On Wednesday, May 2nd , at eight O'clock we had a most interesting evening, when Mrs. Hynes and Mrs. Wood discussed their excursions in the Nelson district. Mrs. Wood has on previous occasions given me articles on these trips so the Editor left her in peace and approached Mrs. Hynes who said, "Wait till I've been to Boulder Lake this summer". Good. The Editor will not forget.

HELPS WITH FERNS

The two following pages of diagrams largely explain themselves and were drawn to illustrate a couple of talks given by the editor first at "The Chimes" on June 7th at 8 o'clock and later on the morning of June 24th at her home in Mountain Road, Henderson.

In describing a fern we consider first the rhizome or rootstock i.e. a creeping stem which emits roots, and note whether it is distinctly creeping, or very short creeping and, so to say, compressed with the fronds tufted at the end of it.

Consider next the frond and note whether the stipe (foot-stalk) is attached to the rhizome by a joint. A frond jointed to the rhizome is more readily shed, and this may be of considerable advantage to a fern that is subject to seasonal shedding of leaves. Observe the colour and form of the stipe and observe whether or not it is grooved, and if smooth or scaly, or hairy or both. Considering the lamina (blade) of the frond, see whether or not it is divided. If divided, note how. If pinnate, it often happens that a pinna or frond is pinnate below, but pinnatifid close to its apex (tip).

The tender uncoiled crooks of a fern have no scale-leaves to protect them as have, for instance, the winter buds of deciduous trees. They are however, usually supplied with hairs or scales which serve the same protective purpose. Look at the uncoiled frond of a tree-fern and you will see what is meant. Incidentally remember that the Cyatheas are well supplied with scales (structures a number of cells wide) while the more primitive Dicksonias have only hairs (structures only one cell wide). There is great variation in fern scales, and a good lens is needed to study them but they are often very beautiful things and well repay observation.

Passing now to the fertile parts of the frond remember that ferns produce spores and these occur in a characteristic way varying widely in the different families. The spores are enclosed in structures known as sporangia. These are fairly uniform among the more advanced ferns, where a sporangium consists essentially of a spore case or capsule on the end of a stalk. These spore cases have a ring round them called an annulus which is so

constructed that when the spores are ripe it will become partially or completely torn from the rest of the capsule and the spores will be liberated. Sporangia are usually found on the back or margin of the frond, and they are frequently protected by a structure known as the indusium which varies greatly in form. It may consist simply of the more or less modified frond margin, it may be situated away from the margin, be round or kidney-shaped, or it may be a flap over an elongated sorus (as in Asplenium). The sorus is the name given to the collection of sporangia with or without an indusium. Sometimes the sori will join and become continuous.

There may be a very distinct difference between the sterile and fertile fronds, then they are said to be dimorphic (having two forms). Sometimes the whole fertile frond is given over to spore bearing, as in Blechnum.

What happens to the spores after they are shed? Do they, on finding a suitable place in which to germinate, grow into fresh ferns? Nothing of the sort. There are many hazards to be encountered before the new fern appears. When the spore finds a suitably damp and sheltered spot it will germinate and grow not into a fern but into an odd little green scale-like body, known as a prothallus. In the higher ferns these are usually more or less heart-shaped. In the filmy ferns they are strap-shaped or filamentous. When the prothallus is mature it will bear the organs of reproduction. In the typical heart-shaped prothallus these will be borne on the under surface. When the organs are mature fertilisation will take place, but here serious difficulty is encountered. Unless there is water present it is impossible for the male cell - the sperm - to reach the egg cell since its only means of locomotion is by swimming. So no water, no fertilisation, and hence no sporeling ferns. (except in special cases where sporelings may be produced directly from the prothallus without fertilisation - a process known as apogamy.) But usually water is essential so the fern is really an amphibian - a sort of "frog" of the plant world which cannot complete its full life cycle without the presence of water. Usually the male organs mature before the female ones so that there is a reasonable chance of fertilisation from an adjacent prothallus, but failing that more male organs may be produced and the prothallus will be "selfed".

If members are interested they can readily grow prothalli for themselves. Run your fertile pinnae under the tap to remove foreign spores, dry, then sow spores on a suitable damp substratum - a piece of brick or crock standing in water, a small upturned flower pot or saucer stuffed with sphagnum and inverted in water, or plant on moist sphagnum, or tree-fern turves standing in water or in sterilised soil. See that your prothallus garden is covered with glass so that your prothalli are kept moist. If fungi give trouble water with weak solution of permanganate of potash (Condy's crystals.) Try to choose a quick growing type of prothallus. Pteris species grow quickly and with luck you might get them mature in about six weeks. Those of filmy ferns take several years. Prothallus growing is not really difficult and quite interesting to try.

The Compositae or daisy family contains 900 genera and 14,000 odd species. New Zealand contains twenty nine genera, seven of which are known only from New Zealand. Not the least interesting of our native composites is the genus Raoulia, the group that includes those fantastic objects the vegetable sheep. The genus contains twenty species, and that courageous and enthusiastic grower of alpines, Mrs. Bedford, gives her experience in growing seven of them.

GROWING RAOULIAS

Most people, even those usually disinterested in growing plants, are fascinated by my patches of Raoulia scabweed. Children pat and stroke them and want to jump on them, which was exactly my reaction when I first saw those remarkable cushions of R.australis at Baring Head, Wellington. Exposed to the wildest, fiercest conditions that Cook Strait alone knows how to brew, this hard convex mat plant seems adapted to withstand anything - found the length of the land, from sea level to 5,000 ft.

I grow it in my garden in scoria scree, in blue metal chips and between paving stones. One cushion 20 inches across has been under water several times this winter and now looks very dilapidated. But I think it will regain its former vigour, given a little dry weather. All definitely need sharp drainage, growing in sand or chips and given a stony ground cover, or they become sodden and rot. As the weather becomes warmer, the cushions become hard and close and the water sits in pools on the surface.

Those at Baring Head I have never seen surpassed - large, rounded, hard as a stone, in fact from the cliff top they appeared like stones on the beach. In flower the plant becomes a patch of gold, illusively perfumed; viewed under a glass, a thing of incredible beauty in both leaf and flower, followed by a fluffy carpet of hairy cypsela, taking flight with the least puff of wind.

R. lutescens: Also silver, is much smaller, closer and tighter, found from Tararua Mts. to Otago, 1,000 - 3,500 ft. Growing as it does in dry parts of Otago with a very low rainfall of 12" annually, it is a marvel it tolerates our torrents. I grow it in scree and it makes a cover over the scoria rock. In summer it is hard and close like a coat of paint. The flowers are bright yellow and cover the entire plant.

R. tenuicaulis: is a quick ground cover, less compact, silvery-green and its white flowers are produced long before other species. It has a distinctive perfume and each year I smell it for several days before realising what it is. It grows from Thames southwards, sea level to 5,000 ft.