

FORESTRY COMMISSION

BOOKLET NO. 1

WOODLAND MOSSES



LONDON: HIS MAJESTY'S STATIONERY OFFICE

1947

TWO SHILLINGS NET

FORESTRY COMMISSION

BOOKLET NO. 1

WOODLAND MOSSES

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WOODLAND MOSSES

IN present day afforestation much attention is devoted to the wild plants as indicating soil and climatic conditions, but within recent times the ordinary mosses have been proved to be just as important.

In the following notes an effort will be made, first to give a life history of a moss, secondly to indicate, as far as present knowledge permits, the soil and climatic conditions under which particular mosses are found and thirdly to illustrate each of these by means of photographs. The mosses selected are those which a forester is likely to meet frequently in the course of his work and so to use in assessing locality conditions.

In each case there is a photograph of the individual shoot, and also of the moss in its natural position on the ground. The latter I have called "turf" photographs.

First of all the forester should get to know the life history of a typical

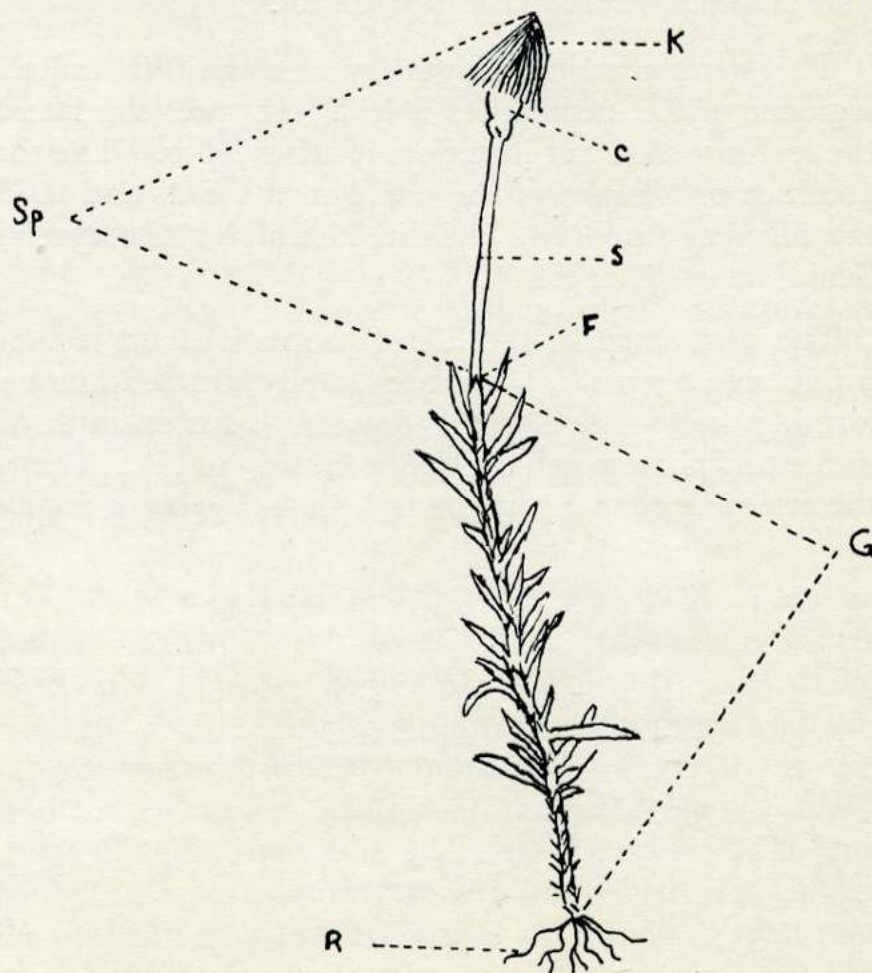


Fig. 1

FRUITING MOSS PLANT

- Sp. Sporophyte
- G. Gametophyte
- C. Capsule
- K. Calyptra
- S. Seta
- F. Foot of seta
- R. Rhizoids

moss plant. Mosses belong to the plant sub-kingdom called Bryophytes, which also includes the Liverworts.

An illustration of a moss plant is shown in Fig. 1. As a moss is a spore-bearing plant we find a *capsule* (C) in which spores are produced. Let us suppose that one of these spores is shed and falls on the moist surface of the soil. There it will germinate and give rise to a web of filaments resting on the ground. These filaments are called the *protonema* (Fig. 2). A bud on one of these filaments (Fig. 2M) develops into a young moss plant. In its first stage we have a slender stem and perhaps branches, with bright green living leaves, terminating in a bud. At the base of the stem arise *rhizoids*, which although not true roots act to some extent as roots. In many mosses *rhizoids* are also produced along the length of the stem.

The bulk of the moss plants' water supply is obtained through the leaves. This accounts for the wonderful revival of dry, apparently dead mosses one notices after a day of rain.

The stems grow in length by means of an apical cell and at each segment of the stem arises a leaf. In trees the lateral bud arises *above* the leaf insertion but in mosses it arises *below*. The shape of the leaf, the presence or absence of the nerve in the leaf, and the shapes of the cells are all very important aids in identifying the species to which a particular moss belongs.

The next stage in the life of the moss plant is the growth of the reproductive organs. These are usually situated among specialised leaves forming the so-called "moss flowers." An example of these can be seen in the turf photograph of *Mnium hornum* (p. 11). They are of two kinds—the *antheridia* or male organs and the *archegonia* or female organs. In some

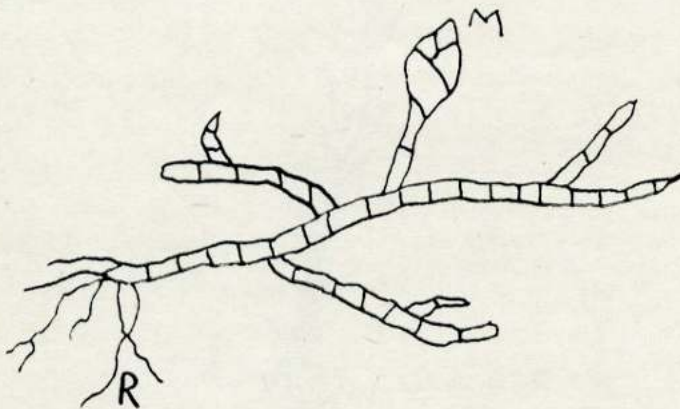


Fig. 2. PROTONEMA

M. Bud

R. Rhizoids

species they are both found on the same plant, and in other species they grow on separate plants. When the antheridia are mature they produce male fertilising cells called *antherozoids*. In moist weather these are able to travel in the film of water on the plant and reach the mature archegonia, or they may be washed there by raindrops. There, one of the antherozoids will enter the open neck of the archegonium and passing down will reach the *ovum* or egg cell and fertilisation will take place. After this the archegonium and its contents undergo great development. The ovum now gives rise to a spore-bearing moss plant (*sporophyte*) distinct from the leafy moss plant (*gametophyte*) which carried the reproductive organs and has just been described. In the life history of the Fern—another spore-bearing plant—the sexual equivalent is the *prothallus*, and the spore-bearing plant is the large fern plant which we find growing so profusely in the woodlands. In the moss this sporophyte is fixed to the tissues of the archegonium by a pointed “foot” and in part lives the life of a green parasite just as mistletoe does on an apple tree.

In Fig. 1 the parts of this *sporophyte* (spore-bearing moss plant) are named. The *capsule* (C) in which the spores are produced is often at first covered with a hood called a *calyptra* (K). This is shed later on. The calyptra or cap originated from the ruptured archegonium and has been carried aloft on the capsule by the elongation of the *seta* (S) or stalk. When the spores are ripe the lid of the capsule opens and falls off. This in many mosses exposes a single or double ring of delicate teeth (the peristome) which can control the opening and closing of the mouth of the capsule, according to the humidity of the air. This allows the scattering of the spores when the weather conditions are suitable. Some of the mosses rarely bear spores. These often reproduce themselves vegetatively, for example by buds or *gemmae*.

To summarise the life history of a moss, let us start with a spore. This germinates and produces the protonema. This bears a bud which develops into the leafy moss plant or gametophyte, comprising rhizoids, stem, leaves, and the reproductive organs—the male antheridia and the female archegonia. Fertilisation of the ovum (female egg cell) in the archegonium takes place by union with it of the antherozoid (male fertilising cell). Great changes then take place in the archegonia and ultimately the sporophyte or spore-bearing generation, which is attached to the gametophyte or leafy moss plant, grows up carrying aloft the capsule on the seta. The important feature in this form of plant life

is that these two generations never part company in the field, both are looked on as one entity—a leafy moss plant with fruit.

How to recognise twenty of these woodland mosses in the field by means of photographs and descriptions will be the aim of the following text. The mosses dealt with are :

- | | |
|--|---|
| 1. <i>Mnium undulatum</i> Hedw. | 11. <i>Hypnum schreberi</i> Brid. |
| 2. <i>Mnium hornum</i> Hedw. | 12. <i>Hypnum crista-castrensis</i> Hedw. |
| 3. <i>Eurhynchium striatum</i> (Hedw.) Schp. | 13. <i>Dicranum majus</i> Turn. |
| 4. <i>Catherinea undulata</i> W. & M. | 14. <i>Plagiothecium undulatum</i> (Hedw.)
Bry. Eur. |
| 5. <i>Thuidium tamariscinum</i> (Hedw.)
Bry. Eur. | 15. <i>Hypnum cupressiforme</i> L. |
| 6. <i>Brachythecium purum</i> (Hedw.)
Dixon. | 16. <i>Polytrichum commune</i> Hedw. |
| 7. <i>Hylocomium triquetrum</i> (Hedw.)
Bry. Eur. | 17. <i>Leucobryum glaucum</i> (Hedw.)
Schp. |
| 8. <i>Hylocomium squarrosum</i> (Hedw.)
Bry. Eur. | 18. <i>Sphagnum cymbifolium</i> Ehrh. |
| 9. <i>Hylocomium splendens</i> (Hedw.)
Bry. Eur. | 19. <i>Sphagnum acutifolium</i> Ehrh.
(agg.) |
| 10. <i>Hylocomium loreum</i> (Hedw.) Bry.
Eur. | 20. <i>Rhacomitrium lanuginosum</i>
(Hedw.) Brid. |

The above order in which the mosses are placed has not been done at random but is intended to give a fair indication of which species one would expect to find on passing from well decomposed humus through the podsol type of soils to peaty conditions, *i.e.*, *Mniums*, etc., on good well-decayed humus ; *Hypnum schreberi*, etc., on poorer conditions and *Rhacomitrium*, etc., on bad raw peat.

The main object of the descriptions of these mosses is to make the forester acquainted with them and enable him to recognise the different species in the woods. From that knowledge he may, by observation in the field, form his own opinion on the possibilities of this interesting type of plant life as an indicator for the selection of trees to be planted on his areas. Much has yet to be done in this line and opinions voiced in this booklet are open to criticism.

With the flowering plants, associations or communities of certain species indicate certain conditions much more surely than individual

species. This also holds good with mosses. Under good humus conditions we would expect to find in company the *Mniums*, *Eurhynchium*, *Catharinea* and *Thuidium*. At the other end of the scale (bad humus conditions) would be *Polytrichum*, *Leucobryum*, *Rhacomitrium* and *Sphagnum*. On medium humus conditions would be found the *Hylocomiums*, *Hypnum*s and *Dicranum*.

1. M N I U M U N D U L A T U M



Shoot showing terminal rosette of leaves and branches. The setae spring from this point

This is a very beautiful moss—often pale green in colour and very flimsy in structure. It forms loose patches and has the two types of shoots—the fertile shoot and the sterile shoot. They are shown in the two photographs, the tree-like fertile shoot with its terminal rosette of leaves bears orange setae with bright brownish drooping capsules. The leaves are long and tongue-shaped and when moist are strongly undulated, which gives the moss its typical appearance; when dry they are crisped. The nerve of the leaf is strong and passes slightly out of the tip. The margin of the leaf has acute teeth in a *single* row. The fruit is rare and is ripe in late spring.

This is a moss of the shady moist woodlands with very good humus decomposition, where it is found sometimes growing in large masses. Perhaps it could be said that it is an indicator of good hardwood conditions.

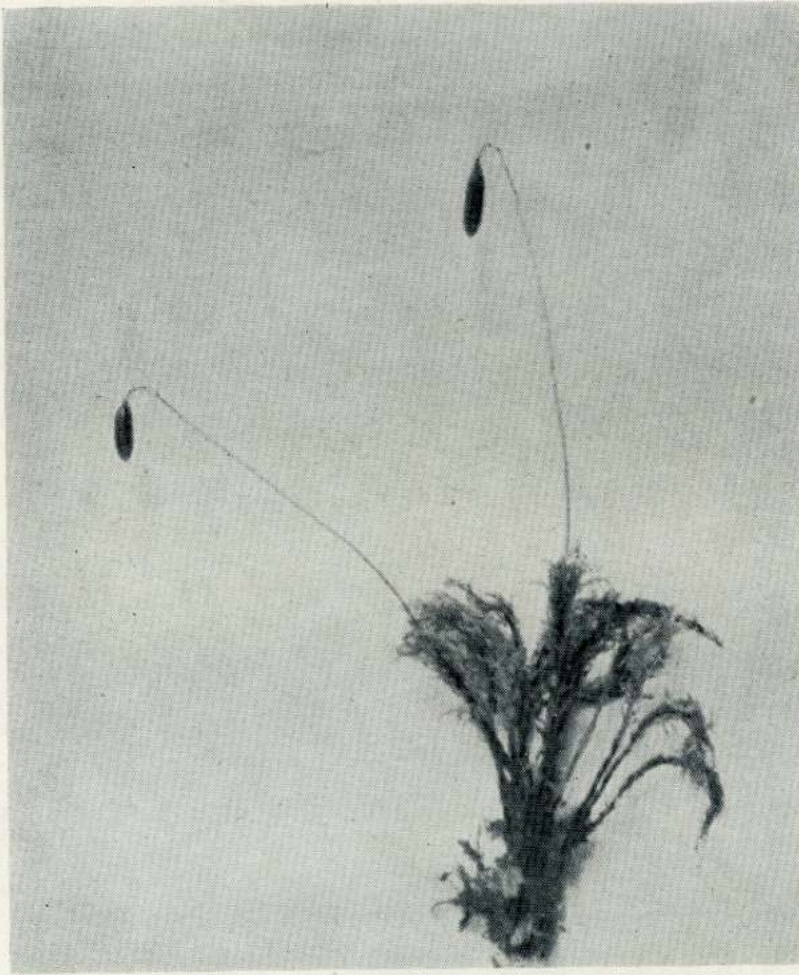
I. M N I U M U N D U L A T U M



MNIUM UNDULATUM

Turf—pale green, showing sterile branches

2. MNIUM HORNUM



Single shoots with
typical shining pen-
dulous capsules

In Scotland, although not in England, *Mnium hornum* is far more frequent than *Mnium undulatum*. It is found in fairly similar shady woodlands but grows in dense green turfs, the stems being matted together with reddish rhizoids. The leaves are lanceolate in shape with more or less acute points. The margin of the leaf is thickened and forms a reddish border with a *double* row of teeth in contrast to the single row borne by the leaves of *Mnium undulatum*. The fruit is as shown in the photograph and ripens in spring. It will be noticed that the leaves are dried up and twisted; this genus of mosses dries up very readily and therefore moist weather is the best time to observe them. In the turf picture the longer sterile shoots can be seen—also the so-called “flowers” of the moss (the groups of antheridia).

2. MNIUM HORNUM

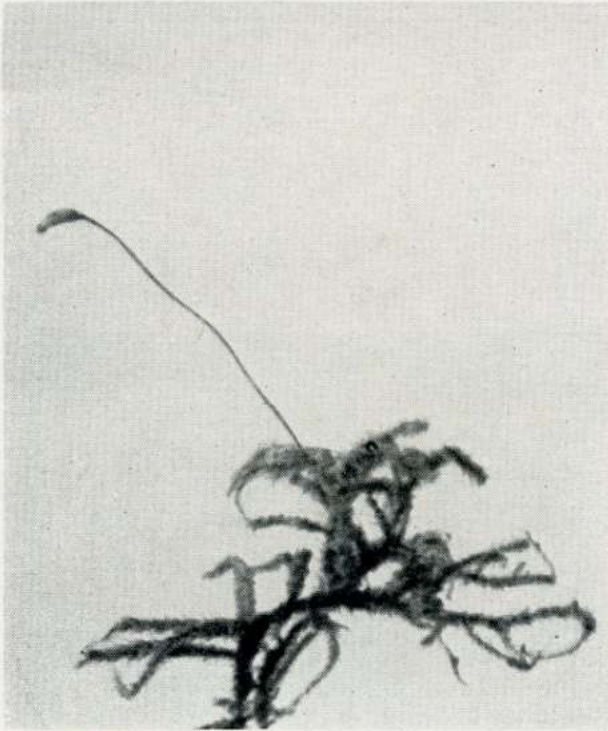
Mnium hornum indicates more acid and therefore slightly less favourable conditions than *Mnium undulatum*.

MNIUM HORNUM

Turf — note the two kinds of shoots—the leafy sterile shoots and the “star-shaped” shoots which bear in the rosettes the male reproductive organs (antheridia)



3. EURHYNCHIUM STRIATUM



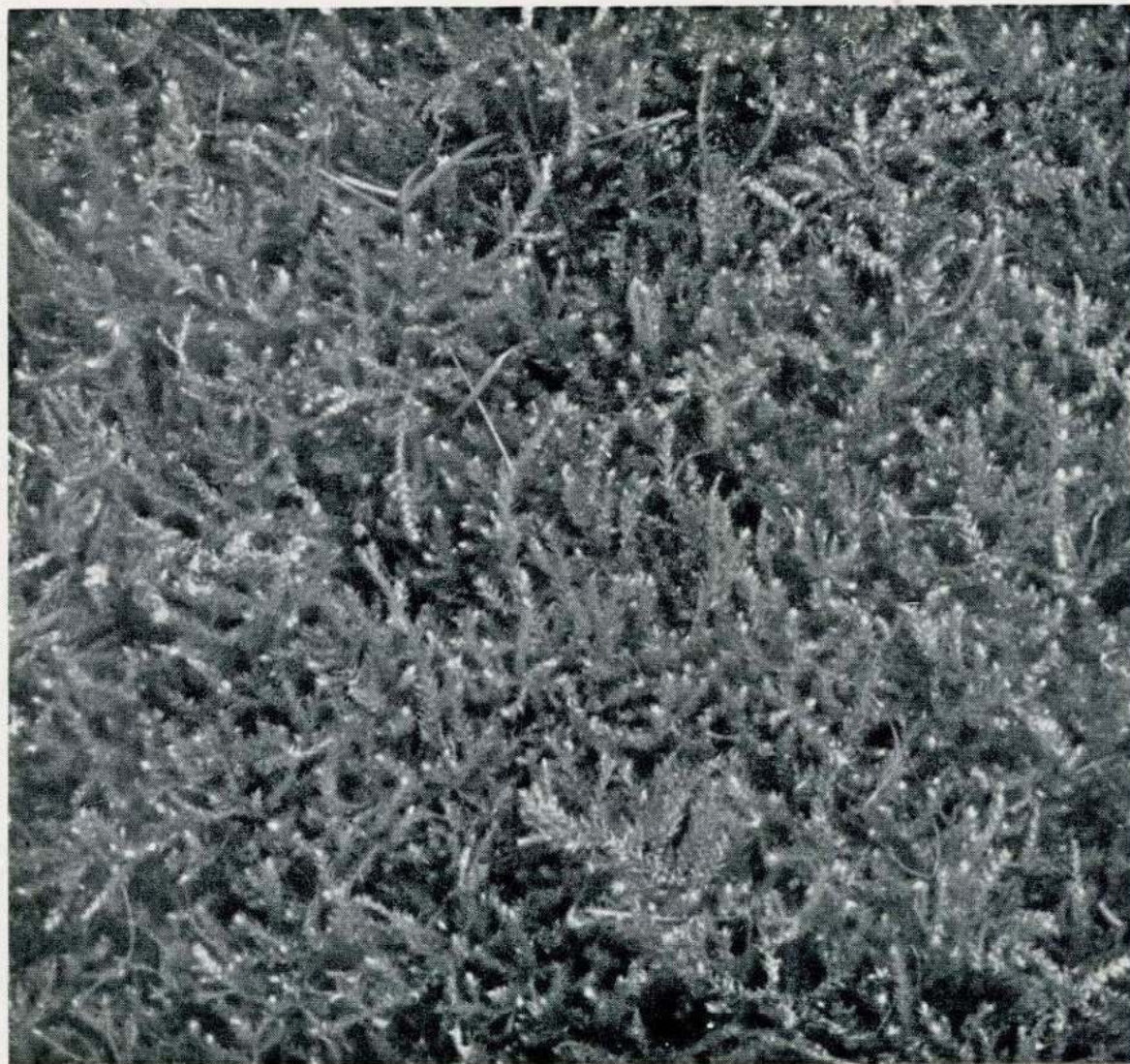
Single fruiting
shoot

This moss forms loose turfs, and with its irregular branching and creeping habit often covers large patches. It is deep green or yellowish green in colour and has a glossy appearance. The leaves are crowded and are fairly large and widely heart-shaped, gradually tapering to a point. The specific name—*striatum*—is given to this moss because of the appearance of its leaves. When examined they appear to be longitudinally folded and furrowed (plicate and striate). They are sharply toothed all round the margin with the nerve reaching about three quarters of the length of the leaf.

The seta is smooth and the capsule large, deep brown and curved (arcuate). The lid of the capsule has a long beak—typical of this difficult genus *Eurhynchium*. It fruits in winter.

E. striatum seems to like good humus conditions on both basic and slightly acid soils and mixed among it one often finds *Mnium undulatum* growing.

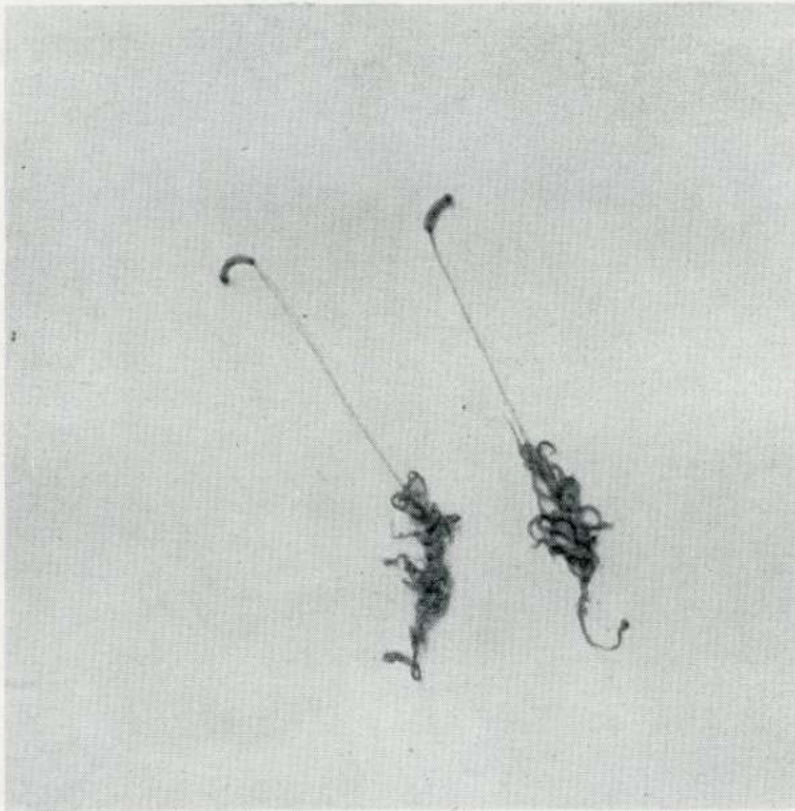
3. EURHYNCHIUM STRIATUM



EURHYNCHIUM STRIATUM

Turf

4. CATHARINEA UNDULATA



Single shoots—fertile,
note the curved capsule

Catharinea undulata grows erect in loosely formed turfs, usually dull green but under drier conditions it is lighter in colour. This moss often grows along with *Mnium* and may be mistaken for it. The chief differences are in the fruits and leaves ; the capsule of the *Mnium* is pendulous and that of *Catharinea* is cylindrical and arcuate (curved or bow-like)—compare the pictures of the fruiting shoots of the two plants—*Catharinea* and *Mnium hornum*. The shapes of the capsules can be seen to differ ; *Mnium* fruits in spring while *Catharinea* fruits abundantly in late autumn and winter. Both *Mnium undulatum* and *Catharinea undulata* have strongly transversely undulated leaves which give them the typical wavy appearance, but in the *Mnium* the point of the leaf is obtuse and the margin of the leaf has a row of single teeth whereas in *Catharinea* the leaf is more tapering and acute and bears on its back and margin a row of teeth in pairs. This is not a difficult moss to recognise once it is seen in the woodlands, the picture of the turf should enable the reader to identify it.

4. CATHARINEA UNDULATA

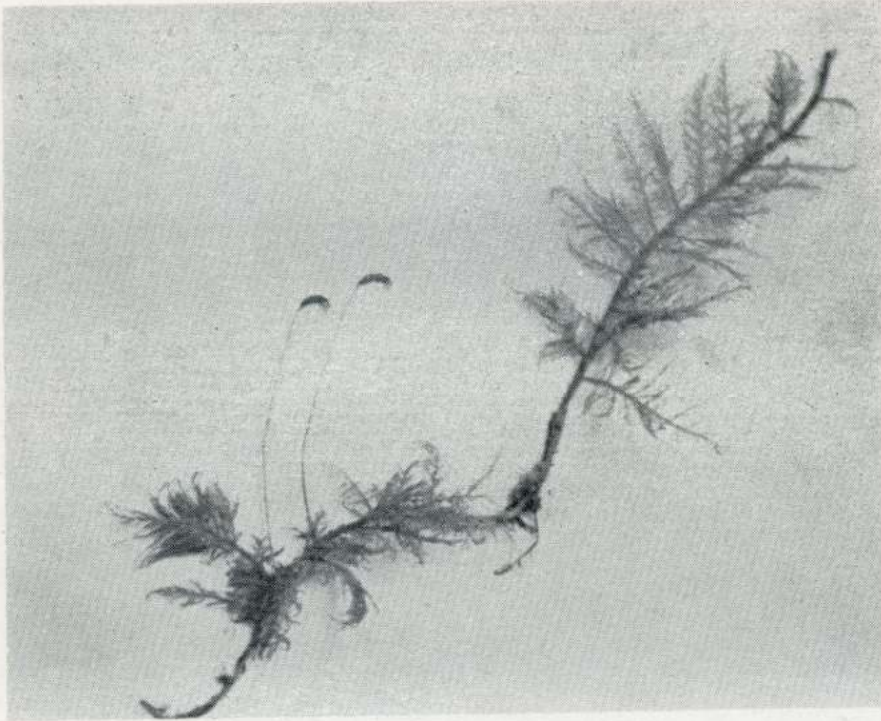
The conditions in which it is found may be said to be very similar to those in which we find the *Mniums* but perhaps more on drier mineral soil with good humus decomposition.



CATHARINEA UNDULATA

Turf—dull green but in dry spots often yellowish, leaves strongly transversely undulate, which gives the plant a “crisped” appearance

5. THUIDIUM TAMARISCINUM



Single shoot —
fertile with two
spore - bearing
capsules

Thuidium tamariscinum is one of our most attractive mosses. A glance at the illustration will show its regular branching and fern-like appearance. It grows often in large mats with the stems and branches interwoven. It forms a loose turf and in the shade is a bright vivid green whereas in open exposures it is more yellowish. It resembles *Hylocomium splendens* but differs in the brighter green colour and the green, not red, stem.

The stems are elongated, as in the picture of the single shoot and often root along the stem and again send out branches. The apex of the shoot is often bare without branches, this is typical. The stem and branches are clothed with small threadlike outgrowths (*paraphyllia*) which give the stems, etc., a furry appearance. The leaves are heart-shaped, toothed on the margins, and covered on both surfaces with minute projections (*papillae*). This moss, besides shedding spores, produces new plants vegetatively.

Note the position of the fruit which is, however, not commonly produced. In *Thuidium* it arises laterally on the stem while in some of the others, *e.g.*, *Catherinea*, it is terminal. In examining a moss in fruit it is helpful as an aid to recognition, to note whether the specimen falls into either of these groups.

5. THUIDIUM TAMARISCINUM

The capsule is arcuate, and is carried on a short reddish seta.

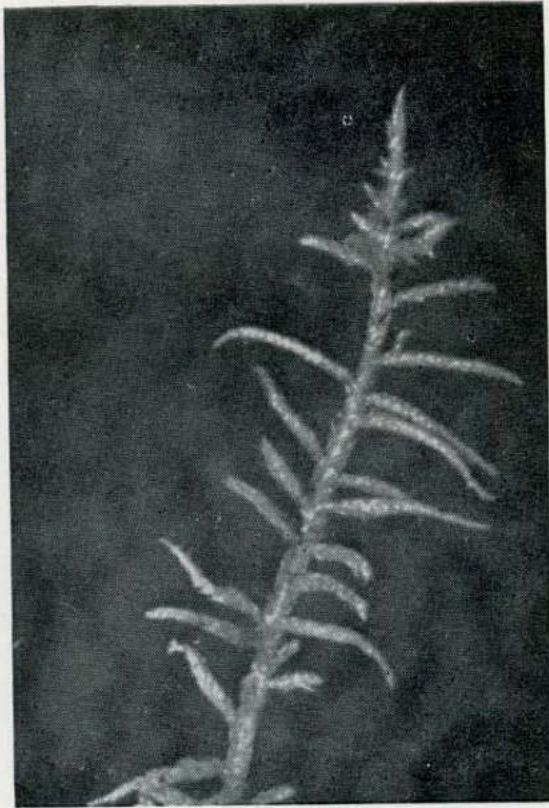
Its habitat is on the best types of spruce soils and it is abundant in the wooded areas of the West of Scotland. It seems to be much less at home in the north and east, where *Hylocomium splendens* is common. These two mosses may be confused in the field but by consulting the photographs and studying both descriptions the reader should not find much difficulty in identifying them.



THUIDIUM
TAMARIS-
CINUM

Turf—a large in-
tricate mat of
bright vivid
green

6. BRACHYTHECIUM PURUM



Single shoots—stem tumid

This moss grows in loose wide patches often mixed with grasses. In colour it is pale green and has a transparent look, when held up to the light. The robust stems are either erect or prostrate and give off pinnate branches. One of the main points in recognition is its swollen obtuse stems which, when looked through, are pale green. This separates it from *Hypnum schreberi*, which may be mistaken for it. The latter has a red stem.

The leaves of *Brachythecium* are wide at the apex, pellucid, and terminate in an abrupt, recurved point. The nerve is single, and short, reaching half-way up the leaf. Fruit is rare.

Its habitat is in the poorer type broad-leaved woods, and it is not uncommon in coniferous plantations, open grassland, etc.

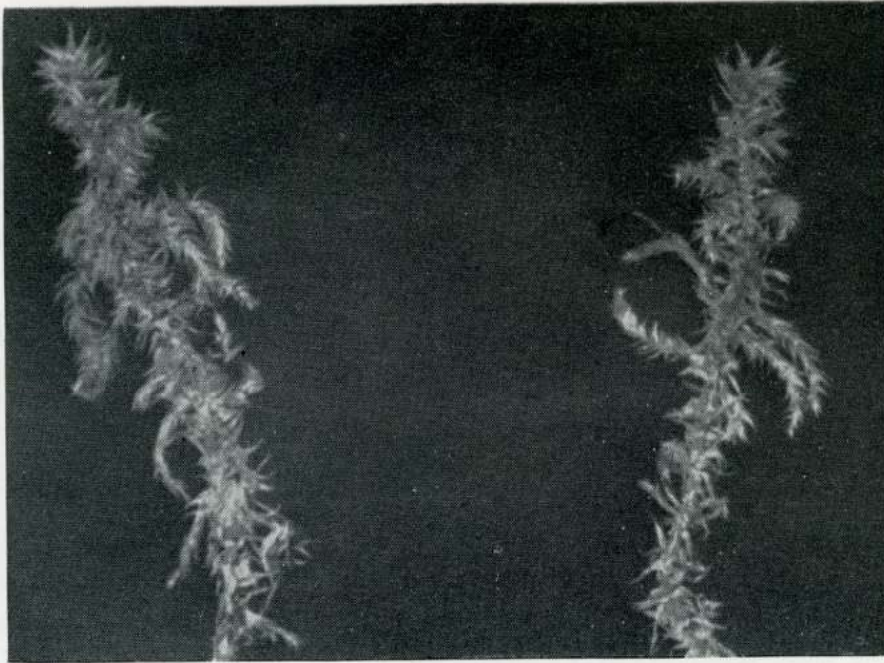
6. BRACHYTHECIUM PURUM



BRACHYTHERCIUM PURUM

Turf—loose, soft and pale green and often mixed with grass

7. HYLOCOMIUM TRIQUETRUM



Single shoots

This moss grows in tall, rigid, loose mats. The stems grow up to 8 inches in height and the plant is bright green to yellowish green in colour. When a piece of the turf is lifted and crushed in the hand it is found to be very elastic and springy. Hence its use for packing, etc. The branches are close to the stem and unequal in length. This gives the plant a bushy appearance.

The leaves are large, recurved, clasping the stem at their base and tapering gradually to an acute point. The leaf appears to be folded showing furrows (plicate). The margins are toothed and there are two slender nerves which disappear a little more than half way up the leaf.

The fruit ripens in spring but is not common.

This moss seems to be more abundant in the North and East of Scotland than in the West where the rainfall is heavier. It also prefers the edges of woods or the more open parts, where there is sufficient light for its development.

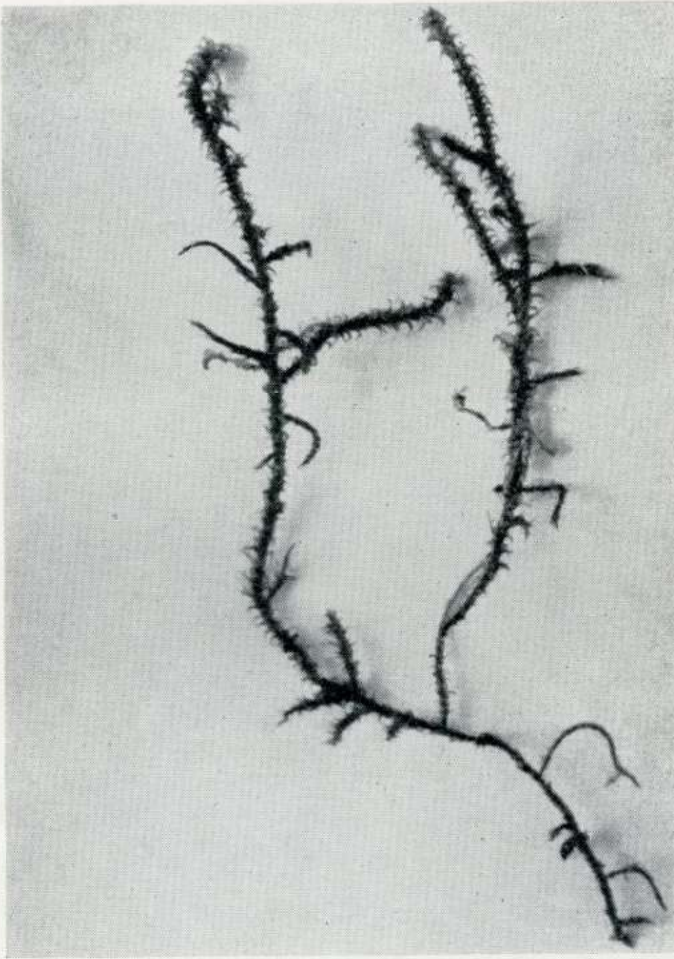
7. HYLOCOMIUM TRIQUETRUM



HYLOCOMIUM TRIQUETRUM

Turf

8. HYLOCOMIUM SQUARROSUM



Single shoots showing squarrose leaves

This is the smallest of the *Hylocomiums* (7, 8, 9 and 10) mentioned. The stems are more slender and soft. It is pale in colour—pale green to yellowish green. It usually grows among grasses and doesn't form the large mats one finds of the other two. Another aid to its recognition is the shape and position of its leaves. If you compare the photographs of the single shoots of these three *Hylocomiums* you will find that in *H. triquetrum* the straight leaves are larger and bunched together—in *H. loreum* they are finer and sickle-shaped, and, lastly, in *H. squarrosum* they are reflexed—*squarrose* (spreading out at right angles to the stem, then turning downwards).

Its habitat is more the open grassy parts of woods, on fairly good humus.

8. HYLOCOMIUM SQUARROSUM



HYLOCOMIUM SQUARROSUM

Turf usually a mixture of *H. squarrosus* and grass

9. HYLOCOMIUM SPLENDENS



Shoot — note the slightly curved branch arising near the tip, which later develops into new "fronds"

The form of this moss somewhat resembles *Thuidium* but it has quite a silky look and is shiny. It is yellowish green to yellowish brown in colour. The stems are reddish with regular pinnate branching. It forms a loose turf. The leaf has a double nerve whereas in the *Thuidium* the nerve is single and strong.

You will notice in the photograph of the single shoot the peculiar mode of growth by prolongation of a shoot, often curved at the tip and bearing very small leaves. These arise at various points of the stem and develop into the slender silky fronds.

Hylocomium splendens seems to favour more the pine woods with their opener and better light conditions. In the North and East it is abundant but in the heavier rainfall areas of the West of Scotland it is not at all frequent. There it indicates along with *Hypnum schreberi* better natural drainage—and sites more suitable for larch than does *Thuidium*.

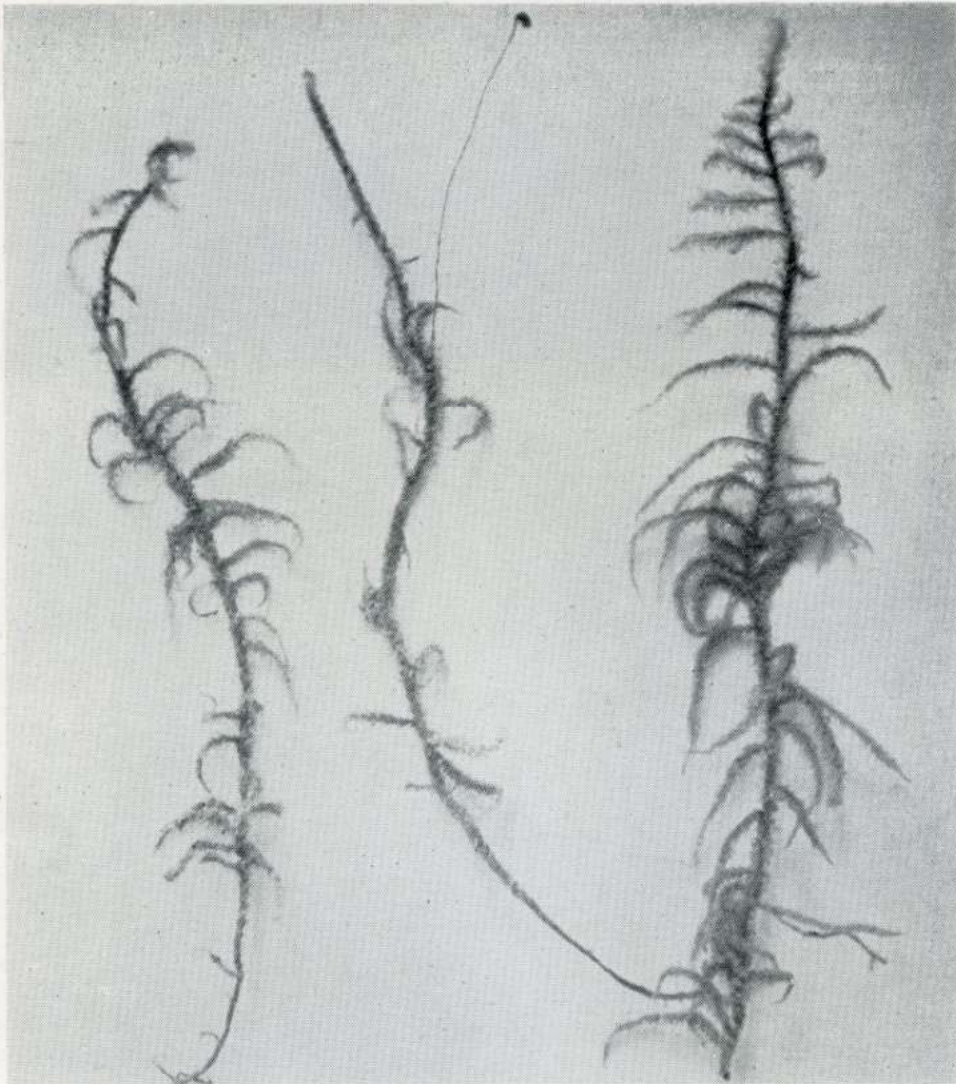
9. HYLOCOMIUM SPLENDENS



HYLOCOMIUM SPLENDENS

Turf with typical silky look

10. H Y L O C O M I U M L O R E U M



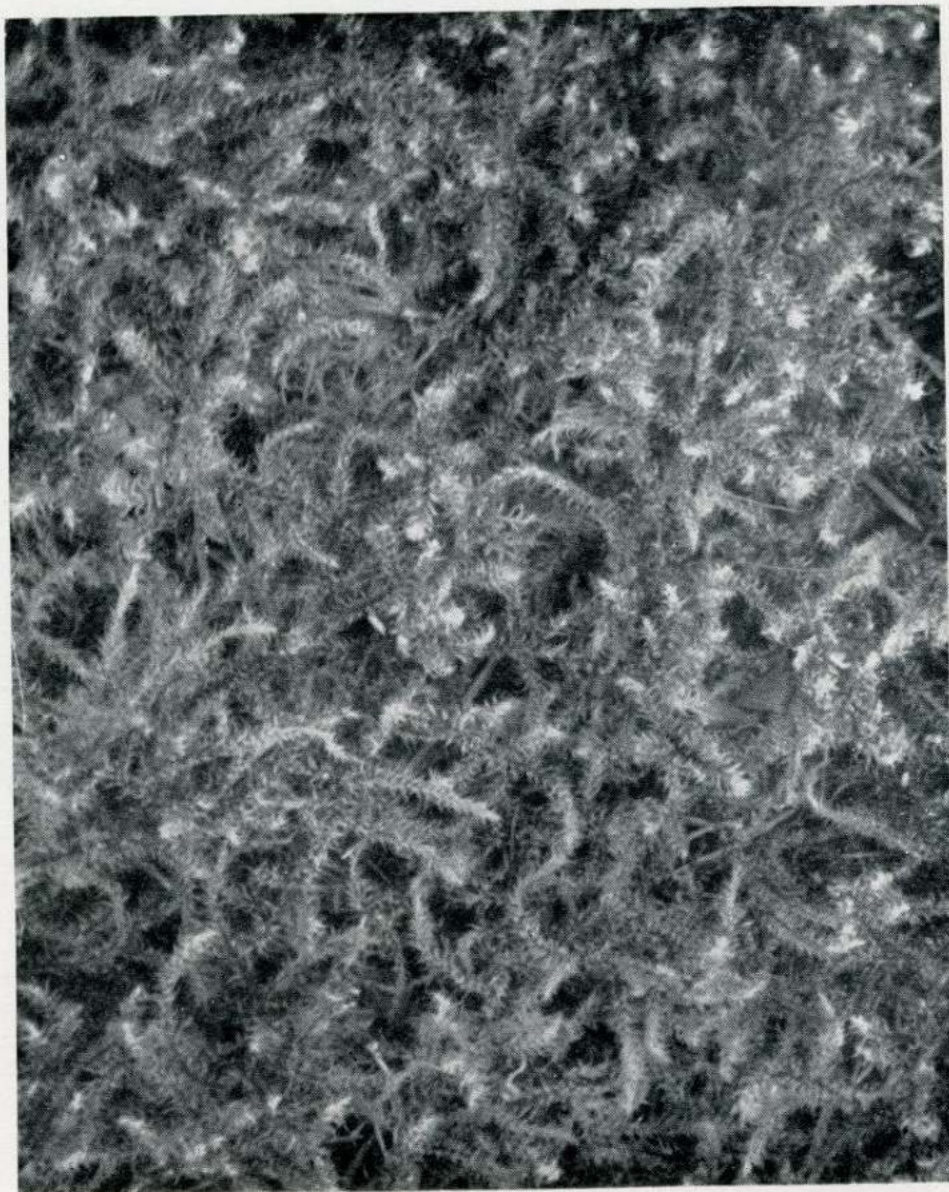
Single shoots
—middle
fertile shoot
bears seta
with capsule

Hylocomium loreum often grows in very large masses. The turfs are soft and olive green in colour. The stems are robust and often reach about 10 inches in length. The branching is pinnate and curved as in the photograph of the single shoot. The leaves are closely set and curved like a sickle (*falcato-secund*). They are fairly large but not so big as those of *H. triquetrum*. They taper to a long, fine, recurved point and are strongly plicate.

The fruit is commoner than in *H. triquetrum* and *H. squarrosum*. A fruiting shoot is shown in the illustration.

10. HYLOCOMIUM LOREUM

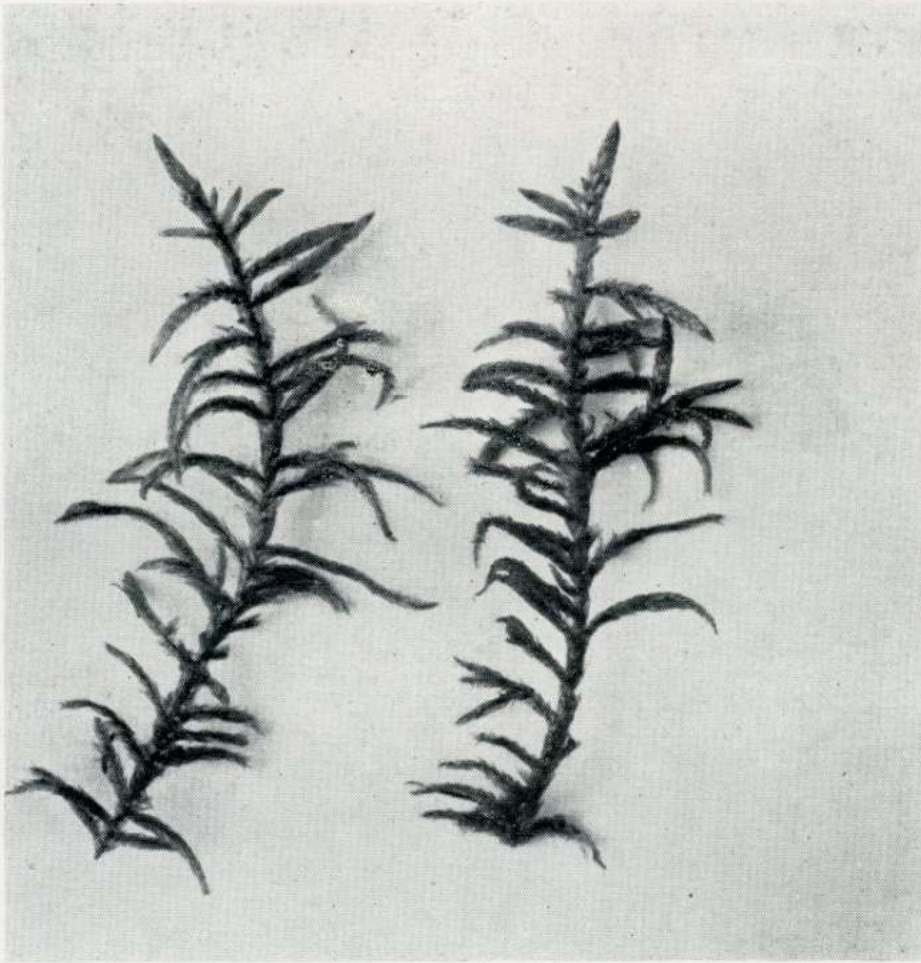
This moss is very common in the West covering large patches of the areas under oak and birch scrub. It seems to have a wide distribution and be able to adapt itself to varying conditions.



HYLOCOM-
IUM LOREUM

Turf — greyish-
green with dense-
ly overlapping
leaves

11. HYPNUM SCHREBERI



Single shoot —
stem erect and
bright red

Turfs are pale, glossy, yellowish green. Stems are erect, stiff and bright red when held between the eye and the light. They have irregularly pinnate branches, which are more or less curved. Leaves are close and imbricated, concave and terminated by a short point. The leaf nerve is short and double. The fruit, which ripens in winter, is very rare in this country although less rare on the continent. This moss is found in conifer woods with a more acid humus especially on the drier woodland soils. Often it is mixed with *Hylocomium splendens* under these conditions. It is a common moss on many moorland soils, and somewhat resembles *Brachythecium purum* but differs in the red stem.

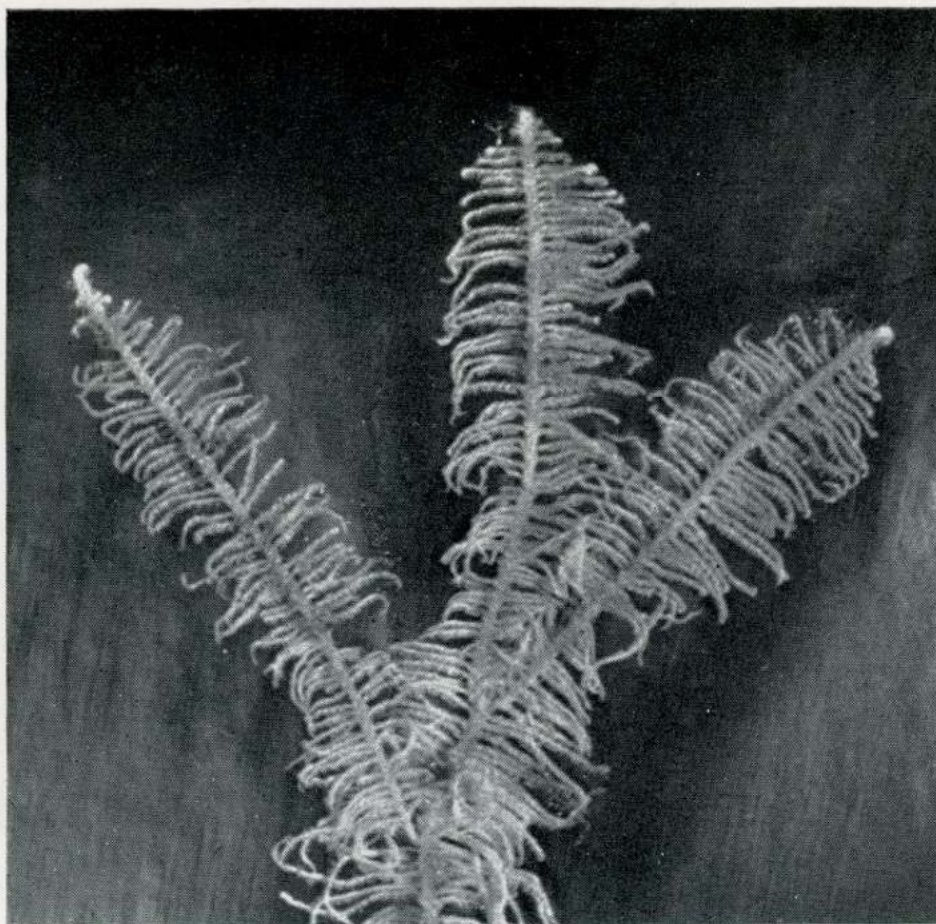
II. HYPNUM SCHREBERI



HYPNUM SCHREBERI

Turf—the red stems shine through the semi-transparent leaves and give the glossy yellowish green mass a reddish tinge

12. HYPNUM CRISTA-CASTRENSIS



Single shoots
—stems erect,
regularly pin-
nate

No one can ever mistake this moss once it has been seen. It is a beautiful plant, both in the turf and as a single shoot. It is rather rare but when you do find it there are usually one or two clumps in the neighbourhood. The habitat, in which I have seen it, is the Pine Wood with long heather undergrowth. It also occurs more rarely in oak and birch woods ; common in parts of Scotland ; in England and Wales in a few localities only. There you may come on quite a large clump of bright yellowish green contrasting strongly with the dark background of the heather. The shoots grow upright and are usually closely set together in the tuft.

A glance at the photographs shows the shape and appearance of these shoots, which are 3-5 inches in length. In design and form they are like feathers with the leaves curled which makes the shoots look like plumes. The whole plant has a soft silky sheen.

12. HYPNUM CRISTA-CASTRENSIS

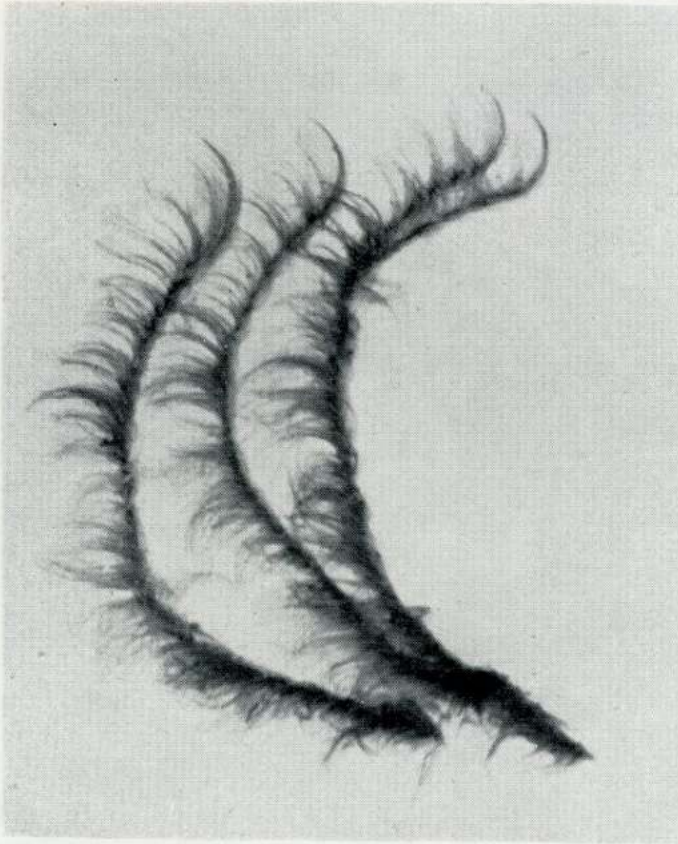
The mosses usually to be found in its company are *Hypnum schreberi* and *Hylocomium splendens*.



HYPNUM
CRISTA-
CASTRENSIS

Turf—loose and
bright yellowish
green with a soft
feathery appear-
ance

13. D I C R A N U M M A J U S



Single shoots—with typical falcate leaves

This moss forms a fairly loose turf of tall stems, many of them 5 inches high. They are glossy yellowish to dark green. The leaves are long and always falcato-secund (curved like a hook and turned to one side of the stem). The photograph should be an aid to easy identification. The fruit stalk is terminal on the shoot and the capsule is small and curved. Two or more pale setae arise from the same point of the stem. Although this moss is quite common in the West, especially in *Quercus sessiliflora* woodlands, another—*Dicranum scoparium*—will more often be found. It forms a more compact tuft but the stems and leaves are smaller. The latter are also shorter and less curved than those of *D. majus*, and the setae are almost always solitary.

These *Dicranums* are often associated with *Hypnum schreberi* and acid-loving plants. As regards humus it might be classed as a not too favourable indicator.

13. DICRANUM MAJUS



DICRANUM MAJUS

Turf—showing the “hooked” ends of the shoots

14. PLAGIOTHECIUM UNDULATUM



Single shoot with transversely undulate leaves

This moss grows in large flattened patches of glossy pale green to almost whitish green colour. The form of this moss is well depicted in the photograph.

Leaves are fairly large and strongly transversely undulate (wavy). This is typical. They are inserted on the prostrate stem in two apparently opposite rows. The fruit stalk arises laterally on the stem and carries a large capsule, which is furrowed when ripe. This moss seems to fruit more on the higher altitudes.

It is usually found in the West and North on the wetter parts of our mountain woodlands both at high and low altitudes—often in company with *Sphagnum* on moist leached soils.

14. *PLAGIOTHECIUM UNDULATUM*



PLAGIOTHECIUM UNDULATUM

Turf—a typical flat spreading pale green almost white mass

15. HYPNUM CUPRESSIFORME



Single shoot

This is a very variable moss. It is very common and forms on the ground a thin mat-like turf, which can be easily rolled up. It also grows over old stumps and at the base of trees. It assumes many forms. On the stems of trees there is a variety called var. *filiforme* which is lighter in colour and extremely slender, and has very little resemblance to the form shown in the photograph.

The photographs show the typical mat-like growth, greyish or olive green in colour. The leaves are somewhat shiny. The stem is pinnate, with closely set leaves, curved to one side, more or less ovate and suddenly drawn out to a fine point.

It fruits abundantly from winter until spring. The curved capsule is carried by a red seta which arises from the side of the stem.

It is the most common moss to be found on the drier heaths and moorlands, growing below heather and often creeping up its lower stems, but also occurs in a great variety of localities and on almost every type of soil from basic to slightly acid.

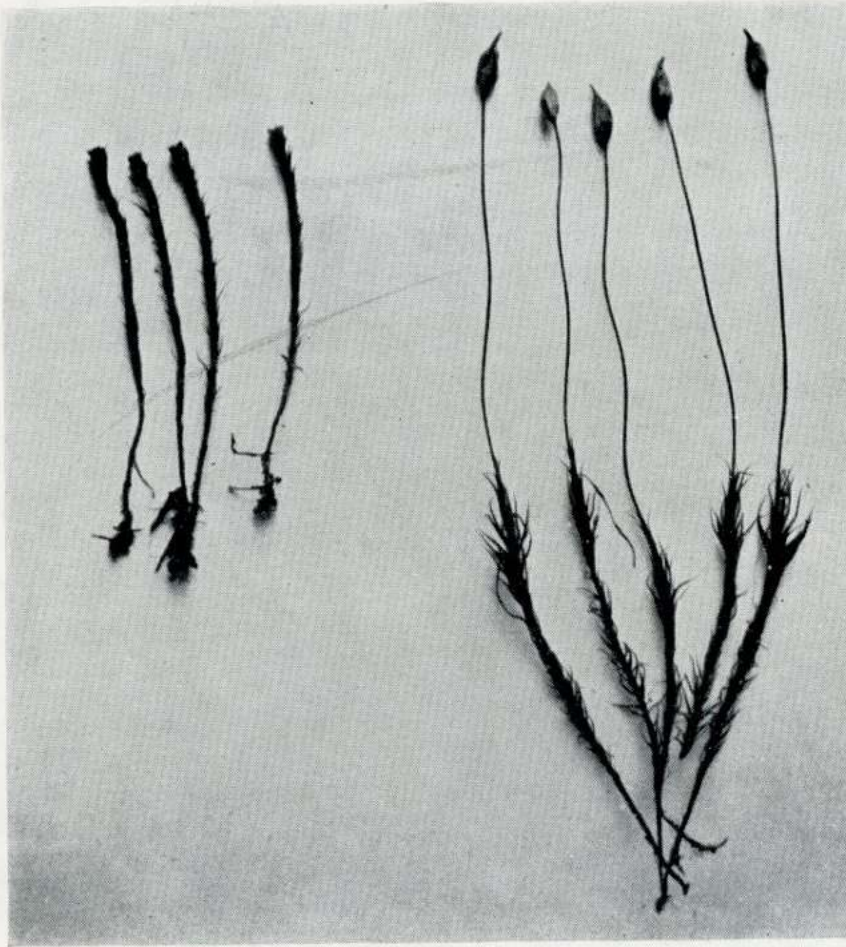
15. HYPNUM CUPRESSIFORME



HYPNUM CUPRESSIFORME

Turf. Thin and flattened with irregularly pinnate shoots

16. POLYTRICHUM COMMUNE

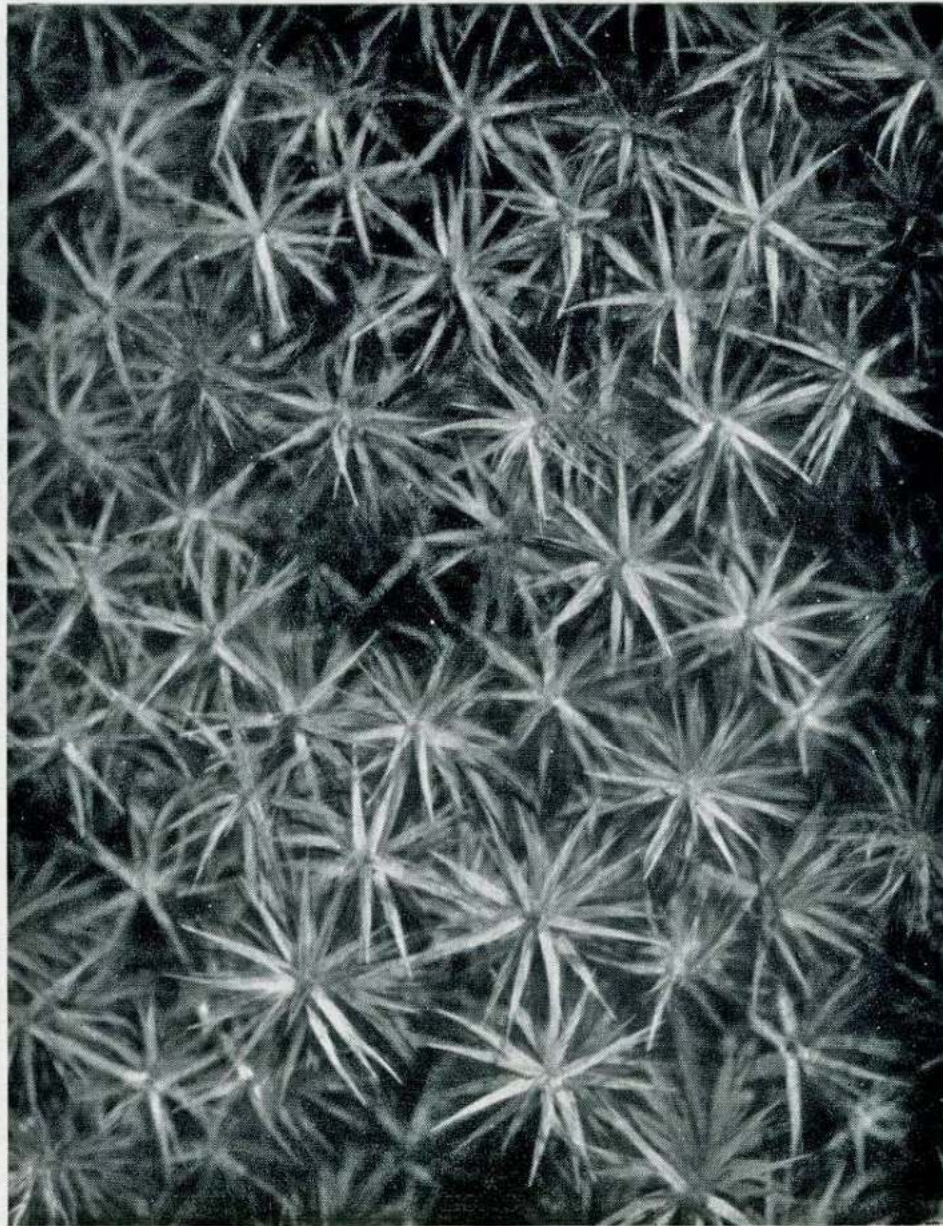


On the right are five fertile shoots with calyptrae covering the capsules. On the left are four male shoots with antheridia at the tips

This moss should be easily recognised from the photographs, at least that it is a *Polytrichum*. This genus has a conspicuous golden brown calyptra or hood as shown in the illustration. It is covered with a dense felt of shaggy hairs and completely encloses the capsules. When the calyptra is shed it discloses a four-angle capsule almost cubical in shape. In *Polytrichum formosum*—a species which is very like *P. commune*—the capsule is longer and narrower and has 5 or 6 acute angles. Both these species form loose tall turfs of a deep green colour. *P. commune* is the taller, sometimes over a foot in height and *P. formosum* may reach 9 inches. When the soil is dried up the leaves of the former are erect and pressed to the stem while in the latter they are freer. Both species have large thick lance-shaped sharply-toothed leaves.

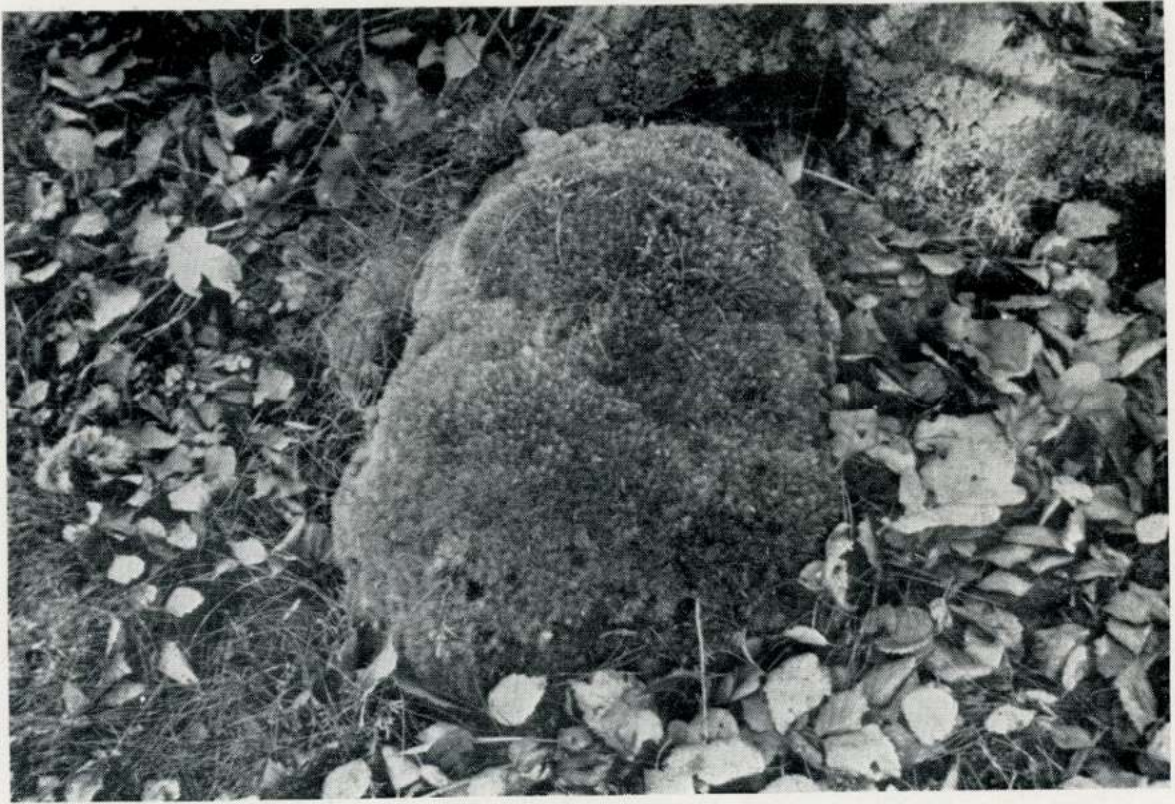
16. POLYTRICHUM COMMUNE

In habitat they differ. *P. formosum* prefers dry shady woods while *P. commune* is found on wetter soils and more open situations and is often associated with *Sphagnum*.



POLYTRI-
CHUM
COMMUNE
Turf—leaves
long, stiff and
pointed

17. L E U C O B R Y U M G L A U C U M



Typical cushion

This moss grows in dense tufted masses as shown in the photograph. They often assume the rounded shape of a cushion about 6 inches high in the centre. The colour is usually a bright green when growing in moist soil conditions to a whitish-green when on dried-out soil. On breaking up the tufts we find the stems a dirty white and when dry very brittle. They bear some resemblance to the *Sphagnum*s in their power to absorb water readily like a sponge. The leaves are crowded together and composed mostly of a broad nerve. The fruit is rare and is borne on a short seta. It appears during the winter.



Single shoot

This moss should be easily recognised. Its habitat is the poorer leached woodland soils and is associated often with the *Sphagnum*s, e.g. scrub birch in

17. L E U C O B R Y U M G L A U C U M

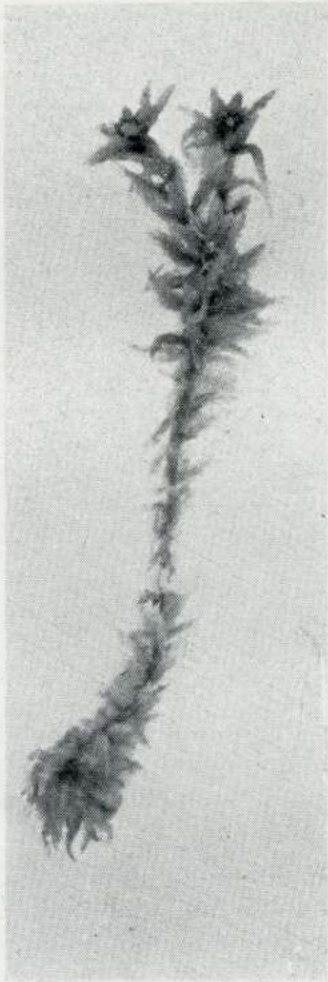
Highlands and beechwoods on leached soils in South-east England.



LEUCO-
BRYUM
GLAUCUM

Close-up view
of turf

18. SPHAGNUM CYMBIFOLIUM



Single shoot with broadly
ovate leaves

Sphagnum moss is easily recognised but as the classification is difficult and most of the differences are microscopic, I have only tried to show two of the common ones—*S. cymbifolium* and *S. acutifolium* (agg.). They are usually found in masses or cushions on wet moorlands, woodlands, or bogs where often they form the bulk of the vegetation. *S. cymbifolium* is one of the largest species. It is a robust plant, having stems often over a foot in length. The branches occur in bundles from 3-5 together, some of them hang down while others are spreading. The leaves are set close together and shaped like a boat, hence the name *cymbifolium*. The colour is usually pale greenish white.

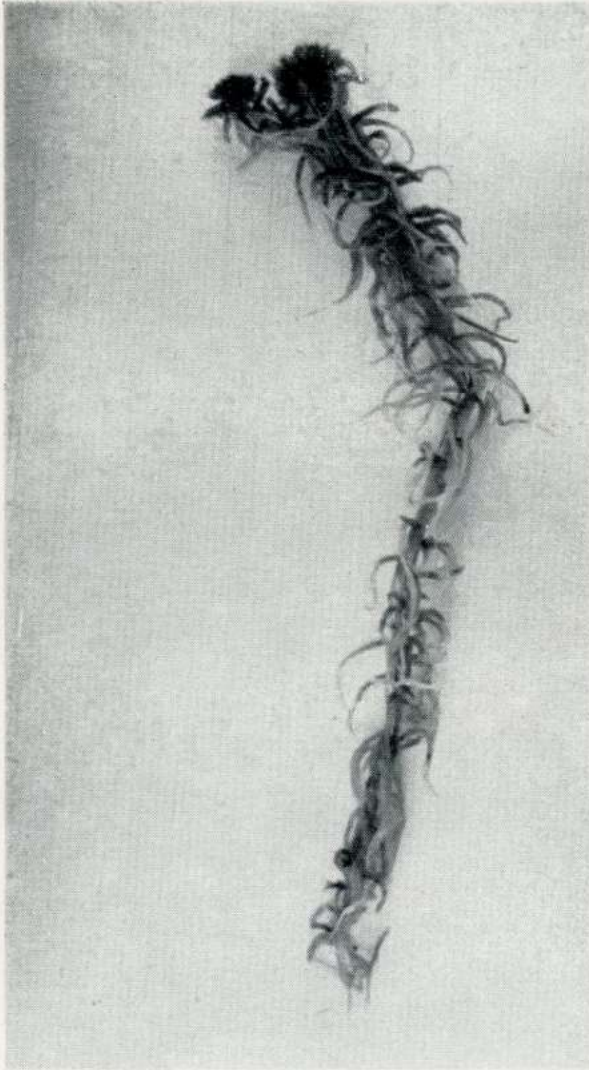
18. SPHAGNUM CYMBIFOLIUM



SPHAGNUM CYMBIFOLIUM

Turf—showing tumid branches

19. SPHAGNUM ACUTIFOLIUM (AGG.)



Single shoot with acute leaves

In *S. acutifolium* we find a more slender plant with leaves lanceolate in shape, acute and toothed at the apex. This moss varies in colour from pink, pale green to whitish, but always there is some trace of red in it. There are many varieties.

The capsules of all the species of *Sphagnum* are similar—dark brown in colour and globular in shape. These are carried on a short stalk arising from among the clustered branches at the top of the stem. The spores are shed when the top or lid of the capsule explosively separates at maturity.

19. SPHAGNUM ACUTIFOLIUM

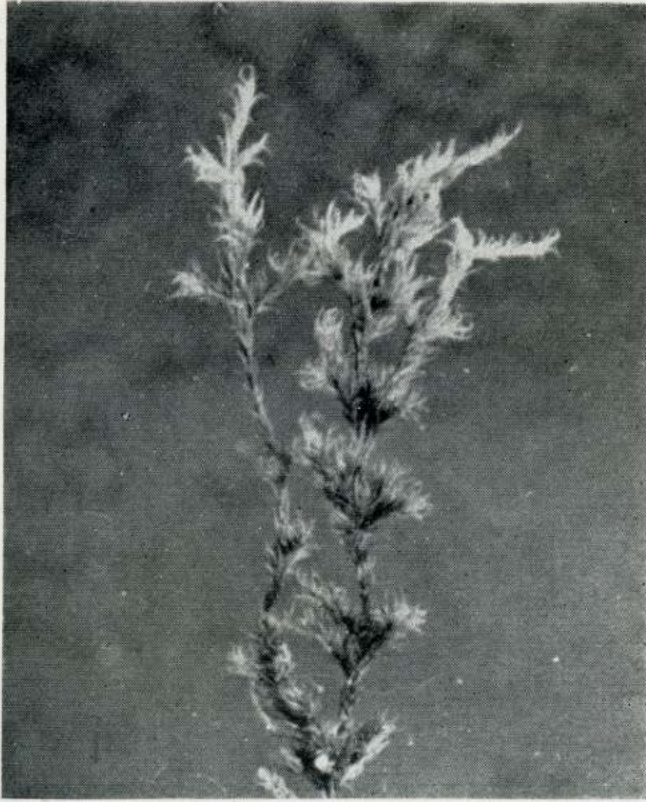
All the *Sphagnums* are peat formers and indicate excess of moisture and acidity, a condition which, in woodlands, can usually be put right by draining.



SPHAGNUM ACUTIFOLIUM

Turf—usually tinged with red

20. RHACOMITRIUM LANUGINOSUM



Single shoot (top)

This moss grows in fairly large tufts of a dull or greyish green, brightened up by the whitish hair-like leaf points. These leaf points are worthy of examination under the microscope. They are beautiful objects—transparent with toothed margins.

The slender stems are from 3-12 inches long and have branches of varying lengths. When dry this moss plant is quite brittle.

This moss is virtually confined to mountain rocks and to certain very poor and acid types of peat ; it is often associated with *Scirpus caespitosus* (Deer Grass) and with lichens.

Though strictly speaking not a woodland species, being intolerant of shade, this moss, along with its associates, is an indicator of conditions usually unsuitable for economic afforestation.

20. RHACOMITRIUM LANUGINOSUM



RHACOMITRIUM LANUGINOSUM

Turf—the leaves narrow to a long very fine white hair-point

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