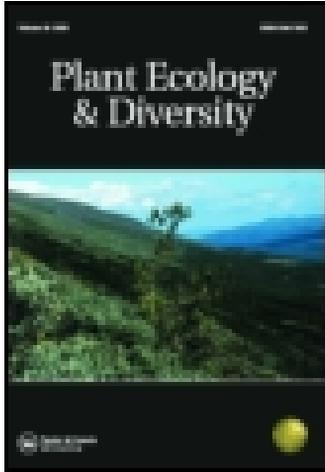


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THE FLORA OF PRINCE CHARLES FORELAND, SPITSBERGEN.
By R. N. RUDMOSE BROWN, B.Sc. (Communicated by
the Secretary.)

In the summer of 1906 the Prince of Monaco landed an expedition under Dr. W. S. Bruce on the little-known island of Prince Charles Foreland, the most westerly island of the archipelago of Spitsbergen. Six weeks in July and August were passed ashore, and though the work of the expedition was in the main restricted to surveying, a small collection of plants was made. In 1907 Dr. Bruce again went to Prince Charles Foreland and spent the whole summer from June to September on the island. A further collection of plants was made, containing several species not included in the previous year's collections. Dr. W. S. Bruce kindly asked me to undertake the description of these two collections, and they form the subject of the present paper.

Previous to Dr. Bruce's exploration of Prince Charles Foreland our knowledge of the island was very meagre. The Swedish Spitsbergen expedition of 1898 under Dr. A. G. Nathorst landed on the island in July of that year, and collected 29 species of flowering plants. Anterior to this date no species had been recorded from the whole island with the two exceptions of *Chrysosplenium alternifolium* and *Draba leptophylla*. Dr. Bruce's collections contain a total of 55 species of vascular plants. It must be remembered that the flora of the whole Spitsbergen archipelago as now known includes barely 200 species of vascular plants. The collections lack several common species well known from Spitsbergen, but surveying expeditions, as I have mentioned was the case with Dr. Bruce's, have few opportunities and little time available for systematic collecting. Such gaps therefore as exist in these collections in all probability will be filled on a future occasion. Three species found on the Foreland by Drs. Andersson and Hesselman in 1898, namely, *Cardamine bellidifolia*, *Sagina nivalis*, and *Saxifraga hieraciifolia*, do not occur in Dr. Bruce's collections. These bring the total number of species known from Prince Charles Foreland up to 58. The Foreland specimens include no species not known from other parts of Spitsbergen, and the flora is entirely

a European one, containing no characteristically American elements. It might have been expected that certain American forms from Greenland would have been found on this island, since it is the most westerly outlier of the European arctic regions; but it is not the case, and in all probability the Greenland Sea sharply divides American and European arctic regions biologically as well as topographically. The flora of the Foreland therefore presents no aspects of great interest, unless it be the entire absence of this American element.

A few brief notes as to the nature of the soil and the physical environment may be of interest. The island is some fifty-five miles long by six broad, and is separated from the mainland of Spitsbergen by a narrow sound varying from eight to two miles in breadth. The interior is very mountainous, rising to a height of 3850 feet in Mount Monaco, but there are extensive stretches of level ground towards the south end, and to some extent also at the north-east. Many of the valleys are filled with glaciers, particularly on the east coast, but only on that coast do some of them reach the sea; the northern and southern parts of the island are unglaciated. A raised beach of half a mile to two miles in breadth almost encircles the Foreland and is clear of snow from June until September, except in the most sheltered spots. The west coast has a far more luxuriant vegetation than the east coast, which is often barren, but, Dr. Bruce says, "even on the west coast there are sterile parts, and one not unfrequently passes abruptly from the flowery region into a veritable desert." Peat bogs are not uncommon, and they support a rich vegetation. At the foot of many of the hills a talus occurs, on the upper and more level parts of which vegetation is relatively abundant, particularly with a southerly or westerly exposure. This is no doubt largely due to the increased fertility of the soil in such spots where birds' nesting-places are always to be found, but certainly other contributing factors are the more direct insulation and the tendency of the soil to be drained of its cold water and thus to become more physiologically suitable for root absorption to take place.

The rapidity with which Arctic plants complete their reproductive processes in the short summer is well known,

and Dr. Bruce notes the fact that on Middle Edinburgh Isle a week after the thick snow had disappeared *Saxifraga oppositifolia* was in full bloom. This is the earliest species to flower in the Foreland, while *Cardamine pratensis* is the latest, being in full flower at the end of August and beginning of September. In early September, when the first falls of snow take place, many plants are still in flower, though fruiting is then general. *Saxifraga aizoides*, *Potentilla emarginata*, and *Cardamine pratensis* were all gathered in flower at this time, and "grasses in fine condition showed their delicate heads through the snow."

My thanks are due to Professor J. W. H. Trail, F.R.S., for much valuable help; and I must also express my indebtedness to Dr. C. H. Ostenfeld, especially in reference to the species of *Poa* and certain other grasses, to Dr. H. Dahlstedt for his opinion on a species of *Taraxacum*, and to Professor I. Bayley Balfour, F.R.S., for facilities in the herbarium of the Royal Botanic Garden, Edinburgh. Dr. W. S. Bruce, who entrusted the collections to me, has earned my further obligations by the excellent state of the specimens and the many valuable notes he took in regard to them.

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RANUNCULACEÆ.

Ranunculus Pallasii, Schlecht. Several specimens from swampy places on the west coast towards the north; in full flower in August.

Ranunculus hyperboreus, Rottb. In very wet places near Vogel Hook and at Cape Cold.

Ranunculus pygmaeus, Wahlenb. A few specimens from the north end of the Foreland. It is apparently not common, but being very inconspicuous might easily be overlooked.

Ranunculus nivalis, Linn. On plains at south end of the Foreland; in full flower in August.

Ranunculus sulphureus, Sol. (*R. altaicus*, Laxm.). One of the common species. Specimens from Cape Cold and from near Vogel Hook. It grows luxuriantly in places to a height of over 15 inches, particularly on a mossy or peaty soil. Smaller specimens approach very closely to the last species.

PAPAVERACEÆ.

Papaver radiculatum, Rottb. (*P. nudicaule*, Linn.). A common species, often of luxuriant growth. Near Vogel Hook and on plains at south end of Foreland.

CRUCIFERÆ.

Cardamine pratensis, Linn. A species represented by specimens from various places on the west coast. In full flower in August and September, the latest of any species on the Foreland.

Draba. In determining the species of this very variable genus I have followed Gelert, who reduces the Arctic forms to ten species, of which five are found in Spitsbergen.

Draba alpina, Linn. Specimens from Cape Cold and vicinity, and from near Vogel Hook. In flower in July; in fruit in August.

Draba alpina, Linn., var. A much smaller, densely cæspitose form, with short and slender flower stalks. A little south of Vogel Hook on the west coast.

Draba hirta, Linn. Near Vogel Hook; in flower in July.

Draba arctica, J. Vahl. "From talus at foot of 1050 feet hill" at the southern end of the central range. In full flower in July.

Cochlearia officinalis, Linn., var. *greenlandica*, Gelert. On west coast; in flower and fruit in July.

Cochlearia officinalis, Linn., var. *oblongifolia*, Gelert. Near Vogel Hook; in flower and commencing to fruit towards the end of July.

CARYOPHYLLACEÆ.

Silene acaulis, Linn. A very common species growing vigorously. Both white and purple varieties occur. Shores

of Antarctic's Bay and near Vogel Hook. Mostly on rather dry and stony ground.

Melandryum apetalum (Linn.), Fenzl (*Wahlbergella apetalum*, Fr.). On south-west coast; in full flower during July and August.

Cerastium alpinum, Linn. Very common. Specimens from Cape Cold and vicinity and the northern part of the west coast. Flowering almost over by the middle of August.

Cerastium Edmondstonii (Wats.), Murb. and Ostenfeld (*C. arcticum*, Lange). From near Vogel Hook.

Cerastium Edmondstonii, var. *caespitosum*, Malmgr. Below Mount Monaco, west coast; in full flower in July.

Stellaria longipes, Goldie. North-west coast and plains at south end of Foreland and Cape Cold.

Stellaria humifusa, Rottb. A single specimen of this very common Arctic plant from near Vogel Hook.

Alsine biflora (Linn.), Wahlenb. "Talus at foot of 1050 feet hill" at southern end of central range.

ROSACEÆ.

Dryas octopetala, Linn. Very common; the ground at "Camp 3" near the north end of the island was carpeted with this species. From various places, particularly towards north and south ends. In flower in July and August.

Potentilla emarginata, Pursh (*P. fragiformis*, Willd., forma *parviflora*, Trautv.). On west coast, north and south of Cape Cold. Beginning to fruit in July and August.

SAXIFRAGACEÆ.

Saxifraga nivalis, Linn. Near Vogel Hook and at Cape Cold. Flowering almost over towards the end of August. Among the specimens is one of a very short, stunted form from Cape Cold, smaller in all respects than the typical *S. nivalis*.

Saxifraga stellaris, Linn., var. *comosa*, Wahlenb. Three specimens from the shores of Peter Winter Bay on the east coast of the Foreland.

Saxifraga oppositifolia, Linn. Probably the commonest plant on the Foreland, growing luxuriantly and covering large areas. All along the west coast, flowering plentifully

in June and July; in full seed in the beginning of September. Abundant on the Middle Edinburgh Isle.

Saxifraga Hirculus, Linn. With its bright sulphur-yellow flowers one of the most conspicuous of Spitsbergen plants. Very common on drier ground, and in full bloom in August. Specimens from the north-west coast, Cape Cold and vicinity, and the southern plain. Particularly abundant about Cape Cold.

Saxifraga aizoides, Linn. Various places on the west coast from near Vogel Hook to Cape Cold. In flower as late as 7th September.

Saxifraga cernua, Linn. The normal form of this species in Arctic regions has the terminal flower buds developed, and flowers freely. Cape Cold, shores of Antarctic's Bay and vicinity, and north-western shores of Foreland. In full flower in July and August. The collection contains a single specimen from near Vogel Hook resembling the British alpine form with drooping, imperfectly developed flowers.

Saxifraga rivularis, Linn. Plentiful in wet places. North-west coast from Vogel Hook southwards.

Saxifraga caespitosa, Linn. Western shores from Vogel Hook southwards, and in the vicinity of Antarctic's Bay. In full bloom in July; fruiting in August.

Chrysosplenium alternifolium, Linn., var. *tetrandrum*, N. Lund. Common in wetter places. North-west shores of Foreland and about Cape Cold.

CRASSULACEÆ.

Rhodiola rosea, Linn. (*Sedum Rhodiola*, DC.). A single very stunted specimen from "talus at foot of 1050 feet hill" at the southern end of central range.

COMPOSITÆ.

Petasites frigidus (Linn.), Fr., Cape Cold. Apparently a rather rare plant on the Foreland.

Taraxacum arcticum (Trautv.), Dahlst. (*T. phymatocarpum*, J. Vahl). Below Mount Monaco and at Cape Cold. Fruiting in August. Dr. H. Dahlstedt very kindly gave me the benefit of his opinion on this species.

CAMPANULACEÆ.

Campanula uniflora, Linn. Three specimens from Cape Cold.

SCROPHULARINEÆ.

Pedicularis hirsuta, Linn. "Talus of 1050 feet hill" at southern end of central range and on north-west shore. In flower in July; in fruit in August.

POLYGONACEÆ.

Polygonum viviparum, Linn. Generally stunted and low growing, this species occasionally assumes a more luxuriant form. Near Vogel Hook, below Mount Monaco, and along the shore southward.

Oxyria digyna, Hill. Luxuriant specimens in profuse flower (July and August) from near Vogel Hook.

SALICINEÆ.

Salix polaris, Wahlenb. Common. Specimens from near Vogel Hook and the shores of Antarctic's Bay.

JUNCACEÆ.

Juncus biglumis, Linn. On shore below Mount Monaco.

Luzula arcuata, Sw. Peter Winter Bay on east coast and near Vogel Hook.

Luzula arcuata, Sw., var. *hyperborea*, R. Br. At north end of Foreland, and at Cape Cold and vicinity.

Luzula nivalis, Beurl. North-west shores of Foreland.

GRAMINEÆ.

Alopecurus alpinus, Sw. Common. From Vogel Hook to Cape Cold.

Phippisia algida (Sol.), R. Br. Vogel Hook and vicinity.

Aira alpina, Linn., forma *vivipara*. Very common; north coast and west coast, southward to Mount Monaco.

Trisetum subspicatum (Linn.), Beauv. Cape Cold.

Arctophila fulva (Trin.), Rupr. (*A. effusa*, Lge.), forma *depauperata*, Nath. (*A. Malmgreni* (Ands.), And. and

Hessel.). Marshy ground on west coast near "500 feet hill."

Poa pratensis, Linn. Near Vogel Hook.

Poa pratensis, Linn. forma. North-west coast.

Poa pratensis, Linn., var. *colpodea* (Th. Fr.), Gelert and Ostenfeld. West coast near Vogel Hook and below Mount Monaco.

Poa cenisia, All. Common on west coast generally, and at Black Hill at north end of Foreland.

Poa alpina, L. forma *vivipara*. West coast.

Dupontia Fischeri, R. Br. West coast from Cape Cold to near Vogel Hook. A pseudoviviparous form from Cape Cold.

Glyceria maritima (Huds.), Wahlenb., forma *reptans* (Laestad), Gelert and Ostenfeld (*G. vilfoidea* (Anders.), Th. Fr.). A mere fragment from the north-east coast, which Dr. C. H. Ostenfeld assures me belongs to this species.

Glyceria angustata (R. Br.), Fr. Common; west coast in the vicinity of Mount Monaco.

Festuca rubra, Linn., var. *arenaria* (Osb.) Lge. Apparently common. Cape Cold and north-west coast; also at Peter Winter Bay on the east coast.

FILICES.

Cystopteris fragilis (Linn.), Bernh., forma *dentata*, Hook. Cape Cold.

Cystopteris fragilis (Linn.), Bernh. var. A variety with pinnæ obtuse, pinnulæ more diffuse and obtuse; growing among grass at Cape Cold.

EQUISETACEÆ.

Equisetum arvense, Linn., forma *alpestre*, Wahlenb. From "talus at foot of 1050 feet hill." Specimens without fertile stems.

LYCOPODIACEÆ.

Lycopodium Selago, Linn. Several well-developed specimens from Cape Cold.