

**THE
FERN SOCIETY
OF
VICTORIA**

Inc.

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NEWSLETTER

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PRESIDENT'S MESSAGE.

Chris Goudey

The new year is upon us once again, Lorraine and I hope you all had an enjoyable Christmas and are looking forward to a prosperous new year.

Our February meeting will be on the 20th and we are having a Fern Identification Night, so bring along any ferns you are not sure of and we'll do our best to identify them. We will also discuss the growing conditions and requirements of each species.

The competition category for next month is a tree fern. We are not expecting any large ones, just something in a pot that you can manage.

This week I received for the club library a copy of Michael Garrett's new book, "The Ferns of Tasmania; Their ecology and distribution". The book has 220 pages with 150 colour photographs covering all of the one hundred and one species of ferns and allied plants. It will be available in a soft cover edition and a limited number of hard copy editions which will be signed by the author.

Michael's treatment of Tasmania's fern flora is very thorough. As well as the usual chapters on Fern Structure and Life Cycle, Propagation and Cultivation etc. it contains interesting topics such as Natural regeneration, Natural hybrids, Composition of Tasmania's fern flora, Tasmanian fern fossil record, The Tasmanian environment and The Conservation status of ferns in Tasmania.

As well as keys to the genera and species there are notes and distribution maps on a 10 km X 10 km map grid of all the Tasmanian ferns including King and Flinders Islands.

There are excellent colour photographs of all the ferns and fern allies. They include habitat, natural hybrids, sporelings in their natural habitat, colourful new growth with many rare and beautiful ferns, seldom seen. In fact, there are quite a number of species that I have never seen before.

Congratulations Michael on a valuable contribution to the fern flora of Australia. I would recommend this book to all fern enthusiasts, amateur or professional. It retails for \$49.95.

Chris Goudey
President



FORTHCOMING MEETINGS & EVENTS

FEBRUARY GENERAL MEETING
Thursday 20th February - 8.00 p.m.

FERN IDENTIFICATION NIGHT

- *Practical session teaching how to go about identifying ferns.
- *Also bring along ferns you're unsure of and we'll try to name them for you.
 This is a very timely topic with the Fern Show approaching so take the opportunity to have a go, and have your efforts verified (or not!)

MARCH GENERAL MEETING
Thursday 20th March - 8.00 p.m.

FERN AND GARDEN PHOTOGRAPHY

- *Tricks and strategies for getting better garden shots, in difficult situations.

VENUE: Victoria Bowling Club, 217 Grattan Street, Carlton.

MEETING TIMETABLE:

7.30	Pre-meeting activities - Sale of ferns, spore, books, merchandise and Special Effort tickets. Also library loans.
8.00	General Meeting.
8.30	Topic of the Evening.
9.30	Fern Competition judging, Fern identification and pathology, Special Effort draw.
9.45	Supper.
10.00	Close.

1997 FERN SHOW

Saturday and Sunday 22nd and 23rd March

National Herbarium
 Royal Botanic Gardens

- Please
- *read the Show Secretary's article in this issue for more information,
 - *decide how you are going to participate in the Show,
 - *tell the Show Committee,
 - *groom your entries and ferns for sale
 - *use the pamphlets in this issue for promotion in your community.



FEBRUARY FERN COMPETITIONA Tree Fern.
MARCH COMPETITION.Best fern photo.
APRIL COMPETITION.A Platycerium.

VISIT TO BADGER WEIR PARK

Barry White

Badger Weir Park is one of the richest fern areas in Victoria and is only 57k from Melbourne and about 5k from Healesville. The weir and the Coranderk aqueduct running down from the weir supply Healesville with water.

Ten carloads of our members turned up on Sunday 17th November 1996 at a reasonably early hour to stroll among the fern gullies and breathe in a variety of fern spores.

The forecast was for rain, not unusual for one of our excursions but rain and ferns are a good combination and the threat of a bit of rain does not deter a true enthusiast. On this occasion God smiled on us and the rain did not eventuate.

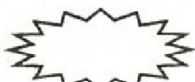
While waiting for all to arrive the Crimson Rosellas

provided some entertainment and photo opportunities as they landed on arms or heads to partake of the proffered bird seed. Although not observed by our group the park is also home to the Lyrebird, the Greater Glider, the Yellow Bellied Glider and the Sugar Glider.

The park management is gradually improving the walks and is installing board walks in some of the wetter areas. Dennis Nation, the Ranger at the Park is interested in obtaining more information from our Society on the ferns in the park which he can then pass on to the general public.

The following twenty eight species of ferns were noted by our members during the walk. Of particular note was the quantity of filmy ferns on some of the *Dicksonia antarctica* trunks. Two Slender Tree-ferns (*Cyathea cunninghamii*) were noted up near the weir. Both were very tall and were probably hundreds of years old.

FAMILY NAME	BOTANICAL NAME	COMMON NAME
Adiantaceae	<i>Adiantum aethiopicum</i>	Common Maidenhair
Blechnaceae	<i>Blechnum nudum</i>	Fishbone Water-fern
	“ <i>minus</i>	Soft Water-fern
	“ <i>patersonii</i>	Strap Water-fern
	“ <i>wattsii</i>	Hard Water-fern
	“ <i>cartilagineum</i>	Gristle Fern
	“ <i>fluviatile</i>	Ray Water-fern
	“ <i>chambersii</i>	Lance Water-fern
Dicksoniaceae	<i>Dicksonia antarctica</i>	Soft Tree-fern
Cyatheaceae	<i>Cyathea australis</i>	Rough Tree-fern
	“ <i>cunninghamii</i>	Slender Tree-fern
Dennstaedtiaceae	<i>Hypolepis muelleri</i>	Harsh Ground-fern
	“ <i>rugosula</i>	Ruddy Ground-fern
	<i>Calochlaena dubia</i>	False Bracken
	<i>Histiopteris incisa</i>	Bat's-wing Fern
	<i>Pteridium esculentum</i>	Bracken
Aspidiaceae	<i>Polystichum proliferum</i>	Mother Shield-fern
	<i>Lastreopsis acuminata</i>	Shiny Shield-fern
Athyriaceae	<i>Diplazium australe</i>	Austral Lady-fern
Osmundaceae	<i>Todea barbara</i>	Austral King-fern
Psilotaceae	<i>Tmesipteris billardieri</i>	Long Fork-fern
Aspleniaceae	<i>Asplenium bulbiferum</i>	Mother Spleenwort
	<i>ssp. gracillimum</i>	
Grammitidaceae	<i>Grammitis billardieri</i>	Finger Fern
Davalliaceae	<i>Rumohra adiantiformis</i>	Leathery Shield-fern
Polypodiaceae	<i>Microsorium diversifolium</i>	Kangaroo Fern
Hymenophyllaceae	<i>Hymenophyllum flabellatum</i>	Shiny Filmy-fern
	“ <i>australe</i>	Austral Filmy-fern
	<i>Polyphlebium venosum</i>	Veined Bristle-fern.



SPEAKER REPORT - NOVEMBER 1996
THE FERNS OF SAN DIEGO COUNTY
 ROBIN HALLEY

Before Robin began his talk he passed on greetings from Jim and Beryl Geekie with whom the Halleys had spent the previous day in Sydney Botanic Gardens.

San Diego County is about 100 miles (160km) south of Los Angeles in California and is right on the American/Mexican border. It is about as far north of the Equator as Newcastle is south but would better compare with Ivanhoe (N.S.W.) in climate! San Diego is quite temperate, with the temperature ranging from 37deg. to -5deg. Robin and Linda live 75 yards from the beach and enjoy a maximum of about 30deg. and almost never get any frost. The average annual rainfall in San Diego County is 30cm or less. In an extremely good year they may get 60 cm. These facts are related to the fern population.



The Ferns. Comparatively, Australia has about four hundred plus species of ferns, U.S.A. has about two hundred plus, the State of California has about a hundred and San Diego has twenty six or twenty seven.

Eleven of San Diego's twenty seven ferns are xerophytes, compared to less than twenty of Australia's four hundred. Xerophytic ferns include the *Cheilanthes*, *Pellaea*, *Notholaena*, *Heuroceterach* and *Pleurosorus* ferns.

A xerophytic fern is one that grows in dry, often very exposed conditions. To cope with this environment ferns must develop special strategies. Common strategies are:

- * to grow and mature very quickly when favourable (or less unfavourable than normal) conditions occur.

- * to grow near rocks, for two or three reasons. They can grow their roots in under the rock, taking advantage of the more or less continually cool root run. Also, rocks tend to channel moisture from dew to the fern. Thirdly, rocks slow the changes in temperature a little, allowing plants which are hugging them to more easily adjust to these changes.

- *To grow hairs thickly over all or some of the plant. As the fern transpires the hairs hold the humidity in around the plant, to some extent creating its own moist mini-climate.

- *To grow very long roots which can penetrate deeply into the soil, taking advantage of the moisture usually found there.

Distribution. About ninety percent of San Diego's ferns live in three microclimates; Mission Gorge, Pine Valley and Borrego Desert. The fourth habitat Robin talked about is Miramar Vernal Pools. Some of the ferns he discussed are listed under their locations, with a bit about them.

1) Mission Gorge.

A coastal scrub climate. It is a deep gorge, sheltered on both sides, which has the tree-lined San Diego River flowing down the middle. All these features combine to create a slightly higher humidity in which 11 species and two varieties of fern grow. 'Slightly' seems to be the appropriate word here - it still looked pretty parched to me! In the rainy season, November to March (Winter), wildflowers abound even though grasses and cacti are the order of the day. After rain this region can even have waterfalls.

Polypodium californicum is found in Mission Gorge. It is very deciduous; no matter what conditions you grow it under, how nicely you treat it, what type of music you play to it, what you feed it on (or not) in about June (Summer) the fronds disappear until October, when it revives and sends out new fronds. It is San Diego County's only native *Polypodium*. Its appearance varies widely. In full sun the fronds will grow 4-6" (10-15cm) high while in the shade can grow to 18-24" (about 40-60cm). Like a lot of the xerophytic ferns, it comes up in a hurry. This is an adaptation to the harsh environment, where the growing season is very short.

Adiantum jordanii is Southern California's native Maidenhair. Found in the hills, it is also very seasonal and very tough. There is a very pretty, almost pendulous form. A natural cultivar between *A. jordanii* and *A. capillus-veneris* is found in northern California, called *A. X Tracyi*. It is not particularly difficult to grow.

Dryopteris arguta, or Coastal Wood Fern, only grows in protected situations or in the mountains.

Asplenium vespertinum, or Western Spleenwort, is Southern California's only Spleenwort, and is exclusive to that part of the world. It is a loner - very rarely seen in multiples. Robin found four growing together one time, and considers that to be remarkable. A very fleshy little Spleenwort, it is deciduous in Summer. The longest frond Robin has seen is about 7-8". It is shiny, with red to brownish stipes.

Pellaea mucronata, the Bird's Foot Fern. Robin considers this to be the most adaptable San Diego fern of all. He has found it growing at an altitude of over 2,000 metres in the mountains and in full sun in the Borrego Desert where temperatures often exceed 40deg. When young it is fresh

green with a pale stipe, as it ages it develops a bluish or greyish tinge and in its off-season just looks dead. It's not deciduous in that it holds the dead fronds - possibly as shade for the later emerging ones? Both Pellaeas found here can sometimes be seen growing on their own on talus slopes. When this occurs, there is runoff water fairly close to the surface. (Talus is the sloping mass of rock-debris at the foot of a cliff. You probably knew that - I had to look it up.)

Pellaea andromedifolia, the Coffee Fern. The pinnae are oval shaped, and as the year goes on they turn purplish and could be likened to a coffee bean in appearance.

Pentogramma viscosa Silverback Fern, Goldback Fern. Pentogrammas either should be divided into four species or there are four cultivars of the one species. This one is silver-backed and it goes from being very soft when young to feeling quite leathery as the year goes on.

Pentogramma triangularis* var. *triangularis. We saw both the silver and gold forms of this one.

Aspidotis californica (formerly *Cheilanthes californica*) - The Californian Lace Fern is a very pretty little fern. It is a xerophyte which shows most of the typical qualities and habits; living close to rocks, being able to come back after droughts or even after being under water. They have been removed from their former classification because they lack some typical Lip-Fern qualities; the spore pattern is different and they are not hairy. The spore noticeably indents the top of the frond and it does not follow the margin as in the Lip Ferns.

Cheilanthes newberryi, Cotton Lip Fern. An extremely attractive little fern. It dies down completely when things get too dry. *Cheilanthes* prefer either shaded, mossy spots in warm climates or to be pressed right up close to rocks. It is so 'cottony' that it is difficult to see the spore. This is an extreme example of one of the *Cheilanthes*' water-saving strategies as mentioned earlier.

2) Pine Valley.

With intermediate terrain, some water and, most significantly, more altitude. Located in the mountains, it sits at about 1300-1400 metres. Three species of fern are found here.

Cystopteris fragilis - Brittle Fern. Pine Valley is the only place in San Diego County where Robin has seen really healthy-looking specimens of this fern. The one we saw had fronds almost a foot long.

Isoetes orcuttii and ***I. howellii***. Quillworts are fern allies which have a rosette of grass-like leaves, emerging from a corm. The one we saw had fronds almost a foot (30cm) long.

Cheilanthes clevelandii - Cleveland's Lip Fern. It's different to most *Cheilanthes* in that the frond looks more like a two-dimensional Christmas tree.

Pentagramma triangularis* var. *Triangularis - the

Goldback Fern.

3) Borrego Desert.

The distinguishing feature is that it is very hot and dry. It has temperatures of over 40 deg. C and gets maybe 10 cm of rain - in a good year! For at least ten months of the year it looks just like the set of a Western movie; bare earth, a few dry grass tussocks, cactus and not much else, really. But when the rain comes, in February-March, a transformation occurs. In spite of the harsh nature of the desert, 7-9 species of fern are growing here. There is an amazing little place with a natural spring, called Palm Canyon in this arid area.

Azolla filiculoides - Mosquito Fern grows in this canyon.

Adiantum capillus-veneris also appears here, growing under the dam. There is a waterfall which I guess would humidify the atmosphere a bit.

Cheilanthes viscida - Sticky Lip Fern. It only just seems to hang on to life out there, but when it finds a spot it likes it really is quite beautiful.

Cheilanthes parryi - Parry's Lip Fern. Robin describes this as 'a little puffball of a plant'. It is very hairy and very fleshy and the underside is a light pink. Very rare.

Cheilanthes covillei - Bead Lip Fern. Well named, as the fertile frond looks as if it has a string of beads around the edge.

Notholaena californica - California Cloak Fern. Another Gold-back, this would have to be the toughest of all. While the others grow in a bit of shade or at least on the cooler side of rocks, this one is found out in full sun. As you might expect it is very leathery, to reduce transpiration and increase drought tolerance. The gold on the frond back is difficult to define. It's not really a wax and not really a farina (a white or yellowish powder).

4) Miramar Vernal Pools.

Vernal pools are strange, shallow, natural pools which are seasonal. The strict meaning of the word is 'occurring in Spring' though the Miramar Pools have water in them in Spring and Autumn. Terry Turney volunteered the theory that they are like the gilgais of Australia which occur on very clay soil. Clay expands and contracts and this eventually causes hollows and mounds to form, with the pools occurring in these hollows.

Ophioglossum californicum. Adder's Tongues are among the most unusual looking ferns around. They are primitive ferns which do not appear to have any living relatives. For that fact alone they are interesting. Deciduous, they grow in damp soil, often beside water as in this habitat.

Marsilea vestita. The Australian name for *Marsilea* is Nardoo. It grows in mud or damp soil, often floating its fronds on the water's surface. On the shore it looks a lot like four-leafed clover, which can get superstitious folk a bit excited at times. In the sun it tends to get a little red around the edges.

Pilularia americana. A grass-like fern, the American Pillwort

grows among grasses and sedges, in the shallow water when there is any. It is difficult to distinguish from grass except that it has a little bend (permanent wave) at the end, and emerging fronds do curl. It grows to about 10cm high.

CRISPY CRITTERS IN THE ARIZONA DESERT.

Robin finished with a very quick and interesting look at the American Fern Society's 1995 Fern Foray to the Arizona Desert. The main points seemed to be that ;

- 1) it was tortuously HOT (our equivalent would be February-March),
- 2) you had to be thankful for every frizzled fern you could find because they were very hard to see and identify, and there weren't too many non-frizzled ones.
- 3) it was FUN!



HINT!
 A general spray mix for aphids, hoppers and such like, on ferns is
 1 tablespoon bluestone
 1 tablespoon washing soda
 10 litres water



INTER-SOCIETY DAY AT LARA.

Saturday 5th October 1996 was a typical Fern Society excursion day - cold, wet and miserable. After much will-we-or-won't-we-ing about thirty (could have been more) of our members, family and friends gathered in the welcoming Austral Fern Nursery with our hosts Lorraine and Chris Goudey, to relax and chat over a warming cuppa or scout off among the fern houses to admire or select from the beautiful, healthy array of ferns they grow.

We began to wonder whether the South Australian Fern Society were ever going to arrive. As it turned out, so did they. Not everyone can get a bus bogged in a motel carpark, but that's what had happened. But all ended well, with only minor loss of humour, and their thirty five or so members also wandered around happily, bought the odd fern, admired the many thousands more and we all enjoyed meeting new people and/or renewing previous friendships. Chris and Lorraine had a busy time enjoying everyone but watching that we didn't choose their not-for-sale stock or special ones - we fernists are a discerning lot!!

George Start's latest idea, lathe turned toadstools from local and garden timber, was much admired. He even agreed to send a consignment over to S.A. and the Vic. members are hoping he will bring some to our meetings, too. I must say I prefer the smaller ones.

Much thanks must go to the Excursion Committee and those who helped on the day by supplying the cuppa and munchies or helping with the visitors' lunch. A special vote of thanks to Lorraine and Chris for opening their place to us so willingly, for their warm hospitality on the day and for the preparation that always accompanies such events.

In case this has begun to sound like a sales day; it wasn't. Our aim was to have a pleasant, social day and we did that. Perhaps we will have another opportunity to meet with the South Australians sometime - I hope so.

Lyn Gresham.



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SPEAKER REPORT - OCTOBER 1996

ADIANTUM (MAIDENHAIR) SLIDE SHOW

Speaker: Chris Goudey
Reporter: Simon Hardin

Chris' talk was the long awaited slide show of Adiantums, featuring a very large number of exotic species and rare cultivars. He began by paying tribute to the many colleagues who assisted him in the preparation of his book "Maidenhairs in Cultivation", but stressed that many more cultivars and species had been introduced since the publication of the book. Many of the new cultivars have originated from the work of Noel Ellis.

To open the slide show, Chris showed shots of a lodge near Grovedale, Geelong, which formerly featured an extensive Begonia and Maidenhair collection but has now been sold off. He also showed some views of Kuranda (Nth Qld) Railway Station in its heyday, whose fernery featured a large number of tropical species such as *A. trapeziforme*, *peruvianum* and *raddianum* cv. Lady Moxham, as well as rare fern species such as *Psilotum coplanatum*. The fernery was maintained by the station master entirely on his own. After his retirement, the collection deteriorated; eventually a curator was appointed to maintain the ferns, and hence the tourism, but the collection has not quite regained its former splendour.

Chris then proceeded to run through his extensive collection of shots of individual Maidenhair species and cultivars, many of which he once grew (but no longer!).

THE MAIDENHAIRS.

An alphabetical list of some species and cultivars (with comments) follows. We saw many beautiful ferns but the information accompanying these may interest you.

A. aethiopicum - crested form, rhomboidal segments (Tas.)

A. aethiopicum - skeletonised form

A. asarifolium - formerly *Reniforme* var.

Asarifolium, (Reunion Is.)

A. capillus-veneris species (Carnarvon Gorge)

A. capillus-veneris cultivars:

Imbricatum - very difficult

Kensington Gem - an attractive sterile hybrid

A. concinnum - (*A. edgeworthii*) species and cultivars have basal pinnule on sub-rachises overlapping main rachis

A. cunninghamii (NE Aus., NZ) - new growth red

A. diaphanum (Aus., NZ)

A. formosum - a slightly variegated cv.

A. fructuosum - tropical

A. macrophyllum (Trop. America) - new growth featured on frondpiece of maidenhair book.

A. macrophyllum cv. Albo-Striatum - variegated

A. patens - very tropical requirements

A. pedatum (N.Hemisphere) - difficult; a number of forms exist

A. pedatum var. Subpubilum (*A. Aleuticum*) - a compact form from the Aleutian Is., also difficult

A. pedatum X *capillus-veneris* - a lost hybrid

A. pendactylon cv. St. Catherinae - (*A.* "Tomcat") marginal browning a common problem

A. peruvianum - Silver Dollar. A tropical weed

A. phillipense - (N.Aus, Malaysia) under boulders, on clay banks

A. phillipense cv. "Tealeaves" - more rounded fronds

A. poiretti cv. Sulphuricum - pressed specimen, (Melb. Herbarium) gold on back of frond

A. polyphyllum - tropical

A. raddianum cultivars:

Affinae - brown colouring

Coarse Variegated - with an occasional fleck (Noel Ellis)

Dissected Leaflet - slightly larger than Micropinnulum, every leaflet double, split up the middle

Fragrantissimum - many forms known

Fragrantissimum "Frog's Foot" - Qld. name

Goldie - a coppery-coloured version of micropinnulum

Gracillimum - reddish new growth

Gracillimum form "Mist" - pinnules slightly more widely spaced

Lambertianum - variegated pinnule base

Lady Geneva - narrow pinnule form

Legrand Morgan - "Bronze Glory" in commerce

Tom Thumb - difficult to grow

Variegated Lady Geneva - slight flecking only

Weeping cv. (Noel Ellis) - difficult; above-ground rhizome tends to snap, killing plant

A. seemanii - tropical America

A. subcordatum - tropical

A. tetraphyllum - tropical

A. tenerum cultivars:

Farleyense - often considered the most beautiful maiden hair

Gloriosum Roseum - red new growth

Glory of Mordreck - a possible form of

Farleyense

Japonica - compact

Lady Moxham - rivals Farleyense in beauty; broader, more flabellate segments

Pacific May - another cultivar rivalling Farleyense

Pacific May - skeletonised form from Noel Ellis

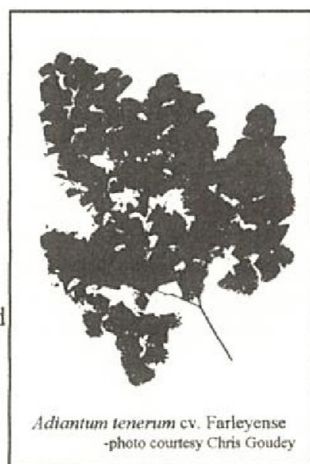
Sleeping Beauty - deflexed pinnules

Sleeping Fergusonii - a weeping cv.

Victoriae - compact

A. trapeziforme - tropical

A. venustum - temperate, grown in UK



Adiantum tenerum cv. Farleyense
-photo courtesy Chris Goudey

Maidenhairs prefer an open, well drained potting mix with a slightly acid pH, although members of the *raddianum* and *capillus-veneris* complexes prefer alkaline conditions.



Thanks to Simon for this report. It takes longer than you'd think! Please refer to Vol. 18 No. 4 (July/August 1996) for more from Chris on Adiantums. This article has been edited to avoid duplication of information from that one. Those who are interested in Maidenhairs and have the opportunity, would do well to get Chris' book.

THE FERN SOCIETY OF VICTORIA'S 1997 FERN SHOW

Arrangements have been made to hold the 1997 FERN SHOW at the National Herbarium, Royal Botanic Gardens (Gate F) South Yarra (Melway Ref. 2L A1) on Saturday 22nd March and Sunday 23rd March. The Show will be open between 10.00 a.m. and 5.00 p.m. and the admission charge will be Adults \$3, Concession \$2.

The annual Fern Show is a very important activity of the Society and its success requires strong support from members. Please put these dates in your diary and make every effort to come along and also participate. There are several ways in which you can contribute to the success of the Show.

1. Publicise the Show.
2. Contribute to the display and enter the competition.
3. Attend the Show and assist with Show activities.

1. Publicity.

Publicity has been, or will be, arranged in gardening magazines, newspapers and on radio. Information on the Show will also be sent to a large number of Gardening Clubs.

However what is required most is for members to publicise the Show by word of mouth to interested friends and acquaintances and to distribute our advertising pamphlets. Two of these are included in this newsletter for this purpose and additional copies will be available at the February meeting. Please try to have them displayed in suitable locations approximately 3-4 weeks before the Show.

2. Competition Display.

The Fern Competition will be conducted in nine categories, plus Best Fern in Competition. Following are the categories:

- | | |
|--|--|
| Cat. 1. Adiantum.
2. Asplenium
3. Blechnum
4. Davallia (including Humata, Scyphularia)
5. Fern Ally (eg., Lycopodium, Psilotum, Selaginella) | 6. Platycerium (single or multiple heads)
7. Fern in Hanging Container
8. Small Tree Fern in Pot
(Cyathea, Dicksonia, Cibotium)
9. Fern Other Than Above |
|--|--|

Our feature display this year will be "FERNS OF NEW ZEALAND" so we are anxious to put on a good display of typical New Zealand ferns. We will also have the usual general display of ferns.

The Show is an excellent opportunity for you to display your favourite ferns so please start planning to contribute to both the competition and the display. We need a wide variety of good quality ferns. Size is of minor importance.

Please ensure that all competition and display ferns are clearly identified with their correct botanical names and some form of personal identification to ensure safe return to you. If you do not know the botanical name of a fern please try to find it out before the Show. Why not bring it along to the February or March meetings?

3. Show Activities.

The Show Committee hope that all members will attend the Show, especially those unable to attend the monthly meetings. Come and make yourselves known.

We would like to hear from members able to help with setting up on the Friday afternoon and/or assisting with the Show on Saturday and Sunday. We need people on the doors, stewards in the display area and people to assist in the fern sales area. We will also need people to assist with packing up after the Show on Sunday.

Offers of help will be welcomed by any member of the Show Committee who are:-

Jack Barrett	Ian Broughton	Don Fuller (Chairman)
Chris & Lorraine Goudey	John & Norma Hodges	Bernadette Thompson
Bill Taylor	Barry White	

Any offers of assistance with publicity or arrangement of the display will also be most welcome.

Fern Sales.

Members who enter the competition or contribute to the display also have the opportunity to bring in ferns for sale. These must be clearly labelled with their botanical names and growing requirements and be free of pests and disease. There is no limit on the number for sale but it should be in proportion to your contribution to the competition or display. We cannot accept small tubes.

Those wishing to sell ferns should contact Bernadette Thompson (9399-1587) & arrange to obtain the required 'booking in' form.

1997 FERN SHOW

The following article is taken, with thanks, from the newsletter of the San Diego Fern Society, "Fern World", April/May, 1992.

Cheilanthoids

Robin Halley

Several different genera of ferns grow in dryer places. In southern California they are mostly cheilanthoids, typically xerophytes [xeros = dry (Greek), phyton = plant (Greek)].

The familiar southern California ferns called cheilanthoids include:

1. *Cheilanthes*
2. *Notholaena*
3. *Pellaea*
4. *Astrolepis*
5. *Argyroschisma*
6. *Pentagramma*

Other cheilanthoids include:

1. *Doryopteris*
2. *Bommeria*
3. *Cryptogramma*
4. *Tachypteris*
5. *Llavea*
6. *Adiantopsis*

As with many groups of closely related ferns, the differences between these cheilanthoids are hotly debated. Most of the disagreement has been between *Notholaena* and *Cheilanthes*, with a little *Pellaea* thrown in.

David Lellinger and John Mickel (two big guns) disagree. Mickel clumps and Lellinger splits. John Mickel does not list any *Notholaena* in his guide to American Ferns. Based on new research, Mike Windham (University of Utah, Garrett Herbarium) splits the genera even further and incorporates three new genera to provide clarification.

Before looking these differences, let's review the genus definitions.

Cheilanthes, Lip Fern

Greek: Cheilos = lip

Anthos = a flower - from the indusium shape

About 125 species, most in dry places from United States to Peru. Characteristic false indusium with sporangia following the margin of the pinnule. Those without false indusium have 3-pinnate laminae with very small, contracted, bead-like segments.

These ferns are small to medium sized, monomorphic (all fronds are fertile), with stipes about equalling the laminae. Most species have curly hairs and/or scales on the abaxial (back) side of the laminae; a few have only hairs.

Notholaena, Cloak Fern

Greek = false cloak - for the non-reflexed edge

Includes about 75 species, mostly in the drier parts of the western United States and Central and South America. The blade margin is not reflexed (turned back). Some resemble *Cheilanthes*, some resemble *Pellaea* (bead-like segments). The species of *Notholaena* native to the United States are less divided. These plants commonly fold their segments upward to reveal the protective and reflective farinose covering on the abaxial surface.

Notholaena are typically small, monomorphic, have stipes as long or longer than the most highly divided laminae. Some species have white, cream, or yellow farinose exudate and sometimes also hairs or scales on the abaxial surface of the laminae; other species are glabrous or have only hairs and/or scales. Many species have recently been placed back into *Cheilanthes* or into *Astrolepis*.

Astrolepis

Greek: Astron = star

Greek: Lepis = scale - refers to the stellate scales characteristic of this group.

Previously known as "the *Notholaena sinuata* complex", the species in this genus are now recognised as a complex of hybrids - another whole evening's talk. The chromosome count in the cells are 29 or multiples of 29.

The ferns in this genus are once pinnate, with the sporangia following the vein rather than the edge of the frond. Other characteristics of *Notholaena* apply. Three main species are known, but many others are being distinguished.

Pellaea, Cliff Brakes

Greek: Pellos = dusky - for the bluish-grey fronds

About 80 species, mostly in dry places from tropical

to sub-tropical regions around the world. These ferns tend to look like miniature *Pteris* and many grow on cliffs which accounts for the common name, Cliff Brakes.

Pellaea are distinguished from *Notholaena* by the pinnae, pinnules, or segments, the lateral halves of which fold down to protect the plants from drying. The segments are ovate to elliptic, and never bead-like, as in *Cheilanthes*.

Pellaea are usually monomorphic, small to medium-sized with short-creeping or multicapital (many-headed) rhizomes bearing tufts of fronds. There is no indusium, but the sporangia are protected by the underrolled lateral margins of the pinnae, pinnules, or segments on which they are borne.

Argyrochosma

Greek: Argyros = silver - for white farina
Greek: Cosmo = ornamented

Newly characterized as having a chromosome count of $N=27$ or multiple (typical Cheilanthoid, $N=29$ or 30 and multiples). *Argyrochosma* have white farinose covering on the back of the frond for most members of this group. The plants look like *Pellaea* and the classification has been kicked back and forth between *Cheilanthes*, *Notholaena*, and *Pellaea*.

The distinguishing characteristics are a combination of concolorous scales and small segments (>4cm) or white farinose indument.

Pentagramma

Greek: Penta = five
Greek: Gramma = letter
Greek: Pentagon = five-sided figure

This genus has been newly split off from *Pityrogramma*. For *Pentagramma* $N=30$, cheilanthoid spores, *Pityrogramma* $N=29$, flanged spores.

Local species are all variants of *Pentagramma triangularis*. *Pentagramma triangularis* has 4 subspecies = *maxonii*, *triangularis*, *viscosa*, *semipallida*. These ferns have small to medium-sized, dark, wiry stipes bearing pinnately organized or pentagonal laminae that are covered usually with a white or yellow exudate, especially on the abaxial surface. Although called waxy, the exudate is not a wax or a farina.

These plants have no false indusium. The sporangia spread over the abaxial surface and are not confined to or near the margin. The fronds are not hirsute or scaly. *Pentagramma* grow almost exclusively in the Western

United States, especially California.

How Cheilanthoids Grow in Dry Places

There are two main factors involved in surviving in the hot, dry niche that these plants have selected for themselves. The first is physical adaptations and the second is their habitat.

Physical Adaptations

There is a long list of adaptations which help these plants survive in inhospitable areas:

1. **Epidermis (skin)** - These plants often have thickened leathery skin. This results from changes in the epidermal structure. The thickened skin helps to protect the plants from drying out.
2. **Hairs, scales, wax on fronds, stipes and rhizomes** - The hairs and scales protect the plant by controlling the local humidity. This is done by producing still air zones near the plant where transpired water will tend to stay rather than evaporate immediately. The hairs, scale and wax also possibly reflect solar radiation.
3. **Finely dissected or narrow pinnules** - Some cheilanthoids (e.g., *Cheilanthes californica*) have finely dissected or bead-like pinnules. This reduction in leaf surface may reduce water loss.
4. **Long roots** - This adaptation enables the plant to grow roots deep into the ground or back under rocks where the soil stays more moist.
5. **Rapid growth** - These plants respond very quickly to positive changes in their environment with a quick spurt of growth.
6. **Early sexual maturity** - Some cheilanthoids have mature spore as early as two months after germination.
7. **Spores remain viable over long dry periods** - Research on *Cheilanthes* spore where the spore were kept over an anhydrous sodium chloride (waterless salt) environment showed that the spore were still viable after 16 months. In another case, spores from an herbarium specimen were sowed more than 2 years after the frond was collected and still germinated.
8. **Plants curl up with spores outside** - This adaptation exposes the wax and hairs on the back to the sun, protecting the plants, and also exposes the sporangia for easier scattering of the spore.

9. **Increased transpiration (humidity), then reduced transpiration (dehydration)** - This adaptation means that the plant provides its own humidity at first. Then, after the plant "decides" that the situation will stay bad, the plant quits transpiring to save water.

10. **Controlled dehydration** - Dehydration in many cheilanthoids is controlled several ways. The plants have a non-drying substance in their cells, they grow with their roots protected, and they assume a curled position when the water supply is limited. These adaptations allow the plants to dry up without injuring cell tissues. Then can rehydrate when the water supply increases.

11. **Reproduction - Apogamy (ability to reproduce asexually)** - Apogamy is the reproduction of a new plant from the tissue of a gametophyte without the requirement for fertilization. Fertilization in plants requires water. Apogamy enables the prothalli to develop in the absence of the water required by sexual production for the sperm to "swim" to the ova.

During the fourth division in mitosis, the chromosomes in the cells do not split, so the cells end up with double the normal number of chromosomes. At meiosis, then, the cells split to form gametes, the chromosomes halve and you have a cell with the same number of chromosomes as the parent plant. When the offspring develop they are genetically identical to the parent plant.

Habitat

Most xeric plants live close to rocks ("appressed") This proximity does several things for the plant.

- First, it helps to control the temperature. Rocks warm up and cool down more slowly than the air. By being close to the rock, a plant can experience a temperature difference of several degrees. Additionally, growing close to a rock will usually mean that the plant is in the shade for part of the day
- Second, you often see plants living in the cracks of the rock. The long roots enable the plants to obtain moisture from deep in the crack and the natural decay of the rock provides soil and minerals to the plant.
- Third, rocks form natural channels that direct the water (rain and dew) to intersections in the rocks. This provides a mesic (moist) environment for the

plant.

- Fourth, the rocks provide a natural protection for the roots. Roots growing far into or under rocks have a reduced chance of completing drying out.

Other cheilanthoids (the Pelleas and Pentagrammas, for example) live in natural drainage and seepage. These plants live on the talus slopes where the thin soil stays moist with water running off higher portions of the hill or mountain. Others live where the rocks have fallen away to expose soil banks out of which the water seeps. Pentagrammas seem particularly fond of growing in road cuts.

How Do You and I Grow Cheilanthoids

There are several things you can do to improve your chances of growing these plants.

- High light levels** - These plants tend to grow in sunny and sometimes very hot places. So, they are used to a lot of light, including some direct sun. I grow many of my plants in direct sun, but I live on the coast. It is important to determine where the plants grow in nature (for example, *Cheilanthes* and *Notholaenas* tend to like more direct sun than *Pentagrammas*).
- Careful soil selection** - These plants grow in a naturally very loose mix (e.g., sand, decomposed rock). They are used to surviving with very good drainage. A mix that stays too moist will kill the roots.

Pay attention to the plant's natural habitat. Note if it is acid, alkaline, or has special mineral content. For example, the literature suggests that *Cheilanthes californicum* needs selenium in its soil. Based on a suggestion from Mike Windham, for collected plants, when possible I try to grow my plants in the soil that the plant grows in in the wild.

I'm personally trying combinations of hydroponic medium (small ceramic pellets) with soil to improve the drainage and provide a neutral growing medium. Irv Knobloch, a well-known pteridologist who has studied cheilanthoids extensively says he uses clay-based kitty litter to get a good fast-draining medium.

- Use very little fertilizer** - These plant are used to deprived conditions. They normally grow where the supply of organic matter is limited.
- Raised humidity** - In nature most cheilanthoids go

dormant when humidity drops as part of their adaptive process. This does not mean wet soil, but rather raised humidity as in an open terrarium. Remember these plants are VERY susceptible to overwatering.

- E. **Water carefully** - For the plants with lacier fronds avoid constant water on foliage. Some people suggest that all the cheilanthoids should be watered from the bottom as most of the time in nature most plants would collect water from their roots from seepage or runoff

- F. **Pray to the Cheilanthoid Gods** - These plants are generally not that easy to grow. So, try your best, follow all the rules, and then hope for a little luck.

Glossary:-

- concolorous - frond same colour both sides
 farina - mealy or flour-like covering
 glabrous - without hairs or scales
 indument - any covering on a plant surface, such as hairs or scales

The following article contains excerpts from an item in the February 1996 issue of "Indigenotes", a publication of the Indigenous Flora and Fauna Association Inc.

THE SECRET LIFE OF TREE FERNS.

A D.C.N.R. report has shown that tree ferns and other understorey plants can outlive their towering eucalypt overstorey many times over. When William the Conqueror was crossing the English Channel, when the giant pyramids were being built by the ancient civilisations of Central America, today's tree ferns were just small green shoots in our forests.

The report, based on radio carbon dating of tree ferns in 80 year old mountain ash forests near Toolangi, show them to be from 330 up to 2,000 years old. The slow growing soft tree ferns, the tallest of which was 5.3 metres, had average growth rates of one centimetre a year. The report showed that although the ferns survived bushfires, their survival rates plunged by 95% in logged areas. The remaining 5% of tree ferns in clearfelled coupes were badly damaged and continued to decline.

Current logging practices are said to have destroyed the natural ecological processes which differentiate a forest from a plantation.

Tree ferns play an important role in the forest ecosystem by providing a nursery site for other plants and by creating a blanket effect to keep the forest understorey moist. The other plants which were dated as being between 200 and 500 years old were the Forest Geebung and the Musk Daisy Bush. Geebung has been shown to only produce viable seed when very mature - at around 200 years old. Clearfelling forests every 50-60 years may eventually cause

FERN COMPETITION RESULTS

NOVEMBER'S MEETING AND DECEMBER'S CHRISTMAS FUNCTION.

NOVEMBER COMPETITION CATEGORY:

1. Chris Goudey *Athyrium filix-femina* cultivar.
2. Chris Goudey *Athyrium filix-femina* cultivar.
3. Dorothy Forte *Athyrium filix-femina* 'Victoriae'.

EXHIBITORS' DRAW: Barry White.

SPECIAL EFFORT: Barry White, Reg Kenealy, Fran Harrison, Janet McClellan.

DECEMBER NO COMPETITION.

SPECIAL EFFORT: Lorraine Goudey, Rex Gresham, Bill Gouge, Mavis Potter.

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NEW LIBRARY BOOK

"FERNS OF SAN DIEGO COUNTY"

Reviewed by Barry White

As well as giving our Society a very interesting talk on xerophytic ferns in and around San Diego County, Robin Halley has also donated to our library a book "Ferns of San Diego County" by Helen Witham.

This is a bright and breezy little book on the twenty six ferns which are native to the county. It is written in a very chatty style which is easy to read and has interesting bits of information. For example, the author's comments on the Pillwort *Pilularia americana* include; "Pillwort is not just a little plant, it is a tiny little plant! Its half to one and a half inch-long leaves are usually described as grasslike because they consist of stalks only, no blade at all. However, very close inspection may reveal a fiddle-head uncoiling, and no grass leaf ever comes into this world in this manner. When you see a fiddle-head you will know that you are looking at a fern. What does a pillwort look like? Like the squiggle in the photograph. The leaves, roots and sporocarps develop from joints in slender creeping rhizomes. Young leaves are frail and succulent, older ones a little tougher but not much so. As the leaves mature they develop a brownish cast which serves to set them apart visually from surrounding greener plants."

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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. 9337 9793). There is no charge for 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.

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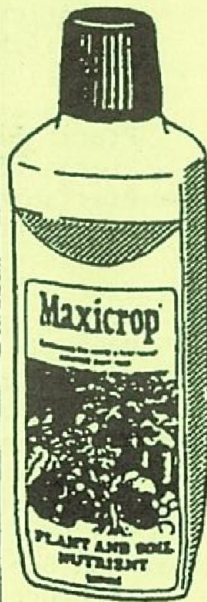
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