ASGAP Fern Study Group

Newsletter Number 106

ISSN 0811-5311 **September, 2004**

LEADER: Peter Hind, 41 Miller Street, Mount Druitt, NSW 2770
SECRETARY / TREASURER: Ron Wilkins, 188b Beecroft Road, Cheltenham, NSW 2119. E-mail: ronwtwilkins@hotmail.com Phone 02 9876 1948
NEWSLETTER EDITOR: Vacant
SPORE BANK: Barry White, 34 Noble Way, Sunbury, Vic. 3429

Note from Secretary / Treasurer

As Peter Hind is recovering from his second hip replacement operation and while the situation of vacant Newsletter Editor is unresolved, I have put together and distributed this third newsletter for the year very largely with notes I have on hand. This is also the right time to join together and pay tribute to the efforts of Mike Healy, the former newsletter editor and his wife Joyce who together developed the newsletter to a new level of communication between the widely distributed members of the Fern Study Group. During this time they had to use all the skills they had, and more, to cope with all sorts of written and computer communications, often helping correspondents like myself with advice on how to accomplish some aspect or other of transmitting or reading files or composing articles. We hope they enjoy a well-earned rest and that this will assist in coping with the serious health problems in the family. Well done Mike and Joyce!!

Group Reports and Forthcoming Events

Programme for Sydney Meetings

September Meeting 11am Sat. 18th Sept. At the home of Dot and Graham Camp, Toomeys Road, Mt Elliot . See map and further details in June 2004 newsletter.
October Meeting 11am Sun. 17th Oct. At the home of Ron and Paula Wilkins, 188B Beecroft Road, Cheltenham. Subjects for discussion – fern growth from spore, and Calder Chaffey's new fern key.
November Meeting Sunday 28th November. **End Of Year Get Together** at Burwood RSL, near junction of Shaftsbury Rd. and Clarence St., Burwood. 12 noon sharp! Cost for lunch $14 (plus drinks).
February Meeting Saturday 19th February 11am At home of Peter Hind and Margret Mitchell, Mt Druitt.

Programme for SE Queensland

September Meeting. Friday 10th Sept. Meet 1pm at Mt. Coot-tha Auditorium to set up Fern Display for S.G.A.P. Flower Show.
October Meeting. Sunday 3rd Oct. Excursion to Binna Burra. Meet at 9.30 am at the picnic grounds, Binna Burra.
November Meeting. Sun. 7th Nov. Excursion to Goomburra State Forest. Meet 9 am (please note time) at Driver Reviver Rest Area, junction of Cunningham Highway and turn-off to Goomburra (at Gladfield) 22 km west of Cunningham's Gap and 27 km NE of Warwick.
December Meeting. Sun. 5th Dec. Meet 9.30 am at home of Nev and Shirley Deeth, 19 Richards Road, Camp Mountain for **End of Year Break-up.** Bring Ferns for Gala Swap and ideas for the 2005 programme.
For further information contact Peter Bostock. Phone Home 07 3202 6983; Work 07 3896 9508

In Memorium Rose Bach

Rose as many in the Fern Study Group would remember her. The photo was taken after a jetboat ride in New Zealand when she was in her 70's.

Rose, a well-known and much loved member of the ASGAP Fern Study Group died on the 24th June 2004 just short of her 82nd birthday. About a dozen members of the Fern Study Group joined family and friends for the memorial service where the eulogy was given by one of her sons, supported by Kyrill Taylor representing the Fern Study Group who spoke movingly about her love of plants and gardens, and of her accomplishments in growing Australian ferns, in which field she had a much reputed expertise.

In her early life as a girl growing up in a poor family near Parramatta during the depression, and afterwards through two difficult marriages, she and her children suffered great deprivation and hardship. It was only in the last 20 years of her life that she achieved the freedom to devote her energies, which were considerable, to the study of ferns and the construction of two remarkable fern gardens, the first in Epping and the second at Glenbrook, in the Blue Mountains of Sydney, growing many of the rare ferns from spore. Rose had considerable technical ability which was surprising in an old lady and she loved handling tools and doing all sorts of construction and maintenance work. She had a strong 'do it yourself' mentality and she was still cleaning leaves from house guttering from a ladder in her 70's.

We remember her cheerful presence at our meetings and her many contributions to the group with fondness. As Kyrill said in his memorial address, there will be big trouble in heaven if Rose does not find a garden there – and hopefully a garden with ferns.

S-E Qld Fern Study Group Report Compiled by Lorna Murray

In June 2001 the SE Queensland members of the Fern Study Group visited Knoll National Park, Mt. Tamborine, and the report of this excursion was recorded in the September number of the Fern Study Group Newsletter, No 94. On 4 July this year members returned to this National Park and again recorded the ferns observed.

On this occasion it was a very warm, bright winters day, and a lot of family groups were visiting the area. The weather had been very dry and some of the ferns were looking rather stressed. However 37 species were observed, including 5 species not recorded previously. These 5 ferns were *Crepidomanes vitiense, Cyathea australis, Diplazium australe, Lastreopsis decomposita* and *Psilotum nudum.* Our fern expert, Peter Bostock, had not been with the group in 2001, and he was interested to find the filmy fern.

Seven species recorded previously were not noted this time, perhaps because of the dry conditions or the group not walking on exactly same tracks as previously. These species were *Arachniodes aristata, Asplenium polyodon, Doodia media, Hypolepis glandulifera, Lastreopsis silvestris, L. smithiana* and *Pteris tremula.*

Sydney Fern Study Group Report Fern Gully Day, Mount Wilson

Compiled by Ron Wilkins

On 17th July four members of the study group and three visitors from regional APS branches braved a very cold winter day in the Blue Mountains visiting the superb fern gully in a patch of rainforest developed on basalt at the Waterfall Walk, Mount Wilson. Despite the cold and the effects of the drought so that there was no water at the waterfall, the ferns were in quite good condition along the trail. Peter Hind led the excursion in his inimitable way with attention to, and identification of every plant from moss to orchid to giant eucalypt. Among the many species of ferns displayed were many excellent examples of the superb rare Leptopteris frazeri growing on the walls of the dry waterfall. Interestingly, only one species of Lastreopsis (acuminata) appears to be present in this area though Peter has seen L. hispida on private property nearby. After lunch we proceeded to the Cathedral of Ferns (Dicksonia forest) where numerous large tree ferns are growing amongst masses of Sticherus lobatus, Blechnum nudum and other ground ferns. We then followed another trail through beautiful rainforest with mostly similar ferns to those we discovered on the Waterfall walk . All agreed that it was an excellent day in an outstanding location and we left puzzled why so few APS members from local regional branches took the opportunity to come. Surely not only because of the freezing weather!

Botany for Gardeners by Brian Capon

Book review by Ron Wilkins

I have recently finished reading Brian Capon's book which was first published in 1990 in the USA and republished in Australia by Bloomings Books, Melbourne in 2001. It's a lovely little book of 220 pages, beautifully organised and illustrated. Its aim is a broad outline of botany with special reference to the flowering plants and gymnosperms. Much of their basic structure and function, however, is so similar to ferns that even fern lovers will learn much from this book. Its relevance to gardening is assured by the use of common garden plants to illustrate the botanical principles discussed.

The book is organised in five sections: growth, organisation, adaption, function and reproduction. The section on growth begins with the plant cell and proceeds to discuss the germination of seeds. The process is so complex that one can readily understand why fern spores have been so extensively utilised as simple models for investigating the mechanism of germination. The distinct functions of roots, stems and leaves are clearly explained by a detailed examination of their internal structures using images of beautifully stained sections of common garden plants.

The section on adaption is interesting but it has minimal relevance to ferns. The section on functions deals with basic physiology and includes a discussion of the role of hormones in plant responses to light, gravity, touch and ageing. Many physiological responses discussed are still imperfectly understood.

The uptake and use of water and minerals in the growth of plants – osmosis, root pressure, transpirational pull, and the role of micronutrients are beautifully described. An introduction to photosynthesis is supported by diagrams and some extraordinary photographs. The section on reproduction refers exclusively to flowering plants, but in a chapter that provides a brief introduction to genetics, the life cycles of mosses, ferns and flowering plants are compared and contrasted, and the origins of mitosis, meiosis and polyploidy, of considerable significance in fern studies, are clearly explained.

However, a word of warning. If you remember some basic physics and chemistry you will find this book an easy and pleasurable read, however other gardeners may not find it so easy-going.

Posting Ferns *by Ron Wilkins (and Claire Shackel !)*

Following correspondence on the methods we use for growing ferns from spore earlier this year, Claire tried sending me some of her juvenile ferns which were ready for potting up. They were simply wrapped in moist newspaper, packed in flat plastic boxes and sent as parcels through the mail from Brisbane to Sydney. The specimens arrived a little compressed but otherwise in good condition. Platycerium veitchii, Asplenium goudeyi, Todea barbara, Asplenium milnei and Asplenium difforme were all sturdy plants about 5 cm high and I potted them straight away and put them outdoors. The Blechnum camfieldii were smaller sporelings but I unwisely did the same to them. All have survived the winter and drought but the B. camfieldi and A. difforme were grazed by snails, my fault entirely, I should have taken more care. But they are hanging on and with the advent of some warmer days they are developing new fronds. As a result of this experience we can predict that sturdy 5 cm juvenile specimens can be successfully posted by ordinary mail though probably winter/spring is the best time to try.

Do you have an excess of juvenile ferns of any species grown from spore? Why not arrange a swap by parcel mail. It works ! Advertise your species for exchange in the Newsletter. Its free!

Ventilating Systems in Ferns *Ron Wilkins*

It is well known that the ventilating pores on the surface of the lamina in ferns, called stomata, are essential for photosynthesis and transpiration. For these processes to be effective, carbon dioxide must be able to enter and oxygen and water vapour to exit the frond. The movement of gases within the leaf is facilitated by the presence of spongy parenchyma tissue in the middle of the leaf.

But what of the stipe and rachis? Some species of fern allies consist of nothing much more than stem, their leaves are so small, think of the skeleton fern Psilotum. From the green colour we can infer that stipes too contain chlorophyll. Even an old stipe of a true fern darkened by lignification is usually green inside. If you look carefully at, let us say a frond of Asplenium bulbiferum, you will see two pale green lines running the length of the stipe, passing off onto the rachis of the first pair of pinnae, and re-commencing on the primary rachis. On other ferns the pale green line may be discontinuous as in Cyathea cooperi so that it resembles rough stitching on a garment. These structures, called aerophores, pneumatophores or pneumathodes are often not mentioned in taxonomic descriptions although they inspired the name of one genus, Pneumatopteris (Thelypteridaceae), because this structure is very conspicuous in the type species. (For fern anatomy terminology see my article 'Inside Ferns' Dec. 2003 newsletter.)

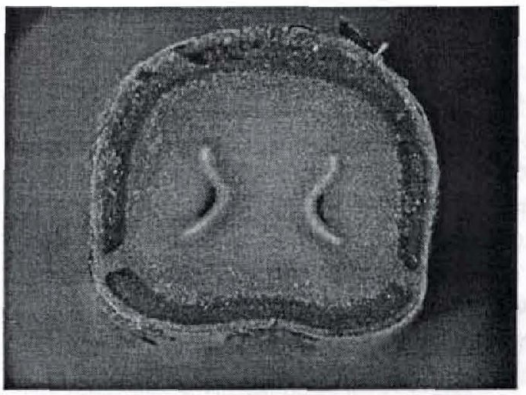

Fig. 1. Asplenium surrogatum. Transverse section of base of stipe.

In the transverse section of the stipe of Asplenium surrogatum seen in Fig. 1, the green parenchyma cells of the cortex penetrate the brown hypodermis to contact the outer epidermis layer at the position of the thin green line on the surface of the stipe, seen in Fig. 2. The ventilating system of the stipe is completed by the presence of stomata in the epidermis along the line of the aerophore, though because these pores are very small, they cannot be convincingly photographed with my low power microscope.

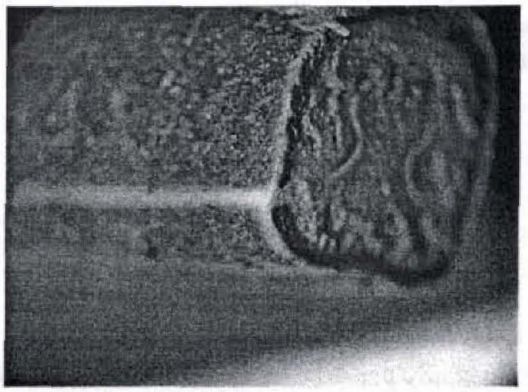

Fig. 2. ***Asplenium surrogatum.*** Photograph taken at an angle to section in Fig. 1 to show relationship between internal structure and green line (aerophore) on surface.

Although my photographs do not reveal the intercellular spaces which must exist in the tissue of the cortex, there is a diagram in Bower (1923) that illuminates the way the aerophores function. It is reproduced here as Fig. 3

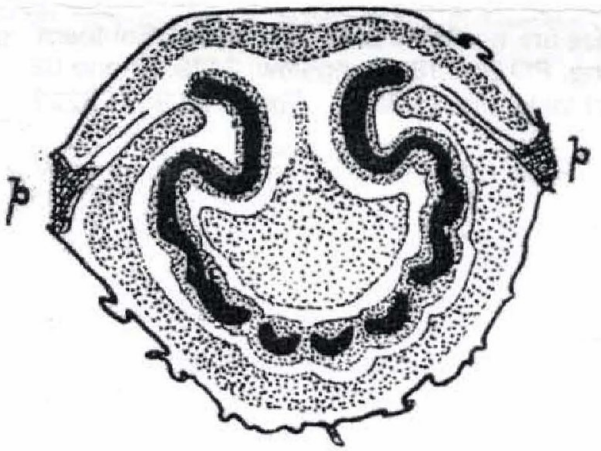

Fig. 3 . Tranverse section of the stipe of ***Saccoloma elegans*** (Dennstaedtiaceae) after Bower (1923).
p = aerophore (pneumathode)

In this transverse section of the stipe of Saccoloma elegans, the black represents the vascular strands, the dotted areas represent thick-walled mechanical tissue or sclerenchyma through which gases pass with difficulty, and the clear areas are soft ventilated parenchyma connecting with the aerophores (p). In this way tissues deep within the stipe are provided with a way to access reacting gases, and to disperse gaseous products. Occasionally in some ferns, the cortex tissue breaks through the epidermis and forms a small patch with a honeycomb-like texture.

An interesting question is how light penetrates stipes that perhaps began their life green, but they have darkened by cell wall thickening and lignification with advancing age, even those that clearly have green chlorophyll-containing parenchyma within. It seems that the pale green–coloured aerophores behave like glass bricks in the otherwise opaque wall of a stairwell, allowing diffuse light to penetrate the interior of the stipe (I am indebted to Trevor Clifford for this nice analogy.) You can test this by cutting a longitudinal section along the stipe of your Asplenium bulbiferum and hold it up to the light. In some ferns the aerophores are not so easy to see. Try cutting off a small piece of the stipe and let it dry. Put the rest of the frond into a wet plastic bag. .Differential loss of water from the ventilated tissues below the aerophores causes a shrinkage crease to develop in the drying piece. Matching this crease with the undried portion of the frond reveals the line of the aerophore. Rose Bach kindly gave me the specimen of A. surrogatum, a Lord Howe Island endemic species shortly before she died.

Reference

Bower, F. O. (1923) The Ferns (Filicales). Vol 1 Cambridge University Press, London. p. 169.

A FINAL NOTE

Ron wilkins

Old fern study Group newsletters are precious. There seem to be few complete sets in existence. Please do not discard them if you have a set. Tess Taylor kindly passed a number of her old issues on to me but if you have any of the missing ones I would be delighted to receive them. The issues I do not have are 1-7, 9, 11-56, 59-67, 74, 77, 82. I will see that any duplicates get a good home. Many thanks in advance.

Copy for December newsletter to reach me before November 15th. The December Newsletter will contain a review of **Calder Chaffey's** recent books **'A Field Guide to Australian Ferns' (2 vols).** These volumes are available at the bookshop, Southern Cross University, or Natureview Publishing, PO Box 130 Bangalow, 2479. Phone 02 6620 3635. I got my copies in Sydney at Florilegium in Glebe Phone 02 9571 8222