BRYOPHYTES
FROM FRANZ JOSEF LAND
AND EASTERN SVALBARD

COLLECTED BY MR. OLAF HANSSEN
ON THE NORWEGIAN EXPEDITION
IN 1930

BY
PER STØRMER

WITH 1 TEXT FIGURE AND 1 MAP

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I. Former Bryological Investigations in Franz Josef Land and Svalbard.

The bryophytes of Franz Josef Land were very little known before the work of L. I. Savicz was published in 1936. As far as I can see, only three authors have dealt with the bryology of the archipelago before that time. H. Fisher (1896 p. 562, 1898 p. 137) gave brief accounts of the material brought home by the Jackson-Harmsworth Expedition in 1894—97. He enumerates only 5 bryophytes. It is to be regretted that no exact indications are given of the localities where the specimens were collected (except for Marchantia). According to O. Hanssen & J. Lid (1932 p. 8) botanical material was collected at Kapp Neale, Kapp Crowther, Kapp Grant, Cooke Rocks (east of Kapp Grant), and Kapp Stephens (all situated in the southern part of Prins Georgøya); Belløya; Mabeløya; Kapp Flora, Kapp Gjertrud, and Kapp Barents (on Northbrookøya).

The Duke of the Abruzzi Expedition in 1899—1900 brought home some bryophytes collected on Rudolføya and Northbrookøya by Dr. Cavalli-Molinelli. A list of 10 mosses and 1 liverwort was published by O. Mattirolo in the “Osservazioni Scientifiche” of the Expedition, printed in 1903.

The Russian “Yermak” Expedition visited Franz Josef Land in 1901. I. V. Palibin (1903) has described the vegetation on Northbrookøya (Kapp Flora) and Hochstetterøya. On the first island he observed 12 species of bryophytes, on the latter 4 species.

The paper of L. I. Savicz (1936) represents the most exhaustive work on the bryology of Franz Josef Land. She has worked out the material collected by the Russian “Sedow” Expeditions of 1929 and 1930. In the former year, bryophytes were collected by M. Ivanoff, in the latter year by V. P. Savicz. This paper, which is written in the Russian language with a French summary, gives a list of 83 mosses and 7 liverworts found in Franz Josef Land. Besides the systematic part, the work also contains general remarks on the
fertility of the material, as well as phytogeographical discussions. Her work is based on material collected chiefly in the southern and northern parts of the Archipelago. She does not mention any bryophytes from the two big western islands Aleksandraøya and Prins Georgøya where Olaf Hanssen has collected one half of his material of bryophytes.

The bryology of the Svalbard Archipelago is much better known than the bryology of Franz Josef Land. The most exhaustive works on the subject have been written by S. O. Lindberg (1861, 1867), S. Berggren (1875), and H. W. Arnell (1900), but there are earlier contributions given by S. C. Sommerfelt (1833) and A. E. Lindblom (1840). Sommerfelt enumerates 26 mosses and 3 liverworts collected by M. Keilhau at Sørkapp and Kvalpynten in 1831. Lindblom’s work is a compendium based on various enumerations of bryophytes from Svalbard given by J. Vahl, C. J. Phips, R. Brown, W. J. Hooker, and S. C. Sommerfelt.

Since 1900 contributions to the bryology of Svalbard have been given by H. W. Arnell (1900), N. Bryhn (1906), J. Theriot (1907), I. Hagen (1908), H. N. Dixon (1912, 1922, 1924), W. Watson (1922), E. Jørgensen (1926), and E. Armitage (1937). The works on the ecology of Bjørnøya (Bear Island) and Northern Svalbard published by V. S. Summerhayes & C. S. Elton (1923, 1928) contain several lists of bryophytes from various types of habitats, but no assembled list of all the observed bryophytes is given, which is very much to be regretted. Dixon, however, has published their more interesting records (Dixon 1922, 1924). Watson (1922) gives a list of the liverworts, which they collected on the expedition of 1921.

II. Mr. Olaf Hanssen’s Collections in 1930.

The following pages deal with the collection of bryophytes, which Olaf Hanssen brought home from Franz Josef Land and Eastern Svalbard in 1930. He was attached to the Norwegian Scientific Expedition led by Dr. Gunnar Horn and sent out by Norges Svalbard- og Ishavs-undersøkelser (leader Adolf Hoel). The expedition used the Norwegian sealer “Bratvaag” of Ålesund, and Hanssen did the botanical work on the expedition. (See G. Horn 1931, O. Hanssen & J. Lid 1932.) He collected vascular plants as well as cryptogams.
The bryophytes dealt with in this paper were collected in Franz Josef Land and on the small islands of Eastern Svalbard. His localities are:

**Franz Josef Land.**

<table>
<thead>
<tr>
<th>Location</th>
<th>Visited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kapp Harmsworth (Aleksandraøya)</td>
<td>Aug. 25</td>
</tr>
<tr>
<td>Kapp Nansen (Prins Georgøya)</td>
<td>17 and 21</td>
</tr>
<tr>
<td>Kapp Stephens</td>
<td>11</td>
</tr>
<tr>
<td>Kapp Forbes</td>
<td>11</td>
</tr>
<tr>
<td>Eirahamna, Belløya</td>
<td>17</td>
</tr>
<tr>
<td>Kapp Flora (Northbrookøya)</td>
<td>16</td>
</tr>
<tr>
<td>Vinndalen, near Kapp Flora (Northbrookøya)</td>
<td>12</td>
</tr>
<tr>
<td>Camp Ziegler (Algerøya)</td>
<td>15</td>
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**Eastern Svalbard.**

<table>
<thead>
<tr>
<th>Location</th>
<th>Visited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abeløya (Kong Karls Land), Lat. 79° N., Long.</td>
<td>Aug. 4</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>30° 10’ E.</td>
<td></td>
</tr>
<tr>
<td>Storøya (to the East of Nordaustlandet), Lat.</td>
<td>5</td>
</tr>
<tr>
<td>80° 6’ N., Long. 28° E.</td>
<td></td>
</tr>
<tr>
<td>Andréeneset, Kviteya (to the East of Nordaus-</td>
<td></td>
</tr>
<tr>
<td>landet), Lat. 80° 5’ N., Long. 31° 30’ ...</td>
<td>6 and 7</td>
</tr>
</tbody>
</table>

From the two large western islands of Aleksandraøya and Prins Georgøya no moss or liverwort has previously been recorded in literature, as far as I can see. Some of the five bryophytes which Fisher (1896, 1898) records from Franz Josef Land may, of course, have been collected on Prins Georgøya, but he does not give any information about where the various specimens were collected. Neither Mattirololo (1903) nor Savicz (1936) gives any records of bryophytes from these islands. On Aleksandraøya Hanssen collected mosses at Kapp Harmsworth, on Prins Georgøya at Kapp Nansen, Kapp Stephens, and Kapp Forbes.

The collection of bryophytes which he made on the small islands to the east of Svalbard is interesting, because we know very little about the bryology of these islands. The Swedish Expedition of A. G. Nathorst in 1898 brought home bryophytes from Kviteya, Svenskøya, and Kongsøya, but none from Storøya and Abeløya where
Hanssen collected 12 specimens of mosses, all of which, however, belong to species common in the Svalbard Archipelago. As to the fertility of our material we may point out that specimens with sporophytes are very poorly represented; in fact only 3 specimens in his collection are fertile, all of them belonging to acrocarpous species. They are: *Haplodon Wormskjoldii*, *Encalypta rhabdocarpa* var. *leptodon*, and *Webera nutans*. The lack of fertility in the Arctic bryophytes is, however, a well known fact that has been often commented on in bryological literature.

Olaf Hanssen’s collection, which consists of 84 samples, has been presented by *Norges Svalbard- og Ishavs-undersøkelser* to the Botanical Museum of the University of Oslo. In the following pages an enumeration of the species is given.

**Enumeration of the Bryophytes Collected in Franz Josef Land and Eastern Svalbard by Mr. Olaf Hanssen in 1930.**

**Musci.**

1. *Polytrichum piliferum* Hedw.
   
   Franz Josef Land: Kapp Harmsworth, Aleksandraøya.
   
   Former investigations. Savicz (1936 p. 559) has only one record from Franz Josef Land, viz: Aagaardøya.

   
   Franz Josef Land: Kapp Nansen, Kapp Forbes, and Kapp Flora.
   Svalbard: Abeleya.
   
   Former investigations. Savicz (1935 p. 559, 560) records it from Hookerøya and Keltieøya. In the Svalbard Archipelago this species seems to be common, being mentioned by nearly all the authors on the bryology of this region, beginning with S. C. Sommerfelt (1833).

   *Polytrichum alpinum* Hedw.
   var. *brevifolium* (R. Br.) Brid.
   
   Svalbard: Andréøeneset, Kviteøya.
   
   Former investigations. This variety has been recorded from Prins Karls Forland by Hagen (1908 p. 328) and Dixon (1912 p. 94).
   f. *arctica* (Kindb.) Arn.
   Franz Josef Land: Kapp Nansen, Belløya, and Kapp Flora.
   Former investigations. Savicz (1936 p. 559, 560) has recorded this variety from Hookerøya and Keltieøya.

4. *Aulacomnium palustre* (Hedw.) Schwaegr.
   Franz Josef Land: Kapp Stephens and Kapp Forbes.
   Former investigations. Savicz (1936) states only the var. *imbricatum* Bruch et Schimp. from Franz Josef Land. Hanssen's specimens can not, however, be referred to that variety. The leaves are gradually acuminate to a narrow point just as in the type of the species.

5. *Aulacomnium turgidum* (Wahlenb.) Schwaegr.
   Franz Josef Land: Kapp Stephens, Kapp Forbes, and Kapp Flora.
   The specimens from Kapp Flora are extraordinarily well developed. The stems are very robust, some of them attaining the height of 15 cm.
   Former investigations. This species is recorded from the Archipelago by Fisher (1898 p. 137). Mattirolo (1903 p. 656) records it from Kapp Flora, and Savicz (1936 p. 559—561) from seven different islands in Franz Josef Land.

   var. *integrifolium* Lindb.
   Franz Josef Land: Kapp Flora, very scanty material.
   Former investigations. This variety is recorded from Northbrookøya by Savicz (1936 p. 560).

   Franz Josef Land: Kapp Flora.
   Svalbard: Storøya and Kvitøya.
   Former investigations. This species, which forms handsome red cushions, was described from Svalbard by Lindberg (1867 p. 544). Later on it has been recorded from that archipelago by Berggren (1875 p. 65), Arnell (1900 p. 117), Jørgensen (1926 p. 29), and Armitage (1937 p. 77). From Franz Josef Land it has been recorded already by Fisher (1898 p. 137). Mattirolo (1903 p. 657) records it from Rudolføya and Savicz (1936 p. 559—561) records it from four different islands in the Archipelago.
Besides this species, there are, also some sterile specimens of *Bryum* in Hanssen's collection. I have, however, not been able to determine them.

8. *Webera cruda* (Hedw.) Bruch

Svalbard: Abeløya.

The specimens form compact tufts with rather appressed leaves, which are only about 1.5 mm long.

Former investigations. This species has been recorded from Svalbard by Lindberg (1867 p. 547), Berggren (1875 p. 58), Arnell (1900 p. 121, Svenskøya and Kongsøya), and Jørgensen (1926 p. 30).


Svalbard: Abeløya, with immature capsules.

Former investigations. Lindblom (1840 p. 156) records it from Svalbard, collected by J. Vahl in 1838 or 1839. It is also recorded by Lindberg (1861 p. 190, 1867 p. 547), Berggren (1875 p. 58), and Arnell (1900 p. 120).


Franz Josef Land: Kapp Flora, with ripe capsules.

Former investigations. This interesting species has been recorded from the archipelago by Fisher (1898 p. 137), Mattirolo (1903 p. 657), and Savič (1936 p. 559, 560). Mattirolo records it from Rudolføya, Savič from Hookerøya and Keltiøya.


Franz Josef Land: Vinddalen, near Kapp Flora, with ripe capsules.

Former investigations. This variety has been recorded from Aagaardøya, Hookerøya, Northbrookøya, and McClintockøya by Savič (1936 p. 559–561).


Svalbard: Storøya and Kvitoøya (Andréenesset).

Former investigations. This nitrophilous species seems to be common in the Svalbard Archipelago, being recorded by Sommerfelt (1833 p. 235), Lindberg (1861 p. 190, 1867 p. 553), Berggren (1875 p. 48), Arnell (1900 p. 122), and Dixon (1924 p. 69).
Svalbard: Abeløya, Storøya and Kvítøya (Andréeneset).

Former investigations. Most of the authors dealing with the bryology of Svalbard have recorded this widely distributed species from the Archipelago, beginning with Sommerfelt (1833 p. 234).

*f. integrifolium* (Lindb.) Monkem.

Franz Josef Land: Kapp Flora.

Former investigations. Savicz (1936 p. 559, 560) records this form from four different islands in the archipelago, including Northbrookøya.

15. *Dicranoweisia crispula* (Hedw.) Lindb.

Franz Josef Land: Kapp Harmsworth.
Svalbard: Storøya and Kvítøya (Andréeneset).

Former investigations. This species is new to Aleksandraøya. Savicz (1936 p. 559, 560) records it only from Hookerøya, Northbrookøya, and Keltieøya. It is also new to Storøya and Kvítøya. Various authors have recorded it from Svalbard, but never from these two islands.

16. *Ceratodon purpureus* (Hedw.) Brid.

Franz Josef Land: Kapp Harmsworth and Kapp Nansen.
Svalbard: Kvítøya (Andréeneset).

Former investigations. Savicz (1936 p. 559, 560) has recorded this widespread species from various islands in Franz Josef Land, but not from Aleksandraøya and Prins Georgøya, where Hanssen has collected his material. From Kvítøya this species has been recorded by Arnell (1900 p. 124), and from other parts of Svalbard by Lindberg (1867 p. 554) and Berggren (1875 p. 44).

17. *Ditrichum flexicaule* (Schleich.) Hampe.

Franz Josef Land: Kapp Flora.

Former investigations. Savicz (1936 p. 559, 560) has recorded this species from various islands in the Archipelago but not from Northbrookøya.

Svalbard: Kvitøya (Andréeneset).

Former investigations. This species has been recorded from the Svalbard Archipelago by Lindberg (1861 p. 190), and Arnell (1900 p. 128), but not from this particular island.


Franz Josef Land: Kapp Stephens and Kapp Forbes.

Former investigations. This species was not collected on the Russian expeditions of 1929 and 1930, the bryophytes of which were worked out by Savicz (1936). It was, however, collected on one of the earlier expeditions to Franz Josef Land. It is recorded in the list of bryophytes from Franz Josef Land which concludes her work (1936 p. 576).


Franz Josef Land: Kapp Nansen, Kapp Flora, and Vinndalen.

Former investigations. This species is new to Prins Georgøya and Northbrookøya. Savicz (1936 p. 560) records it only from Hookerøya.


Franz Josef Land: Camp Ziegler.

Former investigations. Savicz (1936 p. 560) records it only from Hookerøya. It is new to Algerøya.

22. *Calliergon sarmentosum* (Wahlenb.) Kindb.

Franz Josef Land: Kapp Nansen.

Former investigations. This species is new to Prins Georgøya. Savicz (1936 p. 559—561) records it from Belløya, Hookerøya, and Keltieøya.

23. *Calliergon stramineum* (Brid.) Kindb.

Franz Josef Land: Kapp Forbes.

Former investigations: This species is new to Prins Georgøya, being only recorded from Hookerøya and McClintockøya by Savicz (1936 p. 560, 561).

Franz Josef Land: Kapp Nansen.
Svalbard: Storøya and Kvitøya (Andréeneset).

Former investigations. Savicz (1936 p. 560, 561) records it only from Hookeroya and Keltieøya, not from Prins Georgøya where Hanssen has collected his specimen. From northern Svalbard this species has been recorded by Lindberg (1867 p. 539) and Berggren (1875 p. 91). According to the last-mentioned author this species is distributed along the west coast of Svalbard as well as round Hihopenstretet.


var. *faeneum* Hagen 1908.

Franz Josef Land: Kapp Flora.
Svalbard: Abeløya and Storøya.

Former investigations. This variety, described by Hagen (1908 p. 329) from Prins Karls Forland, is probably the same as *D. uncinatus* var. *subjulaceus* (Bruch et Schimp.) Warnst. f. *subfalcata* Warnst. which is recorded by Savicz (1936 p. 559, 561) from Hookeroya and Keltieøya.

*Drepanoclados uncinatus* (Hedw.) Warnst.

var. *gracillimum* Berggren Musci Spitsberg. exssic. No. 134 c.

Franz Josef Land: Kapp Harmsworth, Kapp Nansen, Kapp Stephens, and Vinndalen.
Svalbard: Storøya and Kvitøya (Andréeneset).

Former investigations. This variety has not been recorded from Franz Josef Land by Savicz. It was described in 1875 by Berggren based on material from Bjørnøya (Bear Island) and from Kobbekbuka on Danskøya, Vest-Spitsbergen. (Berggren 1875 p. 86.)

*Drepanoclados uncinatus* (Hedw.) Warnst.

var. *orthothecioides* Lindberg 1867.

Svalbard: Storøya.

Former investigations. This moss was described as a subspecies of *Hypnum uncinatum* by Lindberg (1867 p. 540) based on material from northern Svalbard. According to Berggren (1875 p. 85) this variety is found especially on bird-cliffs, that is, cliffs where seabirds build their nests and hatch their eggs. Hanssen's specimens
confirm this statement, being intermixed with fragments of nitrophilous lichens as well as the nitrophilous *Tortula ruralis*.

The variety is probably the same as *D. uncinatus* var. *subjulaceus* (Bruch et Schimp.) Warnst. *f. orthophylla* Warnst. which is recorded by Savicz (1936 p. 559—561) from Hookerøya, Northbrookøya, and Keltieøya.


Franz Josef Land: Kapp Harmsworth and Kapp Nansen.

Former investigations. This species is new to Aleksandraøya and Northbrookøya. Savicz (1936 p. 559—561) records it from five other islands in the Archipelago.

27. *Campylium zemliae* C. Jensen.

Franz Josef Land: Kapp Nansen, Kapp Flora.

Former investigations. This species was described by C. Jensen (1885 p. 9) from Novaya Zemlya. It has been recorded from Algerøya and Keltieøya by Savicz (1936 p. 559, 560), but not from Prins Georgøya and Northbrookøya where Hanssen has collected his specimens. They are rather tall (8—9 cm), erect, and have few erect branches; obviously they have been collected in a very wet locality.

   var. *alaskanum* (Lesq. et James) Limpr.

Franz Josef Land: Kapp Flora.

Former investigations. This variety has been recorded from Algerøya, Hookerøya, and Northbrookøya by Savicz (1936 p. 559, 560).

It seems to be widely distributed in the Arctic regions, both in the eastern and western parts. Bryhn (1906) does not mention it in his work on the bryophytes collected in Arctic Canada and Greenland on the “Fram” Expedition 1898—1908, which is rather astonishing. He has himself referred one specimen from Gåsefjord (Kong Oscars Land) to this variety. The specimen, collected by H. G. Simmons in 1901, is now in the Oslo University Herbarium. I have gone through all the material in this herbarium of *H. splendens* collected by Simmons in North Lincoln, Kong Oscars Land, Ellesmereland, and NW-Greenland on the “Fram” Expedition. In my opinion, all of it must be referred to the var. *alaskanum*. In Svalbard this moss was collected for the first time by B. M. Keilhau and Captain Pedersen.
in 1827. I have found two specimens in the Oslo Univ. Herb., one from "Vestspitsbergen" leg. Captain Pedersen and another from Kvalpynten leg. B. M. Keilhau. S. C. Sommerfelt, who worked out the material, has labelled the first specimen: "Hypnum splendens?" the other: "Hypnum sp.", but he has not mentioned them in the list which he published (Sommerfelt 1833). There is also material of this variety collected in Vestspitsbergen by S. Berggren 1868, H. Resvoll Holmsen 1907 and E. Hadač 1939. Hadač has collected a great many specimens of this moss, chiefly in the Sassen-district at Isfjorden. He tells me that the moss is common there, from sea-level to 915 m altitude (Albert Bruntoppen).

The relation between *H. splendens* var. *alaskanum*, *H. s.* var. *alpinum* Schliephacke and *H. s.* var. *gracilius* Boulay ought to be thoroughly studied. According to Theriot (1907 p. 37) the var. *alpinum* and the var. *gracilius* is the same thing. But his description of a specimen of *H. s.* var. *gracilius* from Spitsbergen agrees very well with the var. *alaskanum*. If there is any difference between the central European
and the Arctic variety it ought to appear from a comparison between authentic specimens of these two varieties.

K. G. Limpricht (1904 p. 578), R. S. Williams (1919 p. 1), and A. J. Grout (1932 p. 119) state that the stem-leaves of *alaskanum* are not plicate. This, however, does not agree with my observations on the material in the Oslo Univ. Herb. I have found that the obtuse or shortly apiculate stem-leaves characterizing this variety are as a rule longitudinally plicate (see fig. p. 13).

**Hepaticae.**

var. *tenera* Arn. et Jens.

Franz Josef Land: Kapp Flora.

Former investigations. This variety has been recorded by Savicz (1936 p. 559, 560) from Hookerøya, Northbrookøya, and Keltieøya.

30. *Marchantia polymorpha* L.  
var. *alpestris* Nees.

Franz Josef Land: Kapp Flora.

Former investigations. The main species was recorded from the archipelago by Fisher (1896 p. 562). The var. *alpestris* has been recorded from Northbrookøya and McClintockøya by Savicz (1936 p. 560, 561).

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Bryophytes collected by Mr. Olaf Hanssen in Franz Josef Land and Eastern Svalbard in 1930.

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<tr>
<th>Species</th>
<th>Franz Josef Land</th>
<th>Eastern Svalbard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aulacomnium palustre</td>
<td>Kapp Hanssen</td>
<td>Kapp Nansen</td>
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<tr>
<td>Brachythecium turgidum</td>
<td></td>
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<td>Bryum obtusifolium</td>
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<td>Calliergon sarmentosum</td>
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<td>Campylium zemliae</td>
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<td>Ceratodon purpureus</td>
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<td>Dicranum scoparium f. integifolium</td>
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<td>Drepanocladus uncinatus v. faeneum</td>
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<td>Marchantia polymorpha v. alpestris</td>
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Printed November 13, 1940.
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