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PART I

Oribatidae

KØBENHAVN

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INVESTIGATIONS ON THE MICROFAUNA OF NORTHERN CANADA

PART I: *Oribatidae*

BY

MARIE HAMMER

PREFACE

The present investigation on the microfauna (Oribatids and Collemboles) of Northern Canada was supported by the Arctic Institute of North America with funds provided by the Office of Naval Research. The institute financed my expedition to Arctic Canada and helped me in every possible way. I should like to take this opportunity to tender my sincerest thanks to the Arctic Institute, not only because they entrusted me with this task, but also because they prolonged the period fixed for these lengthy investigations. I wish especially to thank Dr. A. L. WASHBURN, Director of the Arctic Institute, who helped me in many different ways.

I should also like to thank most sincerely the International Federation of University Women for awarding me the VIRGINIA C. GILDERSLEEVE Fellowship. This enabled me to extend my study of Oribatids and Collemboles to include the United States, Mexico, Holland, Sweden and England. I wish also to express my appreciation of the understanding shown by the Trustees in making it possible for me to study many different collections.

To the Carlsberg Foundation which has granted me financial support during my work on the collections and also paid for a number of the drawings, I owe a debt of gratitude, and I am also grateful to the Foundation for offering to finance my travel in Canada. Although it was unnecessary to accept this offer, it was nevertheless much appreciated.

During my sojourn in Canada I was received everywhere with unbounded hospitality, and I wish to extend my most cordial thanks to everyone who helped me, not least to the Chief Botanist Dr. A. E. PORSILD of Ottawa, who helped to arrange my journeys and later identified some of the plants which I collected in the various biotopes.

I cannot mention each of the numerous scientists whom I met during my visits, but I should like to extend special thanks to Dr. E. W. BAKER of the United States National Museum, for his advice and help, and to Dr. MAX SELLNICK of Experimentalfältet, Sweden, for facilities and advice during my stay there. Dr. K.-H. FORSSLUND, Stockholm, has helped with the genus *Brachychthonius* for which I am very grateful. I also wish to thank my colleague Dr. S. L. TUXEN for his unfailing helpfulness during my studies at the Zoological Museum of Copenhagen.

All the collections, including the types, are at present being kept at my home at Strødam, Hillerød.

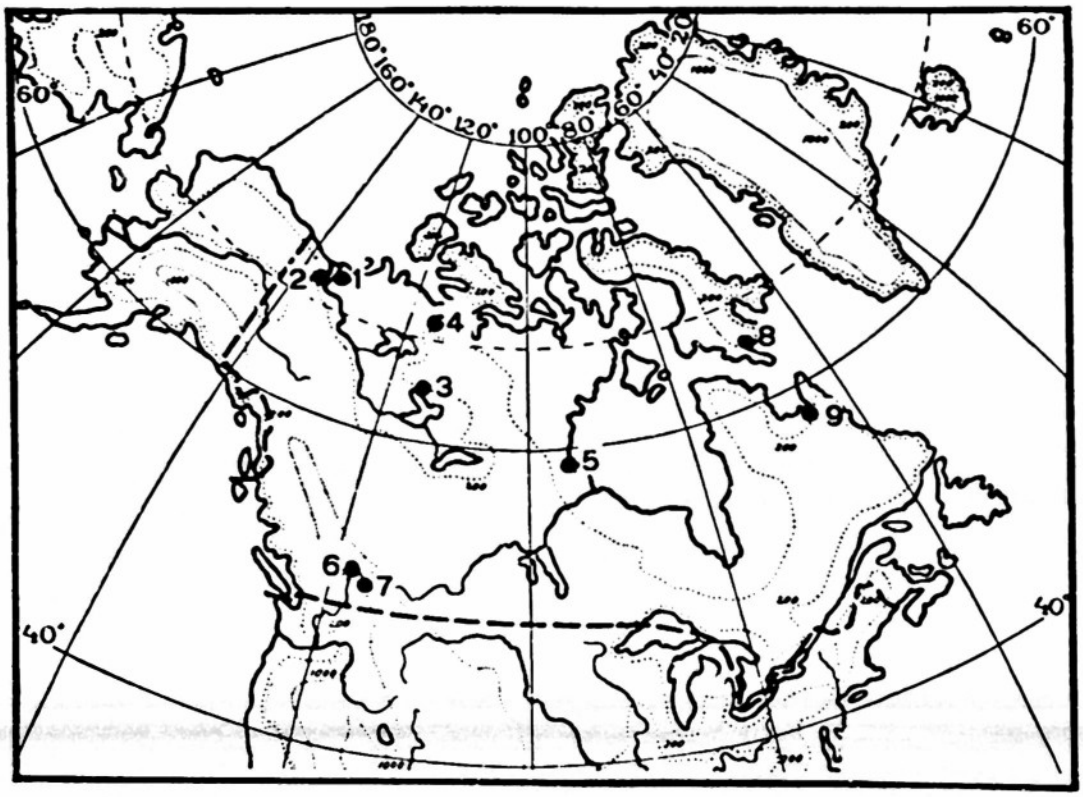
Mrs. AGNETE VOLSOE has undertaken the translation into English.

Strødam, November, 15, 1951.

MARIE HAMMER.

INTRODUCTION

Since the branch of science dealing with the microfauna (in this paper only the oribatids), in the true sense of the word, has only existed for about fifty years, viz. from the invention of the Berlese funnel in 1905, and as the microfauna comprises a huge number of species, our knowledge of these animals in most parts of the world is practically nil. From a few countries which have had interested scientists within this field in a longer period of time, as e.g. England (MICHAEL), Germany (C. L. KOCH, SELLNICK, WILLMANN), France, (GRANDJEAN) and Italy (BERLESE), a long series of species has been recorded, mainly collected in the vicinity of the dwelling places of the respective scientists, but despite this, the microfauna of these countries can hardly be said to be known. Some knowledge of the microfauna may be obtained during an expedition if samples are taken in different localities, and this has hitherto been the only procedure when studying this almost completely unknown animal group in foreign countries. A thorough investigation of the microfauna of any country, even of a single group as the oribatids, would claim a life's work of a single man. As a consequence, it is hardly possible to treat these animals zoogeographically; one constantly meets with the difficulty: our failing knowledge of the microfauna. This was what happened to me during my investigation on the microfauna of Greenland (Hammer 1944) and I wished to compare it with the fauna of the adjacent countries in order to solve the question of the origin of the fauna of Greenland. The North-Atlantic



The map shows the localities where the samples were taken (see the text).

Islands and Europe to the east were comparatively well investigated, but what about the fauna in Canada? Despite expeditions through several years (The Canadian Arctic Expedition 1913–1918, the Fifth Thule Expedition 1921–24) only three species were known from Arctic Canada, (*Ameronothrus lineatus* (Thorell), *Ameronothrus nigrofemoratus* L. Koch and *Trichoribates lucens* (L. Koch)), and a Berlese funnel had never been used there.

When, therefore, an opportunity presented itself, I made up my mind to undertake such an investigation, which, though it must be defective, would still give some idea of the fauna. It proved, however, that in Canada one cannot say: I will go to that place and take samples, as we can in most countries in Europe. In this vast and impassable country, with only few means of communication, one must place one's stations in the close vicinity of these. Samples each comprising 1 1000 sq. m. were therefore taken in the following easily accessible localities (see the map); the thickness varies somewhat in accordance with the thickness of the root layer:

Tundra with tussocks of *Eriophorum vaginatum* near Reindeer Station.

From the top of Richardson Mountains; in the background to the left Mackenzie delta, in the foreground a snow patch surrounded by *Cassiope*.

1. Reindeer Station (ReSt) in the Mackenzie delta		169	samples
2. Richardson Mountains (RiMt) the mountains west of the Mackenzie delta		35	,,
3. Yellow Knife (YeKn) near Great Slave Lake		106	,,
4. Coppermine (CoMi) near Coronation Gulf		123	,,
5. Churchill (Chur) west side of Hudson Bay		143	,,
6. Jasper and Mt. Robson, Rocky Mountains	(RoMt)	12	,,
7. Banff, Rocky Mountains			
8. Frobisher Bay, Baffin Island		36	,,
9. Ungava Bay, Labrador		6	,,

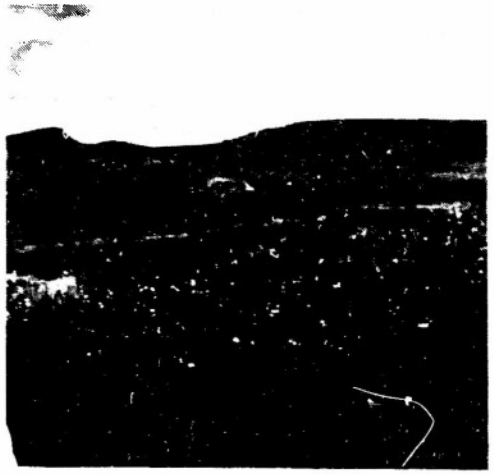
I have not collected the 42 samples from Baffin Island and Labrador myself; thus altogether 630 samples were examined.

The samples from Rocky Mountains, Labrador and from Baffin Island had, however, been kept so long in boxes before they could be treated in the Berlese funnels, that most of the individuals had perished during the constant shaking during transportation. These samples, therefore, are only of small value, but may still say a little of the occurence of the individual species in these districts. New species from Rocky Mountains will be described in a later paper, since they do not belong to northern Canada. In this first part, only the oribatids collected, about 20.000 specimens, will be treated; the collembolen will be discussed in part II.

Transition between forest and tundra near Reindeer Station, towards the Mackenzie delta.

A SHORT DESCRIPTION OF THE LOCALITIES EXAMINED

Reindeer Station (68° 42′ N. 134° 08′ W.) on the eastern side of the Mackenzie delta, is situated near the north limit of the forest. Just behind the bank of the river, the land rises to a slope about 500 feet high, from the top of which the tundra extends endlessly towards the east. Here grows dwarf-birch (*Betula nana*) scatteredly among dense tussocks of *Eriophorum vaginatum*, *Pedicularis arctica*, mosses and different lichens. The slope is cut by ravines which on the south exposed slopes are grown with very sparse spruce wood and scattered birch trees and willow shrub, while the north exposed sides are often naked clay slopes. Down through the ravines *Betula*, *Almus* and *Salix* grow round a small snow water brook, and there is in addition a luxuriant vegetation of *Ledum groenlandicum*, *Vaccinium* spp., *Empetrum nigrum*, *Epilobium angustifolium*, *Pyrola grandiflora*, *Linnaea borealis*, *Pulsatilla* sp. etc., mixed with grasses, mosses, liverwort and lichens. Nearest to the bank of the river there are wet, swampy meadows with



Wet meadow with *Eriophorum* near Coppermine.

Lichen-heath near Coppermine.

High growth of *Scirpus validus* on a lake shore near Yellow Knife.

Half-dead spruce forest on rock near Yellow Knife.

Beach meadow along Churchill river flooded by high tide; with a pronounced beach fauna.

willow shrub. The bank is covered by soft clay (after the thaw) with a little moss. Reindeer Station thus offers a number of different biotopes. The samples were taken between the 9th and the 18th June.

Richardson Mountains. (the peak examined is in about 68° 24′ N. 135° 37′ W.) the outermost spurs to the east of the mountains in Alaska and Yukon. They are about 2000 feet high and fall fairly steeply towards the Mackenzie delta. The samples were taken right beneath the peak and on the top of one of the most easily accessible mountains. The vegetation here is pure arctic with a continuous carpet of *Cassiope* from which the snow has just disappeared, or with a more heath-like vegetation consisting of *Rhododendron lapponicum*, *Dryas punctata*, *Salix reticulata*, *Diapensia aborata*, *Betula nana*, *Empetrum nigrum*, *Vaccinium myrtilus*, and a dense layer of mosses and lichens. On the top there are scattered cushions of *Salix phebophylla* and *Oxytropus pygmaeus* among stones and gravel. The samples were taken on 25th June.

Coppermine. (67° 50′ N. 115° 05′ W.) is situated quite close to the sea on a flat sandy beach with scattered vegetation of *Elymus* sp. After the beach comes a narrow belt with a luxuriant vegetation of *Lupinus arcticus*, *Dryas integrifolia*, *Papaver arctica*, *Epilobium angustifolium* etc. intermingled with grasses; further inland there are swampy meadow areas with *Eriophorum* sp., *Carex*, mosses and liverwort. Behind the meadows the land rises gently to a rocky plateau about 100–150 feet high. On this stretch the flora has a heath-like stamp being especially dominated by *Dryas integrifolia*, *Epilobium*

angustifolium, *Vaccinium* spp., *Empetrum nigrum*, *Rhododendron lapponicum*, *Lupinus arcticus*, *Salix reticulata*, *Luzula nivalis* etc., often with such a pronounced mixture of various lichens near the peak, that the biotope approaches the lichen heath. Small patches exclusively grown with *Cassiope tetragona* occur nearer to the beach. The samples were taken from 11th to 21st July.

Yellow Knife (about 62° 40′ N. 114° 20′ W.) in the woodland is situated on the north side of Great Slave Lake in an area with rounded rocks grown with sparse, sometimes half dead, spruce trees. In many places the soil consists almost of pure sand, in more low-lying areas the soil is swampy and boggy. Small lakes surrounded by sandy shores or reeds occur among the worn rocks, which are grown with spruce, black currants, raspberries, *Epilobium* sp., grasses and lichens. On the meadows grow *Alnus*, *Salix*, *Myrica*, *Vaccinium uliginosum*, *Epilobium* sp., *Rubes*, *Eriophorum*, *Carex* etc. The samples were taken from 29th July to 1st August.

Churchill (58° 48′ N. 94° 11′ W.) is situated on a peninsula bordered by Hudson Bay and Churchill River. The tree limit runs only a few miles south of Churchill. The land is flat and for the greater part covered by tundra. Hudson Bay has sandy shores which by an assemblage of rounded rocks are separated from the *Dryas* plains, bogs, meadows, lakes and the fairly dry stony hills with lichens and scattered plants. South of them the tundra extends towards the forest. Along Churchill River, where there is a big tide, there are clayey meadows with a special flora and a tidal fauna associated with this flora. An about two metres high water conducting tube covered with peat runs over the tundra to Churchill; on a stretch where this water tube runs in a northwest—southeast direction, the vegetation on the southwestern side was much more luxuriant than on the northeastern side, where, on the other hand, the greater humidity conditions a richer animal life. The samples were taken from 18th August to 26th August.

The samples from Rocky Mountains were taken partly near Banff in a meadow with grass, clover and *Solidago* about 4537 feet above sea level (7 samples on 8th August), partly on a ditch bank with clover, grass and moss 3150 feet above sea level near Mt. Robson (2 samples on 8th August), and finally 3 samples near Jasper railway station in *Hordeum* sp. and grass about 3470 feet above sea level (13th August).

All these stations may give an idea, not only of the fauna living in arctic areas (Richardson Mt., Coppermine and in some degree Churchill) under conditions which much resemble those in Greenland, and may therefore serve to compare these two countries; they may also give an impression of the animal life which would be expected

further south (Yellow Knife) and thus form the transition to or connecting link with the fauna in the United States.

In order to clearly set out the climatic difference between the different localities, I have given in table I a number of temperature measurements as well as the annual precipitation. The Mackenzie delta and on the whole the western part of North West Territories has a somewhat warmer summer than Coppermine, which is situated further north than most of this district, and Churchill, though the latter locality is situated much further south outside the actual polar area. The July isotherm for 14 C runs from the middle of James Bay towards north-west south of Churchill to the Arctic Ocean at the mouth of the Mackenzie River. The table shows that the mean temperature for July in the Mackenzie delta near Mc. Pherson (1), which is situated about 80 miles south of Reindeer station, is 14.9° C., while near Churchill it is only 12.4° C. This difference is due to the fact that while the many hours of sunshine in the Mackenzie delta can easily warm the earth, which then, by conducting the heat, warm the lower lying layers of the atmosphere, the cold water from the Arctic Ocean and Hudson Bay is responsible for the very big surface which absorbs the sun rays without any noticeable change of temperature. "Outflows of polar air in summer time are, therefore, quickly warmed in the northwest—but only very slowly in the northeast", under which category Churchill can be reckoned, due to its situation near Hudson Bay. "The Northwestern Lands, therefore, have a distinct season of summer warmth"; this does not, however, apply to the Mackenzie Mountains (4000 to about 8000 feet, the examined peak of Richardson Mountains is about 2000 feet) which on account of their height above sea level have much colder summers and a pure arctic vegetation.

Table I shows that the summer near Coppermine is colder than near Churchill. Unfortunately, there are no particulars of temperature etc. from Yellow Knife. I have instead taken the figures from Hay River which is situated a little further south, and which, like Yellow Knife, is situated near Great Slave Lake. Here the summer is still warmer and longer than in any of the other localities due to its situation right in the middle of Canada and despite the neighbourhood with the inland lake with the late snow melting.

Since it is presumably only the length of the summer and the temperature which are of importance for the thriving of the microfauna I shall not discuss the winter in the different localities; it is very severe in all places. Nor shall I discuss in detail the precipitation which does not differ very much in the different localities.

(1) The measurements originate partly from Aklavik, which is situated about midway between Mc Pherson and Reindeer Station.

Table 1.

	Mackenzie delta Mc. Pherson (Reindeer St.)	Coppermine	Hay River (Yellow Knife)	Churchill
altitude meter	46	5	161	11
air temperature, C	1909–1927	1930–1932	1893–1928	—
January	— 29.2	— 28.9	— 26.3	— 29.4
February	— 25.6	— 30.4	— 23.9	— 26.9
March	— 21.0	— 23.2	— 17.6	— 19.1
April	— 11.7	— 17.9	— 4.9	— 8.2
May	— 1.0	— 6.0	+ 4.1	— 1.3
June	+ 7.7	+ 5.3	+ 10.0	+ 6.6
July	+ 14.9	+ 12.2	+ 15.3	+ 12.4
August	+ 11.9	+ 9.2	+ 13.8	+ 10.9
September	+ 3.4	+ 4.2	+ 8.0	+ 4.7
October	— 7.8	— 4.7	+ 0.1	— 2.8
November	— 22.0	— 17.8	— 12.9	— 14.3
December	— 26.7	— 25.0	— 21.2	— 24.1
Year	— 8.4	— 10.1	— 4.6	— 7.6
Range	44.1	42.6	41.6	41.8
Maximum	29.8	29.4	31.2	27.1
Minimum	— 47.3	— 42.8	— 46.7	— 43.2
Precipitation, mm.	1909–1927	1931–1934	1908–1927	—
Year	261	320	287	428

THE MATERIAL

The material collected is distributed as follows in table 2.

	No. of species	average no. of individuals per sq. m.	highest no. of individuals per sq. m.	no. of individuals found	no. of samples
Rocky Mountains	10			296	12
Richardson Mountains	35	33400	95700	1239	35
Reindeer Station	50	71140	129550	9328	169
Yellow Knife	51	32800	78400	3073	106
Coppermine	33	12420	38500	1528	123
Churchill	43	21460	81200	3655	143
Labrador & Baffin Island	11	—	—	96	42
Total				19215	630

The figures given for the number of individuals per sq. m. do not allow any conclusions to be drawn as to the actual conditions, nor can any comparison between the quantity of animals in the different localities be made, since there is difference of about two and a half months (9.6–26.8) in the taking of the samples between the

first from Reindeer Station and the last ones from Churchill, and the time of the sampling is very important if the greatest number of individuals should be procured. At the beginning of June the soil at Reindeer Station was still frozen at the surface and several snow squalls came which completely covered the ground. The samples from this place were therefore certainly taken too early. It is to be supposed that one month later when the breeding season had started, the number of individuals per sq. m. would have been much greater than that found. The same presumably holds good for Richardson Mountains. At Churchill the samples were however taken rather late, the autumn storms with rain had begun, but whether these had already decimated the population efter the breeding maximum cannot be decided. At Coppermine the vegetation was in full bloom when the samples were taken, and from investigations in Greenland it is known that the breeding period of the microfauna coincides with the flowering period. The numbers of individuals found per sq. m. should accordingly correspond fairly well with the actual conditions; many other factors than the right time may however influence the result obtained, e.g. in the first place, the expelling technique and the room where the samples are placed. At Coppermine it was very difficult to find a suitable room; a small room without windows was used, but as it is just the light in connexion with the desiccation of the air which should expel the animals from the earth the one factor was completely annihilated, and this may account for the smaller number of individuals per sq. m.; that Coppermine is however much poorer than the other localities is also evident from the small number of species found here. In Yellow Knife it was in the height of the summer during the sampling, and this was presumably the right time for obtaining a favourable result, which however did not prove to be very great.

It will appear from the above that the animal life at Reindeer Station in the Mackenzie delta is surprisingly rich in individuals as compared with the other localities, which was to be expected as Reindeer Station is situated inside the woodland area where the animal life is always much richer than outside, and since most of the samples were taken in a warm, sunny ravine, while the other localities apart from Yellow Knife are situated north of or above the tree limit in a more inclement climate.

In no places did I find as high a number of individuals as in Greenland where the number per sq. m. in some localities approached 800.000.

FAUNA LIST

Since oribatids from northern Canada have never before been figured and as they vary a great deal from the European species I have drawn one figure at least of each species. This will make the identification of these animals easier to future specialists.

As far as the very small species are concerned (*Brachychthonius*, *Suctobelba* and in some degree *Oppia*) it is impossible to distinguish the individual species within the same genus without making microscopical preparations. As it was not feasible, among other things due to lack of time, to make preparations of every single species of each of the 630 samples, several of these species which are discussed in the following may therefore have a wider distribution than stated. Probably, several of these small species may be met with in other biotopes within the same locality or in other localities than those listed. The present investigation is based on 435 microscopical preparations.

Eulohmannia ribagai (Berl.) fig. 1.

The Hysterosoma with distinct network consisting of regular hexangular fields which are most distinct on the shoulder. Berlese has overlooked this sculpture and writes that the integument is smooth. Also the propodosoma is reticulate, but fainter. The interlamellar hairs curved backwards, pseudostigmatic organ bent slightly backwards and downwards with 12–13 single bristles.

Reindeer Station: Common in many biotopes; abundant in dense growth of *Vaccinium* sp., *Ledum*, grass, moss and lichens, scarce in thin layers of lichen with reindeer excrement, in thick moss cushion, and in withered grass.

Hypochthonius rufulus C. L. Koch fig. 2.

Yellow Knife: Common in wet meadows with *Vaccinium uliginosum*, *Ledum* sp., *Carex* and *Eriophorum* and a little moss, also in other wet meadows with moss and liverwort.

Hypochthoniella pallidula (C. L. Koch). fig. 3.

Yellow Knife: Common in the same biotopes as the above mentioned species, a few specimens also in thin moss on dry slopes grown with *Atriplex patulum*, *Polygonum aviculare*, *Descurainea Richardsonii* and *Capsella bursa pastoris*.

Churchill: A few in moist moss among *Epilobium angustifolium*, *Rubus chamaemorus*, *Ledum*, *Vaccinium* and grass.

Eobrachychthonius sexnotatus (Jacot) fig. 4.

I have not been able to discern other spots than those indicated on the figure. Unfortunately, the specimen was crushed, therefore the lateral plates are more distinctly seen.

Richardson Mountains. 1 individual in withered moss, liverwort and *Cassiope* near a snow-patch.

Eobrachychthonius montanus n. sp. fig. 5.

Colour yellowish, length 0. 24 mm, breadth 0.14 mm.

The propodosoma slightly broader than long and a little narrower than the hysterosoma. The rostral hairs are situated near the tip of the rostrum: just behind them two bends are seen, posteriorly divided by a little point directed forwards. Lamellar hairs directed forwards, straight connected by a curved line. Pseudostigmatic organ with 6–7 transverse rows of apright bristles. Between the pseudostigmatic organs three pairs of light spots are seen of which the two in the foremost row are round and separated by a larger interspace than that in the two following pairs; they are broad, flattened; the hindmost ones are the most narrow, the fore-edge of the second pair is situated on a level with the interlamellar hairs. More anteriorly on the propodosoma a round light spot is found on either side a little in front of the pseudostigmatic organs. As these spots are very difficult to discern if the individual is not fully coloured, other spots may have escaped attention. Hysterosoma evenly pointed posteriorly. Sides parallel. All hairs short and lanceolate. Light spots are not seen on the hysterosoma. On either side of the second segment a chitinous ring is seen anteriorly surrounded by small chitinous thickenings, presumably the efferent duct for a gland situated here in several species, e. g. in *Trhypochthoniellus*. Behind and laterally of this there is a triangular plate and just behind this there is on either side of the third segment a small lobe which is not completely separated from the chitinous covering on the back of this segment. On the ventral side three of the four lateral plates characteristic of the genus are seen (to the left on the figure 5 a).

Rocky Mountains: Several specimens near Jasper railway station in moist vegetation of grass and *Hordeum* sp.

Brachychthonius scalaris Forssl. fig. 6.

The Canadian form differs from the type by having a greater number of light spots, thus four in front of the pseudostigmatic organ and on the hindmost segment on either side three in an oblique row, of which the Swedish form has only the innermost (1).

Richardson Mountains: Very common in withered moss, *Cassiope* and liverwort near drifts of snow; besides 1 individual in heath-like vegetation (*Rhododendron*, *Dryas*, *Empetrum*, *Vaccinium*, *Betula*, *Diapensia*, moss etc.)

Reindeer Station: Abundant in moss among decayed, wet alder leaves; in withered grass; in *Polytrichum*.

(1) Dr. Forsslund has informed me that he has now found more light spots also on the Swedish specimens than indicated on his figure of this species, and that the Canadian and Swedish specimens probably belong to the same species.

Coppermine: Very common in many biotopes as e. g. wet *Carex* meadows with moss, in *Cassiope tetragona* vegetation, in lichen growth on a large stone where also a little moss was found, and in a moss cushion sheltered by a large stone.

Churchill: Many in moist heath vegetation with moss, *Carex*, *Salix reticulata*, *Rhododendron*, *Dryas*, *Vaccinium*, *Arctostaphylos*, *Pinguicula* etc. and in similar biotopes.

Brachychthonius perpusillus Berl. fig. 7.

The spots on the propodosoma between the interlamellar hairs cannot be seen.

Reindeer Station: Common together with *B. scalaris* in decayed alder leaves, in withered grass, among spruce needles below spruce, and in a thick layer of *Ledum*, *Vaccinium*, grass and moss.

Brachychthonius lapponicus Trghd. fig. 8.

Rocky Mountains: Common in meadows with grass and clover near Banff, in moss near Mt. Robson, and in all the samples from Jasper in grass and *Hordeum* sp. vegetation.

Richardson Mountains: Common in *Dryas* vegetation with a little liverwort and reindeer lichen.

Reindeer Station: Very common in dripping wet moss and liverwort in a little depression grown with *Empetrum*, *Vaccinium*, *Salix* and *Betula*, and in many similar biotopes, also on the river bank in moss.

Yellow Knife: Abundant in luxuriant vegetation of *Equisetum* and *Carex* with moss on dug out peat soil and in withered leaves and spruce needles, in lichen cushions on rocks, and in wet moss in meadows.

Coppermine: A single specimen has been found in luxuriant vegetation of *Dryas*, *Lupinus*, *Salix reticulata*, *Luzula* and moss.

Churchill: Common in moist meadows with moss, grass, *Pinguicula*, *Dryas*, *Andromeda*, *Vaccinium* etc.

Brachychthonius forsslundi n. sp. fig. 9.

Colour yellowish, length 0,23 mm, breadth 0,15 mm. Propodosoma about $^1/_3$ broader than long and half as long as hysterosoma and equally broad. Rostral hairs long, almost parallel, directed forwards, smooth, attached a good distance behind the tip of the rostrum. Lamellar hairs slightly curved, directed forwards, connected by a chitinous ridge. Interlamellar hairs somewhat shorter; all hairs fairly broad. The head of the pseudostigmatic organ is a short, dense tuft. Among the interlamellar hairs there are 4 light spots of which the foremost are the largest and more rounded

than the remaining ones; two very large light spots are seen some distance in front of the pseudostigmatic organ.

The hysterosoma is characteristic by two light longitudinal furrows running across the middle from hair to hair. Where these furrows touch the segment lying in front of them the segment boundaries project into a point: on the hindmost segment the furrows expand. On the foremost segment four light spots can be seen arranged in the way characteristic of many species of *Brachychthonius:* two small ones nearest the shoulder, one large in the middle and posteriorly one slightly smaller. All hairs fairly long. This species has been named after the acarologist Dr. KARL-HERMAN FORSSLUND.

Yellow Knife: 1 specimen in very wet moss in a meadow with *Equisetum* and *Epilobium* vegetation.

Brachychthonius ocellatus n. sp. fig. 10.

Color yellowish. Length 0.20 mm, breadth 0.13 mm.

Easily recognizable by the numerous round light spots and the long hairs.

Propodosoma nearly twice as broad as long and equally broad as the hysterosoma (maybe the animal is slightly pressed in the preparation). Rostral hairs are situated some distance behind the tip of the rostrum, they are almost parallel and directed forwards. Lamellar hairs connected by a chitinous ridge, curved at the tip: the same seems to hold good for the exopseud. hairs if it is not due to a fault during the preparation. Interl. hairs long, bent backwards. Pseudostigmatic organ very thin with long bristles. Between the pseud. organs three pairs of light spots can be seen. The two foremost spots are large and broad, the second pair long and narrow, with their posterior margin on a level with the interl. hairs; the posterior ones are very small. In front of the pseud. organ there are four more or less round spots of which the outermost are the smallest.

The hysterosoma is evenly rounded posteriorly. On the foremost segment there are on either side six (possibly more) light spots as indicated in the figure. On the second segment there are three spots in an oblique line with the smallest ones situated nearest the middle. A similar arrangement is seen on the last segment which besides has three spots in a transverse row in the middle.

Yellow Knife: 1 individual in moss in a meadow with *Myrica, Betula nana, Arctostaphylos, Carex* etc.

Brachychochthonius berlesei Willm. ssp. *erosus* Jacot fig. 11.

Yellow Knife: Several specimens in damp moss in a meadow with *Rubus chamaemorus, Myrica, Eriophorum, Carex, Betula* and *Salix.*

Coppermine: A few in luxuriant vegetation of *Dryas integrifolia*, *Lupinus arcticus*, *Salix reticulata*, *Luzula* and moss.

Brachychochthonius jugatus Jacot ssp. *suecica* Forssl. fig. 12.

The Canadian form differs from the Swedish by a considerable variation in the pattern of the hysterosoma, since nearly all the central fields in some specimens (adults) may be whole, in others divided (indicated by a broken line). The pattern on the sides of the hysterosoma is also very varying (cp. right and left side in the figure, drawn from two different individuals). While Jacot's individuals have broad blade-like bristles on the body, they are considerably smaller in the Swedish form and agree with the Canadian form. There is, however, a slight difference, since the shoulder bristle in the Canadian form is distinctly branched.

Reindeer Station: Several specimens in a *Calamagrostis* tussock, one among spruce needles under a spruce.

Yellow Knife: Several specimens in a little depression under a spruce with damp moss, liverwort, reindeer lichen, old leaves and spruce needles.

Brachychochthonius rostratus Jacot fig. 13.

This species shows small differences from the type. The patterns on the posteriormost segment of the hysterosoma is not quite as stated by Jacot, and there is considerable deviation especially on the propodosoma. Jacot here gives a hatched chitinous ridge of which I can only discern the transverse portion. The spots with the light grains are much fewer on Jacot's drawing than in the Canadian specimen. This may be due to the difficulty in discerning these extremely small fields in the pale yellow surrounding or local variations. Jacot could not see all hairs on the body nor the rostral britles, they are present in the Canadian ferm.

Richardson Mountains: 3 individuals in heath-like vegetation consisting of *Rhododendron*, *Dryas*, *Salix reticulata*, *Empetrum*, *Betula nana* with luxuriant moss and lichens.

Brachychochthonius arcticus n. sp. fig. 14.

Yellowish, 0.18 mm long, 0.09 mm broad. Propodosoma slightly longer than broad and a little narrower than hysterosoma which has the sides almost parallel. Propodosoma and hysterosoma with many spots with small shining points which are especially distinct on propodosoma. They may be arranged in strokes. The spots or pattern on hysterosoma are distinct only in the middle of it. On both sides a row of oval to heart-shaped spots are bordered by a kind of groove in which the exceedingly stout and smooth dorsal bristles are situated. Pseud. organs fusiform clothed with small cusplike bristles. The tarsal joint on legs I and II basally and ventrally have a slightly inclined

bristle, broad and curved at the tip, as indicated by FORSSLUND also in *B. pilososetosus*, and which apparently is present in all *Brachychaetothonius* species and possibly also in all or many species of the genera *Brachychthonius*. This species is subject to a good deal of variation (cp. fig. 14 and fig. 14 b. This species seems to be nearly related to *B. semiornatus* Evans of which I have seen a sketch, and which will be published in 1952. *B. semiornatus* Evans, however, has much fewer light spots on propodosoma, and the pattern on hysterosoma is not so defined.

Rocky Mountains: 1 specimen in damp moss on ditch bank with clover and grass (Mt. Robson).

Richardson Mountains: 1 individual in lichen vegetation mixed with moss.

Reindeer Station: A few individuals in a little moist depression with different mosses; among, decayed wet alder leaves and moss, and in withered *Calamagrostis* tussock.

Coppermine: 1 individual in lichen-heath with reindeer lichen, *Luzula* and *Salix* sp.

Trhypochthonius tectorum (Berl.) fig. 15.

Richardson Mountains: Numerous in withered moss, *Cassiope* and liverwort on ground where the snow has just melted away.

Yellow Knife: A few specimens in a thick layer of dead leaves and spruce needles among *Vaccinium vitis idaea* and *Ledum*.

Churchill: Very common in many biotopes, particularly in a small damp depression with luxuriant grass (*Catabrosa*), *Stellaria longipes*, *Achillea borealis*, *Polygonum viviparum*, *Rubus pubescens*, *Salix* sp. etc., and in wet meadows with moss, grass, *Pinguicula vulgaris*, *Andromeda polyfolia*, *Dryas integrifolia*, *Arctostaphylos rubra* etc.

Trhypochthonius badius (Berl.) fig. 16.

Churchill: Numerous in wet meadows with scattered low willow shrub, moss, *Eriophorum* and *Pinguicula vulgaris*.

Trhypochthonellus setosus Willm. ssp. *canadensis* n. ssp. fig. 17.

Colour brown yellow, in all essentials agreeing with WILLMANN's description but differing by the following characters: Distance between the two hairs in 2nd pair dorsal on hysterosoma is about 2 1/2 times the distance between the two hairs in the 3rd pair, i. e. 1 : 2 1/2, while in the typical species the proportion is only 1 : 1 1/2. The typical species has two hairs just behind the gland on hysterosoma, the variety has only one. Hysterosoma is distinctly reticulate throughout, propodosoma finely wrinkled-punctuate.

Yellow Knife: 2 individuals in *Scirpus validus* vegetation on lake shores with a bottom vegetation of moss and liverwort.

Trimalaconothrus novus Sell. fig. 18.

Coppermine: 1 individual in a very wet meadow with *Eriophorum* and moss.

Yellow Knife: Abundant on lake shore with *Scirpus validus*, moss and liverwort.

Malaconothrus mollisetosus n. sp. fig. 19.

Colour grey-brown. Length 0.41–0.45 mm, breadth 0.21–0.23 mm. In outer appearance very much like *M. globiger* Trghd. Structure punctate, coarsest on propodosoma; under the secretion layer small distinct pits are seen on the hysterosoma. Propodosoma hardly half as long as hysterosoma, but considerably narrower. Hysterosoma broad, rounded posteriorly. As the name indicates all hairs are unusually soft; they are in addition fairly long, smooth and curved. Rostral hairs parallel, smooth and directed forwards. Lamellar hairs and pseud. bristles thin and curved. Beside the pseud. bristle a small hair is situated. The projection on propodosoma between legs I and II almost at right angles. Mandibles (see fig. 19 b). The outermost joint of the palp (fig. 19 a) which is almost spherical bears on its anterior edge 3 stout spines of which the anteriormost is the strongest, and behind these a stout, oblique, thick bristle. On the surface three stout hairs are situated and on the anterior edge in front of the thickest spine there is also a stout bristle. The penultimate joint carries two bristles of which the proximal is pectinate. Hysterosoma is as said above distinctly pitted under the secretion layer. The arrangement of the hairs appears from the figure 19.

Ventral side: genital and anal plates (fig. 19 c) abut throughout their length and are of equal length. Genital plates with five pairs of hairs, anal plates with three pairs of curled bristles. Legs (see figures 19 c and d).

Yellow Knife: Common in moss in meadow with *Rubus chamaemorus*, *Myrica*, *Eriophorum* and *Carex* and in wet meadows with a little moss, *Vaccinium uliginosum*, *Ledum* etc.

Churchill: Common in very wet meadows with luxuriant moss vegetation, *Eriophorum*, *Pinguicula vulgaris*, *Carex* and grass; also abundant in fairly dry heath-like biotopes grown with moss, *Salix reticulata*, *Vaccinium uliginosum*, *Andromeda*, *Dryas*, *Rhododendron*, *Polygonum viviparum*, *Carex* and grass.

Camisia horrida, (Herm.) fig. 20

has been found on nearly all dry biotopes in all the localities examined, but always in small numbers, most often singly.

Camisia lapponica (Trghd.) fig. 21.

As the larva, as far as I know, has not been figured previously, I give a sketch of it in fig. 21 b.

Yellow Knife: 1 adult specimen and a larva were found in a wet meadow with a little moss, *Carex*, *Eriophorum* and *Vaccinium uliginosum*.

Tyrannothrus kochi (Willm.) fig. 22.

Reindeer Station: Common in withered *Calamagrostis* tussock.

Yellow Knife: 2 specimens in a wet meadow with *Carex*, *Vaccinium uliginosum*, *Eriophorum* and a little moss.

Nothrus pratensis Sell. fig. 23.

Reindeer Station: A few specimens in *Sphagnum* mixed with *Carex* and *Ledum* sp., and in dense vegetation of *Ledum* sp., *Vaccinium*, grass, moss and lichens.

Yellow Knife: A few specimens in a wet meadow with *Vaccinium uliginosum*, *Ledum*, *Eriophrum*, *Carex* and a little moss.

Nothrus borussicus Sell. fig. 24.

As I have been in doubt as to the correctness of the determination, I have drawn several detailed figures.

Richardson Mountains: Abundant on snow patches in withered moss, liverwort and *Cassiope*, about half a metre from the edge of the snow.

Yellow Knife: 1 specimen on a scorched slope but with luxuriant moss vegetation and *Atriplex patulum*, *Polygonum aviculare*, *Capsella bursa pastoris* and *Descurainea Richardsonii*.

Coppermine: Fairly common in dripping wet *Sphagnum* mixed with *Ledum*, *Dryas*, *Cassiope*, *Vaccinium*, *Salix reticulata* and *Carex* etc.

Churchill: Abundant in moss with *Carex*, *Vaccinium uliginosum*, *Dryas*, *Rhododendron*, and in several similar localities.

Platynothrus peltifer (C. L. Koch) fig. 25.

Reindeer Station: 1 specimen in withered grass tussock (*Calamagrostis*) with old leaves and roots.

Platynothrus punctatus (L. Koch). fig. 26.

Coppermine: Abundant in knee-deep willow scrub with a thick cover of damp moss and a little *Luzula*, a biotope which is common all round the settlement where there is a little humidity. *Pl. punctatus* is also common in the wet *Carex* meadows with thick moss just above the beach ridge.

Churchill: Abundant in *Carex* swamps with thick moss above the beach; in wet meadows with a rich moss vegetation; in soft clay on the beach meadows with *Plantag* , grass and *Cochlcare* sp. submerged at flood tide.

Heminothrus thori (Berl.) fig. 27.

The hairs on the legs are all distinctly pennate (fig. 27 a). The two hindmost hairs on the ventral side are provided with very fine, small lateral hairs.

Churchill: Common in moist meadows with grass, moss, *Pinguicula vulgaris*, *Vaccinium uliginosum*, *Andromeda* etc.

Hermannia reticulata Thorell fig. 28.

Coppermine: Common in almost pure vegetation of *Cassiope tetragona* with much moss; on lichen heath with scattered *Luzula* and *Salix* sp., and on heaths with *Dryas*, *Vaccinium* spp., *Empetrum*. *Epilobium*, *Rhododendron*, *Lupinus*, moss and lichens.

Belba tatrica (Kulcz.) fig. 29.

Reindeer Station: Several specimens in various biotopes as e. g. in a dripping wet depression with mosses, liverwort, *Empetrum*, *Vaccinium vitis idaea* and knee-deep *Salix* and *Betula*, among dripping wet alder leaves near a water course, and in a dry *Pulsatilla* tussock on a south exposed slope.

Yellow Knife: Several in a thick layer of dead leaves and spruce needles on *Vaccinium vitis idaea* and *Ledum* under alder and spruce trees, in dry reindeer lichen on rocks, and in moss, liverwort, lichens and *Vaccinium vitis idaea* in moist depressions among rocks in an open spruce wood.

Belba longitarsalis n. sp. fig. 30.

Colour: from brown to brown-yellow, length about 0.70 mm, breadth 0.43 mm. Tarsus on leg IV is very long, scarcely 50% longer than femur. Prodoposoma is rounded between legs I and II. The rostrum is fairly broad. The rostral and lamellar hairs are inclined stronly outwards at the tip. The pseudostigmatic organs are fairly short, straight, stiff rough setae (fig. 30 a) which are directed forwards. The interlamellar hairs are not quite as long as half the length of the pseudostigmatic organs; they are directed backwards and are stiff. In front of the pseudostigmatic organ an inclined fine bristle is seen which is as long as the interlamellar hair. Behind the pseudostigmatic organs there are two broad rounded chitinous knobs or ridges. Spinae adnatae are very long and pointed, bent slightly outwards; they project beyond the chitinous tubercles. The hairs on the hysterosoma are situated in two rows with 8 in each across the back; they radiate to all sides and are curved, stiff, rough bristles (fig. 30 b). The legs are exceedingly long, particularly the IV pair. Unfortunately, pair I of the

legs is missing, and several of the stoutest bristles on the other pairs of legs are broken off (in fig. 30 indicated by a transverse line). Coxa IV is 0,15 mm, Femur IV (0.33 mm) is a little more than twice as long as the genu (0.16 mm) and a little shorter than tibia 0.37 mm. The bristles on femur and genu IV must be very long since they are broken off in a place where they are still very stout. Tarsus IV measures 0.43 mm. The sensory hair on tibia IV is placed vertically at right angles to the leg, but in the middle bends in an even arch downwards and backwards. As regards the legs see figure 30.

Reindeer Station: 1 specimen was found together with several other species of *Belba* in a little depression which was dripping wet and grown with mosses, liverwort, *Empetrum*, *Vaccinium vitis idaea* under knee-deep *Salix* and *Betula* schrub.

Belba coxalis n. sp. fig. 31.

Colour yellowish, the animal is faintly chitinized, length 0.43 mm, breadth 0.25 mm. This species is very characteristic by having very broad coxae on leg III due to the fact that along the outer side of the coxa there is a broad rounded fringe. There is no projection between legs I and II. The rostrum is fairly small; the lamellar hairs are placed at a slightly greater distance than the rostral hairs. The pseudostigmatic organs are stiff, smooth bristles. The interlamellar hairs are small and thin. No tubercles are seen on the posterior margin of prodoposoma behind the pseudostigmata.

Hysterosoma. Spinae adnatae are fairly small. The hairs on hysterosoma are arranged in two rows across the back; there are 8 pairs of which the foremost turns forwards, the others backwards, all are curved. Between the genital and anal plates there is a distinct interspace. The legs are short and fairly robust; on leg I femur is club-shaped distally, tibia is very short and thickened, and also the proximal part of the tarsus is strongly thickened. Several hairs are rough (fig. 31 b). Coxa on leg III is, as said above, provided with a chitinous blade. Leg IV is much more slender than leg I, all joints are, however, fairly thick; tarsus is almost double as long as tibia, proximal it is strongly thickened. The outer hair on the genu is not longer than the neighbouring hair, the inner is a little shorter. The sensory hair on tibia is placed at right angles to the joint, but bends backwards almost in the middle in an angle. There are no old skins or dirt on the back.

Reindeer Station: Several specimens were found among dead wet alder leaves and grass under alder trees, a few were found also in reindeer lichens mixed with *Carex* and *Vaccinium* and in a moss cushion.

Belba mackenziensis n. sp. fig. 32.

Colour light yellowish-brown, 0.38 mm long, 0.22 mm broad.

Rostrum fairly broad, rounded. The rostral and lamellar hairs are situated at the same distance from each other. A distinct chitinous ridge resembling lamellae, is found on either side of the propodosoma. Between legs I and II a sharp tooth directed forwards is seen. The pseudostigmatic organs are fairly short and thick, rod-shaped. The interlamellar hairs are thin, short bristles which are directed backwards and reach the anterior margin of the well developed chitinous tubercles on the posterior margin of propodosoma. Spinae adnatae are very short, thin and pointed. 8 pairs of slightly inclined hairs arranged in two parallel rows are situated across the hysterosoma; the foremost pair points laterally, the following four pairs backwards and a little inwards, the sixth pair is inclined towards the middle, and the two last pairs are inclined backwards. The genital and anal plates are distinctly separate (fig. 32 a). All joints of all the legs are a little club-shaped thickened. The sensory hair on tibia I is directed forwards. On tibia IV the sensory hair is also directed forwards when the leg is stretched. The hysterosoma is smooth without dirt or old skins. In fig. 32 c a nymph of this species is seen.

Richardson Mountains: 1 specimen in withered wet moss, liverwort and *Cassiope* about $^1/_2$ m from the snow patch; a few in heath vegetation consisting of *Rhododendron lapponicum*, *Dryas punctata*, *Salix reticulata*, *Diapensia aborata*, *Betula nana*, *Empetrum*, *Vaccinium myrtilus* with much moss and a little lichen.

Reindeer Station: A single specimen in a dense green, about 15 cm. high, moss cushion.

Belba arcticola n. sp. fig. 33.

Colour light-brown; 0.58 mm long, 0.34 mm broad.

Rostrum fairly broad. The rostral and lamellar hairs are placed at the same distance from each other. A weak chitinous ridge across the propodosoma is seen in front of the lamellar hairs. The sides of the propodosoma are rounded without any projection or tooth between legs I and II. The cuticle on propodosoma is scatteredly punctuate. The pseudostigmatic organs are long and flagelliform. The interlamellar hairs are fairly long and thin; they reach to the anterior margin of the hysterosoma. Behind the pseudostigmata there is a strong chitinous tubercle on either side.

Spinae adnatae are very small and difficult to see. There are 8 pairs of hairs on hysterosoma (on the figure only the 7 foremost ones are seen), of which the foremost points laterally, the others backwards. The genital plates are distinctly separated from the anal plates (fig. 33 a).

On leg I the tibia is very short and thick; the sensory hair points laterally at nearly right angles. Proximally the tarsus is globularly swollen, then it suddenly becomes narrower so that the remaining portion is of the same thickness right to the tip. On

leg IV tibia is almost as long as femur; the sensory hair, which is long and flexible, points outwards. The hysterosoma is not covered with dirt or the like.

Reindeer Station: This species was very common in a small dripping wet depression grown with mosses, liverwort, *Empetrum* and *Vaccinium* under knee-deep *Salix* and *Betula* shrub, a few were also found among dead wet alder leaves near a water-course.

Coppermine: A few in heath vegetation consisting of *Ledum*, *Dryas*, *Vaccinium*, *Cassiope*, *Salix reticulata*, *Rhododendron*, *Lupinus* and moss, and in similar biotopes; in addition a specimen was found in a *Sphagnum* cushion mixed with many of the above mentioned plants.

Belba bakeri n. sp. fig. 34.

Colour: yellow-brown; length 0.49 mm, breadth 0.29 mm.

Rostrum is broad but faintly pointed. The rostral and lamellar hairs are placed at the same distance from each other. Posteriorly on the propodosoma a faint net pattern is seen, which may, however, derive from a deeper lying fat tissue. Between legs I and II there is a sharp tooth. The pseudostigmatic organs are long and flagelliform, they are inclined backwards. The interlamellar hairs are fairly long stiff bristles which are directed backwards and reach the anterior margin of the hysterosoma. Behind the pseudostigmata a strong chitinous tubercle is seen on either side.

The Spinae adnatae are broad, but faintly chitinized. 8 pairs of slightly curved hairs are placed in two rows across the hysterosoma, the foremost pair is directed forwards. The genital and anal plates are distinctly separated (fig. 34 a). All joints on all the legs are fairly club-shaped. The hairs are directed more or less parallel to the longitudinal direction of the joints; many of the hairs are stout rough bristles. The outer hair on genu IV is somewhat stouter than the others, but not much longer. The sensory hair on tibia IV is curved strongly backwards. As regards the legs, see figure 34.

Hysterosoma is clean without dirt and cast off skins.

This species is named after the acarologist Dr. E. W. Baker, United States National Museum.

Richardson Mountains: Several in wet withered moss, liverwort and *Cassiope* with ice right below the vegetation and about half a metre from a snow-patch.

Reindeer Station: Several specimens in dripping wet depression with mosses, liverwort, *Empetrum* and *Vaccinium vitis idaea* under knee-deep *Betula* and *Salix* scrub.

Gymnodamaeus ornatus n. sp. fig. 35.

This species of which several specimens are available, is brown, fairly big, about

0.68–0.74 mm long and 0.37–0.42 mm broad, i. e. almost of the same size as *G. bicostatus* C. L. Koch, from which it however deviates on several points, first and foremost by its distinct pattern on the hysterosoma having oval and crescent-shaped areas bordered by smooth ridges. This ornamentation accounts for its name. The four hairs on the rostrum are placed in an arched line beside each other as in *G. bicostatus*, but while the outermost hairs which are stout and slightly rough extend only beyond the tip of the rostrum, the innermost pair which are soft and curved and somewhat rougher, project a good distance beyond the tip of the rostrum. These latter hairs are placed some distance from the edge on the upper side of the rostrum.

The pseudostigmatic organ is about 25% longer than the distance between them; towards the tip they become evenly club-shaped (fig. 35 a). Interlamellar hairs are absent or cannot be seen. Small short lamellae each ending in a small chitinous tubercle run in an even arch anteriorly from the pseudostigmata. Tectp. I and II are well-developed. Hysterosoma round, a little longer than broad and covered by a veil, which along the edges are provided with discontinued, indistinct, radial folds. On the tip of the hysterosoma two pairs of thin hairs are situated; the hindmost pair on each side of a small chitinous thickening. A third pair of hairs is placed a little further anteriorly on either side of the hindmost round field.

Ventral side (see fig. 35 b). The genital and anal plates are placed close to each other a small distance from the posterior edge of the hysterosoma, but they do not touch throughout their breadth; they are separated on both sides by small wedges. Close in front of the genital plate there is a chitinous fold or thickening tapering anteriorly in the middle and from here it runs obliquely backwards to the sides. The legs are exceedingly long and thin, since only the coxa and the proximal part of the femur after a thin stalk are thickened. The tarsus is, however, slightly thicker than the tibia and the genu. The length ratio of the legs and the joints in the individual pairs of legs will be seen from the drawing (fig. 35). On the tibia I the digitiform prolongation (fig. 35 c) bears a long curved sensory hair; beside this hair there is a very thin bristle, not quite as long as half the length of the sensory hair, and two short bristles—all on the tip of the cone-shaped prolongation. Three claws, of which the middle one is the most powerful, are situated on a long stalk. The whole animal is covered by a secretion layer which like small light grains adhere to all surfaces and which makes the hairs on the tip of the hysterosoma uneven and thick. Most of the hairs on the legs are, however, devoid of this secretion layer.

Reindeer Station: 7 specimens found among old withered leaves from a cushion of *Pulsatilla* intermingled with *Saxifraga tricuspidata* and *Artemisia frigida* on a south exposed clayey slope (45°) about 130 m. a. s. l.

Gymnodamaeus gildersleeveae n. sp. fig. 36.

Colour light-brown. A quite small species which is about 0.41 mm long and 0.23 mm broad. The four rostral and lamellar hairs are placed in an arch side by side across the rostrum. They are all curved inwards, densely covered with drops of secretion and meet almost in a point right in front of the tip of the rostrum. Rostrum is narrow and delimited from the remaining part of propodosoma by an interrupted transverse line behind the middlemost pair of bristles (the lamellar hairs). Interlamellar hairs absent, but there is a distinct spot where they ought to be placed. Pseudostigmata with a strong chitinous ring. The pseudostigmatic organs widen very much towards the tip; seen from the edge they are very flat; they are densely covered with fine setae. The distance between them is equal to the length of the pseud. organ. Between the pseudostigmata there is an arched, thickened ridge.

Tectopedia I and II have stout points.

Hysterosoma is regularly oval. Some not very distinct fields on the back are characteristic of which the middlemost is much larger than the remaining ones; in front of this a small round field is seen and on either side 3 fields which may be difficult to discern; posteriorly they converge more or less. Between the fields the integument is smooth, the fields along the edge are provided with small triangular grains of secretion. In the fields small brown secretion drops can be seen. At the posterior end of the hysterosoma three pairs of stout hairs are to be found, of which the foremost pair is by far the stoutest; it is bent outwards and forwards. The two other bristles which are placed at the tip of the hysterosoma are inclined slightly inwards sometimes the hindmost pair is bent outwards (see ventral side fig. 36 a). On the hysterosoma two pairs of small cracks or slits are seen, placed symmetrically; one of them almost in the middle of hysterosoma far laterally, the other one further posteriorly, a little in front and laterally of the foremost pair of bristles. A pair of similar chitinous cracks or slits are seen on the propodosoma in front of the thickened arch between the pseudostigmata. The whole specimen is covered by a veil bordered by small grains; inside the grains there is a finely radially striped rim. One veil seems to cover the hysterosoma, another or several the propodosoma, and the edges of the veils are distinctly seen along the border of the hysterosoma and over the rostrum. Right in front of the citinous arch on the propodosoma such a radially striped rim is seen and in the middle of the propodosoma an irregular figure resembling the letter M is seen. The sculpture on the back is presumably due to this veil.

The ventral side: Propodosoma and hysterosoma separated by a broad, but faintly chintinized belt. Genital and anal plates large; they lie close together, but a small distance from the posterior edge of the ventral plate. A very faint line seems to extend

in a pointed arch from a little in front of the genital plate and backwards to both sides towards leg IV's apodemata. No hairs are seen. The legs are short and powerful; all surfaces and hairs covered by a secretion. Tibia I with a very powerful, tubercle-like prolongation with a long sensory hair and a shorter bristle. Tarsus I has on the outer side a very broad, but soft and flexible hair.

This species is named after VIRGINIA GILDERSLEEVE, for many years Dean of Barnard College, Colombia University, New York. She has played a great part in the American Association of University Women and in the International Federation of University Women.

Yellow Knife: 4 individuals in a small depression among rocks under a spruce; the vegetation consisted of *Vaccinium vitis idaea*, moss, liverwort and reindeer lichens mixed with old leaves and needles.

Suctobelba acutidens Forssl. fig. 37.

Yellow Knife: Common in several biotopes e. g. in thick layers of moss and lichens on rocks; a few in wet meadows with *Vac. uliginosum*, *Ledum*, *Carex* and moss, and in thick layers of *Vac. vitis idaea* with withered alder leaves and spruce needles.

Suctobelba sarekensis Forssl. fig. 38.

Reindeer Station: 1 specimen in a thin layer of *Polytrichum* and reindeer lichens in the tundra.

Yellow Knife: 2 individuals in a thick layer of lichens and moss on a rock, and 1 specimen in very wet moss, liverwort and *Eriophorum*.

Churchill: A few specimens have been found in moist heath vegetation consisting of moss, *Carex*, *Salix reticulata Rhododendron*, *Dryas*, *Vaccinium uliginosum*, *Arctostaphylos*, *Pinguicula* etc., and in similar biotopes.

Suctobelba palustris Forssl. fig. 39.

According to Dr. FORSSLUND, who has seen my specimens, this species is the same as that which he found in Dalarne, Sweden and which he will publish within short under the name *S. palustris*. The appearance of the rostral teeth is seen in the accompanying figure 39 a.

Yellow Knife: Common in moist meadows with luxurient moss, *Carex*, *Salix*, *Eriophorum*, *Myrica*, *Betula nana* etc.

Suctobelba setosoclavata n. sp. fig. 40.

Length 0.26 mm, breadth 0.15 mm. Rostrum rounded at the tip; some distance from the tip there is a big sharp tooth directed forwards. In front of this a somewhat

smaller tooth can be seen in profile, while the rostrum itself is bluntly rounded (fig. 40 b). Rostral hairs stout. Most of the propodosoma is densely punctate; round the lamellar knob 5–6 small tubercles are situated; the lamellar knob is round, the anterior edge undulated, open posteriorly; the long lamellar hairs are situated on the anterior margin. Faint interpseudostigmatic chitinous ridges extend from the posterior part of the lamellar knob in an arch backwards to each side towards the pseudostigmata, where they terminate in a backwards directed chitinous tubercle with parallel sides. In front of these the quite short and thin interl. hairs are situated. Tectp. l stout throughout their length. The lamellae are developed in the proximal part only nearest the pseudostigmata. The pseudostigmatic organs are club-shaped, at the tip drawn out in a long bristle; the outer side fringed with fine hairs. The stalk is of the same length as the head, the bristle at the tip a little shorter. They are bent inwards. The anterior margin of hysterosoma with 4 uniform projections. The hairs on hysterosoma are long (see the figure).

Richardson Mountains: Common in heath-like vegetation: *Rhododendron lapponicum*, *Dryas punctata*, *Salix reticulata*, *Empetrum nigrum*, *Betula nana*, *Vaccinium myrtilus*, moss and lichens.

Reindeer Station: Abundant in tundra with reindeer lichen and moss and on river banks in soft clay and remains of leaves; a few specimens in *Empetrum* and *Vaccinium vitis idaea* vegetation with lichens.

Oppia quadricarinata (Mich.) fig. 41.

Found in small numbers in nearly all the examined localities on biotopes of a heath-like character or in grass-covered areas. Round Yellow Knife it is abundant in lichens on rocks and in thick layers of dead leaves and needles under spruce where *Vaccinium vitis idaea* and *Ledum* were growing. The specimens from Reindeer Station and Yellow Knife have a faint ring-shaped chitinous ridge inside the lamellae (fig. 41 a); anteriorly and laterally on this ridge a small bristle is situated as indicated by Paoli 1908 p. 70, table IV, fig. 30; this ring and the bristles cannot be seen on the specimens from Churchill and Richardson Mountains.

Oppia neerlandica (Oudms.) fig. 42.

This species varies a good deal as regards the appearance of the lamellae and the translamella and the length of the interlamellar hairs (cp. figs. 42, 42 a and 42 b).

Richardson Mountains: A few in withered moss, *Cassiope* and liverwort about ½ m from a snow patch.

Reindeer Station: Some in dense *Vaccinium vitis idaea* vegetation mixed with *Ledum* sp., grass and moss, and on the river bank in soft clay with remains of leaves.

Yellow Knife: Common in most biotopes; abundant in a little bog where the sample was taken in thick moss, liverwort and *Eriophorum* under *Salix* in water.

Churchill: Common in many biotopes. Abundant in a little depression with grass, *Stellaria, Achillea, Polygonum viviparum* and *Salix* sp.

Oppia washburni n. sp. fig. 43.

Light brown. Length 0.28 mm, breadth 0.16 mm. This species which I at first took for a reduced form of *Oppia neerlandica* (Oudms.) is established as a distinct species, since it exhibits many independent characters. Unfortunately, all the specimens are crushed and pressed a little out of shape, presumably because this species is somewhat more thinly chitinized than most other species of *Oppia*. In the figure it therefore appears to be somewhat broader than it ought to be. The anterior portion of the lamellae have fused with the auriculate ridges placed behind into two parellel S-shaped formations. At the anterior end they enclose on the inner side the lamellar hairs, while the interlamellar hairs are situated in a similar way at the posterior end on the outer side. The pseudostig. organ with oblong sharply pointed head with 7–8 setae on the outer side. The pseudostigmatic organs are directed forwards. On the propodosoma there are laterally on each side of the lamellae 2 light spots.

On the anterior edge of the hysterosoma a powerful chitinous projection is situated on either side running backwards for a distance on the hysterosoma. Medially of this there is a small comma-shaped chitinous thickening—remnants of an arch as we find it at *O. neerlandica*. In front of this a small hair is placed; in the same place a similar hair is situated in *Oppia neerlandica* (Oudms.) *Oppia washburni* thus resembles *O. neerlandica* exceedingly in many respects. It is reasonable here to emphasize the similarity with *Oppia krygeri* (Trghd.) from the Faroes, which also has a projection laterally on the anterior edge of the hysterosoma, and as to the appearance of the lamellae it slightly reminds of the present species. *O. krygeri* does not have the comma-shaped formations on the hysterosoma. This species is named after the director of the Arctic Institute, Dr. A. L. Washburn.

Rocky Mountains: Several specimens were found near Banff in a meadow with grass and clover, at Mt. Robson on a ditch bank with grass and clover and near Jasper railway station in grass and *Hordeum* sp. vegetation.

Richardson Mountains: 1 specimen in an almost pure *Dryas* veg. with a little reindeer lichen and liverwort.

Churchill: A few in heath-like vegetation consisting of *Vaccinium uliginosum, Arctostaphylos rubra, Rhodocendron lapponicum, Dryas integrifolia, Empetrum nigrum, Carex* sp., and moss.

Oppia translamellata (Willm.) fig. 44.

In this species the transition between propodosoma and hysterosoma is subject to great variation, from a broad chitinous arch (fig. 44 a) to a very small one which bends upwards between the lamellae (fig. 44 b).

Richardson Mountains: A few in almost pure *Dryas* vegetation with liverwort and reindeer lichen.

Reindeer Station: Common in most not too dry biotopes.

Yellow Knife: A few individuals on moss-grown slopes with *Atriplex patulum*, *Polygonum aviculare*, *Capsella bursa pastoris*, burned by the sun.

Oppia clavigera n. sp. fig. 45.

Colour yellow-grey, faintly chitinized. Length 0.29–0.30 mm, breadth 0.16–0.18 mm. Propodosoma narrow, lamellae, translamella and auriculate chitinous ridges well developed; pseudostigmatic organ club-shaped, at the tip furnished with small stiff bristles.

Rostral hairs smooth, parallel; they sit on the side of rostrum.

The lamellae strikingly resemble the lamellae in *O. translamellata*, i. e. they run in an arch from the pseudostigmata inwards for a distance, then they bend forwards and continue almost parallel, ending at about the middle of the propodosoma. Sometimes they stop a distance behind the lamellar hair. In contrast to *O. translamellata* the proximal end of the lamella has a small tip posteriorly projecting beyond the connexion with the pseudostigmata. The translamella is equally thick throughout; it connects the lamellae on a level with the anterior edge of the pseudostigmata. Often the middle portion of the translamella is absent, or it is tripartite. Lamellar hairs short; they are placed inside the curved anterior tip of the lamella, whereby the similarity to *O. translamellata* becomes still more pronounced. The interlamellar hairs are thin and strinkingly long, as long as the distance between them. They are situated lateraly of the auriculate chitinous ridges. Pseudostigmatic organs club-shaped with 6–7 fine hairs along the rounded tip (fig. 45 a); they are often directed forwards and a little outwards; the stalk has a small bend in the proximal third.

The anterior margin of the hysterosoma is most narrow in the middle with a small chitinous thickening extending over the propodosoma. It becomes weaker and thinner and continues to the translamella. The hairs on hysterosoma are thin and short.

This species is very nearly related to *O. translamellata*, as mentioned above, but differs from it first and foremost by the club-shaped pseudostig. organs.

Reindeer Station: A single specimen in *Empetrum* and *Vaccinium vitis idaea* veg. with lichens, in reindeer lichen and in spruce needles under spruces.

Coppermine: Several on lichen-heaths with reindeer lichen, scattered *Luzula* sp. and *Salix*.

Churchill: A few in luxuriant vegetation of *Catabrosa* sp. with *Stellaria longipes*, *Polygonum viviparum*, *Achillea borealis*, *Salix* sp. and *Rubus pubescens*.

Oppia fissurata n. sp. fig. 46.

Colour yellow-brown. Length 0.33–0.35 mm, breadth 0.18–0.19 mm. This species has broad incisions in rostrum, well developed lamellae and often a translamella. The anterior edge of hysterosoma is broadly rounded and forms a more or less developed arch whose two sides run as ridges backwards over the dorsal side of hysterosoma.

Rostrum with deep incisions behind which the fairly long rostral hairs are situated; they converge and reach with half their length beyond the tip of the lamellae or sometimes a good distance in front of the tip (fig. 46). The lamellae consist of two longitudinal ridges which often lack connexion with the more transversely running part of the lamella issuing from the pseudostigmata; they continue past this backwards in a fairly long drawn tip. Two thirds of the longitudinal lamella is usually placed in front of the transversely running part of the lamella. The lamellae are faintly S-shaped pointed at both ends and broadest in the middle. On a level with the transversally running part of the lamella a translamella is often situated, which may however be very weakly developed and often interrupted in the middle. The auriculate chitinous ridges between the lamellae are well developed. Interlamellar hairs are short and thin; they are situated laterally of the uppermost half of the auriculate ridges. The pseudostig. organs are bent in a large arch inwards and forwards; the head is very pointed, lanceolate with 6–8 long hairs on the outer side.

Hysterosoma fairly rounded, broadest in the middle and slightly pointed posteriorly. Anterior margin rounded in the middle, but its sides run obliquely backwards whereby an even arch arises, which may resemble the arch in *O. neerlandica* a good deal though it is never so pronounced. In some individuals it is very conspicuous and projects beyond the posterior margin of propodosoma; posteriorly it has two distinct ridges running parallel over the dorsal side of hysterosoma half as long as the arch is broad (fig. 46 a). In the middle of the lateral sides of the arch a fairly long thin hair is placed. The hairs on hysterosoma are difficult to see; they are short and thin.

This species apparently is very nearly related to *O. falcata* (Paoli) with the tripartite rostrum, but differs by the appearance of the pseudostig. organs (in *O. falcata* they have much longer bristles) and by the well developed arch on hysterosoma which is not distinct in *O. falcata*.

Richardson Mountains: Several specimens were found half a metre from a snow patch in withered moss, liverwort and *Cassiope*.

Reindeer Station: Numerous in reindeer lichens and in withered tussocks of *Calamagrostis*, in *Polytrichum* etc. A good deal in heath vegetation consisting of *Empetrum*, *Vaccinium vitis idaea*, *Salix* sp., *Betula nana*, mosses and liverwort.

Coppermine: Abundant in heath vegetation near the beach with *Salix reticulata*, *Dryas integrifolia*, *Lupinus arcticus*, *Luzula nivalis* and moss.

Oppia maculata n. sp. fig. 47.

Colour yellow-brown, length 0.26–0.27, breadth 0.12–0.14 mm. The creature is long and narrow. Propodosoma with many light, round spots; 8 in two transverse rows in front of the anterior margin of hysterosoma, of which the two middlemost in the hindmost row are largest, and 8 in two longitudinal rows parallel to the lamellae. In addition, there are two quite small spots anteriorly and close to the pseudostigmata. All these spots are fairly indistinct; the four central spots are the most conspicuous. The lamellae are very weak, almost parallel, stoutest anteriorly and often interrupted posteriorly without connexion with the pseudostigmata. A weak translamella between the anterior points of the lamellae can be seen in some specimens. At the tip of the lamellae the two lamellar hairs are situated which are faintly converging. The interlamellar hairs are very small; they are situated between the pseudostigmata and the two big spots in the hindmost row. The pseudostigmatic organs are pointed, lanceolate, often curved strongly inwards and they are placed on short stalks. Sometimes they are curved outwards and backwards whatever the cause may be, and it can then be seen that the head on the backwards directed edge has a brim of small fine bristles. Hysterosoma is most narrow anteriorly. On either side the lateral edge is slightly thickened and appears to be darker than the anterior margin. These thickened margins extend in the median plane past the pseudostigmata. The integument is smooth. The hairs are smooth and short. This species seems to be very nearly related to *O. foveolata* (Paoli), which it resembles in several points, thus besides the spots the weak almost parallel lamellae. *Oppia sexmaculata* Dalenius likewise has light spots posteriorly on the propodosoma, but the pseudostigmatic organs differ much from those of *O. maculata*.

Reindeer Station: Abundant in *Sphagnum*, a few in moss in wet biotopes.

Yellow Knife: Common in all wet biotopes with *Eriophorum*, moss and liverwort, but it has also been found in great numbers in a cushion of reindeer lichen on rocks.

Churchill: Common on heath-like vegetation consisting of *Salix reticulata*, *Arctostaphylos rubra*, *Vaccinium uliginosum*, *Rhododendron lapponicum*, *Dryas*, *Polygonum viviparum* etc. and much moss at the bottom; a few on other similar biotopes.

Oppia minor (Paoli) fig. 48.

The pseudostigmatic organs with shorter stalks than stated by Paoli; besides

wanting the little semicircular chitinous ridge (translamel?) on propodosoma which is seen in PAOLI's figure in front of the two chitinous projections on the anterior border of hysterosoma.

Yellow Knife: Abundant in a single sample taken in a depression among rocks under a spruce where the vegetation consisted of *Vaccinium vitis idaea*, moss and liverwort covered by dead leaves and spruce needles.

Oribella castanea (Herm.) fig. 49.

Reindeer Station: Common in several fairly dry biotopes with *Vaccinium vitis idaea*, *Ledum*, *Empetrum*, *Salix*, grass, mosses, liverwort and a few lichens.

Yellow Knife: 1 specimen in a meadow with *Vaccinium uliginosum*, *Ledum*, *Carex*, *Eriophorum* and moss.

Oribella spinifera n. sp. fig. 50.

Colour lightbrown, length 0.40 mm, breadth 0.23 mm. Lamellae converging but not so much as in *O. castanea* (Herm.); between the tips of the lamellae 3–4 rows of chitinous spines are situated. The tarsus with one claw. Rostrum rounded; the rostral hairs are placed densely together on small apophyses a small distance on the upper side of rostrum. Lamellar hairs thin, smooth and long; they project for some distance beyond the tip of rostrum. Interlamellar hairs smooth; they project with half their length beyond the base for the lamellar hairs. The lamellae almost equally broad throughout, slightly narrower at the base, smooth on the inner side, the outer or lateral side however with tubercles which are most powerful distally. Between the tips of the lamellae there are 3–4 rows of conical chitinous spines of which there are 6–7 in the anterior row, in the posterior row fewer. The pseudostigmatic organs are directed laterally and anteriorly; they are spear-shaped. On the sides of the propodosoma large irregular spots or tubercles are seen.

Hysterosoma is broadest anteriorly tapering slightly posteriorly. The integument is smooth. The hairs are long and thin. The third pair in the middle of dorsum seems to be wanting. On the shoulder there is a stout bristle directed anteriorly and outwards.

Ventral side (see the figure 50 b). The tarsi have on all four pairs of legs on the inner side and basally (see figure 50 c) 2 branched bristles with only a few ramifications.

Churchill: 2 individuals were found in a very wet meadow near a lake with scattered willow shrub on dense *Eriophorum* growth with *Pinguicula*, moss, grass and *Carex*.

I received an undetermined specimen of this species for comparison during my visit to State College, Las Cruces, New Mexico. Together with other species it had been

taken during the experiments with infection of sheep with tapeworm with oribatids as intermediate host.

Eremaeus oblongus C. L. Koch fig. 51.

The Canadian specimens are rather small, measuring only 0.53 mm × 0.30 mm as compared with WILLMANN's measurements from Germany 0.56 × 0.28 mm and SELLNICK's from Central Europe 0.66 × 0.37 mm; the Canadian specimens also differ by having a faint reticulation on the underside of the legs which is particularly distinct on the femur. This sculpture I have not seen in specimens from Denmark, Iceland or Greenland, so it may be a Canadian variety.

Churchill: A few (mostly nymphs) in luxuriant growth of *Catabrosa* sp. with *Stellaria longipes*, *Polygonum viviparum* and *Achillea borealis* in humid depression under willows.

Eremaeus grandis n. sp. fig. 52.

Colour yellow-brown, length 0.72 mm, breadth 0.36 mm.

Rostral and lamellar hairs placed at the same distance, the lamellar hairs being situated on the upper side of rostrum. Lamellar hairs are smooth or with a faintly rough surface. The lamellae are S-shaped curved, in the middle convex and broader. The outer margin is sharp, while the inner border is more indistinct; at both ends they run out into and disappear in a thin line. The interlamellar hairs are exceedingly stout and long, about $^3/_4$ of the length of the pseudostigmatic organs; they are somewhat rough and directed backwards. The pseudostigmatic organs are about $^1/_4$ longer than their mutual distance. Shortly after leaving the pseudostigmata the stalk shows a little bend and curves backwards and laterally. The club is fairly thin. On the posterior border of the propodosoma behind and laterally of the pseudostigmata there is on either side a chitinous tubercle. Hysterosoma is long and narrow. The integument is smooth, the hairs are long and slightly serrate.

On legs III and IV femur projects somewhat beyond genu and almost covers it (see figure 52 a). The tarsi all with nearly parallel sides for the greater part of their length.

This species in many respects resembles *E. hepaticus* C. L. Koch, but the hysterosoma is not round as in *E. hepaticus* but elongate; the interlamellar hairs are much stouter, and the lamellae are not pitted, wrinkled, but smooth.

Richardson Mountains: 1 individual in *Dryas* vegetation with reindeer lichen and liverwort on a dry stony slope.

Eremaeus foveolatus n. sp. fig. 53.

Colour yellow-brown. Length 0.55–0.58 mm, breadth 0.28–0.32 mm.

Easily recognizable by its very distinct pits on the hysterosoma and between the long almost parallel lamellae.

The lamellar hairs which are rough, are placed on the sides of rostrum, so that the place of attachment cannot be seen from above. They project with about half their length beyond the rostrum and are curved inwards and almost touch each other with their tips. The rostral hairs are placed much closer together and are slightly curled and directed forwards. The lamellae are situated close together and in the foremost $^3/_4$ of their length almost parallel, but posteriorly they run laterally towards the pseudostigmata as a fine keel. The outer or lateral side is undulated and sharp, the inner side indistinct; between the lamellae 3 longitudinal rows of more or less distinct light pits. Where the lamellae cease to be parallel, a faint transverse wall without pits is seen. In front of the lamellae there are 2–3 faint transverse chitinous ridges. Interlamellar hairs stout, rough bristles which are half as long as the pseudostigmatic organs: they are directed forwards and laterally. The pseudostigmatic organs are directed right laterally; hey are a trifle longer than their mutual distance. The club is fairly broad and flat and occupies about half of the total length of the organ. The posterior margin of tectopedia II with deep furrows. Lateral of the pseudostigmata there is a powerful, angle-bent chitinous ridge which, posteriorly along the posterior border of propodosoma, delimits a row of U-shaped chitinous ridges.

Hysterosoma is oblong, oval, narrow anteriorly with thickened border. The sides are likewise thickened anteriorly. The anterior margin and the inner thickened ridges of the lateral sides form an angle of about 135° inwardly. The whole dorsum is covered by light pits which stand out very distinctly. Between the pits the cuticle is finely and densely punctate. The hairs are very long and slightly serrate. The anteriormost are almost twice as long as the posteriormost.

Ventral side (see figure 53 a). The appearance of the legs is seen on fig. 53 b–53 c.

Reindeer Station: Very common and abundant in many biotopes, thus in withered tussocks of *Calamagrostis*, in dead wet leaves under alder trees, in wet depressions with mosses, liverwort, *Empetrum*, *Vaccinium vitis idaea*, and *Salix*, in thick layers of *Ledum*, *Vaccinium vitis idaea*, grass, moss, liverwort and lichens, and in other similar biotopes.

Yellow Knife: Common in thick layers of old leaves and spruce needles over *Vaccinium vitis idaea*, *Ledum*, moss and liverwort in depressions on rocks: a few in a lichen cushion on rock.

Coppermine: Common in luxuriant vegetation behind the beach with *Dryas*, *Lupinus*, *Luzula*, *Salix reticulata* and scattered willow shrub with moss; in almost pure *Cassiope tetragona* vegetation with rich moss growth, and on heath with *Dryas*, *Epilobium angustifolium*, *Vaccinium* spp., *Empetrum*, *Rhododendron*, *Lupinus*, *Salix*, moss and reindeer lichen.

Eremaeus translamellatus n. sp. fig. 54.

Colour brownish, length 0.69–0.74 mm, breadth 0.32–0.40 mm.

The lamellae form an H, as a distinct translamella is always present a little behind the middle of the lamellae.

Rostral and lamellar hairs with almost the same distance, the lamellar hairs being inserted on the upper side of the rostrum. The lamellar hairs are rough, almost parallel, they project with about half their length beyond the tip of the rostrum. The lamellae are convex in the middle and then bend outwards at both ends; in the most narrow place there is a translamella of the same breadth as the lamellae, but sometimes a little more indistinct, as, apparantly, it is inserted slightly deeper. In front of the translamella there might be 4–5 weaker transverse ridges in addition, of which the hindmost then is situated inside the lamellae so that there will be two translamellae. The foremost ends of the lamellae often bend in an arch inwards again tapering at the same time. Towards the pseudostigmata they run like a faint keel. In their whole extension the lamellae are sharpest on the outer or lateral side. Interlamellar hairs stout, rough bristles turning backwards; they are about half as long as the pseudostigmatic organs. The pseudostigmatic organs are directed backwards and laterally and are about $^1/_2$ time longer than their mutual distance; they are almost equally thick throughout, only very little and evenly thicker distally. On the posterior margin of the propodosoma there is a row of V-shaped chitinous ridges.

Hysterosoma is elongate with long fine slightly serrate hairs. Anteriorly the hairs are somewhat longer than those on the tip of the hysterosoma. The cuticle with very indistinct pits which are best seen in profile at the posterior end.

Ventral side (see fig. 54 a). The appearance of the legs is seen in figs. 54 b and 54 c, d.

Richardson Mountains: Common in heath vegetation with *Rhododendron*, *Dryas*, *Salix reticulata*, *Empetrum*, *Vaccinium uliginosum*, *Betula nana* and moss, and in pure *Dryas* vegetation with a few lichens and liverwort.

Reindeer Station. Very common in old wet leaves under alder trees with a bottom vegetation of *Pyrola grandiflora*, *Linnaea borealis* and moss, also together with *E. foveolatus* in dead leaves under alder trees without vegetation.

Coppermine: 1 specimen in lichen heath with reindeer lichen, scattered *Luzula* and *Salix* sp.

Eremaeus quadrilamellatus n. sp. fig. 55.

Colour yellow-brown, length 0.47 mm, breadth 0.25 mm.

The lamellae with two translamellae form a very distinct and almost regular square.

The rostral hairs are placed in small depressions on either side of the tip of the rostrum, and they are curved slightly inwards. Lamellar hairs are inserted on the sides of the rostrum, and their place of attachment cannot be seen from above; they follow rostrum in an even arch and project only slightly beyond the tip of the rostrum; they are slightly rough like the rostral hairs. The lamellae are smooth, convex in the middle and are here connected by a broad translamella. Just behind the translamella the lamellae are inclined outwards in the direction towards the pseudostigmata, but have no connection with this. In front of the tip of the lamellae there is a transverse chitinous ridge forming another translamella. Between the lamellae and the translamellae there is an almost regular square. The interlamellar hairs are stout, rough bristles which are directed forwards and laterally. They attain about $^1/_3$ of the length of the pseudostigmatic organ. In front of them there is a faintly inclined chitinous ridge. The pseudostigmatic organs are directed laterally and are as long as their mutual distance. Towards the tip they become evenly club-shaped.

Hysterosoma is regularly oval, the cuticle smooth. The hairs are long and slightly serrate.

The appearance of the ventral side is best seen in fig. 55 a. I. and IV. pairs of legs with very broad femur. Regarding the legs reference is made to figs. 55 b, c and d.

Yellow Knife: 1 specimen in a thick layer of old leaves and spruce needles on *Vaccinium vitis idaea* and a little *Ledum* sp.

Ceratoppia bipilis (Herm.) fig. 56.

Varies exceedingly in size, from 0.62 mm to 1.02 mm in the length. The large specimens, which all originate from Reindeer Station, have a comparatively shorter propodosoma, and for this reason shorter and thinner lamellae, lamellar hairs, interlamellar hairs, pseudostigmatic organs and the stout characteristic bristle on coxa III.

Richardson Mountains: A few in withered moss, liverwort and *Cassiope* about $^1/_2$ metre from a snow patch.

Reindeer Station: A single or a few in most biotopes which are not too wet.

Yellow Knife: 4 specimens in a layer of lichens and moss about 10 cm thick on a south exposed rock sloping about 30° in a opening in the wood.

Coppermine: Several in a bird's nest on heath, and on heath with vegetation of *Dryas*, *Vaccinium*, *Empetrum*, *Rhododendron* etc.; a single in *Cassiope tetragona* vegetation near a snowy patch, and in wet meadow with *Carex* and much moss.

Churchill: 1 specimen on heath with *Dryas*, *Vaccinium uliginosum*, *Rhododendron lapponicum*, *Empetrum*, *Astragalus alpinus*, *Carex* etc.

Ceratoppia microseta n. sp. fig. 57.

Colour: yellow-brown, length 0.41–0.50 mm, breadth 0.25–0.32 mm.

A small species of *Ceratoppia* with strongly reduced lamellar and interlamellar hairs; the latter are only microscopical bristles. Rostrum broadly tapering, on either side with a very sharp point (figs. 57 a, 57 b). Rostral hairs are placed at the end of a chitinous ridge running from the sides of the tapering rostrum to about the middle of propodosoma to the place where the free portion of the lamellae issue (fig. 57 b). The free portion of the lamellae is of equal length as the attached portion. On the tip a short lamellar hair is situated which projects with $^1/_3$ beyond the broad strong tooth on the tip of the lamellae; it is densely covered with hairs. The interlamellar hairs are very small and thin, smooth; they are placed at a fairly long distance from the anterior edge of hysterosoma and from the lamellae. The pseudostigmatic organ is of the usual form, bristle-shaped, furnished with numerous fine lateral setae. The sides of propodosoma with fine striated undulating lines (fig. 57 b).

The anterior margin of hysterosoma is not straight as in *C. bipilis* but slightly forwards projecting. The hairs on the hysterosoma are very short and thin.

The long seta on coxa III which is characteristic of *Ceratoppia bipilis* is very short in *C. microseta* but as usual furnished with lateral hairs. The tarsi carry 3 claws of which the middlemost is the thickest. As to the legs see figs. 57 c and d.

The larva (fig. 57 e) has the two long hairs on the hysterosoma characteristic of *Ceratoppia*; here these are however not inclined backwards but almost at right angles laterally, as they run for a short distance laterally and backwards, but on a level with the sides of the body make a little bend anteriorly so that this position is obtained. At the tip of hysterosoma 2 more backwards inclined bristles, which like the 2 lateral hairs are coarse and rough.

Richardson Mountains: Very common in withered wet moss, liverwort and *Cassiope* about $^1/_2$ metre from a snow patch.

Coppermine: 4 adults and 2 larvae in luxuriant vegetation behind the beach with *Salix reticulata*, *Dryas integrifolia*, *Lupinus arcticus*, *Luzula nivalis* and moss.

Tectocephcus velatus (Mich.) fig. 58.

Varies rather much as regards breadth of lamellae and cuspes and translamella which is often lacking.

Exceedingly common and numerous in most of the biotopes in all the localities examined except Coppermine, where it was only common in a meadow with a thin layer of reddish moss and scattered vegetation of *Epilobium angustifolium*, *Salix arctica* and *Tofieldia palustris* on wet sandy bottom. At Reindeer Station there were

upwards of 50.000 per sq. m. in vegetation of old *Vaccinium vitis idaea*, *Ledum*, grass, moss, liverwort and lichens.

Ameronothus lineatus (Thorell) subsp. *brevipes* Willm. fig. 59.

The Canadian specimens agree with those found by WILLMANN on the East Frisian Islands in having only one claw, in the colour, and in the sculpture on the hysterosoma which has closely arranged pitted depressions, also by the colour of the legs and their relative shortness.

Churchill: Exceedingly abundant along Churchill River in clayey beach meadows which are submerged during high tide. The vegetation consists of *Plantago* sp., *Stellaria calycantha*, *Ranunculus cymbalaris*, *Potentilla anserina*, *Senecio* sp. and grass.

Ameronothrus maculatua (Mich.) fig. 60.

Churchill: 1 specimen in almost pure *Salix reticulata* vegetation among rocks along Hudson Bay.

Ameronothrus sp. fig. 61.

Of this species only two dead specimens have been found, and as all tarsi are missing, and a closer description of the features of these which are important for the identification of the different species within this genus therefore is impossible, it will not be established as a possible new species. The most important features will however be briefly mentioned. The pseudostigmatic organs are ball-shaped, glassclear. The rostral hairs are stout and directed outwards and forwards. Propodosoma with two small lamellar-like ridges on the tip of which a thin lamellar hair is placed. Rostrum reticulate with round cells, femur with larger irregular cells.

Hysterosoma with many irregularly running wrinkles, showing a tendency to run across the animal in the middle and longitudinally along the sides. The border is however more or less radially striped. The whole aspect forms a very intricate pattern which is more or less blurred, particularly anteriorly where the pattern is finer and only the largest wrinkles are distinct.

Reindeer Station: 2 dead specimens found in spruce needles under a spruce near a brook, about 10 m. a. s. l. in the ravine leading up through the hills. Such a finding place under a spruce tree several hundred metres from the river bank inland is of special interest, since it is a very unusual locality for an Ameronothrus, which normally lives in the tidal zone among wrack.

Carabodes labyrinthicus (Mich.) fig. 62.

The pseudostigmatic organ with a somewhat longer stalk than the European and Greenland specimens.

Yellow Knife: 5 specimens found in a 10 cm thick layer of lichens and moss on rock, south exposed, about 30°.

Cultroribula dentata Willm. fig. 63.

The Canadian specimens differ a little from those described by WILLMANN from Germany. Interlamellar hairs very thin; the lamellar hairs are however stout with lateral bristles (fig. 63 a), which WILLMANN does not state. Besides, the pseudostigmatic organ in the Canadian specimens are spindle-shaped, pointed, while WILLMANN draws them with a rounded tip. There are three claws as stated by WILLMANN.

Richardson Mountains: 1 individual in almost pure *Dryas* vegetation among stones, lichens and moss, and 1 specimen in heath-like vegetation with *Dryas*, *Rhododendron*, *Salix reticulata*, *Empetrum* etc., mixed with a richness of humid moss.

Liebstadia similis (Mich.) fig. 64.

Rocky Mountains: 1 specimen near Mt. Robson at the roadside with humid moss, grass and clover.

Reinder Station: Common in a little wet depression with mosses, liverwort, *Empetrum* sp., *Vaccinium vitis idaea* under knee-deep birch and willow shrub; a single also among dead, wet leaves under alder trees and in *Bryophyllum*.

Oribatula tibialis (Nic.) fig. 65.

Richardson Mountains: A few in withered, wet moss, liverwort and *Cassiope* near a snow patch, and several in dense cushion vegetation of *Salix phebophylla*, *Oxytropus pygmaeus* on the top of the mountain among dry gravel and stones.

Reindeer Station: 2 in thin *Polytrichum* growth in soft clay.

Yellow Knife: Several on lake shore in wet sand in a dense growth of *Eleocharis pauciflorus*.

Oribatula pallida Ewing fig. 66.

The oribatis on fig. 66 I consider to be Ewing's *Oribatula pallida* (*Notaspis pallida* 1909, p. 127). The type—designated *Oribatula pallida* is kept at the United States National Museum, Washington, D. C., and here I made a sketch which completely corresponds to the drawing available.

Yellow Knife: A few in low, yellow-green moss in a depression between alder and spruce trees with scattered *Epilobium angustifolium* and *Eriophorum* sp. EWING has found it in moss in Urbana, Ill.

Zygoribatula pallida Banks fig. 67.

BANK's description (1906, p. 494) is very short, and not very concise, but still agrees with the present figure. For this species too I have a sketch of the type which is kept at the Museum of Comparative Zoology, Harvard, Cambridge. It was previously found in Canada; the locality however not stated.

Reindeer Station: Extremely common in a little depression near the top of the hills with dripping-wet mosses, liverwort, and *Empetrum* sp., *Vaccinium vitis idaea* under knee-deep birch and willow bushes. It also occurs in withered grass; in *Polytrichum*; a few in wet leaves under alder trees; in reindeer lichen etc.

Yellow Knife: Common on wet lake shore in dense low vegetation of *Eleocharis pauciflorus*, and in the nearby situated $^3/_4$ m high growth of *Scirpus validus* with a dense bottom vegetation of moss and liverwort.

Coppermine: Several in heath with *Dryas*, *Vaccinium*, *Empetrum*, *Rhododendron*, *Lupinus*, *Salix*, moss and reindeer lichen; a single also in a wet meadow with *Eriophorum* and moss.

Churchill: Several on *Dryas* plain with scattered *Hedysarum mackenzia*, close behind the beach along Hudson Bay, humid sand bottom.

Scheloribates pallidulus (C. L. Koch) fig. 68.

Found in all localities examined except Coppermine, where it presumably also lives. It is particularly abundant in meadows with grass and clover near Banff (Rocky Mt.); near Yellow Knife in a thick layer of old leaves and spruce needles over *Vaccinium vitis idaea*; extremely abundant near Churchill in almost pure *Dryas* vegetation with scattered *Hedysarum mackenzia* on sand behind the beach and the adjoining beach ridge with *Elymus* sp., *Ribes grossularia*, *Epilobium angustifolium* etc., and a little moss; at Reindeer Station it occurs in smaller numbers in most biotopes, while only one specimen has been found at Richardson Mountains.

Peloribates pilosus n. sp. fig. 69.

Colour brown, length 0.52 mm, breadth 0.38 mm.

This species has all the typical characters and resembles several of the already described species; it seems to be most nearly related to *P. longisetous* Willm. from Guatemala, though the hairs on hysterosoma are somewhat shorter than in this species, and on the ventral side apodemata II does not reach the border of the genital plates; besides, the head of the pseudostiginatic organ is more slender. Also Ewing's *P. iowaensis* resembles it a good deal, but the hairs in this species are much shorter posteriorly on hysterosoma and it has only 12 pairs of hairs, while *P. pilosus* has 14

pairs like *P. longisetosus*. Rostral hairs attached on the side of the rostrum just above the free tip of tectp. I; they reach a good distance beyond the tip of rostrum. The lamellar hairs are about 50% longer than the lamellae and reach with half their length beyond the rostrum; they are distinctly clothed with setae. The lamellae are situated far to the side, and are thinnest at the tip which inclines inwards in an even arch. No cuspes. In front of the lamellae a faint transverse line is seen. Interlamellar hairs with setae, directed anteriorly, parallel and almost reaching the tip of rostrum. Pseudostigmatic organs bend at right angles to the side and backwards just above the border of the pseudostigmata; towards the tip they become evenly thicker into a slender club-shaped pointed head covered with fine hairs (fig. 69 a).

Hysterosoma is smooth with 14 pairs of hairs throughout provided with fine setae (fig. 69 b). Instead of areae porosae there are more or less winding chitinous slits of which that in area porosa adalaris's place is largest and S-shaped.

The appearance of the ventral side is seen in fig. 69 a. Apodemata II, as mentioned above, does not reach the circumference of the genital plates. The legs carry 3 pairs of claws, of which the middlemost pair is the most powerful.

Churchill: 3 specimens on a thin layer of moss on stones in a gravel pit.

Peloribates canadensis n. sp. fig. 70.

Colour dirty brown, length 0.45–0.50 mm, breadth 0.33–0.37 mm.

P. canadensis is very nearly related to *P.* (*Oribata*) *hirsuta* (Banks) and bears a striking resemblence to this species apart from the hairs of hysterosoma which in *P. hirsuta* are clothed like a bottle brush, while in *P. canadensis* they are very thin and faintly rough and a little shorter than those of *P. hirsuta*.

Rostral hairs inserted on the side of propodosoma in front of the free tip of tectp. I; about one third of their length reaches beyond the tip of rostrum. Lamellar hairs rough, of the same length as the lamellae; they reach a little further anteriorly than the rostral hairs. The lamellae are thinnest at the tip which are curved inwards in an even arch; the inner margin thickened; distally the thickened margin runs directly forwards as a thin transverse line in front of the lamellae as a kind of translamella (fig. 70 a), which in this way becomes situated in front of the lamellae (the same feature is to be found in *P. hirsuta* (Banks).

Interlamellar hairs rough, directed forwards and upwards; they reach just beyond the tip of the lamellae. The pseudostigmatic organs turn laterally and posteriorly; they are slender and only slightly thickened distally; the distal half with fine hairs, the tip rounded.

Hysterosoma is almost just as broad as long, the anterior margin almost straight, only faintly projecting. There are 14 pairs of short thin bristles the arrangement of

which is seen in the figure. A characteristic feature is the two spots anteriorly on hysterosoma with a chitinous thickening consisting of a longitudinal stem with ramificating inwards directed branches. The integument is smooth. Areae porosae are very small and more resemble chitinous slits. The appearance of the ventral side is seen in fig. 70 b. Apodemata II here reaches to the circumference of the genital plates. The tarsi carry 3 claws of which the middlemost is the most powerful.

Reindeer Station: Common in many biotopes as e. g. in thick layers of old *Vaccinium vitis idaea* growth mixed with *Ledum*, grass, moss, liverwort and lichens, in a little depression with dripping wet mosses and liverwort and in reindeer lichen vegetation surrounded by *Ledum*, *Vaccinium vitis idaea* and *Carex* sp.

Yellow Knife: A few in a thick layer of old leaves and spruce needles on *Vaccinium vitis idaea* and *Ledum* under alder and spruce.

Churchill: Common in almost pure *Empetrum* vegetation among rocks along Hudson Bay mixed with a little reindeer lichen; a few also on the southeast exposed side of the water pipe grown with moss, *Vaccinium vitis idaea*, grass, *Ledum* and *Epilobium angustifolium*.

Ceratozetes thienemanni Willm. fig. 71.

A few individuals may have a weak translamella as indicated in the figure by the dotted line.

Yellow Knife: Several in a depression among rocks grown with *Vaccinium vitis idaea*, moss, liverwort and reindeer lichens and covered with dead leaves and spruce needles; a few also in a meadow with *Eriophorum*, *Vaccinium uliginosum*, *Ledum* and moss, and in lichens and moss.

Churchill: 1 specimen in a damp depression with luxuriant growth of *Catabrosa* sp., *Stellaria longipes*, *Polygonum viviparum*, *Achillea borealis* and *Salix* sp.

Sphaerozetes arcticus n. sp. fig. 72.

Colour brown, length 0.54–0.56 mm, breadth 0.34 mm.

Translamella broad, cuspis very short, only slightly indicated, anteriorly most often rounded.

Rostrum with 2 small tips. Rostral hairs inserted on the side of rostrum, powerful, directed inwards, with fine hairs: they reach with about half their length beyond the tip of the rostrum. Lamellar hairs rough, parallel, directed forwards, they are a little longer than the rostral hairs. The lamellae are twice as broad off the translamella as at the base. Cuspis very short, it rises only slightly above the anterior margin of the translamella which forms a flat forward directed arch. At the tip cuspis is

generally rounded or faintly incurved with a short tooth on the outer side (fig. 72 a). The translamella is as broad as two thirds of the lamella on a level with the translamella. The interlamellar hairs are stout, rough upright setae, however directed slightly forwards. When lying down they reach to the posterior margin of the translamella. They are situated rather far backwards just below the forwards projecting anterior margin of hysterosoma. The pseudostigmatic organs are directed upwards and forwards, club-shaped with fine setae. Tect. I with a long free tip (see figs. 72 a and b); behind this are seen some irregular, elongate light spots.

Hysterosoma is almost as broad as long, the posterior half represents half an arc of a circle. In the median plane the anterior margin is rather strongly forwards projecting pointed at the shoulders. The integument smooth. The hairs are very short and thin; those situated anteriorly on the shoulders are the longest. Areae porosae distinct. The ventral side is seen in fig. 72 c.

The tarsi have 3 claws of which the middlemost is the most powerful. On tarsus II there are 2 very coarsely serrated hairs (fig. 72 d); on the other legs these hairs are not by far so strongly developed. The figure 72 c shows a leg II on which the genu has regenerated.

Richardson Mountains: 1 specimen in heath-like vegetation consisting of *Rhododendron lapponicum*, *Dryas punctata*, *Salix reticulata*, *Diapensia aborata*, *Betula nana*, *Empetrum nigrum*, *Vaccinium* and much moss.

Reindeer Station: Abundant in very wet moss in a little depression; common in thick growth of *Ledum*, *Vaccinium vitis idaea*, grass, moss and lichens, and in a thin layer of lichens on the ground and in several other places, particularly with wet moss.

Coppermine: A few in luxuriant vegetation consisting of *Salix reticulata*, *Dryas integrifolia*, *Lupinus arcticus*, *Luzula nivalis* with a thick moss layer, and in wet meadows with moss, *Carex* and *Sphagrum*.

Sphaerobates gratus (Sell.) fig. 73.

Reindeer Station: 3 specimens in a thick layer of *Vaccinium vitis idaea*, *Ledum*, grass, moss, liverwort and a little lichen, moist.

Melanozetes meridianus Sell. fig. 74.

Richardson Mountains: A few in humid heath vegetation with *Rhododendron lapponicum*, *Dryas punctata*, *Salix reticulata*, *Diapensia aborata*, *Betula nana*, *Empetrum*, *Vaccinium myrtilus* and much moss.

Coppermine: About ten specimens in dripping wet *Sphagnum* mixed with *Ledum*, *Dryas*, *Vaccinium*, *Cassiope*, *Salix reticulata* and *Carex*.

Churchill: Common in many biotopes e. g. in meadow with grass, *Salix*, *Betula nana*, *Pinguicula*, *Dryas*, *Vaccinium uliginosum*, *Andromeda*, *Arctostaphylos rubra* and much moss, and in *Carex* swamp with a thick moss layer.

Melanozetes longisetosus n. sp. fig. 75.

Colour dirty brown-yellow, length 0.65 mm, breadth 0.39 mm.

Hysterosoma and legs with long soft, slightly hairy setae. The lamellae situated comparatively closely together without a translamella. No free tip on tectp. I. Propodosoma almost twice as broad as long. Rostral hairs long with setae, bent inwards and crossing a distance in front of the tip of rostrum; about two thirds of their length reach beyond the tip of rostrum. Lamellar hairs smooth or slightly rough, directed forwards, at the tip slightly converging; they are a trifle shorter than the lamellae, about $^4/_5$ of their length. Lamellae and cuspes almost equally thick throughout, faintly curved, partly owing to the fact that the cuspes are parallel, while the lamellae converge evenly from the pseudostigmata to the tip. The inner side of the lamellae is slightly thickened. Cuspes rounded. The beginning of a translamella is present, since the thickened inner margin on either side forms a small "beak". The interlamellar hairs are directed upwards and outwards; they are longer than the lamellae and cuspes together and are situated a little in front of the anterior margin of hysterosoma; they are powerful, rough setae. The pseudostigmatic organs consist of a round disc-shaped head on a short stalk of the same length as the head; they are directed forwards and a little outwards.

Tectp. I without a free tip. Tectp. II very short and projecting only slightly beyond the anterior margin of the hysterosoma.

Hysterosoma is broadest behind the middle, the anterior margin is straight; the integument smooth, the bristles are long and curved, slightly hairy (fig. 75 a). A light spot is seen anteriorly on the hysterosoma with two lobes anteriorly, straight posteriorly.

The ventral side is seen in fig. 75 d.

The legs (fig. 75 b and c) are densely and finely punctate on coxa and femur.

Frobisher Bay: 1 specimen on sand, flooded by the river in spring.

Fuscozetes selirickі n. sp. fig. 76.

Colour yellow-brown, length 0.51 mm, breadth 0.31 mm.

Lamellae and cuspes equally broad throughout, cuspes rounded at the tip. The translamella a little longer than cuspis is broad, femur II with a rounded blade.

Propodosoma about $^2/_3$ as long as broad. Mandibles see fig. 76 b. Rostral hairs inserted rather far posteriorly on the side of the propodosoma; they are finely hairy, converging and project only slightly beyond the tip of the rostrum. Lamellar hairs

directed forwards, almost parallel, powerful, slightly rough and of the same length as cuspes. The greater part of them project beyond the rostrum. The [illegible]cellae equally broad throughout, only faintly converging, the translamella is therefore comparatively long, the posterior margin as long as cuspis is broad at the base (fig. 76 a). The lamellae are twice as long as the cuspes which are parallel and rounded at the tip. They reach almost to the tip of rostrum. The space between them is U-shaped. The interlamellar hairs do not reach the translamella; they are rough, directed upwards and forwards. The pseudostigmatic organ has a flat broad head on a stalk as long as the head; the head is bluntly cut off, with fine hairs and directed forwards. Tectp. I with a long free tip (fig. 76 c). Tect. II has on the lateral side fine undulating lines. The hysterosoma is broadest behind the foremost third, the anterior margin is broadly projecting in an arch, the posterior margin almost blunt. There are 14 pairs of slightly bent setae which are unilaterally hairy in their distal half (fig. 76 d). Round the base of the hairs faint black spots are seen. Anteriorly on the hysterosoma there is a ligth spot with two distinct lobes anteriorly, posteriorly it is indistinctly rounded. Areae porosae are small and round.

Ventral side see fig. 76 f.

Anteriorly femur I has a short rounded blade which in femur II extends over the total length of femur like a brim. Tarsus I has on the outer side an undulating sensory hair, tarsus II on the inner side a very stout pectinate bristle. There are 3 pairs of claws, of which the middlemost is the most powerful.

This species is named after the acarologist Dr. Max Sellnick.

Richardson Mountains: Abundant in wet, withered moss, liverwort and *Cassiope* about ½ m from snow patches.

Reindeer Station: Exceedingly abundant (1 sample on 1/500 sq. m gave 357 specimens) in a wet depression with different mosses, liverwort, *Empetrum*, *Vaccinium vitis idaea* under *Betula* and *Salix* shrub, and in thick moss cushions and in *Sphagnum* mixed with *Carex*, *Ledum* and *Vaccinium*.

Coppermine: A few in *Sphagnum* mixed *with Ledum*, *Dryas*, *Vaccinium*, *Cassiope* and *Salix reticulata*.

Churchill: 1 specimen on the north-west exposed side of the water pipe on humid bottom grown with much moss, scattered grass, *Epilobium angustifolium*, *Salix reticulata*, *Vaccinium*, *Ledum*, *Rubes* etc.

Trichoribates lucens (L. Koch) fig. 77.

Reindeer Station: 2 specimens on the river bank in wet mud with a few dead leaves and moss.

Coppermine: Fairly common in wet meadows with *Carex* and moss, just behind the beach, and in wet meadows with *Eriophorum* and moss; occurs also singly in several other wet or humid biotopes.

Churchill: A few in wet depressions among the rocks grown with *Ranunculus cymbalaria* and *Triglochin maritima* along Hudson Bay.

Trichoribates notatus (Thorell) fig. 78.

Richardson Mountains: 2 specimens on the top of the mountain in low cushions of *Salix phebophylla*, *Oxytropus pygmaeus* etc. among stones and gravel.

Reindeer Station: A few in wet dead leaves under alder trees, and on the river bank in wet mud with dead leaves.

Coppermine: A few near the beach in luxuriant vegetation of *Lupinus arcticus*, *Dryas integrifolia*, *Salix reticulata*, *Luzula nivalis*, moss, *Salix* sp. semi dry and in knee-deep willow shrub with a thick layer of moss, humid.

Churchill: A few on heath-like vegetation with much moss among *Salix reticulata*, *Arctostaphylos rubra*, *Vaccinium uliginosum*, *Andromeda*, *Rhododendron*, *Dryas*, *Polygonum viviparum*, *Carex* and grass.

Trichoribates numerosus (Sell.) fig. 79.

The Canadian specimen differs a little from SELLNICK's description. It is much larger the hysterosoma being about 0.95 mm long, while SELLNICK gives the size of the whole creature as 0.68–0.79 × 0.49–0.56 mm. The hair in front of the area porosa adalaris is absent, a spot is however seen. The cuspes are a little shorter and the posterior margin of the translamella is straight, while in the German specimens it curves slightly backwards (fig. 79 a). Tect. I as described by SELLNICK. In order to show that it looks different if seen directly from the surface or more in profile it has been figured in two positions (figs. 79 c and d). If it was figured exactly in profile two big tips would be seen. For further orientation the mandible (fig. 79 e) and leg I (fig. 79 f) have been drawn. These differences which are very small I do not consider sufficient for erecting a variety. In the figured specimen the two areae porosae posteriores fuse into one on the left side.

Reindeer Station: 1 specimen was taken together with *T. notatus* in wet dead leaves under 2–3 m high alder trees on a growth of *Pyrola grandiflora*, *Linnaea borealis* and moss.

Trichoribates copperminensis n. sp. fig. 80.

The lamellae with long parallel cuspes which are almost equally broad throughout. Length 0.51 mm, breadth 0.36 mm.

The propodosoma is considerably broader than long. The rostrum tapering. Rostral hairs stout, hairy, directed forewards and slightly converging; about one third projects beyond the tip of the rostrum. The lamellar hairs are very stout and rough, slightly shorter than the lamellae, parallel and directed forwards; about two thirds project beyond the tip of the rostrum. The lamellae are placed close together and are nearly parallel throughout their length, slightly diverging however at the base. The translamella forms a faint arch, the anterior margin of which is slightly longer than broad. The cuspes are broader than the lamellae and represent about $^2/_5$ of the lamella plus cuspis. The space between the cuspes is regularly U-shaped. The cuspes are rounded at the end without teeth. The lamellar hairs are inserted on the inner side of the cuspes, the outer side is rounded, one specimen however had a deviating appearance, since the cuspes here had a short pointed tooth on the outer side, on the inner side it was cut off straight (cp. figs. 80 a and b). The interlamellar hairs are slightly curved, directed forwards and reach the tip of the rostral hairs; they are somewhat thinner than the lamellar hairs, rough and inserted under the anterior margin of the hysterosoma. The pseudostigmatae are concealed under the anterior margin of the hysterosoma, they have a short tip on the cup. The pseudostigmatic organ bears on a short thin stalk, which is almost of the same length as the head, a large disc-shaped head, which is blunt at the end. Text. I has several teeth on a long free tip which projects slightly beyond the tip the cuspis.

The anterior margin of the hysterosoma is slightly undulating projecting farthest on the middle which covers the base of the interlamellar hairs. The pteromorpha runs into a point posteriorly (fig. 80 c). The hairs on hysterosoma are short, stiff and rough (fig. 80 d shows the right shoulder hair). Areae porosae are all small and round, a. p. adalaris is largest. The integument is smooth.

The appearance of the ventral side is shown in fig. 80 g. The appearance of the legs is seen in figs. 80 e and 80 f. There are 3 claws, of which the middlemost is more than twice as thick as the lateral claws.

Coppermine: Common in knee-deep willow scrub in humid meadows with an undergrowth of *Luzula*, *Salix reticulata* and dense thick layer of withered moss.

Trichoribates striatus n. sp. fig. 81.

Dark-brown, legs yellow-brown. Length 0.66 mm; breadth 0.48 mm.

Lamellae and tect. I with dense longitudinal stripes, hence the name. Rostrum has three faint lobes which are visible a little in front of the lamellae. The rostral hairs reach in a broad arch half their length beyond the rostrum; they are very thick and a little longer than the lamellar hairs, which also project beyond the tip of the rostrum with about half their length. The lamellae are very broad blades, whose

greatest breadth is found off the anterior margin of the translamella. Cuspis represents about $^1/_4$ of the whole lamella; it is broader than long and ends in two blunt teeth of which the outer is the longer (figs. 81 and 81 a). The anterior margin of the translamella is only a little more than half as long as the posterior margin. The breadth of the translamella is about half the breadth of the lamella off the posterior margin of the translamella. Between the teeth on cuspis the stiff rough lamellar hair is situated; it is as long as $^2/_3$ of the whole lamella. The interlamellar hair is also stiff and rough; it projects beyond cuspis. The cup of the pseudotigmatic-organ is provided with a very pointed tip which can be distinctly seen in front of the anterior margin of the hysterosoma. The head of the pseudostigmatic organ is situated on a short stalk of the same length as the head; it resembles a thick blunt club. Tectp. I is, as said above, with distinct longitudinal stripes; on the margin a long free tip is placed (fig. 81 b) which it can be difficult to see as the whole appearance is heavily striped or furrowed. The hysterosoma is smooth and provided with stiff, rough setae. Areae porosae are distinct. A. p. adalares are oblong and slightly larger than the others. The legs (fig. 81 b and c) have 3 claws of which the middlemost on legs I–III is the strongest. On leg IV all claws are equally thick. The legs are of the usual *Trichoribates* type with stiff spines on genu and tibia.

Churchill: Several in *Elymus* vegetation behind the beach with *Oxytropus* sp., *Epilobium angustifolium*, *Ribes oxyacanthoides*, *Anemone multifida*, *Achillea borealis*, *Poa glauca* and moss, and in depressions with *Salix* scrub in luxuriant growth of *Catabrosa* sp., *Stellaria longipes*, *Polygonum viviparum* and *Achillea borealis*; a few on the northeastern side of the water pipe in moss with scattered grass, *Epilobium* and *Rubus chamaemorus*.

Hammeria groenlandica Sell. fig. 82.

In the Candian specimens the two hindmost pairs of hairs on the dorsal side of the hysterosoma are thick rough setae. On the anteriormost of these two pairs the setae are placed close together, each with a pore on the outer side. An examination of my specimens of *H. groenlandica* from Greenland shows that these two pairs of hairs also are thicker and stiffer than the others, although not so pronounced as in the Canadian specimens; nor are they situated as close together as in the Canadian specimens. As Sellnick does not mention the difference between the hairs, this feature, which, as said above, is not so pronounced in the specimens from Greenland, must have escaped his attention.

Richardson Mountains: Several in heath-like vegetation consisting of *Rhododendron lapponicum*, *Dryas*, *Salix reticulata*, *Betula nana*, *Empetrum*, *Vaccinium myrtilus* and moss.

Coppermine: Very common in luxuriant vegetation of *Salix reticulata*, *Dryas inte-*

grifolia, *Lupinus arcticus*, *Luzula nivalis* and moss near the beach. Abundant in almost pure *Cassiope tetragona* vegetation with much moss.

Churchill: Common in many places; most abundant near the beach in *Elymus* with *Oxytropus* sp., *Ribes oxyacanthoides*, *Achillea borealis*, *Poa glauca* and moss, and in the *Dryas* plains with scattered *Hedysarum mackenzia* behind the beach.

Hammeria canadensis n. sp. fig. 83.

Length 0.46–0.49 mm, breadth 0.32–0.33 mm. Colour dark-brown.

This species has the broad lamellae characteristic of the genus with a very short translamella and the lamellar hair inserted in or behind a small incision in the anterior edge of the lamella.

The rostrum is cone-shaped, and the tip projects between the broad cuspes which scarcely reach to the tip of rostrum. The lamellae are almost equally broad throughout, being slightly narrower at their base, the inner margin is surrounded by a thickened ridge. The space between the lamellae is almost regularly trapezoid, broadest at the base; in *H. groenlandica* it has the shape of a church bell (cp. figs. 82 and 83). The lamellar hair is short with small setae on the outer side; the lamellar hairs are inclined inwards. *H. canadensis* differs among other things from *H. groenlandica* by its very stout long and broad interlamellar hair, which projects beyond the tip of the rostrum; it is almost equally broad throughout from its base to the tip, and it is rough; in *H. groenlandica* it is a short stiff seta. The pseudostigmatic organs are inserted in the cup-shaped pseudostigmatae under the anterior margin of hysterosoma; they are directed forwards, elongate spindle-shaped and situated on a short stalk; the head is covered with fine hairs. Tectp. I ends in a strong free tip which almost reaches to the anterior margin of the lamellae; behind this tip the thick rostral hairs are inserted. The hysterosoma is broad. The middle part of the anterior margin has a little process which covers the base of the interlamellar hairs, and the sides of the anterior margin are directed slightly forwards at almost right angles to the pteromorphae.

Hysterosoma is provided with distinct pits, which are most pronounced on the pteromorphae. A similar sculpture is also present on the prodosoma, where it is distinctly seen on the lamellae. The tip of the rostrum is sometimes surrounded by a thin membrane with large clear "pearls". On the dorsal side of the hysterosoma there are 10 pairs of bristles, of which the anteriormost 4 pairs are short and pointed. The next two pairs are a little longer and slightly club-shaped, while the two hindmost pairs on the tip of the abdomen are still thicker and club-shaped, the foremost of these is the stronger. As pointed out by Sellnick for H. *groenlandica* the area porosa adalaris is also here placed quite close to the anteriormost hair in the middle row,

while normally it is situated close to the pteromorpha. Hairs and pores are arranged as in *H. groenlandica*.

The ventral side (fig. 83 a) closely resembles the ventral side in *H. groenlandica*. The hairs are so small that it is difficult to see more than the place of insertion. Some of them I could not see and I have only indicated the place of insertion.

The legs are very powerful and have a thick, rough and serrate spine on the outer side of the genu, tibia and tarsus I and II; there is a similar spine on the genu and tibia IV. As indicated by SELLNICK for *H. groenlandica* genu I has a small process on the outer side from whose ventral side the said spine projects. Tarsus II has on the under side two almost pectinate bristles, each ending in a long thin point or bristle. There are 3 claws of which the middlemost is much stronger than the two on the sides.

The whole creature is covered with secretion and dirt.

Hammerella canadensis seems to be closely related to *Pelops minnesotensis* Ewing, (which does not belong to the genus *Pelops*) from which it however deviates by the following features: *P. minnesotensis* has a somewhat broader space between the cuspes; the cuspis has a long outer tooth; the interlamellar hair is a coarse stiff bristle and not a broad flat hair; the hairs on the hysterosoma are not club-shaped, and the two hindmost pairs are not placed close together.

Rocky Mountains: 4 specimens in *Hordeum* sp. vegetation near Jasper railway station in humid gravel.

Reindeer Station: Common in withered *Calamagrostis* tussocks; a few in dead leaves under birch or alder trees, and in dead leaves of *Pulsatilla* tussocks on clayey slopes, about 45° south exposed.

Yellow Knife: 2 specimens in a little bog with *Eriophorum*, moss and liverwort, dripping wet.

Coppermine: 2 specimens in luxuriant vegetation consisting of *Salix reticulata*, *Dryas integrifolia*, *Lupinus arcticus*, *Luzula nivalis* and humid moss.

Ewingozetes bifurcatus (Ewing) n. nom. fig. 84.

This species which was established by EWING 1909 (Journ. New York Entom. Soc. vol. XVII, no. 3, p. 118, Pl. II, fig. 3) under the name *Pelops bifurcatus* I have here given a new name naming it after EWING, who died recently, *Ewingozetes* Hammer n. gen., since it does not at all belong to the genus *Pelops* which is clearly seen from the figures. The lamellae are parallel, narrow ridges which are almost equally long as the propodosoma. Tect. I has a long free tip. The anterior margin of the hysterosoma has a broad median process. There are 3 claws of which the middlemost is the strongest. This species seems to stand near the *Trichoribates* group. EWING's own description is given:

Reddish brown; integument smooth and shiny.

Cephalothorax as broad as long; lamellae consisting of two long, narrow blades about as long as the cepalothorax, lying parallel to the median line and ending each in a sharp cusp which extends almost as far as the tip of the rostrum; translamella a chitinous ridge, incomplete in the middle. There is a small pair of lateral lamellae curved inwards at the tip. Lamellar hairs short, about twice as long as the lamellar cusps, slightly pectinate and curved outwards; anterolateral hairs twice as long as lamellar hairs, strongly curved as usual and pectinate on the external edge only. Pseudostigmatic organs clavate, directed forwards and about one half as long as the cephalothorax.

Abdomen globose; pteromorpha truncate anteriorly and not extending beyond the anterior margin of abdomen, anterior free margin of pteromorphae slightly concave. Rectangular projection present at the front margin of abdomen, extending twice as far in a transverse direction as in the longitudinal direction. From the anterior margin of the abdomen, on each side just inwards to the pseudostigmatic organs, two very large, flat setae extend forwards. The shape of these setae is very characteristic of the species. Their general shape is spatulate, but they are deeply bifid in front and have serrate margins. Abdomen otherwise hairless. Genital covers much smaller than the anal covers and situated about one half their length in front of the latter.

Anterior pair of legs about one and one third times as long as the cephalothorax. Tarsus of leg I slightly longer than the tibia, tarsus and tibia of leg II subequal in length, but the tibia is somewhat thickened at the distal end. Ungues tridactyle; dactyles unequal.

Length, 0.38 mm; breadth, 0.30 mm. Under logs. Collected by the writer at Havana. III. Two specimens.

Yellow Knife: Common on sandy, wet lake shores in dense vegetation of *Eleocharis pauciflorus*, and in the adjacent $^3/_4$ m high growth of *Scirpus validus* with bottom vegetation of wet moss and liverwort.

Limnozetes canadensis n. sp. fig. 85.

Length 0.37 mm, breadth 0.24 mm.

Translamella incomplete, free tip on tect. I, pseudostigmatic organ with round head. Hysterosoma distinctly pitted.

The rostral hairs are situated on a small elevation on a level with the translamella. They are very broad at their base, but soon become thinner and end in a long fine point in front of the rostrum where they cross. Lamellar hairs almost as thick as cuspes and about twice as long, directed forwards and curved inwards. The cuspes are about $^1/_3$ as long as the lamellae, slightly converging. The tip projects beyond the lateral

side of rostrum. Interlamellar hairs very thin, of the same length as the lamellar hairs; they are directed forwards and outwards. The pseudostigmatic organ carries a small globose head on a thin stalk, only the head projects freely.

Tectp. I with a long free curved tip at the base of which a chitinous ridge issues which abuts a U-shaped ridge on the inner branch of which the rostral hair is situated (fig. 85 a). In *Limnozetes ciliatus* a chitinous ridge runs in an arch from the base of the free tip direct to the rostral hair, so by a cursory view it looks alike in the two species. Hysterosoma is long and narrow, about equally broad throughout, the anterior margin projecting forwards. Pteromorpha (fig. 85 b) narrow with parallel sides and rounded tip; pteromorpha with distinctly pitted sculpture which is also conspicuous in profile along the body edge. The back with oblong finely punctate longitudinal furrows. On the ventral side there is a broad transverse connexion between apodemata I and II (see fig. 85 c). The tarsi with 3 claws, the middlemost being the thickest.

This species bears a close resemblance to *L. ciliatus* (Schrank), but differs in the following features: the pitted sculpture of the hysterosoma (present in *L. ciliatus* subsp. *foveolatus* Willm., which is however considerably smaller, 0.27×0.15 mm), the incomplete translamella, the transverse connexion between apodemata I and II, and by the slightly deviating structure of tectp. I with the surrounding chitinous parts.

Churchill: 1 specimen in a very wet meadow with luxuriant moss vegetation and *Eriophorum*.

Mycobates parmeliae (Mich.) fig. 86.

Yellow Knife: 1 specimen in a thick layer of dead alder leaves and spruce needles upon *Vaccinium vitis idaea*, a little *Ledum* and lichens, and in an about 10 cm thick layer of lichens and moss on a south exposed rock under spruce, alder, *Salix* and *Betula*. Churchill: A specimen on a tussock in the tundra grown with moss, *Carex*, *Salix reticulata*, *Dryas*, *Vaccinium uliginosum*, *Pinguicula* etc.

Mycobates tridactylus Willm. fig. 87.

The Canadian specimens show less deviations from the type known from Germany. Thus the hairs on the hysterosoma of the Canadian specimens are not quite so stiff, and they are slighly shorter and inserted on the outer side of oblong chitinous slits. This holds good of all the species of *Mycobates* which I found in Canada. WILLMANN does not mention this feature, nor does MICHAEL mention it for *Mycobates parmeliae*. Frobisher Bay: Several on sand flooded during spring tide in the spring.

Mycobates conitus n. sp. fig. 88.

Colour brown, lamellae and tectp. blackish-brown. Length 0.63 mm, breadth p.35 mm. Propodosoma represents about $^1/_3$ of the total length of the creature. As indicated

by the name the rostrum projects as a cone in front of the translamella. The rostral hairs reach to the tip of the rostrum, they are as usual unilaterally hairy. The lamellae are almost equally broad throughout, however a little narrower at the base (fig. 88 a). The translamella is strong and almost as broad as the lamella. The cuspis is between $^1/_3$ and $^1/_4$ of the rest of the lamella; it is pointed, but this can only be seen when it has been dissected out (fig. 88 a). A little behind the tip the lamellar hair is situated, it is slightly longer than the rostral hair, thin and with fine setae, it projects with a little more than half its length beyond the tip of the rostrum. The interlamellar hairs are very long, thin, and smooth; they are parallel, directed forwards and reach to the tip of the rostrum. The pseudostigmatic organs are bent towards each other; the head is short and tapers into the stalk; it ends more or less bluntly and is clothed throughout with fine hairs. Tectp. I (fig. 88 a) consists of a large rounded plate on the anterior margin of which 6 teeth are situated of which the two lowermost are blunt, while the remaining 4 are pointed. Tect. II is likewise well developed.

The hysterosoma is broadest rather far anteriorly; posteriorly it is semi-circulary rounded. The cuticle is not shiny but finely and densely punctate, which is however not clearly seen; besides there are many large brown irregularly scattered chitinous tubercles especially anteriorly at the base of the pteromorphae. There are 9 pairs of hairs as in the other species of *Mycobates*; the hairs are situated at the end of small chitinous slits; they are smooth. Areae porosae are large, rounded and comparatively easy to discern (fig. 88). I. and II. pairs of legs have a sharp tooth on the genu (fig. 88 b). III. and IV. pairs are much more slender; the IV pair has on the femur a broad brim along the underside (88 c). There are 3 claws on all pairs of legs, the middlemost is the most powerful.

Reindeer Station: Few in reindeer lichen, single specimens in a dense green moss cushion and on the tundra grown with *Eriophorum vaginatum* and moss.

Coppermine: A few in heath with *Dryas*, *Vaccinium*, *Empetrum*, *Rhododendron*, *Lupinus*, *Salix reticulata*, *Luzula*, moss and lichens.

Mycobates consimilis n. sp. fig. 89.

The colour is from light-brown to brown; length 0.48 mm, breadth 0.31 mm. As in *M. conitus* the rostrum projects as a cone beyond the translamella, but here as a much flatter cone. The rostral hairs do not reach to the tip of the rostrum, but extend slightly in front of the tip of the cuspis. The lamellae are broad, in the middle a somewhat darker chitinous portion is seen which anteriorly is situated laterally of the lamellar hair, ending in a point in front of this (fig. 89 a). The translamella is almost as broad as the lamella, well defined anteriorly, posteriorly more indistinct. The cuspis represents about $^1/_3$ of the remaining part of the lamella, anteriorly it ends in

a tip. A little behind the tip the lamellar hair, which is covered with fine setae and slightly longer than the rostral hair is situated; it projects beyond the tip of the rostrum. The interlamellar hairs are thin and smooth bristles reaching to the anterior margin of the translamella. The pseudostigmatic organs are bent towards each other; the elongate head tapers into the stalk. Tectp. I which reaches to the posterior margin of the translamella, is blade-shaped as in the other species of *Mycovates*; distinct teeth are not seen, but a finely serrate margin (fig. 89 b). The hysterosoma has the shape typical of most species of Mycobates, being semi-circularly rounded posteriorly, and anteriorly with projecting pteromorphae and medial margin. The cuticle is smooth; there are 9 pairs of hairs which are inserted in chitinous slits. Araea porosae are present (see fig. 89). I and II pairs of legs have a tooth on the genu (fig. 89 c and d). On leg IV coxa and femur are broad and flat; the femur has a broad fringe along the underside, the tibia is shorter than the tarsus (fig. 89 e). All pairs of legs have 3 claws, of which the middlemost is the strongest.

Richardson Mountains: Abundant in lichens with a little moss.

Reindeer Station: A single specimen in a thin layer of reindeer lichen with a little moss.

Coppermine: A single specimen in a lichen heath with scattered *Luzula*, and in *Cassiope tetragona* vegetation with moss.

Mycobates incurvatus n. sp. fig. 90.

Colour dark-brown to blackish-brown, length 0.67 mm, breadth 0.43 mm.

Seen from above the rostrum is distinctly incurved, hence the name (fig. 90 and 90 a). The rostral hairs scarcely reach to the tip of the rostrum; they are directed forward, curved slightly inwards, and unilaterally hairy. The lamellae almost reach to the tip of the rostrum. Cuspis ends in two sharp teeth of which the base can be seen from above; they are curved downwards and can be seen in their full extension only by dissection. Between the teeth of cuspis the lamellar hair is inserted; it is clothed with setae and is of the same length as the rostral hair. The distance between the lamellae is twice as great at the base as off the teeth of cuspes. A little behind the translamella the lamellae for a short distance become slightly broader on the inner side, whereby two knobs are formed (fig. 90 a). The translamella is situated unusually far posteriorly. Together with the inner sides of cuspes the anterior margin forms a U-shaped figure. The cuspis represents about $^2/_3$ of the whole lamella. The interlamellar hairs scarcely reach to the tip of rostrum, they are covered with fine setae, parallel and directed forwards and a little upwards. The pseudostigmatic organs are situated in very deep cups (fig. 90c), of which a part can be seen in front of the anterior margin of the hyste-

rosoma. The head of the pseudostigmatic organ tapers into the thin stalk; in lateral view it is very flat and clothed with fine setae arranged in longitudinal rows. The psend. organs are directed forwards and slightly inwards. Tectp. I (fig. 90 a and b) consists of a large blade, which has a small incurvation at the tip and in front of this 1–2 small tubercles which can hardly be called teeth. The hysterosoma has 9 pairs of fine setae which are situated at a chitinous slit. The cuticle is provided with a good deal of unevennesses in the shape of triangular knobs, the anteriormost part of which looks like a lighter point (fig. 90 d). These knobs are placed in irregular oblique rows especialy on the foremost part of the hysterosoma (fig. 90). Pteromorpha (see fig. 90 e). Legs I and II on the genu has a sharp tooth (fig. 90 f); on leg IV the coxa as well as the femur has a very long hair on the downward directed keel (fig. 90 g). There are 3 claws of unequal size on all the pairs of legs, the middlemost being the strongest.

Yellow Knife: A few in a small depression on a rock with *Polytrichum* and lichens, a few in wet moss on rocks, and in lichens and moss on a rock under spruce and alder trees.

Ungawa Bay, Labrador: 3 specimens in reindeer lichen and moss.

Mycobates sarekensis (Trghd.) fig. 91.

This species agrees with TRÄGÅRDH's description (see figs. 91 a and b).

Richardson Mountains: Several in *Dryas* vegetation with lichens and liverwort and a single specimen also in heath with *Rhododendron lapponicum*, *Dryas punctata*, *Salix* sp., *Empetrum* and *Betula nana*.

Reindeer Station: 1 specimen was found in a thin growth of reindeer lichen, and in a dripping wet moss cushion in a small depression.

In order to facilitate the determination of the species of *Mycobates*, which are very difficult to discern I have made a little key, which may be of some help, though it is hardly sufficient for a safe identification of the species. This can certainly be done only by dissection of e. g. tectp. I and the lamellae, which can only be seen in their full extension when laid bare.

Key to the Canadian species of *Mycobates*.

1. Tarsus with 1 claw, genu I and II with a tooth, interl. hairs reach beyond tip of rostrum ..... *M. parmeliae* (Mich.)
   Tarsus with 3 claws 2
2. Genu I and II without tooth, interl. hairs do not reach cuspis *M. tridactylus* Willm.
   Genu I and II with powerful tooth 3
3. Rostrum more or less pointed and seen from above it projects beyond the tip of cuspis 4

Rostrum round, seen from above it hardly projects beyond the tip of cuspis..... 5

4. Interlamellar hairs reach the tip of rostrum, rostrum pointed, cone-shaped..... *M. conitus* n. sp.
Interlamellar hairs reach the translamella, rostrum flat, cone-shaped..... *M. consimilis* n. sp.

5. Rostrum seen from above incurved, pseudostigm. organ slender, club-shaped..... *M. incurvatus* n. sp.
Rostrum seen from above forms a flat arch, pseudostigm. organ with short pear-shaped head..... *M. sarekensis* Trghd.

Punctoribates quadrivertex (Halbert) fig. 92.

Churchill: Common on wet clayey beach meadow, flooded at high tide. Vegetation of *Plantago maritima*, *Ranunculus* sp., *Cochleare* sp. and grass; it was also found in a meadow with *Carex* and grass near a lagoon.

Galumna formicarius (Berl.) fig. 93.

Yellow Knife: Several specimens in a small depression on a rock in a *Polytrichum* tussock and lichens in spruce wood; a single also in dripping wet moss in a bog with *Eriophorum*, *Carex* sp., *Salix* sp. and liverwort.

Galumna hudsoni n. sp. fig. 94.

Colour brown, length c. 0.60 mm, breadth 0.54 mm. The specimen has been crushed, for which reason it is difficult to see exactly the hairs on the propodosoma and the lamellae. Propodosoma is very broad and constitutes a flat cone. The rostral and lamellae hairs are inserted on the side of the propodosoma, the lamellar hairs are a little longer than the rostral hairs. The lamellae are as long as the lamellar hairs; the interlamellar hairs are only half as long as the lamellar hairs, they are curved outwards. The pseudostigmatic organ is curved backwards, pointed lanceolate and only slightly broader towards the tip; the distal half is unilaterally hairy on the posterior margin, tapering towards the end. There is a distinct border line between propodosoma and hysterosoma. Ar. p. ad. is broadest anteriorly, tapering posteriorly. Ar. p. m. I is round, Ar. p. m. II more oblong and Ar. p. post. is very long and narrow. Pteromorpha has on the free margin a strong incurvation. Anteriorly on the hysterosoma some small irregular groups of shiny points can be seen.

This species seems to be nearly related to *G. flagellata* Willm. The pseudostigmatic organ is however not flagelliform as in *G. flagellata*; p. m. II is not "pantoffelartig" (in my opinion better characterised as peanut-shaped), and ar. p. post. is much longer and narrower than in *G. flagellata*.

Churchill: A single specimen in the tundra on a tussock grown with moss, *Carex*, *Salix reticulata*, *Dryas*, *Vaccinium*, *Polygonum viviparum*, *Pinguicula* and a few lichens.

Neoribates aurantiacus (Oudms.) fig. 95.

Richardson Mountains: A few in lichens and moss on frozen ground, and in *Dryas* vegetation with a little reindeer lichen and liverwort among stones.

Reindeer Station: A few above the valley in scattered vegetation of reindeer lichen and humid *Polytrichum* and in *Empetrum* and *Vaccinium vitis idaea* vegetation with lichen.

Yellow Knife: 1 specimen in an about 10 cm thick layer of lichens and moss on rock.

Tegoribates latirostris (C. L. Koch) fig. 96.

Reindeer Station: Abundant on the river bank in clayey mud with a few dead leaves and moss.

Yellow Knife: Exceedingly abundant in luxuriant growth of *Equisetum* and Carex and in a little pool with moss, liverwort and *Eriophorum* and in similar biotopes.

Churchill: Very common in many biotopes, e. g. in meadow land behind the beach with grass, *Pinguicula vulgaris*, *Dryas*, *Vaccinium uliginosum*, *Andromeda* and much moss, and in *Salix reticulata* vegetation on the rocks along the bay mixed with *Elymus*, *Astragalus alpinus*, *Polygonum viviparum* and *Carex* sp.

Lepidozetes singularis Berl. fig. 97.

Reindeer Station: A few in dripping wet moss and liverwort in a small depression with *Empetrum* and *Vaccinium vitis idaea* under knee-deep *Salix* sp. and *Betula nana* scrub.

Yellow Knife: A few in humid meadows with *Arctostaphylos rubra*, *Carex* and *Eriophorum* under *Myrica* and *Betula nana*.

Coppermine: Very common in humid, almost pure *Cassiope tetragona* growth mixed with much moss; a few in similar biotopes with luxuriant moss and liverwort.

Lepidozetes latipilosus n. sp. fig. 98.

Colour dirty yellow-brown. Length 0.40 mm, breadth 0.30 mm.

Pseudostigmatic organ with very broad disc-shaped head.

The rostral hairs are very stout and hairy, inserted on the side of the rostrum; they project only slightly beyond the tip of the rostrum. The lamellar hairs are likewise stout and provided throughout with fine hairs; they are parallel, slightly shorter than the rostral hairs, directed forwards and reaching with half their length beyond the rostrum; they are placed on the upper side of the fused squamous lamella.

As in *L. singularis* the lamellae form a large transparent squamous blade which

covers the whole of the propodosoma; the hyaline anterior margin is seen in front of the rostrum between the rostral hairs (see fig. 98).

The interlamellar hairs are inserted a small distance below the anterior margin of the hysterosoma; they are stout hairy bristles which are directed straight forwards and reach to the base of the lamellar hairs.

The pseudostigmatic organ consists of a short stalk with an unusually broad, flat head which points forwards and laterally following the bend of the projecting part of the pteromorpha. Apparently, they are covered with fine hairs, in the middle a light transparent area is seen. The pseudostigmata is situated deeply under the anterior margin of the hysterosoma. Tect. I with a strong free tip (see figs. 98 a and 98 b). Tect. II are large and wing-like.

Hysterosoma is broadest across the middle. Pteromorpha rounded anteriorly, projecting as in *L. singularis*. The anterior margin between the pteromorphae forms a kind of arch forwards which reaches equally far anteriorly as the pteromorphae (in *L. singularis* this portion is a straight line). There are 10 pairs of fine hairs arranged as in *L. singularis*. Areae porosae small and round, much smaller than in *L. singularis*. The ventral side is seen in fig. 98 c. The tarsi has 3 claws of which the middlemost is the strongest.

Richardson Mountains: Common in heath-like vegetation consisting of *Rhododendron lapponicum, Dryas punctate, Salix reticulata, Diapensia, Betula nana, Empetrum, Vaccinium myrtilus*, much moss and a little lichen, and in pure *Dryas* vegetation with a little liverwort.

Scutozetes lanceolatus Hammer n. gen. n. sp.
Scutozetes n. gen.

The lamellae are fused into a thin scutellate chitinous plate as in *Lepidozetes*. Tectp. I consists of very strong chitinous plates which are placed close to the lamellar scutellum and not covered by it. Pteromorphae do not project beyond the anterior margin of hysterosoma. The lamellar hair is situated far anteriorly, where the scutellate lamellar blade curves downwards and cannot be seen unless by dissection.

Typical species *S. lanceolatus* n. sp. fig. 99, dark-brown with somewhat lighter legs; 0.48 mm long and 0.39 mm broad. Rostrum is cone-shaped, it is distinctly seen through the thin lamellae. The tip is placed just below the anterior margin of the lamellae; sometimes the thin hyaline anterior margin of the lamellae however projects beyond the rostrum (fig. 99 a). The rostral hairs, which are hairy, project freely beyond the tip of rostrum. From their point of attachment a broad tooth projects forwards and laterally on tect. I, while a weak chitinous ridge runs in the median plane to the lamellar hair which is very thin and short (fig. 99 b right side). (Only the one could

be seen in the preparation). The fused lamellae form a large hyaline plate which is evenly rounded anteriorly (fig. 99 b), in situ however inclined downwards so that the anterior margin becomes concave (fig. 99 a). The interlamellar hairs are inserted below the anterior margin of hysterosoma, they are directed forwards and upwards and in a lying position almost reach the base of the rostral hairs; they are thin and rough. The pseudostigmatic organs are also inserted below the anterior margin of hysterosoma. The head projects freely and is inclined laterally and a little forwards; it is lanceolate and covered with fine hairs. The mouth-parts are very powerful and well developed (see fig. 99 c (mandible) and 99 (maxilla)). Hysterosoma is almost as broad as long, posteriorly it is broadly rounded, anteriorly in the middle with slightly projecting margin. Pteromorpha forms a weak arch anteriorly. Ptemorpha see fig. 99 e. Anteriorly in the middle of hysterosoma an oblong light spot is seen. There are nine pairs of thin, slightly rough bristles wich are placed as in *Lepidozetes* which this species resembles much in many respects. Instead of true areae porosae distinct round light spots with an oblong chitinous slit are seen. The legs (fig. 99 f and g) are fairly short and thick, particularly I and II, while leg IV is more slender. There are 3 claws of which the middlemost is the thickest.

Richardson Mountains. Common on several dry biotopes: in lichen growth with a littel moss, in dense *Dryas* vegetation with reindeer lichen and liverwort, and in a biotope with scattered cushions of *Salix phebophylla* and *Oxytropus pygmaeus* on gravel and stony fields.

Yellow Knife: 2 specimens were found in dripping wet moss in a little depression on a rock.

Oribatella arctica Sig Thor fig. 100.

Corresponds closely to SIG THOR's and STRENZKE's descriptions apart from the fact that from 2 to 5 teeth are present on the outer tooth of the lamella. The inner tooth is sometimes considerably shorter than the outer one. The integument is distinctly punctate, as pointed out by STRENZKE for the subsp. *littoralis*.

Richardson Mountains: 1 specimen in heath-like vegetation consisting of *Rhododendron lapponicum*, *Dryas punctata*, *Salix reticulata*, *Diapensia aborata*, *Betula nana*, *Empetrum*, *Vaccinium myrtilus* and much moss.

Reindeer Station: Very common in dripping wet moss in a small depression; a few also in heath-vegetation with much moss and liverwort, and in other biotopes with wet moss.

Yellow Knife: A few specimens in meadows with *Arctostaphylos rubra*, *Carex*, *Eriophorum* and moss under *Myrica* and *Betula nana*.

Coppermine: A good deal of specimens in heaths like those on Richardson Mountains; a few also in wet *Eriophorum* meadows with much moss.

Churchill: Very common in almost pure *Dryas integrifolia* vegetation with scattered *Hedysarum mackenzia*; a few on heath-like vegetation.

Tectoribates latitectus (Berl.) fig. 101.

Yellow Knife: Several in meadows with *Rubus chamaemorus*, *Myrica* sp., *Betula nana*, *Salix* sp., *Eriophorum*, *Carex* and moss; a few in lichen cushions in depressions among the rocks, and in wet moss in depressions on rocks.

Churchill: Very common in wet meadows with grass, *Pinguicula*, *Dryas*, *Vaccinium uliginosum*, *Andromeda*, *Arctostaphylos rubra* and moss; also in small numbers in luxuriant vegetation of *Catabrosa* with *Stellaria longipes*, *Polygonum viviparum* and *Achillea borealis*.

Achipteria coleoptrata (L.) fig. 102.

Churchill: Common in wet meadow with *Eriophorum*, moss, *Pinguicula vulgaris*, *Carex* sp., grass and scattered *Salix* sp.

Achipteria nivalis n. sp. fig. 103.

Colour dark-brown to black-brown. Length 0.51–0.53 mm, breadth 0.32–0.35 mm. The hairs of hysterosoma long, areae porosae large and distinct. Tectp. I with a long broad tip, tect. II without a tip. The integument smooth or very weakly undulating stribed.

Achipteria nivalis does not seem to resemble any previously described species. The long hairs on hysterosoma, areae porosae and the free tip on the anterior margin of tectp. I it has in common with *A. punctata* (Nic.), but as the tip of tectp. II is missing and the cuticle is smooth it cannot be this species.

The lamellae touch each other for a long distance and conceal the rostrum; the lamellar tip is fairly short and seen from above it is blunt or rounded, being inclined downwards; when laid bare as in fig. 103 a the real shape can be seen. The lamellar hairs are also inclined downwards. The interlamellar hairs project only slightly beyond the tip of the lamellae. The pseudostigmatic organ (figs. 103 c and 103 d) is slender, the head pointed, seen "en face" or from the broadest side rounded at the tip. Tect. I (fig. 103 b) with a broad, free forward directed tip. At the point of attachment of the rostral hair there is a thickening of the chitin posteriorly running into a broad ridge which fuses with tectp. I. Tectp. II (figs. 103 e and 103 g) rounded without a tip, provided with irregular veins.

Hysterosoma is very slender. The tip of pteromorpha is fairly thick and short (see fig. 103 f). The hairs are long and smooth; the two on the shoulder are the longest and of these, the foremost is somewhat longer than the hindmost. Areae porosae adalares are largest and surrounded by thickened folds; the others are somewhat smaller. Leg II has a branched seta on the tarsus which is sometimes 4-branched, and sometimes 6-branched (fig. 103 h).

Coppermine: Common near beach in luxuriant vegetation consisting of *Lupinus arcticus*, *Dryas integrifolia*, *Luzula nivalis*, *Salix reticulata* and humid moss; besides in almost pure *Cassiope tetragona* vegetation with a dense bottom vegetation of moss, and in a moist low moss carpet sheltered by a large boulder, and in several other places.

Allopelops (1) *septentrionalis* Trghd. fig. 104.

Coppermine: A few in Carex meadows with wet moss and scattered Salix sp.

Churchill: A few in several biotopes; it is most common in moist meadows with *Salix* sp., *Betula nana*, *Pinguicula*, *Dryas*, *Vaccinium uliginosum*, *Andromeda*, grass and moss, and on heaths with moss, *Carex* sp., *Salix reticulata*, *Rhododendron*, *Dryas*, *Arctostaphylos rubra*, *Polygonum viviparum*, *Pinguicula* and similar localities.

Hoploderma striculum (C. L. Koch) fig. 105.

Yellow Knife: Only found in meadows with *Rubus chamaemorus*, *Myrica* sp., *Betula nana*, *Salix* sp., *Eriophorum*, *Carex* and moss; abundant here.

Oribotritia loricata (Rathke) fig. 106.

It deviates from previous descriptions by having 9 pairs of hairs at the genital opening (WILLMANN states 6 pairs, while 1 specimen in Oudeman's collection in Leiden had 8 pairs), of which the foremost is the longest; they decrease evenly in length posteriorly.

Yellow Knife: 1 specimen in wet meadow with burned off young spruces and undergrowth of *Alnus*, *Salix* sp., *Vaccinium uliginosum*, *Ledum*, *Eriophorum*, *Carex*, and a little moss.

Churchill: 1 specimen on the south-western side of the pipe which is covered with peat dust and densely grown with grass, *Ledum*, *Rubus chamaemorus*, *Vaccinium vitis idaea*, *Epilobium angustifolium* and humid moss.

(1) M. Sellnick in litteris.

Table 3. Table 3 shows the distribution of the species in Canada and adjacent regions. In the column farthest to the left then come Greenland, Jan Mayen, Bear Island, Spitsbergen, Lapland, Iceland & the Faroes and Europe. Then follow Sellnick's from Central Europe all in μ: farthest to the right some measurements of different authors some stated in mm, species in

Species	Localities												
	North America	RoMt	RiMt	ReSt	YeKn	CoMi	Chur	Baffin Island Labrador	Greenland	Jan Mayen Bear Island Spitsbergen	Lapland	Iceland & Faroes	
1. *Eulohmannia ribagai* (Berl.)				×							×	×	
2. *Hypochthonius rufulus* C. L. Koch	×				×							×	
3. *Hypochthoniella pallidula* (C. L. Koch)					×		×						
4. *Eobrachychthonius sexnotatus* Jacot	×		×						× (1)				
5. — *montanus* n. sp.		×											
6. *Brachychthonius scalaris* Forssl.			×	×		×	×						
7. — *perpusillus* Berl.				×									
8. — *lapponicus* Trghd.		×	×	×	×	×	×				×		
9. — *forsslundi* n. sp.					×								
10. — *ocellatus* n. sp.					×								
11. *Brachychochthonius berlesei* Willm. ssp. *erosus* Jacot	×				×	×			× (2)				
12. — *jugatus* Jacot var. *suecica* Forssl.	×			×	×								
13. — *rostratus* Jacot	×		×										
14. — *arcticus* n. sp.		×	×	×		×							
15. *Trhypochthonius tectorum* (Berl.)			×		×		×		×				×
16. — *badius* (Berl.)							×						
17. *Trhypochthoniellus setosus* Willm. var. *canadensis* n. var.					×								
18. *Trimalaconothrus novus* Sell.					×	×			×		×		
19. *Malaconothrus mollisetosus* n. sp.					×		×						
20. *Camisia horrida* (Herm.)		×	×	×	×	×	×	×	×	×	×	×	
21. — *lapponica* (Trghd.)					×				×		×		
22. *Ctenothrus kochi* (Willm.)				×	×						×		
23. *Nothrus pratensis* Sell.				×	×						×		
24. — *borussicus* Sell.		nymph ?	×		×	×	×	×	×		×		
25. *Platynothrus peltifer* (C. L. Koch)	×			×					× (4)		×	×	
26. — *punctatus* (L. Koch)						×	×		×		×		
27. *Heminothrus thori* (Berl.)							×		×		×	×	
28. *Hermannia reticulata* Thorell						×			×	×		×	
29. *Belba tatrica* (Kulcz.)				×	×				×				
30. — *longitarsalis* n. sp.				×									

(1) *Brachychthonius grandis* Sell., Hammer, 1944 p. 40 = *Eobrachychthonius sexnotatus* Jacot (Forssl. in litteris).
(2) *Brachychochthonius berlesei* Willm., Haarlov 1942 p. 34 = *Brachychochthonius immaculatus* Forssl.
(3) *Brachychochthonius rostratus* Jacot probably = *B. hungaricus* Balogh 1943.

previous occurence in N. America is indicated. The seven following columns indicate the localities examined in Canada, my measurements from Canada indicated in mm, the length first, Willmann's and a few of Strenzke's from Germany, some in μ as recorded in the literature. These measurements are mainly taken from the authors who have established the question.

Europe (excl. Lapland)	Canada length/breadth in mm	Germany Willmann Strenzke St. length/breadth in μ	Central Europe Sellnick length/breadth in μ	Ba. B. E. F. H. J. Ko. M. P. S. To. Th. Tr. W. Banks Berlese Ewing Forsslund Halbert Jacot L. Koch Michael Paoli Sellnick Thor Thorell Tragårdh Willmann	
×	0.76–0.78/0.28–0.30	670/230	671/231	680/240	B.
×	0.78/0.39	650–700/370	660/374		
×	0.43–0.45/0.26	370/185	375/175		
×	0.36 0.24/0.14			3[illegible]/182	S.
×	0.12/0.14–0.15			190–212/126–134	F.
×	0.19/0.12	176/79	188/95	180/110	B.
	0.195/0.12 0.23/0.15 0.20/0.13			180/	Tr.
×	0.19/0.09	180/95		174/86	J.
×	0.18/0.08			159–171/86–100	F.
× (3)	0.20/0.12 0.18/0.09			168/88	J.
×	0.75/0.50	660–690/390–400	680/440	750/	B.
×	0.66–0.72/0.38–0.40	525/280	550/310	540/	B.
×	0.62/0.35	490/265			
×	0.65/0.37 0.41–0.45/0.21–0.23	400–600/	594/330		
×	0.76–1.12/	870/450	858/440		
×	0.73/0.42	850/460	685/355	870/468	Tr.
×	1.09/0.45	975/450	990/440		
×	0.84–0.93/0.49–0.55	800–900/525	880/520		
×	0.95–1.04/0.46–0.57	975–990/460–480	925/450		
×	0.92/0.52	620/330	860/440		
×	0.77–0.94/0.44–0.58			0.75/Ko. 720/400	Tr.
×	0.97–1.03/0.53–0.63	990/620	1000/660	1000/	B.
×	0.77/0.48			c. 0.8/Th. 0.85/0.50	M.
×	0.62–0.72/0.37–0.47 c. 0.70/0.43	600/390	682/440		

(4) *Platynothrus peltifer* (C. L. Koch), Hammer 1944, p. 42 = *Pl. punctatus* (L. Koch), the same probably holds good for most previous records of this species from Greenland.

Table 3

Species	Localities												
	North America	RoMt	RiMt	ReSt	YeKn	CoMi	Chur	Baffin Island Labrador	Greenland	Jan Mayen Bear Island Spitsbergen	Lapland	Iceland & Faroes
31. *Belba coxalis* n. sp.				×								
32. — *mackenziensis* n. sp.			×	×								
33. — *arcticola* n. sp.				×		×						
34. — *bakeri* n. sp.			×	×								
35. *Gymnodamaeus ornatus* n. sp.				×								
36. — *gildersleeveae* n. sp.					×							
37. *Suctobelba acutidens* Forssl.					×							
38. — *sarekensis* Forssl.				×	×		×	×	×		×	×
39. — *palustris* Forssl.	×				×							
40. — *setosoclavata* n. sp.			×	×								
41. *Oppia quadricarinata* (Mich.)	×		×	×	×	×	×		×			
42. — *neerlandica* (Oudms.)	×		×	×	×		×	×	×	×	×	×
43. — *washburni* n. sp.		×	×				×					
44. — *translamellata* (Willm.)			×	×	×			×	×		×	×
45. — *clavigera* n. sp.				×		×	×					
46. — *fissurata* n. sp.			×	×		×						
47. — *maculata* n. sp.				×	×		×					
48. — *minor* (Paoli)	×				×							
49. *Oribella castanea* (Herm.)				×	×							×
50. — *spinifera* n. sp.	×						×					
51. *Eremaeus oblongus* C. L. Koch	×						×		×		×	×
52. — *grandis* n. sp.			×									
53. — *foveolatus* n. sp.				×	×	×						
54. — *translamellatus* n. sp.			×	×		×						
55. — *quadrilamellatus* n. sp.					×							
56. *Ceratoppia bipilis* (Herm.)	×		×	×	×	×	×		÷ (5)		×	×
57. — *microseta* n. sp.			×			×						
58. *Tectocepheus velatus* (Mich.)	×	×	×	×	×	×	×	×	×	×	×	×
59. *Ameronothrus lineatus* (Thrll.) ssp. *brevipes* Willm.	×						×		×	×		×
60. — *maculatus* Mich.							×		×			
61. — sp.				×								
62. *Carabodes labyrinthicus* (Mich.)					×				×		×	
63. *Caltroribula dentata* Willm.			×									
64. *Liebstadia similis* (Mich.)		×		×					×		×	×
65. *Oribatula tibialis* (Nic.)			×	×	×				× (6)		×	×
66. — *pallida* Ewing	×				×							
67. *Zygoribatula pallida* Banks	×			×	×	×	×					
68. *Scheloribates latipidulus* (C. L. Koch)		×	×	×	×		×		÷ (7)			

(5) *Ceratoppia bipilis* (Herm.) var. *sphaerica* L. Koch, Hammer, 1944, p. 42 = *Ceratoppia hoeli* Thor.
(6) *Oribatula exilis* Nic. var. *crassipes* L. Koch, Hammer 1944, p. 43 = *Oribatula tibialis* (Nic).

Cont.

Europe excl. Lapland	Canada length breadth in mm	Germany Willmann Strenzke St. length breadth in μ	Central Europe Sellnick length breadth in μ	Ba. – B. – E. – F. – H. – J. – Ko. – M. – P. – S. – To. – Th. – Tr. – W. Banks – Berlese – Ewing – Forsslund – Hallbert – Jacot – L. Koch – Michael – Paoli – Sellnick – Thor – Thorell – Trägårdh – Willmann	
	0.43/0.25				
	0.38/0.22				
	0.58/0.34				
	0.49/0.29				
	0.68–0.74/0.37–0.42				
	0.41/0.23				
×	c. 0.19/0.22/0.10–0.51			198–214/102–115	F.
×	0.21–0.22/0.12–0.13			204–231/112–144	F.
×	c. 0.28/0.17	232–250 St.			
	c. 0.26/0.15				
×	0.21/0.12	210/120	215/125	0.2/0.13	M.
×	0.28/0.31/0.13–0.18	240–315/135–165	250/141		
	0.28/0.16				
×	0.29–0.32/0.13–0.16	280/150	280/159		
	0.29/0.30/0.16/0.18				
	0.33–0.35/0.18–0.19				
	0.26/0.27/0.12–0.14				
×	0.18/0.20/0.08–0.09	225/93	214/96	170–180/75–80	P.
×	0.40–0.41/0.22–0.25	350/200	374/198		
	0.40/0.23				
×	0.53/0.30	560/280	660/374		
	0.72/0.36				
	0.53–0.58/0.28–0.32				
	0.69/0.74/0.32/0.40				
	0.47/0.25				
×	0.62/1.02/0.41–0.63	630/405	616, 880/418, 572		
	0.41–0.50/0.25–0.32				
×	0.29/0.35/0.18/0.21	300/187	310/172	0.32/0.17	M.
×	0.74/0.88/0.47/0.59		725/440	c. 0.5 Th. 0.68/0.42	M.
×	0.58/0.36		583/363	0.54/0.30	M.
	0.86/0.52/0.52/0.56				
×	0.50/0.52/0.29/0.32	500/300	539/319	0.45/0.25	M.
×	0.30/0.32/0.18	320/180			
×	0.51–0.60/0.32/0.36	540/310	539/308	0.55/0.33	M.
×	0.43/0.48/0.24/0.31	460/330	460/330		
×	0.52–0.54/0.32/0.34			480/300	E.
×	0.33–0.38/0.22/0.25			380	Ba.
×	0.41/0.45/0.25/0.30	430/240	350/210		

7 *Scheloribates palliidulus* (C. L. Koch), Hammer 1944, p. 43 = *Peloribates pilosus* n. sp.

Table 3

Species	Localities												
	North America	ReMt	RiMt	ReSt	YeKu	CoMi	Chur	Baffin Island Labrador	Greenland	Jan Mayen Bear Island Spitsbergen	Lapland	Iceland & Farors
69. *Peloribates pilosus* n. sp.							×		×			
70. — *canadensis* n. sp.				×	×		×		×			
71. *Ceratozetes thienemanni* Willm.					×		×	×	×		×	
72. *Sphaerozetes arcticus* n. sp.			×	×		×						
73. *Sphaerobates gratus* (Sell.)				×								
74. *Melanozetes meridianus* Sell.			×			×	×		×			×
75. — *longisetosus* n. sp.								×				
76. *Fuscozetes sellnicki* n. sp.			×	×		×	×		× (8)			
77. *Trichoribates lucens* (L. Koch)	×			×		×	×	×	×	×	×	
78. — *notatus* (Thorell)			×	×		×	×		×	×	×	
79. — *numerosus* (Sell.)				×								
80. — *copperminensis* n. sp.						×						
81. — *striatus* n. sp.							×					
82. *Hammeria groenlandica* Sell.			×			×	×		×			
83. — *canadensis* n. sp.		×		×	×	×						
84. *Ewingozetes bifurcatus* (Ewing)	×				×							
85. *Limnozetes canadensis* n. sp.							×					
86. *Mycobates parmeliae* (Mich.)					×		×					
87. — *tridactylus* Willm.								×				
88. — *conitus* n. sp.				×		×						
89. — *consimilis* n. sp.			×	×		×						
90. — *incurvatus* n. sp.					×			×				
91. — *sarekensis* Trghd.			×	×					×	×	×	×
92. *Punctoribates quadrivertex* (Halbert)							×					
93. *Galumna formicarius* (Berl.)					×							
94. *hudsoni* n. sp.							×					
95. *Neoribates aurantiacus* (Oudms.)			×	×	×							
96. *Teporibates latirostris* (C. L. Koch)				×	×		×				×	×
97. *Lepidozetes singularis* Berl.				×	×	×						
98. — *latipilosus* n. sp.			×									
99. *Scutozetes lanceolatus* n. gen. n. sp.												
100. *Oribatella arctica* Sig. Thor			×	×	×	×	×			×		
101. *Tectoribates latitectus* (Berl.)	×				×		×					
102. *Achipteria coleoptrata* (L.)	×						×		×			×
103. — *media* n. sp.						×						
104. *Alloppelops septentrionalis* (Trghd.)						×	×		×		×	×
105. *Hoplophorella striculum* (C. L. Koch)					×							
106. *Oribotritia lericata* (Rathke)					×		×				×	

8) *Melanozetes* sp., Hammer 1944, p. 46 — *Fuscozetes sellnicki* n. sp.

Cont.

Europe (excl. Lapland)	Canada length/breadth in mm	Germany Willmann Strenzke St. length/breadth in μ	Central Europe Selinack length/breadth in μ	Banks Berlese Ewing Forsslund Halbert Jacot L. Koch Michael Paoli Selinack Thor Thorell Trägårdh Willmann	
	0.52/0.38				
	0.45–0.50/0.33–0.37				
	0.35–0.36/0.21–0.22			390/430	W.
	0.54–0.56/0.34				
×	0.58/0.65/0.42–0.48	540/410	590/405		
×	0.57–0.69/0.34–0.47	600/405	600/405		
	0.65/0.39				
	0.51/0.31				
×	0.62/0.42–0.52			0.6/ Ko. 580–650/420–446	Tr.
	0.60–0.72/0.42–0.53			c. 0.5/ Th. 0.60/0.38	Tr.
×	c. 0.05 (Hysterosoma)	700/500	680–700/490–560		
	0.51/0.36				
	0.68/0.45				
	0.44–0.47/0.26–0.30			462/308	S.
	0.46–0.49/0.32–0.33				
	0.45/0.36			380/300	E.
	0.37/0.24				
×	0.45/0.30	410–420/260		0.42/0.25	M.
×	0.54/0.36	540/375			
	0.55–0.57/0.37–0.42				
	0.50–0.52/0.31–0.33				
	0.62–0.70/0.42–0.49				
	0.51–0.58/0.34–0.40			495/	Tr.
×	0.47–0.55/0.32–0.35	460–480/300		450/280	H.
×	0.60–0.63/0.45	560/430	550/405	540/360	B.
	c. 0.60/0.54				
×	0.65–0.73/0.42–0.50	525–720/350–430	710/485		
×	0.44–0.46/0.33–0.37	600/468	671/462		
×	0.46/0.32	430/285	430/285	540/360	B.
	0.40/0.30				
	0.50–0.54/0.35–0.36				
×	0.40–0.44/0.25–0.26	430–465/270–305 St.		420–490/300–330	To.
×	0.50/0.40	465/345		450/310	B.
×	0.65/0.50	580/430	583/430		
	0.51–0.53/0.32–0.35				
	0.63–0.70/0.51–0.57			700/600	Tr.
×	0.48/0.38	505/360	418/286		
	0.55/0.40	550/410			

SIZE OF THE CANADIAN ORIBATIDS

During the identification of the species it soon became clear that they differed considerably in size from the forms known from Europe. It became necessary therefore to measure all the species (table 3), but due to lack of time I had to confine myself to measure the comparatively few specimens of which I had made microscopical preparations. It appeared that the majority of the species were considerably larger than the measurements stated for the palaearctic forms from Europe. Since the species differ fairly much I consider an exactitude of 1/100 mm sufficient. Due to this great variation I also consider it wrong to attach too much importance to the size of the animal as a specific character. Unfortunately, there are only comparatively few measurements from different regions in arctic countries and from Europe, but even these sparse data may tend to show that the individual species on the whole is larger in arctic regions than in southern areas. Some examples will show this:

The two following pronounced arctic species cannot be compared with corresponding species in palaearctic areas, since, apart from arctic areas, they have only been found in Switzerland (*Pl. punctatus*) at so great altitudes above the sea level that they approach the conditions under which the species occurs in arctic countries: judging from the figures it looks as if the species become smaller in more southern and possibly milder regions, but there does not seem to be any great difference (see below) as in the comparison between arctic and palaearctic forms.

Platynothrus punctatus (L. Koch) an arctic and alpine species (see map p. 80)

L. Koch 1879, p. 114,	Gåskap. Novaja Zemlya	0.75 mm
Graversen 1931, p. 10(1)	North-East Greenland	0,77–0.91 mm
	Arctic Canada	0.77–0.94 mm
Kramer 1895, p. 81,	Umanak, West Greenland	0.75 mm
Trägårdh 1910, p. 524,	Lappland	0.72 mm
Schweizer 1922, p. 73,	Switzerland (1900–2250 m a.s.l.)	0.75–0.80 mm

Trichoribates notatus (Thorell), a purely arctic species (see map p. 81)

Thorell 1871, p. 695,	Spitsbergen	> 0.50 mm
Graversen 1931, p. 7,	North-East Greenland	0.64–0.77 mm
	Arctic Canada	0.62–0.72 mm
Trägårdh 1904, p. 13,	Locality? Lappland	0.60 mm

(1) *Platynothrus peltifer* (C. L. Koch) is *Pl. punctatus* (L. Koch). This erronous identification goes to 1902 when Trägårdh placed *Nothrus punctatus* (L. Koch) as synonymous with *Nothrus peltifer* C. L. Koch, a mistake which Trägårdh himself corrected in 1910, p. 531.

To this should be remarked that THORELL's measurement is very approximate. Nor is L. KOCH's measurement of the following species very exact (see below). As far as these two species are concerned North-East Greenland and Arctic Canada show the largest specimens which might indicate that it is not only the geographical latitude which determines the size of the animal, but rather the climate, since the species have a longer period of development in colder regions with lighter summers. I shall not however go further into this problem.

Trichorhbates lucens (L. Koch), an arctic species, which has however also been found in south Sweden (see map p. 81).

KULCZYNSKI 1902, p. 349,	Spitsbergen	0.65 mm
L. KOCH 1879, p. 115,	Spitsbergen, Novaja Zemlya	0.60 mm
		(0.63 TRÄGÅRDH 1904, p. 14)
	Arctic Canada	0.62 mm
GRAVERSEN 1931, p. 10,	West Greenland	0.58–0.62 mm
TRÄGÅRDH 1904, p. 14.	Lappland	0.58 mm

Camisia horrida (Herm.), widely distributed

THORELL 1871, p. 697	Spitsbergen	about 0.83 mm
	Arctic Canada	0.76–1.12 mm
WILLMANN 1931, p. 109	Germany	0.87 mm
MICHAEL 1888, p. 504	England	0.80 mm

Ceratoppia bipilis (Herm.), widely distributed.

L. KOCH (*v. sphaerica*) 1879, p. 117	Spitsbergen, Novaja Zemlya	1,00 mm
	Arctic Canada	0.62–1,02 mm
THOR 1930, p. 66	Norway	0.70–0.91 mm
SCHWEIZER 1922, p. 66	Switzerland	0.66–0.93 mm
SELLNICK 1929, p. 36	Central Europe	0.62–0.88 mm

This species is known to vary much in size, which is apparent from the measurements stated, but even in consideration of this feature the specimens from Spitsbergen and Arctic Canada are somewhat larger than their more southern relatives.

On the whole the specimens from Arctic Canada of the species discussed here are among the largest, but in several cases they are however surpassed by specimens from more northern districts as e. g. *Tr. notatus* from North-East Greenland and *Tr. lucens* from Spitsbergen. If therefore forms with a wide distribution from arctic regions (here is meant Arctic Canada) through great parts of Europe are examined this feature is still more evident.

Eulohmannia ribagai (Berl.)	Arctic Canada	0.76–0.78 mm
TRÄGÅRDH 1910, p. 544 (2)	Lappland	0.63 mm
WILLMANN 1931, p. 95	Germany	0.67 mm
BERLESE 1910, p. 223	Italy	0.68 mm

The largest specimens in Canada are here 14.7% larger than those from Italy.

Hypochthonius rufulus C. L. Koch

	Arctic Canada	0.78 mm
WILLMANN 1931, p. 99	Germany	0.65–0.70 mm

which gives at least an increase of 11.4%.

Hypochthoniella pallidula (C. L. Koch)

	Arctic Canada	0.43–0.45 mm
SELLNICK 1929, p. 22	Central Europe	0.38 mm

whereby the difference between the German specimens and the largest Canadian individuals becomes 18.4%.

Trhypochthonius badius Berl.

	Arctic Canada	0.66–0.72 mm
SELLNICK 1929, p. 22	Central Europe	0.55 mm
BERLESE 1904, p. 237	Italy	0.54 mm

which gives a difference of 33.3% between the largest specimens from Canada and Berlese's specimens from Italy.

Trimalaconothrus novus Sell.

	Arctic Canada	0.65 mm
WILLMANN 1931, p. 106	Germany	0.40–0.60 mm

which gives a difference of at least 8.3%.

Still more examples could be given, but the above, which have been taken from table 3, are sufficient to show that the specimens from Arctic Canada tend to be considerably larger than the corresponding forms in more southern regions. There are however many exeptions (see Table 3).

As far as mammals and birds are concerned it is a wellknown fact that the arctic forms are larger than the corresponding palaearctic forms. For the Oribatids TRÄGÅRDH in 1910, p. 577 pointed out this tendency in a few words: "6.5% der untersuchten Oribatiden zeigten eine Längenzunahme, die nicht unter 11% der Körperlänge der entsprechenden paläarktischen Arten herunter ging". That in Canada there

(2) *Arthrozchus biunguiculatus* Trghd. = *Eulohmannia ribagai* (Berl.)

is a still greater increase of length is evident from the above mentioned percentages which show the difference between the Canadian and the corresponding palaearctic specimens.

Similarly, the number of species which in Canada surpasses the corresponding palaearctic species in size is much greater than the 6.5% mentioned by TRÄGÅRDH from Lappland, since in Canada it is about half the total number. Apparently, this difference in length is greatest in the larger species; the very small species as e. g. *Brachychthonius*, *Suctobelba* and *Oppia* are generally of the same size as the corresponding European species.

DISTRIBUTION OF THE SPECIES IN CANADA

In order to show the distribution in Canada and to make a comparison between the fauna here and that of Greenland possible I have listed the species in table 3 and furthermore divided them into certain groups which are directly comparable to the corresponding groups in Greenland.

1. 3 circumpolar species (see p. 81)	*Platynothrus punctatus* (L. Koch) *Trichoribates lucens* (L. Koch) *Trichoribates notatus* (Thorell)	= 2.8% of the 106 species found.
2. 3 Canadian-Greenland species	*Hammeria groenlandica* Sell. *Fuscozetes sellnicki* n. sp. *Peloribates pilosus* n. sp.	= 2.8%
3. 38 new species		= 35.8%
4. 26 species known from Greenland and Europe		= 24.5%
5. 33 species known from Europe		= 31.1%
6. 3 American species (U.S.)	*Oribatula pallida* Ewing *Zygoribatula pallida* Banks *Ewingozetes bifurcatus* (Ewing)	= 2.8%

We shall first look at the distribution of the species in Canada and see what Oribatid families they represent. Table 3 shows how all the species found are distributed over the localities examined and which species were previously found in North America (column to the left). I shall revert to this later. For the sake of succinctness and in order to find out whether some families are more abundant than others, the species are placed under their respective families in table 4 whose first column comprises all species, the second column species which are also known from Europe, and the third the new species. The difference between these two last columns represent the circumpolar species, the American species (U.S.) in Canada and the Canadian-Greenland species, *Hammeria groenlandica*.

It is evident from the table that the new species are mainly distributed on the families *Belbidae*, *Eremaeidae* and *Notaspididae*, while the Canadian-European species are richly represented also within the most primitive families.

Table 4. The species found are distributed over the families listed below (the most primitive at the top of the list).

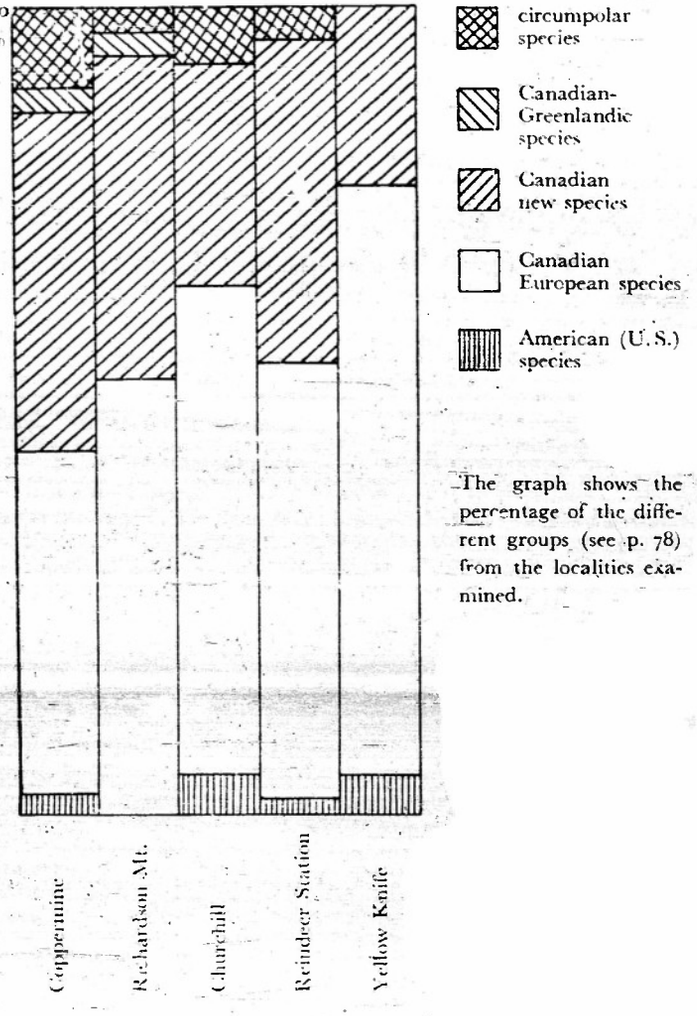
	All species	Canad.-Europ. species	New species	
Eulohmannidae	1	1		
Hypochthoniidae	16	12	4	
Malacothridae	2	1	1	
Camisiidae	8	7		+ 1 circumpolar
Hermanniidae	1	1		
Belbidae	8	1	7	
Eremaeidae	21	10	11	
Carabodidae	5	4	1	
Liacaridae	1	1		
Oribatulidae	4	2		+ 2 American
Notaspididae	36	16	16	+ 2 circumpolar, 1 Canad.
Pelopsidae	1	1		1 Greenland, 1 American sp.
Phthiracaridae	2	2		
	106	59	40	+ 7

Table 5 shows how the Canadian-European and the new species, which are listed under their respective families, are distributed on the different localities. It appears that all families are almost equally well represented in all the localities in relation to the number of species found.

Table 5. The occurence of the Canadian-European and the new species on the localities examined listed under their respective families.

	Rocky Mt.		Richardson Mt.		Reindeer St.		Coppermine		Churchill		Yellow Knife		Baffin Isl. & Labrador	
	C-E.	new	C-E.	new	C-E.	new	C-E.	new	C-E.	new	C-E.	new	C-E.	new
Eulohmannidae					1									
Hypochthoniidae	1	2	3	1	4	1	3	1	5		7	2		
Malacothridae							1			1	1	1		
Camisiidae	2		2		4		2		3		5		2	
Hermanniidae							1							
Belbidae				2	1	6		1			1	1		
Eremaeidae		1	4	6	6	6	2	7	5	1	6	3	3	
Carabodidae	1		1		1	1	1		3		2		1	
Liacaridae			1											
Oribatulidae	1		1		2						1			
Notaspididae	1	1	5	5	8	6	3	7	9	6	9	4	2	2
Pelopsidae							1		1					
Phthiracaridae									1		2			
number of species	6	4	19	14	27	20	14	14	27	11	37	11	8	2
percentage			54	40	54	40	42	42	63	26	73	22		

If the total number of Canadian-European species in each locality is considered Yellow Knife shows the greatest number, viz. 37 species (73%), then come Churchill and Reindeer Station each with 27, i. e. 63% and 54% respectively. Last comes Richardson Mountains with 19 species, and Coppermine with 14, 54% and 42% respectively (Rocky Mountains and Baffin Island, Labrador are left out of consideration owing to the scanty collections). It is not surprising that Yellow Knife shows the greatest Canadian-European element, since this locality due to its more southern situation with warmer summers and within woodland offer much better conditions of life to these species than do the more arctic localities Reindeer Station and Churchill. On the other hand, these two localities which are situated near the northern limit of the forest are more favourable to a European fauna than Coppermine which is pure arctic. Strange enough, Richardson Mountains has an equally great percentage of European species as Reindeer Station although it is pure arctic. The close vicinity of the Mackenzie delta with its rich fauna with a European stamp may explain this, and the locality is presumably not sufficiently isolated to have a characteristic fauna of its own. Finally, and this may be the most important reason, Richardson Mountains are not nearly so well investigated as the localities used for comparison. A more thorough investigation, which would presumably increase the number of species consider-



The graph shows the percentage of the different groups (see p. 78) from the localities examined.

ably, may also displace the composition in the one or the other direction, presumably in the arctic direction.

The total number of new species in each locality shows that the greatest number of new species is to be found in the most westerly situated localities as Richardson Mountains and Reindeer Station with 14 and 20 species respectively, in both cases 40% and at Coppermine which has 14 new species or 42%, i. e. at the stations which are isolated and situated at the greatest distance from the previously studied areas southwards.

If we then consider the distribution of all the groups in the localities studied we get the picture shown in the graph on p. 77 where the localities are arranged according to their distance from the forest beginning from the left with Coppermine which is farthest from the woodland, then comes the alpine Richardson Mountains, then Churchill which is situated right north of the forest, and Reindeer Station right at the north limit of the forest, and finally Yellow Knife in the middle of the woodland. This different situation greatly impresses the composition of the fauna. At Coppermine there are 10% circumpolar species and 3% Canadian-Greenland species. At Richardson Mountains these two elements represent only 6%; at Churchill there are 7% circumpolar species, but the Canadian-Greenland element is missing. Reindeer Station has 4% circumpolar species, here too the Canadian-Greenland part of the fauna is missing, and finally Yellow Knife misses both the circumpolar and the Canadian-Greenland element. The other groups have been discussed previously (see table 5) apart from the American species which are known from the United States. Of these Churchill and Yellow Knife which are the two most southern localities harbour the greatest part, viz. each of them 5%, Coppermine 3% and Reindeer Station 2%, while these species have not been found in Richardson Mountains.

Despite small differences there is a striking similarity between the four first mentioned localities and their contrast to the last one, Yellow Knife, with the great number of species known from Europe, with comparatively few new species and completely devoid of any arctic element.

Table 6 in which the localities are listed vertically and horizontally as in the graph according to their distance from the forest better shows how much the different localities have in common. The figures indicate the number of species which the individual locality has in common with each of the other ones. e. g. Coppermine has 18 species in common with Richardson Mountains, 17 with Churchill, 22 with Reindeer Station and so on. Table 6 shows that despite a great similarity with Richardson Mountains in the graph p. 77 Coppermine appears to have more species in common with Reindeer Station (22) than with Richardson Mountains (18). As mentioned above it is unfortunate to compare Richardson Mountains with the other localities, since this locality

Table 6.	Coppermine	Richardson Mt.	Churchill	Reindeer st.	Yellow Knife
Coppermine	33	18	17	22	13
Richardson Mt.	18	35	15	23	14
Churchill	17	15	43	17	21
Reindeer St.	22	23	17	50	24
Yellow Knife	13	14	21	24	51

is not by far so thoroughly studied, only 35 samples having been taken there, while there are more than 100 samples from each of the other localities. A more thorough investigation with a greater number of species would presumably show that the two purely arctic localities, Coppermine and Richardson Mountains, have most in common. Similarly it is seen from the table that despite its arctic stamp Churchill has more in common with Yellow Knife than with any of the other stations; the same holds good for Reindeer Station, which however has nearly equally much in common with the arctic stations which might be explained by the fact that the forest at Reindeer Station extends right to the arctic regions and thus offers favourable conditions of life to more fauna elements.

If we look at Yellow Knife this locality has 24 species in common with Reindeer Station, but only 21 with Churchill.

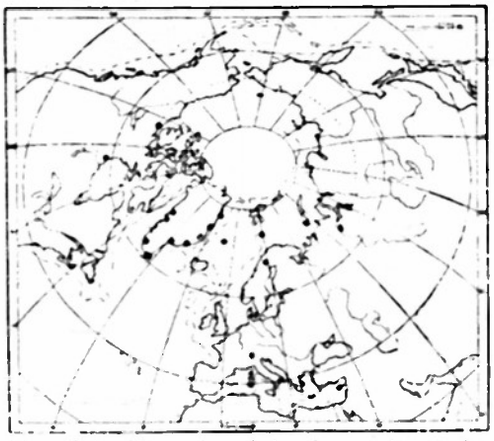
By this calculation made on the basis of table 3 it is striking to see how many of the species have been found only in one of the localities examined. This holds good for no less than 44 of the 106 species found, i. e. about 42%, since Coppermine has 3 (2 new species), Richardson Mountains 5 (2 new), Churchill 12 (5 new), Reindeer Station 9 (4 new), and Yellow Knife 15 (4 new) species. These isolated finding places of so many species clearly show that Canada must harbour a much greater number of species than the 106 found, and that the localities examined, by a still more thorough study, will probably prove to be much richer in species. How should we else explain that wellknown European species as e. g. *Eulohmannia ribagai*, *Platynothrus peltifer* and *Sphaerobates gratus* occur at Reindeer Station, in a region most remote from Europe, but in no other places in Canada? Most of the species which are known from Europe must be supposed to have a much wider distribution in Canada than indicated by the finds, in so far as suitable biotopes occur. This incomplete or only approximate investigation of the Oribatid fauna in Canada also makes it difficult to make only fairly reliable comparisons between the localities inter se, and we will find the same insufficiency if we try to compare the different countries. Most of the countries will presumably, in the course of a few years, show much greater numbers of species than to-day.

COMPARISON BETWEEN THE ORIBATID FAUNA OF CANADA AND GREENLAND

The preceding part of the present investigation on the microfauna of nothern Canada was undertaken in order to find out what species live in Canada so that a comparison could be made between the microfaunas of Greenland and Canada, and thus contribute to a solution of the problem as to the origin of the fauna of Greenland. A comparison between the Oribatid fauna of Canada and Greenland can best be made if the Oribatid fauna of Greenland (59 species) is divided into the following groups, as it was for Canada on p. 75:

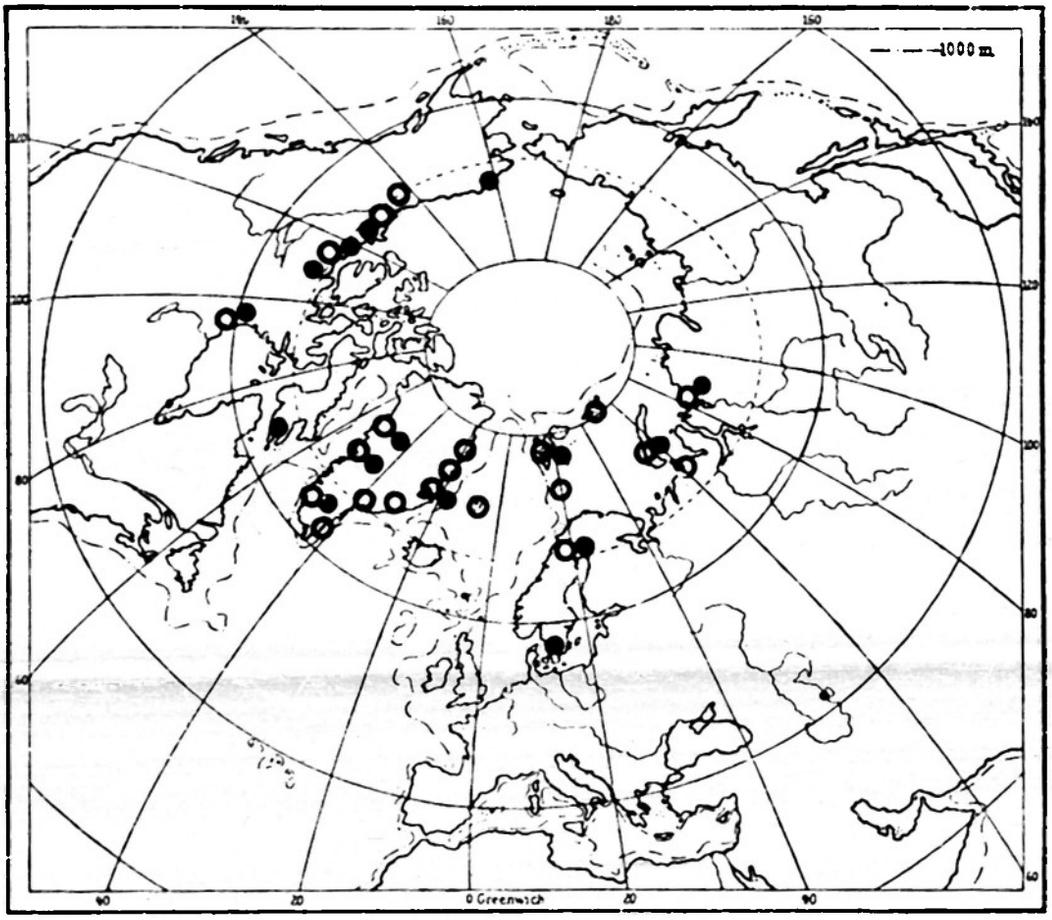
1. 3 circumpolar species	*Platynothrus punctatus* (L. Koch) *Trichoribates lucens* L. Koch *Trichoribates notatus* (Thorell)	= 5.1% of the 59 known species (Hammer 1944)
2. 3 Canadian-Greenland species	*Hammeria groenlandica* Sell. *Fuscozetes sellnicki* n. sp. *Peloribates pilosus* n. sp.	= 5.1%
3. 2 species known from Greenland only	*Belba trägardhi* Graversen *Jugoribates gracilis* Sell.	= 3.4%
4. 26 species known from Canada and Europe		= 44.1%
5. 25 species known from Europe		= 42.4%

These figures cannot be quite exact since the identification of the genus *Brachychthonius* in Greenland has not been carried up to date after several new species have



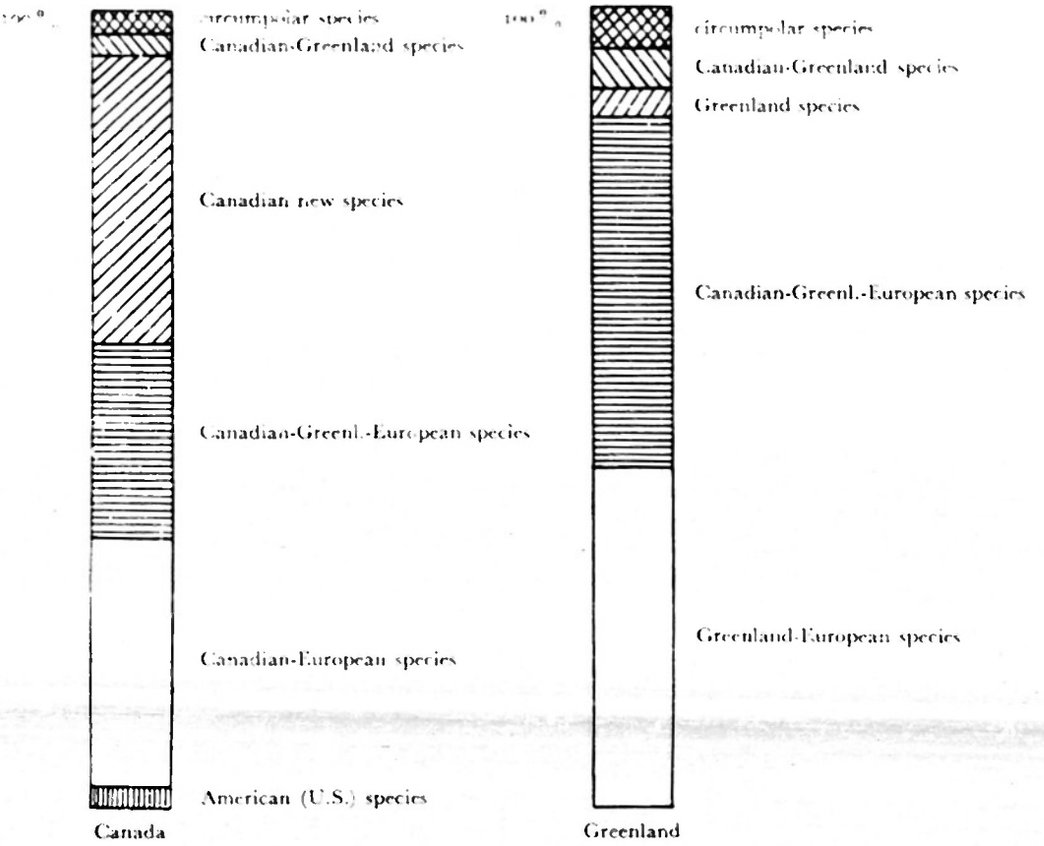
Map of the distribution of the circumpolar species *Platynothrus punctatus* (L. Koch).

The occurence of the Canadian-Greenland species *Hammeria groenlandica* (○), *Fuscozetes sellnicki* (×), *Peloribates pilosus* (•) and *Jugoribates gracilis* (●) in Canada and Greenland.



Map of the distribution of the circumpolar species ○ *Trichoribates notatus* (Thorell) and ● *Trichoribates lucens* (L. Koch).

been described in the last few years. The species of *Brachychthonius* known from Greenland are here reckoned as common with Europe. A slight shifting in the number of species within the different groups will however not influence the results obtained. At the top of the graph p. 82 of the Oribatid fauna of Canada and Greenland the circumpolar species are placed, the exact localities of which are entered on the map p. 80 and p. 81. Unfortunately, Siberia apart from the Jenisei area is completely unknown as far as the Oribatid fauna is concerned, but presumably these species may be met with everywhere along the Arctic Ocean. Under the circumpolar species in the graph are entered the Canadian-Greenland species which will be discussed later, and then come the species which are known only from Canada and Greenland



A comparison between the Oribatid fauna of Canada and Greenland. The listed groups in different hatching (see text).

respectively. The rest of the Oribatid fauna of Greenland, i. e. no less than 44.1 + 42.4 = 86.5% are known from Europe. Of these a little more than half (44.1%) also occur in Canada. Canada has only 24.5 + 31.1 = 55.6% in common with Europe, and of these not quite the half (24.5%) have also been found in Greenland. It is regrettable that south and west Greenland are still almost unexplored as regards the microfauna, and it is to be supposed that a much greater number of European species could be found in the inner southern fjords, which despite the fact that they have been very slightly investigated have proved to be much richer in species than any other region in Greenland. It must be supposed therefore that all the species in Canada which are known from Europe are presumably also to be found in Greenland, and that a great part of the European species in Greenland presumably also occur in Canada, since Europe-Greenland-Canada must be supposed to have been one large area of

distribution. Since only a few of these "European" species are known from the United States it may also be doubtful that this common area of distribution should extend so far south to the United States. Thus there can hardly be any doubt that Greenland at a very early time received an important part of its microfauna from Europe.

On the other hand, it can definitely be said what species Greenland got from America. *Hammeria groenlandica* Sell. which in Greenland is known only from Upernavik in west Greenland is an American species which is distributed from Richardson Mountains to the west via Coppermine to the north to Churchill near Hudson Bay to the east. The distribution of this and the following species in Canada and in Greenland is indicated on the map p. 80. In Canada occurs also another species of the genus *Hammeria*, *H. canadensis*, which lives under not nearly so extreme conditions as *H. groenlandica*, viz. in Rocky Mountains, at Reindeer Station, round Yellow Knife, and at Coppermine. EWING also found several very nearly related species in the United States (see under *H. canadensis*). Besides *Hammeria groenlandica*, *Fuscozetes sellnicki* n. sp. which in Greenland too is known only from the Upernavik district must have come from America, where it is known from Richardson Mountains, Reindeer station, Coppermine and Churchill, but not from Yellow Knife—i. e. a species with a northern distribution. Besides should be mentioned *Peloribates pilosus* n. sp. which has been found still farther from Canada; it occurs in the Franz Joseph Fjord area on the east coast of Greenland. In Canada it has been found near Churchill at the Hudson Bay (see the map p. 80). *Peloribates* is an American genus with many species scattered throughout America from south to north, but with few representatives only in Europe. Another species of *Peloribates*, *P. canadensis* has been found in Canada: at Reindeer station, at Yellow Knife, and at Churchill.

Jugoribates gracilis Sell (see the map p. 80), which is known only from Upernavik in west Greenland, is presumably an American species too. A study of the adjacent territories as Baffin Island and the islands situated still farther north might involve incorporation of this species in the American fauna. It seems reasonable to point out that several of these species occur in Greenland exclusively at Upernavik. Unfortunately, the Oribatid fauna is not known along the coast stretch north of Upernavik, nor on Ellesmere Island and the islands situated south of this place. These species may be found on this coast stretch, but the possibility cannot be excluded that dispersal took place from Canada across the ice to west Greenland. This American element in Greenland probably immigrated rather late, judging from the small distribution of these species. In contradistinction to this the European element presumably survived the ice age in Greenland (cp. Hammer 1944, p. 172).

SUMMARY

During the present investigation on the Oribatid fauna of Northern Canada 106 species have been found of which two were known from previous expeditions (in all only three species had been found previously). Of the 106 species 40 are new to science; in addition, one new genus and one new variation have been found. One genus has got a new name.

Measurements have shown that about half the Oribatids of Northern Canada are larger, often considerably larger, than the corresponding palaearctic forms. A comparison between the measurements (length) from arctic regions and southern areas recorded in the literature shows that the arctic forms are generally larger than the southern species.

Of the localities studied in Canada the two purely arctic ones: Coppermine and Richardson Mountains in several respects differ from the others among others by having a fauna element common with Greenland (see the graph p. 77). Yellow Knife differs much from all the other localities by the great number of European species and by its complete absence of an arctic imprint. The distance from the forest influences the composition of the fauna in the different biotopes.

A comparison between the Oribatid fauna of Canada and Greenland shows that Canada-Greenland-Europe must have been a common area of distribution from the very old days, since Canada and Greenland have a very great part of the fauna in common with Europe. This common area of distribution presumably did not extend far south in the United States judging from the comparatively few European species occuring there. On the other hand, Greenland must have got a part, although small, of its fauna from Canada, since a few species are known only from Canada and Upernavik on the west coast of Greenland (see the map. p. 80), a single one, besides from Canada only from the Franz Joseph Fjord area on the east coast of Greenland. The occurence of these Canadian-Greenland species in Greenland exclusively so near Canada as at Upernavik tends to show a late immigration, while the rest of the Oribatid fauna in Greenland probably survived the Glacial Period (cp. Hammer 1944, p. 172).

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EXPLANATION OF THE FIGURES

Fig. 1. *Eulohmannia ribagai* (Berl.)
- 1a. — — rostrum and rostral hairs.
- 1b. — — the most posterior part of hysterosoma from the ventral side.
- 2. *Hypochthonius rufulus* (C. L. Koch)
- 3. *Hypochthoniella pellidula* (C. L. Koch)
- 4. *Eobrachychthonius sexnotatus* Jacot (crushed)
- 5. — *montanus* n. sp.
- 5a. — — hysterosoma from the ventral side.
- 6. *Brachychthonius scalaris* Forssl.
- 7. — *perpusillus* Berl.
- 8. — *lapponicus* Trghd.
- 8a. — — pseudostigmatic organ
- 9. — *forsslundi* n. sp.
- 10. — *ocellatus* n. sp.
- 11. *Brachychochthonius berlesei* Willm. ssp. *erosus* Jacot
- 11a. — — ssp. *erosus* pseudostigmatic organ with surrounding details.
- 12. — *jugatus* Jacot var. *suecica* Forssl. (right and left half originate from two different specimens).
- 12a. — — pseudostigmatic organ and shoulder hair.
- 13. — *rostratus* Jacot.
- 14. — *arcticus* n. sp.
- 14a. — — rostrum.
- 14b. — — variation.
- 15. *Trhypochthonius tectorum* (Berl.)
- 15a. — — pseudostigmatic organ and two different hairs from hysterosoma.
- 16. — *badius* (Berl.)
- 17. *Trhypochthoniellus setosus* Willm. var. *canadensis* n. var.
- 17a. — — — — — rostrum.
- 18. *Trimalaconothrus novus* Sell.
- 18a. — genital-anal area.
- 19. *Malaconothrus mollisetosus* n. sp.
- 19a. — — palp.
- 19b. — — mandible.
- 19c. — — leg I from below.
- 19d. — — tarsus II.
- 19e. — — genital-anal area.
- 20. *Camisia horrida* (Herm.).
- 20a. — — hair from the posterior part of hysterosoma.
- 21. — *lapponica* (Trghd.)
- 21a. — — pseudostigmatic organ.
- 21b. — — larva.
- 22. *Eueonothrus kochi* (Willm.)
- 22a. — — pseudostigmatic organ.
- 23. *Nothrus pratensis* Sell.

Fig. 24. *Nothrus borussicus* Sell.
- 24a. — — pseudostigmatic organ.
- 24b. — — upperside of propodosoma.
- 24c. — — leg I (left from the underside).
- 24d. — hair from posterior end of hysterosoma (dorsal side).
- 25. *Platynothrus peltifer* (C. L. Koch).
- 26. — *punctatus* (L. Koch)
- 26a. — — pseudostigmatic organ.
- 27. *Hermannia thori* (Berl.)
- 27a. — — hair from a leg.
- 28. *Hermannia reticulata* Thorell.
- 28a — — pseudostigmatic organ.
- 29. *Belba tatrica* (Kulcz.)
- 29a. — — genital-anal area.
- 29b. — — leg I.
- 29c. — — leg IV.
- 30. — *longitarsalis* n. sp.
- 30a. — — pseudostigmatic organ.
- 3b. — — hair from hysterosoma
- 30c. — — genital-anal plates.
- 30d. — — tarsus IV (right) 430 μ long.
- 31. — *coxalis* n. sp.
- 31a. — — genital-anal plates.
- 31b. — — leg I.
- 31c. — — leg IV.
- 32. — *mackenziensis* n. sp.
- 32a. — — genital-anal plates.
- 32b. — — nymph.
- 33. — *arcticola* n. sp.
- 33a. — — genital-anal plates.
- 34. — *bakeri* n. sp.
- 34a. — — genital-anal plates.
- 35. *Gymnodamaeus orr[illegible]us* n. sp.
- 35a. — — pseudostigmatic organ.
- 35b. — — ventral side of hysterosoma.
- 35c. — — tibia and tarsus of leg I (right).
- 36 — *gildersleeveae* n. sp.
- 36a. — — from ventral side.
- 36b. — — leg I (left).
- 36c. — leg IV (left).
- 37. *Suctobelba acutidens* Forssl.
- 38. — *sarekensis* Forssl.
- 39. — *palustris* Forssl.
- 39a. — — rostral teeth.
- 40 — *setosoclavata* n. sp.
- 40a. — — pseudostigmatic organ.
- 40b. — — propodosoma in profile.
- 41. *Oppia quadricarinata* (Mich.)
- 41a. — — the chitinous ring between the lamellae.

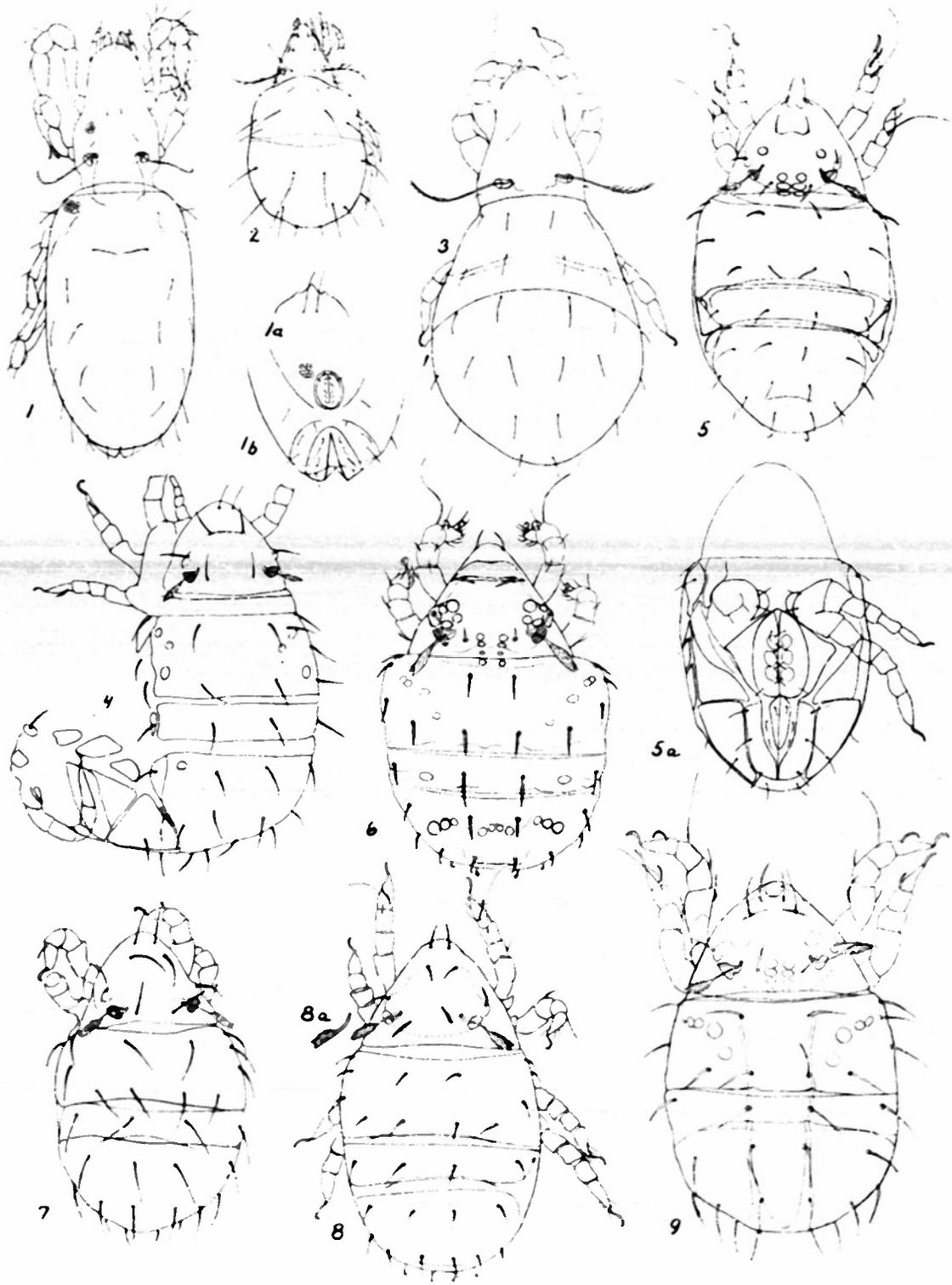
Fig. 42. *Oppia neerlandica* Oudms.
- 42a. — — variation of lamellae, interlamellar hairs etc.
- 42b. — — — — .
- 43. — *washburni* n. sp.
- 44. — *translamellata* Willm.
- 44a. — — variation of lamellae and of the transition between propodosoma and
- 44b. — — hysterosoma.
- 45. — *clavigera* n. sp.
- 45a. — — pseudostigmatic organ.
- 46. — *fissurata* n. sp.
- 46a. — — variation of the position of the lamellar hairs and of the arch on hysterosoma.
- 47. — *maculata* n. sp.
- 47a. — — pseudostigmatic organ.
- 48. — *minor* (Paoli)
- 49. *Oribella castanea* (Herm.)
- 50. — *spinifera* n. sp.
- 50a. — — pseudostigmatic organ.
- 50b. — — ventral side.
- 50c. — — leg I (left).
- 51. *Eremaeus oblongus* C. L. Koch.
- 52. — *grandis* n. sp.
- 52a. — — leg IV (left).
- 53. — *foveolatus* n. sp.
- 53a. — — ventral side.
- 53b. — — leg I (left).
- 53c. — — leg IV (right).
- 54. — *translamellatus* n. sp.
- 54a. — — ventral side.
- 54b. — — leg I.
- 54c. — — leg III.
- 54d. — — leg IV.
- 55. — *quadrilamellatus* n. sp.
- 55a. — — ventral side.
- 55b. — — leg I.
- 55c. — — leg II.
- 55d. — — leg III.
- 56. *Ceratoppia bipilis* (Herm.)
- 57. — *microseta* n. sp.
- 57a. — — rostrum (RO) with the tip of the lamellae (L), the lamellar hairs (LH) and rostral hairs (RH) seen obliquely from the right; cp. 57b.
- 57b. — — propodosoma with lamellae and rostrum (from above).
- 57c. — — leg I (right).
- 57d. — — leg IV (right).
- 57e. — — larva.
- 58. *Tectocepheus velatus* (Mich.)
- 59. *Ameronothrus lineatus* (Thorell) subsp. brevipes Willm.
- 60. — *maculatus* (Mich.)
- 61. — sp. dead specimen.
- 62. *Carabodes labyrinthicus* (Mich.)

Fig. 64. *Cultroribula dentata* Willm.
- 65a. *Cultroribula dentata* propodosoma from the side.
- 64. *Liebstadia similis* (Mich.)
- 65. *Oribatula tibialis* (Nic.)
- 65a. — — pseudostigmatic organ.
- 66. — *pallida* Ewing.
- 67. *Zygoribatula pallida* Banks.
- 67a. — — lamella and pseudostigmatic organ.
- 68. *Scheloribates pallidulus* (C. L. Koch).
- 69. *Peloribates pilosus* n. sp.
- 69a. — — pseudostigmatic organ.
- 69b. — — hair from hysterosoma.
- 69c. — — ventral side.
- 70. — *canadensis* n. sp.
- 70a. — — lamella with lamellar hair.
- 70b. — — ventral side.
- 71. *Ceratozetes thienemanni* Willm.
- 72. *Sphaerozetes arcticus* n. sp.
- 72a. — — lamella and tectp. I.
- 72b. — — rostral hair with the tip of tectp. I.
- 72c. — — ventral side.
- 72d. — — leg II.
- 72e. — — regenerated leg II (right).
- 73. *Sphaerobates gratus* (Sell.)
- 74. *Melanozetes meridianus* Sell.
- 75. — *longisetosus* n. sp.
- 75a. — — hair from hysterosoma.
- 75b. — — leg II (left).
- 75c. — — leg III (left).
- 75d. — — ventral side.
- 76. *Fuscozetes sellnicki* n. sp.
- 76a. — — lamellae and pseudostigmatic organ.
- 76b. — — mandible.
- 76c. — — leg I (right), rostral hair and tectp. I.
- 76d. — — hair from hysterosoma.
- 76e. — — leg II.
- 76f. — — ventral side.
- 77. *Trichoribates lucens* (L. Koch).
- 78. — *notatus* (Thorell).
- 79. — *numerosus* (Sell.)
- 79a. — — detail of lamella tip with tectp. I.
- 79b. — — pseudostigmatic organ.
- 79c. — — } tectp. I in different positions.
- 79d. — — }
- 79e. — — mandible.
- 79f. — — leg I.
- 80. — *copperminensis* n. sp.
- 80a. — — } lamellae variations.
- 80b. — — }

Fig. 80e. *Trichoribates coppermineusis* pteromorpha (left).
- 80d. hair from the shoulder (hysterosoma).
- 80e. — leg I.
- 80f. — — leg II.
- 80g. ventral side.
- 81. — *striatus* n. sp.
- 81a. — — lamellae.
- 81b. — right side of propodosoma (lamellae removed), with leg I, tectp. I, mandible and pseudostigmatic organ.
- 81c. — — leg IV.
- 82. *Hammerla groenlandica* Sell.
- 83. — *canadensis* n. sp.
- 83a. — — ventral side.
- 83b. — — leg I (left).
- 83c. — — leg II (right).
- 84. *Ewingozetes bifurcatus* (Ewing).
- 84a. — — mandible.
- 84b. — — ventral side.
- 84c. — — leg I (right).
- 84d. — — leg IV (right).
- 85. *Limnozetes canadensis* n. sp.
- 85a. — — lamellae and tectp. I.
- 85b. — — pteromorpha and pseudostigmatic organ.
- 85c. — — ventral side.
- 85d. — — leg I.
- 86. *Mycobates parmeliae* (Mich.).
- 87. — *tridactylus* Willm.
- 87a. — — rostrum.
- 88. — *conitus* n. sp.
- 88a. — — rostrum with left lamella and tectp. I.
- 88b. — — leg I (the joint slightly dislocated between genu and tibia).
- 88c. — — leg IV.
- 89. — *consimilis* n. sp.
- 89a. — — rostrum and lamellae.
- 89b. — — tectp. I with surrounding details.
- 89c. — — leg I.
- 89d. — — leg II.
- 89e. — — leg IV.
- 90. — *incarinatus* n. sp.
- 90a. — — rostrum, lamellae and tectp. I.
- 90b. — — tectp. I from the ventral side.
- 90c. — — pseudostigmatic organ from the side and from the edge.
- 90d. — — chitinous turbercles on the hysterosoma.
- 90e. — — pteromorpha (left).
- 90f. — — leg II (the joint slightly dislocated between genu and tibia).
- 90g. — — leg IV.
- 91. — *sarekensis* Trgbd.
- 91a. — — lamellae.
- 91b. — — leg II.

Fig. 92. *Punctoribates quadricentes* (Haibert.).
- 93. *Galumna formicarius* (Berl.)
- 94. — *hudsoni* n. sp.
- 94a. — — pseudostigmatic organ.
- 95. *Neoribates aurantiacus* (Oudms.)
- 96. *Tegoribates latirostris* (C. L. Koch).
- 96a. — — ventral side.
- 97. *Lepidozetes singularis* Berl.
- 98. — *latipilosus* n. sp.
- 98a. — — anterior part of the fused lamellae with the rostral hair and tectp. I.
- 98b — — palpa, rostral hair and tectp. I from the ventral side.
- 98c. — — ventral side.
- 98d. — — leg II.
- 99. *Scutozetes lanceolatus* n. gen. n. sp.
- 99a. — — anterior part of the fused lamellae and rostral hairs.
- 99b. — — lamellar blade with one lamellar hair, rostral hairs and tectp. I.
- 99c. — — mandible.
- 99d. — — maxilla with palpa.
- 99e. — — pteromorpha.
- 99f. — — leg I.
- 99g. — — leg IV.
- 100. *Oribatella arctica* Thor.
- 100a. — — lamellae, variation.
- 101. *Tectoribates latitectus* (Berl.)
- 102. *Achipteria coleoptrata* (L.) hysterosoma.
- 102a. — — lamellae, rostrum and pseudostigmatic organ.
- 102b. — — ventral side.
- 103. — *nivalis* n. sp.
- 103a. — — tip of the lamellae.
- 103b. — — left lamella and tectp. I seen through the lamella.
- 103c. — — lamella and pseudostigmatic organ.
- 103d. — — pseudostigmatic organ, variations.
- 103e. — — tectp. II (right).
- 103f. — — pteromorpha.
- 103g. — — leg II and tectp. II (left).
- 103h. — — the comb-shaped bristles on the tarsus II.
- 104. *Allopelops septentrionalis* Trghd.
- 104a. — — larva.
- 105. *Hoplophorella striculum* (C. L. Koch).
- 105a — — pseudostigmatic organ.
- 105b. — — hair from hysterosoma.
- 106. *Oribotritia loricata* (Rathke).
- 106a. — — pseudostigmatic organ.
- 106b. — — hair from hysterosoma.
- 106c. — — structure on hysterosoma.

PLATES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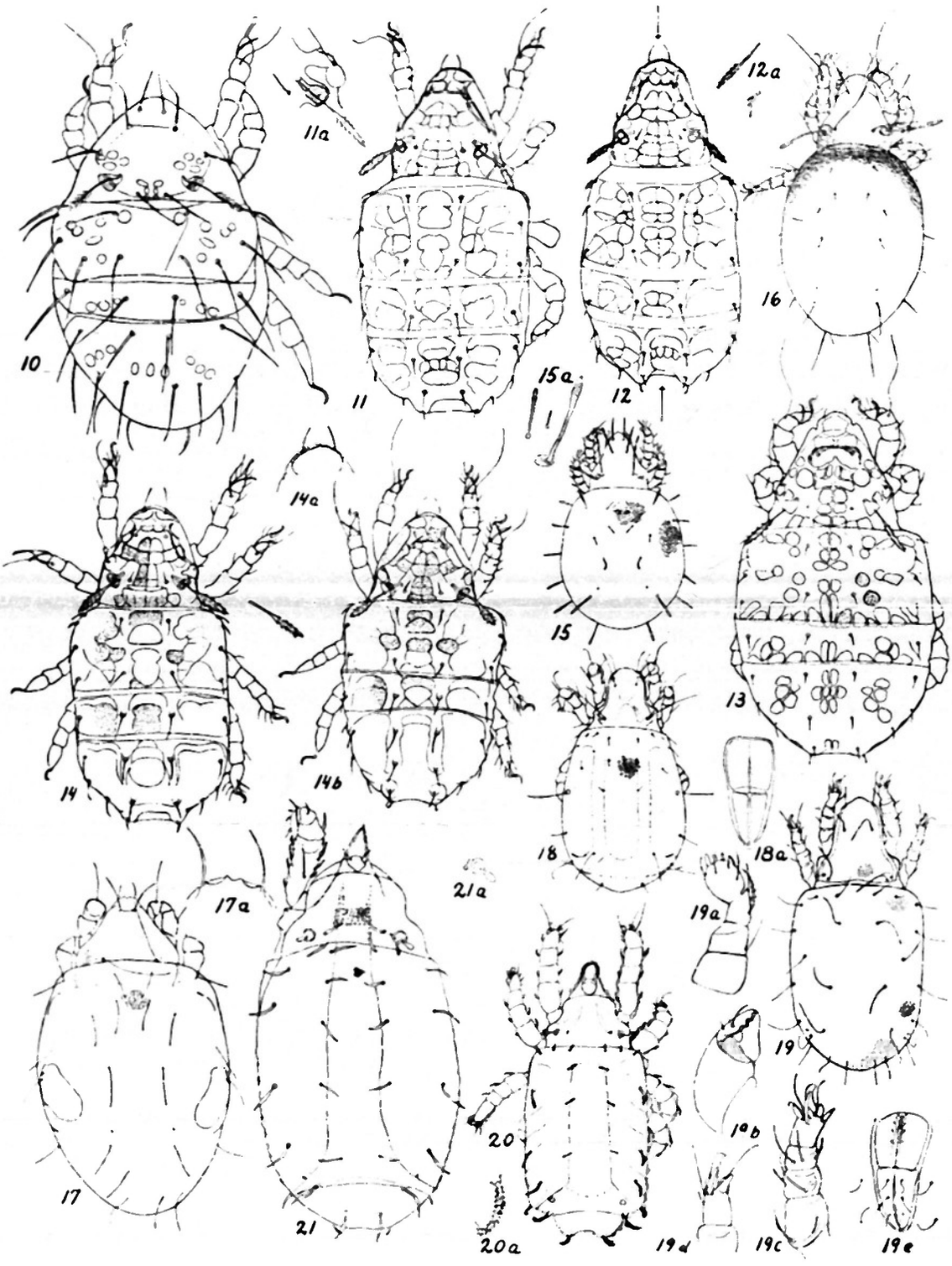
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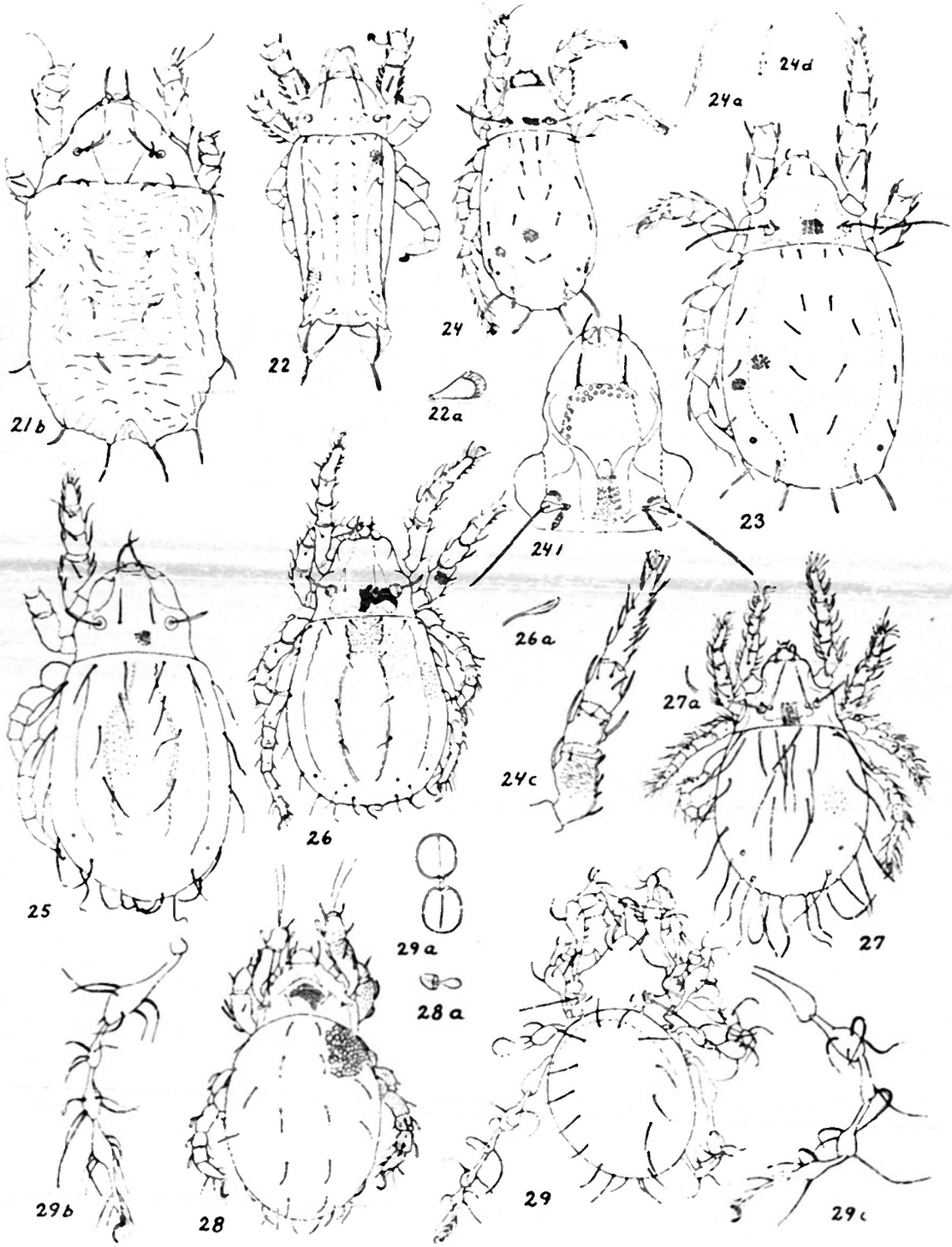
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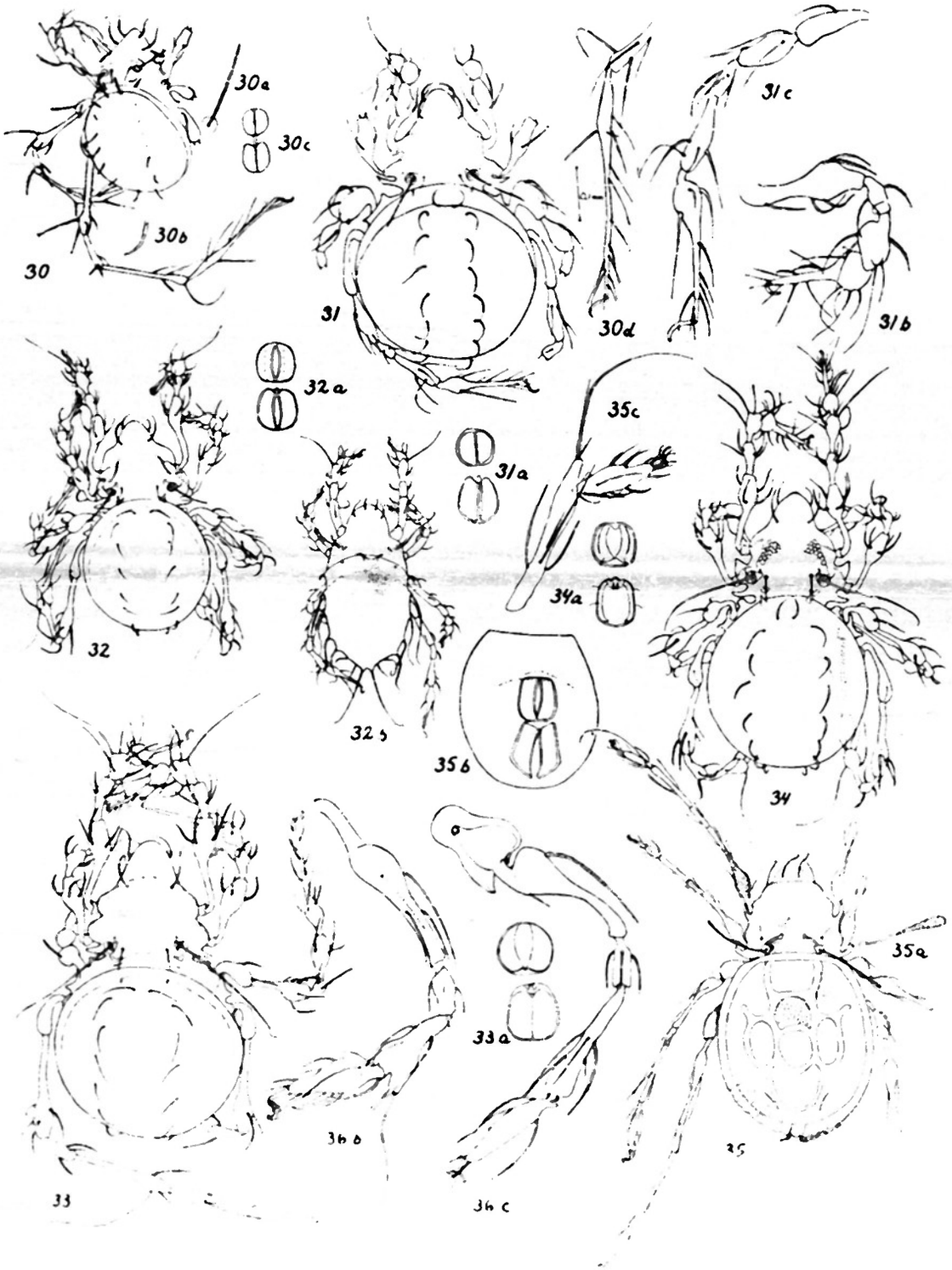
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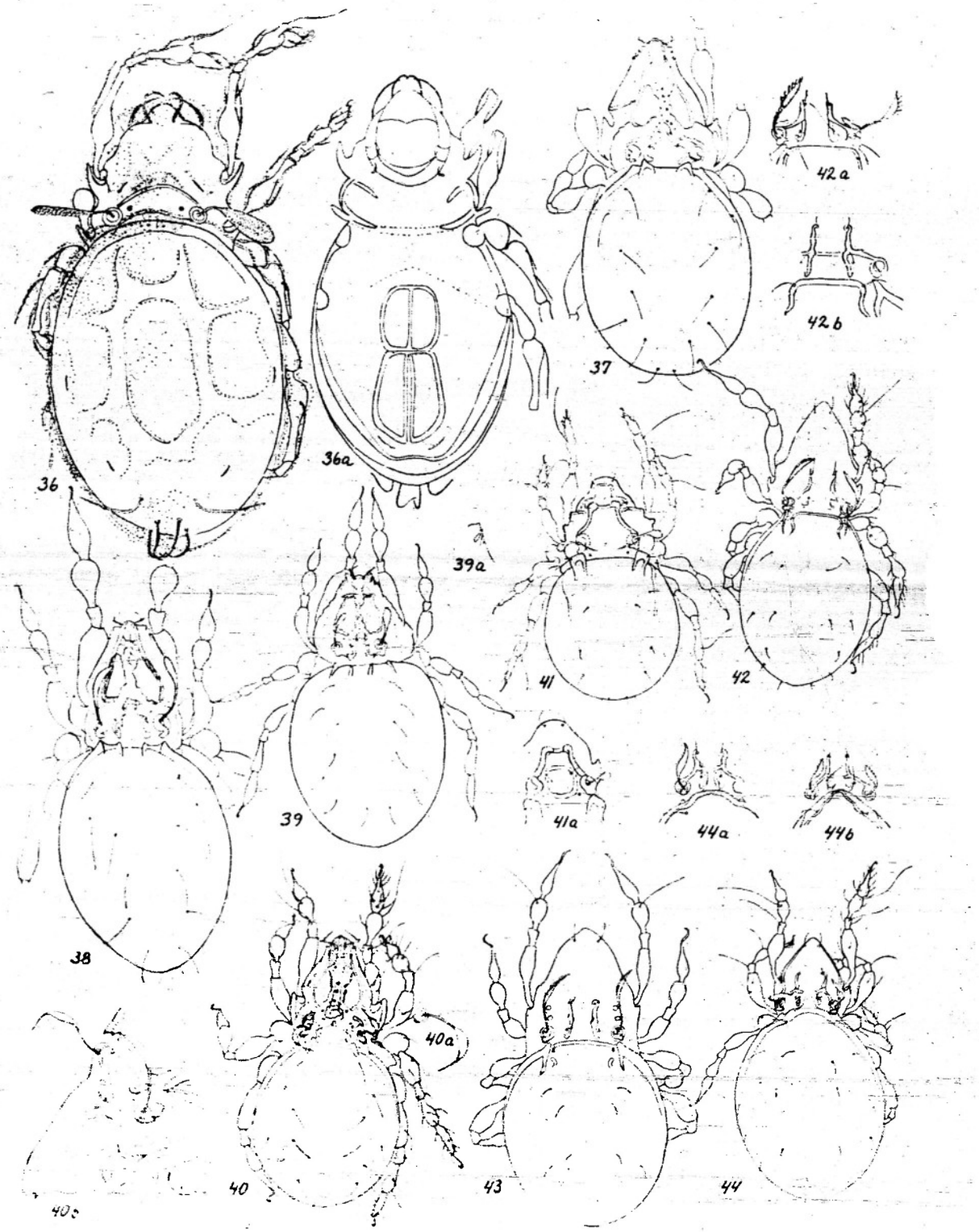
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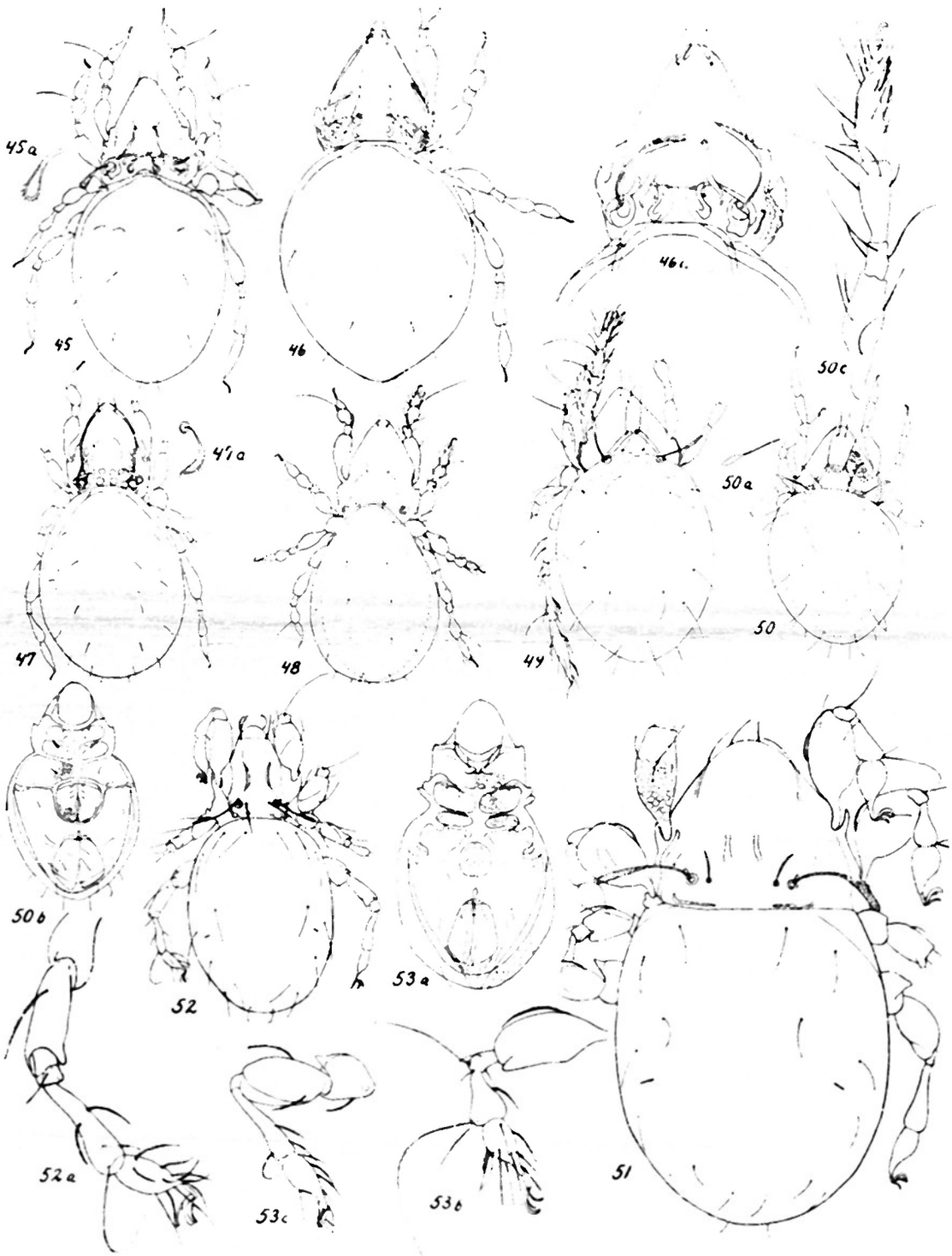
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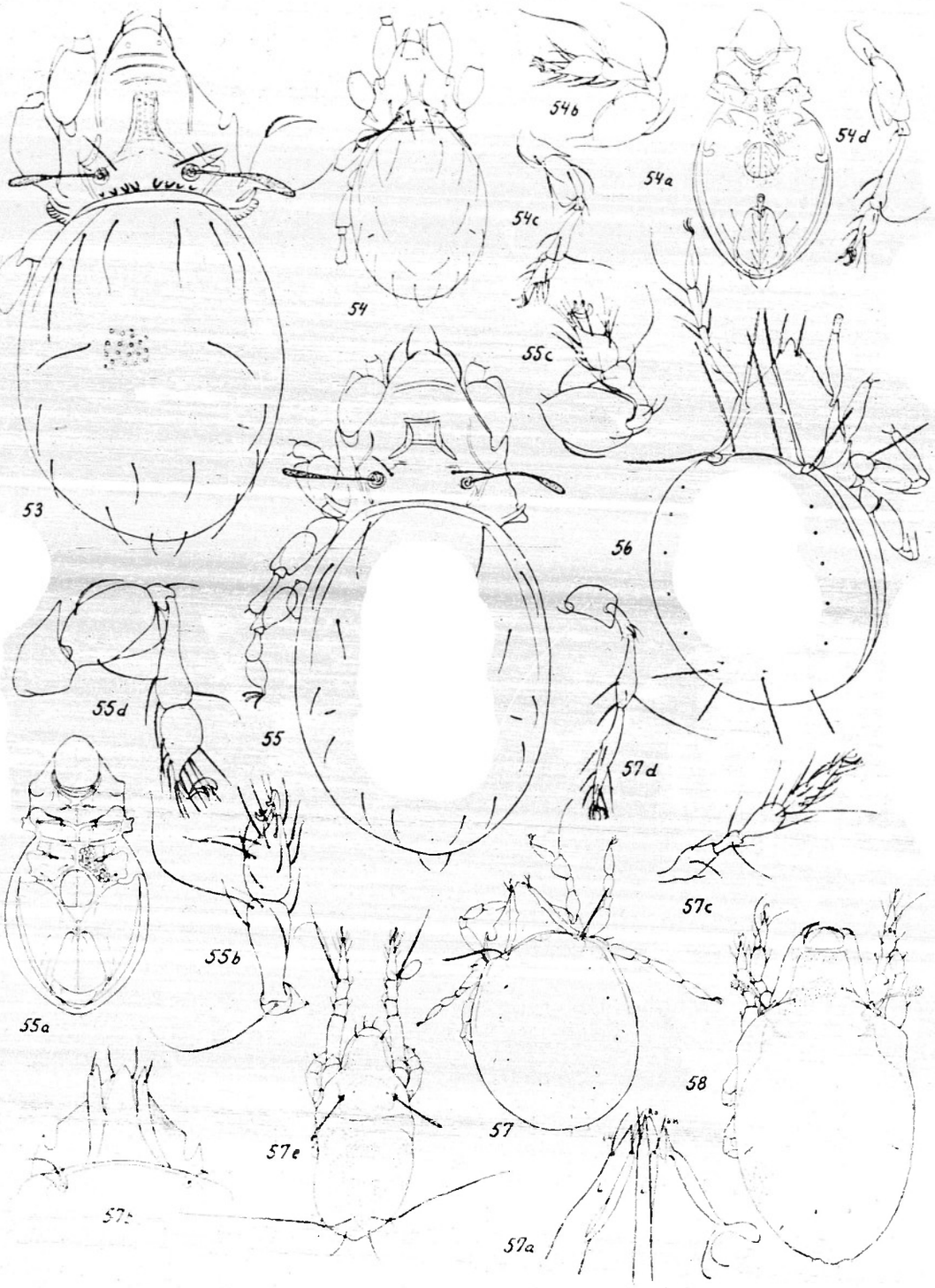
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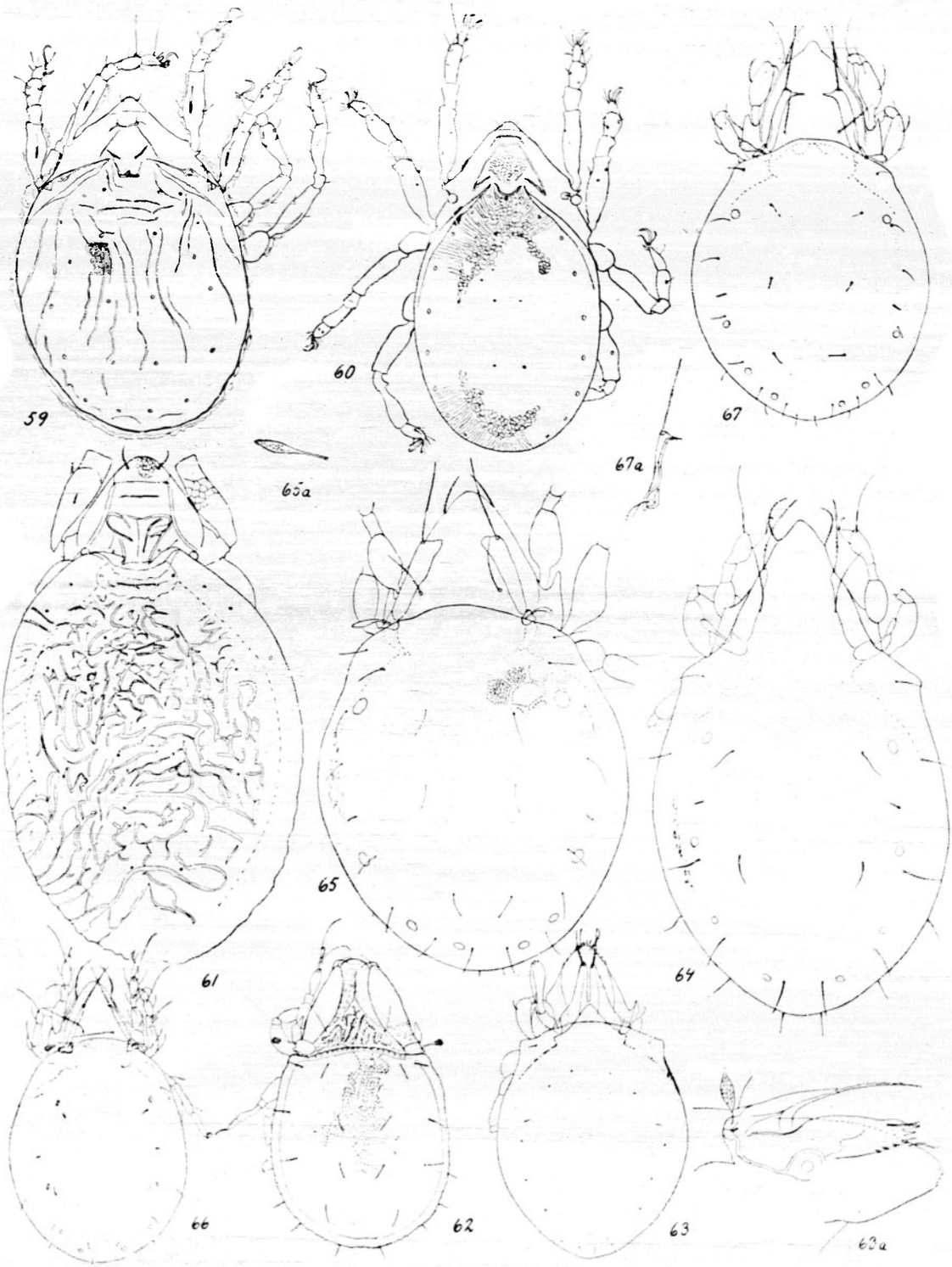
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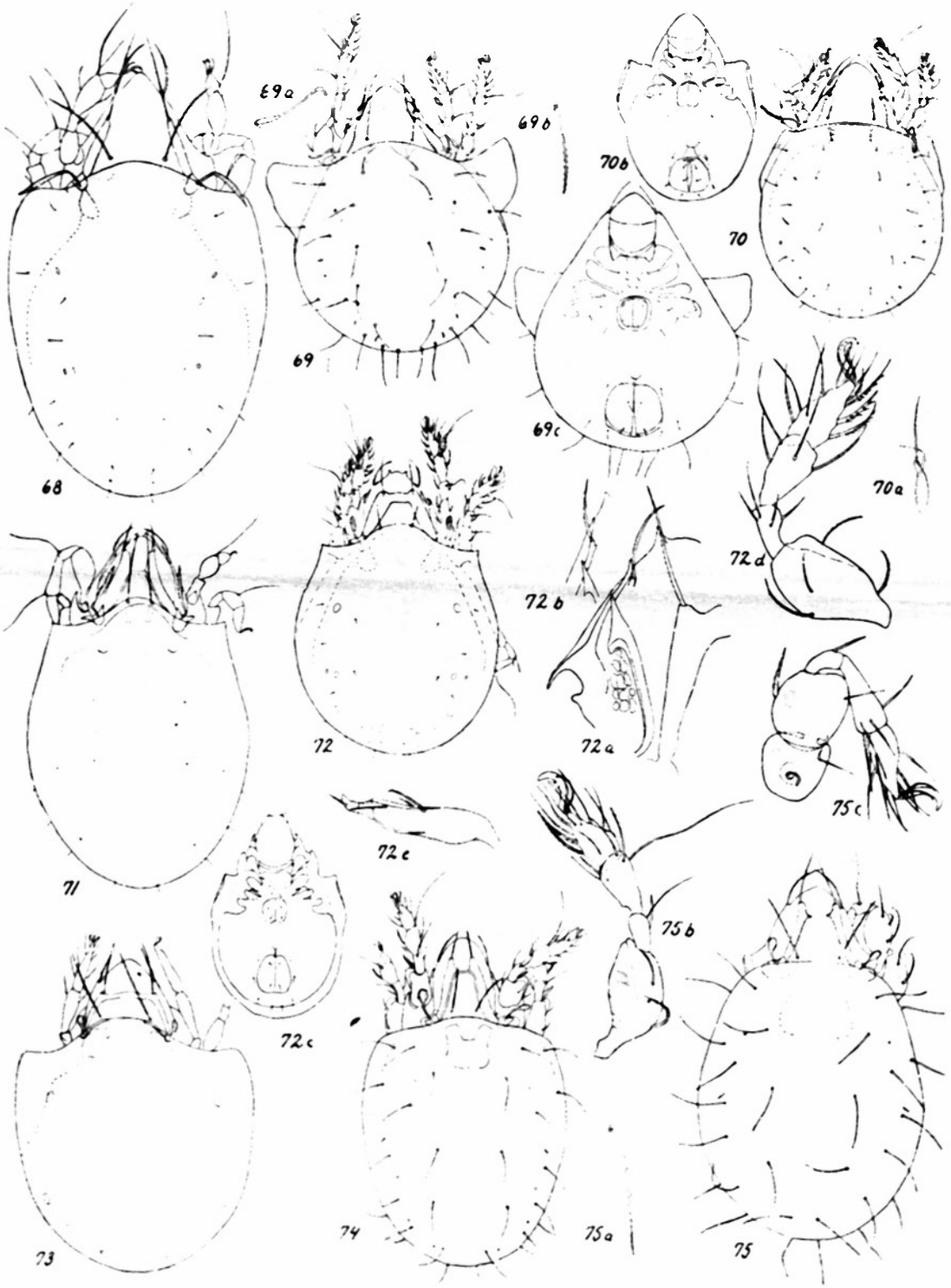
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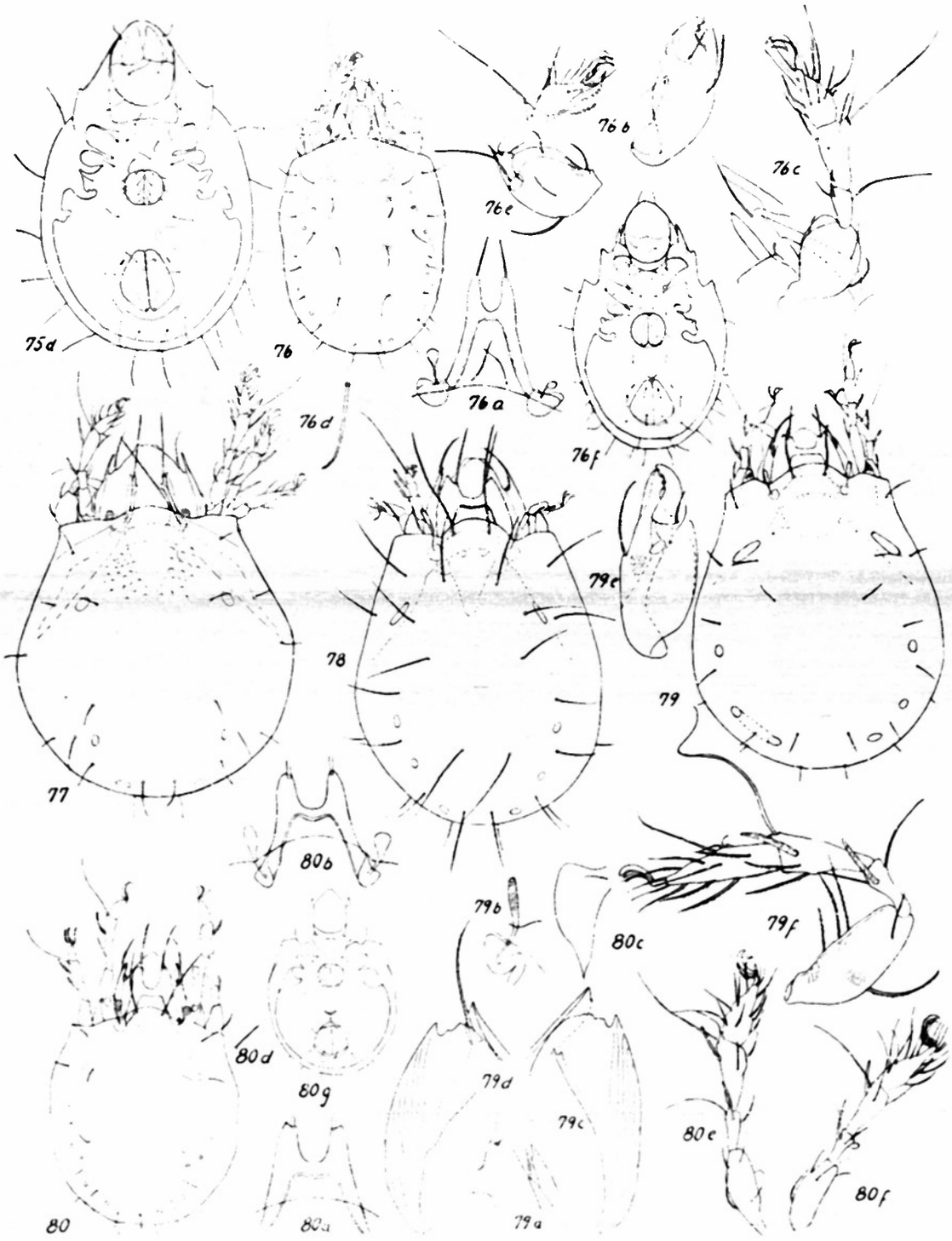
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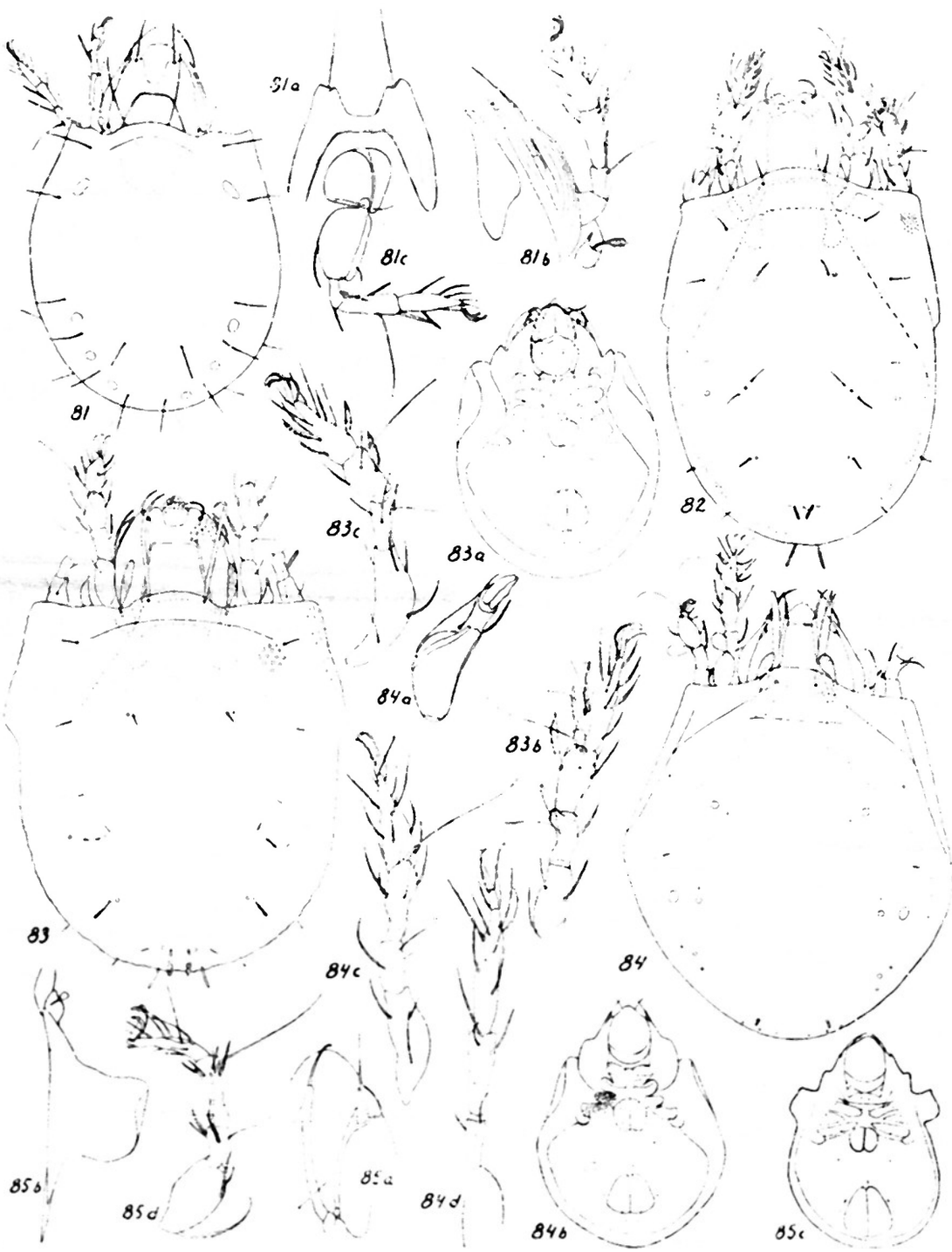
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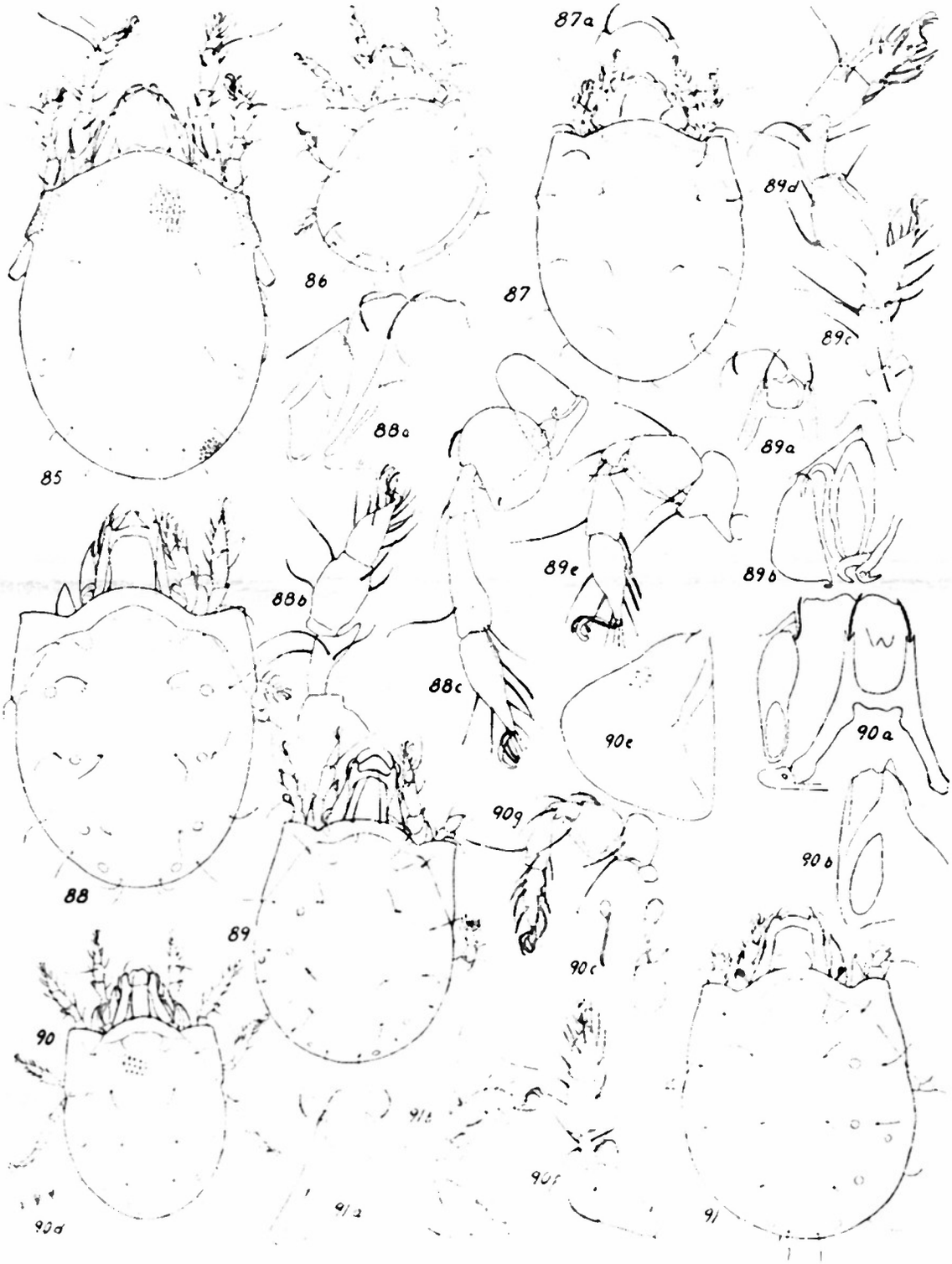
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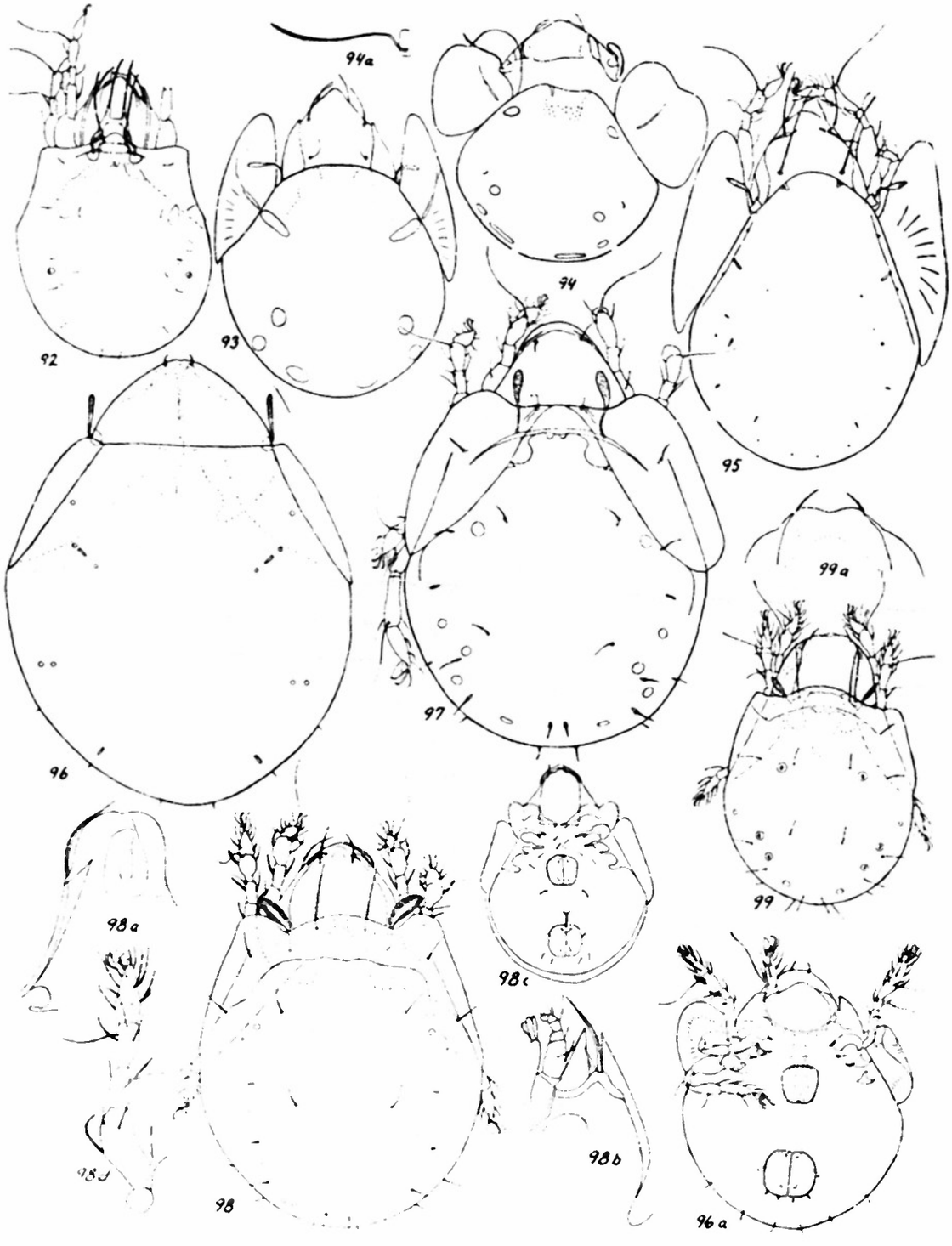
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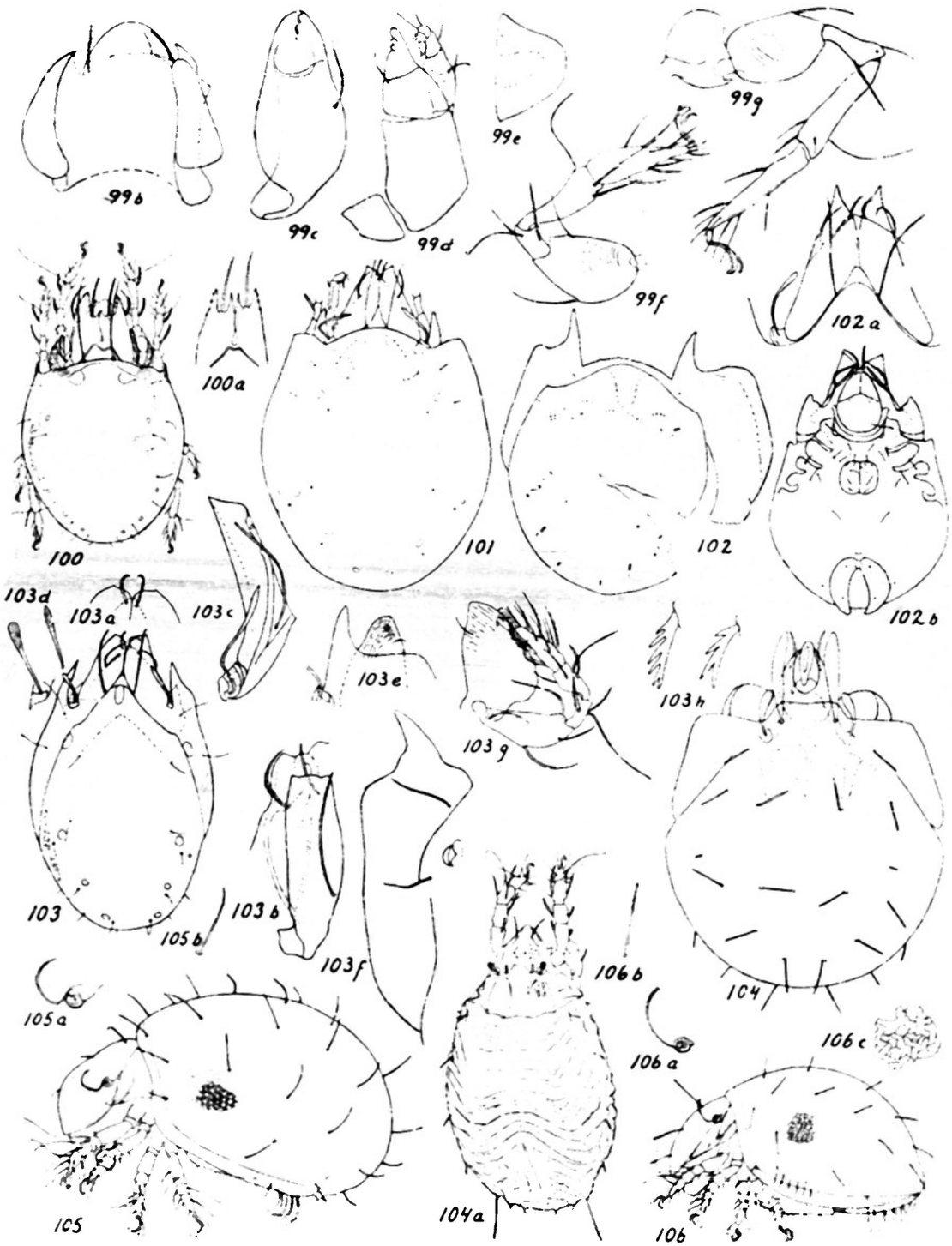
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