

DET KONGELIGE DEPARTEMENT
FOR HANDEL, SJØFART, INDUSTRI, HÅNDVERK OG FISKERI

NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER
LEDER: ADOLF HOEL

MEDDELELSE Nr. 47

BRYOPHYTES
FROM FRANZ JOSEF LAND
AND EASTERN SVALBARD

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

BY
PER STØRMER

WITH 1 TEXT FIGURE AND 1 MAP

OSLO
I KOMMISJON HOS JACOB DYBWAD
1940

DET KONGELIGE DEPARTEMENT
FOR HANDEL, SJØFART, INDUSTRI, HÅNDVERK OG FISKERI

NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER
LEDER: ADOLF HOEL

MEDDELELSE Nr. 47

BRYOPHYTES
FROM FRANZ JOSEF LAND
AND EASTERN SVALBARD

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

BY
PER STØRMER

WITH 1 TEXT FIGURE AND 1 MAP

OSLO
I KOMMISJON HOS JACOB DYBWAD
1940

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. Mattiolo 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 "Sedov" 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.		Visited
Kapp Harmsworth (Aleksandraøya)	Aug.	25
Kapp Nansen (Prins Georgøya).....	„	17 and 21
Kapp Stephens „ „	„	11
Kapp Forbes „ „	„	11
Eirahamna, Belløya.....	„	17
Kapp Flora (Northbrookøya)	„	16
Vinddalen, near Kapp Flora (Northbrookøya).	„	12
Camp Ziegler (Algerøya).....	„	15

Eastern Svalbard.		Visited
Abeløya (Kong Karls Land), Lat. 79° N., Long.		
30° 10' E.	Aug.	4
Storøya (to the East of Nordaustlandet), Lat. 80°		
6' N., Long. 28° E.....	„	5
Andréeneset, Kvitøya (to the East of Nordaust-		
landet), Lat. 80° 5' N., Long. 31° 30' ...	„	6 and 7

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 Mattirollo (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 Kvitøya, 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.

2. *Polytrichum alpinum* Hedw.

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

Svalbard: Abeløya.

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: Andréeneset, Kvitøya.

Former investigations. This variety has been recorded from Prins Karls Forland by Hagen (1908 p. 328) and Dixon (1912 p. 94).

3. *Timmia austriaca* Hedw.
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). Mattiolo (1903 p. 656) records it from Kapp Flora, and Savicz (1936 p. 559—561) from seven different islands in Franz Josef Land.

6. *Mnium affine* Bland.
var. *integrifolium* Lindb.

Franz Josef Land: Kapp Flora, very scanty material.

Former investigations. This variety is recorded from Northbrookøya by Savicz (1936 p. 560).

7. *Bryum obtusifolium* Lindb.

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). Mattiolo (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).

9. *Webera nutans* Hedw.

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).

10. *Haplodon Wormskjoldii* (Hornem.) R. Br.

Franz Josef Land: Kapp Flora, with ripe capsules.

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

11. *Encalypta rhabdocarpa* Schwaegr.
var. *leptodon* (Bruch et Schimp.) Lindb.

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

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

12. *Tortula ruralis* (Hedw.) Schwaegr.

Svalbard: Storøya and Kvitøya (Andréeneset).

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).

13. *Rhacomitrium lanuginosum* (Hedw.) Brid.

Svalbard: Abeløya, Storøya and Kvitøya (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).

14. *Dicranum scoparium* Hedw.
f. *integrifolium* (Lindb.) Mønkem.

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 Kvitøya (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 Kvitøya. 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: Kvitøya (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 Kvitøya 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.

18. *Myurella julacea* (Hedw.) Bruch et Schimp.

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.

19. *Brachythecium turgidum* (Hartm.) C. Hartm.

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).

20. *Camptothecium nitens* (Schreb.) Schimp.
var. *involuta* Limpr.

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

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

21. *Cirriphyllum cirrhosum* (Schwaegr.) Grout.

Franz Josef Land: Camp Ziegler.

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

22. *Calliargon 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. *Calliargon 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).

24. *Calliergon turgescens* (Th. Jens.) Kindb.

Franz Josef Land: Kapp Nansen.

Svalbard: Storøya and Kvitøya (Andréeneset).

Former investigations. Savicz (1936 p. 560, 561) records it only from Hookerøya 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 Hinlopenstretet.

25. *Drepanocladus uncinatus* (Hedw.) Warnst.
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 Hookerøya and Keltieøya.

Drepanocladus uncinatus (Hedw.) Warnst.
var. *gracillimum* Berggren Musci Spetsberg. exsicc. No. 134 c.

Franz Josef Land: Kapp Harmsworth, Kapp Nansen, Kapp Stephens, and Vinddalen.

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 Kobbukta on Danskøya, Vest-Spitsbergen. (Berggren 1875 p. 86.)

Drepanocladus 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 sea-birds 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.

26. *Hygrohypnum polare* (Lindb.) Broth.

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.

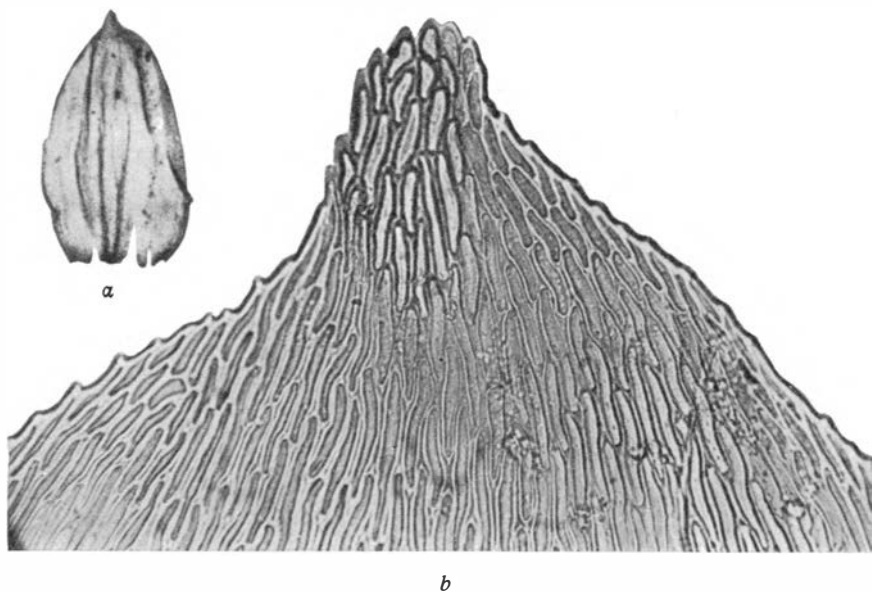
Former investigations. This species was described by C. Jensen (1885 p. 9) from Novaya Zemlya. It has been recorded from Algerøya and Keltieøya by Savicz (1936 p. 559, 560), but not from Prins Georgøya and Northbrookøya where Hanssen has collected his specimens. They are rather tall (8—9 cm), erect,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

28. *Hylocomium splendens* (Hedw.) Bruch et Schimp.
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



Hylocomium splendens v. *alaskanum* from Kapp Flora 12/8 1930
a, stem leaf; $18 \times$ b, apex of stem leaf $260 \times$.
Phot. F. Roll-Hansen 1940

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.

29. *Lophozia quinquedentata* (Huds.) Cogn. 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).

Papers cited:

- Armitage, E. Some Spitsbergen Mosses. (The Bryologist. Vol. 40. Pittsburgh 1937.)
- Arnell, H. W. Beiträge zur Moosflora der Spitzbergischen Inselgruppe. (Öfversigt af Kgl. Vet. Akad. Förh. 1900. No. 1. Stockholm 1900.)
- Berggren, S. Musci et Hepaticae Spetsbergensis. (Kgl. Svenska Vet. Akad. Handl. Bd. 13. No. 7. Stockholm 1875.)
- Bryhn, N. Bryophyta in itinere polari norvagorum secundo collecta. (Report of The Second Norwegian Arctic Expedition in the „Fram“ 1898—1902. No. 11. Kristiania 1906.)
- Dixon, H. N. Supplementary Note on Mosses of Prince Charles Foreland, Spitsbergen. (Trans. and Proc. of the Bot. Soc. of Edinb. Vol. 24. Edinburgh 1912)
- The Mosses of the Oxford University Expedition to Spitsbergen, 1921. (The Bryologist, Vol. 25. Pittsburgh 1922.)
- Spitzbergen Mosses. (Ibid., Vol. 27. 1924.)

- Fisher, H. Some Remarks on the Flora of Franz Josef Archipelago. (The Geographical Journal. Vol. 8. No. 6. London 1896.)
— Flora of Franz Josef Archipelago. (Ibid. Vol. 9. No. 2. 1898.)
- Grout, A. J. Moss Flora of North America north of Mexico. Vol. III. Part 3. New-fane 1932.
- Hagen, I. The Mosses and Hepatics of Prince Charles Foreland, Spitsbergen. (Trans. and Proc. of the Bot. Soc. of Edinb. Vol. 33. Edinburgh 1908.)
- Hanssen, O. and J. Lid. Flowering Plants of Franz Josef Land. (Skrifter om Svalbard og Ishavet. Nr. 39. Oslo 1932.)
- Horn, G. Ekspedisjonen til Franz Josefs Land. (Norges Svalbard-og Ishavsundersøkelser. Meddelelse. Nr. 13. — Norsk Geogr. Tidsskr., Bd. III. Oslo 1931.)
- Jensen, C. Mosser fra Novaia-Zemlia, samlede paa Dijmphna-Expeditionen 1882—83 af Th. Holm. Dijmphna-Togtets zoologisk-botaniske Udbytte. Kjøbenhavn 1885.
- Jørgensen, E. Mosses. In : Iversen, T.: Hopen (Hope Island), Svalbard. (Resultater av de norske statsunderst. Spitsbergene eksp. Bd. 1. No. 10. Oslo 1926.)
- Limpricht, K. G. Die Laubmoose Deutschlands, Oesterreichs und der Schweiz. III Abth. In : Dr. L. Rabenhorst's Kryptogamen-Flora. 2 Aufl. Bd. 4. Leipzig 1904.
- Lindberg, S. O. Mossor år 1858 på Spitsbergen insamlade af Professor A. E. Norden-skiöld. (Öfversigt af Kgl. Vet. Akad. Förh. 18 Årg. Stockholm 1861.)
— Förteckning öfver mossor, insamlade under de svenska expeditionerna till Spitsbergen 1858 och 1861. (Ibid. 23 Årg. 1867.)
- Lindblom, A. E. Förteckning öfver de på Spetsbergen och Beeren Eiland anmärkta vexter. (Botaniska Notiser. Lund 1840)
- Mattiolo, O. Cryptogamae. In : Osservazioni scientifiche eseguite durante la Spedizione Polare di S. A. R. Luigi Amedeo di Savoia, Duca Degli Abruzzi 1899—1900. Milano 1903.
- Palibin, I. V. Resultats botaniques du voyage à l'Océan Glacial sur le bateau brise-glace »Ermak«, pendant l'été de l'année 1901. II. Végétation de la partie meridionale de la Terre François Joseph. (Bull. du Jard. Imp. Bot. de St.-Petersbourg. Tome III. Livr. 5. St.-Petersbourg 1903.)
- Savicz, L. I. Les mousses de L'Archipel François-Joseph, Severnaia Zemlia, ile Wiese, récoltées par V. P. Savicz durant l'expédition polaire de 1930 sur le brise-glace »G. Sedov«. (Acta Inst. Bot. Acad. Sc. Union. Rer. Publ. Sovet. Socialist. Ser. II. Plant. Cryptog. Fasc. III. Mosqua 1936.)
- Sommerfelt, S. C. Bidrag til Spitsbergens og Beeren-Eilands Flora, efter Herbarier, medbragte af M. Keilhau. (Magaz. for Naturv. Anden Rækkes 1ste Bind 2det Hefte. Christiania 1833)
- Summerhayes, V. S. and C. S. Elton. Contributions to the Ecology of Spitsbergen and Bear Island. (The Journ. of Ecology. Vol. XI. Cambridge 1923.)
— Further Contributions to the Ecology of Spitsbergen. (Ibid. Vol. 16. 1928.)
- Theriot, I. Mousses du Spitzberg. (Revue Bryolog. 34e Année. No. 2. Caen 1907.)
- Watson, W. Spitsbergen Liverworts. (The Journ. of Bot. Vol. 60. London 1922.)
- Williams, R. S. *Hylocomium alaskanum* (L. & J.) Kindb. (The Bryologist, Vol. 22. Pittsburgh 1922.)

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

	Franz Josef Land							Eastern Svalbard			
	Kapp Harmsworth	Kapp Nansen	Kapp Stephens	Kapp Forbes	Belloya	Kapp Flora	Vinddalen	Camp Ziegler	Abeloya	Storøya	Kvitøya
<i>Aulacomnium palustre</i>			×	×							
— <i>turgidum</i>			×	×							
<i>Brachythecium turgidum</i>			×	×		×					
<i>Bryum obtusifolium</i>						×				×	
<i>Calliergon sarmentosum</i>		×									
— <i>stramineum</i>				×							
— <i>turgescens</i>											
<i>Camptothecium nitens</i> v. <i>involuta</i>		×	×			×	×			×	×
<i>Campylium zemliae</i>		×	×			×					
<i>Ceratodon purpureus</i>	×	×									
<i>Cirriphyllum cirrhosum</i>								×			
<i>Dicranoweisia crispula</i>	×									×	×
<i>Dicranum scoparium</i> f. <i>integrifolium</i> ..						×				×	
<i>Ditrichum flexicaule</i>						×					
<i>Drepanocladus uncinatus</i> v. <i>faeunum</i> ..						×			×	×	
— — v. <i>gracillimum</i> ..	×	×	×							×	×
— — v. <i>orthothecioides</i> ..									×	×	
<i>Encalypta rhabdocarpa</i> v. <i>leptodon</i> ...							×				
<i>Haplodon Wormskjoldii</i>						×					
<i>Hygrohypnum polare</i>	×	×									
<i>Hylocomium splendens</i> v. <i>alaskanum</i> ..						×					
<i>Mnium affine</i> v. <i>integrifolium</i>						×					
<i>Myurella julacea</i>						×					×
<i>Polytrichum alpinum</i>		×		×		×			×		
— — v. <i>brevifolium</i> ...											×
— <i>piliferum</i>	×										×
<i>Rhacomitrium lanuginosum</i>									×	×	×
<i>Timmia austriaca</i> f. <i>arctica</i>		×			×	×					
<i>Tortula ruralis</i>									×		×
<i>Webera cruda</i>									×		
— <i>nutans</i>									×		
<i>Lophozia quinqueidentata</i> v. <i>tenera</i> ...						×					
<i>Marchantia polymorpha</i> v. <i>alpestris</i> ...						×					

NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER

Observatoriegaten 1, Oslo

MEDDELELSER:

- Nr. 1. PETTERSEN, K., *Isforholdene i Nordishavet i 1881 og 1882*. Optrykk av avis-artikler. Med en innledn. av A. Hoel. — Særtr. av Norsk Geogr. Tidsskr., b. 1, h. 4. 1926. Kr. 1,00. [Utsolgt.]
- ” 2. HOEL, A., *Om ordningen av de territoriale krav på Svalbard*. — Særtr. av Norsk Geogr. Tidsskr., b. 2, h. 1. 1928. Kr. 1,60. [Utsolgt.]
- ” 3. HOEL, A., *Suverenitetsspørsmålene i polartraktene*. — Særtr. av Nordmands-Forbundet, årg. 21, h. 4 & 5. 1928. Kr. 1,00. [Utsolgt.]
- ” 4. BROCH, O. J., E. FJELD og A. HØYGAARD, *På ski over den sydlige del av Spitsbergen*. — Særtr. av Norsk Geogr. Tidsskr., b. 2, h. 3—4. 1928. Kr. 1,00.
- ” 5. TANDBERG, ROLF S., *Med hundespenn på eftersøking efter „Italia“-folkene*. — Særtr. av Norsk Geogr. Tidsskr. b. 2, h. 3—4. 1928. Kr. 2,20.
- ” 6. KJÆR, R., *Farvannsbeskrivelse over kysten av Bjørnøya*. 1929. Kr. 1,60.
- ” 7. NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER, *Jan Mayen. En oversikt over øens natur, historie og bygning*. — Særtr. av Norsk Geogr. Tidsskr., b. 2, h. 7. 1929. Kr. 1,60. [Utsolgt.]
- ” 8. I. LID, JOHANNES, *Mariskardet på Svalbard*. II. ISACHSEN, FRIDTJØV, *Tidligere utforskning av området mellem Isfjorden og Wijdebay på Svalbard*. — Særtr. av Norsk Geogr. Tidsskr., b. 2, h. 7. 1929. Kr. 1,60.
- ” 9. LYNGE, B., *Moskusoksen i Øst-Grønland*. — Særtr. av Norsk Geogr. Tidsskr., b. 3, h. 1. 1930. Kr. 1,60. [Utsolgt.]
- ” 10. NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER, *Dagbok ført av Adolf Brandal under en overvintring på Øst-Grønland 1908—1909*. 1930. Kr. 3,40. [Utsolgt.]
- ” 11. ORVIN, A. K., *Ekspedisjonen til Øst-Grønland med „Veslekari“ sommeren 1929*. — Særtr. av Norsk Geogr. Tidsskr., b. 3, h. 2—3. 1930. Kr. 2,80.
- ” 12. ISACHSEN, G., *I. Norske Undersøkelser ved Sydpollandet 1929—31. II. „Norvegia“-ekspedisjonen 1930—31*. — Særtr. av Norsk Geogr. Tidsskr., b. 3, h. 5—8. 1931. Kr. 1,60.
- ” 13. *Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner sommeren 1930*. I. ORVIN, A. K., *Ekspedisjonen til Jan Mayen og Øst-Grønland*. II. KJÆR, R., *Ekspedisjonen til Svalbard-farvannene*. III. FREBOLD, H., *Ekspedisjonen til Spitsbergen*. IV. HORN, G., *Ekspedisjonen til Frans Josefs Land*. — Særtr. av Norsk Geogr. Tidsskr., b. 3, h. 5—8. 1931. Kr. 2,20.
- ” 14. I. HØEG, O. A., *The Fossil Wood from the Tertiary at Myggbukta, East Greenland*. II. ORVIN, A. K., *A Fossil River Bed in East Greenland*. — Særtr. av Norsk Geol. Tidsskr., b. 12. 1931. Kr. 3,60.
- ” 15. VOGT, T., *Landets senkning i nutiden på Spitsbergen og Øst-Grønland*. — Særtr. av Norsk Geol. Tidsskr., b. 12. 1931. Kr. 1,00.
- ” 16. HØEG, O. A., *Blütenbiologische Beobachtungen aus Spitzbergen*. 1932. Kr. 1,60.
- ” 17. HØEG, O. A., *Notes on Some Arctic Fossil Wood, With a Redescription of Cupressinoxylon Polyommatum, Cramer*. 1932. Kr. 1,60.
- ” 18. ISACHSEN, G. OG F. ISACHSEN, *Norske fangstmenns og fiskeres ferder til Grønland 1922—1931*. — Særtr. av Norsk Geogr. Tidsskr., b. 4, h. 1—3. 1932. Kr. 2,80.
- ” 19. ISACHSEN, G. OG F. ISACHSEN, *Hvor langt mot nord kom de norrøne grøn- lendinger på sine fangstferder i ubygdene*. — Særtr. av Norsk Geogr. Tidsskr., b. 4, h. 1—3. 1932. Kr. 1,00.
- ” 20. VOGT, TH., *Norges Svalbard- og Ishavs-undersøkelsers ekspedisjon til Syd- østgrønland med „Heimen“ sommeren 1931*. — Særtr. av Norsk Geogr. Tidsskr., b. 4, h. 5. 1933. Kr. 2,20.
- ” 21. BRISTOWE, W. S., *The Spiders of Bear Island*. — Repr. from Norsk Entomol. Tidsskr., b. 3, h. 3. 1933. Kr. 0,75.
- ” 22. ISACHSEN, F., *Verdien av den norske klappmyssfangst langs Sydøst- Grønland*. 1933. Kr. 1,60.

- Nr. 23. LUNCKE, B., *Norges Svalbard- og Ishavs-undersøkelers luftkartlegning i Eirik Raudes Land 1932*. — Særtr. av Norsk Geogr. Tidsskr., b. 4, h. 6. 1933. Kr. 1,00.
- „ 24. HORN, G., *Norges Svalbard- og Ishavs-undersøkelers ekspedisjon til Sydøstgrønland med „Veslemari“ sommeren 1932*. — Særtr. av Norsk Geogr. Tidsskr., b. 4, h. 7. 1933. Kr. 1,60.
- „ 25. ORVIN, A. K., *Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner til Nordøst-Grønland i årene 1931—1933*. — *Isfjord fyr og radiostasjon, Svalbard*. Særtr. av Norsk Geogr. Tidsskr., b. 5, h. 2. 1934. Kr. 1,60.
- „ 26. GRIEG, J. A., *Some Echinoderms from Franz Josef Land, Victoriaøya and Hopen. Collected on the Norwegian Scientific Expedition 1930*. 1935. Kr. 1,00.
- „ 27. MAGNUSSON, A. H., *The Lichen-Genus Acarospora in Greenland and Spitsbergen*. — Repr. from *Nyt Magazin for Naturvidensk. B. 75*. 1935. Kr. 1,60.
- „ 28. BAASHUUS-JESSEN, J., *Arctic Nervous Diseases*. Repr. from *Skandinavisk Veterinær-Tidskrift*, No. 6, 1935. Kr. 2,20.
- „ 29. I. KOLSRUD, O., *Til Østgrønlands historie*. II. OSTERMANN, H., *De første efterretninger om østgrønlandingerne 1752*. — Særtr. av Norsk Geogr. Tidsskr., b. 5, h. 7. 1935. Kr. 2,20.
- „ 30. TORNØE, J. KR., *Hvitesøk og Blåserk*. — Særtr. av Norsk Geogr. Tidsskr., b. 5, h. 7. 1935. Kr. 1,00.
- „ 31. HEINTZ, A., *Holonema-Reste aus dem Devon Spitzbergens*. — Sonderabdr. aus *Norsk Geol. Tidsskr.*, b. 15, 1935. Kr. 1,00.
- „ 32. ORVIN, A. K., *Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner i årene 1934 og 1935*. — Særtr. av Norsk Geogr. Tidsskr., b. 5. 1935. Kr. 1,00.
- „ 33. OSTERMANN, H., *Dagbøker av nordmenn på Grønland før 1814*. 1935. Kr. 10,00.
- „ 34. LUNCKE, B., *Luftkartlegningen på Svalbard 1936*. — Særtr. av Norsk Geogr. Tidsskr., b. 6. 1936. Kr. 1,00.
- „ 35. HOLTEDAHL, O., *On Fault Lines Indicated by the Submarine Relief in the Shelf Area West of Spitsbergen*. — Særtr. av Norsk Geogr. Tidsskr., b. 6. h. 4. 1936. Kr. 0,75.
- „ 36. BAASHUUS-JESSEN, J., *Periodiske vekslinger i småviltbestanden*. — Særtr. av *Norges Jeger- & Fiskerforb. Tidsskr.* h. 2 og 3, 1937. Kr. 1,00.
- „ 37. ORVIN, A. K., *Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner til Øst-Grønland og Svalbard i året 1936*. — Særtr. av Norsk Geogr. Tidsskr., b. 6, h. 7. 1937. Kr. 1,00.
- „ 38. GIÆVER, JOHN, *Kaptein Ragnvald Knudsens ishavsferder*. Sammen-arbeidet efter hans dagbøker, rapporter m.v. 1937. Kr. 5,80.
- „ 39. OSTERMANN, H., *Grønlandske distriktsbeskrivelser forfattet av nordmenn før 1814*. 1937. Kr. 6,40.
- „ 40. OMANG, S. O. F., *Über einige Hieracium-Arten aus Grønland*. 1937. Kr. 1,60.
- „ 41. GIÆVER, JOHN, *Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner til Øst-Grønland sommeren 1937*. — Særtr. av Norsk Geogr. Tidsskr., b. 6, h. 7. 1937. Kr. 0,75.
- „ 42. SIEDLECKI, STANISLAW, *Crossing West Spitsbergen from south to north*. — Særtr. av Norsk Geogr. Tidsskr., b. 7, h. 2. 1938. Kr. 1,00.
- „ 43. SOOT-RYEN, T., *Some Pelecypods from Franz Josef Land, Victoriaøya and Hopen. Collected on the Norwegian Scientific Expedition 1930*. 1939. Kr. 1,60.
- „ 44. LYNGE, B., *A small Contribution to the Lichen Flora of the Eastern Svalbard Islands. Lichens collected by Mr. Olaf Hanssen in 1930*. 1939. Kr. 1,00.
- „ 45. HORN, GUNNAR, *Recent Norwegian Expeditions to South-East Greenland*. — Særtr. av Norsk Geogr. Tidsskr., b. 7, h. 5-8. 1939. Kr. 1,00.
- „ 46. ORVIN, ANDERS K., *The Settlements and Huts of Svalbard* — Særtr. av Norsk Geogr. Tidsskr., b. 7, h. 5-8. 1939. Kr. 1,00.
- „ 47. STØRMER PER, *Bryophytes from Franz Josef Land and Eastern Svalbard. Collected by Mr. Olaf Hanssen on the Norwegian Expedition in 1930*. 1940. Kr. 1,00.