris celebica
Cyathea cooperi (Hook ex Muell) Domin.	Sphaeropteris cooperi
Cyathea cunninghamii Hook f.	Alsophila cunninghamii
Cyathea felina (Roxb) Morton.	Sphaeropteris concinna
Cyathea leichhardtiana (F Muell) Copel	Sphaeropteris australis
Cyathea marcescens N.A.Wakefield.	Alsophila marcescens
Cyathea rebeccae (Muell) Domin.	Alsophila rebeccae
Cyathea robertsiana (F.Muell) Domin.	Alsophila robertsiana
Cyathea woolsiana (F.Muell). Domin.	Alsophila woolsiana

In some cases the new classification has reverted to earlier titles. Also in recent re-classification Dicksoniaceae is now classified as Cyatheaceae.

Obviously many such changes has caused much confusion amongst lay persons. In relation to authors names as abbreviations we have
R.Br. = Dr Robert Brown. Scotland & Australia. (1753-1858)
Domin = Karl Domin. Chechslovakia (1872-1954).
Bl. = Carl Ludwig Von Blume. Netherlands (1796-1862)
Muell = Frederick von Mueller. Germany. (1828-1896)
Hook f = Sir Joseph Dalton Hooker. England. (1817-1911)
Copel = Edward Bingham Copel. U.S.A. (1873- 1964)
Morton = Conrad Vernon Morton U.S.A. (1905-1972)

(Ed: Our thanks to Ray for his interesting article, we greatly appreciate his wealth of knowledge. Peter has advised that the N.S.W. Herbarium has not accepted the classification proposed by Tryon & Tryon and Copeland, and the recently published "Flora of New South Wales" ignored the Alsophila and Sphaeropteris titles. "The Flora" also maintains Dicksonia in Dicksoniaceae and not Cyatheaceae. .....so much for the botanists and their changes!)

Deadline for Copy

Please keep those contributions coming in - this edition was a pleasure to compile given the articles provided by so many members. All material should be forwarded to the Secretary. The closing date for the December issue is 15 November 1993.

NOTES FROM MID NORTH COAST

Contributed by Charlie Charters

Report on Outing to Wauchope Area 31 May / 1 June 1993

Our outing for the week end started on top of North Brother Mountain. Although it was overcast the views over the entrance of the Camden River and Laurieton were magnificent. We explored a small pocket of rainforest on top of the mountain. From there we travelled to the western end of Queens Lake - a beautiful place for a picnic, but not much in the way of ferns. After a short break we headed off again, north on the Pacific Highway to the Old Bottlebutt Tree. This is a red bloodwood with an unusual shape, it has a large bowl-like base with a straight trunk over 60 m tall. Still not able to find any ferns, the Group retired to look over Charlie and Judy's bush house and farm.

On Sunday morning we travelled to Wilson River Primitive Reserve and covered the same area visited in May 1990 (Newsletter No. 49, June 1990) by the combined Sydney and Queensland Groups. On the previous outing 46 ferns were found. On this occasion there were four we couldn't find, but we were able to find six different ferns not previously found. What started as a fairly quiet week end turned out being most successful.

Addendum:
Our thanks to Phil Avery who has supplied lists of the fens identified during the week end. The 48 species identified on the visit to Wilson River Primitive Reserve included the following ferns not reported in the June 1991 Newsletter: Asplenium attenuatum, Blechnum sp. (aff. camfieldii?), Doodia caudata, Hypolepis muelleri, Lastreopsis decomposita and Pellaea paradoxa. Ferns reported in June 1991 but not seen on this latest visit were Adiantum diaphanum, Arachniodes aristata, Cyathea cooperi and Pteridium esculentum.

Ferns identified at the locations North Brother Mountain (NB), Queens Lake State Forest (QL) and Old Bottlebutt Burrawan State Forest (OB) were as follows:
Adiantum hispidulum NB QL OB, A. silvaticum OB, Arthropteris tenella NB, Asplenium australasicum NB, A. polyodon NB, Blechnum cartilagineum NB QL OB, Calochlaena dubia NB QL OB, Christella dentata QL, Cyathea australis NB OB, C. leichhardtiana NB OB, Davallia pyxidata NB, D. aspera NB QL OB, Lastreopsis decomposita NB OB, L. microsora NB, Lindsaea linearis QL, L. microphylla QL, Microsorum scandens NB, Pellaea paradoxa NB, Platycerium bifurcatum NB OB, Pteridium esculentum NB QL, Pteris umbrosa NB, Pyrrosia rupestris NB.

NOTES FROM SOUTH EAST QUEENSLAND

Contributed by Merle Goadby

Report on Visit to Maleny, 6 June 1993

On a day with a cold wind which felt as though Winter may have started, a goodly number of members met at the Woolston's home at Maleny. All enjoyed their view of the Glasshouse Mountains to the South East and did justice to Frank's "Ginger Dog".

The group wandered through their garden which is planned around the remnant rainforest vegetation including mature Cyathea australis and C. cooperi. We noted over 40 species of Australian ferns. A wonderful collection of ferns from North Queensland is a highlight of the garden.

We were privileged to have Frank give us a short talk on his and the Late Stan Colliver's research into the use of Blechnum indicum as a staple food by East coast aborigines. Starch from the rhizomes was an important source of carbohydrate. Frank had gathered for us a sample of B. indicum with thick fleshy rhizomes and explained that it could be relatively easy to dig them up from sandy soils in flat country at the margins of swamps.

Searches of historical literature had turned up a number of references to aborigines using B. indicum as a food item. However, there were no "recipes" indicating how the material was actually prepared, so Frank had carried out his own experiments. After roasting the roots in the coals, it was possible to scrape off the outside scales and "skin". The resulting toasted rhizome material was edible and reasonably palatable. They could also be eaten raw, or cooked and ground to a flour.

Report on Outing to Sunnybank Hills, 11 July 1993

Contributed by Irene Cullen

Fern lovers are never disappointed when viewing Cliff Richie's ferns. Despite an earlier cold spell, his ferns were in very good condition. His ferns are always displayed without old fronds or any sign of disease.

Naturally everyone was eager to know what potting mix he uses. Cliff is forever experimenting and is never afraid to admit that he has lost ferns by overdoing a certain ingredient in the mix. His advice to us that day was to leave leaf mulch break down until it is almost a black looking "soil". He sterilises his mix by heating on a sheet of tin over a fire outdoors. He is free with his advice, however, he is like a chef - he has no set recipe, but prefers to mix his mulch, sand and a very little ash if any, until the mixture "looks right". He hand waters by preference. As to fertilising, he warns don't over do it.

Cliff is always trying to propagate by spore and had some promising trays to show us, as well as a tray of a special fern which was obviously anything but the fern from the spore he planted. Yes, the trays were well covered. So it can even happen to the best of us! Since our visit to Tassledon, our interest in trying to propagate the Tassels has been stirred. To date it seems we may be having some success with Lycopodium phlegmaria, L. squarrosum and L. proliferum. We will keep you posted.

NOTES FROM SYDNEY AREA

Report on Outing to Lawson, 5 June 1993

Not deterred by the over night rain, 14 members participated in the visit to this popular ferny areas - an easy walk past Adelina, Junction, Federal and Cataract Falls. Our previous outing here was in November 1989 and we added three species - Pellaea falcata, Selaginella uliginosa and Lindsaea linearis, to the

28 listed on that occasion. The ferns dominate the vegetation and as Kyrill was heard to say, "Wouldn't it be a great place if they hadn't found it!". Thank you Peter for showing it to us and or helping us with the names of so many plants.

Report on Meeting at Dural, 24 July 1993

These Saturday half days are pretty intense - "A Members Fern", study, lunch and a copious afternoon tea leaves little time for garden inspections during Winter afternoons. In any case, one could devote the whole day and not see all of the Kenyon / Newman vast garden, so the 19 members present concentrated on study as Peter told us about Macrothelypteris and Cyclosorus.

Peter brought a small Macrothelypteris torresiana to the meeting, and several members brought fronds. Peter said that his plant had volunteered in the pot in his shade house, this fern has a reputation for self sowing. None of the members present had the other Australian Macrothelypteris species, M. polypodioides growing. Peter explained that the genus was easily recognised being the only member of the Thelypteridaceae Family with fronds that are more than one-pinnate. Fronds are erect, lacy and can be from 60 cm to 1.5m tall. The sori are small, circular; the indusium tiny and persistent. M. torresiana is widespread in Queensland and extends just across the N.S.W. border. It can also be found in Madagascar and Asia and the Pacific Islands. M. polypodioides is native to North Queensland (Peter said he didn't consider it to be really widespread) and extends to various Pacific Islands. In cultivation both can be grown fairly easily, although M.polypodioides in particular, is frost tender.

Cyclosorus interruptus has been known by numerous names over the years but is now regarded as the sole member of the genus in Australia. The species name refers to its pinnules some of which are (usually) twisted. It has a long creeping rhizome and erect fronds to 1 m high and forms large clumps in fresh water swamps in N.S.W. from the Royal National Park north, Queensland, Northern Territory and Western Australia, and is also found in New Zealand. It is easy to grow in the ground and tolerates a good deal of sun in moist conditions.

When Do Ferns Spore?

Jake and Wendy Schotte have really come to our aid here with a wonderful record of their experience collecting and growing spore in connection with their wholesale business, Green Frond Fernery.

Enclosing the list of times when spore were collected, the Schottes wrote,
"All observations are taken from our records of commercial spore growing for the last 16 years.
Some varieties set spore regularly each year, e.g., Blechnum nudum around May. Others may go years between setting spore leaves, e.g., Stenochlaena palustris, Microsorum scandens. Some have viable spore all year around, e.g., Asplenium australasicum, Doodia media. Todea barbara usually spores in October on a new flush of fronds and needs to be collected while still green".

More on this topic, including the Schotte's data next Newsletter.

FORTHCOMING EVENTS

IN SOUTH EASTERN QUEENSLAND

Friday 3 September 1993, Fern Display, Rochedale
Meet at 3.30 pm to set up Fern Display at Redeemer College, Rochedale Road, Rochedale for annual S.G.A.P. Flower Show on 4 and 5 September.

Sunday 17 October 1993, Excursion, Conondale Area
Leader Ross Scott, Kenilworth. Meet 9.30 am at the junction of Little Yabba Sunday Creek Road and the Conondale - Kenilworth Road. Bring lunch and walking shoes.

Sunday 21 November 1993, End of Year Meeting, Rochedale South
To be held at home of Russell and Irene Cullen, 39 Sunningdale Avenue, Rochedale South. Bring a fern for exchange - Business: Programme for next year - we want your suggestions.

Enquiries contact Irene Cullen (07) 341 4272.

IN THE MID NORTH COAST OF N.S.W.

Week End 25 & 26 September 1993, Camden Head & Limeburners Creek
On the Saturday something different - a wildflower walk lead by Betty Batty. Sunday we are going to Big Hill Rainforest Walk in the Limeburners Creek Nature Park. Contact Phil Avery (065) 61 7280 for further information.

IN THE SYDNEY REGION

Week End 4 - 5 September 1993, Garden Show at North Rocks
From 9 am to 4 pm both days assisting with sale of ferns at the Graham & Sandra Ross Great Garden Show at the School for the Deaf & Blind, North Rocks. A few more volunteers would lighten the load for all - phone Moreen 528 4881 if you are not already on the roster and can help.

Sunday 24 October 1993, Meeting at Como
Meet from 11 am at the Woolletts, 3 Currawang Place, Como West, with Study starting at 12 noon. "A Member's Fern" will be presented by Kyrill Taylor, the ferns being studied Stenochlaena & Oleandra. Enquiries to Moreen 528 4881.

Saturday 13 November 1993, Outing to Mt Tomah
Meet at 10 am in the Visitor's Centre at Mount Tomah Botanic Gardens. Note that there is an entrance fee. After inspecting ferns and having lunch, Peter will lead a short walk to ferny area in nearby bushland. Enquiries to Peter 625 8705.

Sunday 5 December 1993, End of Year Function at Dee Why
Meet from 11 am for our festive season gathering at the Stony Range Flora Reserve, Pittwater Road, Dee Why. Please inform Jan 971 6132, or Cynthia 451 6531 as early as possible before the date whether bringing meat, salad or sweets, for pooled lunch. Please supply own cutlery and crockery. In keeping with the tradition of these occasions, please bring a gift (or several according to number in your party).