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THE ZOOLOGY OF EAST GREENLAND

COLLEMBOLES

BY

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WITH 2 FIGURES IN THE TEXT

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BIANCO LUNOS BOGTRYKKERI A/S
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INTRODUCTION

The first information regarding East Greenland collemboles originates from MEINERT, who in a preliminary statement (1895) mentions 7 species collected by the Ryder Expedition 1891—92 in the Scoresby Sund area. In 1896 MEINERT writes about the collemboles of Greenland and deals in greater detail with the 7 species mentioned in the preliminary statement. When a few years later, in 1900, the collective work of SCHÄFFER appeared in "Fauna Arctica", only the same 7 species were known. In the meantime the Swedish Nathorst Expedition to Jan Mayen and East Greenland (the Franz Joseph Fjord and Scoresby Sund areas) had collected a considerable material, which was prepared by WAHLGREN in 1900. These collections comprise 13 species, eleven of which were until then unrecorded from those parts, and thus the work of WAHLGREN is an extremely important contribution to our knowledge of the collembole fauna of East Greenland. From the Danmark Expedition to Northeast Greenland 1906—08 no collemboles are at hand; a single specimen was caught but not brought home. In 1907 J. C. NIELSEN prepared a survey of all the insects hitherto known from East Greenland, this survey being partly based on the collections made by the more recent expeditions, *viz.* the Holm and Garde umiaq-Expedition 1883—85, the Ryder Expedition 1891—92, and the Amdrup Expedition 1898—1900, and partly on all the previously published works. In spite of this, mention is only made of the 7 species of collemboles which were known to MEINERT, and this also applies to HENRIKSEN and LUNDBECK who are likewise unacquainted with the work of WAHLGREN. REMY (1928) who in 1926 joined the expedition of Charcot to Scoresby Sund added 2 species to those hitherto known, making in all mention of 20 species from East Greenland. MARIE JØRGENSEN (1934) gives a list of all the species on record, adding 4 new ones, while PETERS (1934) only mentions 2 previously known species from Scoresby Sund, the latter having been collected by the Wegener Expedition 1929 and 1930—31. LACK (1934) records 8 species as having been identified by the Cambridge Expedition to Scoresby Sund 1933, and no less than four of these were

new to East Greenland. LINNANIEMI (1935) mentions 10 species, one of which is new, from the Norwegian Government Expedition to Northeast Greenland, 1929—30. MADSEN (1936) mentions 10 species, one of which was hitherto unknown from East Greenland. On Knud Rasmussens 7th Thule Expedition in 1933 MARIE HAMMER (1937) found 22 species at Angmagssalik and Miki's Fjord, nine of which were new to East Greenland. The British Expedition to East Greenland 1935—36 mentions 3 species from Miki's Fjord and Kangerdlugssuaq, including one hitherto unrecorded species (J. M. BROWN 1937).

The present work is partly based upon the literary records mentioned above, and partly upon hitherto unprepared material from the collections of the Zoological Museum and later expeditions. A large collembole material was collected at Ella Ø and Scoresby Sund by the Three Years Expedition; this and a similar material from Lindenow's Fjord, collected by the Thor Expedition, is included in the present work, which also comprises part of the material collected by the 6th and 7th Thule Expedition to Southeast Greenland 1932—33. Finally the material which was determined by MEINERT in 1896 and is to be found in the Zoological Museum at Copenhagen has been made subject to a revision, causing essential alterations to be made in the fauna lists. Thus MEINERTS *Isotoma viridis* (GMELIN) SCHÖTT has been proved to be identical with *Isotoma sensibilis* TULLBERG. Among the specimens of *Isotoma quadrioculata* TULLBERG there was 1 specimen of *Proisotoma tenella* REUTER. The specimens determined as *Achorutes humicola* O. FABRICIUS were found to include a number of *Xenylla humicola* O. FABRICIUS, while *Achorutes uniunguiculatus* TULLBERG proved to be *Xenylla humicola* O. FABRICIUS. *Lipura ambulans* O. FABRICIUS has been proved to be identical with *Onychiurus groenlandicus* TULLBERG. The revision has further done away with *Schöttella* (*Achorutes*) *uniunguiculatus* TULLBERG as a Greenland species, seeing that it has not been identified in later finds. Only four of the species originally determined by MEINERT are left, whereas the material is proved to comprise the following new species: *Isotoma sensibilis* TULLBERG, *Proisotoma tenella* REUTER, *Xenylla humicola* O. FABRICIUS and *Onychiurus groenlandicus* TULLBERG.

Up to the present a total of 40 species of collemboles are known, of which *Tulbergia krausbaueri* BÖRNER and *Ågrenia bidenticulata* TULLBERG have for the first time been identified from East Greenland in this publication.

Neither *Protura*, *Diplura* nor *Thysanura* are known from East Greenland.

I take this opportunity to thank mag. sc. S. L. TUXEN who in several ways has assisted me in the preparation of this paper.

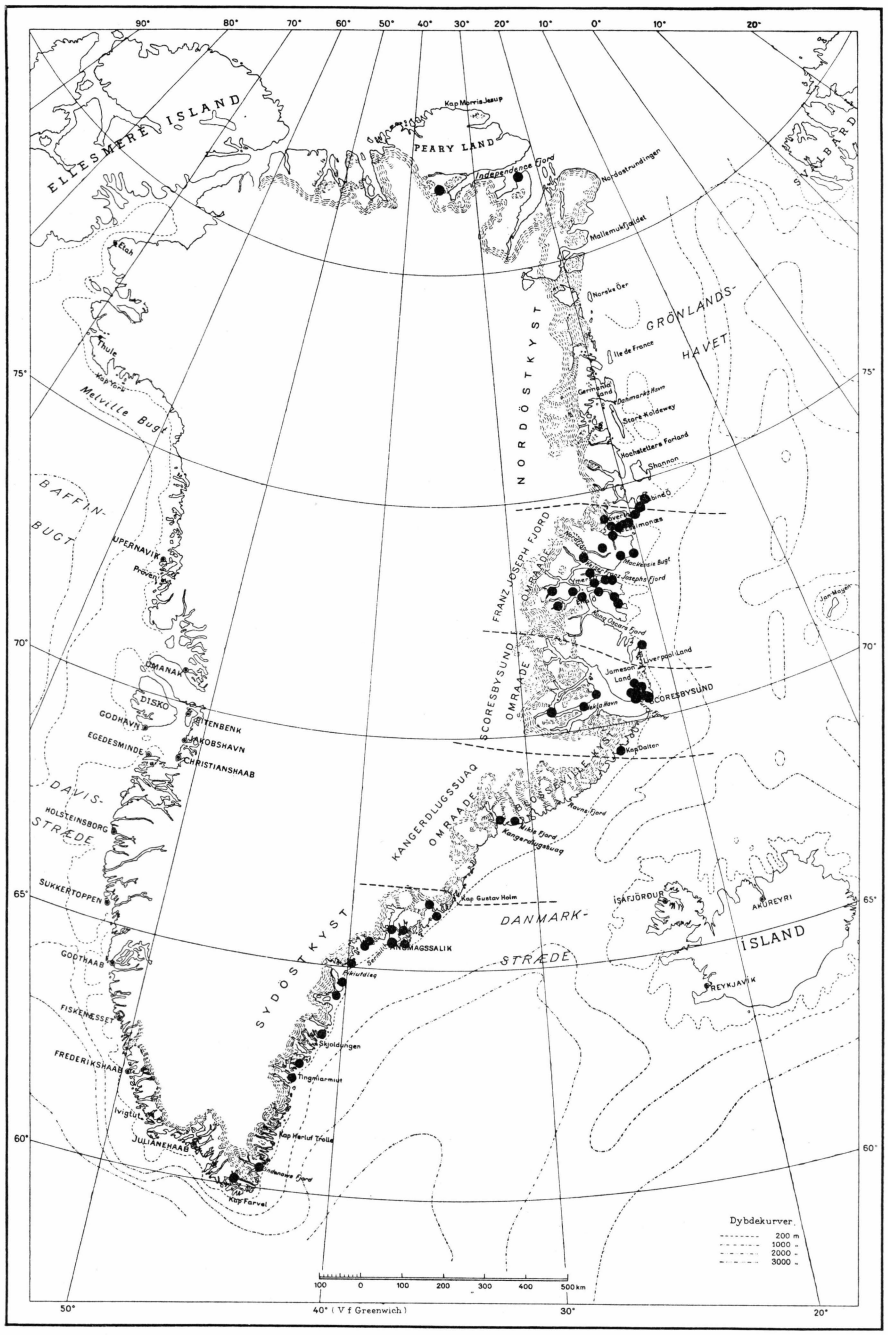

Fig. 1. Map of localities where material has been collected.

SYNOPSIS OF THE SPECIES

1. *Hypogastrura armata* Nicolet.

Hypogastrura armata Handschin 1929, p. 22, figs. 22—23.

East Greenland records:

Achorutes armatus Meinert 1895, p. 120.
— — Meinert 1896, p. 171.
— — Nielsen 1907, p. 409.
— — Henriksen & Lundbeck 1917, p. 741.
Hypogastrura armata Remy 1928a, p. 59.
— — Jørgensen 1934, p. 7.
— longispina Jørgensen 1934, p. 7 Err!
— armata Linnaniemi 1935, p. 21.
— longispina Madsen 1936, p. 19 Err!
— armata Hammer 1937, p. 10.
— — Brown 1937, p. 515.

Occurrence in East Greenland: This species has been found in great numbers in the following localities: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs), Revet (Clavering Fjord), Nordfjord, Suess Land, Ella Ø (Narhvalsund), Traill Ø. — *Scoresby Sund area:* Kap Stewart, Scoresby Sund Koloni, Danmarks Ø (Hekla Havn). — *Kangerdlugssuaq area:* Miki's Fjord, and *South East Coast area:* Stor Ø.

Distribution: West Greenland (Ũmánaq, Kangersunek, Taserssuaq, Tasiusaq; besides it is mentioned, but not localized by Tullberg), Iceland (S, SW, N, NE, SE), Jan Mayen, Spitsbergen, Lappland, Novaja Semlja, Waigatsch, Siberia, all over Europe, North Africa, South Africa, Ceylon, Sumatra, Australia, New Zealand, North America: Canada (North-West Territories), South America (Brazil, Chile, Paraguay, Uruguay) and Juan Fernandez, being thus a pronouncedly cosmopolitan species.

Biology. In East Greenland it is most frequently found in rather moist localities; thus, it is of common occurrence in bog, but may be found in all kinds of localities. It has been found in fell-field[1]), *Carex-*

[1]) A more detailed description of the plant communities mentioned in the following is found in Jørgensen 1934, Madsen 1936 and Hammer 1937.

rupestris-herb-vegetation, *Elyna*-vegetation (dry and wet), birch "stripes", *Dryas*-heath, mixed dwarf-shrub-vegetation, *Cassiope*-snowpatch, in luxuriant grass, *Empetrum*-vegetation, in lichen-heath sparsely intermixed with *Salix herbacea*, in wet moss, in lake shore with a dense moss layer; it is also represented by numerous specimens in a fungus and on the beach. It has been taken throughout the spring and summer from March to September.

Remarks. This species was erroneously identified as *H. longispina* TULLBERG (JØRGENSEN 1934), and this error was repeated by MADSEN. By a revision of the material it was proved to be *H. armata* NIC.

2. *Hypogastrura sp.* (? *longispina* TULLBERG).

Achorutes longispinus TULLBERG 1876, p. 37, pl. X, figs. 31—34; HANDSCHIN 1929, p. 24.

East Greenland records:

Hypogastrura sp. (?longispina) REMY 1928a, p. 61.
— ?longispina REMY 1928b, p. 51.

Occurrence in East Greenland: A single individual from the *Scoresby Sund area* has, though somewhat doubtfully, been determined as *Hypogastrura longispina.*

Distribution: Spitsbergen, Franz Joseph Land, Lappland, Novaja Semlja, northern Russia (Kanin), northern Siberia, Scotland, England, Ireland, Norway, Sweden, France, South Africa, New Zealand, North America, South America (Argentine) and the Antarctic.

Biology: The specimen was found under stones in the period July-August.

3. *Hypogastrura tullbergi* SCHÄFFER.

Achorutes tullbergii FOLSOM 1919, p. 272, pl. XVI, figs. 1—8.

East Greenland records:

Hypogastrura tullbergi LINNANIEMI 1935, p. 21.

Occurrence in East Greenland: This species has hirtherto only been found at Herschelhus (*Franz Joseph Fjord area*), the number of individuals being 10.

Distribution: West Greenland (Saunders Ø), Spitsbergen, Franz Joseph Land (var. *concolor* CARPENTER), Novaja Semlja, northern Siberia, North America: Canada (Cocked Hat Island near Ellesmere Land (var. *concolor* CARP.), North-west Territories), United States (Massachusetts (var. *concolor* CARP.), Alaska). Further, it is known from Central Europe (Bohemia and ?France). The identifications from the latter finding places are possibly uncertain.

Biology: No information is available as to the living conditions of this species in East Greenland. The animals were caught on July 19th.

4. *Hypogastrura viatica* TULLBERG.

Hypogastrura viatica LINNANIEMI 1912, p. 19, pl. II, figs. 13—14.

East Greenland records:

p. p. Achorutes humicola MEINERT 1895, p. 120.
p. p. — — MEINERT 1896, p. 170.
— viaticus SCHÄFFER 1900, p. 242.
p. p. — humicola NIELSEN 1907, p. 409.
— viaticus HENRIKSEN & LUNDBECK 1917, p. 740.
Hypogastrura viatica REMY 1928a, p. 60.
— — JØRGENSEN 1934, p. 7.
— — PETERS 1934, p. 174.
— — MADSEN 1936, p. 19.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs). — *Scoresby Sund area:* Jameson Land, Fame Øerne (Hurry Fjord), Scoresby Sund Koloni, Milne Land (Charcot Havn), Danmarks Ø (Hekla Havn), and *South East Coast area:* Kap Dan.

Distribution: West Greenland (the Godhavn district, Egedesminde, Holsteinsborg, Frederikshaab, Nekamiut, Arsuk; further, it is mentioned, but not localized by TULLBERG); Iceland (S, SW, W, N), Bjørneø, Spitsbergen, Hope Ø, Novaja Semlja, northern Siberia (White Island at the mouth of Ob, Taimyr Peninsula), everywhere in Europe, South Africa, North America: Canada (Agpatôq Island in Hudson Strait), United States (California); South America (Terra del Fuego), the sub-antarctic island Macqarie and the Antarctic.

Biology: This widely distributed collembole is most frequently a pronouncedly littoral form, which nearly everywhere occurs in great quantities. In East Greenland it was taken along the shore under very different conditions, as e. g. in great quantities in a lagoon the bottom of which contains iron-sulphides in detrital accumulations on rather dry oozy planes, as well as in *Puccinellia phryganodes* littoral meadow; besides, a single individual was taken on a sandy beach under seaweed. All the individuals have been collected in summer, in the period June 25th—October 1st.

Remarks: MEINERT also records this species from Kap Stewart; he puts it down as being synonymous with *Achorutes viaticus* (see MEINERT 1896, p. 170), but a revision of his material shows that the specimens from this locality in reality belong to *Xenylla humicola.*

5. *Hypogastrura purpurascens* Lubbock.

Hypogastrura purpurascens Handschin 1929, p. 25, fig. 27.

East Greenland records:

Hypogastrura purpurascens Remy 1928a, p. 60.
— — Remy 1928b, p. 51.
— — Jørgensen 1934, p. 7.

Occurrence in East Greenland: This species has only been found in the northernmost part of East Greenland, as far south as Scoresby Sund. It is known from the following localities: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs), Nordfjord. — *Scoresby Sund area:* Jameson Land north of Kap Stewart, and Scoresby Sund Koloni.

Distribution: Iceland (S), Lappland, northern Russia, as well as the whole of Europe, North Africa (Algiers), South Africa, Australia and sub-arctic South America.

Biology: This species occurs by far most frequently in East Greenland in moist soil; many specimens were found in *Salix arctica*-vegetation, with a thick moss and grass carpet. Further, a few specimens were taken in moss with *Eriophorum*, under stones, in grass-vegetation near old Eskimo houses, as well as in a moist *Vaccinium uliginosum*-vegetation. One specimen was found in a half-dried cake of muskox dung. All of these individuals were taken in the period July-August.

Remarks: The specimen found by Remy in the cake of muskox dung was determined by Denis as *Hypogastrura purpurascens* Lubb., though with the additional remark that this specimen seems very closely allied with var. *concolor* Carpenter of *Hypogastrura tullbergi* Schäffer, and Denis adds: "Sans doute faudra-t-il reunir tout cela. Carpenter ou Folsom n'hésiterait pas à déterminer l'exemplaire en question *Tullbergi-concolor.*"

6. *Hypogastrura manubrialis* Tullberg.

Hypogastrura manubrialis Linnaniemi 1912, p. 21. pl. II, figs. 15—21.

East Greenland records:

Achorutes manubrialis Wahlgren 1900, p. 368.
Hypogastrura — Remy 1928a, p. 60.
— — Jørgensen 1934, p. 7.

Occurrence in East Greenland: A few specimens were found on Hvalros Ø (*North East Coast area*) and on Murray Ø (*Franz Joseph Fjord area*).

Distribution: It is known from Iceland (S, SW, N), northern Siberia (Lena River (var. *assimilis* Krausb.)), northern and Central Europe, North Africa, South Africa, Australia and South America (Buenos Ayres) and thus seems to be cosmopolitan.

Biology: This species has hitherto only been taken by WAHLGREN, who however gives no details as to the finding places, the dates of the collections being likewise unknown.

7. *Xenylla humicola* (O. FABRICIUS).

Xenylla humicola LINNANIEMI 1912, p. 42, pl. IV, figs. 23—25.

East Greenland records:

Achorutes ununguiculatus MEINERT 1895, p. 120. Err!
p. p. — humicola MEINERT 1895, p. 120. Err!
— uniunguiculatus MEINERT 1896, p. 171. Err!
p. p. — humicola MEINERT 1896, p. 170. Err!
Xenylla humicola WAHLGREN 1900, p. 368.
Schöttella uniunguiculatus SCHÄFFER 1900, p. 244. Err!
Achorutes — NIELSEN 1907, p. 409, Err!
p. p. — humicola NIELSEN 1907, p. 409. Err!
Schöttella — HENRIKSEN & LUNDBECK 1917, p. 742. Err!
Xenylla humicola REMY 1928a, p. 61.
— — REMY 1928b, p. 51.
Hypogastrura (Schoettella) ununguiculata REMY 1928, p. 61. Err!
— — — JØRGENSEN 1934, p. 7. Err!
Xenylla humicola JØRGENSEN 1934, p. 7.
— mucronata MADSEN 1936, p. 30. Err!
— humicola HAMMER 1937, p. 10.

Occurrence in East Greenland: *Scoresby Sund area:* Jameson Land north of Kap Stewart, Kap Stewart, Danmarks Ø (Hekla Havn), Gaaseland west of Røde Ø. — *South East Coast area:* Store Ø and Angmagssalik.

Distribution: West Greenland (Qarajaq, the Godhavn district, Amerdloq Fjord, Utorqait, Taserssuaq, Igaliko; further, it is mentioned but not localized by TULLBERG), Iceland (SW, E), Jan Mayen, Bjørne Ø, Spitsbergen, Lappland, northern Russia (Kanin), Novaja Semlja, Waigatsch, northern Siberia, the whole of northern and Central Europe, North America: Canada (Ontario and as far as the arctic area), the United States (Massachusetts, New York), southern South America and the Azores.

Biology: In East Greenland this species has been met with under the most varying conditions, e. g. in very great numbers in the site of a house; it was also found in fairly large quantities in bog with abundant moss-vegetation, which it seems to favour. A few specimens were besides caught under stones at the foot of a cliff, in fell-field and in *Salix herbacea*-vegetation as well as in stony *Carex ursina* littoral meadow. The collections were made in the period July 18th—August 22nd.

Remarks: When examining the collembole material in the Zoological Museum of Copenhagen, it proved that *Schöttella ununguiculatus*

TULLBERG, which was determined by MEINERT in 1895, is in reality *Xenylla humicola* (O. FABRICIUS), and this error has been repeated in all later literary records. The correction does away with *Schöttella ununguiculatus* TULLBERG as an East Greenland species. In the same manner *Xenylla mucronata* AXELSON (MADSEN 1936) proved to be *Xenylla humicola* (O. FABRICIUS). MEINERT's material of *Achorutes humicola* O. FABRICIUS from Kap Stewart was found to contain a number of *Xenylla humicola* (O. FABRICIUS).

8. *Willemia anophthalma* BÖRNER.

Willemia anophthalma LINNANIEMI 1912, p. 53, pl. V, figs. 22—25.

East Greenland records:

Willemia anophthalma HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs, Falskenæs), Ella Ø at Langdalsgletcheren. — *Scoresby Sund area:* Scoresby Sund Koloni. — *Kangerdlugssuaq area:* Miki's Fjord. — *South East Coast area:* Atingat (interior of Angmagssalik Fjord), Angmagssalik and Nanûseq (Lindenow's Fjord).

Distribution: *Willemia anophthalma* seems to have a rather small distribution, as outside East Greenland it is only known from Spitsbergen and northern and Central Europe (Norway, Finland, the Baltic countries, Germany and England).

Biology: This species is extremely common everywhere in East Greenland, though particularly in dry and barren localities. It has been found in fell-field, lichen-heath, *Salix arctica*-heath, abounding in lichen, *Carex rupestris Dryas*-heath, *Cassiope*-heath, *Empetrum-Vaccinium*-heath, in shrub-like vegetation of *Salix arctica* with a thick moss and grass carpet, on rocky ledges with a dry foliage and *betula*-vegetation, on grass slopes, grass *Salix* snow bed, in pure *Empetrum*-vegetation (extremely numerous), in sand littoral meadow with scattered tufts of grass; on the other hand, it is extremely rare in bog and *Sphagnum*, from which a few individuals have been taken. It has been found at 2 to 75 m above sea level in the period June 11th—August 8th.

9. *Friesea quinquespinosa* (WAHLGREN) DENIS.

Polyacanthella quinquespinosa WAHLGREN 1900, p. 368, figs. 6—8.

East Greenland records:

Polyacanthella	quinquespinosa	WAHLGREN 1900, p. 368.
—	—	REMY 1928a, p. 62.
—	—	JØRGENSEN 1934, p. 7.
Friesea	—	LINNANIEMI 1935, p. 22.
Polyacanthella	—	HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Dødemandsbugten, Clavering Ø. — *Scoresby Sund area:* Kap Stewart. — *South East coast area:* Atingat (in Ikerasaussaq, a branch of the Angmagssalik Fjord) and Angmagssalik.

Distribution: This species is only known from East Greenland.

Biology: A few of the East Greenland specimens were found under moss in *Salix herbacea*-vegetation with a sparse bottom vegetation of lichens, in thick, wet moss-vegetation (chiefly *Sphagnum*) near a brook, in scattered *Carex*- and moss-vegetation on the shore of a lake; it was also found in greater quantities in bog. The collections were made during the period July 18th—August 9th.

10. *Anurida granaria* NICOLET.

Anurida granaria TULLBERG 1872, p. 56, pl. XII, figs. 13—17; HANDSCHIN 1929, p. 38.

East Greenland records:

Anurida granaria WAHLGREN 1900, p. 373.
— — REMY 1928a, p. 61.
— — REMY 1928b, p. 51.
— — JØRGENSEN 1934, p. 7.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Murray Ø. — *Scoresby Sund area:* Jameson Land near Kap Stewart, Scoresby Sund Koloni. — *South East Coast area:* Nanûseq (Lindenow's Fjord). These localities show the widely scattered occurrence of the species.

Distribution: Iceland (SW), Jan Mayen, Spitsbergen, Franz Joseph Land, Lappland, northern Siberia (Tschuktschen Land), the other parts of northern and Central Europa, Australia and North America: the United States (Massachusetts). *Anurida granaria* is particularly characteristic of the arctic islands.

Biology: One of the individuals found in East Greenland was taken in a cake of muskox dung; in greater quantities it was found in a low sand littoral meadow with scattered tufts of grass and in moist soil. It has been found in the period July 27th—August 16th.

11. *Achorutes muscorum* TEMPLETON.

Anura muscorum TULLBERG 1872, p. 58, pl. XII, figs. 18—24; HANDSCHIN 1929, p. 41.

East Greenland records:

Achorutes muscorum HAMMER 1937, p. 10.

Occurrence in East Greenland: 2 individuals were found at Angmagssalik (*South East Coast area*).

Distribution: West Greenland (Ipiutat), Iceland (S, SW, N, NE, E), Lappland, northern Russia, Siberia, and all over Europe, New Zealand and North America: Canada (Agpatôq Island in Hudson Strait) and the United States, where it is of common occurrence everywhere.

Biology: Only two individuals of this species have, up to the present, been identified in East Greenland; they were found in a thick, luxuriant very wet layer of moss (particularly *Sphagnum*) near the bank of an open mountain lake, about 20 m above sea level. The moss sample with the individuals was taken on July 28th.

12. *Onychiurus groenlandicus* Tullberg.

Onychiurus groenlandicus Handschin 1929, p. 43, fig. 67.

East Greenland records:

Lipura ambulans Meinert 1895, p. 120. Err!
— — Meinert 1896, p. 172. Err!
Aphorura armata Schäffer 1900, p. 241. Err!
— groenlandica Wahlgren 1900, p. 372.
Lipura ambulans Nielsen 1907, p. 409. Err!
Aphorura armata Henriksen & Lundbeck 1917, p. 739. Err!
Onychiurus armatus Remy 1928a, p. 62. Err!
Onychiurus affinis Ågren var. groenlandicus Remy 1928a, p. 63.
— — — — — Remy 1928b, p. 51.
— — Remy 1928b, p. 51.
— — Ågren var. groenlandicus Jørgensen 1934, p. 7.
— armatus Jørgensen 1934, p. 7. Err!
— groenlandicus Linnaniemi 1935, p. 21.
— affinis var. groenlandica Madsen 1936, p. 30.
— groenlandicus Hammer 1937, p. 10.

Occurrence in East Greenland: *North East Coast area:* Kap Desbrowe, Hvalros Ø. — *Franz Joseph Fjord area:* Clavering Ø (Kap Mary, Eskimonæs, Dødemandsbugten), Revet (Clavering Fjord), Kap Stosch, Nordfjord, Ella Ø, the continent in the interior of Franz Joseph Fjord, on an island (72°46′ N, 22°56′ W) in contributory fjord to King Oscars Fjord, Murray Ø. — *Scoresby Sund area:* Jameson Land, interior of Hurry Fjord (70°53′ N, 22°33′ W), Amdrup Havn, Scoresby Sund Koloni, Kap Stewart. — *Kangerdlugssuaq area:* Miki's Fjord. — *South East Coast area:* Atingat (interior of Angmagssalik Fjord) and Nanûseq (Lindenow's Fjord).

Distribution: West Greenland (Saunders Ø; further, it is mentioned but not localized by Tullberg), Jan Mayen, Spitsbergen, Franz Joseph Land, Norway and Germany. The variety *affinis* Ågren is known from the Scandinavian and Baltic countries, England and Switzerland (as far as 2000 m above sea level).

Biology: In East Greenland *Onychiurus groenlandicus* has been found in the site of a house, in moss, in a thick, spongy moss carpet at the bank of a lake, in moist moss with *Eriophorum-* and *Salix arctica*-vegetation, in fertile grass-vegetation, in stony *Carex ursina-Puccinellia phryganodes* littoral meadow with mosses, in bog, in *Salix herbacea*-vegetation, in pure *Empetrum*-vegetation; it seems in particular to favour moist moss. Samples of this species have been found from June 26th to August 25th.

Remarks: An examination of the Greenland material determined by MEINERT proves that the collembole which in 1895 was designated *Lipura ambulans* NIC. (O. FABRICIUS) is in reality *Onychiurus groenlandicus* TULLBERG; *Lipura ambulans* NIC. (O. FABRICIUS) has later on been designated *Onychiurus armatus* TULLBERG.

The specimens which HAMMER (1937) designated *Onychiurus groenlandicus* TULLBERG have, owing to the overwhelming material, not been made subject to detailed investigations, but it possibly also includes individuals which are to be referred to *Onychiurus groenlandicus* var. *affinis* ÅGREN. Judging by the available literature all the other specimens known from East Greenland belong to *Onychiurus groenlandicus*, with the exception of a single specimen taken by REMY on Jameson Land and determined as *Onychiurus affinis*.

If *Onychiurus groenlandicus* TULLBERG and *Onychiurus affinis* ÅGREN are in reality one and the same species, it must be designated as *Onychiurus groenlandicus* TULLBERG, seeing that this is the oldest, and *Onychiurus affinis* ÅGREN must then be regarded as a variety of the latter.

13. *Onychiurus sibiricus* TULLBERG.

Onychiurus sibiricus HANDSCHIN 1929, p. 44, fig. 68.

East Greenland records:

Aphorura sibirica WAHLGREN 1900, p. 373.
Onychiurus sibiricus REMY 1928a, p. 63.
— — JØRGENSEN 1934, p. 7.
— — LINNANIEMI 1935, p. 21.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Nordfjord, Ymer Ø (at the mouth of Sofia Sund), Kap Humbolt, Suess Land, Vegasund, Ella Ø (at Narhvalsund, Langdalsgletcheren, at the scientific station), Röhssfjord, Traill Ø, island in Kong Oscars Fjord.

Distribution: Northern Europe: northern Russia (Kanin) and Finland, Siberia. In Central Europe it has been found in Austria (Mora-

vian caves), France and Switzerland (2000 m above sea level); besides, it is known from North America: the United States (Illinois).

Biology: *Onychiurus sibiricus* is of common occurrence in East Greenland in all kinds of localities: on the beach, in fell-field, in *Carex rupestris*-herb-vegetation, in *Elyna*-vegetation (dry and wet), in dry *Betula nana*-vegetation, in drifting soil with *Betula nana*- and *Salix*-vegetation, in birch-grass-vegetation, in *Dryas*-heath, in mixed-dwarf-shrub-vegetation, in *Cassiope*-heath, in dry grass-vegetation, in bog, in lake bank with a sparse moss- and *Carex*-vegetation and in *Calamagrostis-Chamaenerium*-vegetation. It is, however, by far the most numerous in moist or wet localities, and has been found throughout the summer from May 19th—August 26th.

14. *Onychiurus armatus* Tullberg.

Onychiurus armatus Handschin 1929, p. 46, fig. 12.

East Greenland records:

Onychiurus armatus Linnaniemi 1935, p. 21.
— — Hammer 1937, p. 10.

Occurrence in East Greenland: A few individuals have been found in *Franz Joseph Fjord area:* at Dødemandsbugten (Clavering Ø); further, it is known from *Scoresby Sund area:* Scoresby Sund Koloni. — *South East Coast area:* Angmagssalik, Nanûseq (Lindenow's Fjord) and Augpilagtoq.

Distribution: West Greenland (Tatsip atâ, Tasiussaq, Neriaq, Camp Lloyd and Søndre Strømfjord (var. *arcticus* Tullberg)); besides, it is on record from West Greenland (Tullberg, no locality given), from Iceland (S, SW, N, NE, E, SE), Jan Mayen, Bjørne Ø, Spitsbergen, Lappland, northern Russia (Kanin), Novaja Semlja, northern Siberia and everywhere in Europe (in Italy from 1000 m to 1650 m, in the Alps up to 3400 m); East Africa, Australia, North Zealand, North America: the United States (Illinois, Maine), and South America (Chile). This species thus seems to be cosmopolitan.

Biology: In East Greenland *Onychiurus armatus* has been found in several kinds of localities, apparently, however, by preference in wet or moist surroundings; it has been found in thick, luxuriant, wet moss (*Sphagnum*), in bog with a thick bottom vegetation of mosses, in sandy lake bank with a sparse *Carex*- and moss-vegetation, in littoral meadow with scattered tufts of grass, in dry river bed on mountain slope with moss, grass and *Lycopodium* and in moist soil. It nowhere occurs in very great numbers. All the individuals have been taken within the period July 18th—August 30th.

15. *Onychiurus pseudarmatus* FOLSOM.

Onychiurus pseudarmatus FOLSOM 1917, p. 646, pl. 68, fig. 6, pl. 74, figs. 52—60.

East Greenland records:

Onychiurus pseudarmatus LACK 1934, p. 602.

Occurrence in East Greenland: A single individual has been found at Konstabel Pynten at Hurry Fjord (*Scoresby Sund area*).

Distribution: Alaska.

Biology: As to the living conditions of this species in East Greenland no information is at hand apart from the period August 1st—15th, in which the only specimen known was found. In Alaska it is known from moss August 6th.

16. *Tullbergia krausbaueri* BÖRNER.

Tullbergia krausbaueri HANDSCHIN 1929, p. 51.

Occurrence in East Greenland: Scoresby Sund Koloni.

Distribution: ?Jan Mayen, the whole of Scandinavia (as far as the northernmost parts of Lapmarken), Finland, the Baltic countries, England, Ireland, Germany and South Africa.

Biology: A few individuals of this species have been taken in wet moss (*Sphagnum*) in the bed of a river, as well as in dry stony fell-field within the period July 27th — August 25th.

Remarks: The only individual found in wet moss is distinguished from the others by three anal spines of equal length.

17. *Tetracanthella wahlgreni* AXELSON.

Tetracanthella wahlgreni LINNANIEMI 1912, p. 103, pl. VIII, figs. 14—18.

East Greenland records:

Tetracanthella wahlgreni JØRGENSEN 1934, p. 7.
— — HAMMER 1937, p. 10.

Occurrence in East Greenland: *Scoresby Sund area:* Scoresby Sund Koloni. — *South East Coast area:* Atingat (in the interior of Angmagssalik Fjord), Angmagssalik and Nanûseq (Lindenow's Fjord); from the latter locality only a single specimen is available, whereas in the others it is of very common occurrence.

Distribution: *Tetracanthella wahlgreni* is widely distributed over the arctic and antarctic regions; thus it has been found in the following localities: West Greenland (Ũmánaq), Bjørne Ø, Spitsbergen, Lapp-

land, the Faroes, England, Sweden, Norway, Finland and North America: Canada (North-west Territories).

Biology: In East Greenland this species has been collected in luxuriant moss-vegetation and in lichen-heath 50—75 m above sea level, where it was extremely numerous, in *Salix herbacea*-vegetation, in bog as well as in lake shore with a sparse vegetation of *Carex* and mosses. The individuals collected have been taken in the period July 18th — August 29th.

18. *Folsomia sexoculata* Tullberg.

Folsomia sexoculata Handschin 1929, p. 57, fig. 99.

East Greenland records:

Isotoma sexoculata Wahlgren 1900, p. 367.
— — Remy 1928a, p. 65.
— — Jørgensen 1934, p. 7.
Folsomia sexoculata Lack 1934, p. 602.
— — Madsen 1936, p. 30.
— — Hammer 1937, p. 10.

Occurrence in East Greenland: *North East Coast area:* Hvalros Ø. — *Scoresby Sund area:* Konstabel Pynten (at Hurry Fjord), Gaase Land west of Røde Ø. — *Kangerdlugssuaq area:* Miki's Fjord. — *South East Coast area:* Atingat (in Ikerasaussaq) and Angmagssalik.

Distribution: Jan Mayen and Spitsbergen; besides it is distributed over great parts of northern and Central Europe: Ireland, England, Scotland, Denmark, Norway, Sweden, Finland, northern Germany and Switzerland.

Biology: This form has been found in East Greenland on stony beaches grown with *Carex ursina*, in sandy lake shore with a sparse vegetation of *Carex* and moss, about 20 m above sea level, in bog, in *Salix herbacea*-vegetation, and in pure *Empetrum*-vegetation. It occurs by preference in moist localities. The dates of occurrence were July 28th—August 22nd.

19. *Folsomia quadrioculata* Tullberg.

Folsomia quadrioculata Linnaniemi 1912, p. 111, pl. IX, fig. 11.

East Greenland records:

Isotoma quadrioculata Meinert 1895, p. 120.
— — Meinert 1896, p. 170.
— — Wahlgren 1900, p. 367.
— — Schäffer 1900, p. 248.
— — Nielsen 1907, p. 408.
— — Henriksen & Lundbeck 1917, p. 738.

Folsomia quadrioculata REMY 1928a, p. 66.
— — REMY 1928b, p. 51.
— — JØRGENSEN 1934, p. 7.
— — MADSEN 1936, p. 19.
— — HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs, Falskenæs), Nordfjord, Suess Land, Ella Ø (at Narhvalsund, the scientific station), Traill Ø, on an island (72°46′ N, 22°56′ W) in contributory fjord to Kong Oscars Fjord. — *Scoresby Sund area:* Jameson Land, Kap Stewart, Scoresby Sund Koloni, Milne Land (Charcot Havn), Danmarks Ø (Hekla Havn). — *Kangerdlugssuaq area:* Miki's Fjord. — *South East Coast area:* Stor Ø, Atingat (in Ikerasaussaq), Angmagssalik (250 m above sea level) and Nanûseq (Lindenow's Fjord).

Distribution: West Greenland (Camp Lloyd, Søndre Strømfjord; besides it is mentioned but not localized by TULLBERG), Iceland (S, SW, N), Bjørne Ø, Spitsbergen, Hope Ø, Lappland, Novaja Semlja, northern Siberia (White Island), the other parts of northern and Central Europe, Italy, Jugoslavia, New Zealand and North America: Canada (North-west Territories, Agpatôq Island in Hudson Strait), the United States (New York, Illinois, Minnesota).

Biology: This species is extremely common everywhere in East Greenland. It has been found under moss in a half-dried cake of muskox dung, on the beach, in lake shore, in bog, in fell-field, in lichen-heath, in *Empetrum*-vegetation etc. It is by far the most commonly occurring collembole, being found from March until medio September.

19a. *Folsomia quadrioculata* TULLBERG var. *anophthalma* AXELSON.

Folsomia quadrioculata var. anophthalma LINNANIEMI 1912, p. 112, pl. IX, figs. 17—18.

East Greenland records:

Folsomia quadrioculata var. anophthalma REMY 1928a, p. 66.

Occurrence in East Greenland: *Scoresby Sund area:* Jameson Land, a little north of Kap Stewart.

Distribution: Iceland (S, SW), Hope Ø, northern Russia (Kanin), Novaja Semlja, Siberia (Ural), Norway and Finland.

Biology: A few specimens have been found in a half-dried cake of muskox dung August 9th.

20. *Folsomia diplophthalma* AXELSON.

Folsomia diplophthalma LINNANIEMI 1912, p. 113, pl. I, fig. 12, pl. IX, figs. 12—16.

East Greenland records:

Folsomia diplophthalma HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs). — *Scoresby Sund area:* Scoresby Sund Koloni. *Kangerdlugssuaq area:* Miki's Fjord.

Distribution: West Greenland (Saunders Ø), Spitsbergen, Lappland, northern Russia, Novaja Semlja, northern Siberia (White Island), Finland, Norway, Sweden, England, New Zealand and North America: the United States (Illinois).

Biology: In East Greenland this species is of particularly common occurrence in wet, thick moss, but it has also been found in drier localities, such as *Cassiope*-heath, as well as in shrub-like vegetation of *Salix arctica* with a thick moss and grass carpet. The individuals were collected in the period July 9th—September 8th.

21. *Folsomia fimetaria* (Linné) Tullberg.

Folsomia fimetaria Handschin 1929, p. 58, fig. 100.

East Greenland records:

Isotoma fimetaria Wahlgren 1900, p. 368.
Folsomia fimetaria Remy 1928a, p. 66.
— — Remy 1928b, p. 51.
— — Jørgensen 1934, p. 7.
— — Lack 1934, p. 602.
— — Linnaniemi 1935, p. 22.
— — Hammer 1937, p. 10.

Occurrence in East Greenland: *North East Coast area:* Hvalros Ø. — *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs, Falskenæs), Revet (Clavering Fjord), Myggebugten, Ella Ø (at Langdalsgletcheren, Narhvalsund), on the continent in the Franz Joseph Fjord area (73°06′ N, 27°17′ W), on an island (73°05′ N, 22°59′ W) in an eastern contributory fjord of Kong Oscars Fjord, on an island (72°46′ N, 22°56′ W) in Kong Oscars Fjord. — *Scoresby Sund area:* Jameson Land, Liverpool Land (nunatak), Kap Stewart, Scoresby Sund Koloni. — *Kangerdlugssuaq area:* Miki's Fjord.

Distribution: West Greenland (the Godhavn district; further, it is mentioned but not localized by Tullberg), Jan Mayen, Spitsbergen, Franz Joseph Land, Lappland, northern Siberia (White Island), the whole of northern and Central Europe, Jugoslavia, Australia, North America: the United States (of common occurrence everywhere, Alaska), Mexico, and Central America (Guatemala).

Biology: In East Greenland *Folsomia fimetaria* has been met with under stones, in *Salix arctica*-heath rich in lichens, in lichen-heath with a slight *Salix herbacea*-vegetation, in *Carex rupestris-Dryas*-heath, in *Empetrum-Vaccinium*-heath, in a shrub-like vegetation of *Salix arctica* with a thick moss and grass carpet, as well as in pure *Empetrum-*

vegetation, where it occurred in very great quantities. It has been taken in the period May 30th—September 8th. On a nunatak (Liverpool Land) it was found about 1000 m above sea level.

22. *Archisotoma besselsi* PACKARD.

Archisotoma besselsi HANDSCHIN 1929, p. 59, figs. 102—104.

East Greenland records:

Archisotoma besselsi JØRGENSEN 1934, p. 7.
— — MADSEN 1936, p. 21.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs), Dusénfjord, Ella Ø. — *Scoresby Sund area:* Scoresby Sund Koloni, Fame Øerne (Hurry Fjord) and Milne Land (Charcot Havn).

Distribution: West Greenland (Polarisbugt, Umanak, Søndre Strømfjord), Jan Mayen, Spitsbergen, northern Russia (Kola), Novaja Semlja, Finland, Norway, Scotland, England, Ireland, France, North America: Canada (Agpatôq Island in Hudson Strait), United States (Massachusetts, New York, California), South America (Terra del Fuego) and the Antarctic. The peculiar distribution of this species is undoubtedly due to ocean currents (FOLSOM 1901). This explains its complete absence from asiatic-arctic areas, as well as its occurrence from northern Greenland and nearly as far as the arctic area. CARPENTER and PHILLIPS are, on the other hand, of the opinion that a land connection in the northern Atlantic within the Tertiary and Pleistocene periods is the only probable way of distribution of the species. In their opinion the distribution of *Archisotoma besselsi* as far as the southern point of South America suggests a rather high antiquity.

Biology: *Archisotoma besselsi* is a pronouncedly littoral form which in East Greenland has been found under washed-up seaweed, in a lagoon with a clayey bottom and iron sulphate, as well as in a lagoon without iron sulphate and dry at ebb-tide. The animals were found within the period June 26th—August 16th.

23. *Proisotoma tenella* REUTER.

Proisotoma tenella LINNANIEMI 1912, p. 127, pl. X, figs. 33—34.

East Greenland records:

Proisotoma tenella HAMMER 1937, p. 10.

Occurrence in East Greenland: *Scoresby Sund area:* Danmarks Ø (Hekla Havn). — *South East Coast area:* Kangerdlugssuatsiaq, Angmagssalik, island at Inigssalik, Sujunikajik, Qardlît, Nordbyes Øer and Nanûseq (Lindenow's Fjord).

Distribution: The Faroes (a few specimens caught on Nolsø have been referred to this species; the determination is perhaps somewhat doubtful), Ireland, Finland and Germany.

Biology: In East Greenland this species has been found in moss near seeping water, in bog with thick wet moss at the bottom, in wave-washed lake bank with a sparse vegetation of *Carex* and mosses, as well as in sandy littoral meadow with a few tufts of grass. Thus it seems to a large extent to prefer wet localities. The individuals were taken from July 18th to September 20th.

Remarks: The single individual originating from Hekla Havn deviates from the others by being provided with two anal spines. This specimen belonged to the material of MEINERT and was found together with *Folsomia quadrioculata*.

24. *Isotoma* (*Pseudisotoma*) *sensibilis* TULLBERG.

Isotoma sensibilis HANDSCHIN 1929, p. 64, figs. 112—113.

East Greenland records:

Isotoma palustris MEINERT 1895, p. 120. Err!
— viridis MEINERT 1896, p. 169, Err!
— — SCHÄFFER 1900, p. 245, Err!
— sensibilis WAHLGREN 1900, p. 367.
— viridis NIELSEN 1907, p. 408. Err!
— — HENRIKSEN & LUNDBECK 1917, p. 737. Err!
Pseudisotoma sensibilis REMY 1928a, p. 65.
— — REMY 1928b, p. 51.
Isotoma (Pseudisotoma) sensibilis JØRGENSEN 1934, p. 7.
— sensibilis LACK 1934, p. 603.
— (Pseudisoma) sensibilis PETERS 1934, p. 174.
Vertagopus (Pseudisotoma) sensibilis LINNANIEMI 1935, p. 22.
Pseudisotoma sensibilis MADSEN 1936, p. 19.
— — HAMMER 1937, p. 10.
Isotoma (Pseudisotoma) sensibilis BROWN 1937, p. 518.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs), Herschelhus, Hold-with-Hope, Myggebugten, Nordfjord, Ella Ø (the scientific station, Langdalsgletcheren, Fimbul Mt. 400 m above sea level, Narhvalsund), Traill Ø, Murray Ø. — *Scoresby Sund area:* Liverpool Land (near Amdrup Havn; a nunatak), Scoresby Sund Koloni, Jameson Land, Kap Stewart, Danmarks Ø (Hekla Havn). — *Kangerdlugssuaq area:* Miki's Fjord, Kangerdlugssuaq (Kraemers Bugt). — *South East Coast area:* Atingat (in Ikerasaussaq) and Angmagssalik.

Distribution: West Greenland (Frederikshaab), Iceland (S, SE), Jan Mayen, Lappland, Novaja Semlja, Siberia (Ural), the other parts of northern Europe, Great Britain, Germany, Austria, France, Switzerland and North America: Canada (Agpatôq Island in Hudson Strait),

United States (Massachusetts, New York, Ohio, Illinois, Minnesota, Florida, Louisiana).

Biology: This species occurs everywhere in East Greenland. It was found in the site of a house, under moss, in muskox dung, in *Carex rupestris*-herb-vegetation, in *Elyna*-vegetation (dry and moist), in drift soil in *Betula nana*-vegetation, in grass, in *Dryas*-heath, in lichen-heath, in *Cassiope*-heath, in mixed dwarf-shrub-vegetation, in *Polytrichum*-snow bed, in bog, in lake bank, on the beach etc. Nowhere, however, it occurs in great quantities. The individuals have all been taken in the period from March till the end of October, and the species has been met with as far as 1000 m above sea level.

Remarks: *Isotoma palustris* (MEINERT 1895), which was later on designated *Isotoma viridis*, is in reality *Isotoma sensibilis* (see *Isotoma viridis*). MEINERT mentions it from Hold-with-Hope, Kap Stewart and Hekla Havn.

25. *Isotoma* (*Vertagopus*) *cinerea* NICOLET.

Isotoma (Vertagopus) cinerea LINNANIEMI 1912, p. 139, pl. XI, figs. 1—2.

East Greenland records:

Isotoma cinerea LACK 1934, p. 603.

Occurrence in East Greenland: *Scoresby Sund area:* Liverpool Land (on nunatak), Konstabel Pynten (at Hurry Fjord).

Distribution: This species is known from Franz Joseph Land, Lappland, northern Russia, Siberia (arctic Ural, Tschuktschen Land); besides, it is scattered over the remaining parts of Europe. It is, furthermore, to be found in North America: Canada and the United States (Maine, Massachusetts, New York, Ohio, Illinois).

Biology: Several specimens were collected from August 1st—15th on a nunatak, about 1000 m above sea level. Apart from this no information is at hand regarding the conditions of life of the species in East Greenland. In Germany it lives under bark, more rarely under wood, stones and moss.

26. *Isotoma* (*Vertagopus*) *arborea* (L.) ÅGREN.

Isotoma arborea FOLSOM 1937, p. 83, pl. 28, figs. 309—315.

East Greenland records:

Isotoma (Vertagopus) arborea BROWN 1937, p. 518.

Occurrence in East Greenland: Kraemers Bugt (Kangerdlugssuaq).

Distribution: Novaja Semlja, Siberia, the Faroes, Scotland, England, Ireland, Denmark, Norway, Sweden, Finland, Germany, France,

Switzerland, Hungary. North America: United States (Maine, Massachusetts, New York, Ohio and Illinois).

Biology: Numerous specimens were found on August 6th; otherwise there is no information regarding the conditions of life of this species in East Greenland. In Germany it is found under bark.

27. *Isotoma finitima* Stscherbakow.

Isotoma finitima Stscherbakow 1899, p. 80, fig. 8.

East Greenland records:

Isotoma finitima Wahlgren 1900, p. 367.
— — Remy 1928a, p. 65.
— — Jørgensen 1934, p. 7.

Occurrence in East Greenland: A few individuals of this species have been collected in the *Franz Joseph Fjord area* on an island (72°46′ N, 22°56′ W) in a contributory fjord to Kong Oscars Fjord.

Distribution: Southwestern Russia.

Biology: No information is at hand regarding the biology of this species in East Greenland. Stscherbakow found it abundantly under flowerpots and in boggy soil in southwestern Russia.

28. *Isotoma minor* Schäffer.

Isotoma minor Handschin 1929, p. 65, fig. 116.

East Greenland records:

Isotoma minor Hammer 1937, p. 10.

Occurrence in East Greenland: *Kangerdlugssuaq area:* Miki's Fjord. — *South East Coast area:* Angmagssalik and Nanûseq (Lindenow's Fjord).

Distribution: Lappland, northern Russia, the remaining parts of northern and Central Europe, New Zealand, North America: United States (Massachusetts, Illinois) and Mexico.

Biology: In East Greenland *Isotoma minor* occurs abundantly in moist moss, in lichen-heath, 50—75 m above sea level; further, it is of frequent occurrence in pure *Empetrum*-vegetation; a few individuals have also been found in lake shore in a sparse *Carex*- and moss-vegetation, in *Betula nana*-vegetation with moist moss at the bottom, on mountain ledges with a dry leaf- and *Betula*-vegetation, as well as in dry river bed on mountain ledges with moss, grass and *Lycopodium*. All the individuals were taken within the period July 18th—September 8th.

29. *Isotoma coeruleo-griseus* HAMMER.

Isotoma coeruleo-griseus HAMMER 1938, p. 43, figs. 1—2.

East Greenland records:

Isotoma n. sp. HAMMER 1937, p. 10.
— coeruleo-griseus HAMMER 1938, p. 43.

Occurrence in East Greenland: *South East Coast area:* Atingat (in Ikerasaussaq), Angmagssalik and Nanûseq (Lindenow's Fjord).

Distribution: This species is only known from East Greenland.

Biology: *Isotoma coeruleo-griseus* was to be found in great numbers in lichen-heath, 50—75 m above sea level, less abundantly in grass-*Salix* snowbed, besides, a few individuals were found in *Salix herbacea*-vegetation, in lake shore, in bog as well as in *Betula nana*-vegetation with moist moss at the bottom. All of these specimens were collected within the period July 18th—August 13th.

30. *Isotoma bipunctata* AXELSON.

Isotoma bipunctata HANDSCHIN 1929, p. 66, fig. 117.

East Greenland records:

Isotoma bipunctata HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs). — *Scoresby Sund area:* Scoresby Sund Koloni. — *Kangerdlugssuaq area:* Miki's Fjord, and *South East Coast area:* Atingat (in Ikerasaussaq).

Distribution: This species is up to the present only known from Lappland, Norway, Finland, the Baltic countries, Switzerland and Australia.

Biology: In East Greenland *Isotoma bipunctata* has been found in moist moss (*Sphagnum*), in pure *Empetrum*-vegetation, as well as in shrub-like *Salix arctica* × *glauca*-association with tufts of *Vaccinium uliginosum* (May 30th—August 16th).

31. *Isotoma viridis* (BOURLET) SCHÖTT.

Isotoma viridis HANDSCHIN 1929, p. 67, fig. 119.

East Greenland records:

Isotoma viridis WAHLGREN 1900, p. 366.
— — REMY 1928a, p. 64.
— — JØRGENSEN 1934, p. 7.
— — LACK 1934, p. 603.
— — LINNANIEMI 1935, p. 22.
— — HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Suess Land, Ella Ø, Narhvalsund; on island (72°46′ N, 22°56′ W) in a

contributory fjord to Kong Oscars Fjord. — *Scoresby Sund area:* Scoresby Sund Koloni, Kap Dalton. — *South East Coast area:* Atingat (in Ikerasaussaq), Kap Dan, Sarfaq (in Sermilik), Angmagssalik (250 m above sea level), on an island at Inigssalik, Umîvik, Nukarfik, Ikerasak (slightly west of Igdlut), Tingmiarmiut (Brattneset) and Nanûseq (in Lindenow's Fjord).

Distribution: West Greenland (Ipiutat, Tatsip atâ, Sakak, Neriaq, Tasiussaq), Iceland (S, SW, N, NE, E, SE), Jan Mayen, Bjørne Ø, Spitsbergen, Franz Joseph Land, Lappland, Novaja Semlja, Waigatsch, northern Siberia (arctic Ural, Taimyr Peninsula), the Faroes, the Orkneys, Great Britain and Ireland; everywhere on the European Continent, as well as in Mesopotamia and North America: Alaska, Canada (North-west Territories, Agpatôq Island in Hudson Strait), United States and Mexico.

Biology: In East Greenland *Isotoma viridis* was taken under moss near the sea shore, in sandy littoral meadow with a few tufts of grass, in bog, in lake shore in a thick layer of moss, in *Carex rupestris*-herb-vegetation, in mixed dwarf-shrub-vegetation, in lichen-heath, grassy slope, *Salix herbacea*-vegetation, grass-*Salix* snow bed etc. This species may undoubtedly be found in activity throughout the year; hitherto it has been taken from January 4th—October 3rd.

Remarks: *Isotoma palustris* (Meinert 1895), subsequently termed *Isotoma viridis*, proved, by a revision of Meinerts material, to be *Isotoma sensibilis*. This error has been repeated in all later literary records.

32. *Isotoma violacea* Tullberg.

Isotoma violacea Handschin 1929, p. 69, figs. 122—123.

East Greenland records:

Isotoma violacea Hammer 1937, p. 10.

Occurrence in East Greenland: *South East Coast area:* Stor Ø, Atingat (in Ikerasaussaq), Kap Dan, Angmagssalik and Nanûseq (Lindenow's Fjord).

Distribution: West Greenland (Ũmánaq), Iceland (N), Spitsbergen, Lappland, northern Russia, northern Siberia, the Faroes, Great Britain, Denmark, Norway, Sweden, Finland, Germany, Poland, the Baltic countries, Switzerland and North America: Canada.

Biology: In East Greenland *Isotoma violacea* is of common occurrence in lichen-heath 50—75 m above sea level, and in dry grassy slope; isolated individuals have further been taken in moss-vegetation, in bog, in lake shore, in *Salix*-vegetation, in dry *Empetrum*-vegetation on mountain slope, as well as in dry river bed on mountain slope with a

vegetation consisting of moss, grass and *Lycopodium*. All individuals were taken within the period July 18th—October 1st.

33. *Isotoma olivacea* TULLBERG.

Isotoma olivacea HANDSCHIN 1929, p. 70, fig. 124.

East Greenland records:

Isotoma olivacea WAHLGREN 1900, p. 367.
— — REMY 1928a, p. 64.
— — JØRGENSEN 1934, p. 7.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs), Nordfjord, Ella Ø (the scientific station, at Narhvalsund), Traill Ø, an island (72°46′ N, 22°56′ W) in a contributory fjord to Kong Oscars Fjord. — *Scoresby Sund area:* Scoresby Sund Koloni, and *South East Coast area:* Nanûseq (Lindenow's Fjord).

Distribution: West Greenland (Ũmánaq); Iceland (S, SW, N) and Jan Mayen (var. *grisescens* SCHÖTT); Spitsbergen, Lappland, northern Russia, Scotland (var. *grisescens* SCHÖTT), England, Norway, Sweden, Denmark, Finland, Germany, Poland, Bohemia, Austria, Hungary, Australia and North America: Canada (Agpatôq Island in Hudson Strait), United States (New York, Illinois).

Biology: In East Greenland this pronouncedly hydrophile form has been found under moss near the beach, in lake shore with a thick spongy moss carpet, in *Cassiope*-heath with moss, in moist *Eriophorum*- and *Carex*-vegetation with moss; further, in moist *Betula nana*-vegetation with moss. The collections were made within the period June 15th—August 6th.

Remarks: AGRELL (1936) merged *Isotoma violacea* TULLBERG and *Isotoma olivacea* TULLBERG into one species, finding all transitions between them. Accordingly, he regards *Isotoma violacea* as a variety of *Isotoma olivacea* and terms it *Isotoma olivacea* var. *violacea*. From an oecological point of view the variety deviates greatly from the principal form. *Isotoma olivacea* is very hydrophile, whereas the variety *Isotoma olivacea* var. *violacea* occurs in drier localities. This seems to agree entirely with the conditions under which the two species have been found in East Greenland.

34. *Ågrenia bidenticulata* TULLBERG.

Ågrenia bidenticulata HANDSCHIN 1929, p. 71, figs. 92, 127.

Occurrence in East Greenland: *North East Coast area:* Adam Bierrings Land, Østre Næs at Hagens Fjord near Independence Bugt.

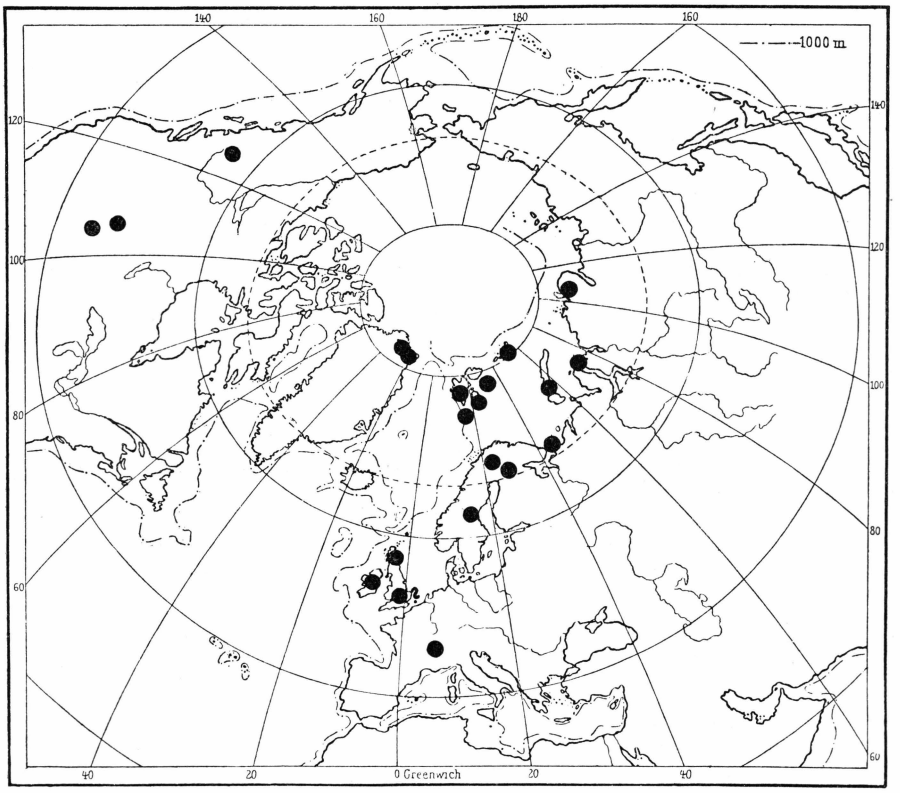

Fig. 2. Chart of the distribution of *Ågrenia bidenticulata*. The species is besides known from West Greenland, no locality being given.

Distribution: West Greenland (without locality (TULLBERG)), Bjørne Ø, Spitsbergen, Hope Ø, Kong Karls Land, Franz Joseph Land, Lappland, northern Russia (Kanin), Novaja Semlja, northern Siberia (White Island, Taimyr Peninsula), Sweden (in the mountains of Jämtland), Finland, Scotland, Ireland, England?; it is reported from Central Europe as being of rare occurrence except in mountain regions (in the Alps as far as 2500 m, in Switzerland in Lower Engadin), North America: Canada (British Columbia), United States (Colorado, Wyoming (in Rocky Mountains)). According to CARPENTER and PHILLIPS the distribution of *Ågrenia bidenticulata* (see fig. 2) must have taken place by a land connection in the northern Atlantic within the Tertiary and Pleistocene periods. By this means the species has spread from western and northern Europe across the said land connection as far as Greenland and from there as far as North America.

Biology: This species is only known from the northernmost part of Greenland. The individuals were found in great numbers, either skipping about on the snow very close to the shore in sunshine, June

5th 1912 (Hagens Fjord), or skipping on the surface of the water in a small river bed and on the stones surrounding it, July 12th 1912 (Adam Bierrings Land). The individuals were taken by the 2nd Thule Expedition.

35. *Lepidocyrtus lanuginosus* (GMELIN) TULLBERG.

Lepidocyrtus lanuginosus TULLBERG 1872, p. 38, pl. VI, figs. 1—7; HANDSCHIN 1929, p. 87.

East Greenland records:

Lepidocyrtus lanuginosus JØRGENSEN 1934, p. 7.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Ella Ø (the scientific station).

Distribution: Iceland (W, N, NE, E, SE), Spitsbergen, Lappland, northern Russia, northern Siberia (Tschuktschen Land), the remaining parts of Europa, ? the Azores, South Africa and North America.

Biology: From East Greenland we only possess a single individual of this species; it was taken in wet, tufted bog with a dense moss-vegetation at the bottom. The animal was found on August 26th.

36. *Sminthurides malmgreni* TULLBERG.

Sminthurus Malmgrenii TULLBERG 1876, p. 30, pl. VIII, figs. 5—7; Sminthurides Malmgreni HANDSCHIN 1929, p. 109.

East Greenland records:

Sminthurides malmgreni JØRGENSEN 1934, p. 7.
— — MADSEN 1936, p. 30.
— — HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (Eskimonæs), Ella Ø. — *Scoresby Sund area:* Scoresby Sund Koloni, and *South East Coast area:* Angmagssalik.

Distribution: Bjørne Ø, Spitsbergen, Lappland, Novaja Semlja, islands in Bering Sea, ? Russia, Great Britain, Sweden, Finland, Germany, France, Switzerland and North Africa: Algeria.

Biology: In East Greenland this species has been found in great numbers on *Carex ursina-Puccinellia phryganodes* littoral meadow; besides a few specimens have been taken in *Dryas*-heath, in lake shore with a thick spongy moss carpet, in moist moss near river bed, in bog and wave-washed lake shore with a sparse vegetation of *Carex* and mosses. The collections were all made within the period June 15th—September 12th.

37. *Arrhopalites pygmaeus* WANKEL.

Arrhopalites pygmaeus HANDSCHIN 1929, p. 112, figs. 204—205.

East Greenland records:

Arrhopalites pygmaeus HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Ella Ø (Narhvalsund). — *Scoresby Sund area:* Scoresby Sund Koloni. — *South East Coast area:* Angmagssalik and Nanûseq (Lindenow's Fjord).

Distribution: Spitsbergen, Russia, Finland, Norway, Germany, Belgium, Austria and Italy.

Biology: In East Greenland this species has always been found under the same conditions, i. e. in thick, wet moss near lake shore, in bog with moss, in *Sphagnum* and in moss near river bed. The individuals have been collected within the period July 18th—August 6th.

38. *Sminthurinus niger* Lubbock.

Sminthurus niger Schött 1893, p. 32, pl. II, fig. 12; Sminthurinus niger Handschin 1929, p. 112.

East Greenland records:

Sminthurinus niger Lack 1934, p. 603.

Occurrence in East Greenland: *Scoresby Sund area:* Konstabel Pynten (at Hurry Fjord).

Distribution: Bjørne Ø, Spitsbergen, northern Siberia (Jenissei at 70°40′ N. lat.), all over Europe, and North America: Canada (Agpatôq Island in Hudson Strait).

Biology: No information is at hand as to the conditions under which this species lives in East Greenland; the only known specimen was taken between August 1st and 15th. In Germany it more particularly occurs near inhabited localities, under planks and in hothouses; it seems to be a humus form.

Remarks: Brown (1932) records it i. a. from Greenland. This locality apparently refers to *Smynthurus niger* Lubb. (Meinert 1895, p. 120) which was later on described by Meinert as *Smynthurus concolor* Meinert.

The specimens found by Lack (1934) on Konstabel Pynten have been determined by G. H. Carpenter.

39. *Sminthurinus concolor* (Meinert) Tuxen.

Sminthurinus concolor Tuxen 1934, p. 4, figs. 1—4.

East Greenland records:

Smynthurus niger Meinert 1895, p. 120.
— concolor Meinert 1896, p. 167.
— — Schäffer 1900, p. 253.
— — Nielsen 1907, p. 408.
Sminthurus — Henriksen & Lundbeck 1917, p. 736.
— — Remy 1928a, p. 67.
Sminthurinus — Tuxen 1934, p. 4.
— — Jørgensen 1934, p. 7.

Sminthurinus concolor LINNANIEMI 1935, p.23.
— — MADSEN 1936, p. 21.
— — HAMMER 1937, p. 10.

Occurrence in East Greenland: *Franz Joseph Fjord area:* Clavering Ø (i. a. Falskenæs, Eskimonæs and Dødemandsbugten), Herschelhus, Nordfjord, Ella Ø (at the scientific station, Fimbul Mt: about 400 m above sea level, Narhvalsund), Röhssfjord, Traill Ø. — *Scoresby Sund area:* Scoresby Sund Koloni, Kap Stewart. — *Kangerdlugssuaq area:* Miki's Fjord, and *South East Coast area:* Angmagssalik.

Distribution: West Greenland (Frederikshaab) and Spitsbergen.

Biology: In East Greenland this species is to be found in all kinds of localities, though in greatest number in moist places, as under washed-up seaweeds, in wet moss near river beds, in *Elyna*-vegetation (dry and moist) and in bog; further, a few specimens have been found in *Empetrum-Vaccinium*-heath, in shrub-like *Salix arctica* × *glauca*-association with tufts of *Vaccinium uliginosum*, in fell-field, in birch-scrub, in drift soil with *Betula nana*-vegetation, in birch-grass-vegetation, in *Dryas*-heath, in lichen-heath, in mixed dwarf-shrub-vegetation, in *Cassiope*-snow patch, in sandy lake shore with a sparse vegetation of *Carex* and mosses, in pure *Empetrum*-vegetation etc. The collections were undertaken within the period May 20th to October 23rd.

40. *Sminthurus viridis* (LINNÉ) LUBBOCK.

Sminthurus viridis HANDSCHIN 1929, p. 120, figs. 215—216.

East Greenland records:

Sminthurinus viridis LACK 1934, p. 603.

Occurrence in East Greenland: *Scoresby Sund area:* Jameson Land.

Distribution: Iceland (S, NW, N, NE, E, SE), Lappland, Novaja Semlja, Siberia (arctic Ural, at Jenissei, Tschuktschen Land), all the other countries of Europe, North Africa (Tunis), Japan, Australia, Tasmania and North America.

Biology: No information is at hand regarding the biology of this species in East Greenland. 3 individuals were found between August 1st and 15th. In Germany it lives on all manner of higher plants, and it frequently does great damage to lucern, clover and turnips cultures.

Table 1. Distribution of the species in East Greenland.

Species	North East Coast area	Franz Joseph Fjord area	Scoresby Sund area	Kangerdlugssuaq area	South East Coast area
Ågrenia bidenticulata	×	..	..	..	..
Hypogastrura manubrialis	×	×	..	..	..
— tullbergi	..	×	..	..	..
Onychiurus sibiricus	..	×	..	..	..
Isotoma finitima	..	×	..	..	..
Lepidocyrtus lanuginosus	..	×	..	..	..
Hypogastrura purpurascens	..	×	×	..	..
Archisotoma besselsi	..	×	×	..	..
Hypogastrura longispina	..	..	×	..	..
Onychiurus pseudarmatus	..	..	×	..	..
Tullbergia krausbaueri	..	..	×	..	..
Isotoma cinerea	..	..	×	..	..
Sminthurinus niger	..	..	×	..	..
Sminthurus viridis	..	..	×	..	..
Folsomia fimetaria	×	×	×	×	..
Onychiurus groenlandicus	×	×	×	×	×
Folsomia sexoculata	×	..	×	×	×
Friesea quinquespinosa	..	×	×	×	..
Folsomia diplophthalma	..	×	×	×	..
Isotoma arborea	..	..	..	×	..
Hypogastrura armata	..	×	×	×	×
Willemia anophthalma	..	×	×	×	×
Folsomia quadrioculata	..	×	×	×	×
Isotoma sensibilis	..	×	×	×	×
— bipunctata	..	×	×	×	×
Sminthurinus concolor	..	×	×	×	×
Hypogastrura viatica	..	×	×	..	×
Anurida granaria	..	×	×	..	×
Onychiurus armatus	..	×	×	..	×
Isotoma viridis	..	×	×	..	×
— olivacea	..	×	×	..	×
Sminthurides malmgreni	..	×	×	..	×
Arrhopalites pygmæus	..	×	×	..	×
Xenylla humicola	..	..	×	..	×
Tetracanthella wahlgreni	..	..	×	..	×
Proisotoma tenella	..	..	×	..	×
Isotoma minor	..	..	..	×	×
Achorutes muscorum	..	..	..	..	×
Isotoma coeruleo-griseus	..	..	..	..	×
— violacea	..	..	..	..	×
Number of species within the individual areas	5	24	29	13	22

Table 2. Synopsis of the distribution of the collemboles occurring in East Greenland

Species	Canada and North America	West Greenland	Iceland	Spitsbergen	Finmarken[1] (Lappland)	Northern Russia[2]	Distribution[3]
Hypogastura armata NIC.	×	×	×	×	×	×	cosmopolitan
— sp. (?longispina TULLB.) .	..	..	..	×	×	×	cosmopolitan
— tullbergi SCHÄFFER.....	×	×	..	×	..	×	circumpolar, arctic; palearctic, nearctic
— viatica TULLB.	×	×	×	×	..	×	cosmopolitan
— purpurascens LUBB.....	..	..	×	..	×	×	arctic, palearctic, neotropic
— manubrialis TULLB.	..	..	×	..	..	..	cosmopolitan
Xenylla humicola (O. FABR.)...	×	×	×	×	×	×	cosmopolitan
Willemia anophthalma BÖRNER.	..	..	..	×	..	..	arctic, palearctic
Friesea quinquespinosa (WAHL.) DENIS	..	..	..	..	..	..	arctic, endemic
Anurida granaria NIC.	..	..	×	×	×	..	arctic, palearctic, nearctic
Achorutes muscorum TEMPL. ..	×	×	×	..	×	×	circumpolar, arctic; palearctic, nearctic
Onychiurus groenlandicus TULLB.	..	×	..	×	..	..	arctic, palearctic
— sibiricus TULLB.	..	..	..	..	..	×	arctic, palearctic, nearctic
— armatus TULLB.	..	×	×	×	×	×	cosmopolitan
— pseudarmatus FOLSOM...	×	..	..	..	..	..	arctic
Tullbergia krausbaueri BÖRNER	..	..	..	..	×	..	arctic, palearctic, ethiopic
Tetracanthella wahlgreni AXELS.	×	×	..	×	×	..	circumpolar, arctic; palearctic
Folsomia sexoculata TULLB. ...	..	..	..	×	..	..	arctic, palearctic
— quadrioculata TULLB. ...	×	×	×	×	×	×	circumpolar, arctic; palearctic, nearctic
— diplophthalma AXELS....	..	×	..	×	×	×	arctic, palearctic, nearctic
— fimetaria (L.) TULLB. ...	×	×	..	×	×	..	circumpolar, arctic; palearctic, nearctic, neotropic
Archisotoma besselsi PACKARD .	×	×	..	×	..	×	bipolar, circumpolar, arctic
Proisotoma tenella REUTER....	..	..	..	..	..	..	arctic, palearctic
Isotoma sensibilis TULLB.....	×	×	×	..	×	×	circumpolar, arctic; palearctic, nearctic
— cinerea NIC.....	×	..	..	..	×	×	circumpolar?, arctic; palearctic, nearctic
— arborea (L.) ÅGREN.....	..	..	..	..	..	×	arctic, palearctic, nearctic
— finitima STSCHERBAKOW .	..	..	..	..	..	..	arctic, palearctic
— minor SCHÄFFER.....	..	..	..	..	×	×	arctic, palearctic, nearctic
— coeruleo-griseus HAMMER.	..	..	..	..	..	..	arctic
— bipunctata AXELS.....	..	..	..	..	×	..	arctic, palearctic
— viridis (BOURLET) SCHÖTT	×	×	×	×	×	×	circumpolar, arctic; palearctic, nearctic
— violacea TULLB.	×	×	×	×	×	×	circumpolar?, arctic; palearctic, nearctic?
— olivacea TULLB.	×	×	×	×	×	×	circumpolar, arctic; palearctic, nearctic
Ågrenia bidenticulata TULLB. ..	×	×	..	×	×	×	arctic, palearctic, nearctic, alpine
Lepidocyrtus lanuginosus (GMELIN) TULLB.	..	..	×	×	×	×	arctic, palearctic, nearctic
Sminthurides malmgreni TULLB.	..	..	..	×	×	×	arctic, palearctic
Arrhopalites pygmaeus WANKEL	..	..	..	×	..	..	arctic, palearctic
Sminthurinus niger LUBB.	×	..	..	×	..	..	circumpolar, arctic; palearctic
— concolor (MEINERT) TUXEN	..	×	..	×	..	..	arctic
Sminthurus viridis (L.) LUBB. ..	..	..	×	..	×	×	cosmopolitan

[1]) Sarep and Lappland from the polar circle.

[2]) Northern Russia with the adjoining islands: Waigatch and Novaja Semlja.

[3]) A detailed description of the zoogeographical terms used in this work is to be found in: Handwörterbuch der Naturwissenschaften, vol. X, p. 951, 1915.

Table 3. The apterygot fauna in the islands of the northern Atlantic.

Species	East Greenland	West Greenland	Iceland	Spitsbergen
Lepisma saccharina L.	..	..	×	..
Petrobius brevistylis Carp.	..	..	×	..
Hypogastrura armata Nic.	×	×	×	×
— sp. (?longispina Tullb.)	×	..	..	×
— bengtssoni Ågren	..	..	×	..
— tullbergi Schäffer	×	×	..	×
— viatica Tullb.	×	×	×	×
— purpurascens Lubb.	×	..	×	..
— manubrialis Tullb.	×	..	×	..
Xenylla humicola (O. Fabr.)	×	×	×	×
Willemia anophthalma Börner	×	..	..	×
Friesea mirabilis Tullb.	..	..	×	..
— claviseta Axels.	..	..	×	..
— quinquespinosa (Wahl.) Denis	×	..	..	..
Xenyllodes armatus Axels.	..	..	..	×
Anurida tullbergi Schött	..	..	×	..
— granaria Nic.	×	..	×	×
Achorutes muscorum Templ.	×	×	×	..
Onychiurus groenlandicus Tullb.	×	×	..	×
— sibiricus Tullb.	×	..	..	..
— armatus Tullb.	×	×	×	×
— — var. arcticus Tullb.	..	×	..	×
— pseudarmatus Folsom	×	..	..	..
— fimetarius L.	..	..	×	..
Tullbergia krausbaueri Börner	×	..	..	..
Tetracanthella wahlgreni Axels.	×	×	..	×
Folsomia sexoculata Tullb.	×	..	..	×
— quadrioculata Tullb.	×	×	×	×
— diplophthalma Axels.	×	×	..	×
— binoculata Wahl.	..	..	..	×
— fimetaria (L.) Tullb.	×	×	..	×
Archisotoma besselsi Packard	×	×	..	×
Proisotoma minuta Tullb.	..	..	×	..
— tenella Reuter	×	..	..	..
— thermophila (Axels.)	..	..	..	×
Isotoma sensibilis Tullb.	×	..	×	..
— cinerea Nic.	×	..	..	..
— arborea (L.) Ågren	×	..	..	..
— finitima Stscherbakow	×	..	..	..
— minor Schäffer	×	..	..	..
— coeruleo-griseus Hammer	×	..	..	..
— bipunctata Axels.	×	..	..	..
— viridis (Bourlet) Schött	×	×	×	×
— maritima Tullb.	..	..	×	..
— violacea Tullb.	×	×	×	×

Table 3 (continued).

Species	East Greenland	West Greenland	Iceland	Spitsbergen
Isotoma olivacea TULLB.	×	×	×	×
Ågrenia bidenticulata TULLB.	×	×	..	×
Entomobrya multifasciata TULLB.	..	..	×	..
— nivalis L.	..	..	×	..
Sira buski LUBB.	..	..	×	..
— flava ÅGREN	..	..	..	×
Lepidocyrtus cyaneus TULLB.	..	×	×	..
— lanuginosus (GMELIN) TULLB.	×	..	×	×
Orchesella cincta (L.) LUBB.	..	..	×	..
Tomocerus minor LUBB.	..	..	×	..
— vulgaris TULLB.	..	..	×	..
Sminthurides malmgreni TULLB.	×	..	..	×
Arrhopalites pygmaeus WANKEL	×	..	..	×
Sminthurinus niger LUBB.	×	..	..	×
— aureus LUBB.	..	..	×	×
— concolor (MEINERT) TUXEN	×	×	..	×
Bourletiella pruinosa (TULLB.) ÅGREN	..	..	×	..
Deuterosminthurus bilineatus BOURLET	..	..	×	..
Sminthurus viridis (L.) LUBB.	×	..	×	..
Dicyrtoma minuta O. FABR.	..	..	×	..
— fusca (LUCAS) LUBB.	..	..	×	..
	40	19	36	30

GENERAL REMARKS

Table 1 shows the distribution of the species in East Greenland, those occurring in the most northerly regions being placed at the top of the list, and those occurring in the most southerly at the bottom. The figures given for the North East Coast area are much smaller than those given for the other areas. This is not due to the fact that few species only inhabit those northern regions, but that the collections merely include a few scattered individuals, and that there are no Berlese samples from those parts, this being by far the best method of collection for collemboles. The number of species will undoubtedly be increased by further collections from these regions, so that the greater part of the species inhabiting the Franz Joseph Fjord area and more southerly areas will in all probability be found here. Apart from the North East Coast area which, as already mentioned, has not been made subject to thourough investigations, there does not seem to be any decrease in the number of species towards north, the same number of species existing practically everywhere. An exception forms, however, the Kangerdlugssuaq area, where for unexplained reasons a number of species are not represented in the material collected.

It is not possible to establish definite boundary lines between northern and southern forms, as is for instance the case with higher animals and plants on the Blosseville Coast. Practically all species, the seemingly northern occurring as far south as Scoresby Sund as well as all the others, which are to be found scattered along the whole of the coast line, are of common occurrence in great parts of Europe and North America. This seems to indicate that the species have neither immigrated from Europe nor North America, but have spread over a continuous North America-Greenland-Europe land area, such as was supposed to exist in former periods.

Neither does it seem possible to demonstrate any difference in the composition of the fauna of the inner fjord areas and that of the outer coast districts.

As appears from table 3 and the remarks made under the individual species as to their general geographical distribution, some of the East

Greenland collemboles are purely arctic or characteristic of arctic regions. The latter are:

Hypogastrura tullbergi
Friesea quinquespinosa
Anurida granaria
Onychiurus groenlandicus
Tetracanthella wahlgreni
Sminthurinus concolor.

The following remarks can be made regarding the distribution outside East Greenland:

A few species are very sparingly represented in the collections hitherto made, and so it is, for the present, impossible to say anything for certain as to the distribution of the latter. This applies to:

Onychiurus pseudarmatus (East Greenland, Alaska).
Isotoma finitima (East Greenland, southwestern Russia).
Isotoma coeruleo-griseus (East Greenland).

A few species are characteristic of East Greenland and the adjoining areas and are unrecorded from anywhere else. To these belong:

Friesea quinquespinosa (endemic).
Sminthurinus concolor (Greenland, Spitsbergen).

One species is, outside Greenland, only known from Europe, and here only from a few countries *viz:*

Proisotoma tenella (the Faroes, Ireland, Finland and Germany).

The greater part of the East Greenland Collemboles, however, belong to species, which are common in the arctic as well as in temperate Europe and North America i. e. palearctic-nearctic species. A number of these must be regarded as cosmopolitan, *viz.* the following species:

Hypogastrura armata
— *longispina*
— *viatica*
— *manubrialis*
Xenylla humicola
Onychiurus armatus
Sminthurus viridis.

A comparison between the Collembole faunas of East Greenland and Spitsbergen shows a rather close agreement (see table 3). It is to be expected that the following 5 East Greenland species are to be found at Spitsbergen, as outside East Greenland they are also known from other

islands in the northern Atlantic, and Spitsbergen is climatically less arctic than East Greenland:

Hypogastrura purpurascens
— *manubrialis*
Achorutes muscorum
Isotoma sensibilis
Sminthurus viridis

The following species

Onychiurus sibiricus
— *pseudarmatus*
Tullbergia affinis
Proisotoma tenella
Isotoma cinerea
— *finitima*
— *bipunctata*,

which in the northern Atlantic area are only known from East Greenland (see table 3), are here found in a purely arctic area (table 1), and there is consequently a possibility that with continued investigations these species may be found at Spitsbergen. The species endemic to East Greenland, *viz. Friesea quinquespinosa*, may possibly also be found at Spitsbergen. In the same manner there is a probability that *Isotoma minor* and *Isotoma coeruleo-griseus* which are both rather numerously represented in the collections made in East Greenland may be found at Spitsbergen. *Isotoma coeruleo-griseus* has, however, hitherto only been identified in the South East Coast area, whereas *Isotoma minor* is known from Miki's Fjord (the Kangerdlugssuaq area) to Lindenow's Fjord.

The following species are known from Spitsbergen, but not from East Greenland:

Xenyllodes armatus
Onychiurus armatus var. *arcticus*
Folsomia binoculata
Proisotoma thermophila
Sira flava
Sminthurinus aureus

Of these species *Xenyllodes armatus* is apparently a littoral form, As it has not been found in spite of numerous Berlese samples taken from the shore in the Franz Joseph Fjord and Scoresby Sund areas there seems little chance of finding this species in East Greenland. On the other hand, one may beyond doubt expect to find *Onychiurus armatus* var. *arcticus* in East Greenland, as it is known from West Greenland and its principal form from East Greenland. *Folsomia binoculata* and

Proisotoma thermophila have been found in moss at Spitsbergen, and there is every probability that these two species may also be found in East Greenland. *Sira flava* lives essentially under bark, but can also be met with in moss and under stones; seeing that it is widely distributed in northern and Central Europe, as well in northern Asia and North America, it may also be found in East Greenland. Outside Spitsbergen *Sminthurinus aureus* is known from Iceland, where it has probably been spread by human agency with hay or the like, and so there is for the present hardly any chance of finding it in East Greenland.

On the other hand, a comparison between the Collembole faunas of East Greenland and Iceland shows distinct points of disagreement. The Collembole fauna of East Greenland and Spitzbergen largely consists of primitive forms, which are closely associated with the soil, whereas it only contains few representatives of the more highly developed families Entomobryidae, Tomoceridae and Sminthuridae, which form an essential part of the Icelandic Collembole fauna. These forms which are largely bound up with the dwellings of man and cultivated fields (grass, clover, lucern and the like) have beyond doubt in the first place been introduced to Iceland with hay and the like, which have been brought there by man.

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