

S.G.A.P. - Fern Study Group - Newsletter

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LEADER: Molly Murray
25 Nowill Street, RYDALMERE..2116.

DISTRIBUTION: John Lee
76 The Bulwark, CASTLECRAG..2068.

HON. TREASURER: Fay Low
151 Raglan Street, MOSMAN....2088.

SPORE BANK: Gwen Hardwick
21 Nowill Street, RYDALMERE.2116.

John Lee who organises the distribution of our newsletter has made application to Australia Post for a cheaper mailing rate. His enquiries have revealed, that we must have a letterhead stating who we are with the word "Newsletter" contained on the one line. Ergo, our heading. We must also publicly state to members our intent to publish regularly at quarterly intervals. Hence - it is our intention to issue newsletters which will be posted in the last week of the months of March, June, September and December of each year.

On our excursion to Lawson it was fascinating to see the regeneration that had taken place in the few years since bushfires devastated the area in December 1977. The walk itself was an easy 2½ hours, with a gradual descent into the valley. The track followed a creek bordered with magnificent Todea barbara throughout its course. Typical ferns framed the several picturesque waterfalls and flourished in sandstone caves and overhangs. Ceratopetalum gummiferum had prospered and with several trunks growing from the roots to replace the charred original, formed many handsome stands. Vast colonies of Bauera rubioides, Pultenaea scabra and other species of the pea families covered the slopes, while the flowering Epacris reclinata lent a touch of colour from rock crevices. The entire valley seemed a testimony to the bitter sweet intimacy between fire and our flora.

Which leads one to reflect, do we sometimes unduly protect species of native fern in glasshouses? The recent winter was cold and dry in Sydney, but ferns growing outside in my garden looked more comfortable than I felt. In the Parramatta district we are growing Asplenium, Athyrium, Blechnum, Doodia and Pteris species in open fernery situations, with shadecloth giving a minimum of protection where natural tree canopies are lacking. Ferns from northern rainforests, Drynaria, Goniophlebium and even Lycopodium phlegmaria have adjusted to these conditions, although not making the profuse growth they display in the humidity of their natural habitat. A Cheilanthes I tried to grow under shadecloth, threatened to expire until I moved the plant to an unsheltered position in my front garden where it copes happily with cold southerly winds, hot westerly wind and sun. However, recently I had the pleasure of visiting Jan and John Fairley at their lovely home on Collaroy Plateau, as we toured the extensive grounds John pointed out a problem he was experiencing with a local Adiantum which has spread, uninvited, over large tracts, invading raised sandstone garden beds to the detriment of plants that John would prefer to grow. This was the first occasion on which I had viewed a fern and felt compelled to coldly regard it as a weed, I returned to my small garden, resolved to plant only tufted species in the ground.

Following the issue of our June newsletter, Nev. Litter of Bulimba Q'sland contacted us with news that he thought members might like to have of a recent publication on ferns. So, "better late than never;" It is titled "FERNS, FERN ALLIES AND CONIFERS OF AUSTRALIA" by H.T. Clifford and J. Constantine. H.T. Clifford is a graduate at the Universities of Melbourne (D.Sc.) and Durham, England (Ph.D.) He is a reader in botany at the University of Queensland. Jean Constantine is currently lecturing at the Darling Downs Institute of Advanced Education having graduated from the University of Queensland with a M.Sc. in the botany of ferns. The book is written as a laboratory manual and student - orientated. Simplified

keys are provided with descriptions of all taxonomic ranks, from classes, down to families, genera and species. It contains 150 pages, (no colour-plates) and excellent line drawings illustrate some of the less easily defined technical terms. "FERNS, FERN ALLIES AND CONIFERS OF AUSTRALIA" retails at \$19.95. Published by University of Queensland Press.

A book with something for everyone! "GROWING FERNS" subtitled 'A Beginner's Guide To Ferns and Their Culture' has been written by Ray Best. On leaving school Ray became apprenticed to the Printing and Allied Trades. He studied commercial art for five years at Evening Technical College. Qualifying as a Photographic Lithographic Artist. During the second world war his talent was utilised by the military when he served with a Cartographic unit in New Guinea. Returning to civilian life, Ray pursued his artistic career until early retirement enabled him to devote time to an extensive study of ferns. Ray is a member of the British Pteridological Society, The Los Angeles Fern Society, The Fern Society of Victoria (Aust.) and a valued member of the S.G.A.P. Fern Study Group. He has written material for the Australian Encyclopedia of Gardening and his contributions are much sought after by quality gardening magazines. "GROWING FERNS" is attractively illustrated with colour photographs and sketches by the author, contains practical information and advice. Retails at \$3.95 published by Bay Books Rushcutters Bay N.S.W.

Two members responded to John Lees article on the branching Cyathea cooperi.

(1) From Lathlain Park in Western Australia came this comment. "The article on the branching Cyathea cooperi was of particular interest. It is a natural escapee here and in one area in a low creek I've noticed many double headed plants, perhaps the farmer had cut them down in earlier days. Another interesting C.cooperi that I came across had struggled hard for life and given up at a trunk size of three (3) feet, parted into two (2) flat trunks and then joined together again further up. Its history swung back and forth from tender care to complete neglect and when its owner died so did it! Maybe it could have been two separate sporlings growing so close that they became one."

(2) Ray Best wrote. "Regarding John Lees request for information about Cyathea cooperi and its ability to branch; generally I am sure it produces a single trunk. However one of the species grown from a sporeling on my property at Kenthurst N.S.W. put out a side branch about one metre above ground; both the original trunk and branch are doing well. This I would suspect may be the result of a gene mutation; not with the slashing young gardener; but with the tree fern itself. Branching is not unusual with quite a number of tree ferns particularly Dicksonia species. Sometimes in deep rainforest a sporeling will set in the lower part of the trunk and in time form a branch on the original trunk. In most cases I feel sure it is within the growth pattern of the fern. I have propagated from the spores of my branching C. cooperi without any evidence as yet of branching specimens; most are reasonably small so it is still a matter of wait and see. Perhaps an ideal situation with rich soil could assist in forcing a branch structure, or excessive fertilisation may produce a similar result. I feel the possibility that the slashing young gardener turned its head rather remote."

Audrey Fisher of Rosebud Vic. has reported some success with spore. Cyathea brownii received from the bank in April, was planted into plastic containers on May 10th in a medium of sterile soil topped with spagnum moss, prothallus was noted on June 21st. The containers were kept in a potting shed which allowed light but very little sun. At her Regional S.G.A.P. Meeting she was interested in a talk on ferns given by Mr. Doug Thomas and intends to try his method of propagating. Doug uses a mixture of mainly peat moss, with propagation sand plus a little leaf mould placed on a terracota saucer. He then places the saucer in a clear plastic container covered with a sheet of glass. Audrey considers the advantage of this method is that one can see at a glance what is happening.

Kathleen Ward of Mullumbimby, Northern N.S.W. would like to recommend to residents or touring members, the KOONYUM RANGE NURSERY, Lot 3 Eugenia Street, Mullumbimby, which sells a range of ferns from Queensland and ferns local to the nearby Nullum State Forest area. Kathleen also mentions a Mrs. S. Saperstein who grows all her ferns, including many natives from spore. Mrs. Saperstein grows commercially at Main Arm about 11 Kilometres from Mullumbimby.

Robert Riedl of Sydney has suggested a project which, if executed, could further the ideals and aims of our Study Group. The project concerns one of Australia's most handsome ferns ANGIOPTERIS EVECTA, considered to be extinct in northern New South Wales, it now occurs only from north eastern Queensland south towards the border, inhabiting coastal rain forests, with a relic population in The Carnarvon Gorge of central Queensland. Experienced growers have tried in vain to propagate A. EVECTA from spore, but in common with other plant species the prothallus relies upon a close relationship with soil fungi to develop. The basic principle involved in Robert's suggestion is to utilize the "Seed Flasking" technique which over a number of decades has been the standard method of orchid growers to raise new plants from seed, wherein a nutrient medium is used containing simple sugars and essential salts which are required by the germinating plant, but which in nature can only be obtained through a symbiotic relationship with specific mycorrhizal fungi. (The fungus uses enzymes which have the ability to break down polysaturates like cellulose, starches etc. into simple sugars which it makes available to the seedling). Robert considers it reasonable to assume that young sporlings of A. EVECTA may be successfully raised like orchid seedlings on an "appropriate" nutrient medium, a variety of which are nowadays available "off the shelf." He suggests that we should first experiment a little with this technique using more common fern spores until we are proficient. The next step would be for the spore bank to obtain Angiopteris spore for interested members who could then try out their newly acquired skills, reporting back to the Group Leadership so that information may be coordinated and dispersed through our Newsletters. In conclusion Robert reminds us and I quote "we often gain more insight from our failures than from our successes."

Members can participate by experimenting and reporting, by supplying spore of ANGIOPTERIS EVECTA or by passing on to us any observations you have to make about the fern or the project in general.

As most fern growers could be unfamiliar with the flask culture of seedlings on synthetic nutrient media, we appealed to Sam Jack for assistance. Sam had an early introduction to 'gardening know how', his father being the proprietor of a large nursery business in Ermington before that suburb was overtaken by 'progress'. While living in the metropolitan area Sam and his wife Betty, had in their garden a collection of orchids numbering thousands. Now residing in the Blue Mountains their interests have turned to the propagation of native plants and ferns. We are obliged to Sam for this contribution.

ANGIOPTERIS EVECTA:

An enquiry from a fern group member, showing concern about the possible extinction of this fern, and as to whether fern spores could be cultivated by the same method as that which is used for orchid seed cultivation has prompted the following article on this method.

In 1922 at Cornell University a Dr. Lewis Knudson perfected the Asymbiotic Method which requires the use of an agar jelly to which has been added the necessary minerals, nutrients and sugar. These ingredients are in balanced proportions in sterilized flasks to which the seed is introduced after first being sterilized.

A good standard formula would be 'Knudsons Formula "C" '

Calcium Nitrate	1.00	Gram.
Monobasic Potassium Phosphate	0.25	"
Magnesium Sulfate	0.25	"
Ammonium Sulfate	0.50	"
Sucrose	20.00	"
Ferrous Sulfate	0.025	"
Manganese Sulfate	0.0075	"

Add the ingredients one at a time to one litre of distilled water and dissolve completely. Then add fifteen grams of plain agar and warm until all the agar is dissolved.

At this time the P.H. or Hydrogen ion concentration must be checked. The P.H. scale is based on units from zero to fourteen, which indicate the degree of acidity or alkalinity of a solution, seven being neutral, below seven is acid, and the lower the number the more acid. Above seven is alkaline.

The degree of acidity or alkalinity will be determined for the suitability to the use of fern spores. Too great an acidity can kill the spore, and a too alkaline condition can impoverish the sporelings, by the prevention of their ability to take up the necessary minerals.

Spore will have to be disinfected prior to its placement into the sterilized agar. Calcium Hypochlorite solution has been the accepted means of disinfecting orchid seed, as seed can be left in it for several hours without harm. Fern spore will require some experimentation to determine the strength and suitability of this solution.

Some other mediums are Hydrogen Peroxide, Clorazene, and Clorox.

Flasks to be used may be 500cc Ehrlenmeyer or any wide mouthed clear glass bottles that can be sterilized, for instance Johnny Walker whisky bottles. Rubber stoppers are the best means of stoppering. The stopper should have a hole in the centre, plugged with cotton-wool. Should your rubber stoppers have no hole then freeze them and it is then easy to drill the hole.

When flasks are prepared and the agar solution is heated, use a long funnel to pour the agar into the flask, this prevents the splashing of agar onto the neck or sides of the flasks which would encourage the growth of mould.

The agar should be approx. one inch in depth.

Stopper the flasks securely by tying on stoppers and prepare for sterilizing. Twenty minutes at fifteen pounds pressure in a home pressure cooker is sufficient. Be sure to prevent water entering the flasks, cool off flasks and they are ready for sowing.

METHOD 1. You will need a one quarter ounce vial with cork, medicine dropper, a glass or china cup, a graduated cylinder that holds at least 100cc, two empty bottles, filter paper, glass funnel, an open flame and a paring knife. To make up disinfecting solution put ten grams of solid Calcium Hypochlorite in one bottle and add 140cc of distilled water or an amount as worked out to be better for fern spores. Shake thoroughly and let stand for one hour, shaking it at intervals. Then filter off the clear solution into the other bottle, this solution must be used immediately, as it has a short life.

Fill the vial two thirds with the Hypochlorite solution and add a tiny bit of fern spore, use the knife for this purpose, after flaming it first, (be sure the knife is cold before touching it to the spore.) Cork the vial and shake thoroughly for at least twenty minutes to create a complete wetted situation with the spore.

Whilst sterilizing the seed soak the dropper in some of the solution in the cup, make sure you fill and empty the dropper.

All your equipment should be close to hand with flasks still stoppered, and a bowl containing 10% Clorox for disinfecting flask stopper whilst removed for sowing.

Unstopper one flask at a time, placing flask in Clorox solution, use dropper to stir spore in solution by drawing in and ejecting it, then take up a few drops containing spores and transfer to flask by holding the dropper in the neck of the flask so the drops will not run down the sides, move the dropper in a circle so as to deposit the spore in a different place on the agar. As soon as the spore is in remove dropper, take the stopper from the bowl, drain off all excess Clorox and replace on flask.

After sowing all flasks gently rock each back and forth to disperse spore over surface of agar. Fasten foil over stopper and label flask with date and plant name. If you have'nt been careful enough flasks will show mould within a few days and this will destroy your spore.

METHOD 2. Do all as previously described except that a wide bore hypodermic syringe will replace the eye dropper. The spore in suspension is picked up with the needle and injected through the cotton wool plug in the stopper.

Place end of needle in Clorox solution before inserting in flask, if spore sticks in needle add a small amount of warm agar to solution to act as a lubricant. Cover stopper with foil after sowing.

Should people wish to experiment with these methods the agar solution can be purchased ready prepared in a dry condition to which distilled water will have to be added from Selby Chemicals.

The writer will carry out some flasking experiments with fern spore and release details in later Newsletters.

Good luck to all experimenters. Sam Jack.

The 1980 Flower Show. Congratulations to Peter Olde and his team on the organisation of a first class show. Various regional groups set up their exhibits smoothly and effectively. Unfortunately, this was not so with the Fern Study Group display, which was unplanned and scrappy. Only sheer good luck prevented disaster when our heavy structure of arches collapsed during erection.

Next Years Exhibition is to be held at Sydney University during August, in conjunction with the International Botanical Congress.

SUBJECT TO:

- (a) The Fern Study Group being invited to mount an exhibit.
- (b) Sydney Group members deciding whether such a venture would yield positive results.

It would be desirable to rethink the issue and find a light structure, which could be erected by a few middle aged women as opposed to a dozen strong men. We should also know what ferns are to be exhibited and strive for quality presentation in our arrangement. We will discuss past and future displays at our first meeting in early 1981. In the meantime Sydney members might like to begin cultivating a specific fern for this coming Show. Happily all is never quite lost; to admirers, ferns always look good. Given the season of the year we did have some handsome species on show. Tossed together as they were, into our truncated structure, they still attracted fair comment. I would like to thank our members and those from other groups who lent their ferns and labour to our display.

SPORE BANK REPORT: Again I would like to thank those who have sent spore to the Bank. Most material yielded viable spore but in some instances, the spore had released prior to collection and only empty sporangia remained. As I sincerely appreciate and indeed, rely upon the time and effort that members employ in picking and mailing fertile material to the bank, please do persevere with the good work, because as the experts (Jones and Clemesha) advise us, "COLLECTION OF IMMATURE FRONDS OR OLD FRONDS FROM WHICH ALL SPORES HAVE SHED IS A COMMON PROBLEM BUT ONE WHICH LESSENS WITH EXPERIENCE."

During August the Group purchased an "ENDECOTTS" Laboratory Test Sieve, Brass/P. Copper, 200mm x 53 microns at a cost of \$47.95 from Townson & Mercer, Mortlake. N.S.W. Using this sieve in conjunction with the microscope, I am now more able to delete waste material and package pure spore. I will advise each donor, promptly by mail, of the quantity of spore obtained from each contribution, so that you may better judge if you are collecting at the right time.

Members have sent fronds to me for identification, as I am not qualified for this task I have passed the samples on to the Sydney Herbarium. To save time, might I suggest that you send any such material direct to:- "THE DIRECTOR, ROYAL BOTANIC GARDENS, SYDNEY.2000." Letters received at the Gardens are numbered and dealt with in rotation as soon as possible, at this time a stamped addressed envelope is not required.

The Herbarium requires where possible, a section of rhizome, stipe and fertile frond. Scales and hairs on stipe play an important part in fern identification. In the case of the larger tree ferns, send some scales from the base of fronds and a section of fertile frond. Number your material to match the plant at home, as material is not returned. Pack material in paper, not plastic as plastic causes the material to sweat.

ADDITIONAL SPORE IN THE BANK:

- | | | |
|------|-------------|--------------|
| (1) | ACROSTICHUM | speciosum |
| (2) | ADIANTUM | formosum |
| (3) | BLECHNUM | fluviatile |
| (4) | " | patersonii |
| (5) | " | vulcanicum |
| (6) | CHEILANTHES | distans |
| (7) | CYATHEA | australis |
| (8) | " | celebica |
| (9) | " | cunninghamii |
| (10) | PLATYCERIUM | veitchii |
| (11) | POLYSTICHUM | australiense |

GWEN.

Additions to membership will be published in the December Newsletter.

Several families are visiting the Burrendong Arboretum on the weekend of 18th & 19th of October to take a donation of ferns and to view the new rainforest area.

Our last excursion for 1980 will be to tour the W.R.A.A.C. Barracks and nearby foreshore at Middle Head. We will meet at 10.a.m. at the approach to the Barracks on November 23rd., weather permitting we hope to enjoy a picnic lunch.

Molly Murray LEADER.
FERN STUDY GROUP.