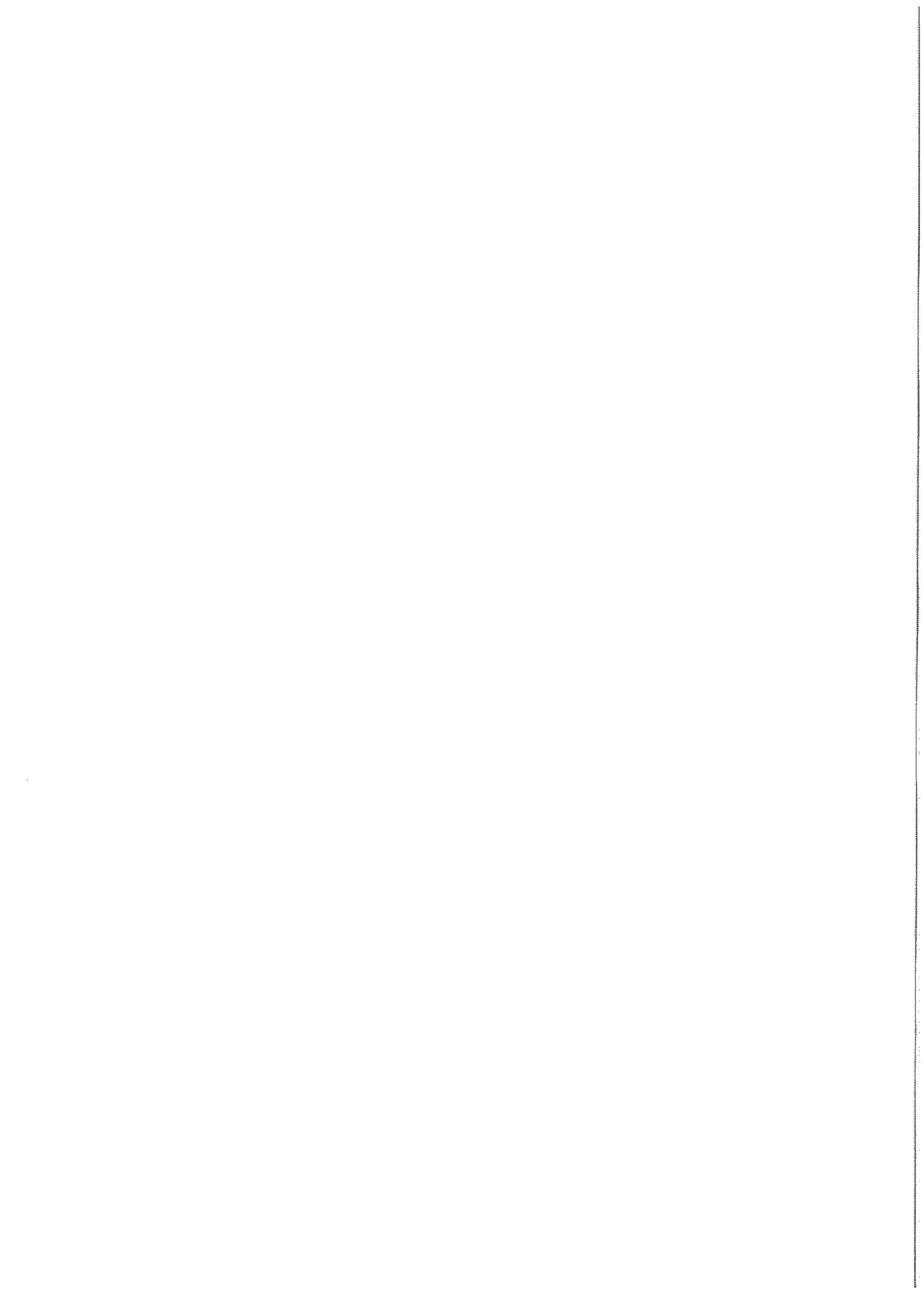


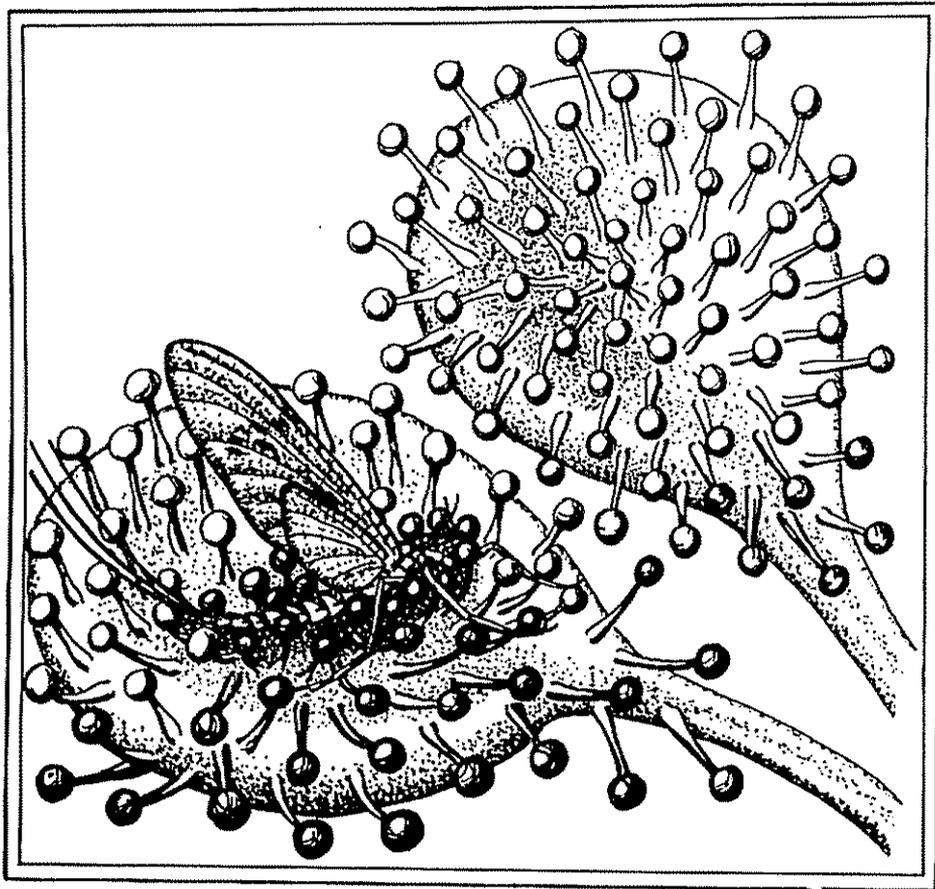
CORS CARON

NATIONAL NATURE RESERVE



CORS CARON (TREGARON BOG)
NATIONAL NATURE RESERVE

An Introduction to the Vegetation of the South-East Bog



Revised Edition, Spring 1984

The Nature Conservancy Council & The University College of Wales, Aberystwyth

SOME WARNINGS

Bogs can be extremely hazardous; so please read the following warnings:-

Pools, Flashes and Peat-Cuttings

Some of these have soft bottoms and you can go down to your knees (perhaps hips); so avoid any area covered with 'green' Sphagnum, Cotton-grass or Bog Asphodel. If any member of the party goes down to the knees it is best to 'fall backwards', thus spreading the weight and for any rescuers to make sure that they have their feet on the firm ground surrounding the pool or cutting, otherwise they too will go down to their knees as they pull the first victim to safety!

Afon (River) Teifi

When there has been excessive rainfall the level of the Teifi can rise very rapidly; so beware of crossing the bridges if the flood water is flowing over the approach paths on either side of the river. The Teifi is deep (up to 3m in places) with a sticky, soft bottom. It is most difficult to get out again without leaving your wellingtons behind in the mud. Undercutting of the banks causes instability so do not stand close to the edge.

Snakes

You may be lucky enough to see an Adder (Viper). If so you must keep well away from it; on no account must a party of students surround a snake since it will probably panic and strike out at anyone in its way. If by any chance you are bitten, send a member of the party to telephone Bronglais Hospital, Aberystwyth (Tel: Aberystwyth 3131). (Tregaron Hospital will have an out-patients department at some time in the future). Keep the victim warm and take to Aberystwyth Hospital for treatment, as soon as possible.

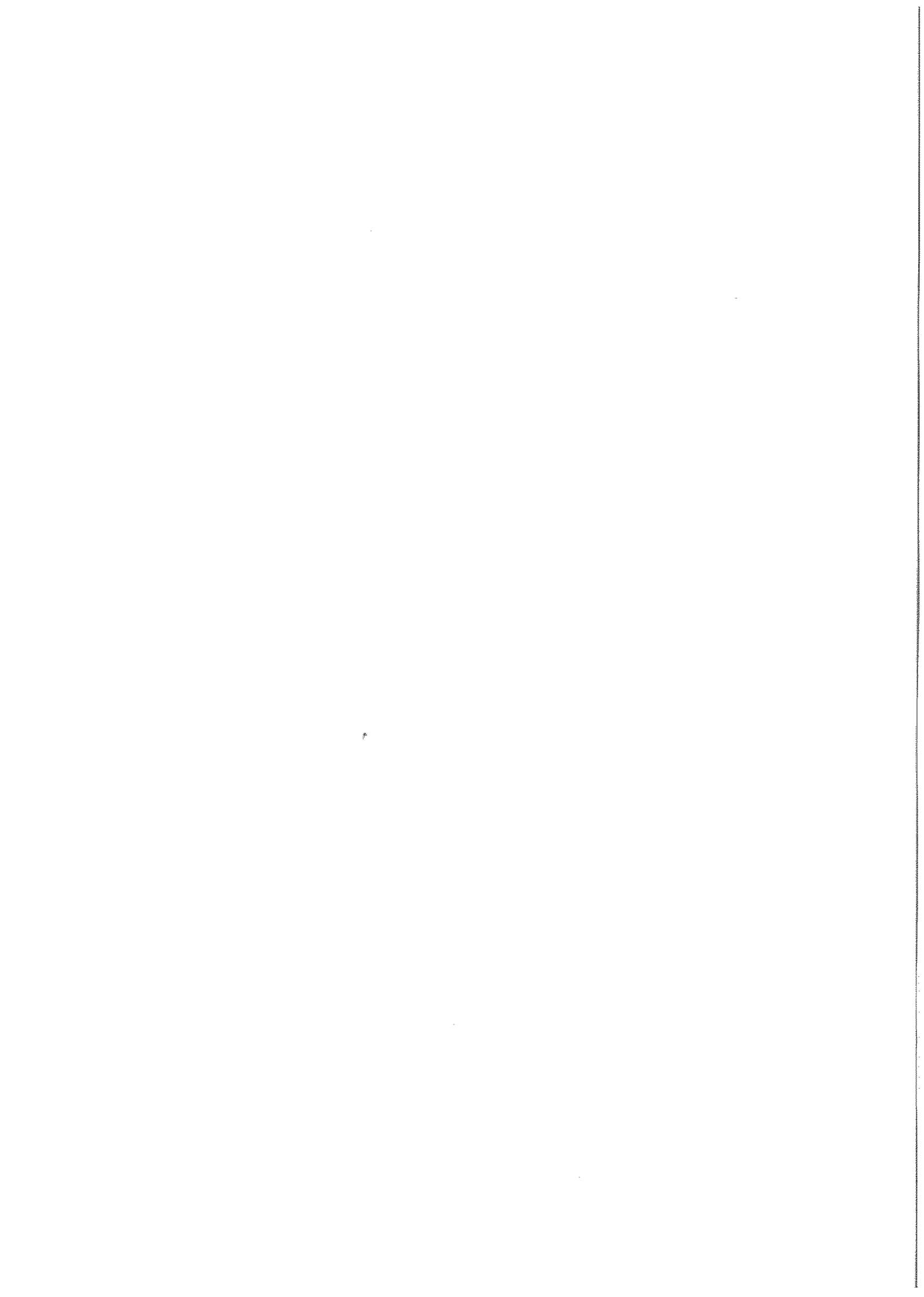
Please keep to the main paths indicated on the map and use the boardwalks. The surface of a raised bog is easily damaged and one can often see where visiting parties have been many months after their visit. See if you can enjoy your visit to Cors Caron without leaving any evidence of your activities.

Fire Risk

Take great care with cigarettes. At times of highest risk smoking may be banned.

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Introduction

Cors Caron

This National Nature Reserve of some 792 hectares (1957 acres) was first established between 1955 and 1964 by agreements with Lord Lisburne. In 1978 the Nature Conservancy Council purchased the freehold of most of the reserve (1847 acres), and the section of disused railway line which bounds the reserve (30 acres).

It occupies a 6 km length of the Teifi Valley, formerly occupied by a large shallow lake. At the southern end of Cors Caron, a series of recessional moraines left by the last glaciation effectively blocked the valley, thus allowing the formation of the lake. From about 11,000 BP fine sediments washed down from the surrounding lands reduced the depth of the lake which was invaded by the Common Reed (Phragmites australis) and other fen species.

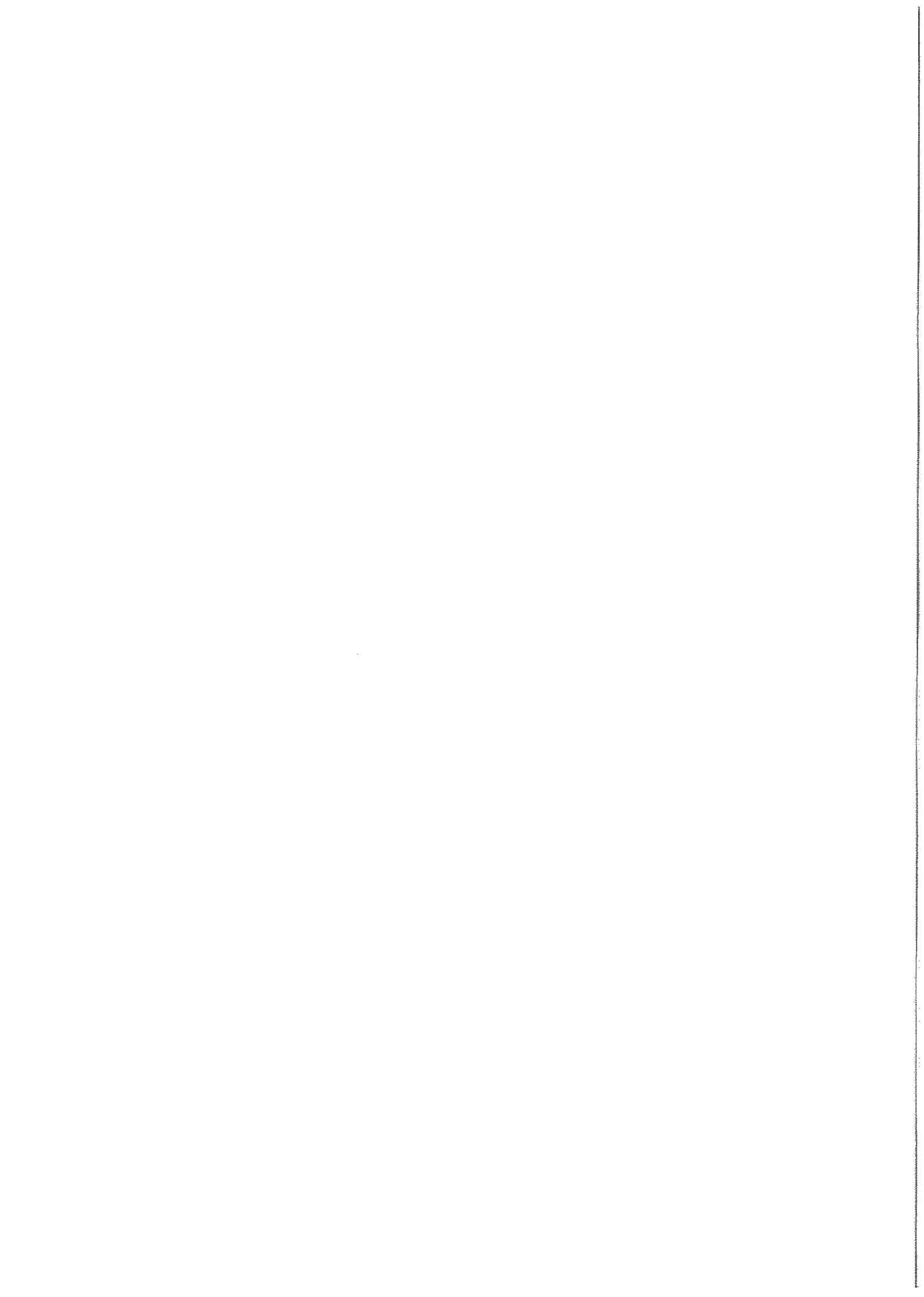
Following development to woodland, increasing rainfall leached out nutrients derived from boulder clay, raised water levels and increased acidity. This encouraged the formation of valley bog vegetation, with extensive beds of Juncus (rushes) and Eriophorum (Cotton grass). Later, bog mosses Sphagnum spp invaded the area and initiated the formation of acid peat, which ultimately resulted in the present raised bogs.

There are three raised bogs (south-east, north-east and west) but evidence suggests that additional raised bogs may have been present, one in the south, and two in the northern area. These bogs were probably destroyed as the result of the extraction of peat for fuel, and the remaining raised bogs provide ample evidence of this activity in extensive abandoned peat cuttings around their margins. The central domes of the three remaining bogs survive to provide a natural series of typical raised bog plant associations.

Educational facilities

The Nature Conservancy Council has encouraged educational visits by permit to Cors Caron for many years. Although a descriptive leaflet was available no special handbooks or educational trails were provided. However, as a result of the setting up of a joint Nature Conservancy Council and University College of Wales Wetlands Committee in November 1976, it was decided to develop the educational potential of this reserve. In the spring of 1977 the first educational route was set up on the South-east Bog and this guide is an introduction to the plant associations that can be found along this route. Obviously there are some parts of the guide that certain visitors would like to see expanded and it is hoped to satisfy this need by publishing a small handbook to be followed by a more general account of the history, flora and fauna of Cors Caron. We hope that visiting parties will help us in compiling a comprehensive handbook by providing us with details of any projects, transect or peat core work that they have carried out on Cors Caron. Records of bryophytes, lichens and information on all insect groups would be most welcome. For the time being we hope that this guide will be sufficient to help you find and study the main areas of a typical raised bog.

Dr D G Jones, The Nature Conservancy Council, Plas Gogerddan, Aberystwyth
Dr J P Savidge, The University College of Wales, Aberystwyth.



THE SOUTH-EAST BOG

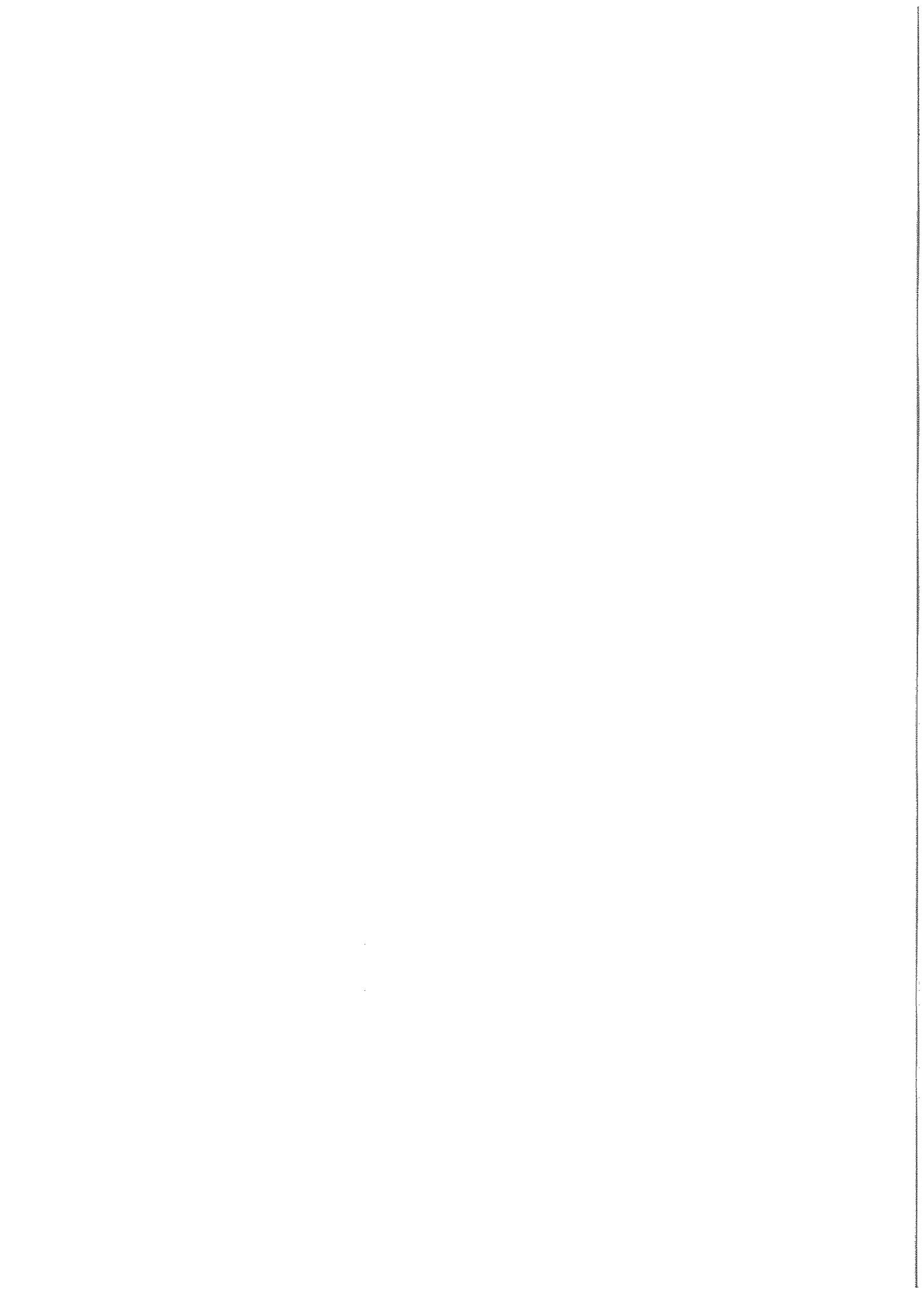
The South-east raised Bog has been selected for the educational route since it is the most convenient for access, it is the least dangerous of the three to walk on, and it provides good examples of the main plant associations. The only associations that cannot easily be studied, the Rand and Juncetum, have been included in the route by extending it for a short distance across the Afon Teifi onto the West Bog.

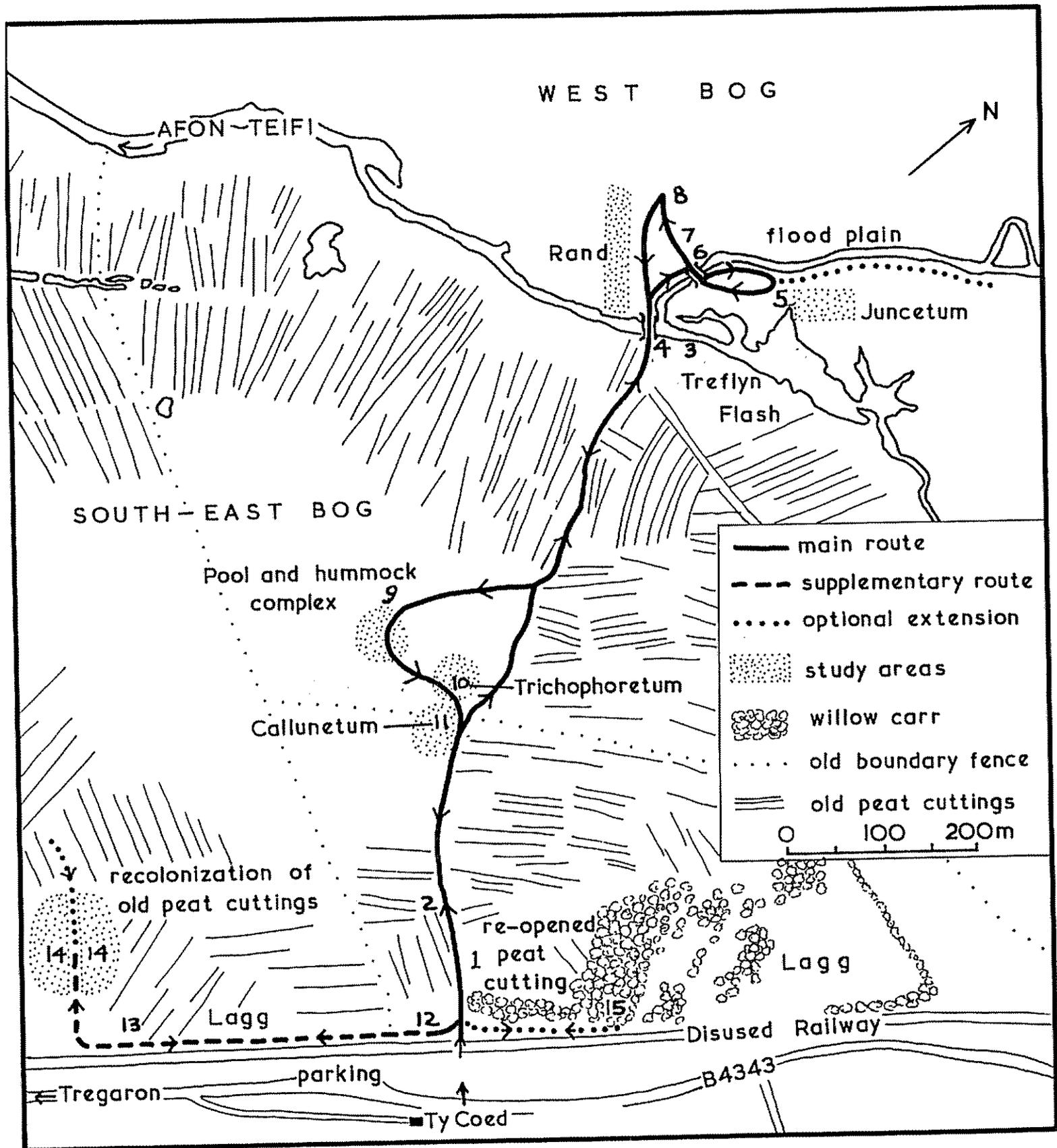
The outer rim of the South-east Bog is 160 m (525 ft) above OD and it rises to 165 m (540 ft) at its centre. It is ungrazed except for occasional grazing by stray ponies, cattle and sheep. The vegetation is not quite as tall as one might expect since it was frequently burned by fires spreading from the Aberystwyth to Carmarthen railway line, which traversed the south-east boundary of the nature reserve. Since 1964, when the railway was closed, there have been no serious fires on the South-east Bog.

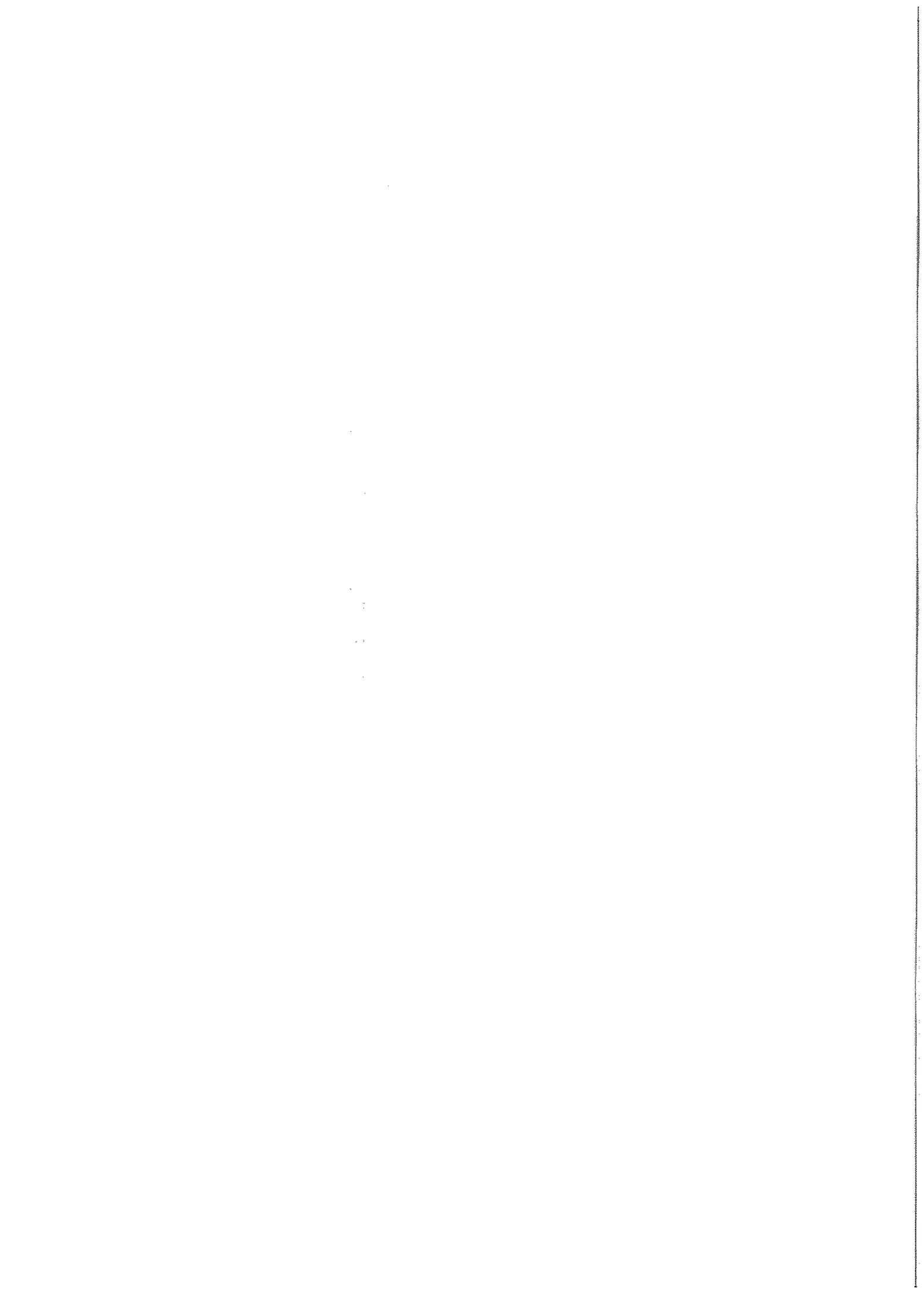
Access to the South-east Bog (see map) should be made from the parking place below Ty Coed on the B4343 road, NGR SN687618 two miles from Tregaron on the Tregaron - Pontrhydfendigaid - Ysbyty Ystwyth route to Devil's Bridge. From the parking place you should walk about 200 m towards Pontrhydfendigaid to the stile on the left hand side of the road. Cross the narrow field, and the old railway line, and pass through the gate onto the Bog. The main route takes you down to the Afon Teifi, across two bridges as far as POST8,5 then on to the West Bog to examine the Rand and Sphagnetum. From here you return across the first bridge to examine the habitats on the main part of the South-east raised Bog. The route then brings you back to the entrance gate. From here you can go back on to the road or, if you have time, take the supplementary and optional routes to examine the Lagg habitats in greater detail. Several areas have been set aside for quadrat, transect and other work. Please keep to these areas, marked by dots on the map, since it is essential to keep the South-east Bog as free from disturbance as possible.

A quick examination of the main route on the South-east Bog would take you about an hour, but for those who wish to look at the area in some detail there is more than enough to occupy you for a whole day.

After your visit to the South-east Bog we suggest that you might look at the market town of Tregaron followed by a quick look at the Afon Teifi at Pont Einon about one mile out of Tregaron on the way to Aberystwyth on the A485. Here you will find good examples of reed swamp species growing at the edge of the Teifi. You might also like to visit the remains of the Cistercian abbey of St Mary's which was founded in 1164. The abbey ruins are at Strata Florida (NGR SN746657) just east of Pontrhydfendigaid.





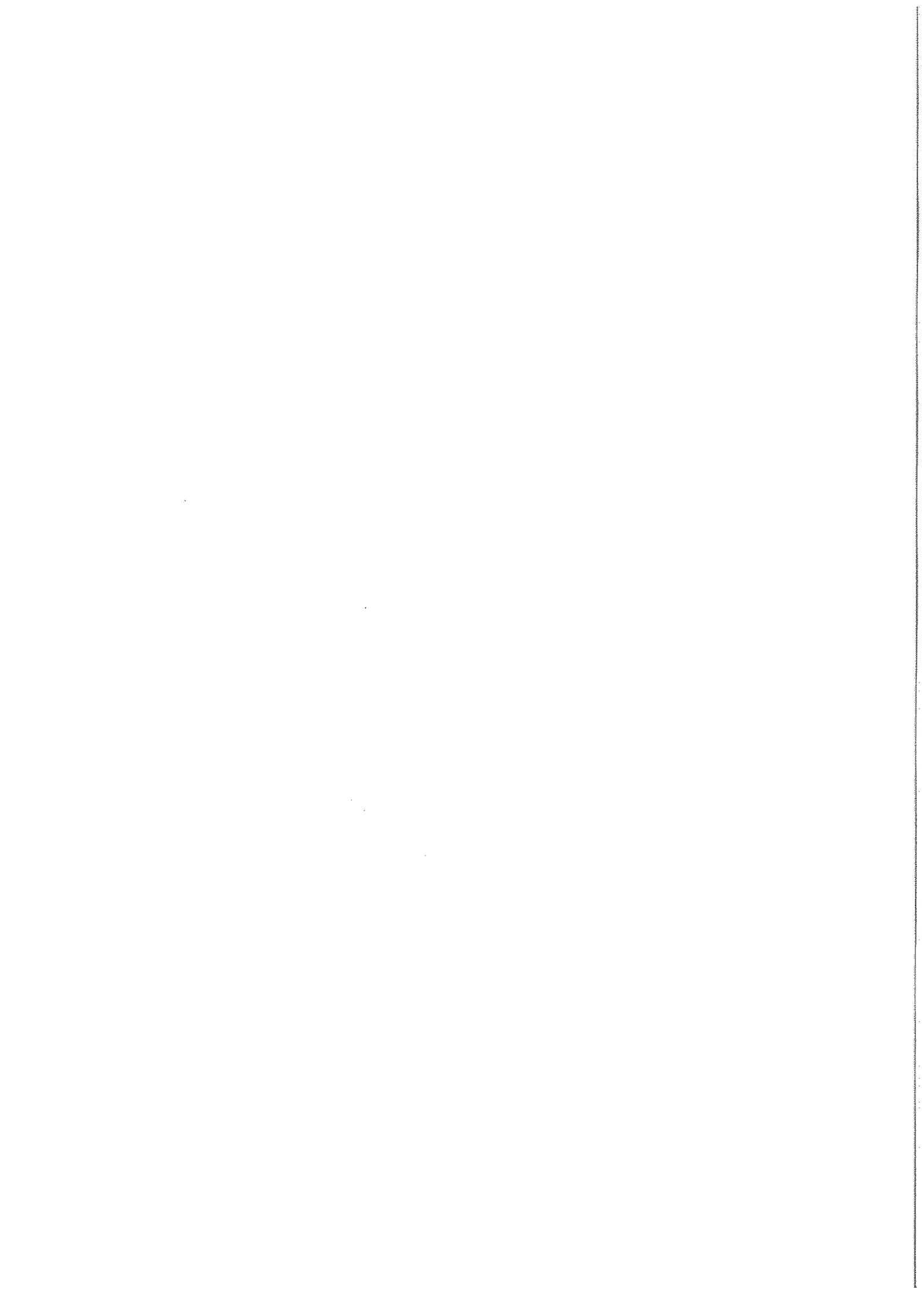


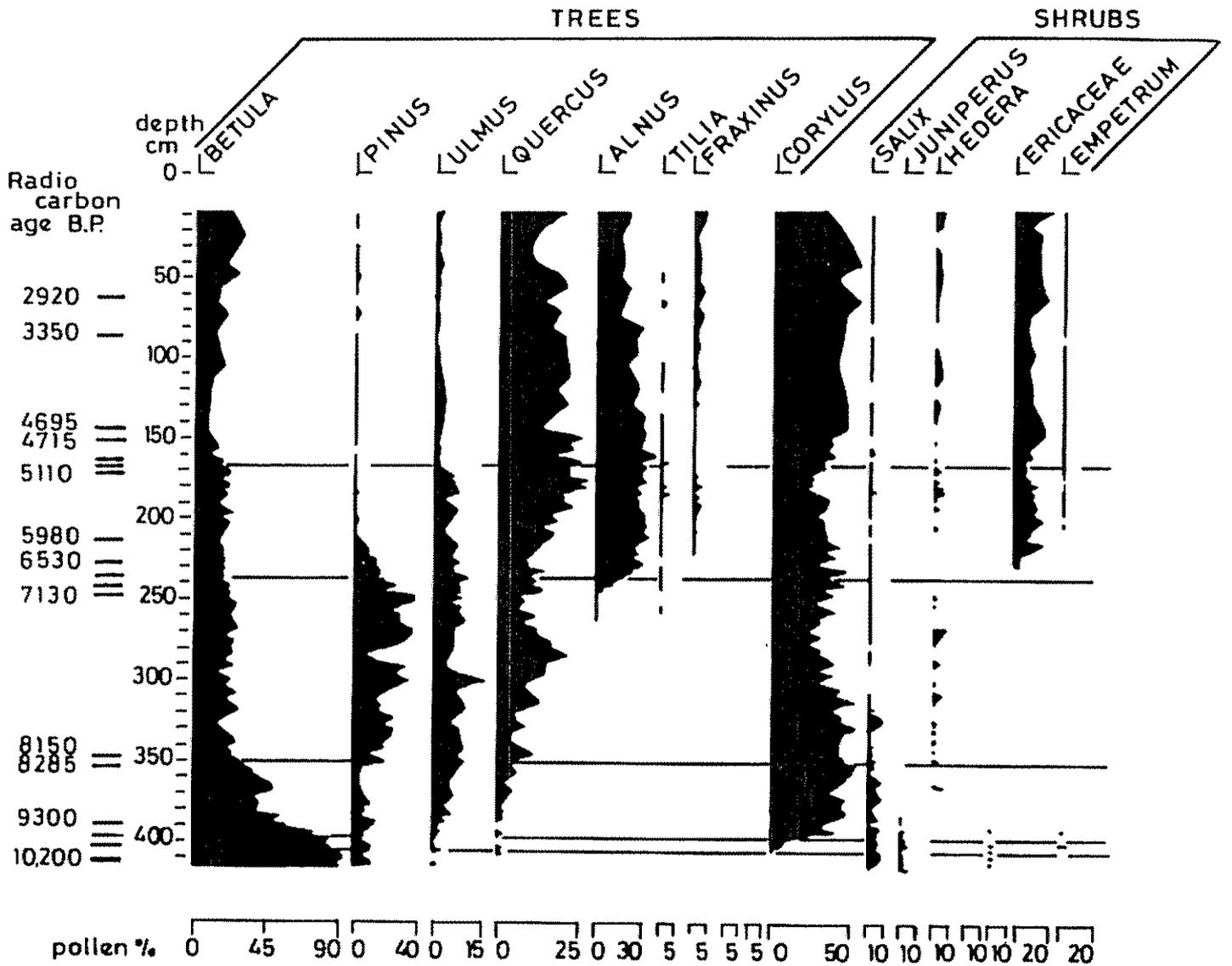
POST 1 - Peat Cutting Face

This exposure represents over 2,000 years of local history. The total depth of peat at this point is 4.5 m but further out along the board-walk, at post 9, the peat is up to 9.5 m in depth above the original lake floor. The pH of the peat below the Calluna plants is usually about PH 3.4, but further down the pH increases to 4.6. In peat cores it has been found that the pH continues to increase with increasing depths and values of up to pH 7.3 can be found in the basal layers. Removal of peat from the marginal areas of the bog leads to an increase in species since the less acid tolerant species will become established in these more base-rich sites.

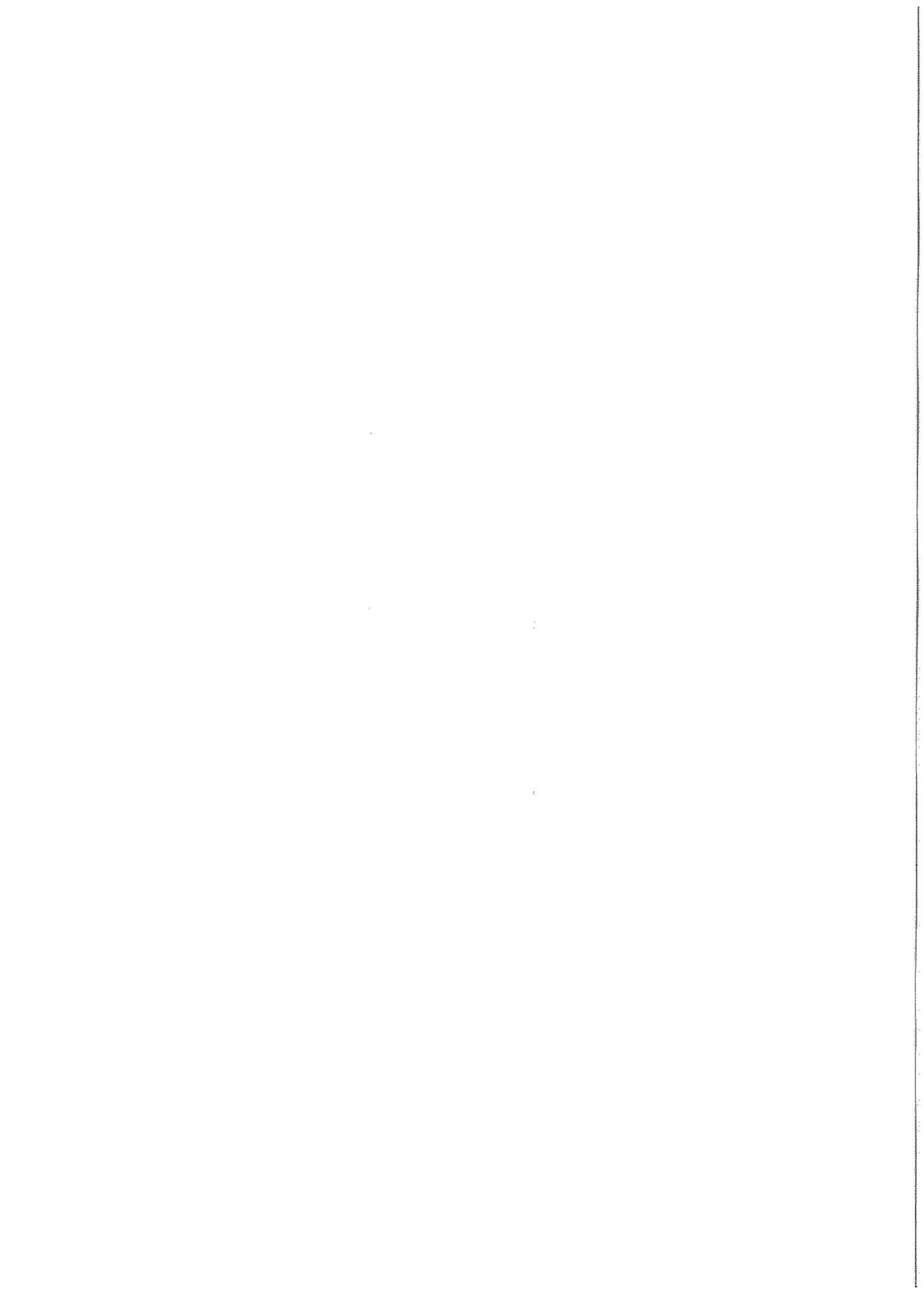
The roots of both the Calluna and Molinia are found to a metre below the surface, but this is atypical for the bog as a whole, since in most parts the roots rarely penetrate below the permanent water-table which is situated about 40 cm below the surface. Note that the actual surface of the peat is being colonized by leafy liverworts and some lichens. There are also a few young trees of Betula pubescens (Downy birch) and Sorbus aucuparia (rowan) growing on the better drained areas. The birch with its peeling bark, has very few lichens compared to the more stable bark of the rowan (mountain ash).

The text figure provides a simplified pollen diagram obtained from this area. Radiocarbon dates are indicated on the left-hand side. A more complete set of diagrams is given in Hibbert & Switsur (1976). Appendix 1 gives a summary of the climate, vegetation, and human activities of the Tregaron areas since the end of the last Ice-age.





A simplified pollen diagram for trees and shrubs based on a pollen profile obtained at Cors Tregaron by Hibbert and Switsur (1976). The black bands indicate the percentage of pollen found for each of the main species.

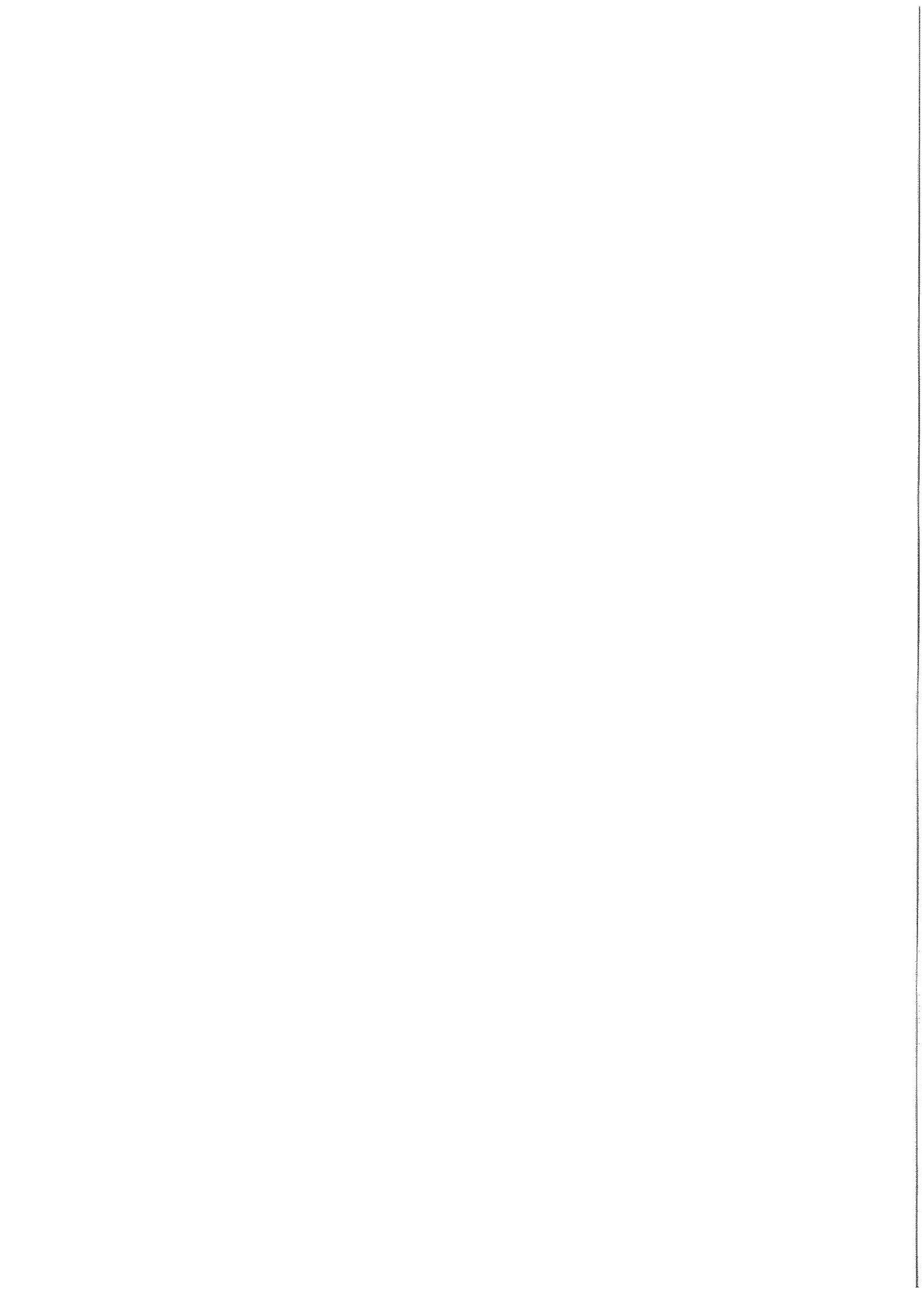


POST 2 - Peat Cuttings

From this point you can see the large areas of peat cuttings on the north side of the path. The area in front of you was re-opened in the spring of 1977 to show a typical peat-cutting face. The new face was cut by some of the local peat-cutters using the traditional tools. In the past, most of the peat-cutting was carried out during the late spring and early summer and the turves were left to dry out in stacks during the summer months. The turves were then removed on horse-drawn sledges along one of several exit routes to the B4343 Tregaron - Pontrhydfendigaid road where they were transferred to horse drawn carts. Peat-cutting was a major local industry as recently as the 1950's. This industry helped to ease some of the developing unemployment problem caused by the closure of nearby lead/zinc/copper mines.

Peat is formed mainly from the humified stems of the bog moss, Sphagnum, together with stems of (Heather) Calluna vulgaris, and the rhizomes and leaves of Eriophorum angustifolium (Common Cotton grass) which is not a true grass but belongs to the sedge family. If you examine the peat with a magnifying glass you will see that the Sphagnum leaves are broad and hooded. At first it might be thought that they were the leaves of Sphagnum papillosum which forms extensive hummocks on the main part of the raised bog. However, this is not the case. They are the leaves of Sphagnum imbricatum, a species which was very common on most raised bogs until about 100 years ago. For some reason this species has shown a remarkable decline and has become extinct on Cors Caron, although a few rather weak clumps still survive at Cors Fochno (Borth Bog).

From here we would like you to walk down to the Teifi and start your main investigation from there. This will mean that you study the various habitats in reasonably logical order. Please use the boardwalks.



POST 3 - Treflyn Flash

The six flashes on the Cors Caron NNR are an important habitat for over-wintering birds and most of them show a well developed hydrosere at their margins, with a transition from submerged plants at the centre of the flash to the tall reed-like species along their margins. All six flashes are shallow back-waters with permanent water, although the marginal areas dry out in summers with a prolonged drought. The muddy base is VERY SOFT AND TREACHEROUS - DO NOT WADE OUT INTO ANY OF THE FLASHES, ESPECIALLY IF YOU ARE ON YOUR OWN.

The water in the flashes is slightly more nutrient-rich than in the adjacent river for two reasons: the main input streams drain from the hills to the east which are heavily limed, and the birds using the flash add more nutrients than they remove since they mainly use the flash as a safe refuge rather than feeding grounds. The flashes are not particularly rich in phytoplankton since the water is too acidic for many common species.

The main species forming the hydrosere, from near the centre of the flash to post 3 are:

| | |
|-----------------------------------|------------------------------------|
| <u>Potamogeton polygonifolius</u> | (Bog pondweed) |
| <u>Nuphar lutea</u> | (Yellow Water-lily) |
| <u>Myriophyllum alterniflorum</u> | (Alternate-flowered water milfoil) |
| <u>Ranunculus pseudofluitans</u> | (Water Crowfoot) |
| <u>Callitriche hamulata</u> | (Water Starwort) |
| <u>Equisetum fluviatile</u> | (Water Horsetail) |
| <u>Carex acuta</u> | (Tufted Sedge) |
| <u>Phalaris arundinacea</u> | (Reed-grass) |
| <u>Deschampsia cespitosa</u> | (Tufted Hair-grass) |
| <u>Molinia caerulea</u> | (Purple Moor-grass) |
| <u>Juncus effusus</u> | (Soft Rush) |

After the autumn and winter floods, considerable rafts of decaying vegetation are left stranded in the Phalaris zone. Seeds of many aquatic species can be found in this litter which forms a valuable food source for birds and voles. The decaying vegetation adds some nutrients to this zone and this results in an increase in species such as:

| | |
|---------------------------------|--------------------|
| <u>Achillea ptarmica</u> | (Sneezewort) |
| <u>Lychnis flos-cuculi</u> | (Ragged-robin) |
| <u>Senecio aquaticus</u> | (Marsh ragwort) |
| <u>Scutellaria galericulata</u> | (Common Skull-cap) |
| <u>Galium palustre</u> | (Marsh Bedstraw) |

As the margins of the flash dry out in the summer, the bare mud is colonized by opportunist species such as:

| | |
|-----------------------------------|------------------|
| <u>Callitriche hamulata</u> | |
| <u>Elatine hydropiper</u> | (Water wort) |
| <u>Lythrum portula</u> | (Water purslane) |
| <u>Myriophyllum alterniflorum</u> | (Mud ecotype) |

These species have the ability to germinate, flower, fruit and produce seeds within a few weeks: in some years they are very successful; but in others the autumn floods come before the seeds are fully developed.

The flashes are particularly important for over-wintering birds such as whooper swans, and several species of duck. In summer they are frequented by many species of dragon and damsel - flies. For details see Appendix 2.

POST 4 - Afon Teifi

BEWARE: The Teifi is deep at this point!

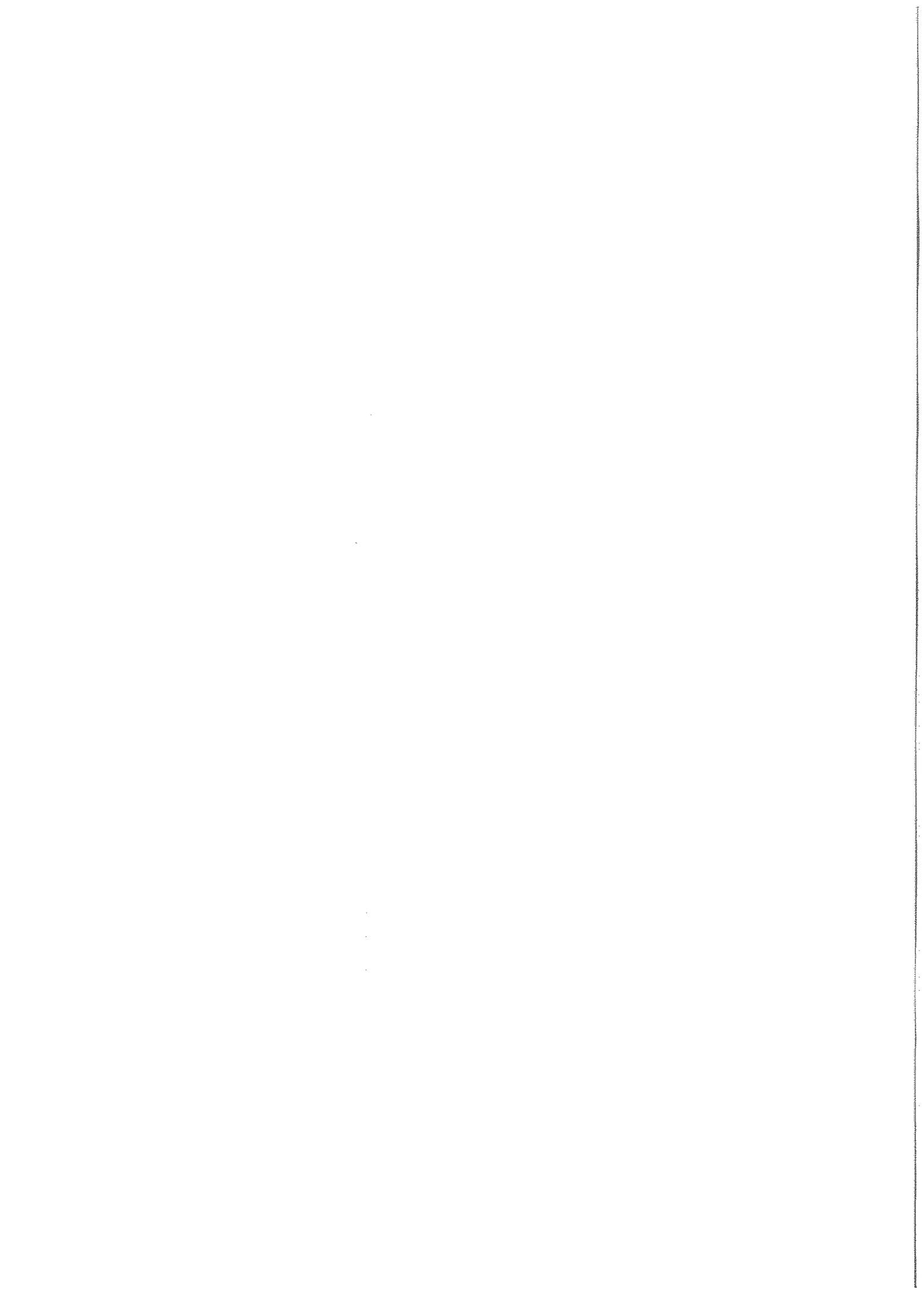
The Afon Teifi rises above Llyn Teifi to the east of Pontrhydfendigaid and flows out into Cardigan Bay at Aberteifi (Cardigan). From a first glance one might expect the Teifi to be very sluggish as it meanders through Cors Caron; however, you should be able to see a steady current as the river falls some 5 m (15 ft) in its 6 km course through the nature reserve. It brings down some nutrient-rich material which, at times of flood, is deposited on the flood plain which extends for many metres on either side of its main banks. Parts of the Teifi were cleaned out in 1961/62: hence the raised banks, especially in the more northern parts of the reserve. At certain times of the year considerable quantities of gravel, including material from the spoil tips of the old lead mines, are brought down in flood water and this helps to produce a well-drained, reasonably rich organic soil with a pH of about 6.5.

The main submerged and floating species of the Teifi are:

| | |
|-----------------------------------|------------------------------------|
| <u>Callitriche hamulata</u> | (Water Starwort) |
| <u>Callitriche platycarpa</u> | ditto |
| <u>Callitriche stagnalis</u> | ditto |
| <u>Myriophyllum alterniflorum</u> | (Alternate-flowered Water Milfoil) |
| <u>Nuphar lutea</u> | (Yellow Water-lily) |
| <u>Potamogeton polygonifolius</u> | (Bog Pondweed) |
| <u>Ranunculus pseudofluitans</u> | (Water Crowfoot) |

Note that the leaves of both Myriophyllum and Ranunculus are finely divided: an obvious adaption to a fast-flowing aquatic environment. The yellow flowers of Nuphar show many primitive features (especially the numerous broad laminar stamens) and its leaves are well adapted to floating on water. There are no reed habitat species at this point: please visit Pont Eionon to see these.

When you cross the bridge to go on to the West Bog please treat the bridge with respect. Too many student jumping on this bridge, and the next one, could cause a nasty accident. Also be careful not to stand close to the edge of the river bank since some of it overhangs and could collapse. Follow the bank of the Teifi upstream for about 100 m and then go across the next bridge. Follow the east bank for about 150 m and you will arrive at the Juncetum on the flood plain at POST 5.



POST 5 - The Teifi Flood Plain

The reasons for this area having a high diversity were mentioned at POST 4. Another point to note is that some of the river gravel deposited on the flood plain has come from old lead mine workings and the lead level of the soil is well above normal. One of the old lead mine spoilheaps is being reprocessed and unless strictly precautions are taken this could lead to rather serious additional quantities of lead being leached into the river. This could have a serious effect on the vegetation and on the fish, since the Teifi is highly regarded as a salmon and trout river. In the Afon Ystwyth and Afon Rheidol to the north the range of species is very limited even though active lead mining ceased over 50 years ago. The old spoil heaps and mine workings will continue to pollute these rivers for many centuries to come.

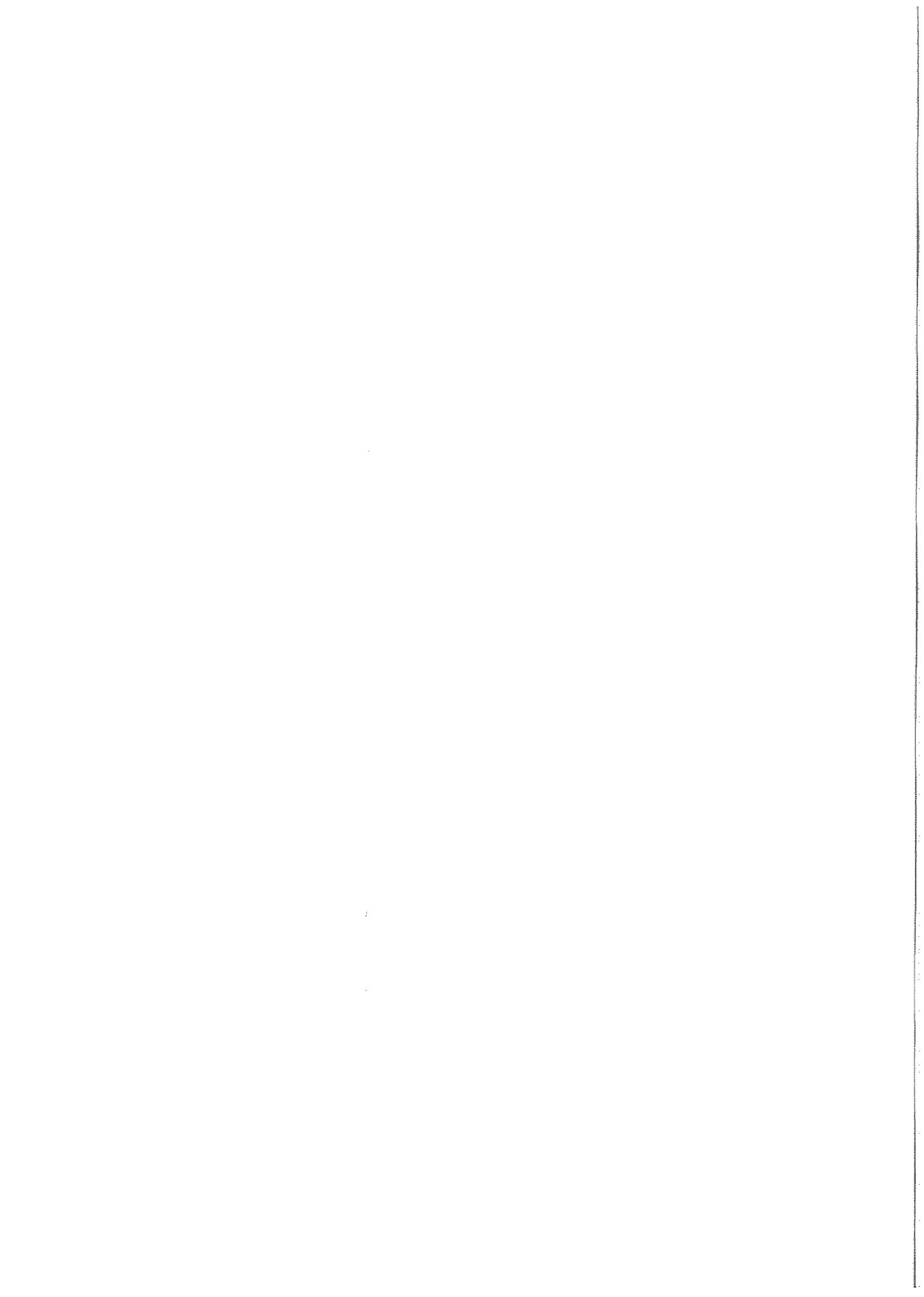
The main species of the flood plain are tall grasses and rushes

| | |
|------------------------------|-----------------------|
| <u>Carex acuta</u> | (Tufted Sedge) |
| <u>Deschampsia cespitosa</u> | (Tufted Hair-grass) |
| <u>Juncus effusus</u> | (Soft Rush) |
| <u>Juncus acutiflorus</u> | (Sharp-flowered Rush) |
| <u>Molinia coerulea</u> | (Purple Moor-grass) |
| <u>Phalaris arundinacea</u> | (Reed-grass) |

which form a very dense stand of vegetation, often difficult to walk through in late summer and autumn. In addition there is a good quantity of Agrostis stolonifera (Creeping Bent) and A. capillaris (Common Bent Grass) with Poa spp (Meadow Grasses) on the grassy banks of the river. The numerous dicotyledonous herbs include Caltha palustris (Marsh Marigold), Galium palustre (Marsh Bedstraw), Myosotis spp (Forget-me-not), Potentilla palustris (Marsh Cinquefoil), Ranunculus acris (Meadow Buttercup) and R. repens (Creeping Buttercup), and several of those species listed in the list for the Lagg (POST 12).

The dark green area to the north is a region which is mown for its rushes Juncus effusus in late summer when water levels permit. The Juncus stems make useful bedding for cattle and other animals and the area that is cut tends to form a reasonable summer pasture for sheep and ponies. You may like to make careful lists and make quadrat recordings to compare the vegetation in the cut and uncut areas.

From here go back over the bridge to POST 6 to examine the lower part of the West Bog.



POST 6 - The Lower Rand

We are going to look at the rand on the West Bog since it is much better developed here than on the South-east Bog where it has been destroyed or modified by peat-cuttings. From POST 6 you can see that the edge of the bog slopes quite steeply, at about three degrees. This area is well-drained and dissected by numerous drainage channels. These result from rain water falling on the top of the bog and running off to lower levels, since it cannot readily be absorbed by the bog when it is already completely water-logged.

The vegetation of the lower part of the rand is completely dominated by Molinia caerulea (Purple Moor-grass) which forms extensive hummocks and turns a creamy white colour during winter, it being one of the few deciduous-leaved perennial grasses. It is a characteristic species of slopes with partially impeded drainage and it cannot survive in stagnant water: hence its abundance on some of the steeper-sided upland hills, and in some of the peat cuttings where limited drainage has been artificially induced.

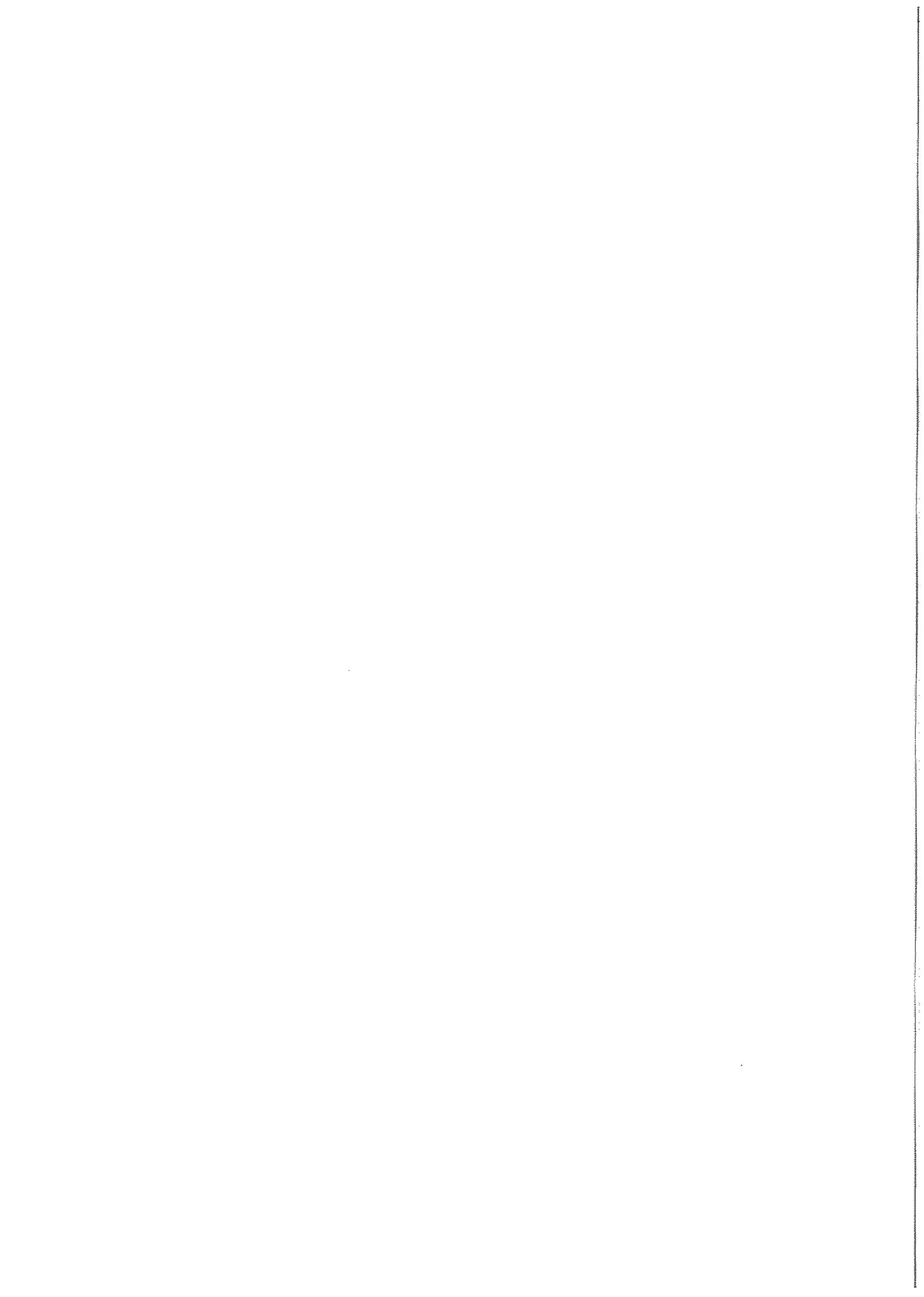
Mixed in with Molinia one can find:

| | |
|---------------------------------|-------------------------|
| <u>Calluna vulgaris</u> | (Heather) |
| <u>Eriophorum angustifolium</u> | (Common Cotton-grass) |
| <u>Potentilla erecta</u> | (Common Tormentil) |
| <u>Vaccinium myrtillus</u> | (Bilberry/Whortleberry) |
| <u>Vaccinium vitis-idaea</u> | (Cowberry) |

The last species is close to its most southerly limit in Britain and, on the whole, looks rather sickly, especially at this point. However, it does appear to be more vigorous and healthy in another site on the West Bog, where it has formed hybrids with V. myrtillus.

The Calluna occurs mainly along the edge of the drainage channels and appears as distinct black stripes on aerial photographs.

From here you can see that the bog lies in the bottom of a wide valley surrounded by high hills. This results in some very low temperatures on clear anticyclonic nights. One can expect several readings below -10°C each winter, and frost have been recorded in all months of the year. Daytime temperatures are lower than might be expected since the wet surface of the bog acts like a 'wet bulb' thermometer. On most summer days there is either a cool wind blowing down from the mountains or a cool sea breeze penetrating inland from Cardigan Bay.



POST 7 - Middle & Upper Rand

The middle rand is almost entirely dominated by Molinia caerulea but where the drainage channels run down the rand to the flood plain one finds Sphagnum with Rhynchospora alba (White Beak-sedge), Erica tetralix (Cross-leaved Heath) and the two cotton-grasses Eriophorum angustifolium and E. vaginatum occurring between the Molinia tussocks, with Calluna vulgaris growing on the tops of the channel banks.

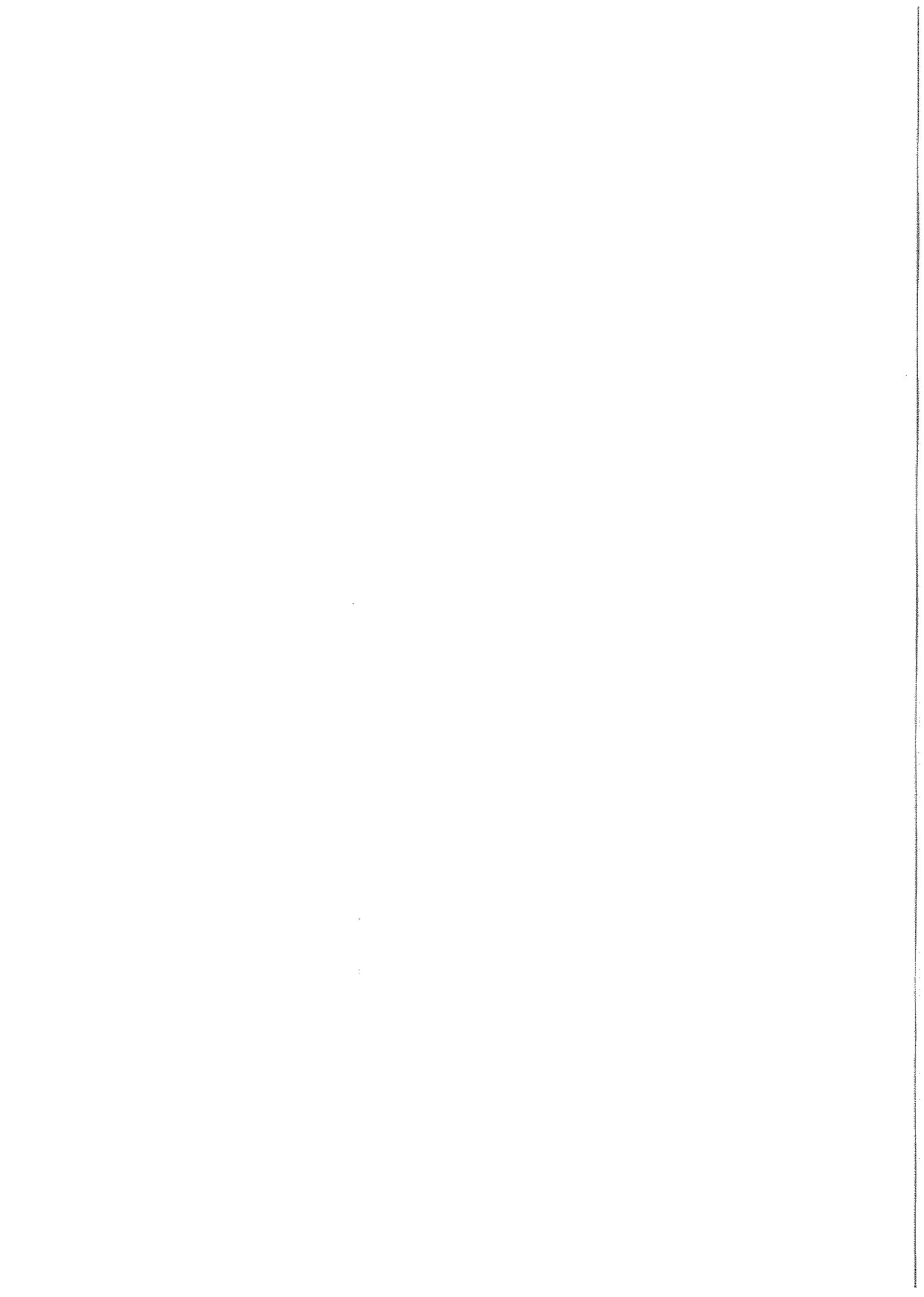
The upper part of the rand gradually merges into the Sphagnetum (POST 8) in which the following become more abundant

| | |
|--------------------------------|-----------------------|
| <u>Narthecium ossifragum</u> | (Bog Asphodel) |
| <u>Andromeda polifolia</u> | (Bog Rosemary) |
| <u>Drosera rotundifolia</u> | (Round-leaved Sundew) |
| <u>Trichophorum cespitosum</u> | (Deer Grass) |

and the Sphagnum species, S. cuspidatum and S. tenellum, S. papillosum and the three lichens:

Cladonia crispata
Cladonia impexa
Cladonia uncialis

From this post you have a good view of the surrounding farmland which consists of permanent and semi-permanent pasture below about 300 m and semi-natural hill pasture above 300 m. The soil and land is unsuitable for the growth of corn crops and few root crops are grown apart from turnips which are used as winter feed for cattle and sheep. Much of the nearby hill land has been afforested, although there is not much evidence of this on the hills adjacent to Cors Caron. A few miles away are the first of many reservoirs, the first series, the Teifi Pools, being for local usage, but only a few miles further away are the Elan, Claerwen and Craig Goch Reservoirs, and Llyn Brianne which was built a few years ago in the upper Towy valley.



POST 8 - The Sphagnetum

The area around the post and for a short distance towards the centre of the West Bog was termed the Sphagnetum by Godwin and Conway (1939). A similar area has not been found on the South-east Bog so please examine this area before returning back across the Teifi (all the other associations of the West Bog can be found on the South-east Bog). The main characteristic of the Sphagnetum is the abundance of the three Sphagnum species S. cuspidatum, S. papillosum and S. capillifolium together with Trichophorum cespitosum, Erica tetralix and Eriophorum vaginatum and a fair amount of Cladonia impexa, C. crispata and C. uncialis, and, in a few places, Cladonia arbuscula. Two further species of Sphagnum may be seen, S. pulchrum and S. tenellum, but they are rather uncommon by POST 8.

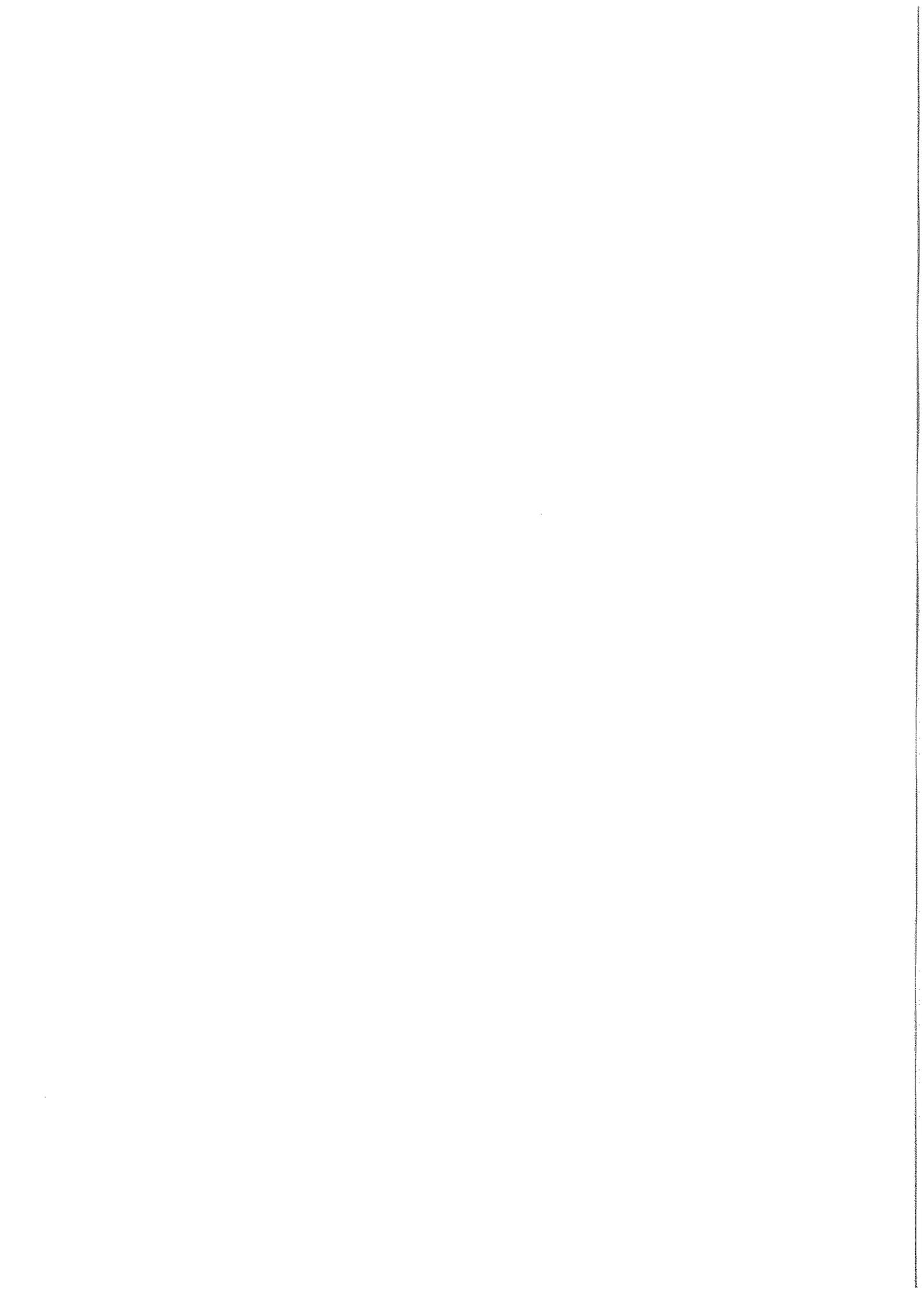
At this point, you may be able to find Empetrum nigrum (Crowberry), Vaccinium oxycoccus (Cranberry), Andromeda polifolia (Bog Rosemary), some Narthecium ossifragum (Bog Asphodel), and Drosera spp (Sundew).

You may be tempted to extend your visit to the West Bog, but please do not go beyond POST 8: there is no pathway across the West Bog (the track passing POST 8 extends only a short distance further across the bog). The surface of the Sphagnetum is extremely sensitive to trampling and there are many hidden dangers for those who do not have a warden accompanying them.

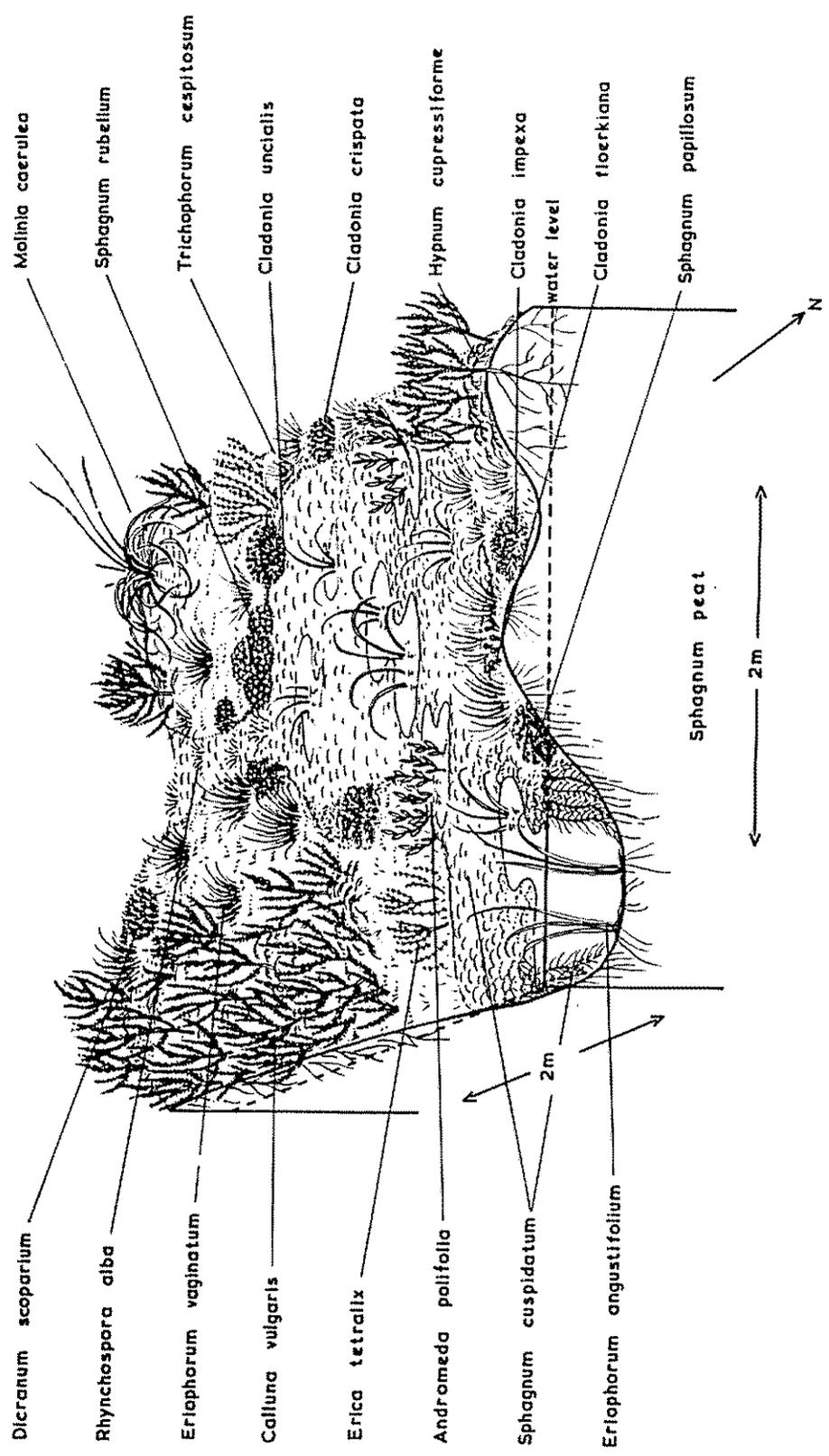
Rand Study Area

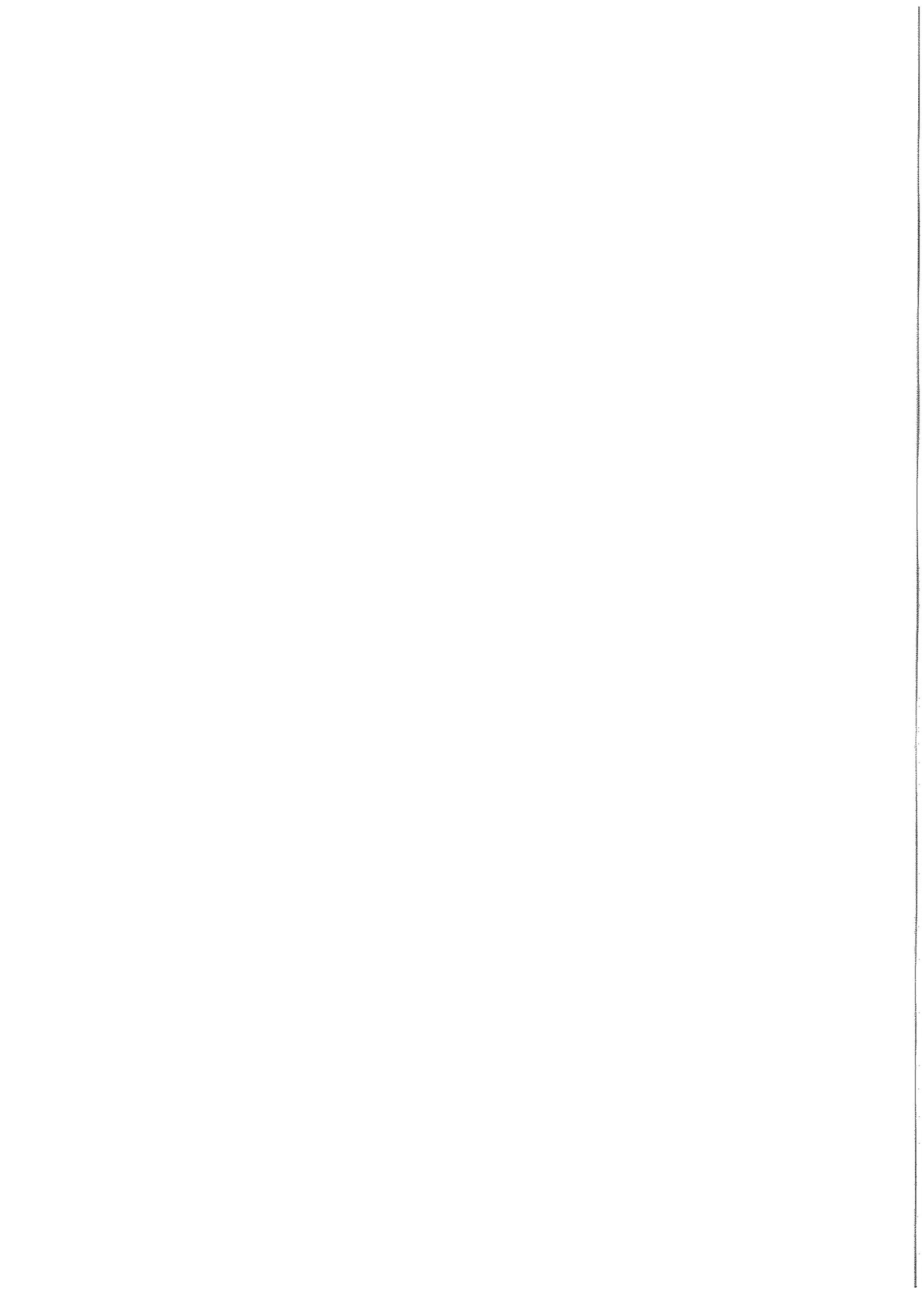
For those who wish to carry out transect and quadrat work, an area just downstream (south) of POST 8 has been set aside to provide a good example of a representative area from the river through flood plain and the various parts of the rand to the Sphagnetum. If you carry out a line transect you may like to compare your results with those of Godwin and Conway (Journal of Ecology 1939, Volume 27, Page 325). In reading this paper remember that it was based on records made during July no less than 45 years ago: so you might expect to find some changes in the distribution of the various species. The main changes that have taken place since the late 1930's are the ending of peat-cutting, elimination of frequent burning since the closure of the railway, some slight changes in the climate and, last but not least, a large increase in the number of educational groups visiting Cors Caron.

Please return over the Afon Teifi to the South-east Bog and retrace your steps along the path until you arrive at the sharp right-hand bend. Here you will see a post pointing to POST 9 which takes you on to the main raised part of the South-east Bog. If you do not have time to complete this circuit, return to the entrance gate along the main pathway. If you wish to examine the pool and hummock area head towards POST 9.



Pool and Hummock Complex - March





POST 9 - Pool & Hummock Complex

In arriving at POST 9 you will realise that you have not reached the highest point of the South-east Bog. However, we would ask you not to proceed any further towards the centre and can assure you that there is very little change in vegetation from here onwards. You will probably notice damage to the surface vegetation which has resulted from student use. As the vegetation is very sensitive, please leave the boardwalk only when it is essential to do so. The pool and hummock at POST 9 can be regarded as being typical. From October to May it will certainly be full of water, but during the summer months the water table will fall and there may be just a green carpet of Sphagnum cuspidatum lining the pools. In the severe drought of 1976 most of the pools completely dried out.

The plants of the pools and hummock complex are illustrated on the opposite page. The present illustration was made in March 1977 to indicate what you might expect to find in the winter and early spring. The pool and hummock complex was explained in detail by Godwin and Conway (1939) and their illustrations have found their way into many recent textbooks. You will find that the pool and hummock complex of the South-east Bog is not quite the same as the one described by Godwin and Conway, which was based on the pool and hummocks of the main West Bog. Recent work has shown that each of the three bogs has its own variants of this association.

Most of the species of the pool and hummock complex, as in the case of the other raised bog associations, are perennials, and the only species that you will probably find that is not included in the March illustration is Drosera rotundifolia (Round-leaved Sundew). The pools are rarely circular in outline: in most cases they are branched and sinuous with active Sphagnum growth in their bottoms (S. cuspidatum) and margins (S. papillosum), and no growth on top of the hummock which is dominated by Calluna vulgaris and several species of Cladonia, including C. coccifera, C. floerkiana, C. impexa and C. crispata.

The theory of peat bog growth commonly known as the cyclic regeneration theory was formulated in Sweden by Von Post and Sernander in 1910 and elaborated by Osvald from 1923 onwards. Godwin and Conway agreed with this theory where pools were gradually infilled by the growth of Sphagnum mosses which eventually became dry enough to support the growth of the drier hummock species such as Calluna vulgaris, and formed hummocks. The adjacent hummocks then became the base of future pools as the developing adjacent pools gradually overtop the original hummocks. Barber (1978) questioned this theory by palaeoecological methods, and he demonstrated a distinct link between peat stratigraphy and climatic change. In the absence of any evidence for an autogenic cycle of hummocks and hollows and with the clear demonstration of climatic control over the relative areas of pools and drier surfaces the 'Osvald Theory' was rejected. Barber proposed a new theory, the Phasic Theory. This states that bog growth occurs in phases closely related to climatic variations, and recognises the importance of phase-shifts to a wetter bog surface which initiate changes in vegetation and peat stratigraphy.

If you wish to obtain a good peat core of four or more metres you do not require special permission provided that you take it in the adjacent study area, or in the rather firmer area indicated by POST 10 which is reached by proceeding further along the boardwalk. If you take a core but do not wish to take it away with you, carefully collect the peat and replace it in the core hole afterwards.

POST 10 - Trichophoretum

The Trichophoretum (=Scirpetum) occurs in the area between the rand and the main central dome of the raised bog. It is reasonably firm to walk on and the height of the vegetation rarely exceeds 30 cm. The Deergass (Trichophorum cespitosum) is the dominant species forming dense tussocks and flowering in April. The following are all common

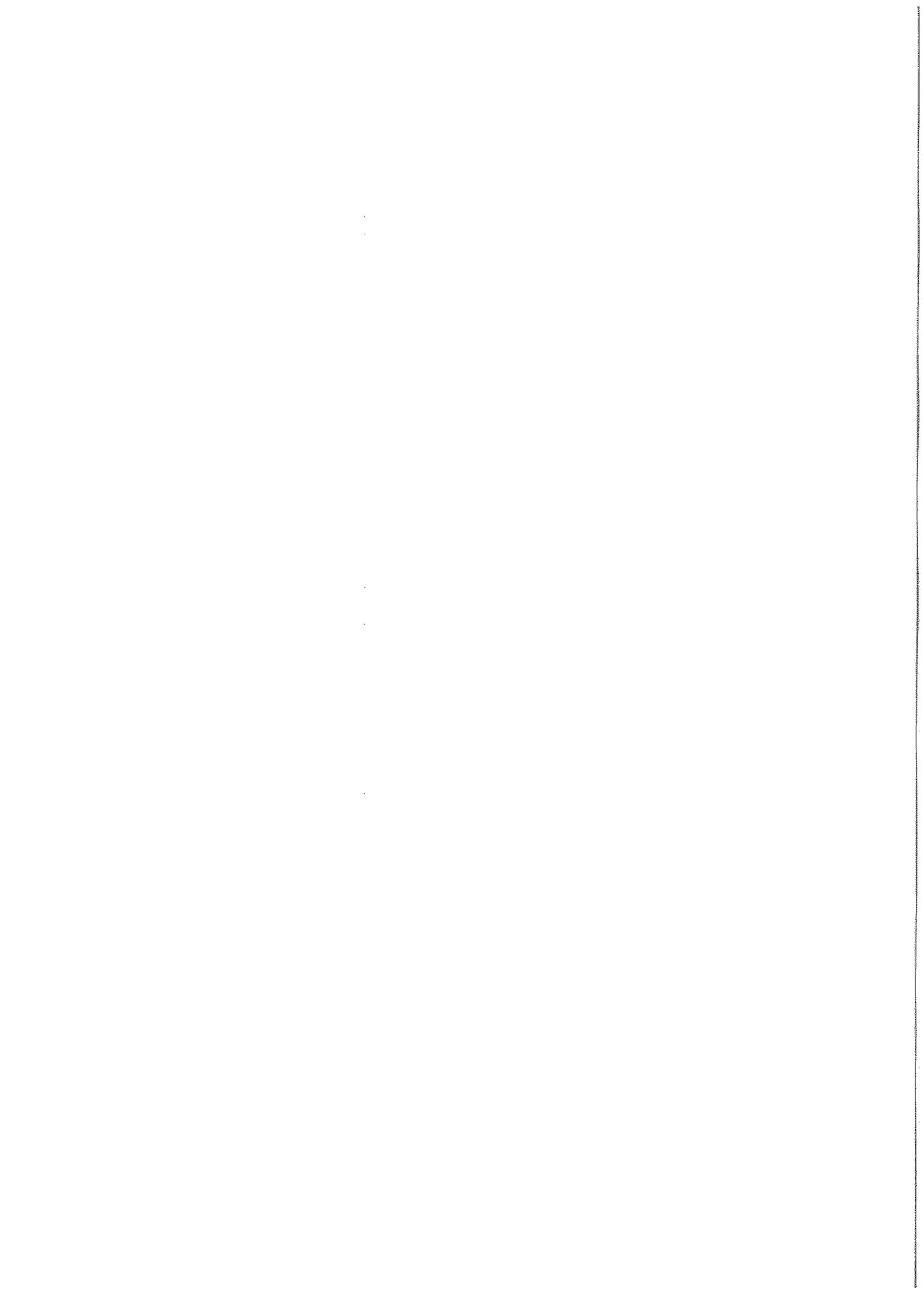
| | |
|------------------------------|-------------------------------|
| <u>Cladonia impexa</u> | |
| <u>Erica tetralix</u> | (Cross-leaved Heath) |
| <u>Eriophorum vaginatum</u> | (Cotton-grass or Hare's tail) |
| <u>Narthecium ossifragum</u> | (Bog Asphodel) |
| <u>Sphagnum cuspidatum</u> | |
| <u>Sphagnum tenellum</u> | |

while the following are frequent, but confined to either the drier or moister parts of the association:

| | |
|---------------------------------|-----------------------|
| <u>Andromeda polifolia</u> | (Bog Rosemary) |
| <u>Calluna vulgaris</u> | (Heather) |
| <u>Cladonia uncialis</u> | |
| <u>C. crispata</u> | |
| <u>C. coccifera</u> | |
| <u>C. floerkiana</u> | |
| <u>Eriophorum angustifolium</u> | (Common Cotton-grass) |
| <u>Molinia coerulea</u> | (Purple Moor-grass) |
| <u>Polytrichum alpestre</u> | |
| <u>potentilla erecta</u> | (Tormentil) |
| <u>Sphagnum papillosum</u> | |
| <u>Sphagnum capillifolium</u> | |

The Calluna appears to be very slow-growing in this area, although in the absence of burning it could become a serious invader species converting some fo the Trichophoretum into a Callunetum.

The pH of the peat in this region is between 3.5 and 4.6 and the nutrient status is very low since the only input of nutrients comes from rainfall (annual rainfall is about (56 in/1400 mm)). Wind borne nutrients, are few, although high levels of pollutant from the industrial midlands are carried into the area during periods of easterly winds. The pH of rain is usually between 4.6 and 5.7 except during periods of winds from between north and south-east when the pH may be as low as 3.5. Conductivity valves can be as low as 8 μ s with south westerly winds; but may exceed 100 μ s with strong north-west winds bringing in salt-spray from Cardigan Bay or with south-easterly winds carrying in SO₂, NO₂, NO₃ and Cl from industrial areas. Occasional burning can be beneficial since this realeases some nutrients locked up in the older plant remains, but this bruning must be carefully controlled so that it is slight with only the older stems being burnt. A prolonged fire can do serious damage by actually burning the surface and sub-surface peat and destroying all seeds and spores, the only plants surviving being those with deep underground rhizomes.

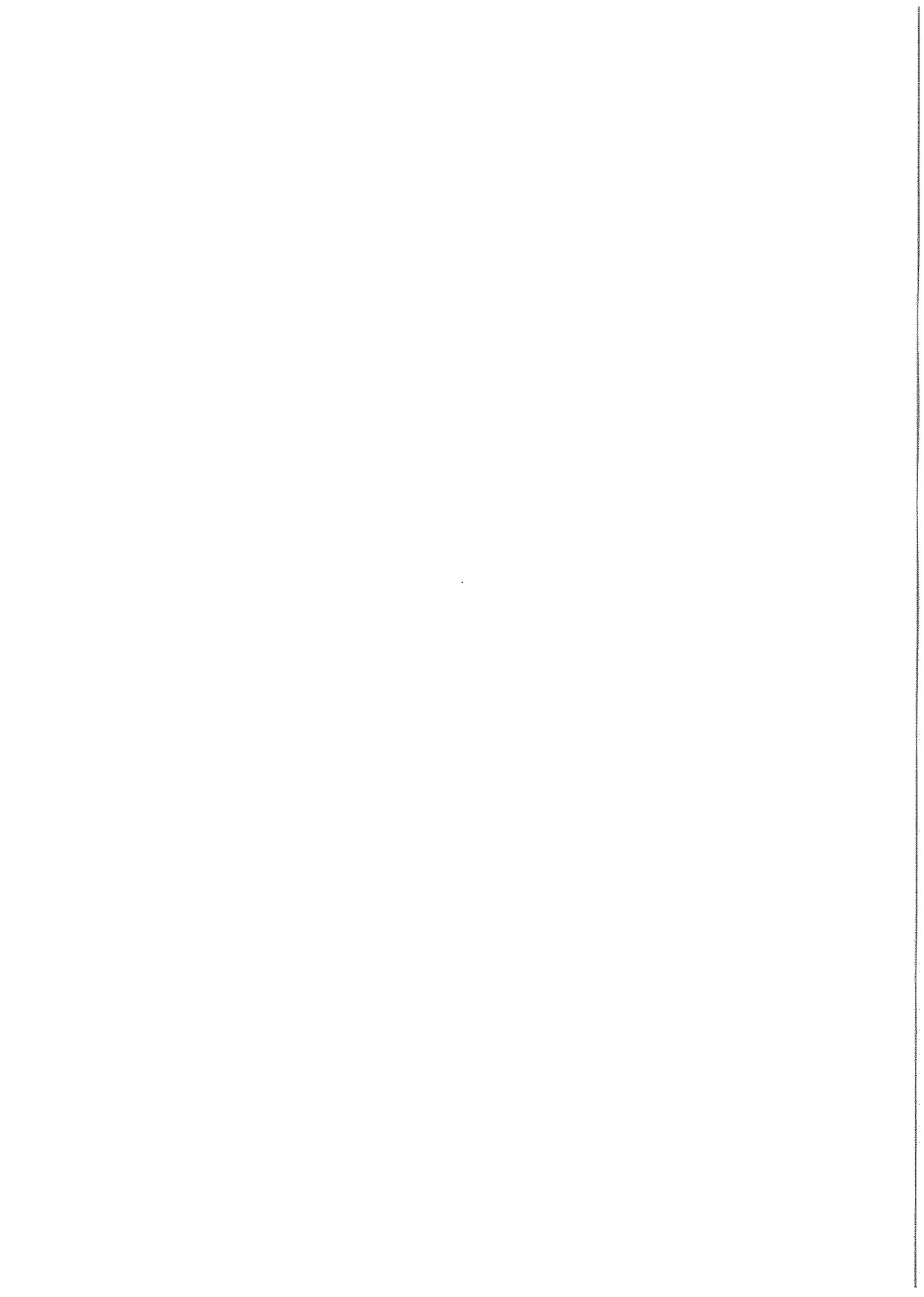


POST 11 - Callunetum

This is a "species-poor" association dominated by Calluna vulgaris which occurs on the drier, well-drained parts of the raised bog, particularly above the rand and on the tops of banks left by peat-cutting activities. The Calluna can be very dense in places and forms bushes up to about 1.5 m high, but this luxuriant growth is mainly limited to the old peat-cutting banks. In most other parts of the bog the Calluna is about 25 cm high and often shows considerable die-back. The reasons for this poor growth are probably the fairly recent burning and the fact that Calluna does not thrive in wet hollows.

Species found in the Callunetum include Eriophorum vaginatum and Trichophorum cespitosum together with several species of Cladonia, (C. impexa, C. crispata and C. floerkiana) and, where Calluna is high, several mosses such as Hypnum cupressiforme, Dicranum scoparium, Pleurozium schreberi and one or more species of Polytrichum. One odd feature is the lack of lichens actually growing on the older bushes of Calluna. One may occasionally find plants near old birch or rowan trees covered with specimens of Hypogymnia physodes, but rarely any other species: a marked contrast to the rich lichen coverage of Calluna plants on the surrounding hill sides. Past burning of the Bog may possibly be one of the factors involved in the absence of more epiphytic lichens.

The area of Callunetum at POST 11 is not quite the best stand on the South-east Bog; in fact the area just to the east of the old boundary fence is somewhat better and you may use this area for any investigations. Once you have examined this site, return to the main pathway and to the entrance gate, from where you can go back to the main road or continue your studies along supplementary routes to POSTS 12, 13, 14 and 15 which form parts of the "species-rich" Lagg communities.



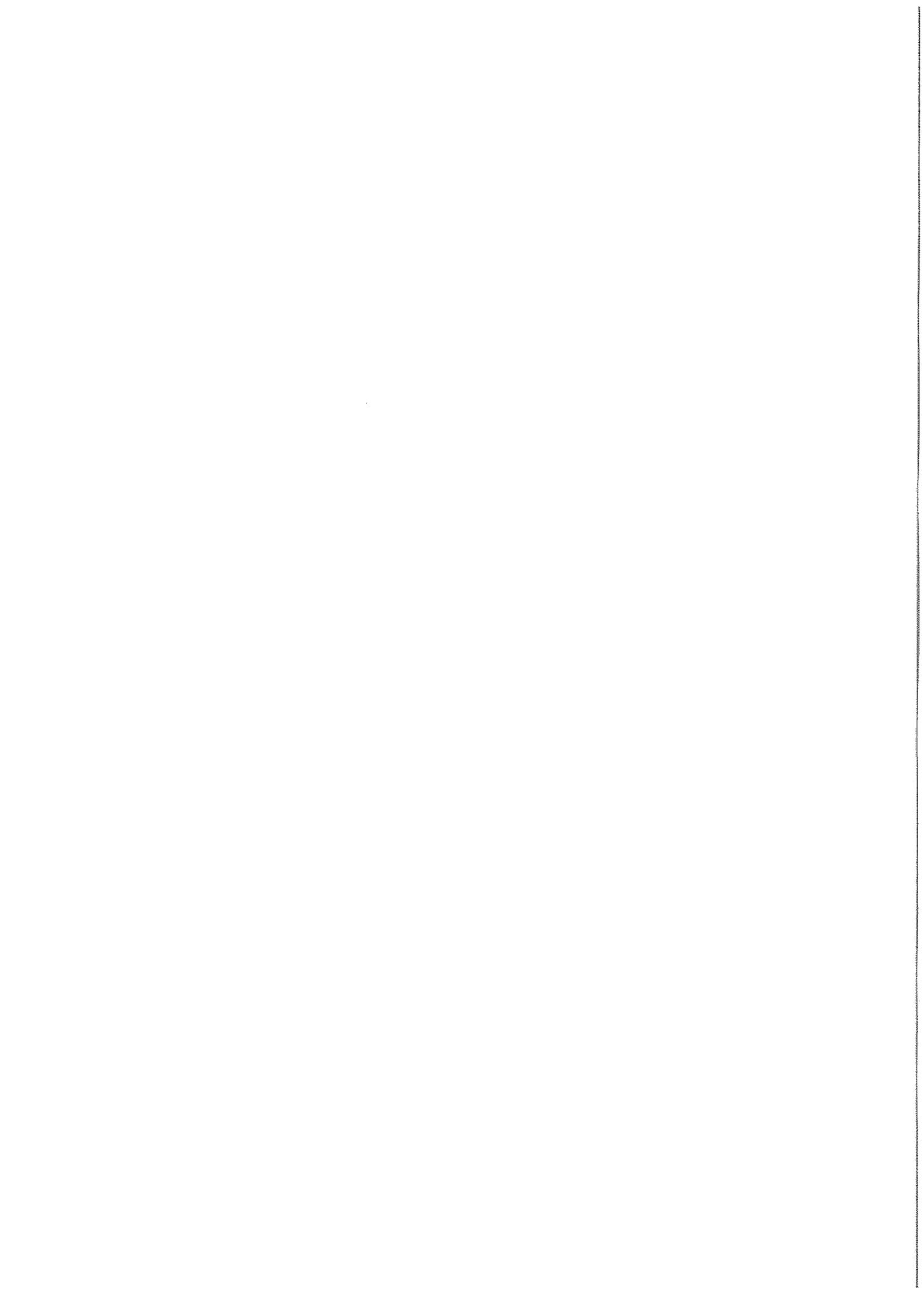
POST 12 - The Lagg

The Lagg is the outermost region of the raised bog where the vegetation is usually species-rich and lush as a result of nutrient-rich water draining off the surrounding hills into the marginal regions of the bog. The transition from peat-cutting pools to species-rich Lagg is well seen as one arrives back at the main entrance gate, although the best Lagg areas are to the north-east of POST 15 and the south-east sector of POST 14. The Lagg is the first area to become green in early spring when the main grasses and large tap-rooted plants begin to grow several weeks ahead of those on the main part of the raised bog. At POST 12 a stream enters the South-east Bog, from the eastern hill side. Take care here as the ground can be very soft off the boardwalk, especially after prolonged rainfall. The species list is a long one, the main constituents being

| | |
|------------------------------|------------------------------|
| <u>Angelica sylvestris</u> | (Wild Angelica) |
| <u>Caltha palustris</u> | (Marsh Marigold/Kingcup) |
| <u>Cardamine pratensis</u> | (Lady's Smock/Cuckoo Flower) |
| <u>Carex curta</u> | (White Sedge) |
| <u>Carex echinata</u> | (Star Sedge) |
| <u>Carex pulicaris</u> | (Flea Sedge) |
| <u>Carex panicea</u> | (Carnation Grass) |
| <u>Cirsium palustre</u> | (Marsh Thistle) |
| <u>Filipendula ulmaria</u> | (Meadow-sweet) |
| <u>Galium palustre</u> | (Lesser Marsh Bedstraw) |
| <u>Juncus acutiflorus</u> | (Sharp-flowered Rush) |
| <u>Lotus uliginosus</u> | (Large Birdsfoot-trefoil) |
| <u>Mentha aquatica</u> | (Water Mint) |
| <u>Narthecium ossifragum</u> | (Bog Asphodel) |
| <u>Myosotis secunda</u> | (Water Forget-me-not) |
| <u>Pedicularis sylvatica</u> | (Lousewort) |
| <u>Pedicularis palustris</u> | (Marsh Lousewort) |
| <u>Potentilla palustris</u> | (Marsh Cinquefoil) |
| <u>Oenanthe crocata</u> | (Hemlock Water Dropwort) |
| <u>Scutellaria minor</u> | (Lesser Skullcap) |
| <u>Succisa pratensis</u> | (Devil's-bit Scabious) |
| <u>Veronica scutellata</u> | (Marsh Speedwell) |
| <u>Viola palustris</u> | (Marsh Violet) |

and many more.

Please follow the path along the old railway line as far as the gate if you wish to go along the supplementary route to see Fen Carr and the best examples of recolonisation of old peat-cuttings.



POST 13 - Lagg: A Mixed Shrub Association

Here we have a good example of a mixed shrub association at the edge of the Lagg, with hawthorns, roses and willows at the extreme edge of the railway, a dense thicket of Prunus spinosa (Blackthorn/Sloe), mixed with Lonicera periclymenum (Honeysuckle) and three species of Rubus spp (Blackberry) to the bog side of the pathway and, finally, a small area of willow and birch carr at the edge of the peat-cuttings. This shrub association was probably far more common many years ago, but is now restricted to just a few sites, as at POST 13. In some ways it is surprising that this area has survived so near the railway, but it must have escaped fire damage over many years since the thick coverage of lichens on the stems of the Blackthorn suggest that conditions have been stable here for many decades. The main shrubby or fruticose lichens are

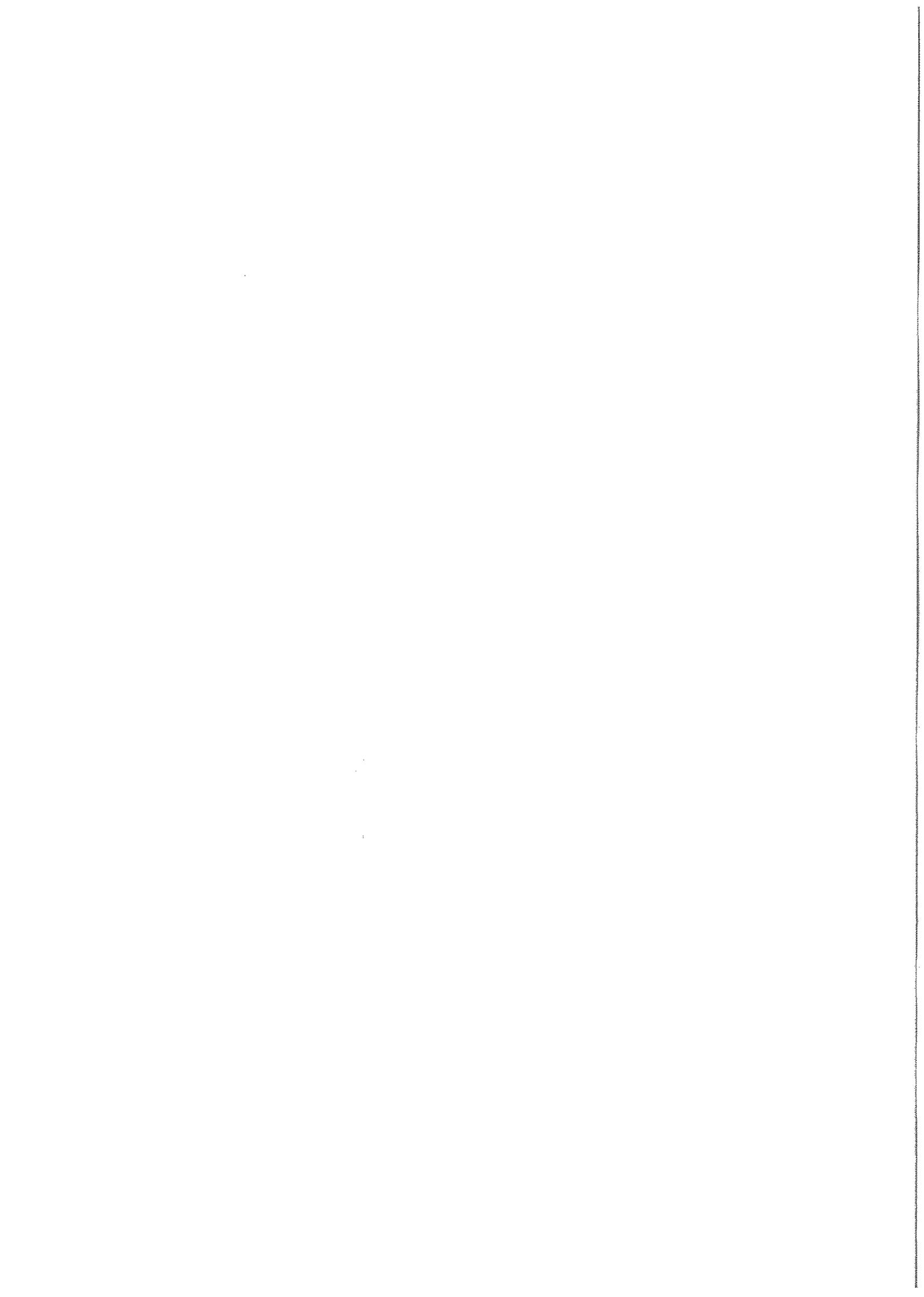
| | |
|---------------------------|--|
| <u>Evernia prunastri</u> | (strap-shaped with white undersides) |
| <u>Ramalina farinacea</u> | (narrow straps, green on both sides with marginal soridia) |
| <u>Usnea florida</u> | (filamentous with large apothecial discs) |
| <u>Usnea subfloridana</u> | (long, filamentous, occasionally with small apothecia) |

while the following foliose species are common

| | |
|----------------------------|--|
| <u>Hypogymnia physodes</u> | (hollow, with no rhizinae on main part of underside) |
| <u>Parmelia glabratula</u> | (small green-brown lobes near tips of shoots) |
| <u>Parmelia sulcata</u> | (lobes solid on main stem with elongate laminal soredia) |
| <u>Parmelia saxatilis</u> | (mainly on trunks and covered with isidia) |

and several crustose lichens belonging to Lecidea and Lecanora.

From POST 13 a few metres further south and then bear right on to the boardwalk thence to an old causeway as far as POST 14.



POST 14 - Recolonisation of old Peat Cuttings

POST 14 is about half way along the causeway, but you may go a short distance further if you wish to. From POST 14 you can readily see that the South-east Bog is dome-shaped and see the contrast, at least from October to May, of the whiter areas of the old peat-cuttings, which are dominated by Molinia and the uncut parts of the central region, which are dominated by Calluna.

The old peat-cutting on the north-east side of the causeway is in a state of active growth with the following dominant species

Erica tetralix
Rhynchospora alba
Sphagnum papillosum
Narthecium ossifragum

Eriophorum angustifolium
Sphagnum cuspidatum
Cladonia impexa
Eriophorum vaginatum

and with Molinia and Calluna invading the 'drier' islands. If you wish to study the recolonisation in detail you may do so: most of the surface is reasonably firm.

The old peat-cutting on the south side of the causeway is rather more diverse and, at the end near the railway line, shows an ecotonal region as it joins the Lagg. Please note that this area is not firm to walk on and that the part of the cutting nearest the railway is extremely dangerous as one can sink to well above wellinton-top level in some of the hollows between the Molinia tussocks. This cutting is rather more advanced in recolonisation than the north side one. Both Calluna and Molinia are rather more extensive in distribution and there is even a rhododendron seedling. The mosses are particularly good here with at least seven species of Sphagnum (S. cuspidatum, S. fimbriatum, S. palustre, S. papillosum, S. plumulosum, S. recurvum and S. capillifolium) and there are also:

Aulacomium palustre
Dicranum scoparium
Polytrichum commune

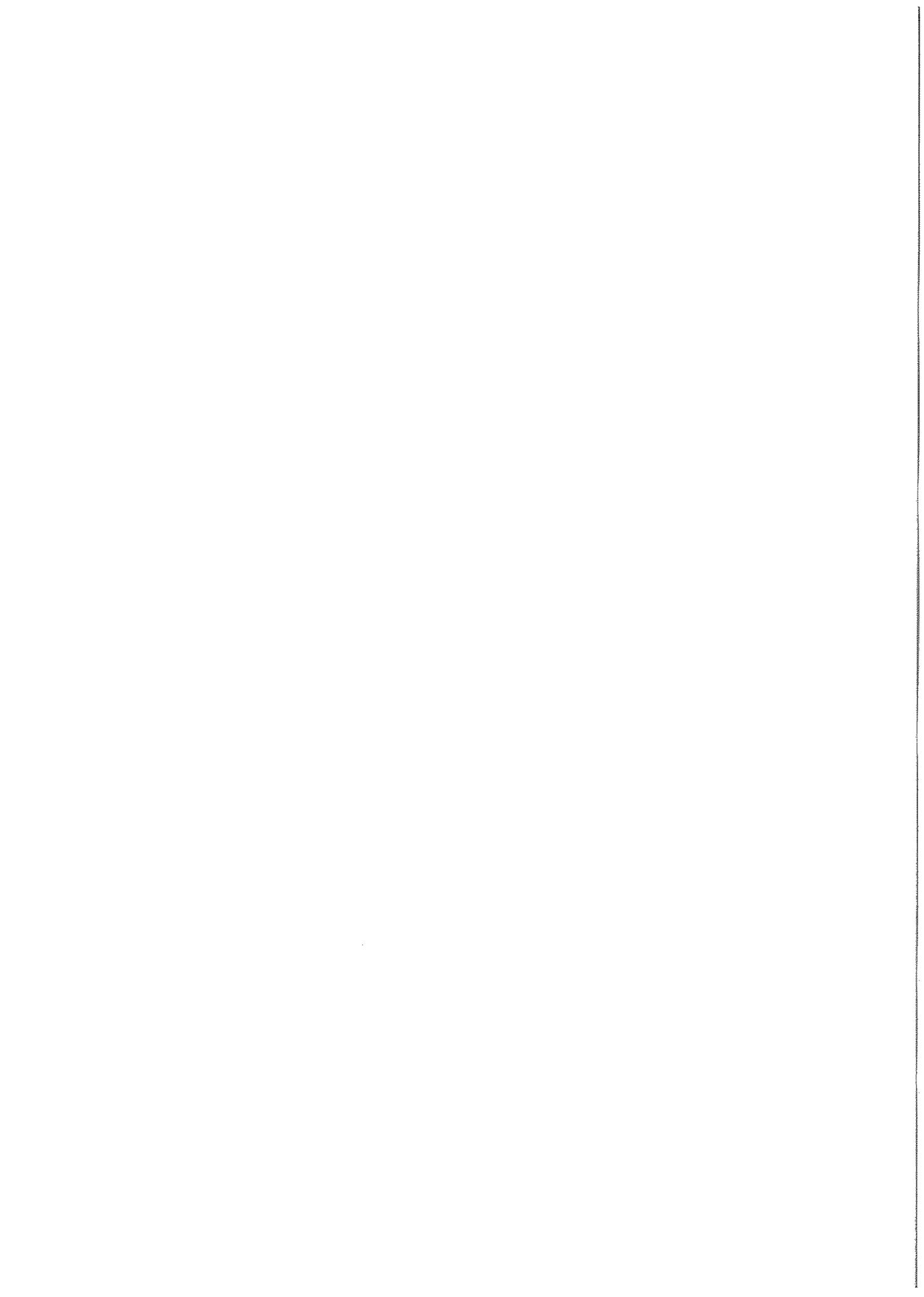
Dicranum bonjeanii
Pleurozium schreberi

You will also find several aquatic angiosperms which you may not have seen before:

Callitriche stagnalis
Lemna minor
Ranunculus omiophyllus

(Starwort)
(Duckweed)
(Lenormand's Water Crowfoot)

After investigating this area, please retrace your steps to the firebeater stand, from where you may go on to POST 15 (Willow Carr) or back across the field to the parking place.



POST 15 - Willow Carr

This is a good example of willow carr in which the water table is above ground level from the late autumn to early spring and in which there are very soft areas throughout the year: so beware of treading on any bright green patches of vegetation. This is only a small sample of willow carr, but it is much more species-rich than the more extensive willow carrs at the northern end of Cors Caron. This richness is the result of several streams bringing down mineral-rich water from the eastern hillside. The main tree species is Salix cinerea but there are some birches Betula pubescens, especially at the edge of the carr and, if looked for, a few Alnus glutinosa (Alder) and Sorbus aucuparia (Rowan). The herbaceous layer consists of most of these species listed under POST 12 and also:

| | |
|-----------------------------------|---------------------|
| <u>Callitriche platycarpa</u> | (Water Starwort) |
| <u>Carex nigra</u> | (Common Sedge) |
| <u>Equisetum fluviatile</u> | (Water Horsetail) |
| <u>Iris pseudacorus</u> | (Yellow Flag) |
| <u>Juncus effusus</u> | (Soft Rush) |
| <u>Potamogeton polygonifolius</u> | (Bog Pondweed) |
| <u>Sparganium erectum</u> | (Branched Bur-reed) |

You will notice that the trunks and branches of the willows are thickly covered by lichens which grow well here because of the high humidity. Generally speaking, the older the willow carr, the richer the lichen flora. This area may be fairly new since it is not indicated on the older maps and although the cover of lichens is high the number of species is not as high as in some neighbouring areas. The more abundant species of lichen and moss are:

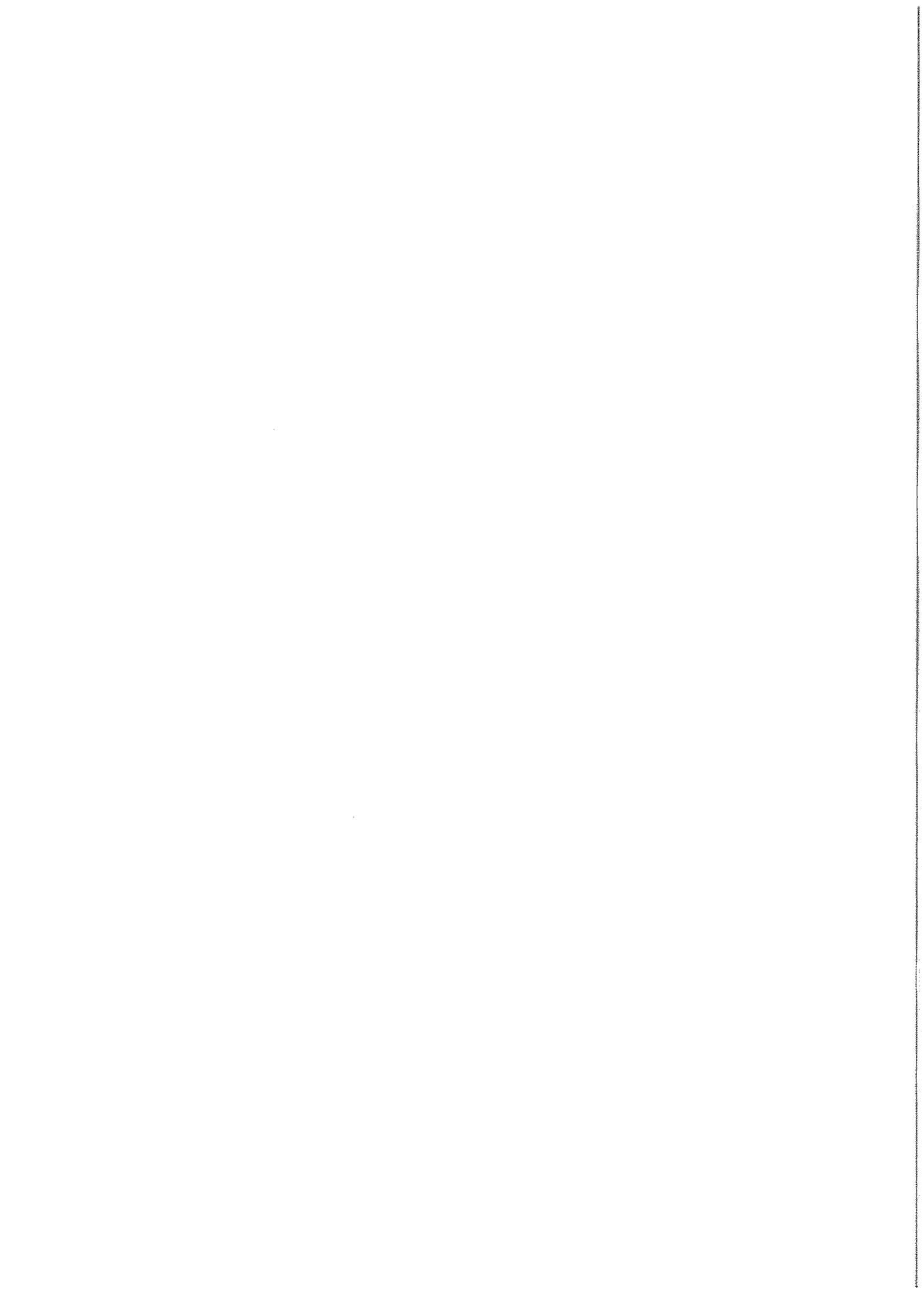
LICHENS

Cladonia coniocraea
Cladonia fimbriata
Cladonia impexa
Cladonia squamosa
Evernia prunastri
Hypogymnia physodes
Lecidea limitata
Parmelia caperata
Parmelia glabratula
Parmelia saxatilis
Parmelia sulcata
Peltigera horizontalis
Peltigera polydactyla
Usnea florida
Usnea subfloridana

MOSSES

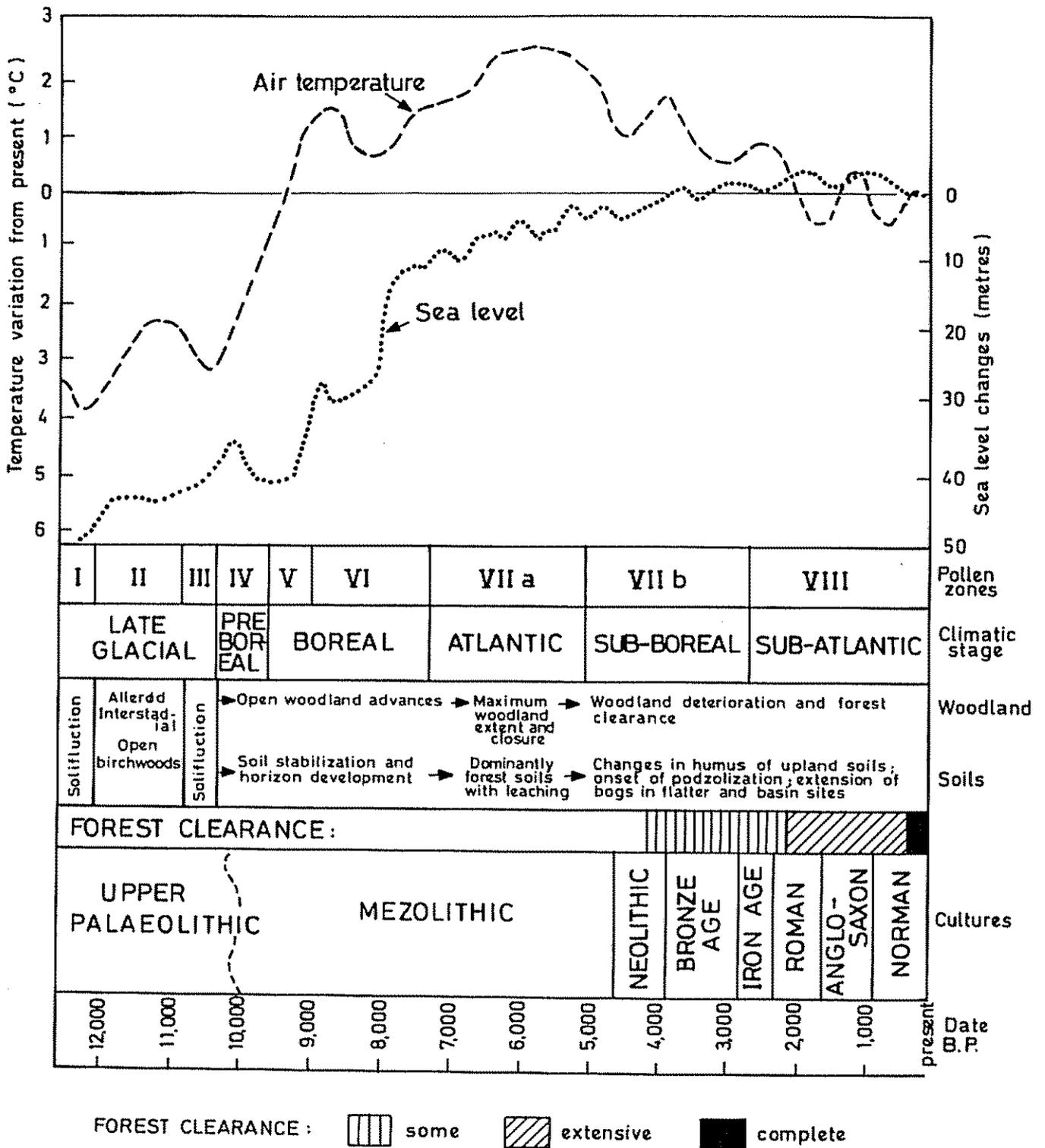
Acrocladium cuspidatum
Aulacomnium palustre
Dicranum bonjeanii
Dicranum scoparium
Eurhynchium praelongum
Hypnum cupressiforme
Isothecium myosuroides
Mnium hornum
Mnium punctatum
Pseudoscleropodium purum
Rhytidiadelphus squarrosus
Sphagnum recurvum
Thuidium tamariscinum

You may go a short distance beyond POST 15 to investigate the carr vegetation, but take care of the very wet areas. Return to the main entrance via the outward route, by which time you will have completed the full educational trail. We trust that you have had a successful and rewarding visit to Cors Caron.

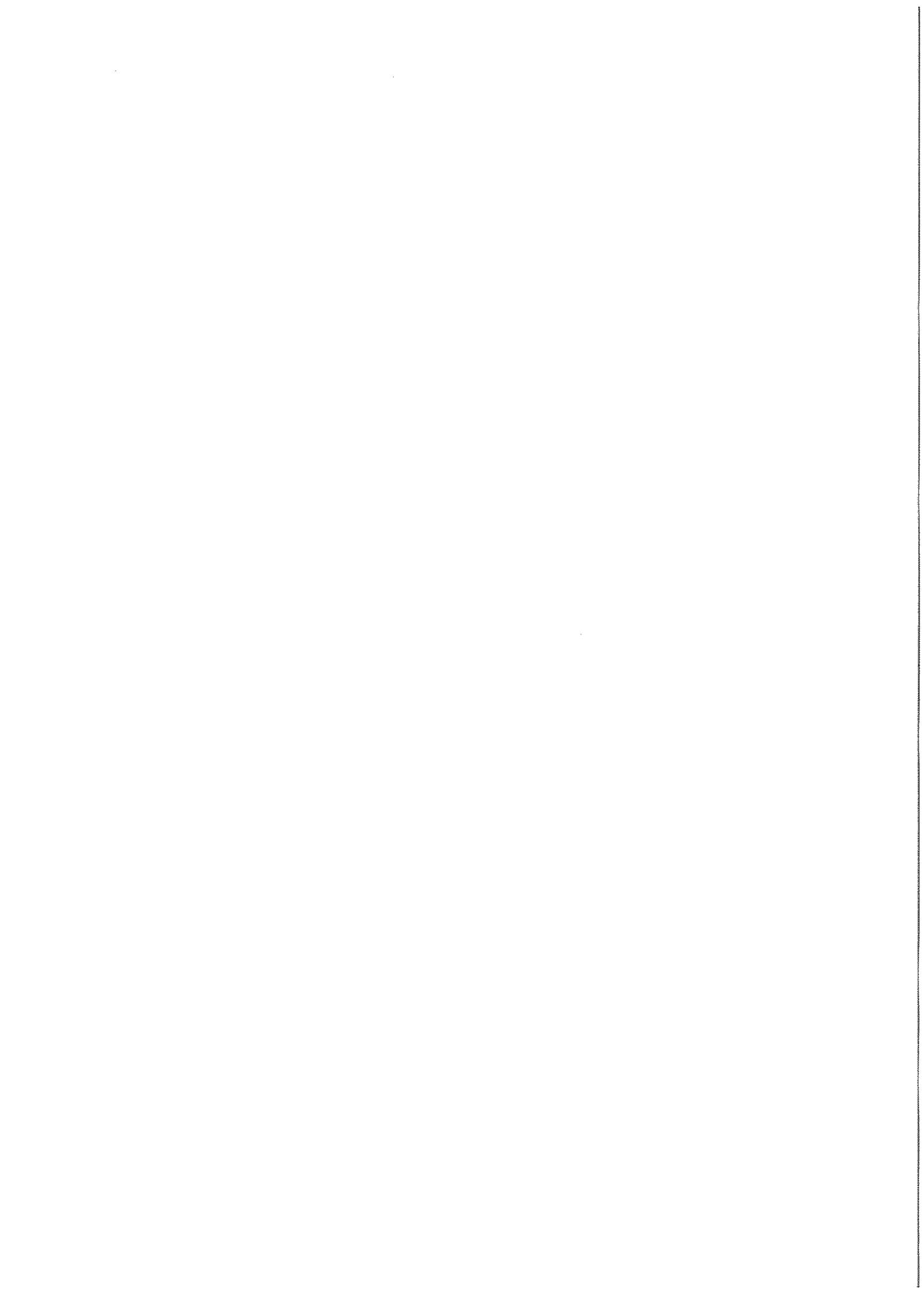


APPENDIX 1

Summary of the main changes in climate and vegetation in Wales since the end of the Devensian glaciation. From various sources.



Summary of the main changes in climate and vegetation in Wales since the end of the Devensian glaciation. From various sources.



APPENDIX 2

Invertebrates

The reserve supports a wide variety of invertebrate life, many of which spend their larval stages in the aquatic environment, some of which are widely distributed and not specific in their habitat requirements, and others which are only to be found in precise and limited localities. Their movements are seasonal and few are to be seen during the winter months, but many of the large and more colourful ones may be readily observed, between spring and autumn depending on weather conditions on the day of your visit.

Comparatively few butterflies breed on the bog and most commonly seen are the green veined white (Pieris napi) and the small heath (Coenonympha pamphilus). The reserve is the southernmost breeding station of the large heath (Coenonympha tullia) and this may be observed on the wing in July. On the edges of the reserve, particularly along the old railway line may be found small tortoiseshell (Aglais urticae), orange tip white (Anthocaris cardamines), gatekeeper (Maniola tithonus), grayling (Eumenis semele), red admiral (Vanessa atalanta), painted lady (Vanessa cardui), peacock (Nymphalis io), common blue (Polyommatus icarus), and the small copper (Lyceana phleas) among others.

Although most moths are nocturnal, you may be fortunate enough to encounter the spectacular Empress (Saturnia pavonia), or you may find its cocoon, occupied or empty, woven into the upper stems of heather plants. Some moths fly by day, and among these are the heath lattice (Chiasmia clathrata), and the beautiful yellow underwing (Anarta myrtilli).

The reserve is dominated by water, and it follows that many invertebrates pursue an aquatic existence for all, or part, of their lives. Most spectacular among these are the dragonflies and their smaller cousins the damselflies whose larvae are voracious predators in pools and slow moving waterways.

These include:

| | |
|---------------------------------|---------------------------|
| <u>Celopteryx splendens</u> | (Banded Agrion) |
| <u>Lestes sponsa</u> | (Green Lestes) |
| <u>Pyrrhosoma nymphula</u> | (Large Red Damselfly) |
| <u>Ishnura elegans</u> | (Common Ischnura) |
| <u>Coenagrion puella</u> | (Common Coenagrion) |
| <u>Enallagma cyathigerum</u> | (Common Blue Damselfly) |
| <u>Aeshna cyanea</u> | (Southern Aeshna) |
| <u>Cordulegaster boltonij</u> | (Golden Ringed Dragonfly) |
| <u>Libellula depressa</u> | (Broad-bodied Libellula) |
| <u>Libellula quadrimaculata</u> | (Four-spotted Libellula) |
| <u>Sympetrum striolatum</u> | (Common Sympetrum) |
| <u>Sympetrum scoticum</u> | (Black Sympetrum) |

Numerous stoneflies, caddis flies and mayflies also spend their larval stages in the water, and among these, some notable species of caddis flies have been recorded.

Also associated with the aquatic environment are those less apparent insects whose presence is more readily detected by painful or irritable bites. These include a large number of species of midge and mosquito which are often present in vast numbers from late spring until the frost of autumn.

Spiders are plentiful and so far thirty species have been identified.

Beetles are very mobile insects and many are found which are not strictly native to the reserve. However, a number of water beetles are found and the species include whirligig beetles of the genus Gyrinus, and diving beetles of the genera Dytiscus, Elmis and Limnius.

Bugs of the order Hemiptera include thirteen species.

Hymenoptera are not very common, and are most frequently found on the grassy sides of the old railway, particularly in the cuttings. So far, only four species each of Ants and Bumblebees have been recorded on the reserve.

APPENDIX 3

CHECKLIST OF BIRDS OF CORS CARON NNR

The list includes all species known to have occurred in the reserve, or very near the boundaries, up to the end of 1983. The following abbreviations and conventions are used: B - breeds; OB - occasionally breeds; HB - has bred or formerly bred; SV - summer visitor; WV - winter visitor; OV - occasional visitor; PM - passage migrant. Months of occurrence are given for seasonal species; brackets indicate irregular occurrence in that month. Population figures indicate the range of maximum numbers recorded. For species recorded five times or fewer, all dates are given.

The sequence is that of Prof Dr K H Voous, List of Recent Holarctic Bird Species, 1977.

Little Grebe (Gwyach Fach) HB Maesllyn; WV, (Aug) Sep-Mar, 5-10; OV rest of year.

Great Crested Grebe (Gwyach Fawr Gopog) OV any season, mostly Apr-Jun, singly.

Manx Shearwater (Aderyn-Dryc in Manaw) 11/9/77.

Cormorant (Mulfran) Present all seasons, up to 14.

Bittern (Aderyn y Bwn) Irregular WV, Oct-Feb, singly. Perhaps bred in 19th century.

Grey Heron (Crëyr Glas) Non-breeding visitor, all seasons.

Purple Heron (Crëyr Porffor) 17-25/5/70, 29/6/71.

White Stork (Ciconia Gwyn) 18/4/71.

Mute Swan (Alarch Dof) Resident 1970, up to 11; B 1971 and 1973-76, one pair. One 1/1/80, one 31/12/83.

Bewick's Swan (Alarch Bewick) Rather irregular WV and PM, Nov-Mar, usually under 10 but up to 58 on Mar passage.

Whooper Swan (Alarch y Gogledd) WV (Oct) Nov-Mar (Apr. once May), up to 50.

Bean Goose (Gŵydd y Llafur) 18-28/2/76.

White-fronted Goose (Gŵydd Dalcen-Wen) Greenland race: WV to 1968, Oct-Apr up to 600; scarce occasional WV since then. Siberian race: five 18/2-1/3/76.

Greylag Goose (Gŵydd Wyllt) 28/4-1/5/68, 26/2/76, 25/10/78, 26/1/79.

Canada Goose (Gŵydd Canada) Jan-Feb 1947 (up to 15). 17 introduced 1954 and few more 1956 and 1982, soon emigrated or were shot.

Barnacle Goose (Gŵydd Wyran) 13/11/65, shot, had been ringed Greenland 1963.

Shelduck (Hwyaden yr Eithin) 8/1/55, 27/1/76, 25/3/77, 29/5/77.

Wigeon (Chwiwell) WV, (Aug) Sep-Mar (Apr, twice May), up to 200 (Formerly 400?).

Gadwall (Hwyaden Lwyd) Scarce, irregular, WV and PM, seen all months except June-July, up to 9.

Teal (Corhwyaden) B, up to 20 nests; WV and PM, up to 400. American race, two 11/12/68.

Mallard (Hwyaden Wyllt) B, perhaps 50 nests; WV/PM, up to 400 (1000 earlier?).

Pintail (Hwyaden Lostfain) Scarce, irregular, WV and PM, Oct-Mar mainly Jan-Feb, few records Apr, July, Sept; up to 9.

Garganey (Hwyaden Addfain) HB, 1968; otherwise irregular PM Mar-Apr and Aug-Sep; up to 3.

Shoveler (Hwyaden Lydanbig) OB incl. 1949, 1955, prob. 1968; PM or WV, scarce, any month but mainly Apr and Sep, up to 12 (more formerly?).

Pochard (Hwyaden Bengoch) WV/PM, seen all months except June, mainly Oct-Feb, up to 12.

Tufted Duck (Hwyaden Gopog) Same as Pochard.

Eider (Hwyaden Fwythblu) 13-14/11/66, Maesllyn.

Common Scoter (Môr-Hwyaden Ddu) 17/10/70, shot.

Goldeneye (Hwyaden Lygaid-Aur) WV (Oct) Nov-Mar (Apr, once May), up to 4.

Smew (Lleian Wen) 26/1/70.

Goosander (Hwyaden Ddanheddog) Irregular WV, Nov-Mar, mainly Jan, up to 6.

Red Kite (Barcud) Seen at all seasons, but mainly winter.

Marsh Harrier (Bod y Gwerni) Recorded in 1882, Jan 1957, Aug 1959, and six records 1963-83, all May-June.

Hen Harrier (Bod Tinwen) WV and PM (Aug) Sep-Mar (Apr, once July), usually 3-4 but up to 8 seen.

Montagu's Harrier (Bod Montagu) HB, 1953, prob. other years; PM May-Sep, very irregular, none since 1970.

Goshawk (Gwalch Marth) 15/4/56, 4/1/78.

Sparrowhawk (Gwalch Glas) B, 2-3 pairs, and seen all year.

Buzzard (Bwncath) B (but seldom in reserve), 12-15 pairs, and resident all year.

Rough-legged Buzzard (Bod Bacsio) Reported winter 1961-62, 1/4/65. Most other records evidently in error for pale Buzzards.

Kestrel (Cudyll Coch) B, ca. 6-8 pairs peripheral to reserve; present all year.

Merlin (Cudyll Bach) PM/WV, seen irregularly Sep-Mar, up to 3.

Peregrine (Hebog Tramor) Regular visitor all year, usually singly.

Red Grouse (Grugiar) B, few pairs on raised bogs, present all year.

Black Grouse (Grugiar Ddu) OV, formerly resident all year, may have bred.

Grey Partridge (Petrissen Lwyd) Former resident, extinct. Recent releases did not persist.

Red-legged Partridge (Petrissen Goesgoch) Releases 1968-70 did not persist.

Quail (Sofliar) Irregular SV/PM, may have bred 1964. Only recent records July 1973, May 1977, June 1980.

Pheasant (Ffesant) B and resident all year; numbers released annually.

Water Rail (Rhegen y Dŵr) B (frequent, perhaps regular), and WV/PM, in small numbers.

Spotted Crake (Rhegen Fraith) 9/5/67, 13/5/70, 14-16/5/72. Probably overlooked.

Corncrake (Rhegen yr Yd) Former regular breeding SV, irregular since 1930s, bred 1969. Scarce irregular PM, Apr-May and Sep (once Nov).

Moorhen (Iâr Ddwr) B, probably 10-20 pairs, and present all year.

Coot (Cwtiar) B, probably 5-10 pairs; WV, up to 50.

Oystercatcher (Pioden y Môr) 6/3/77.

Little Ringed Plover (Cwtiad Torchog Bach) 10-12/4/71.

Ringed Plover (Cwtiad Torchog) 29-31/5/75 (two).

Golden Plover (Cwtiad Aur) PM/WV, mainly Mar-Apr and Oct-Nov, up to 50 (600 in the past).

Lapwing (Cornchwiglen) B, few pairs in reserve, more nearby; PM/WV, up to 500.

Dunlin (Pibydd y Mawn) HB until 1950s, few pairs; PM, usually under 10, mainly May and Jul-Aug, rarely in winter.

Ruff (Pibydd Torchog) None before 1967, but annual PM since, Mar-May or July-Oct up to 9.

Jack Snipe (Giach Fach) Scarce PM/WV, seen Sep-Apr.

Snipe (Giach Cyffredin) B, probably 20-40 pairs; and PM, mainly Aug-Sep. Normally few mid-winter.

Great Snipe (Giach Fawr) Sep 1947.

Woodcock (Cyffolog) WV in small numbers, (Oct) Nov-Mar (Apr).

Black-tailed Godwit (Rhostog Gynffonddu) Seen in seven years since 1968, five times Mar-May, twice Jul-Aug, up to 4.

Whimbrel (Coegyflfinir) Rather irregular PM, seen Apr-Sep but mainly Apr-May and Jul-Aug; up to 9.

Curlew (Gylfinir) B, probably 30-40 pairs. Rarely seen Aug-Jan, returns Feb.

Spotted Redshank (Pibydd Coesgoch Mannog) Irregular PM, seen 1963 and most years since 1967. Records all months Apr-Oct but most in Aug-Sep; up to 6.

Redshank (Pibydd Coesgoch) B, up to 10-12 pairs; prob also PM. Present (Feb) March, July, rarely in other months.

Greenshank (Pibydd Coeswerdd) Irregular PM, seen all months Apr-Oct but mostly Aug-Sep, up to 5.

Green Sandpiper (Pibydd Gwyrdd) PM (Apr, Jun) July-Sep (Nov), up to 4.

Wood Sandpiper (Pibydd y Graean) Seven records in five years since 1968, four in May, three in Aug, all of one or two birds.

Common Sandpiper (Pibydd y Dorlan) PM (B nearby) Apr-Sep, in small numbers.

Little Gull (Gwylan Fechan) 13/5/70, 21/6/77 (two).

Black-headed Gull (Gwylan Benddu) B, usually up to 300 pairs, occ. up to 1200 pairs, and seen all year.

Common Gull (Gwylan y Gweunydd) PM/WV, seen all months except June, not very numerous.

Lesser Black-backed Gull (Gwylan Gefnddu Leiaf) HB until 1920s.

Scarce PM Mar-Sep but numerous (up to 170) in June-July 1976-78.

Herring Gull (Gwylan y Penwaig) Irregular visitor in small numbers at any season, but most often June-Aug.

Great Black-backed Gull (Gwylan Gefnddu Fwyaf) Irregular visitor at all seasons, rarely more than three.

Sandwich Tern (Morwennol Bigddu) 21/6/22 (dead).

Arctic Tern (Morwennol y Gogledd) 17/5/67 (two).

Black Tern (Corswennol Ddu) Seven records, two April, one May, three June, one July; up to 12.

Stock Dove (Colomen Wylt) B (outside reserve), small numbers. Few seen Oct-Feb.

Wood Pigeon (Ysguthan) B, fairly numerous, present all year.

Collared Dove (Turtur Dorchog) Resident locally in recent years.

Turtle Dove (Turtur) OV, mainly Apr-May, up to ca. 6.

Cuckoo (Gog) B/SV and PM, small numbers, Apr-Aug (Sep).

Barn Owl (Tylluan Wen) B (outside reserve), several peripheral pairs, hunting into bog, seen all year.

Little Owl (Tylluan Fach) Former resident (and presumed B) up to 1950s. Recent records 10/12/76 (dead), 26/10/81.

Tawny Owl (Tylluan Frech) B (uncertain, but probably within reserve), several peripheral pairs, seen all year.

Short-eared Owl (Tylluan Glustiog) Rather irregular PM/WV, mainly in winter but recorded in all months in recent years, may have attempted to breed; up to 4.

Nightjar (Troellwr Mawr) Former SV, bred until 1930s, but no recent record.

Swift (Gwennol Ddu) B nearby villages, and often over reserve (Apr) May-Aug (Sep), seldom over 100.

Kingfisher (Glas y Dorlan) One or two present each autumn, but no recent record outside the period Jul-Dec.

Hoopoe (Copog) 26/4/76.

Green Woodpecker (Cnocell Werdd) Very infrequent OV to periphery of reserve outside breeding season.

Great Spotted Woodpecker (Cnocell Fraith Fwyaf) B, one or two peripheral pairs on E side of bog; more widely seen in winter.

Lesser Spotted Woodpecker (Cnocell Fraith Leiaf) 3/9/78.

Woodlark (Ehedydd y Coed) A few peripheral pairs on E side until 1962. No later record.

Skylark (Ehedydd) B, widely distributed on raised bogs and drier river terraces. Scarce Nov-Jan or Feb. PM, sometimes numerous, Feb-Mar and Sep-Oct.

Sand Martin (Gwennol y Glennydd) PM/SV, B nearby, (Mar) Apr-Sep (Oct); numbers usually low, but up to 100 at Aug roost.

Swallow (Gwennol) PM/SV, B at most peripheral farms, Apr-Oct, up to 200 (perhaps more) in late summer roosts.

House Martin (Gwennol y Bondo) PM/SV, B nearby, Apr-Oct, seldom over 100 seen.

Richard's Pipit (Corhedydd Richard) 17/10/69.

Tree Pipit (Corhedydd y Coed) PM/SV, some B within reserve, Apr-Sep (Oct).

Meadow Pipit (Corhedydd y Waun) B, numerous on raised bogs; seen all year, but scarce Nov-Feb. Numerous PM, mainly Mar-Apr and Sep-Oct.

Water Pipit Scarce WV/PM since 1968, all records between Oct and Mar, up to 5.

Yellow Wagtail (Siglen Felen) Bred up to 1920s. Now scarce, irregular PM, seen occasionally May, more often Aug-Sep, usually singly.

Grey Wagtail (Siglen Lwyd) B nearby; OV in reserve, mainly in autumn.

Pied/White Wagtail (Siglen Fraith) Pied: B near, frequently seen in reserve at all seasons, most commonly Aug-Sep. White: PM occasionally identified in Apr-May.

Dipper (Bronwen y Dŵr) B (irregularly in reserve), two-three peripheral pairs. One or two often seen at any season.

Wren (Dryw) B at edges of bog, numerous except after hard winters. Widely seen throughout reserve in winter.

Duncock (Llwyd y Gwrych) B, few in reserve, common nearby; seen all year.

Robin (Robin Goch) B, few in reserve, common nearby; present all year.

Redstart (Tingoch) PM/SV, B just outside reserve, Apr-Sep (Oct).

Whinchat (Crec yr Eithin) PM/SV, B at edges of reserve, seen elsewhere on passage Apr-Oct.

Stonechat (Clochdar y Cerrig) PM/WV, regular in small numbers; HB, one-three pairs 1973-78.

Wheatear (Tinwen y Garn) PM, seen mainly along railway, Mar-May or July-Sep; seldom more than two or three. B nearby. Greenland race: one or two occasionally identified on passage.

Ring Ousel (Mwyalchen y Mynydd) 6/8/82.

Blackbird (Mwyalchen) B at edges of reserve, numerous nearby; resident, also PM/WV; sometimes obvious passage Oct-Nov.

Fieldfare (Socan Eira) PM/WV, (Sep) Oct-Apr (May, once June), normally most numerous in autumn.

Song Thrush (Bronfraith) B, few at edge of reserve, not uncommon nearby; seen all year, occasional obvious movements autumn/winter.

Redwing (Coch Dan-aden) PM/WV, (Sep) Oct-Apr; usually numerous in autumn then comparatively few until moderate spring passage.

Mistle Thrush (Brych y Coed) B, few in reserve, fairly common nearby; seen all year.

Grasshopper Warbler (Troellwr Bach) B in fen/carr areas, up to probably 50 pairs in past, fewer recently; SV, Apr-Sep (Oct).

Sedge Warbler (Telor yr Hseg) B in fen/carr areas; probably up to 200 pairs in past, fewer recently; SV, Apr-Sep.

Whitethroat (Llwydfon) Scarce PM/SV, HB before 1969, probably again 1978, at edge of reserve. Seen (Apr) May-Aug (Sep). Formerly more widespread, but not common even before 1969 collapse.

Garden Warbler (Telor yr Ardd) BSV, not common, OV within reserve mainly at passage seasons. Seen May-Sep.

- Blackcap (Telor Penddu) Uncommon SV, B nearby, OV within reserve on passage. May-Oct (Nov).
- Wood Warbler (Telor y Coed) Uncommon SV, B in woods near E side, Apr-July (Aug) no certain reserve record.
- Chiffchaff (Siff-saff) PM in small numbers, probably breeds irregularly. Seen (Mar) Apr (May) and Aug-Oct (Nov).
- Willow Warbler (Telor yr Helyg) B, numerous in willow-carr areas and in scrub at edge of reserve; SV, Apr-Sep (Oct).
- Goldcrest (Dryw Eurben) Mainly PM/WV, a few breed nearby. Fairly numerous, especially in Sep-Nov.
- Spotted Flycatcher (Gwybedog Mannog) B, in fairly small numbers, round periphery of reserve; SV, (Apr) May-Sep (Oct).
- Pied Flycatcher (Gwybedog Brith) B in small numbers in oakwoods, E side of reserve and OV within it except in very small area near nest sites. Seen Apr-July.
- Long-tailed Tit (Titw Gynffon-hir) B, small numbers, at edges of reserve; scarce after hard winters. Wandering flocks in winter.
- Marsh Tit (Titw'r Wren) Uncommon and probably irregular visitor outside the breeding season.
- Willow Tit (Titw'r Helyg) B, small numbers, and present all year.
- Coal Tit (Titw Penddu) B, a few pairs in woods on E side of bog; more widely in winter.
- Blue Tit (Titw Tomas Las) B, widely distributed in woods and farmland at all seasons.
- Great Tit (Titw Mawr) B, as Blue Tit, and almost as numerous.
- Nuthatch (Delor y Cnau) B, a few pairs in woods near reserve; wandering more widely in winter.
- Tree Creeper (Dringwr Bach) B, as Nuthatch but rather more numerous.
- Red-backed Shrike (Cigydd Cefngoch) 11/10/78.
- Great Grey Shrike (Cigydd Mawr) One wintered annually from 1965-66 until 1976-77, and a second present in 1973-74; recorded in all months Sep-Apr, mostly Nov-Mar.
- Jay (Ysgrech y Coed) B, small numbers in scrub woodland; more widely seen outside breeding season.
- Magpie (Pioden) B, widely distributed, present all year.
- Jackdaw (Jac y do) B, fairly numerous in villages and farmland; roost up to 2000 in willow swamp in winter.
- Rook (Ydfran) B, several small colonies in farmland near reserve; present all year.
- Carrion Crow (Bran Dyddyn) B commonly throughout area, resident.
- Raven (Cigfran) B nearby, several territories extending into the reserve; seen all year.
- Starling (Drudwen) B, rather scarce, in farms and villages nearby; PM/WV, more widespread and numerous.
- House Sparrow (Aderyn y Tô) B in farms and villages, frequently on old railway track.
- Crossbill (Gylfin Groes) five 19/10/83.

Chaffinch (Ji-binc) B, numerous in woods and farmland, a few pairs in reserve; PM/WV, good numbers outside breeding season.

Brambling (Pinc y Mynydd) PM/WV, Oct-Mar (Apr) in very variable numbers, up to 150 seen.

Greenfinch (Llinos Werdd) B, small numbers in farmland; PM/WV in variable numbers flocked up to 150 seen.

Goldfinch (Nico) B, small numbers in farmland; parties up to 40 in autumn, very few through winter.

Siskin (Pila Gwyrdd) Irregular PM/WV in small numbers, seen July-Apr but mostly Oct-Dec, up to 30 seen.

Linnet (Llinos) B, fairly common around edge of reserve; normally scarce outside breeding season, but in some years flocks up to 200 in farmland.

Redpoll (Llinos Bengoch) B, small numbers in reserve area; PM/WV more widely seen in winter, flocks up to ca 50.

Bullfinch (Coch y Berllan) B, small numbers in scrub round periphery of reserve. Present all year.

Yellowhammer (Bras Melyn) B, small numbers, less common than formerly, in farmland and probably sometimes within reserve. Small parties through winter.

Cirl Bunting (Bras Ffrainc) Dec 1961-Jan 1962 (three).

Reed Bunting (Bras y Crys) B, numerous in river-terrace areas, probably 50-100 pairs; most leave Sep-Oct and return Mar-Apr, scarce in winter.

Wryneck (PENGAM) 29/4/84

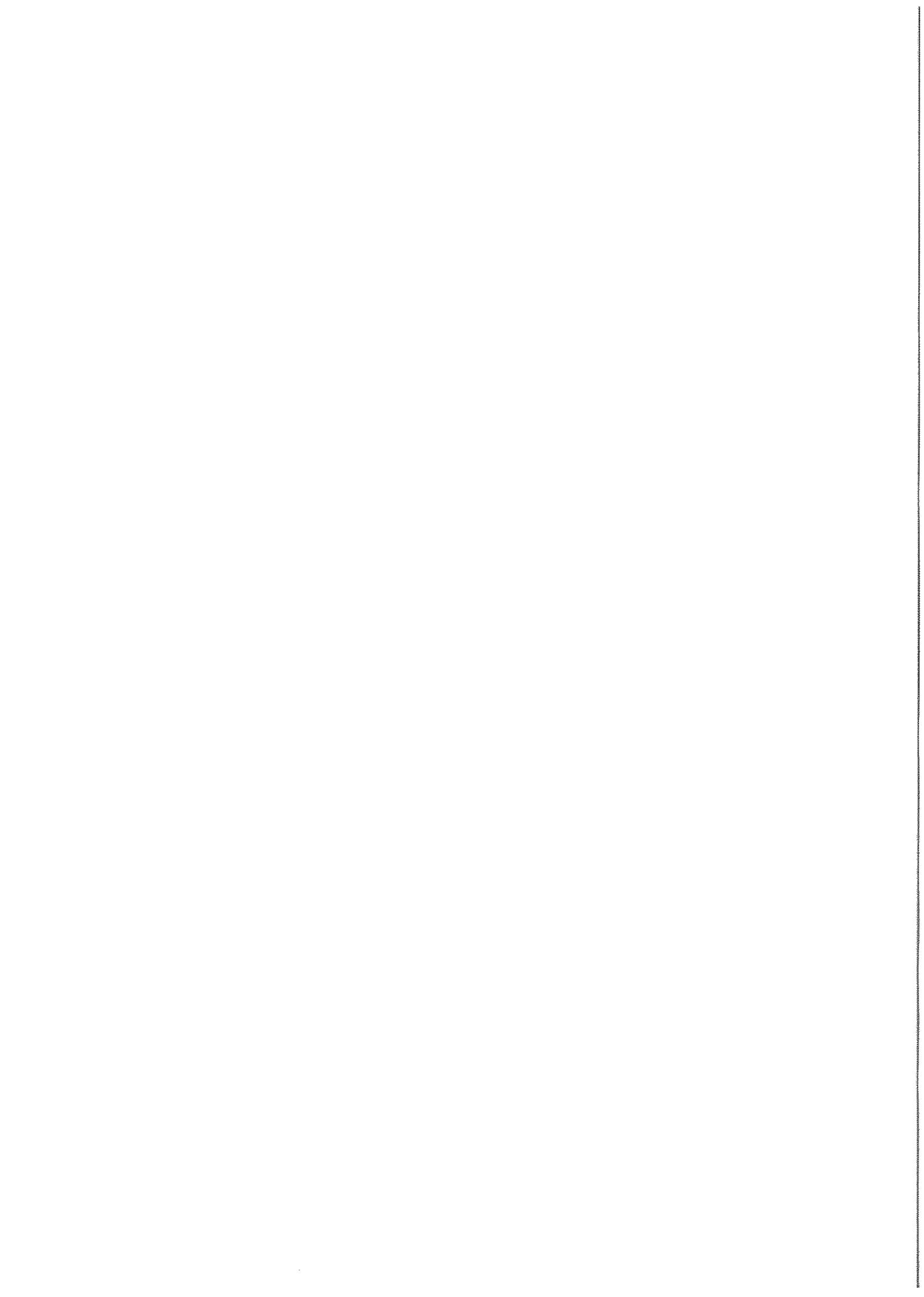
The following additional species have been seen in the Tregaron area, within about 5 miles of the reserve: Gannet (Hugan), Common Crane, Osprey (Gwalch y Pysgod), Hobby (Hebog yr Ededydd), Black Redstart (Tingoch Ddu), Lesser Whitethroat (Llwydfron Fach), Lapland Bunting (Bras y Gogledd), Snow Bunting (Bras yr Eira).

For further information contact:

J E Davis
Warden - Mid Ceredigion Reserves
Nature Conservancy Council
Minawel
Ffair Rhos
Ystrad Meurig
Dyfed SY25 6BN

Tel: Pontrhydfendigaid 671

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Some Useful References

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Permits for visits to Cors Caron

Access to the South-east Bog and all part of the reserve except the old railway walk requires a permit. Please apply stating the date and purpose of your visit to:-

The Warden Mid-Ceredigion Reserves
Nature Conservancy Council
Minawel
Ffair Rhos
Ystrad Meurig
Dyfed SY25 6BN (Tel: Pontrhydfendigaid 671)

Useful Records

Visitors are asked to send records of projects and the recording of any unusual species, especially those not mentioned in this Guide, to either the Warden - as above

or

Dr D Glyn Jones
Nature Conservancy Council
Plas Gogerddan
Aberystwyth
Dyfed SY23 3EE

or

Dr John P Savidge
Department of Botany & Microbiology
University College of Wales
Penglais
Aberystwyth
Dyfed

YOUR COMMENTS ON THIS TEXT AND RECOMMENDATIONS FOR ITS
IMPROVEMENT WILL BE MOST WELCOME