

shaped or filamentous. It is hoped that members who have a special interest in ferns may be able to acquire this book, which will make for easier fern identification of the species listed.

This work divides the ferns into groups, where possible under their popular names, for instance as spleenworts, filmy ferns, crape ferns etc.

Mr Chinnock has recently done research on Tmesipteris and it is of interest that he lists three species instead of the single one given in Flora of New Zealand, Vol.1. Spotting points of the 3 species are:-

Tmesipteris elongata - Leafy appendages dull green (not shiny or glossy).

Tmesipteris tannensis - Synangium tapering at ends, not rounded as in other two species.

Tmesipteris lanceolata - Synangia confined to lower part of the stem.

The book contains a concluding section dealing with fern propagation which includes an account of the growing of ferns from spores. It ends with a glossary and index.

Miss M. Crookes

#### FERTILITY AND DIMORPHISM IN FERNS, MY GROPE FOR KNOWLEDGE

A.D. MEAD

Cheeseman ( Manual, 1925 ) in his general description of ferns says: "Sporangia usually arranged in groups (sori) on the under surface or margins of the fertile fronds, which are either similar to the sterile fronds, or narrower and more restricted." Allan ( Flora, 1961 ) has it: "Fertile and infertile leaves sometimes sharply differentiated."

These statements seem to imply that all ferns habitually have separate fertile and sterile fronds. Reading Cockayne "N.Z. Plants and their Story" I find: "In some ferns only certain leaves bear spores."

Faced with a seeming discrepancy of this sort, the proper course is to get out into the bush and look for oneself. I speedily found that in some ferns all fronds, except the unfolding young ones, carried spores, while others had clearly distinct fertile and sterile fronds, and in nearly all such cases this difference was

accompanied by a difference in form.

Further reading revealed that this information was by no means new. G.M. Thompson (The Ferns and Fern Allies of N.Z., 1882) clearly calls attention to the phenomenon and illustrates it by descriptions of two representative species:

"Lomaria fluviatilis ... the fronds are distinctly of two forms ( hence called dimorphic ), one of them being the fertile, or spore-bearing."

"Asplenium bulbiferum ... in the fronds there is not the same separation into sterile and fertile, but are nearly similar, and when mature are spore-bearing."

( Lomaria fluviatilis we now know as Blechnum fluviatile ). In his listing by genera and species he mentions for many of them that the fern has separate fertile and barren fronds, presumably implying that if not so mentioned all fronds are potentially fertile. Other writers on N.Z. ferns have more or less touched on the subject, Greta Stevenson perhaps the most fully.

From overseas literature, I quote K.B. Boedijn in the series "Plants of the World", edited by De Wit (1965): "Many ferns form sterile and fertile leaves of different shapes; in others, all the fronds act as combined organs of assimilation and reproduction."

I also found ( this of course not new ) that the degree of dimorphism varies substantially from species to species. In most of the species of Blechnum the differences of appearance between fertile and sterile fronds hits one in the eye at once; in Blechnum fraseri it is slight and has to be looked for. In all cases of dimorphism the fertile pinnae are narrower than the barren; this is carried to an extreme in Blechnum filiforme where the fertile pinnae are reduced to threads. Ferns also differ in the proportionate number of fertile to total fronds. In Blechnum discolor they may be one in three; in B. filiforme perhaps less than one in twenty. In one fern, the kidney fern, I have seen no difference in shape or appearance, other than the presence or otherwise of spores, between fertile and sterile fronds. Maybe I have not examined closely enough.

Having got to this stage it appeared to me that ferns might be grouped with reference to this habit into four categories:

A. Ferns with separate fertile and sterile fronds and pronounced dimorphism; e.g., Blechnum spp. ( except B. fraseri ); Lygodium.

B. With separate fertile and sterile fronds and slight dimorphism; e.g., Blechnum fraseri; Microsorium diversifolium.

C. With separate fertile and sterile fronds, but all fronds of similar shape; e.g., Cardiomanes reniforme.

D. Ferns with all fronds actually or potentially fertile; e.g., Asplenium lucidum; Cyathea dealbata.

I dropped a note to Dr Eric Godley on these lines and received a reply expressing interest in my observations and suggesting that if confirmed it might illustrate the evolution of ferns. But he

omitted to mention at which end the sequence started. Further, if this grouping followed evolutionary development we should expect it to conform to main taxonomic classes; but it seems more random. In Lindsaea, for instance, the only markedly dimorphic species is L. linearis. Boedijn, mentioned above, says of Aspidiaceae: "Most species produce only a single type of frond, but some form sterile as well as fertile ones." That is, the difference cuts across the family classification.

Greta Stevenson in her book tabulates the N.Z. genera of ferns in order of evolution as arranged by Christensen; it is not at all parallel with amount of dimorphism as I have observed. But it is doubtful in our present state of knowledge, whether we can with any degree of confidence decide the evolutionary history of ferns, or whether such a table is little more than conjecture. Marguerite Crookes, in reply to my enquiry, examined the writings of Copeland, the American fern expert, who has listed the dimorphic genera fairly fully; on the general principle he seems to regard uniformity of fronds as more primitive than dimorphism.

The subject appears one which could provide a fascinating and rewarding field study if carried right through our range of ferns, examining each at frequent intervals over two or more seasons. I would be greatly delighted to see a young, capable and enthusiastic fern lover take it up. The Waitakeres, with 100 of our 150 N.Z. species of ferns, would not be a bad place to start.

This characteristic if fully described might assist in classification, help the student and collector of ferns in identification, and add interest and delight to our bush rambles. To incorporate it into descriptions in a Flora there seems to be a need for a single term to represent the circumlocution "having separate fertile and sterile fronds." The word "dimorphic", though necessarily retained to complete the picture, refers to shape, not reproduction.

*DIMORPHIC FERNING*

#### WAIMAUKU AND MURIWAI

Mrs B. WORMALD

We had a perfect day for our April outing to the University Reserve and the Muriwai area. On entering the bush at Waimauku it was disappointing to find the undergrowth on the upper slopes more sparse than on a former visit some years ago, but there is good regeneration of young kauri and tanekaha. Several of the other plants noted were species of Olearia, pigeonwood, Hedycarya arborea, an Alseuosmia and clumps of the fern Lindsaea trichomanoides var. trichomanoides growing well in spite of the dry conditions.

On the lower slopes where the vegetation is more dense there are some quite large, well shaped kauri and at the base of one of these we found Schizaea dichotoma, the fan-shaped kauri fern. We also saw some early plants of Acianthus fornicatus var. sinclairii in bud.