<table>
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<tr>
<th><strong>Title</strong></th>
<th>Scottish mountain flora in relation to the flora of an isolated Norwegian valley</th>
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<tr>
<td><strong>Author</strong></td>
<td>Corner, R. W. M.</td>
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Thesis scanned from best copy available: may contain faint or blurred text, and/or cropped or missing pages.

Digitisation notes:
- Page 13 skipping in original pagination
Rappdalen is a small uninhabited valley with active glaciers situated on the North-East side of the Lyngen Peninsula in the Troms region of North Norway in the Herred of Karløy. It is approximately 200 miles North of the Arctic Circle on latitude 69° 50' North and longitude 20° 20' East. Access is only possible by boat from Lyngen Fjord.

There are no records of any botanist having visited the valley before.

The scope of the paper is limited to general descriptions of the area and its vegetation. The valley was visited for two weeks from July to August, 1959.

DESCRIPTION

(a) Topography

Rappdalen is a small glaciated valley about 2½ kilometres (1½ miles) long, running due West. The steep terminal moraine clothed with birches restricts the view of the interior of the valley from the fjord.

The mountains at the head of the valley are jagged and rise sheer from the accumulated snow at their bases to over 4,000 feet.

There are three small corrie glaciers at the head of the valley; one coming in from the North, one from the South and a Western one at the extreme head of the valley. Their snouts are 700', 1550' and 1200' respectively above sea level. The northern glacier consists of packed snow and contains no blue ice. The southern glacier has its snout a few hundred feet above the valley floor and is fed by a high-level snowfield. The terminal glacier is fed by the snow accumulating round the bases of the mountains above and is in a very active state. Though these glaciers are retreating, most fresh morainic material is being deposited only by terminal glacier.

There are three main moraines in the glacial area which were examined, (a) the "Left Lateral" moraine on the east side of the snout of the southern glacier, (b) the "Windy Ridge" moraine on the south side of the terminal glacier, (c) the "Long Curved Moraine - Snout" which is a continuation of "Windy Ridge" moraine and which curves round the
of the northern glaciers. They are all of recent origin.

Large talus slopes have been formed below the mountam on the north and south sides of the valley, particularly on the northern south-facing side. These mountains have high rock-faces and ledges, though their summits are lower than the peaks at the head.

The valley floor is a complex area with the most recent moraines at its head. Further down it is completely blocked from side to side with the massive boulders of an older moraine. Two glacial pools have been formed in this part. This region was called "The Great Divide". The melt-water from the glaciers emerges as a stream from the base of the boulders and enters the wider, flat grassy valley floor. Wet silty areas lined by willow thickets have been produced by flooding. Small heath-covered moraines mark the end of this flat area. The stream flows rapidly over a bed of boulders and makes a sudden turn in the birchwood before plunging in a series of falls over the oldest terminal moraine into the fjord. On the north side of the stream above the terminal moraine is a flat tree-less area covered by tall herbaceous plants.

(b) Geology

The rock forming the mountains is of the Caledonian series; gabbroic with layers of mica-schists, limestones, and some granite.

(c) Climate

The gulf-stream makes the climate exceptionally mild as compared with other parts of the northern hemisphere at the same latitude. The weather is cool, windy and foggy with rapid changes and often rather chilly summers. (Benum, 1958). Snow appears in early autumn and disappears in late spring.

Temperature - The isotherms run parallel to the coast and the temperatures increase or decrease rapidly from the coast to the frontier. The extremes of temperature occur in the inland areas. Rappdalen lies in the +11°C (52°F) isotherm for the average July temperature, and in the -4°C (25°F) isotherm for the average January temperature. Approximately half the year has recorded temperatures below freezing point.
Precipitation - The average annual precipitation varies from 1000 - 2000 mm/year (40" - 80") (Hulten, 1950). Rain, sleet and snow occur from October - December and snow falls from January - April. July and August are the rainiest months. Snow lies for approximately 190 days in the year. The depth in March has been recorded as 2 feet (64 cms.). The snowcap is present from October - May (Figures for Tromso from Benum, 1958).

Snow fell on the mountains at Rappdalen in the first fortnight of August, 1959, down to 3000 feet. Snow patches were present on the north-facing slopes at this time being present below 500 feet in places. The south-facing slopes were completely free of snow.

Exploitation - The only evidence of man in Rappdalen was shown by the presence of rotting birch stumps. The felling must have occurred many years ago because this area is now covered by dense birchwood.

(d) Vegetation

The vegetation is a varied one, the habitats ranging from maritime to recent glacial moraines.

Birch forest covers the lower slopes from sea-level up to 1500'. It only occurs at the entrance to the valley, ceasing 300 - 400 yards from the entrance. The south-facing slopes above the crags are well clothes with dense birchwood while the north-facing slopes possess only a few small stunted specimens. The trees are all small but stout and branch freely.

There are marked differences between the north and south-facing slopes. These are still present but less pronounced on ascending the valley.

The slopes below the south-facing cliffs at the entrance are covered by a luxuriant herbaceous flora of which Filipendula ulmaria and Chamaenerion augustifolium are most abundant. The fern Matteuccia Struthioptris and grasses like Calamagrostis purpurea and Milium effusum grow on the flat area below the slope and produce a dense herbaceous cover of over 3 feet in height. There is no comparable vegetation on the north-facing slopes, Empetrum heath being present at a comparable altitude.
The scree-slopes of the south-facing side are unstable and dry whereas those facing north are much more stable with a protective covering of bryophytes on humus. Plants like Silene maritima and S. rupestris grow on the former whereas Cerastium cerastoides and Cassiope hypnoides are abundant on the latter.

The glacial stream has a strong influence on the flora. The drop in temperature encountered beside the stream in summer was considerable. Where the stream meanders through areas liable to flood, Willows (Salix) thickets line its banks and Equisetum palustre is abundant. Juncus filiformis is dominant in a marshy area and Leontodon autumnalis grows in a damp meadow of Agrostis and tufts of Deschampsia caespitosa. A dry grassland of Deschampsia flexuosa and Phleum commutatum supports an entirely different flora of Eyrola minor and Hieracium Sp. mosses (Philonotos sp.) are particularly abundant over the rocks and banks, due to the great quantity of glacial silt which the stream carries.

The moraines themselves show the transition which takes place with age, of the flora clothing them. The sparse arctic-alpine flora of the recent moraines is derived from the surrounding mountains. Cerastium spp., Saxifraga oppositifolia, Silene acaulis, Lycoptodium selago, Juncus trifidus and the grass Deschampsia flexuosa are the most common early colonizers. The lichen Solorina crocea is common on the level and more stable areas of the moraines and of the mosses, Polytrichium Sp. is present. The intermediate moraines are clothes with Empetrum heath. Vaccinium vitis-idea, Loiseleuria procumbens and Deschampsia flexuosa are very common. The climax is reached with the Birch forest and the woodland flora of the oldest moraines. Chamaepericlymenum suecicum, Helanthyrum spp. and the ferns Thelypteris spp. are all abundant. Linnea borealis was locally common.

It should be mentioned that young Willows (Salix) up to one foot high (0.3 metres) grew on the most recent moraines and must be counted as some of the earliest colonizers. Similarly young birches one foot high and less were recorded. These young trees must die out if one judges from their absence on the intermediate moraines and the varied arctic-alpine flora be replaced by the more or less uniform Empetrum heath.
PLANTS ABSENT FROM SCOTLAND

Only about 12% of the plants observed were completely absent from Scotland. About one half of these plants absent from Scotland were present on the north-facing slopes and the most recent moraines. The remainder were scattered over the other habitats, the south-facing slopes accounting for the great majority of the remainder. The climatic conditions may account for the distribution in the above fashion, conditions in Scotland being less extreme.

PLANTS EXTINCT FROM SCOTLAND

Only one plant (Pinguicula alpina) from the valley itself was extinct in Scotland. It occurred most abundantly on a basic damp north facing slope below a cliff. It also grew very sparingly on damp humus amongst the boulders of the "Great Divide" by the glacial pools.

Trichophorum alpinum also extinct in Scotland, grew abundantly in the peat bog of CAMVIK, a valley parallel and to the north of Rappdalen. There was no peat to provide a similar habitat in Rappdalen.

PLANTS OF EXTREME RARITY IN SCOTLAND

Diapensia lapponica was present on Empetrum heath and the most recent moraines. On the "Great Divide", it was present on the thin layer of humus on top of some of the largest boulders. Its lowest altitude was 250'. One habitat in Scotland.

Arabis alpina was present below a north-facing cliff in fair quantity. A few scattered specimens were found on the most recent moraines. One habitat in Scotland.

Phyllodoce coerulesc grew on the most recent moraines and round the glacial pools of the "Great Divide". It shows itself to be an early colonizer. One habitat in Scotland.

Viscaria alpina provided an interesting feature on habitats. It was present on moist basic ledges a few feet above the fjord and only appeared again on the dry south-facing scree slopes a mile up the valley. It was an early colonizer on the most recent moraines but in small quantity. One habitat in Scotland.
These were the extreme rarities.

*Cicerbita alpina* grew abundantly amongst the tall herbaceous flora in the Meadowland and in the open parts of the Birchwood. It is limited to ledges in the Glen Clova area of Scotland.

*Gentiana nivalis* grew on the dry basic south-facing rock ledges. It is found on Ben Lawers and in Glen Clova in Scotland.

*Erigeron borealis* was present only on the south-facing cliffs. The specimens were larger than their Scottish relatives, which are found on Lawers and Glen Clova.

*Saxifraga cernua* grew abundantly below the basic north-facing cliff. The silty soil round the glacial pool supported only a few specimens. Where the stream emerged from the "Great Divide" a few plants grew by a calcareous spring. Ben Lawers, Newis and an Argyllshire locality provide the only Scottish habitats.

*Saxifraga caespitosa* occurred most frequently on the most recent moraines being therefore an early colonizer. A few specimens grew on the south-facing scree slopes. Limited to the Cairngorms in Scotland.

*Saxifraga rivularis* grew in the moist shady habitats under the north-facing cliff and by the boulders round the glacial pool and stream. A few specimens were found by the boulders at the base of the most recent moraines. It was slightly more frequent than *S. cernua* in the valley. First recorded from the Breadalbane area in Scotland.

*Saxifraga nivalis* grew on rocks at sea-level and in suitable habitats over the whole valley including the most recent moraines. It is a very local plant in Scotland being limited to high basic rocks.

*Veronica fruticans* only grew on the dry south-facing cliffs and scree. It was absent from the most recent moraines. Found only round the Breadalbane area in Scotland.

*Veronica alpina* had a general distribution over the valley in the damper areas. It grew beside the stream and glacial pools and as an early colonizer on hollows in the surface of the most recent moraines. It is much commoner in Scotland than *V. fruticans* but is still very rare.
Carex lachenalii grew in the damp areas below the north-facing cliff and on the silt beside the glacial pools and stream. It was absent from the most recent moraines. No carices were present on these moraines and therefore cannot be considered as early colonizers. Limited to the Cairngorms in Scotland.

Luzula arculata was present on the exposed boulders of the "Great Divide" and on the most recent moraines. In Scotland it is only found on the exposed plateaux of the Cairngorms and the higher mountain areas of the North-West.

Salix reticulata was found on the basic moist rocks on the north-facing side and very rarely on the most recent moraines. In Scotland it is limited to basic rocks particularly in the Breadalbane area.

Woodia alpina grew in small quantity on the dry south-facing cliffs. It is very rare in Scotland being found over 1900'.

Gnaphalium norvegicum grew in the meadowland and very occasionally on the most recent moraines showing a wide range of habitats. It is limited to high damp corries in Scotland.

Sagina saginoides was distributed all over the valley in suitable habitats from the south-facing slopes to the most recent moraines. It is found from Shetland to Lawers in Scotland.

Juncus filiformis was abundant in the marsh beside the stream. It is a rare rush of loch sides in Scotland.

Alchemilla glomerulans was abundant beside the stream growing as high as the glacial pools. It was also present in the meadowland. In Scotland it is limited to over 2000' from Perth to Ross-shire.

Bartsia alpina was common beside the stream and in damp north-facing rills. It is very rare in Scotland being limited to Perth and Argyllshire.

Cerastium cerastoides was most abundant on the most recent moraines where it was one of the commonest species. It was present on the damp north-facing slopes. It is the rarest of the genus Cerastium in Scotland.

Cerastium arcticum and Cerastium alpinum were abundant on the most recent moraines. The genus is very variable and many different sizes and degrees of hairiness were observed. In Scotland the two are local species in the higher mountains.
Carex atrofusca although not occurring in the valley itself was present in a basic flush 300 feet above sealevel a few hundred yards south of the valley entrance. It is one of Scotland’s rarest sedges.

Carex atrata was commonest on the south-facing slopes but was present on the north-facing ones and in the tall vegetation of the meadowland.

Carex pauperoula was observed growing on a mossy boulder in the glacial stream. This habitat would be equivalent to the Scottish habitat of spongy bogs in the hills.

Deschampsia alpina in the viviparous form grew in moist situations beside the stream and glacial pools and occasionally on the most recent moraines. In Scotland it must be looked for over 3000 feet.

Phleum commutatum was abundant in the dry grassland beside the stream. It was absent from the most recent moraines.

Poa glauca was an early colonizer of the moraines and was rarer than Poa alpina. The latter was most commonly non-viviparous being the opposite of the Scottish plants which are very rarely so.

Dryas octopetala formed a Dryas-cassiope tetragona heath on the south side of the entrance to the valley at 1000 feet. A few specimens occurred as early colonizers on the most recent moraines. It is a plant confined to limestone in the mountains of Scotland descending low in Sutherland.

Potentilla crantzii was common on the dry south-facing cliffs. It was absent from the damp north-facing rocks. It is a strict calcicole in Scotland being very local.

Melampyrum sylvaticum was confined to the Birchwoods and grew with its commoner relative Melampyrum pratense.

Linnea borealis another boreal species, very local in Scottish woods was locally common in the woodland growing with Vaccinium vitis-idaea and Empetrum hermaphroditum.

Lycopodium annotinum was limited to the woodland and was the rarest of the clubmosses in the valley.

Aguga pyramidalis was a very local plant of the woodland being found southwards, along the coast. It was associated with Geranium sylvaticum and Hieracium sp.
Pyrola media was a rare plant of the woodland being observed in only one locality.

Pyrola minor was the commonest species of wintergreen in the valley being an early colonizer of the moraines. Ramischia secunda grew on ledges on the southside of the entrance to the valley and very occasionally on the most recent moraines. It is a local plant in the Scottish highlands.

Platanthera bifolia had a single colony in the woodland. It is not an infrequent plant in grassy places in Scotland.

Althyrium alpestre was present amongst boulders on the Empetrum heath and below the north-facing cliffs. Small specimens were present on the most recent moraines as early colonizers. It is a local fern of the Scottish mountains.

Plants common to the Scottish Highlands were the commonest species in the valley. i.e. Deschampsia flexuosa, Betula pubescens, Alchemilla alpina, Solidago virgaurea, Oxyria digyna, Saxifraga stellaria and Saxifraga oppositifolia, Salix herbacea, Thalictrum alpinum, Lycopodium selago and Lycopodium alpinum. Vaccinium vitis-idea and Vaccinium myrtillus, Sedum rosea, Cirsium heterophyllum, Equisetum palustre, Polygonum viviparum, Campanula rotundifolia, Pinguecula vulgaris, Trientalis europaeus, Silene acaulis, Melampyrum pratense, Juncus trifidus and the ferns Thelypteris dryopteris and Thelypteris phlegopteris, Dryopteris austriaca and Cystopteris fragilis. Empetrum nigrum is commoner in Scotland than Empetrum hermaphroditum.

Calluna vulgaris was a rare plant being found only on the south-facing screes and on the most recent moraines. Plants were only a few inches in size.

Vaccinium uliginosum grew in the woodland and as a dwarf stunted species on the most recent moraines. It was the most uncommon species of Vaccinium as it is in Scotland.

Saxifraga aizoides was not a common species being found occasionally on the moist rocks of the north and south-facing sides and as an early colonizer of the most recent moraines.
_Trollius europaeus_ was a striking plant of the meadowland and occasionally by the stream. It is often found on ledges on the Scottish mountains.

_Saussurea alpina_ was most common by the glacial stream and on the north-facing cliffs. It is found at low altitudes in the northwest of Scotland.

_Chamaepericlymenum suecicum_ grew in the woodland and formed large dense patches in the Empetrum heath where it was associated with _Vaccinium myrtillus_.

_Silene maritima_ grew on the south-facing screes at 500 feet. It was absent from the shoreline. The latter habitat was unsuitable there being no shingle. The scree-slopes were ideal.

_Listera cordata_ grew on _Sphagnum sp._ associated with _Vaccinium vitis-ideae_ in the open areas of woodland. _Sphagnum moss is its habitat of choice in Scotland._

A number of species are common in the lowlands of Scotland but occur on large dry ledges in the mountains. Grazing by animals has banished these herbaceous plants to the ledges. In Norway as a whole, grazing is absent or minimal hence these plants are able to grow on open slopes as they were at Rappdalen.

_Anthriscus sylvestris_ grew on the meadowland, the south-facing slopes and amongst boulders below cliffs. Here it was associated with _Angelica sylvestris_ which was a slightly commoner species.

_Melandrium rubrum_ was present in small quantity in the meadowland.

_Filipendula ulmaria_ and _Chamaenerion angustifolium_ were abundant on the slopes below the cliffs on the south-facing side. The slope was white with the former's blooms. The latter showed its power of propagation by the presence of a few small specimens on the most recent moraines.

_Valeriana officinalis_ was more locally abundant.

_Geranium sylvaticum_ was more widespread occurring in the Birchwoods also. _Epilobium montanum_, that garden weed in Scotland was an occasional species with _Galeopsis tetrahit_ a plant of waste land in Britain. The raspberry (Rubus idaeus) was scarce and a redcurrant
Ribes nubicatum was rarer. Scrophularia nodosa was at its most northerly limit here as were most of these species. Vicia cracca common by roadsides in Scotland was present in the meadowland and the common speedwell, Veronica officinalis grew very sparsely in the shade of the Birchwood. The two Stellarias, S. nemorum and S. graminea were not common, the former being limited to the shade of rocks or trees. The stinging nettle (Urtica dioica) grew in a belt along the base of the south-facing cliff on dry mineral soil. Ranunculus acris had a great range of habitats from the meadowland, along the streamside to the glacial pools and on the damp sheltered areas below the north-facing cliffs. In Scotland it is found high up on all the mountains. It was the commonest Ranunculus in the valley.

Rumex acetosa was found in the meadowland and as an early colonizer on the moraines. It demonstrates its hardiness in Scotland where it is found on high ledges. The coltsfoot (Tussilago farfara) grew on the most recent moraines and in this respect acted as an early colonizer as it does in Scotland on any bank of heavy soil or slag-heaps.

CONCLUSION

This account has attempted to show the very close similarity between the mountain flora of Scotland and Norway.

Although the locality described is 200 miles north of the arctic circle it has a very rich herbaceous flora with many species found in the lowlands of Scotland. This is due to the warming influence of the Gulf Stream.

The outcrops of basic rock produced an interesting arctic-alpine flora with no Norwegian rarities. It is true to say that the presence of utilizable Calcium is just as important in producing a rich flora in the Norwegian mountains as it is in Scotland. In the latter country however, excessive grazing has limited the habitats.

The finding of three plants new to the Scottish flora within the past ten years shows that there may be yet more plants with a Scandinavian affinity to be found in less explored Scottish mountains.
Nomenclature from Clapham, Tutin and Warburgh's "Flora of The British Isles" and Lid's "Norsk Flora".

The division of the area into habitats each with its own flora has been carried out. The sides of the mountains above 1500 - 2000 feet were unexplored. The flora is obviously not a comprehensive one.

* Absent from Scotland.

**COAST LINE**

Betula pubescens (a)
Cicerbita alpina (la)
Ligusticum sutticum (a)
Mertensia maritima (l)
Saxifraga nivalis (f)

*Sedum annnum (f)*
Sedum rosea (a)
Thalictrum alpinum (f)
Tofieldia pusilla (f)
Viscaria alpina (lf)

**BIRCH WOOD**

Ajuga pyramidalis (vl)
Alnus incana (o)
Betula pubescens (d)
Chamaepericlymenum suecicum (f)
Dryopteris austriaca (la)
Erypetrum hermaphroditum (ld)
Euphrasia agae. (lf)
Geranium sylvaticum (f)
Hieracium sp. (f)
Juniperus Communis (la)
Linnæa Borealis (lf)
Listeria cordata (lf)
Luzula pilosa (vl)
Lycopodium annotinum (l)
Melampyrum pratense (f)
Melampyrum sylvaticum (f)

Orchis ericetorum (l)
Paris quadrifolia (vl)
Platantheria bifolia (r)
Pyrola media (r)
Salix sp. (o)
Solidago virgaurea (f)
Sorbus aucuparia (f)
Thelepterus phegopteris (f)
Thelepterus dryopteris (f)
Trientalis Europæus (f)
Vaccinium Myrtillus (f)
Vaccinium uliginosum (f)
Vaccinium vitis-idea (la)
Veronica officinalis (l)
Viola sp. (l)
SOUTH-FACING CLIFFS (including Birch Wood above)

Agropyron caninum (o)
Agrostis sp. (o)
Alchemilla alpina (a)
Anthriscus sylvestris (o)
Arabis hirsuta (l)
Betula pubescens Dominant above cliffs.
Campanula rotundifolia (o)
Chamaenerion augustifolium (f)
Carex strata (lf)
Carex capillaris (f)
Cerastium alpinum (lf)
Cystopteris fragilis (f)
Deschampsia flexuosa (a)
Draba incana (l)
Erigeron borealis (vl)
*Erigeron politum (r)
*Erysimum hieraciifolium (r)
Euphrasia sgg. (o)
Festula ovina (f)
Filipendula ulmeria (la)
Gentiana nivalis (l)
Geranium sylvaticum (f)
Hieracium sp. (o)
Juniperus communis (o)
Melampyrum pratense (o)
Melica nutans (o)
Oxyria digyna (f)

Parnassia palustris (r)
Poa alpina (o)
Poa pratensis (o)
Polypodium vulgare (r)
Polystichum lonchitis (l)
Potentilla Crantzii (lf)
Rhinanthus borealis (f)
Rubus saxatilis (l)
Sagina saginoides (l)
Salix sp. (o)
Saxifraga aizoides (o)
*Saxifraga cotyledon (vl)
Saxifraga nivalis (l)
Saxifraga oppositifolia (f)
Sedum alpina (lf)
*Sedum annuum (lf)
Sedum rosea (f)
Silene acaulis (la)
Solidago virgaurea (f)
Stellaria graminea (l)
Trisetum europaeus (o)
Vaccinium myrtillus (f)
Vaccinium vitis-idea (o)
Veronica fruticans (lf)
Vicia cracca (o)
Viola sp. (l)
Woodsia alpina (vl)
MEADOWLAND (Trail Meadow and Meadowsweet Slope)

Agrostis spp. (1d-0) (tenuis)
Alchemilla alpina (o)
Alchemilla glomerulans (a-f)
*Angelica archangelica (o-f)
*Angelica sylvestris (o)
Anthoxanthum odoratum (f)
Anthriscus sylvestris (r)
Athyrium sp. (o)

* Calamagrostis purpurea (la)
Campanula rotundifolia (c)
Carex atrata (o)
Chamaenerion austrofusum (1d-a)
Cicerbita alpina (la-f)
Cirsium heterophyllum (f)
Deschampsia flexuosa (f)

Epilobium collinum (o)
Epilobium montanum (o)
Equisetum sp. (o)
Filipendula ulmeria (ld-f)
Galeopsis tetrahit (c)

STREAMSIDE (including Leontodon Meadow) Below Great Divide.

Agrostis sp. (o)
Agrostis stolonifera (f)
Alchemilla glomerulans (la)
*Angelica archangelica
Bartsia alpina (c)
Betula pubescens (vf-r)
Carex aquatilis (1)
Carex bigelowii (vl)
Carex canescens (1)
Carex pauciprimita (vr)

Geranium sylvaticum (r)
Gnaphalium norvegicum (r)
*Mateuccia struthiopteris (c)
Melandrium rubrum (o)
Milium effusum (1)
Myosotis silvatica (c)
Ranunculus acris (c)
Ribes spicatum (r)
Rubus idaeus (c)
Rumex acetosa (f)
Scrophularia nodosa (r)
Sedum rosea (c)
Solidago virgaurea (f)
Stellaria graminea (c)
Stellaria nemorum (o)
Trollius europaeus (f)
Urtica dioica (lf)
Valeriana officinalis (la-f)
Vicia graccia (c)

* Cerastium alpinum sp glabrum (r)
Cirsium heterophyllum (c)
Coeloglossum viride (o)
Deschampsia alpina (1)
Deschampsia caespitosa (la)
Deschampsia flexuosa (c)
Epilobium anagallidifolium (o)
Epilobium palustre (1)
Eriophorum angustifolium (o)
*Eriophorum scheuchzeri (vl)
STREAMSIDE (cont.)

Equisetum palustre (a)
Equisetum sylvaticum (o)
Gnaphalium norvegicum (l)
Hieracium spp. (la)
Juncus filiformis (ld)
Leontodon autumnalis (la)
Listera cordata (o)
Orchis sp. (l) Spotted leaves.
Phleum commutatum (f)
Pinguicula vulgaris (f)
Polygonum viviparum (f)
Potentilla crantzii (one specimen observed)
Pyrola minor (lf)
Ranunculus acris (f)
Rhinanthus borealis (o)
Rumex acetosa (o)
Salix herbacea (la)
Salix spp. (la)
Saxifraga alpina (f)
Saxifraga cernua (vr) (one colony of five plants observed)
Saxifraga stellaris (f)
Sedum rosea (o)
Sibbaldia procumbens (r)
Taraxacum sp. (l)
Trollius europaeus (o)
Tussilago farfara
Veronica alpina (l)
*Viola biflora (f. below willows)

NORTH-FACING CLIFFS, LEDGES AND SHOULDERS.

Alchemilla alpina (rf)
Alchemilla glomerulans (la)
Angelica archangelica (l)
Anthriscus sylvestris (l)
Arabis alpina (lf)
Arctous alpina (l)
Asplenium viride (f)
Athyrium alpestre (lf)
Bartsia alpina (f)
Carex atrata (o)
Carex capillaris (f)
Carex Lachenalii (l)
*Cassiope hypnoides (lf)
*Cassiope tetragona (la)
Cerastium cerastoides (lf)
Cystopteris fragilis (f)
Diapensia lapponica (o)
Dryas octopetala (la)
Empetrum hermaphroditum (lf)
*Epilobium lactiflorum (l)
Juncus trifidus (a)
Leuchorchis albida (vl)
Loiseleuria procumbens (lf)
Luzula spicata (vf)
*Luzula wahlenbergii (r)
Mycosotis silvatica (l)
Oxyria digyna (la)
Parnassia palustris (o)
*Pedicularis lapponium (l)
Pinguicula alpina (l)
NORTH-FACING CLIFFS, LEDGES AND SHOULDERS cont.

Pinguicula vulgaris (f)
Polygonum viviparum (f)
Polystichum lonchitis (lf)
Pyrola minor (lf)
Ramischia secunda (l)
Ranunculus acris (o)
*Ranunculus glacialis (o)
*Ranunculus nivalis (vl)
*Ranunculus pygmaeus (l)
Salix Herbacea (a)
Salix reticulata (l)
*Salix spp. glauca (o)
Sausserea alpina (f)
Saxifraga aizoides (f)
Saxifraga cernua (lf)
Saxifraga nivalis (lf)
Saxifraga oppositifolia (f)
Saxifraga rivularis (l)
Saxifraga stellaris (vf)
Sedum rosea (a-f)
Selaginella Selaginoides (f)
Silene acaulis (f-a)
Taraxacum sp. (l)
Thalictrum alpinum (f)
Tofieldia pusilla (f)
Veronica alpina (f)
Vaccinium uliginosum (lf)
Viola biflora (lf)

SCREES South Facing (above Meander)

Alchemilla alpina (r)
Athyrium alpestre (o)
Angelica sylvestris (o)
Betula pubescens (f)
Calluna vulgaris (r)
Campanula rotundifolia (a)
Chamaenerion angustifolium (f)
Cryptogramme crispa (a)
Deschampsia flexuosa (f)
Festuca rubra (o)
Geranium sylvaticum (r)
Juncus trifidus (o)
Luzula spicata (o)

Oxyria digyna (r)
Rumex acetosa (o)
Salix sp. (f)
Sedum annuum (o)
Sedum rosea (r)
Silene maritima (la)
*Silene rupestris (o)
Solidago virgaurea (f)
Sorbus aucuparia (o)
Veronica fruticans (r)
Saxifraga caespitosa (vr)
### SCREES South facing (above Great Divide)

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alchemilla alpina</td>
<td>(c)</td>
</tr>
<tr>
<td>Betula pubescens</td>
<td>(c)</td>
</tr>
<tr>
<td>*Cardamine bellidifolia</td>
<td></td>
</tr>
<tr>
<td>Cerastium alpinum</td>
<td>(f)</td>
</tr>
<tr>
<td>Cryptogramma crispa</td>
<td>(f)</td>
</tr>
<tr>
<td>Deschampsia flexuosa</td>
<td>(f)</td>
</tr>
<tr>
<td>*Luzula spicata</td>
<td>(f)</td>
</tr>
<tr>
<td>*Ranunculus glacialis</td>
<td>(lf)</td>
</tr>
<tr>
<td>Salix herbacea</td>
<td>(vr)</td>
</tr>
<tr>
<td>Salix sp.</td>
<td>(c)</td>
</tr>
<tr>
<td>*Veronica alpina</td>
<td>(f)</td>
</tr>
<tr>
<td>*Viscaria alpina</td>
<td>(f)</td>
</tr>
</tbody>
</table>

### SCREES North facing (above Great Divide)

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Cassiope hypnoides</td>
<td>(vf)</td>
</tr>
<tr>
<td>Cerastium cerastoides</td>
<td>(la)</td>
</tr>
<tr>
<td>Gnaphalium supinum</td>
<td>(a)</td>
</tr>
<tr>
<td>*Oxyria digyna</td>
<td>(a)</td>
</tr>
<tr>
<td>*Ranunculus glacialis</td>
<td>(a)</td>
</tr>
<tr>
<td>Salix herbacea</td>
<td>(a)</td>
</tr>
</tbody>
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### AREA OF LARGE MORAINIC BOULDERS (Great Divide)

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alchemilla alpina</td>
<td>(f)</td>
</tr>
<tr>
<td>Cryptogramma crispa</td>
<td>(f)</td>
</tr>
<tr>
<td>Diapensia lapponica</td>
<td>(lf)</td>
</tr>
<tr>
<td>Juncus trifidus</td>
<td>(a)</td>
</tr>
<tr>
<td>Loiseleuria procumbens</td>
<td>(f)</td>
</tr>
<tr>
<td>*Luzula spicata</td>
<td>(vf)</td>
</tr>
<tr>
<td>*Oxyria digyna</td>
<td>(o)</td>
</tr>
<tr>
<td>Salix herbacea</td>
<td>(f)</td>
</tr>
<tr>
<td>Vaccinium myrtillus</td>
<td>(c)</td>
</tr>
<tr>
<td>Vaccinium vitis-idea</td>
<td>(f)</td>
</tr>
</tbody>
</table>

### GLACIAL POOLS in Great Divide

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alchemilla alpina</td>
<td>(c)</td>
</tr>
<tr>
<td>Alchemilla glomerulans</td>
<td>(vl)</td>
</tr>
<tr>
<td>Bartsia alpina</td>
<td>(vl)</td>
</tr>
<tr>
<td>Calluna vulgaris</td>
<td>(c)</td>
</tr>
<tr>
<td>Carex lachenalii</td>
<td>(l)</td>
</tr>
<tr>
<td>*Cassiope hypnoides</td>
<td>(lf)</td>
</tr>
<tr>
<td>*Cassiope tetragona</td>
<td>(1-r)</td>
</tr>
<tr>
<td>Deschampsia alpina</td>
<td>(l)</td>
</tr>
<tr>
<td>Deschampsia flexuosa</td>
<td>(f)</td>
</tr>
<tr>
<td>*Empetrum hermaphroditum</td>
<td>(lf)</td>
</tr>
<tr>
<td>*Epilobium alsinefolium</td>
<td>(l)</td>
</tr>
<tr>
<td>*Epilobium lactiflorum</td>
<td>(lf)</td>
</tr>
<tr>
<td>Festuca vivipara</td>
<td>(c)</td>
</tr>
<tr>
<td>Gnaphalium norvegicum</td>
<td>(l)</td>
</tr>
<tr>
<td>Gnaphalium supinum</td>
<td>(lf)</td>
</tr>
<tr>
<td>Loiseleuria procumbens</td>
<td>(o)</td>
</tr>
<tr>
<td>*Luzula spicata</td>
<td>(o)</td>
</tr>
<tr>
<td>Lycopodium selago</td>
<td>(o)</td>
</tr>
<tr>
<td>Lycopodium alpinum</td>
<td>(vl)</td>
</tr>
<tr>
<td>*Oxyria digyna</td>
<td>(f)</td>
</tr>
</tbody>
</table>
# Glacial Pools in Great Divide cont.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phyllodoce coerulea</td>
<td>Saxifraga rivularis (vl)</td>
</tr>
<tr>
<td>Pinguicula alpina</td>
<td>Saxifraga stellaria (f)</td>
</tr>
<tr>
<td>Poa alpina</td>
<td>Sedum rosea (l)</td>
</tr>
<tr>
<td>Polygonum viviparum</td>
<td>Silene acaulis (o)</td>
</tr>
<tr>
<td>Pyrola minor</td>
<td>Solidago virgaurea (l)</td>
</tr>
<tr>
<td>Ramunculus acris</td>
<td>Taraxacum sp. (lf)</td>
</tr>
<tr>
<td>*Ramunculus nivalis</td>
<td>Torfildia pusilla (f)</td>
</tr>
<tr>
<td>Sagina saginoides</td>
<td>Vaccinium myrtillus (l)</td>
</tr>
<tr>
<td>Salix herbacea</td>
<td>Vaccinium uliginosum (f)</td>
</tr>
<tr>
<td>Salix glauca</td>
<td>Vaccinium vitis-idea (vl)</td>
</tr>
<tr>
<td>Saxifraga cernua</td>
<td>Veronica alpina (o)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BARE HEATH AND ROCKS</strong></td>
<td></td>
</tr>
<tr>
<td>Alchemilla alpina</td>
<td>Juncus trifidus (a)</td>
</tr>
<tr>
<td>Arctous alpina</td>
<td>Loiseleuria procumbens (vr)</td>
</tr>
<tr>
<td>Athyrium alpestre</td>
<td>Lycopodium alpinum (f)</td>
</tr>
<tr>
<td><em>Chamaepericlymenum suecicum</em></td>
<td>Lycopodium clavatum (l)</td>
</tr>
<tr>
<td>Deschampsia flexuosa</td>
<td>Sorbus aucuparia (o)</td>
</tr>
<tr>
<td>Diapensia lapponica</td>
<td>Vaccinium myrtillus (la)</td>
</tr>
<tr>
<td>Dryopteris austriaca</td>
<td>Vaccinium vitis-idea (vf)</td>
</tr>
<tr>
<td>Empetrum hermaphroditum</td>
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</table>

# RECENT MORAINES

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betula pubescens</td>
<td>*Ranunculus glacialis (o)</td>
</tr>
<tr>
<td>*Cassiope hypnoides</td>
<td>Salix herbacea (o)</td>
</tr>
<tr>
<td>*Cassiope tetragna</td>
<td>Salix sp. (vl)</td>
</tr>
<tr>
<td>Cerastium alpinum</td>
<td>Saxifraga nivalis (l)</td>
</tr>
<tr>
<td>Cerastium cerastoides</td>
<td>Saxifraga oppositifolia (o)</td>
</tr>
<tr>
<td>Festuca vivipara</td>
<td>Silene acaulis (o)</td>
</tr>
<tr>
<td>Juncus trifidus</td>
<td>Thelypteris dryopteris (o)</td>
</tr>
<tr>
<td>Luzula arcuata</td>
<td></td>
</tr>
<tr>
<td>Luzula spicata</td>
<td></td>
</tr>
</tbody>
</table>
THE LONG CURVED MORaine S Noun

Agrostis sp. (vl)
Alchemilla alpina (o)
*Antennaria alpina (o)
Antennaria dioica (o)
Betula pubescens (o)
Calluna vulgaris (l)
Campamula rotundifolia (o)
*Cassiope hypnoides (o)
*Cassiope tetragona (o)
Cerastium alpinum (lf)
Cerastium arcticum (lf)
Cerastium cerastoides (if)
Chamaenerion angustifolium (vl)
Cryptogramma crispa (o)
Cystopteris fragilis (v)r
Deschampsia flexuosa (f)
Dryas octopetala (vl)
*Epilobium lactiflorum (l)
Pestuca vivipara (o)
Gnaphalium norvegicum (vl)
Gnaphalium supinum (lf)
Juncus trifidos (f)
Loiseleuria procumbens (o)
Luzula arcuata (o)
Luzula spicata (o)
Oxyria digyna (o)
Phyllodoce caerulea (o)

Pinguicula vulgaris (l)
Poa alpina (c)
Poa glauca (c)
Poa nemoralis (c)
Polygonum viviparum (l)
Polystichum lonchitis (c)
Pyrola minor (lf)
Ranischia secunda (vl)
Rumex acetosa (l)
Sagina saginoides (l)
Salix herbacea (lf)
*Salix polaris (only one colony observed)
Salix reticulata (r)
*Salix glauca (o)
Saxifraga aizoides (vl)
Saxifraga caespitosa (f)
Saxifraga oppositifolia (o)
Saxifraga nivalis (l)
Silene acaulis (f)
Solidago virgaurea (o)
Taraxacum sp. (l)
Tussilago farfara (l)
Vaccinium myrtillus (o)
Veronica alpina (lf)
Viscaria alpina (lf)
LONG CURVED MORAINE (W) WINDY RIDGE

*Antennaria alpina (1)  Oxyria digyna (o)
Antennaria dioeca (o)  Poa alpina (o)
Anthoxanthum odoratum (o)  Poa glauca (o)
Arabis alpina (only one plant observed)  Poa nemoralis (o)
Athyrium alpestre (o)  Phyllodoce caerulea (o)
Betula pubescens (vl)  Polystichum lonchitis (l)
Calluna vulgaris (vl)  Pyrola minor (lf)
Campanula rotundifolia (o)  *Ranunculus glacialis (vl)
*Cassiope hypnoides (lf)
*Cassiope tetragona (1)
Cerastium alpinum (f)  Salix herbacea (lf)
Cerastium arcticum (lf)  Salix sp. (vl)
Cerastium cerastoides (f)  Saxifraga caespitosa (1)
Chamaenerion angustifolium (o)  Saxifraga nivalis (1)
Cryptogramma crispa (o)  Saxifraga oppositifolia (f)
Deschampsia flexuosa (f)  Saxifraga rivularis (vr)
Dispensia lapponica (o)  Saxifraga stellata (lf)
Dryopteris felix-mass (agg.) (o)  Silene acaulis (f)
Empetrum hermaphroditum (lf)  Solidago virgaurea (o)
*Epilobium lactiflorum (1)  Taraxacum sp. (1)
Gnaphalium supinum (lf)  Thelypteris dryopteris (o)
Hieracium sp. (o)  Thelypteris phagopteris (o)
Juncus trifidos (f)  Tussilago farfara (vl)
Loiseleuria procumbens (lf)  Vaccinium myrtillus (o)
Luzula arcuata (l)  Vaccinium uliginosum (o)
Luzula spicata (o)  Veronica alpina (1)
Lycopodium selago (f)  Viscaria alpina (1)
ADDITIONS

Southwards along coast  Open habitat 300' above sea.

Carex atrofusca (l)
Carex palescens (f)
Carex flava (f)
Juncus triglumis (f)
Juncus alpinus (f)
Trichophorum sp. (ld)

Northwards UT. GAMVIK. Bogland beside stream.

Carex aquatilis (f)
Caltha palustris (f)
Menyanthes trifolia (a)
Potentilla palustris (a)
Trichophorum alpinum (ld)

ABBREVIATIONS

d = dominant
ld = locally dominant
a = abundant
la = locally abundant
vf = very frequent
f = frequent
lf = locally frequent
o = occasional
l = local
vl = very local
r = rare
vr = very rare
MAP OF RÅPPDÅLEN

NORWAY
MAP OF RAPPDALEN

Heights given in metres

Depth of fjord in feet

= Moraine

ONE MILE
Photographs of Rappdalen (1)
A
View of Rappdalen from the fjord showing the glacial stream flowing over the birch covered terminal moraine

B
Looking up the valley from the campsite. Jagged gabbroic peaks in the background

C
Damp, misty day. Powdering of snow on rocks down to 2500-3000 foot mark 30th August 1959

D
Summit of Tverrbacktind 1390 metres (4500' feet) Note South facing scree slope to right of picture.

E
Looking down the valley from the southern edge of the "Great Divide." Willow thickets line the stream and Leontodon meadow is on the right bank of the stream. Note small terminal moraine forming partial barrier.

F
Slight of terminal moraine just to right of centre. Northern glacier curving round to snout at bottom left-hand corner. "Windy ridge" moraine is to left of the terminal glaciers snout and "Snout" moraine runs parallel to the Northern glaciers.

G
View of the head of the valley from the "Great Div." Note large boulders. "Windy ridge" moraine and "Snout" moraine seen end on. The former is to the left of the la
PHOTOGRAPHS OF RAPPDALEN (2)
The Southern glaciers seen from the upper part of the "left lateral" moraine. Note crevasses.

The Southern glaciers with part of the left lateral moraine visible. Note the snowfield.

Glacial pool on "Great Divide." Fjord in background.

Close up of surface of the snout of the Terminal glaciers showing debris.

Rock debris on surface of Terminal glaciers.
PHOTOGRAPHS OF RAPPDALEN (2)
The Southern glaciers seen from the upper part of the "left lateral" moraine. Note crevasses.

The Southern glaciers with part of the left lateral moraine visible. Note the snowfield.

Glacial pool on "Great Divide." Fjord in background.

Close up of surface of the snout of the Terminal glacier showing debris.

Rock debris on surface of Terminal glaciers.
Polarflokkene er et tidsskrift og medlemsblad for Nordnorsk avdeling av Norsk Botanisk Forening. Polarflokkene har vært utgitt siden 1976 med to nr. pr. år.


Manuskripter frister:
1. januar (vårheftet)
1. juli (høstheftet)
Rappdalen (Fig. 1) is a small uninhabited valley with active glaciers situated on the North-East side of the Lyngen Peninsula in the Troms region of North Norway; formerly in Karlsøy herred, now transferred to Lyngen. It is approximately 200 miles (120 km) north of the Arctic Circle on latitude 69°50' N and 20°20' E. Access is only possible by boat from Lyngen Fjord.

The valley was visited for two weeks from July to August 1959 by the author and his two botany student companions at that time, Mr. R.B. Knox and Mr. J.G. Urquart. We were members of the Edinburgh University North Norway Expedition of 1959.

There are no records of botanist having visited the valley before (cf. Benum 1958). The scope of the paper is limited to general descriptions of the area and its vegetation.
Topography

Rappdalen is a small glaciated valley about 2.5 kilometres (1.5 miles) long, running due West. The steep terminal moraine clothed with birches restricts the view of the interior of the valley from the fjord.

The mountains at the head of the valley are jagged and rise sheer from the accumulated snow at their bases to over 4,000 feet (Tverrbakktnid 1390 m).

There are three small corrie glaciers at the head of the valley; one coming in from the North, one from the South and a Western one at the extreme head of the valley. Their snouts are 700 feet (215 m), 1550 feet (480 m) and 1200 feet (370 m) respectively above sea level.

The northern glacier consists of packed snow and contains no blue ice. The southern glacier has its snout a few hundred feet above the valley floor and is fed by a high-level snowfield. The terminal glacier is fed by the snow accumulating round the bases of the mountains above and is in a very active state. Though these glaciers are retreating, most fresh morainic material is being deposited only by the terminal glacier.

There are three main moraines in the glacial area which were examined, (a) the "Left Lateral" moraine on the east side of the snout of the southern glacier, (b) the "Windy Ridge" moraine on the south side of the terminal glacier, (c) the "Long Curved Moraine - Snout" which is a continuation of "Windy Ridge" moraine and which curves round the end of the northern glaciers. They are all of recent origin.

Large talus slopes have been formed below the mountains on the north and south sides of the valley, particularly on the northern south-facing side. These mountains have high rock-faces and ledges, though their summits are lower than the peaks at the head.
Fig. 1. A. Key map. B. Map of Rappdalen and the surrounding area (from the topographical "Lyngen", 1:50000, 1 x 1 km squares).

A. Nøkkelkart. B. Kart over Rappdalen og tilgrensende områder. Utsnitt av kartblad Lyngen. Rutenettet er 1 x 1 km.
Geology

The rock forming the mountains is of Caledonian series, gabbroic with layers of mica-schists, limestones, and some granite.

Climate

The gulf-stream makes the climate exceptionally mild as compared with other parts of the northern hemisphere at the same latitude. The weather is cool, windy and foggy with rapid changes and often rather chilly summers (Benum 1958). Snow appears in early autumn and disappears in late spring.

Temperature. The isotherms run parallel to the coast and the temperatures increase or decrease rapidly from the coast to the frontier. The extremes of temperatures occur in the inland areas. Rappdalen lies in the +11 °C (52 °F) isotherm for the average July temperature, and in the -4 °C (25 °F) isotherm for the average January temperature. Approximately half the year has recorded temperatures below freezing point.

Precipitation. The average annual precipitation varies from 1000 - 2000 mm/year (Hultén 1950). Rain, sleet and snow occur from October - December and snow falls from January - April. July and August are the rainiest months. Snow lies for approximately 190 days in the year. The depth in March has been recorded as 2 feet (61 cm). The snowcap is present from October - May (figures for Tromsø from Benum 1958).

Snow fell on the mountains at Rappdalen in the first fortnight of August, 1959, down to 3000 feet (930 m). Snow patches were present on the north-facing slopes at this time, below 500 feet (155 m) in places. The south-facing slopes were completely free of snow.
Exploitation

The only evidence of man in Rappdalen was shown by the presence of rotting birch stumps. The felling must have occurred many years ago because this area is now covered by dense birchwood.

Vegetation

The vegetation is a varied one, the habitats ranging from maritime to recent glacial moraine.

Birch forest covers the lower slopes from sea-level up to 1500 feet (460 m). It only occurs at the entrance to the valley, ceasing 300 - 400 yards (270 - 360 m) from the entrance.

There are marked differences between the north- and south-facing slopes. These are still present but less pronounced on ascending the valley.

The slopes below the south-facing cliffs at the entrance are covered by a luxuriant herbaceous flora of which *Filipendula ulmaria* and *Epilobium angustifolium* are most abundant. The fern *Matteuccia struthiopteris* and grasses like *Calamagrostis purpurea* and *Milium effusum* grow on the flat area below the slope and produce a dense herbaceous cover of over 3 feet (0.9 - 1.0 m) in height. There is no comparable vegetation on the north-facing slope, *Empetrum* heaths being present at comparable altitude.

The scree-slopes of the south-facing side are unstable and dry whereas those facing north are much more stable with a protective covering of bryophytes and humus. Plants like *Silene maritima* and *Silene rupestris* grow on the former whereas *Cerastium cerastoides* and *Cassiope hypnoides* are abundant on the latter.

The glacial stream has a strong influence on the flora. The drop in temperature encountered beside the stream in summer was
considerable. Where the stream meanders through areas liable to flood, Salix thickets line its bank and Equisetum palustre is abundant. Juncus filiformis is dominant in a marshy area and Leontodon autumnalis grows in a damp meadow of Agrostis and tufts of Deschampsia cespitosa.

A dry grassland of Deschampsia flexuosa and Phleum alpini supports an entirely different flora of Pyrola minor and Hieracium sp. Mosses (Philonotos sp.) are particularly abundant over the rocks and banks, due to the great quantity of glacial silt which the stream carries.

The moraines themselves show the transition which takes place with age, of the flora clothing them. The sparse arctic-alpine flora of the recent moraine is derived from the surrounding mountains. Cerastium spp., Saxifraga oppositifolia, Silene acaulis, Huperzia selago, Juncus trifidus and the grass Deschampsia flexuosa are the most common early colonizers. The lichen Solorina crocea is common on the level and more stable areas of the moraine, and of the mosses, Polytrichum sp. are present.

The intermediate moraines are clothed with Empetrum heath, Vaccinium vitis-idaea, Loiseleuria procumbens and Deschampsia flexuosa are very common.

The climax is reached with the birch forest and the woodland flora of the oldest moraines. Cornus suecica, Melampyrum spp. and the ferns Dryopteris spp. are all abundant. Linnaea borealis is locally common.

It should be mentioned that young willows (Salix) up to one foot (30 cm) high grew on the most recent moraines and must be counted as some of the earliest colonizers. Similarly young birches of one foot (30 cm) high and less were recorded. These young trees must die out if one judges from their absence on the intermediate moraines, and the varied arctic-alpine flora be replaced by the more or less uniform Empetrum heath.
Flora

a. Plants absent from Scotland

Only about 12% of the plants observed were completely absent from Scotland. About one half of those plants absent from Scotland were present on the north-facing slopes and the most recent moraines. The remainder were scattered over the other habitats, the south-facing slopes accounting for the great majority. The climatic conditions may account for the distribution in the above fashion, conditions in Scotland being less extreme.

b. Plants extinct from Scotland

Only one plant (Pinguicula alpina) from the valley itself was extinct in Scotland. It occurred most abundantly on a basic damp north facing slope below a cliff. It also grew sparingly on damp humus amongst the boulders of the "Great Divide" by the glacial pools.

Scirpus hudsonianus also extinct in Scotland, grew abundantly in the peat bog of Gamvik, a valley parallel and to the north of Rappdalen.

c. Plants of extreme rarity in Scotland

Diapensia lapponica was present on Empetrum heath and the most recent moraines. On the "Great Divide", it was present on the thin layer of humus on top of some of the largest boulders. Its lowest altitude was 250 feet (75 m). One locality in Scotland.

Arabis alpina was present below a north-facing cliff in fair quantity. A few scattered specimens were found on the most recent moraines. One locality in Scotland.

Phyllodoce caerulea grew on the most recent moraines and round the glacial pools of the "Great Divide". It shows itself to be an early colonizer. One locality in Scotland.

Lychnis alpina provided an interesting feature on habitats. It was present on moist basic ledges a few feet above the fjord and only appeared again on the dry south-facing slopes a mile (1.6 km) up the valley. It was an early colonizer on the most recent moraines but in small quantity. One locality in Scotland.

Cicerbita alpina grew abundantly amongst the tall herbaceous flora of the meadowland and in the open parts of the birchwood. It is limited to ledges in the Glen Cova area of Scotland.

Gentiana nivalis grew on dry basic south-facing rock ledges. It is found on Ben Lawers and in Glen Cova in Scotland.
Erigeron borealis was present on the south-facing cliffs. The specimens were larger than their Scottish relatives, which are found on Lawers and Glen Cova.

Saxifraga cernua grew abundantly below the basic north-facing cliff. The silty soil round the glacial pool supported only a few specimens. Where the stream emerged from the "Great Divide" a few plants grew by a calcareous spring. Ben Lawers, Mevis and an Argyllshire locality provide the only Scottish habitats.

Saxifraga cespitosa occurred most frequently on the most recent moraines being therefore an early colonizer. A few specimens grew on the south-facing scree slopes. Limited to the Cairngorms in Scotland.

Saxifraga rivularis grew in the moist shady habitats under the north-facing cliff and by the boulders at the base of the most recent moraines. It was slightly more frequent than Saxifraga cernua in the valley. First recorded from the Breadalbane area in Scotland.

Saxifraga nivalis grew on rocks at sea-level and in suitable habitats over the whole valley including the most recent moraines. It is a very local plant in Scotland being limited to high basic rocks.

Veronica fruticans only grew on the dry south-facing cliffs and scree. It was absent from the most recent moraines. Found only round the Breadalbane area in Scotland.

Veronica alpina had a general distribution over the valley in the damper areas. It grew beside the stream and glacial pools and is an early colonizer on hollows in the surface of the most recent moraines. It is much commoner in Scotland than Veronica fruticans but is still very rare.

Carex lachenalii grew in the damp areas below the north-facing cliff and on the silt beside the glacial pools and stream. It was absent from the most recent moraines. No carices were present on these moraines and therefore cannot be considered as early colonizers. Carex lachenalii is limited to the Cairngorms in Scotland.

Luzula arcuata was present on the exposed boulders of the "Great Divide" and on the most recent moraines. In Scotland it is only found on the exposed plateaux of the Cairngorms and the higher mountain areas of the North-West.

Salix reticulata was found on the basic rocks on the north-facing side and very rarely on the most recent moraines. In Scotland it is limited to basic rocks particularly in the Breadalbane area.

Woodsia alpina grew in small quantity on the dry south-facing cliffs. It is very rare in Scotland being found over 1900 feet (580 m).
Gnaphalium norvegicum grew in the meadowland and very occasionally on the most recent moraines showing a wide range of habitats. It is limited to high damp corries in Scotland.

Sagina saginoides was distributed all over the valley in suitable habitats from the south-facing slopes to the most recent moraines. It is found from Shetland to Lawers in Scotland.

Juncus filiformis was abundant in the marsh beside the stream. It is a rare rush of lochsides in Scotland.

Alchemilla glomerulans was abundant beside the stream growing as high as the glacial pools. It was also present in the meadowland. In Scotland it is limited to over 2000 feet (610 m) from Perth to Ross-shire.

Bartsia alpina was common beside the stream and in damp north-facing rills. It is very rare in Scotland being limited to Perth and Argyllshire.

Cerastium cerastoides was most abundant on the most recent moraines where it was one of the commonest species. It was present on the damp north-facing slopes. It is the rarest of the genus Cerastium in Scotland.

Cerastium arcticum and Cerastium alpinum were abundant on the most recent moraines. The genus is very variable and many different sizes and degrees of hairiness were observed. In Scotland the two are local species in the higher mountains.

Carex atrofusca although not occurring in the valley itself was present in a basic flush 300 feet (90 m) above seal level a few hundred yards (200 - 300 m) south of the valley entrance. It is one of Scotlands rarest sedges.

Carex atrata was commonest on the south-facing slopes but was present on the north-facing ones and in the tall vegetation of the meadowland.

Carex magellanica was observed growing on a mossy boulder in the glacial stream. This habitat would be equivalent to the Scottish habitat of spongy bog in the hills.

Deschampsia cespitosa ssp. alpina grew in moist situations beside the stream and glacial pools and occasionally on the most recent moraines. In Scotland it must be looked for over 3000 feet (915 m).

Phleum alpinum was abundant in the dry grassland beside the stream. It was absent from the most recent moraines.

Poa glauca was an early colonizer of the moraines and was rarer than Poa alpina. The latter was most commonly non-viviparous being the opposite of the Scottish plants which are rarely so.

Dryas octopetala formed a Dryas - Cassiope tetragona heath on the south side of the entrance to the valley at 1000 feet (300 m). A
few specimens occurred as early colonizers on the most recent moraines. It is a plant confined to limestone in the mountains of Scotland descending low in Sutherland.

Potentilla crantzii was common on the dry south-facing cliffs. It was absent from the damp north-facing rocks. It is a strict calcicole in Scotland being very local.

Melampyrum sylvaticum was confined to the birchwood and grew with its commoner relative Melampyrum pratense.

Linnaea borealis another boreal species, very local in Scottish woods was locally common in the woodland growing with Vaccinium vitis-idaea and Empetrum hermaphroditum.

Lycopodium annotinum was limited to the woodland and was the rarest of the clubmosses in the valley.

Ajuga pyramidalis was a very local plant of the woodland being found southwards, along the coast. It was associated with Geranium sylvaticum and Hieracium sp.

Pyrola media was a rare plant of the woodland being observed in only one locality.

Pyrola minor was the commonest species of wintergreen in the valley being an early colonizer of the moraines.

Orthilia secunda grew on ledges on the south side of the entrance to the valley and very occasionally on the most recent moraines. It is a local plant in the Scottish highlands.

Platanthera bifolia had a single colony in the woodland. It is not an infrequent plant in grassy places in Scotland.

Athyrium distentifolium was present amongst the boulders on the Empetrum heath and below the north-facing cliffs. Small specimens were present on the most recent moraines as early colonizers. It is a local fern of the Scottish mountains.

Plants common to the Scottish Highlands were the commonest species in the valley, i.e. Deschampsia flexuosa, Betula pubescens, Alchemilla alpina, Solidago virgaurea, Oxyria digyna, Saxifraga stellaris and Saxifraga oppositifolia, Salix herbacea, Thalictrum alpinum, Huperzia selago, Diphasium alpinum, Vaccinium vitis-idaea and Vaccinium myrtillus, Rhodiola rosea, Cirsiun helenoides, Equisetum palustre, Polygonum viviparum, Campanula rotundifolia, Pinguicula vulgaris, Trientalis europaea, Silene acaulis, Melampyreum pratense, Juncus trifidus and the ferns Gymnocarpium dryopteris, Dryopteris assimilis and Cystopteris fragilis. Empetrum nigrum is commoner in Scotland than Empetrum hermaphroditum.

Calluna vulgaris was a rare plant being found only on the south-facing screes and on the most recent moraines. Plants were only a few inches (5 - 10 cm) in size.
Vaccinium uliginosum grew in the woodland and as a dwarf stunted species on the most recent moraines. It was the most uncommon species of Vaccinium as it is in Scotland.

Saxifraga aizoides was not a common species being found occasionally on the moist rocks of the north- and south-facing sides and as an early colonizer of the most recent moraines.

Trollius europaeus was a striking plant of the meadowland and occasionally by the stream. It is often found on ledges on the Scottish mountains.

Saussurea alpina was most common by the glacial stream and on the north-facing cliffs. It is found at low altitudes in the northwest of Scotland.

Cornus suecica grew in the woodland and formed large dense patches in the Empetrum heath where it was associated with Vaccinium myrtillus.

Silene maritima grew on the south-facing screes at 500 feet (150 m). It was absent from the shoreline. The latter habitat was unsuitable there being no shingle. The scree-slopes were ideal.

Listera cordata grew on Sphagnum sp. associated with Vaccinium vitis-idaea in the open areas of woodland. Sphagnous moss is its habitat of choice in Scotland.

A number of species are common in the lowlands of Scotland but occur on large dry ledges in the mountains. Grazing by animals has banished these herbaceous plants to the ledges. In Norway as a whole, grazing is less intense; hence these plants are able to grow on open slopes as they were at Rappdalen.

Anthriscus sylvestris grew on the meadowland, the south-facing slopes and amongst boulders below cliffs. Here it was associated with Angelica sylvestris which was a slightly commoner species.

Silene dioica was present in small quantity in the meadowland. Filipendula ulmaria and Epilobium angustifolium were abundant on the slopes below the cliffs on the south-facing side. The slope was white with the former's blooms. The latter showed its power of propagation by the presence of a few small specimens on the most recent moraines.

Geranium sylvaticum was more widespread occurring in the birchwoods also. Epilobium montanum, that garden weed in Scotland was an occasional species with Galeopsis tetrahit a plant of waste land in Britain. The raspberry (Rubus idaeus) was scarce and a red currant (Ribes spicatum) was rarer. Scrophularia nodosa was at its most northernly limit here.

Valeriana sambucifolia was more locally abundant.

Vicia cracca common by roadsides in Scotland was present in the meadowland and the common speedwell (Veronica officinalis) grew very sparingly in the shade of the birchwood.
The two stellarias, *Stellaria nemorum* and *Stellaria graminea* were not common, the former being limited to the shade of rocks and trees.

The stinging nettle (*Urtica dioica*) grew in a belt along the base of the south-facing cliff on dry mineral soil.

*Ranunculus acris* had a great range of habitats from the meadowland, along the streamside to the glacial pools and on the downs, sheltered areas below the north-facing cliffs. It was the commonest *Ranunculus* in the valley.

*Rumex acetosa* was found in the meadowland and as an early colonizer on the moraines. It demonstrates its hardiness in Scotland where it is found on high ledges.

The coltsfoot (*Tussilago farfara*) grew on the most recent moraines and in this respect acted as an early colonizer as it does in Scotland on any bank of heavy soil or slag-heap.

**Conclusion**

This account has attempted to show the very close similarity between the mountain flora of Scotland and Norway.

Although the locality described is 200 miles (320 km) north of the arctic circle it has a very rich herbaceous flora with many species found in the lowlands of Scotland. This is due to the warming influence of the Gulf Stream.

The outcrops of basic rocks produced an interesting arctic-alpine flora, albeit with no Norwegian rarities. It is true to say that the presence of utilizable calcium is just as important as producing a rich flora in the Norwegian mountains as it is in Scotland. In the latter country however, excessive grazing has limited the habitats.

The finding of three plants new to the Scottish flora within the past ten years shows that there may be yet more plants with Scandinavian affinity to be found in less explored Scottish mountains.
References


Species list

The division of the area into habitats each with its own flora has been carried out. The sides of the mountains above 1500 to 2000 feet (460 - 610 m) were unexplored. The flora is obviously not a comprehensive one.

Abbreviations:

p: dominant (dominerende)

thd: locally dominant (lokalt dominerende)

a: abundant (rikelig)

la: locally abundant (lokalt rikelig)

vf: very frequent (meget hyppig)

hf: frequent (hyppig)

lf: locally frequent (lokalt hyppig)

of: occasional (tilfeldig)

l: local (lokalt)

vl: very local (meget lokalt)

t: rare (sjelden)

vr: very rare (meget sjelden)

Abs: Absent from Scotland (mangler i Skottland).
Coast line (kystlinjen)

*Betula pubescens* - bjørk (a)
*Cicerbita alpina* - turt (1a)
*Ligusticum scoticum* - strandkjeks (a)
*Lychnis alpina* - fjelltjæreblom (1f)
*Mertensia maritima* - østersurt (1)
*Rhodiola rosea* - rosenrot (a)
*Saxifraga nivalis* - snøsildre (f)
*Sedum annuum* - småbergknapp (f)
*Thalictrum alpinum* - fjellfrostjerne (f)
*Tofieldia pusilla* - bjønndrodd (f)

Birch wood (bjørkeskog)

*Ajuga pyramidalis* - jonsokkoll (vl)
*Alnus incana* - gråor (o)
*Betula pubescens* - bjørk (d)
*Cornus suecica* - skrubber (f)
*Dactylorhiza maculata* ssp. *maculata* - flekkmarihånd (1)
*Dryopteris assimilis* - sauettelg (1a)
*Empetrum hermaphroditum* - fjellkrekling (1d)
*Euphrasia coll.* - øyentrost (1f)
*Geranium sylvaticum* - skogstorkenebb (f)
*Gymnocarpium dryopteris* - fugletelg (f)
*Hieracium sp.* - sverver (f)
*Juniperus communis* - einer (1a)
*Linnaea borealis* - linnea (1f)
*Listera cordata* - småtvælb (1f)
*Luzula pilosa* - hårfrytle (vl)
*Lycopodium annotinum* - stri kråkefot (1)
*Melantherum pratense* - stormarimjelle (f)
*Melantherum sylvaticum* - småmarimjelle (f)
*Paris quadrifolia* - firblad (vl)
*Platanthera bifolia* - nattfiol (r)
*Pyrola media* - klokkevintergrønn (r)
*Saliix sp.* - vier (o)
*Solidago virgaurea* - gullris (f)
*Sorbus aucuparia* - rogn (f)
*Thelypteris phegopteris* - hengeving (f)
*Trientalis europaea* - skogstjerne (f)
*Vaccinium myrtillus* - blåber (f)
*Vaccinium uliginosum* - blokkebar (f)
*Vaccinium vitis-idaea* - tyttebar (1a)
*Veronica officinalis* - legeveronica (1)
*Viola sp.* - fioler
South-facing cliffs, including birch wood above
(Sørvendte klipper, inkludert bjørkeskogen ovenfor)

*Agrostis* sp. - kvein arter (o)
*Alchemilla alpina* - fjellmarikåpe (a)
*Anthricus sylvestris* - hundekjeks (o)
*Arabis hirsuta* - bergskrinneblom (1)
*Betula pubescens* - bjørk (dominant above cliffs / dominerende ovenfor berg).
*Campanula rotundifolia* - blålokke (o)
*Carex atrata* - svartstarr (1f)
*Carex capillaris* - hårstarr (f)
*Cerastium alpinum* - fjellarve (1f)
*Cystopteris fragilis* - skjørlok (f)
*Deschampsia flexuosa* - smyle (a)
*Draba incana* - Iodnerublom (1)
*Elymus caninus* - hundekveke (o)
*Epilobium angustifolium* - geiterams (f)
*Erigeron borealis* - fjellbakkestjerne (vl)
*Erigeron politus* - blankbakkestjerne (r)
*Erysimum hieraciifolium* - berggull (r)
*Euphrasia coll.* - øyentrøster (o)
*Festuca ovina* - sauesvingel (f)
*Filipendula ulmaria* - mjødurt (1a)
*Gentiana nivalis* - snøsøte (1)
*Geranium sylvaticum* - skogstorkenebb (f)
*Hieracium sp.* - svever (o)
*Juniperus communis* - enier (o)
*Melampyrum pratense* - stormarimjelle (o)
*Melica nutans* - hengeaks (o)
*Oxvria digyna* - fjellsyre (f)
*Parnassia palustris* - jåblom (f)
*Poas alpina* - fjellrapp (o)
*Poas pratensis* coll. - engrapp s.l. (o)
*Polypodium vulgare* - sissesildre (r)
*Polystichum lonchitis* - taggbregne (1)
*Potentilla crantzii* - flekkmure (1f)
*Rhinanthus minor* coll. - småengkall (o)
*Rhodiola rosea* - rosenrot (f)
*Rhus saxatilis* - teiebær (1)
*Sagina sibirica* - seterarve (1)
*Salix sp.* - viere (o)
*Saxifraga aizoides* - gulsildre (o)
*Saxifraga cotyledon* - bergfrue (vl)
*Saxifraga nivalis* - snøsildre (1)
*Saxifraga oppositifolia* - rodsildre (f)
*Saxifraga oppositifolia* - rodsildre (f)
*Sedum annuum* - småbergknapp (1f)
*Silene acaulis* - fjellsmelle (1a)
*Solidago virgaurea* - gullris (f)
*Stellaria graminea* - gressjærneblom (1)
*Trientalis europaeus* - skogstjerne (o)
*Vaccinium myrtillus* - blåbær (f)
*Vaccinium vitis-idaea* - tyttebær (o)
*Vicia cracca* - fuglevikke (o)
*Viola sp.* - fioler (1)
*Woodsia alpina* - fjell-lodnebregne (vl)
Meadowland - trail meadow and meadowsweet slope (på eng)

Agrostis capillaris - engkvein
Agrostis spp. - kvein-arter (ld-o)
Alchemilla alpina - fjellmarikåpe (o)
Alchemilla glomerulans - kildemarikåpe (a-f)
*Angelica archangelica - kvann (o-f)
Anthriscus sylvestris - hundekjeks (r)
Athryum sp. - skog- eller fjellburkne (o)
Calamagrostis purpurea - skogrørkvein (la)
Campanula rotundifolia - blåkickke (o)
Carex atrata - svartstarr (o)
Cicerbita alpina - turt (la-f)
Cirsium helenoides - hvitbladtistel (f)
Deschampsia flexuosa - smyle (f)
Epilobium angustifolium - geiterams (ld-a)
Epilobium collinum - bergmjølke (o)
Epilobium montanum - krattnjølke (o)
Equisetum sp. - sneller (o)
Filipendula ulmaria - mjødurt (ld-f)
Galeopsis tetrahit - kvassdå (o)
Cerastium alpinum ssp. glabratum - snauarve (r)
*Matteuccia struthiopteris - strutseving (o)
Milium effusum - myskegress (1)
Myosotis decumbens - fjellforglemmei (o)
Ranunculus acris - engsoleie (o)
Rhodiola rosea - rosenrot (o)
Ribes spicatum - villrips (r)
Rubus idaeus - bringebær (o)
Rumex acetosa - engsyre (f)
Silene dioica - rød jonskblom (o)
Solidago virgaurea - gulris (f)
Stellaria graminea - grøstjerneblo (o)
Stellaria nemorum - skogstjerneblo (o)
Trollius europaeus - ballblom (f)
Urtica dioica - stornesle (lf)
Valeriana sambucifolia - vendelrot (la-f)
Vicia cracca - fuglevikke (o)

Streamside, including Leontodon meadow - below Great Divide (på elvekant, inkludert følbloem-eng)

Agrostis sp. - kvein, ubestemt (o)
Agrostis stolonifera - krypkvein (f)
Alchemilla glomerulans - kildemarikåpe (la)
*Angelica archangelica - kvann
Bartsia alpina - svarttopp (o)
Betula pubescens - bjørk (o)
Carex aquatilis - nordlandsstarr (1)
Carex bigelowii - stivstarr (1)
Carex canescens - grastarr (1)
Carex magellanica - frynsestarr (vr)
Cerastium alpinum ssp. glabratum - snauarve (r)
Cirsium helenoides - hvitbladtistel (o)
Coeloglossum viride - grønnkurle (o)
Dactylorhiza sp. - marihånd (l) - spotted leaves
Deschampsia alpina - fjellbuine (1)
Deschampsia cespitosa - sølvbuine (o)
Deschampsia flexuosa - smyle (o)
Epilobium angallidifolium - dvergmjølke (o)
Epilobium palustre - myrmjølke (1)
Equisetum palustre - myrsnelle (a)
Equisetum sylvaticum - skogsnelle (o)
Eriophorum angustifolium - duskmyrull (o)
Eriophorum scheuchzeri - snøull (vl)
Gnaphalium norvegicum - setergråurt (l)
Hieracium spp. - svever (1a)
Juncus filiformis - trådsiv (ld)
Leontodon autumnalis - fylbulom (1a)
Listera cordata - småtvøl (o)
Phelum alpinum - fjelltimotei (f)
Pinguicula vulgaris - tettegress (f)
Potentilla crantzii - flekknør (one specimen observed)
Pyrola minor - perlevintergrønn (lf)
Ranunculus acris - engsoley (f)
Rhinanthus minor coll. - småengkall (o)
Rhodiola rosea - rosenrot (o)
Rumex acetosa - engsyre (o)
Salix herbacea - musøre (1a)
Salix spp. - vier-arter (1a)
Saxifraga cernua - knoppasildre (vr - one colony of five plants)
Saxifraga stellaris - stjernesildre (f)
Sibbaldia procumbens - trefingerur (r)
Taraxacum sp. - løvetann (l)
Trollius europaeus - ballblom (o)
Tussilago farfara - hestehov
Veronica alpina - fjellveronika (1)
*Viola biflora - fjellfiol (found below willows)

Bare heath and rocks/Empetrum heath (skogbar hei og berg/kreklinghei)

Alchemilla alpina - fjellmarikåpe (f)
Arctostaphylos alpinus - rypebær (vl)
Athyrium distentifolium - fjellburkne (lf)
Cornus suecica - skrubbær (1a)
Deschampsia flexuosa - smyle (f)
Diapensia lapponica - fjellpryd (1)
Diphasium alpinum - fjelljanne (f)
Dryopteris assimilis - saueltelg (lf)
Empetrum hermaphroditum - fjellkrekling (d)
Juncus trifidus - rabbesiv (a)
Loiseleuria procumbens - greplyng (vf)
Lycopodium clavatum - myk kråkefot (l)
Sorbus aucuparia - rogn (o)
Vaccinium myrtillus - blåbær (1a)
Vaccinium vitis-idaea - tyttebær (vf)
North-facing cliffs, ledges and shoulders (nordvendte klipper og rygger)

Alchemilla alpina - fjellmarikåpe (rf)
Alchemilla glomerulans - kildemarikåpe (la)
*Angelica archangelica - kvann (1)
Anthriscus sylvestris - hundekjeks (1)
Arabis alpina - fjellskrinneblom (lf)
Arctostaphylos alpinus - rypebær (lf)
Asplenium viride - grønnburkne (f)
Athyrium distentifolium - fjellburkne (lf)
Bartsia alpina - svarttopp (f)
Carex atrata - svartstarr (o)
Carex capillaris - hårstarr (f)
*Carex lachenalii - rypestarr (l)
Cassiope hypnoides - moselyng (lf)
*Cassiope tetragona - kantlyng (lf)
Cystopteris fragilis - skjørlok (f)
Diapensia lapponica - fjellpyrd (o)
Dryas octopetala - reinrose (la)
Empetrum hermaphroditum - fjellkrekling (lf)
Epilobium lactiflorum - hvitmjølke (1)
Juncus trifidus - rabbesiv (a)
Leucorchis albida - hvitkurile (vl)
Loiseleuria procumbens - greplyng (lf)
Luzula spicata - aksfrytle (vf)
*Luzula wahlenbergii - reinfrytle (r)
Myosotis decumbens - fjellfjellkrem (1)
Orthilia secunda - nikkevintergrønn (l)
Oxyria digyna - fjellsyre (la)
Parnassia palustris - jåblom (o)
*Pedinularis lapponica - bleikmyrklegg (l)
Pinguicula alpina - fjelltettegress (1)
Pinguicula vulgaris - tettegress (f)
Polygonum viviparum - harerug (f)
Polystichum lonchitis - taggbregne (lf)
Pyrola minor - perlevintergrønn (lf)
Ranunculus acris - engsoleie (o)
*Ranunculus glacialis - issoleie (o)
*Ranunculus nivalis - snøsoleie (vl)
*Ranunculus pygmaeus - dvergsoleie (1)
Rhodioloa rosea - rosenrot (a-f)
Salix herbacea - musøre (a)
Salix reticulata - rynkevier (1)
*Salix cf. glauca - sølvvier (o)
Saussurea alpina - fjelltistel (f)
Saxifraga aizoides - gulskildre (f)
Saxifraga cernua - knoppkildre (lf)
Saxifraga nivalis - snøskildre (lf)
Saxifraga oppositifolia - rødsildre (f)
Saxifraga rivularis - bekkesildre (l)
Saxifraga stellaris - stjernesildre (vf)
Selaginella selaginoides - dvergjamme (f)
Silene acaulis - fjellsmelle (f-a)
Taraxacum sp. - løvetann (1)
Thalictrum alpinum - fjellfrostjerne (f)
Tofieldia pusilla - bjørnbrodd (f)
Veronica alpina - fjellveronika (f)
Vaccinium uliginosum - blokkebær (lf)
*Viola biflora - fjellfiol (lf)
A. Above meander (ovenfor elvesving)
B. Above Great Divide

<table>
<thead>
<tr>
<th>Species Name</th>
<th>North Facing</th>
<th>South Facing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Alchemilla alpina - fjellmarikåpe</td>
<td>(r)</td>
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<tr>
<td>Athyrium distentifolium - fjellburkne</td>
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<td>Campanula rotundifolia - blåklokke</td>
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<td>*Cerastium alpinum - fjelllarve</td>
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<td>Lychnis alpina - fjelljærebblom</td>
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<td>*Oxvria digyna - fjellsyre</td>
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<td><strong>B</strong> Ranunculus glacialis - issoleie</td>
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<td>Rhodiola rosea - rosenrot</td>
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<td>Rumex acetosa - engsyre</td>
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<td>Sorbus aucuparia - rogn</td>
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<td>Veronica alpina - fjellveronika</td>
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<tr>
<td>Veronica fruticans - bergveronika</td>
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Screes - north facing, above Great Divide (nordvendte skrenter)

*Cassiope hypnoides - moselyng (vf)
*Cerastium cerastoides - brearve (la)
*Gnaphalium supinum - dverggrådurt (a)
*Oxvria digyna - fjellsyre (a)
*Ranunculus glacialis - issoleie (a)
*Salix herbacea - musore (a)
A. Area of large morainic boulders, Great Divide
(område med store moreneblokker)

B. Glacial pools in Great Divide (smeltevannsdammer)

<table>
<thead>
<tr>
<th>Species</th>
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<tr>
<td>Alchemilla alpina</td>
<td>fjellmarikápe (f)</td>
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| Alchemilla glomerulans| kjeldemarikápe (v)
| Bartsia alpina        | svarttopp (v)
| Calluna vulgaris      | røsslyng (v)
| Carex lachenalii      | rypebær (v)
| *Cassiope hypnoides   | moselyng (f)
| *Cassiope tetragona   | kantlyng (f)
| Cryptogramma crispa   | hestespreng (f)
| Deschampsia alpina    | fjellbunke (v)
| Deschampsia flexuosa  | smyle (f)
| Diapensia laponica    | fjellpyrd (f)
| Diphasium alpinum     | fjelljanne (v)
| Empetrum hermaphroditum| fjellkrekling (f)
| Epilobium alsinifolium| kildemjolke (f)
| *Epilobium lactiflorum| hvitmjolke (f)
| Festuca vivipara      | geitvingel (f)
| Gnaphalium norvegicum | setergrårt (f)
| Gnaphalium supinum    | dvergrårt (f)
| Huperzia selago       | lusegress (f)
| Juncus trifidus       | rabbesiv (f)
| Loiseleuria procumbens| greplyng (f)
| Luzula arcuata        | buefrytte (f)
| Luzula spicata        | aksfrytte (vf)
| Oxymria digyna        | fjellyle (f)
| Phyllodoce caerulea   | blålyng (f)
| Pinguicula alpina     | fjelllettegress (v)
| Poa alpina            | fjellrapp (f)
| Polygonum viviparum   | harerug (f)
| Pyrola minor           | perlevintergronn (f)
| Ranunculus acris      | engsoleie (f)
| *Ranunculus nivalis   | snøsoleie (f)
| Rhodola rosea         | rosenrot (f)
| Sagina saginoides     | seterarve (f)
| Salix herbacea        | musøre (f)
| Salix glauca          | solvvier (f)
| Saxifraga cernua      | knoppssilde (f)
| Saxifraga rivularis   | bekkessilde (f)
| Saxifraga stellaris   | stjernesilde (f)
| Silene acaulis        | fjellamelle (f)
| Solidago virgaurea    | gullris (f)
| Taraxacum sp.         | løvetann (f)
| Tofieldia pusilla     | bjønnsbrodd (f)
| Vaccinium myrtillus   | blåbær (o)
| Vaccinium uliginosum   | blokkebær (v)
| Vaccinium vitis-idaea  | tyttebær (f)
| Veronica alpina       | fjellveronika (f)
Recent moraines (ferske morener):

A. Left lateral (venstre sidemorene)

B. The long curved moraine, S snout (den lange, buete morenen, sørspissen)

C. Long curved moraine, windy ridge (den lange, buete morenen, vindutsatt rygg)

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<td>Agrostis sp. - kvein</td>
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<td>*Cassiope hypnoides - moselyng</td>
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</table>

** Only one colony observed
*** Only one plant observed

Additions (tillegg)

**Southwards along coast - open habitat 300 feet above sea**
(sørover langs kysten - åpent område 90 m o.h.)

Carex atrofusca - sotstarr (1)
Carex pallescens - bleikstarr (f)
Carex flava - gulstarr (f)
Juncus alpinus - skogsiv (f)
Juncus triglumis - trillingsiv (f)
Scirpus sp. - bjønnskjegg eller sveltull (ld)

**Northwards: Ytre Gamvik, bogland beside stream**
(nordover: Ytre Gamvik, myr ved elv)

Caltha palustris - soleihov (f)
Carex aquatilis - nordlandsstarr (f)
Menyanthes trifoliata - bukkeblad (a)
Potentilla palustris - myrhatt (a)
Scirpus hudsonianus - sveltull (ld)
Sammendrag

Rappdalen er en liten og avsidesliggende fjelldal nordøst på Lyngenhalvøya. Forfatteren besøkte området i juli-august 1959, og synes å være den eneste som har gjort botaniske undersøkelser her.

Dalen er omgitt av stupbratte tinder på opp til 1390 m. Fra fjellene strekker tre breer eller snøbreer seg ned i dalen. De er i ferd med å trekke seg tilbake, og har etterlatt en serie morenerygger av vekslende alder. Berggrunnen er variert, og består dels av gabbro, dels av glimmerskifer og kalk, men det er også noe granitt. Klimaet er kjølig og nedbørrike.

Skråningene ned mot sjøen er dekket av bjørkeskog. Den når opp til snaut 500 m o.h., og strekker seg bare så vidt inn i munningen av dalen. Det er stor forskjell på nord- og sørventede skråninger. Under de sørventede bergene i dalmunningen er det frodig høystaudvegetasjon, mens de nordventede skråningene bare har kreklinghei. I dalbunnen finnes vierkjerr med bl.a. smyle (Deschampsia flexuosa), fjelltimotei (Phleum alpinum) og sølvbunke (Deschampsia cespitosa).

Morenene i dalen viser store ulikheter i vegetasjon alt etter alderen. Nylig blottlagte morener har en sparsom flora av fjellplanter som rødsoildre (Saxifraga oppositifolia), fjellsvelle (Silene acaulis), lusegress (Huperzia selago), rabbesiv (Juncus trifidus), smyle (Deschampsia flexuosa) og ulike arver (Cerastium spp.). Morenene i de midlere alderer er dekket av kreklinghei. På de eldste morene, i dalmunningen, vokser det bjørkeskog.

Floraen i dalen blir sammenlignet med den som finnes i det skotske høylandet. Rappdalen rommer flere arter som mangler eller er svært sjeldne i Skottland. Fjelltimotei (Phylocoeca caerulea) og blålyng (Phyllodoce empetrata) er vanlig i Skottland. Fjelltop (Diapensia lapponica), fjellkarperblom (Arabis alpina), fjellsrins (Juncus arcticus) og fjelljarteblom (Leychnis alpina) er alle bare kjent fra en lokalitet i Skottland. En rekke andre arter har bare et fåttall forekomster i Skottland. De vanligste artene i Rappdalen er imidlertid også vanlige i Skottland. Det gjelder f. eks. smyle (Deschampsia flexuosa), bjørk (Betula pubescens), fjellmarikåpe (Alchemilla alpina), gullris (Solidago virgaurea) osv.

Artikkelen har også med artsslister for en rekke mindre områder og vegetasjonstyper i og nær Rappdalen. Listene er her supplert med norske navn, og skulle dermed være leselige for de fleste.

I hovedsak er floraen triviell og karakteristisk for ikke altfor kalkrike bergarter i Troms. Av interessante arten kan nevnes nattfiol (Plantanthera bifolia), brunrot (Scrophularia nodosa), klokkevinger (Pyrola media), jonsokkoll (Ajuga pyramidalis), kjol (Cassiope tetragonata) og strandssvelle (Silene maritima). Den siste vokser her i skredjord, og kan indikere ultrabasiske bergarter (serpentin/olivin).

(Funnene synes ikke å være belagt, og artsbestemmelsene kan tenkes å inneholde feil.)
Trondheim den 12.1.1990

Polarflokken
v/ Karl-Dag Vorren
Universitetet i Tromsø
IBG, 9000 Tromsø

I Polarflokken nr. 2, 1989, er inntatt årsmøterefereat fra Nordnorsk avdeling av Norskk Botanisk Forening.

Med vennlig hilsen

Norsk Botanisk Forening

[Signature]
Olav Gjørvoll
leder
Norsk Botanisk Forening ble stiftet i 1935. Foreningen har som formål å:
- være et bindeledd mellom vårt lands botanisk interesserte.
- spre kunnskap om planteliv ved å arrangere ekspedisjoner.
- avholde møter, utgi Blyttia o.l.
- Verne om naturen, da spesielt plantelivet.
Foreningen har utgitt tidsskriftet BLYTTIA siden 1943.

Nordnorsk avdeling ble opprettet i 1971 og har siden 1976 utgitt tidsskriftet POLARFLOKKEN.

Lokalforeningen arrangerer ekspedisjoner til ulike deler av Nord-Norge og Svalbard. I vinterhalvåret holdes det medlemsmøter med foredrag om botaniske emner fra hele verden. Lokalforeningen har også vært engasjert i utredningsarbeid i forbindelse med offentlig planlegging.

For tiden finnes det fem typer medlemskap i lokalforeningen. Ta derfor kontakt med styret for nærmere orientering.

Styret i
Nordnorsk avdeling av
Norsk Botanisk Forening har fra høsten 1989 følgende sammensetning:

Leder................... Knut Fredriksen,
Uranusv. 32,
9020 Tromsdalen

Styremedlem.............. Tormod Lunde,
Gronlandsv. 12,
9000 Tromsø

Styremedlem.............. Hans Tømmervik,
Varden 145,
9000 Tromsø

Styremedlem.............. Hanne Edvardsen,
Universitetet i Tromsø, ADM.,
9000 Tromsø

Styremedlem.............. Ann Marie Odasz,
Universitetet i Tromsø, IEG,
9000 Tromsø

1. Vararepresentant............. Edel Nesje,
Universitetet i Tromsø, IEG,
9000 Tromsø

2. Vararepresentant............. Eli Isaksen,
Universitetet i Tromsø, IEG,
9000 Tromsø