

## Something on Mosses

As the editor has noted recently a considerable interest in mosses on the part of members of the Society, it has been thought that a few notes on this fascinating but difficult group might not come amiss.

Members are now thoroughly familiar with the life history of ferns and realise that while the fern plant bears spores, it is the prothallus, the sexual generation that bears the organs of reproduction, and on which fertilisation takes place. There seems little likeness between the average moss and the little somewhat heart-shaped green scale that is a common form of a prothallus with ferns, nevertheless the little moss plant is actually the sexual generation which bears the organs of reproduction. The leaves of the moss plant vary greatly in size and shape but they are not usually arranged in noticeable ranks on the mature shoots. The shoots have no roots, only thread-like rhizoids. The male and female organs are minute, but resemble those of ferns and bear the same names i.e. antheridia, and archegonia. These organs may be borne on the end of the little stem (acrocarpous) or along the sides of it (pleurocarpous). Generally the "acrocarps" have upright stems often close together and unbranched while the "pleurocarps" are frequently prostrate, forming wide mats, and their branching is always pinnate, while the acrocarps never branch pinnately.

When the sexual organs are mature, fertilisation can only take place in the presence of water since the minute sperm must swim to the egg cell in the archegonium. When fertilisation has taken place the tiny embryo develops and starts to grow. But here the mosses part company with the ferns, for while with ferns the product of fertilisation is the dominant generation and the most plant-like, with mosses it is the sexual generation, or gametophyte, that is plant-like, for the product of fertilisation is not a new plant but merely that picturesque little object, the moss capsule. The fern sporeling soon becomes independent of the fern prothallus which later shrivels away, but the moss capsule remains forever, largely parasitic upon the moss plant from which it draws nourishment.

The capsule usually possesses a stalk known as the seta. It is opaque and of a purplish-red or yellow colour. The capsule may be erect on the end of the stalk or bent over in various ways. It is provided with a lid or valve, known as the operculum which is shed when spore dispersal time comes. On top of the operculum is usually a delicate and slightly ragged structure known as the calyptra, from a Greek word meaning to cover. After fertilisation the archegonium

enlarged a little and the remains of it are borne aloft on the developing capsule.

When we look at the mouth of the mature capsule after the operculum has been shed, we notice that it is surrounded by one or sometimes two rows of teeth. The teeth form the peristome, from peri, round about and stoma meaning mouth. They vary in different genera and are important in classification. What is the meaning of these attractive little fringing structures? Now it is obvious that the spores within the capsule must be shed, but it is also desirable that they should be shed in suitable weather so that they may take advantage of moving currents of air to take them from the parent plant. The peristome, then, is so constructed that it will respond to the moisture in the atmosphere, in dry weather it will open leaving a free passage for the spores and in wet close over them. When the spores reach a suitable position they germinate. And form a new moss plant? Not at all - they give rise to an odd little structure known as a protonema which appears as a delicate mass of green threads. On this protonema tiny buds will appear which will eventually grow into new plants.

The structure of the capsule must be examined under the microscope to be understood. The capsule consists essentially of a central column round which the spores are arranged. The lower part of the capsule is sterile and sometimes shows as a small swelling where it joins the seta. This area is known as the apophysis.

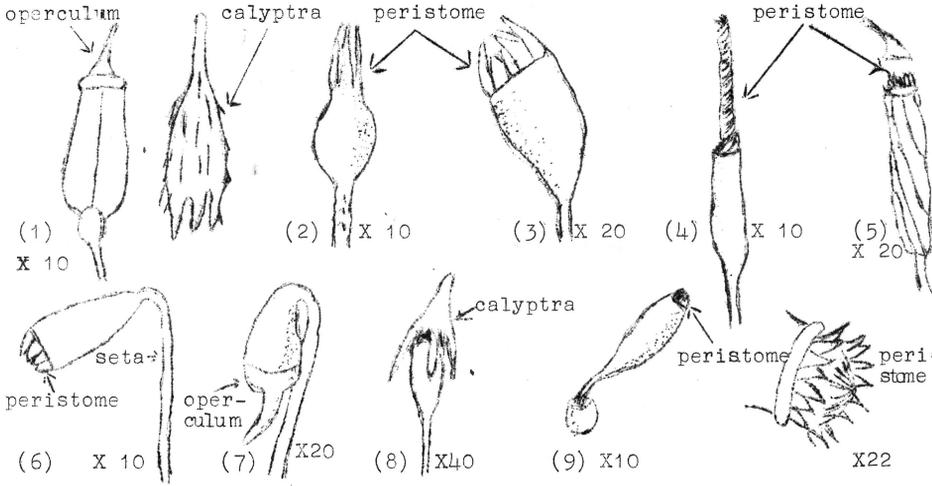
In the above description a typical member of the Bryales, the main group of mosses, has been chosen. The two small groups of Sphagnales (bog mosses) and Andreales differ in some important respects and are not considered.

New Zealand has about 440 moss species according to Sainsbury, though there are probably more, since Sainsbury states his concept of species is a wide one.

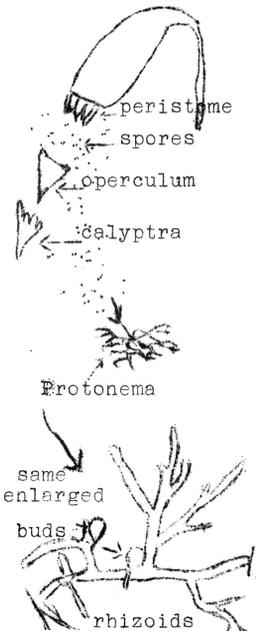
Owing to their very small size mosses are not easy to identify. There is no popular book on New Zealand mosses. The standard authority is Sainsbury's A Handbook of New Zealand Mosses (20/-). This fine work is beautifully illustrated by line drawings by Nancy Adams. Unfortunately it lacks a key, but one by Allison has been published in Tuatara (Vol.2, No.3, Sept.1949). A key to the local mosses has been published in Tane (Vol.4, No.1, 1951). The last two works, unfortunately, are difficult to obtain.

A popular work dealing with British Mosses is The Observer's Book of Mosses and Liverworts, by Arthur Jewel (6/-). A well illustrated little book dealing with 166 species. Mosses, by Paul Richards is a popular beautifully illustrated book (a King Penguin) but it deals only with 16 species.

Names of mosses illustrated on next page: Polytrichum juniperinum  
2. Rhacomitrium laguninosum, 3. Dicranella jamsonii,  
4. Tortella calycina, 5. Zygodon menziesii, 6. Bryum crassum,  
7. Homalia pulchella, 8. Ephemeropus trentepoplioides,  
9. Cyathophorum pulchellum



**Capsules**



**Life history of moss (diagrammatic)**

