Symphyla and Pauropoda from Denmark

by
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The preparation of this paper has been undertaken in the belief that it will fill an actual deficiency in the Danish faunistic literature and on the other hand also promote the further investigation of these interesting groups of Myriapoda in this area. It will show that the present data are insufficient and that additional studies are needed. Our knowledge of the occurrence has up to date been restricted to what the well-known monographs by the late Dr. H. J. Hansen tell us. The first one, an excellent systematic study of the Pauropoda, was published in 1902 and the second, a corresponding study of the Symphyla, in 1903. Only brief data of the occurrence of the species up to that time were mentioned there.

According to the present observations these Myriapoda seem to be very scanty distributed here, but further collecting will result in the discovery of a great number of new localities for most of the species mentioned below. The number of species will also probably increase, but not much. Every zoologist studying the soil fauna may find both Symphyla and Pauropoda in many places, if he only looks for them. They are not as uncommon as the number of localities hitherto known indicates. The distribution within Denmark is unfortunately very incompletely known and a more detailed knowledge of it is of an obvious interest. As those who study these myriapods are highly interested in new finds from all parts of the world new Danish localities are of great value. Especially to a zoologist dealing with Scandinavian zoogeographical and ecological problems the Danish occurrence must be very important.

The following is a list of the hitherto known species of Symphyla and Pauropoda from Denmark and is largely based on not published material which has been accumulated in the collections of the Zoological Museum of Copenhagen. The main part of the samples has been brought together by Dr. S. L. Tuxen, but some other Danish zoologists have also contributed with several

specimens. Among them I will mention H. J. Hansen and C. With. Besides I have studied some samples collected by Mag. Scient. N. Haarløv and Dr. P. Aagaard Poulsen which will be deposited in the collections of the Zoological Museum, Copenhagen. Finally a few own samples are included, all from the Island of Møn, and also a single Pauropod-find[1]) belonging to the Zoological Museum of the University of Lund. My own collection will be deposited in the latter museum.

Four species of Symphyla, representing 2 families and 4 genera, have been found up to date. In this paper one of them is reported from this area for the first time. Of the Pauropoda we now know 13 forms belonging to 2 families and 4 genera. Eight of them are announced here for the first time for Denmark, 6 species and 2 varieties of already known species. One of the two varieties is new to science and very likely one of the other species as well.

Symphyla.

The first records of Danish Symphyla occur in Hansen's monograph of this order in 1903 (Quart. Journ. Micr. Sci. n.s. 47:1, pp. 1—101, Pl. 1—7), where he announces three species: *Symphylella vulgaris* (called *Scolopendrella v.*), *Scutigerella immaculata* and *Hanseniella caldaria* (called *Scutigerella c.*). To this list we can now add *Symphylellopsis subnuda,* described by Hansen but not found by him in Denmark. It is a minute symphylellid species looking much of a *Symphylella vulgaris.*

In spite of the scarce material from most of the area, certain preliminary facts about the distribution may be pointed out. Of the four species *Symphylella vulgaris* and *Scutigerella immaculata* seem to be the most common. In the future they will be discovered in many further

[1]) Møn, Maglevands Fald, $^{15}/_{7}$ 1905, leg. With.

localities, probably all over the country where suitable biotopes occur. *Symphylellopsis subnuda* is presumedly a common species, too, while *Hanseniella caldaria,* a species with its main distribution on the southern hemisphere, has been introduced and is, I think, very uncommon here. It is known from several places in Europe, but only from hothouses and Botanical Gardens, while it is an inhabitant of natural biotopes in New Zealand, South America and Africa.

Fam. ***Scolopendrellidae.***

Gen. ***Symphylella*** Silvestri.

1. **Symphylella vulgaris** (Hansen 1903).

Jylland. Horsens Fjord, Vorsø: Vesterskov, under high ashes, $^{21}/_{6}$ 1932, 1 juv 10 ad[1]); Vestermark, under high grass, $^{22}/_{6}$ 1932, 2 juv 11, 4 juv 10, 1 juv 9; Østre Remise, $^{23}/_{6}$ 1932, 3 ad, 1 juv 11, 1 juv 9; Vesterskov, spruce forest, $^{27}/_{9}$ 1933, 1 juv 9; Nørremark, $^{27}/_{9}$ 1933, 1 ad; Vesterskov, $^{29}/_{9}$ 1933, 2 juv 8, leg Tuxen; Vesterskov, under young oaks, $^{22}/_{9}$ 1945, 1 juv 10, 1 juv 9, 2 juv 8; Østre Remise, $^{24}/_{9}$ 1945, 1 ad, 1 juv 9, 1 juv 8; Østermark, $^{25}/_{9}$ 1945, 1 juv 10; Østermark, $^{10}/_{6}$ 1946, 1 ad; without exact locality, $^{15}/_{6}$ 1946, 1 ad; without exact locality, $^{16}/_{6}$ 1946, 1 juv 9; without exact locality, $^{30}/_{9}$ 1947, 1 juv 9; without exact locality, $^{1}/_{10}$ 1947, 1 juv 9, leg Knudsen.— Thisted: Østerbakken 43, $^{10}/_{9}$ 1948, 1 ad, 2 juv 9, 1 juv 8; Kronborgvej 47, in a garden, $^{11}/_{9}$ 1948, 1 juv 11, 2 juv 9; in a garden, $^{12}/_{9}$ 1948, 1 juv 10; in a garden, $^{15}/_{9}$ 1948, 1 juv 10, 4 juv 9, 2 juv 8; in a garden, $^{14}/_{8}$ 1949, 1 juv 9, 1 juv 8; in a garden, $^{15}/_{8}$ 1949, 1 juv 8; in a garden, $^{9}/_{10}$ 1949, 1 ad; in a garden, $^{6}/_{11}$ 1949, 1 juv 10, 2 juv 9, leg Tuxen; in a garden, $^{20}/_{9}$ 1953, 2 ad, 2 juv 11, leg Poulsen.

Sjælland. N of Copenhagen, Eremitagesletten: $^{3}/_{5}$ 1942, 1 ad, 1 juv stage?; $^{25}/_{3}$ 1943, 1 juv 10, 1 juv 9, leg Haarløv. — Ruderhegn, under moss, $^{31}/_{10}$ 1902, 1 ad, leg ?

Bornholm. Dynddalen, $^{20}/_{6}$ 1906, 1 ad, leg With.— Troldbjærg, $^{1}/_{7}$ 1906, 1 juv stage ?, leg With.

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[1]) Abbreviations: ad, it is here a specimen with the maximum number of legs; juv..., a juvenile specimen with the number of pairs of legs indicated. These numbers include the rudimentary first pair of legs in *Symphylella.*

Hansen collected several specimens under large flower-pots in the Rosenborg Have in Copenhagen, $^{16}/_{7}$ 1901 (1903, p. 80). This is the only record before the collections enumerated above.

Gen. ***Symphylellopsis*** Ribaut.

2. **Symphylellopsis subnuda** (Hansen 1903).

Jylland. Horsens Fjord, Vorsø: Vesterdam, under young elms, $^{22}/_{6}$ 1932, 1 juv 9; Vorsø Kalv, $^{30}/_{9}$ 1933, 1 ad; Østerskov, $^{3}/_{10}$ 1933, 4 ad, 1 juv 11, leg Tuxen. — Thisted: Østerbakken 43, in a garden, $^{10}/_{9}$ 1948, 1 juv 10; in a garden, $^{14}/_{8}$ 1949, 1 juv 11, leg Tuxen.

Sjælland. Copenhagen, Eremitagesletten, $^{14}/_{2}$ 1943, 1 juv 10, leg Haarløv. — Knurrevang, $^{22}/_{5}$ 1943, 1 juv 11, 1 juv 8, leg Haarløv.

Fam. ***Scutigerellidae.***

Gen. ***Scutigerella*** Ryder.

3. **Scutigerella immaculata** (Newport 1845).

Jylland. Horsens Fjord, Vorsø: Vesterskov, beech forest, $^{27}/_{9}$ 1933, 1 ad, 1 juv 9, leg Tuxen; Vesterskov, under young oaks, $^{22}/_{9}$ 1945, 1 juv 9; without exact locality, $^{4}/_{10}$ 1947, 1 juv 11; without exact locality, $^{8}/_{10}$ 1947, 1 juv 9; without exact locality, $^{9}/_{10}$ 1947, 1 juv 9, 1 juv 7, leg Knudsen. — Mors, east of Assels, $^{20}/_{4}$ 1942, 1 ad, leg Nielsen. — Thisted: Kronborgvej 47, in a garden, $^{11}/_{9}$ 1948, 2 ad; in a garden, $^{15}/_{9}$ 1948, 2 juv 11, 1 juv 8; in a garden, $^{9}/_{10}$ 1949, 2 juv 8, leg Tuxen; in a garden, $^{28}/_{9}$ 1953, 1 juv 8, leg Poulsen.

Fyn. Western Fyn, Kalør-Holeskov, $^{19-20}/_{7}$ 1891, 1 ad, leg Hansen.

Sjælland. N of Copenhagen: Dyrehaven, $^{24}/_{5}$ 1891, 2 ad and $^{29}/_{6}$ 1891, 3 ad and $^{27}/_{7}$ 1891, 1 ad, leg Hansen; the same locality, under moss on a tree-stump, $^{4}/_{5}$ 1924, 2 ad, leg Hammer; the same locality, $^{4}/_{6}$ and $^{1}/_{11}$ 1924, 2 ad, 1 partly damaged, leg Stephensen; Dyrehaven, Ordrup, $^{31}/_{8}$ 1907, 1 ad, leg ?; Ermelunden, $^{14}/_{4}$ 1902, in moss, 1 ad and $^{12}/_{10}$ 1902, in maple mould, 8 ad, 2 juv 8 and $^{3}/_{11}$ 1902, in maple mould, 1 ad and $^{30}/_{8}$ 1903, in leaves, 2 ad and $^{10}/_{5}$ 1904 1 ad, leg ?; Eremitagesletten, in a grove, $^{17}/_{5}$ 1943, 1 ad and $^{21}/_{6}$ 1943, 1 juv 10 and $^{19}/_{9}$ 1946, 1 juv 9, leg Haarløv. — Damhusmosen, $^{17}/_{1}$ 1934, 1 juv 10, leg Kaiser. — Boserup, $^{11}/_{9}$ 1927, 5 stage?, leg ?. — Farum, $^{20}/_{4}$ 1935, 1 ad, leg Larsson. — Frederiksdal, tree stump, $^{8}/_{5}$ 1902, 1 ad, leg ?. — Ganløse Ore, Ryget Skov, $^{4}/_{5}$ 1930, 1 ad, leg Larsson. — Hillerød, beech forest, under stones,

$^{23}/_{8}$ 1926, 4 ad, leg Hammer. — Lillerød, at Allerød Lake, under board, $^{8}/_{7}$ 1939, 5 ad and at Allerød, $^{11}/_{6}$ 1940, 2 stage?, leg Kryger. — Lyngby, Lyngby Mose, in leaves, $^{31}/_{8}$ 1903, 1 juv 11, leg ?. — Ørholm, $^{5}/_{6}$ 1903, 1 ad, leg ?

Falster. — Nykøbing, date?, 1 ad, leg ?.

Hansen found *S. immaculata* being common in moderately damp places in forests (1903, p. 30), but he gave no exact localities himself. Hammer considers this species as being extremely common in well-shaded, not too dry places and he records it from under stones on shore-meadows as well (1931, pp. 12—13), but he did not publish any locality either.

Gen. ***Hanseniella*** Bagnall.

4. **Hanseniella caldaria** (Hansen 1903).

Sjælland. Copenhagen: Østerbro, gardener Olsen's Have, in the hothouses, $^{5}/_{8}$ 1891, 6 ad, 2 juv 11, 1 stage?; Frederiksberg Have, in hothouses, $^{8}/_{8}$ 1891, 13 ad, 1 juv 11; Rosenborg Have, in hothouses, $^{16}/_{7}$ 1901, 7 ad, 1 juv 10, leg Hansen.

This species, described by Hansen, has here been found only by him. In his monograph of the Symphyla he gives two localities (1903, p. 37): "In the tan-bark in hothouses in the royal garden, 'Rosenborg Have', Copenhagen, I discovered this species many years ago, and have found it again every time I visited the place. I have also found it in similar bark in a very warm hothouse in the Botanical Garden in Copenhagen." According to the material studied by the present author Hansen also has collected this species in two more hothouses in Copenhagen. It seems as if *H. caldaria* is not too uncommon here, probably a widely distributed hothouse species.

Pauropoda.

Hansen's revision of the Pauropoda in 1902 (Vidensk. Medd. nat. For. Kjøbenhavn, 1902, pp. 323—424, Pl. 1—6) contains the first information about the Danish Pauro-

poda. Among others he there described three species mainly on material from Denmark: *Allopauropus danicus, gracilis* and *vulgaris*. The first and the third he could not find in the material from other parts of the world, but since then the distribution areas have widened. He also gave the first Danish localities for *Stylopauropus pedunculatus* and *Pauropus Huxleyi,* the first discovered of all Pauropoda. In all that was five species. The later finds, especially those by Tuxen, have shown that the pauropod fauna is considerably richer. Eight additional forms are given below: *Stylopauropus pedunculatus* var. *biramosus* n. var., *Pauropus Huxleyi* var. *lanceolatus* and the five *Allopauropus*-species *Cuenoti, helveticus* var. *obtusicornis, multiplex, sabaudianus* and *sequanus,* and finally a member of the genus *Asphaeridiopus.*

Of the species recorded by Hansen, only one, *Allopauropus vulgaris,* seemed to him possibly to be found here and there. Having been thoroughly investigated, also *Allopauropus sequanus* and *Cuenoti* will probably prove to be comparatively common as well as *A. vulgaris.* They will probably be found all over the country where suitable biotopes occur. *A. vulgaris* and *sequanus* are the only two species which have been collected at the four best investigated places: Vorsø, Thisted, the beech forests of the eastern part of the Island of Møn and the Copenhagen district. This points to a common occurrence. From Thisted 8 species are known, from the Island of Møn 6, but only 3 species, *A. vulgaris* and *sequanus* and *Stylopauropus pedunculatus* are found at both places. The distribution of the remaining species is very insufficiently known but they must be regarded as being rather scarce or even very uncommon.

In the list below the species of *Allopauropus,* the only genus with more than one species, are arranged in alphabetical order.

Fam. ***Pauropidae.***

Gen. ***Stylopauropus*** Silvestri.

1. **Stylopauropus pedunculatus** (Lubbock, 1868), type.

Møn. Maglevands Fald, $^{12}/_{7}$ 1905, 1 ad 8[1]) (♀), 1 juv 6 and $^{15}/_{7}$ 1905, 1 ad 9 (♀), 2 stage?, leg With; upper part, $^{18-20}/_{10}$ 1949, 6 ad 9 (sex non det.), 7 ad 8 (sex non det.), 3 juv 7, 3 juv 6, 9 juv 5, 3 juv 3; lower part, $^{18-20}/_{10}$ 1949, 1 juv 7, leg Scheller. — Three stations in the eastern part of Store Klinteskov, $^{18-20}/_{10}$ 1949, 1 ad 9 (sex non det.), 1 juv 7, 1 juv 6, leg Scheller. — Sandskredsfald, $^{13}/_{7}$ 1905, 1 ad 8 (♀), 1 stage?, leg With. — Pinkenborg near Pomle, $^{14}/_{7}$ 1905, 1 ad 8 (♀), leg With.

Bornholm. Near Dynddal, under stones, $^{30}/_{6}$ 1906, 3 ad (♀♀), 1 ad 8 (♀), leg With.

The first Danish specimens of this pauropod were discovered by Hansen (1902, p. 345) in July 1891 when he found numerous specimens on the Island of Bornholm. One year later he found several specimens in Store Klinteskov and Maglevands Fald on the Island of Møn.

2. **Stylopauropus pedunculatus** (Lubbock 1868) var. **biramosus** n. var. (Fig. 1).

Jylland. Thisted: in a garden, $^{15}/_{8}$ 1949, 1 juv 6; in a garden, $^{6}/_{11}$ 1949, 1 juv 5, leg Tuxen.

None of these specimens are entirely suitable for a detailed description. The one with 5 pairs of legs is just molting and the older one with 6 pairs of legs is nearly crushed and broken in two pieces.

Pygidium. — The *tergum* overreaches the sternum and is posteriorly produced into a short, blunt triangle. The submedian setae, a_1, are inserted slightly outside the styli, *st*. The distance between a_1 is nearly equal to their length. a_1 and the intermediate pairs of setae, a_2, are of about the same length and about $^{4}/_{5}$ of the length of the lateral pair of setae, a_3. All three pairs of setae

[1]) Abbreviations: ad...., an adult specimen with the number of pairs of legs indicated; juv..., a juvenile specimen with the number of pairs of legs indicated.

are tapering with an acute end and covered with a moderate pubescence. *St* are short, their length not so much as $^1/_5$ of the length of a_1. They are feebly clavate and are covered with a short delicate pubescence. The distance between *st* are somewhat shorter than the distance between a_1.

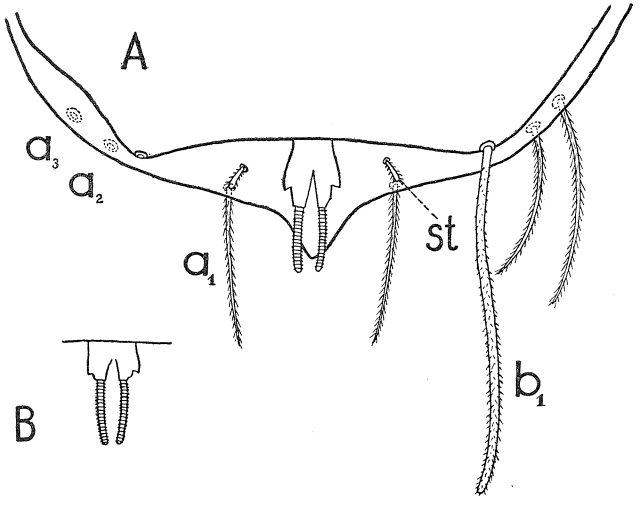

Fig. 1. *Stylopauropus pedunculatus* Lubbock 1868 var. *biramosus* n. var. — *A*, juv 6, posterior part of the pygidium, ventral view. a_1, submedian setae; a_2, intermediate setae; a_3, lateral setae; b_1, posterior setae; *st*, styli. — *B*, anal plate, from the specimen with 5 pairs of legs, ventral view. — × 1000.

Sternum. The posterior pair of setae, b_1, are cylindrical and moderately pubescent. The distance between them is as long as their length. The lateral pairs of setae, b_2, have not been studied. The anal plate is as long as it is broad. Posteriorly it is produced into two horizontally placed cylindrical branches which are weakly bent inwards. They are somewhat longer than the plate. Between these branches there is a V-shaped incision in the posterior margin. On the lateral sides of the plate there

are rudimentary processes corresponding to the outer branches occurring in f. *typica*. The plate is naked while the two posterior branches are striated and have a very delicate pubescence.

Affinities. — This pauropod is closely related to var. *brevicornis* which was described in 1935 by Remy (1935 b, pp. 273—275, fig. 2). Thus the outer branches of the anal plate are undeveloped and *st* are short and feebly clavate. However, the distance between a_1 is considerably longer in the here described variety than in var. *brevicornis* where it is only $^3/_5$ of the length of a_1. This deviation causes a different relative location of a_1 and *st* in the two varieties. Besides the long submedian branches of the anal plate are striated and straight in var. *biramosus*, while they are bent towards the ventral side and quite glabrous in var. *brevicornis*.

Gen. ***Pauropus*** Lubbock.

3. **Pauropus Huxleyi** Lubbock 1868, type.

This species was collected in Copenhagen, in the forest Dyrehaven in June and July 1891 by Hansen (1902, p. 359). Hammer (1931, p. 22) contributes with another locality, Møns Klint, on the Island of Møn, but I suppose that this is a find of var. *lanceolatus*, which has been found on Møns Klint (see below). Var. *lanceolatus* was not established at the time of Hammer's publication.

4. **Pauropus Huxleyi** Lubbock 1868
var. **lanceolatus** Remy 1937.

Møn. Maglevands Fald, upper part, $^{18-20}/_{10}$ 1949, 3 ad 9 (♀♀), 2 ad 8 (♀♀), leg Scheller. — Lilleskov, Pomlerende, $^9/_7$ 1905, 1 ad 9 (♀), leg. With.

Gen. ***Allopauropus*** Silvestri.

5. **Allopauropus Cuenoti** (Remy 1931).

Jylland. Horsens Fjord, Vorsø: Vestermark, $^{21}/_6$ 1932, 1 stage?, leg Tuxen; without exact locality, $^{15}/_6$ 1946, 1 ad 8 (♀); without

exact locality, $^{16}/_{6}$ 1946, 1 stage?, leg Knudsen. — Thisted: Kronborgvej 47, in a garden, $^{11}/_{9}$ 1948, 1 juv 6; in a garden, $^{3}/_{8}$ 1949, 1 juv 6; in a garden, $^{6}/_{10}$ 1949, 1 ad 8 (♀); in a garden, $^{9}/_{10}$ 1949, 2 ad 9 (♀♀); in a garden $^{6}/_{11}$ 1949, 3 ad 10 (♀♀), 9 ad 9 (♀♀), leg. Tuxen. — Hillerslev, Præstegaardshaven, $^{24}/_{7}$ 1948, 1 juv 6, 2 juv 5, leg Tuxen.

6. **Allopauropus danicus** (Hansen 1902).

The only record for this species is that of Hansen (1902, p. 378). He found a single specimen in the wood Store Klinteskov on the Island of Møn in July 1892.

7. **Allopauropus gracilis** (Hansen 1902).

Only two specimens are known, both recorded by Hansen (1902, p. 397). One of them was collected by him on the Island of Møn and the second one by Dr. Th. Mortensen at Hellebæk, near Elsinore.

8. **Allopauropus helveticus** (Hansen 1902) var. **obtusicornis** Remy 1935 a.

Jylland. Thisted: in a garden, $^{27}/_{7}$ 1948, 1 ad 9 (sex?); in a garden, $^{15}/_{9}$ 1948, 1 ad 8 (♀); in a garden, $^{6}/_{11}$ 1949, 1 ad 9 (♀), leg Tuxen.

9. **Allopauropus multiplex** Remy 1936.

Jylland. Thisted, in a garden, $^{12}/_{8}$ 1949, 1 juv 6, leg Tuxen.

10. **Allopauropus sabaudianus** (Remy 1935 a).

Jylland. Thisted, in a garden, $^{6}/_{11}$ 1949, 1 ad 10 (♀), 1 ad 9 (♀), 1 juv 7, leg Tuxen.

11. **Allopauropus sequanus** Remy 1930.

Jylland. Horsens Fjord, Vorsø, $^{25}/_{9}$ 1945, 1 ad 9 (♀) and $^{10}/_{6}$ 1946, 1 juv 5 and $^{6}/_{10}$ 1947, 1 juv 3, leg Knudsen. — Thisted: in a garden, $^{27}/_{7}$ 1948, 1 ad 9 (sex?), 1 ad 8 (sex?); Østerbakken 43, in a garden, $^{10}/_{9}$ 1948, 3 ad 9 (♀♀); Kronborgvej 47, in a garden, $^{11}/_{9}$ 1948, 1 ad 8 (♀), 1 juv 3; in a garden, $^{3}/_{8}$ 1949, 1 ad 8 (♀); in a garden, $^{5}/_{10}$ 1949, 1 ad 9 (♂); in a garden, $^{6}/_{10}$ 1949, 2 ad 10 (♀♀), 7 ad 9 (2 ♂♂, 4 ♀♀, 1 sex?), 1 ad 8 (♀), 1 juv 6, 1 juv 5, 2 juv 3; in a garden, $^{7}/_{10}$ 1949, 1 ad 8 (♀); in a garden, $^{8}/_{10}$ 1949, 1 ad 10 (♀), 7 ad 9 (3 ♂♂, 4 ♀♀), 2 juv 6; in a garden, $^{9}/_{10}$ 1949, 11 ad 9 (6 ♂♂,

5 ♀♀), 2 ad 8 (♀♀), 2 juv 3; in a garden, $^{6}/_{11}$ 1949, 2 ad 10 (♀♀), 14 ad 9 (5 ♂♂, 9 ♀♀), 2 ad 8 (♀♀), 2 juv 6, 1 juv 5, 1 juv 3, leg Tuxen; in a garden, $^{20}/_{9}$ 1953, 1 juv 5, leg Poulsen. — Hillerslev, Præstegaardshaven, $^{24}/_{7}$ 1948, 1 juv 6, leg Tuxen.

Sjælland. Copenhagen, Eremitagesletten, $^{12}/_{4}$ 1942, 1 ad 9 (♀); $^{9}/_{6}$ 1942, 1 ad 9 (♀); $^{7}/_{9}$ 1942, 1 ad 9 (♀), leg Haarløv.

Møn. Store Klinteskov, Lollikebakke, $^{18-20}/_{10}$ 1949, 1 ad 9 (♂), leg Scheller.

12. **Allopauropus vulgaris** (Hansen 1902).

Jylland. Horsens Fjord, Vorsø: Vesterskov, under young oaks, $^{22}/_{9}$ 1945, 1 ad 8 (♀); Østermark, $^{25}/_{9}$ 1945, 1 juv 3; without exact locality, $^{30}/_{9}$ 1947, 2 juv 3; without exact locality, $^{1}/_{10}$ 1947, 1 ad 8 (♀); without exact locality, $^{6}/_{10}$ 1947, 1 ad 8 (♀), 1 juv 3; without exact locality, $^{9}/_{10}$ 1947, 1 juv 3, leg Knudsen. — Thisted: in a garden, $^{27}/_{7}$ 1948, 1 ad 8 (sex?); Østerbakken 43, in a garden, $^{10}/_{9}$ 1948, 2 juv 6; in a garden, $^{15}/_{9}$ 1948, 1 ad 9 (♂); in a garden, $^{12}/_{8}$ 1949, 1 ad 9 (♀); in a garden, $^{7}/_{10}$ 1949, 1 ad 9 (♀), 1 juv 6; in a garden, $^{6}/_{11}$ 1949, 2 ad 9 (♀♀), 1 juv 6, leg Tuxen; in a garden, $^{20}/_{9}$ 1953, 1 ad 9 (sex?), leg Poulsen. — Hillerslev, Præstegaardshaven, $^{24}/_{7}$ 1948, 1 stage?, leg Tuxen.

Sjælland. N of Copenhagen, Eremitagesletten, $^{12}/_{4}$ 1942, 1 ad 9 (♀), leg Haarløv.

Møn. Maglevands Fald: upper part, $^{18-20}/_{10}$ 1949, 5 ad 9 (sex non det.), 1 ad 8 (sex non det.); lower part, $^{18-20}/_{10}$ 1949, 3 ad 9 (sex non det.), leg Scheller. — In the eastern part of the Store Klinteskov, Timmesø Bjærg, $^{18-20}/_{10}$ 1949, 1 juv 6, leg Scheller. — Lilleskov, Pomlerende, $^{9}/_{7}$ 1905, 1 ad 8 (♂), leg With.

Hansen (1902, p. 395) found *A. vulgaris* near Copenhagen, in Dyrehaven in June and July 1891 and again in July 1901 and at Ledreborg on July 31, 1891. He could also prove the occurrence in Store Klinteskov on the Island of Møn in July 1892. According to the same author Dr. Th. Mortensen collected this species at Hellebæk near Elsinore.

Besides these finds of *Allopauropus* there is a sample in the Copenhagen Museum containing one defect fore part of an *Allopauropus*-trunk. It is collected in beech leaves at Jonstrup, on the Island of Sjælland, collector and date are not mentioned on the label.

Fam. *Asphaeridiopidae.*

Gen. *Asphaeridiopus* Bagnall.

13. **Asphaeridiopus sp.** (Fig. 2—3).

Jylland. Thisted, in a garden, $^5/_{10}$ 1949, 1 juv 6, leg Tuxen.

Length. — 0.44 mm.

Head. — The surface of the head is completely free from pubescence, nor has it been possible to discover any pubescence on the setae. These are all thin, cylindrical, feebly annulate and generally long. The shortest of them are the submedian setae in the fourth row which are not half as long as the lateral setae in the same row. The setae in the two frontal rows are somewhat shorter than those of the hind part of the head. The shortest seta in the first, pre-antennal row is $1^1/_4$ times longer than the submedian setae in the fourth row.

Antennae. — The longest and evenly curved, slender seta on the antero-dorsal surface of the fourth antennal segment, *p*, is $1^1/_3$ times longer than the length in total of the two distal segments. The second seta of the fourth segment is shorter, about $^3/_4$ of the length of the mentioned longer seta. It is directed forwards and down. The two antennal branches are subequal in length, the upper branch is scarcely $^1/_{10}$ longer than the lower one. They are both cylindrical, the upper all through, while the lower branch is a little thinner towards the base and has a cutting out on the anterior side. The length of the upper branch is $2^3/_4$ times longer than the breadth, while the lower branch is $2^1/_4$ times its breadth. On the anterior part of the ventral side of the the lower branch a slightly curved seta, *q*, is inserted. Its length is equal to that of the branch. The flagellum of the upper branch, F_1, is $^1/_{10}$ longer than the branch and measures $^4/_5$ of the length of the posterior flagellum of the lower branch, F_3. The anterior flagellum of the lower branch, F_2, is much shorter than F_3 only measur-

ing about $^1/_4$ of its length. F_2 is much shorter than the lower branch, about $^2/_5$, while F_3 is noticeably longer than that branch, $^3/_2$. F_1 and F_3 are both cylindrical and of equal thickness. F_2 is nearly conic-shaped which is due to the decrease of the diameter of the rings towards the apex. The lower branch is distally furnished with

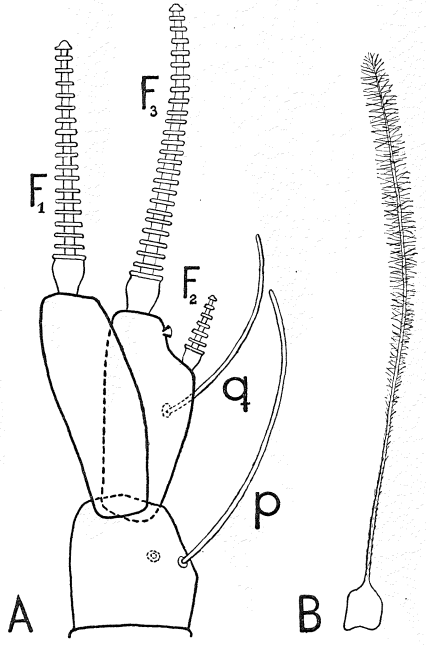

Fig. 2. *Asphaeridiopus sp.*, juv 6, Thisted. — *A*, left antenna, dorsal view. — *B*, T_3. — A × 1600, B × 930.

a very minute structure between F_2 and F_3, nearest the latter. It is smaller than what is known from any other species and is just perceptible (× ca 1200, oil immersion, n. a. 0.2) and seems to consist of a ring of short diverging rods rising from one point. This organ must correspond to the globulus of other Pauropoda.

Trunk. — The length and the breadth are of medium size. The dorsal shields are nearly glabrous, the

first one being about the breadth of the head. The chaetotaxy here do not show anything remarkable. The length of the submedian pubescence-covered setae of the posterior part of the last shield measures $^{7}/_{10}$ of the distance between them.

Four pairs of tactile setae are developed, T_1, T_2, T_3 and T_5. The first two of them are of the same length, about $^{4}/_{5}$ of T_3. Along the proximal $^{2}/_{5}$ of T_3 the thin

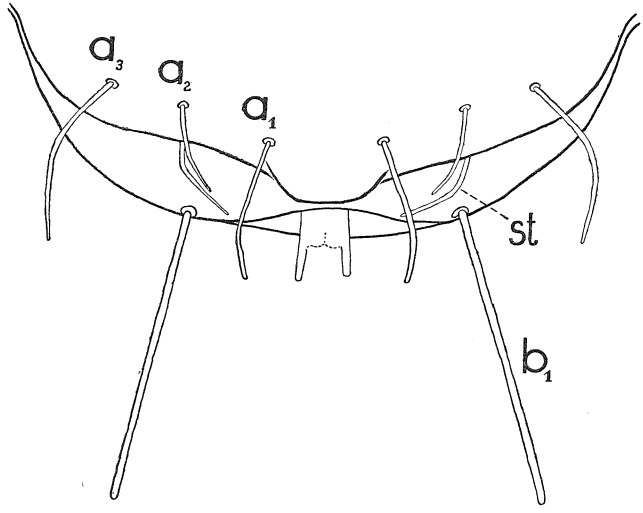

Fig. 3. *Asphaeridiopus sp.*, juv 6, Thisted. — Posterior part of the pygidium, dorsal view. For the explanation see fig. 1. — × 1600.

axis has a short outwards slightly increasing pubescence which in the outer part of this region is rather outstanding while towards the base it lies nearer to the axis. On the middle fifth of this tactile seta the pubescence becomes more long and more outstanding. The distal $^{2}/_{5}$ is covered with a right outstanding but delicate hairiness so that this part looks much of a testtube-brush.

Pygidium. — The *tergum* is rounded with a lobe-shaped protuberance projecting backwards and covering

the anal plate. The three pairs of setae, the submedian, a_1, the intermediate, a_2, and the lateral, a_3, are all glabrous and directed backwards. The submedian pair is straight and cylindrical, while the two others are cylindrical but somewhat tapering towards the end. The distance between a_1 is $^8/_{10}$ of their length. The length of a_1 exceeds that of a_2 with $^1/_3$, while its length is $^1/_5$ below that of a_3. The location of a_2 is nearly midway between a_1 and a_3, just a little nearer a_3 than a_1. The styli, *st*, are setiform and pointing inward-backwards. They project from the caudo-ventral surface of the sternum just below a_2 and are as long as these, $^1/_3$ shorter than a_1. The distance between the basal points of *st* is three times longer than their length.

The *sternum*, the hind margin of which has two pairs of glabrous setae and the anal plate, is broadly rounded. The posterior pair of the setae, b_1, is more strongly developed than the remaining setae of the pygidium. They are directed backwards and a little outwards and are somewhat longer than the distance between them. The lateral sternal setae, b_2, are nearly as long as a_1. The anal plate consists of a basal almost quadratic mainpart and two appendages from the caudo-lateral corners. The lateral margins of the glabrous plate are straight while the posterior margin is indented by a shallow notch. The two appendages are somewhat shorter than the breadth of the organ and they are cylindrical and naked without any pubescence. The structure of the plate between these processes has not been studied with sufficient accuracy because of foreign particles attached to the hind margin of the plate.

Affinities. — The members of the genus *Asphaeridiopus* are extremely uncommon. The first one, *ashworthi*, was discovered in 1935 by Bagnall (1935, pp. 625—627) near Edinburgh in Scotland, where he found several specimens of different stages. This pauropod was

assigned to the new family and the new genus. No author has since found this species at any other place. Some years later Remy records an *Asphaeridiopus* from a place near Sinaia in Wallachia in Roumania, (1939, pp. 36—40), where two specimens had been found and he described an animal with 8 pairs of legs. This pauropod has later got the name *dacicus* (Remy 1947, p. 4). Remy also gave the third record (1945, pp. 138—139). This time he describes a larva with 6 pairs of legs, which later has been given the name *villosus* (Remy 1947, p. 4). This single specimen was collected at Evisa on the Island of Corsica. Besides these three findings Gisin reports a new species, *trilobatus*, from Switzerland in 1947 (pp. 599—600). Thus this genus, the only of the family, is hitherto known from four countries with the same number of species. It is evident that the locality found by Dr. Tuxen is the fifth in the world for this type of pauropod. It is also the northernmost record we know.

According to the structure of the anal plate the larva from Thisted must be regarded as near related to *ashworthi* and *villosus*. However, in comparison with the descriptions of these species some differences must be noted, but as the material here dealt with is very scarce, it has not been possible to get a complete diagnosis. Bagnall did not figure the anal plate of *ashworthi* but gave a short description (1935, p. 626): "Anal plate small, subquadrate, and furnished with four short and apparently subequal distal processes." The Danish larva has only two distal processes, a character which must be regarded as a very valuable difference. The form of the hind margin of the plates are not accessible to a comparison as Bagnall omitted to discribe it on his species. There are also some other characters which separate the Thisted- and the Edinburgh-material. The upper branch of the antenna of the former animal is

not as long as in *ashworthi* and the length of F_1 is shorter than in this species. In *ashworthi* F_1 is two times longer than the upper branch while in the Thisted-animal F_1 is only $^1/_{10}$ longer. Among the remaining separating characters it must be noted that F_2 is noticeably longer in *ashworthi* and that the long seta of the lower branch is shorter in this species than in the Thisted-specimen. As stated above *A. sp.* shows a certain degree of similarity to *villosus,* but here, too, there are essential separating features. The general form of the anal plate is probably the same, but they are not identical. The pubescence of the *villosus*-plate has not been found in *A. sp.* and the two distal appendages is here cylindrical and parallel, while they are clavate and feebly bent outwards in *villosus.* It is also worth mentioning that the length of the appendages is greater in *villosus* than in *A. sp.* Further differences are to be found on the antennae and the pygidium. The upper branch is more robust in *villosus,* its length is here of about double the breadth, while this branch is comparatively longer in *A. sp.*, $2^3/_4$ times longer than broad. The lower branch is a little shorter than the upper branch in *villosus,* while this difference is more marked in *A. sp.* The shortness of F_2 compared with the length of F_1 is larger in *A. sp.* than in *villosus,* while the length of F_3 compared with the length of F_1 is larger in *A. sp.* than in *villosus.* According to the figure of the *villosus*-antenna in Remy's paper (1945, p. 138) the globulus here is well developed, while it is just perceptible in the above described specimen. This must be considered as an important difference. In *villosus* the length of a_1 is equal to the distance between them, but in *A. sp.* a_1 are proportionately longer. The distance between *st* is only a little longer than the distance between a_1 in *villosus,* while it is $2^1/_2$ times longer in *A. sp.* Another difference lies in b_1 which is

tapering towards the apex in *villosus* but cylindrical in *A. sp.* Nor is the mutual location of b_1 equal.

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