On the Ephemeroptera-fauna of Laatokan Karjala (Karelia Ladogensis).

L. TIENSUU.

With 11 fig.

Every summer since 1928, I have collected mayflies at the north shore of the Laatokka and made notes concerning them. I did this, however, only incidentally, until the year 1934, when I procured a somewhat richer material, the greater part of which is from Sortavala. It was only during excursions of short duration, that I collected in the other parishes along the shores (Salmi, Impilahti, Harlu, Jaakkima, Lumivaara and Kurkijoki). In this study I shall give an account of the results of my collections.

Some earlier findings from the district in question have been mentioned in J. E. ARO's Finnish study »Suomen päivänkorennoiset» (The *Ephemeroptera* of Finland)[1], which appeared in 1928. Almost all these data are founded on the collections of dr A. J. SILTALA, from the year 1902. Among the collections of the University of Helsinki are also some specimens, found in this district. ARO mentiones 16 species of mayflies from Laatokan Karjala. I have found 36 species there or five more species than are known to ARO from the whole of Finland. Of these species I consider the three, mentioned below as new to science:

Polymitarcys ladogensis.
Melanameletus (n. gen.) *brunnescens.*
Eurylophella (n. gen.) *karelica.*

The following are, moreover, new to the Finnish fauna:

Ephemera danica MÜLL.
Heptagenia fuscogrisea RETZ.
» *dalecarlica* BGTN.
Siphlonurus aestivalis ETN.

[1] J. A. LESTAGE has written a report on an earlier study by ARO (Les Ephémères finnoises de M. le Docteur J. E. ARO. Bull. Soc. Entom. Belgique, Tome VI, 1924, pp. 33—36).

Baëtis Rhodani PICT.
» *pusillus* BGTN.
Centroptilum ? stenopteryx ETN.
Cloëon inscriptum BGTN.
Procloëon bifidum BGTN.
Paraleptophlebia submarginata STEPH.
Caenis nivea BGTN.
» *nocturna* BGTN.

As nymphs I have found 17 species; among them is one, whose imago is unknown to me (*Eurylophella karelica* n. sp.).

The mayfly-fauna of Laatokan Karjala has a rather southern character. The greater part of its species (24 species) are found also in Central-Europe (Die Tierwelt Mitteleuropas, *Ephemeroptera* von G. ULMER), but the arctic species of the northern parts and mountain-districts of Scandinavia are lacking. Among the species of Laatokan Karjala are northern species, which are not found in Central-Europe, but occur in Scandinavia: *Arthroplea congener* (found also on the British islands), *Heptagenia dalecarlica*, *Metretopus norvegicus*, *Baëtis pusillus*, *Paraleptophlebia Strandi*, *Caenis nivea* and *C. nocturna*. Among our species, *Cloëon rufulum* and *C. simile*, which are wanting in Scandinavia (BENGTSSON: Bemerkungen über die nordischen Arten der Gattung *Cloëon* LEACH., Entom. Tidskrift, 1914, pp. 210—220), are probably of eastern distribution, as are also the new species, described in this study. The distribution of the species elsewhere in Finland I omit in this study, since it is my intention before long to account for all the Finnish species in another connection.

In Laatokan Karjala are waters, very varying in quality, where the mayfly-nymphs thrive well, and there can be no doubt, that this is partly the cause of the rich fauna of the district. In the following I classify the species according to these different waters.

In marshponds with brown, rather stagnant water, poor in oxygen, only one species thrives: *Leptophlebia vespertina*.

In different pools one finds the following species: *Cloëon inscriptum*, *C. rufulum*, *C. simile* and *Leptophlebia vespertina*.

In beach-waters of lakes, that are protected from stronger waves and generally rich in vegetation, the following species thrive: *Ephe-*

mera vulgata, Heptagenia fuscogrisea, Siphlurella Linnaeana, Baëtis bioculatus, Centroptilum diaphanum, Cloëon inscriptum, C. rufulum, C. simile, Leptophlebia marginata, L. vespertina, Caenis horaria v. *fennica* and *C. nocturna*. All these species occur at the shores of the Laatokka's inner archipelago, but in the smaller lakes I have only found a part of them. Thus one finds, for instance, in smaller forest-lakes with clear water only *Ephemera vulgata* and *Leptophlebia vespertina* (in all the lakes, that I examined); in some larger ones moreover *Centroptilum diaphanum*, the *Cloëon*-species and *Leptophlebia marginata*. In the mouths of brooks one finds, not only the above mentioned species, but also those found in running water.

In Salmi, at the open shoal-shores of the Laatokka, where they are exposed to the breakers, and are in places stony (fig. 1), in others composed of clean sand, and in consequence of the surge wholly devoid of vascular plants, there exists a special set of species. The water is comparable to running water on account of its mobility and for this reason its richness in oxygen. The following four species

Fig. 1. A view of the outer shore of Lunkulansaari, where *Polymitarcys ladogensis* occurs.

occur there in large quantities: *Polymitarcys ladogensis, Heptagenia dalecarlica, Ephemerella ignita* and *Caenis nivea.*

In slowly running water there lives a very abundant set of species: *Ephemera vulgata, Heptagenia fuscogrisea, H. sulphurea, H. dalecarlica, Metretopus norvegicus, Siphlonurus lacustris, S. aestivalis, Siphlurella Linnaeana, Baëtis gemellus, Centroptilum diaphanum C.? stenopteryx, Cloëon rufulum, C. simile, Procloëon bifidum, Paraleptophlebia cincta, Leptophlebia marginata, L. vespertina, Ephemerella ignita, Eurylophella karelica* and *Caenis horaria* v. *fennica.* Of these, it is particularly in stony places, that one finds *Heptagenia sulphurea, H. dalecarlica, Baëtis gemellus* and *Ephemerella ignita,* the others are to be found especially on the vegetation-bottom. In addition to the above should be mentioned in this connection the species *Arthroplea congener* and *Paraleptophlebia Strandi.* Both seem almost only to favor small forest-brooks with a slow stream, where as a rule only some few *Leptophlebia* live in their company.

In quickly running, stony brooks (fig. 2) and rapids, we find the following species: *Ephemera danica, Heptagenia sulphurea, H. dale-*

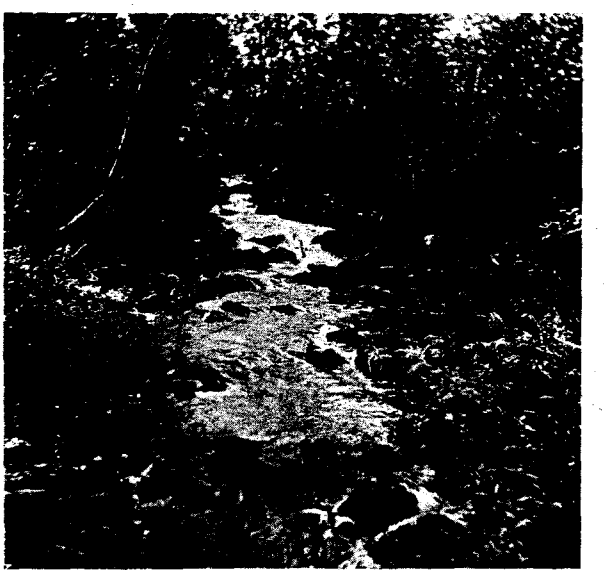
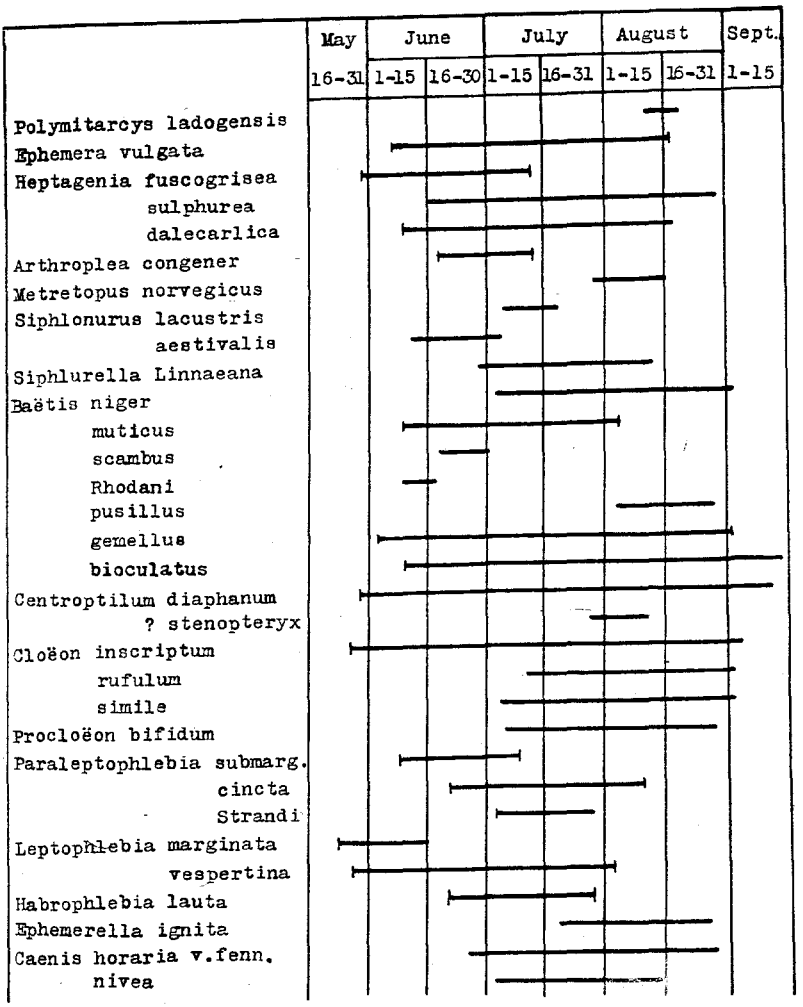


Fig 2. Brook of Pyörölampi in Sortavala, Rytty.

carlica, Siphlurella Linnaeana, Baëtis muticus, B. niger, B. scambus, B. Rhodani, B. gemellus, Paraleptophlebia submarginata, P. cincta and *Habrophlebia lauta.* The species found in slow and rapid waters often occur side by side, because in running waters there generally are both rapids and still-water places even within a small distance of one another.



Although further on in the systematical survey will be given more exact accounts of the flying periods of the different species, for the sake of a general survey I have here added a flying-period-table, where I have combined all observations. In the table I have omitted three species, which I have found only once. In the case of the species, by which the beginning and the end of their flying season has been surely constated, there is a short, transverse line at the end of the line, that shows the flying period. We constate, that only a few species have a long flying period, lasting nearly the whole summer. Spring-species are *Heptagenia fuscogrisea*, *Leptophlebia vespertina* (by the end of June and the beginning of July one no longer finds anything except a few specimens of both species) and *L. marginata*, which absolutely disappears in the middle of June. In the outer archipelago of the Laatokka, where the water stays cold a long time, *L. vespertina* has still been found 3. VIII. Species of the middle of the summer are *Arthroplea congener*, the *Paraleptophlebia*-species and *Habrophlebia lauta*. First towards the end of the summer appear, amongst others, *Cloëon rufulum*, *C. simile* and *Ephemerella ignita*.

In the following survey, on account of the scarceness of the observations I do not try to determine the frequency and abundance of all these species, but only enumerate the localities.

POLYMITARCIDAE

Polymitarcys Etn.

P. ladogensis n. sp. — Imago, ♂. Head white, overside between the ocelli with dark brown tinge, the ocelli white, surrounded by a black circle, eyes black. Prothorax almost as long as broad, above faintly brownish, for the rest whitish, underside with an almost black spot near the hind margin and in some specimens with pale brown spots on the coxae. Meso- and metathorax above shining black, with yellow sutures; the sides yellowish white with dark brown spots under the base of the wings; underside with five dark brown spots, of which a median one is V-shaped and the other two pairs before the coxae are nearly triangular with rounded angles. Abdomen grayish white, translucent, except that the I segment is above brownish black, lustrous, and the three terminal segments above faintly brownish; underside almost clean white. The margins

of the segments with fine gray stripes. Forceps white, on its basal joint a brownish spot. Penis and setae wholly white. Foreleg somewhat longer than the body, its femora and tibiae dirty brown, tarsi white. Intermediate and hind legs white. The basal joint of forceps (fig. 3) proportionally broad, the third joint ca $^1/_5$ of the second, the second joint rather much curved. The penis-lobes directed straight apart from each other (fig. 4), penis narrower than the abdomen, 0.9—1 mm broad. The stub of the intermediate seta 6—9-jointed. Wings white, the costa, subcosta and radius in the forewings with gray tinge. Length of body 10.5—12, forewing 10—12, setae 27—31 mm.

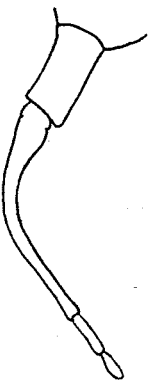


Fig. 3. Forceps-limb of *Polymitarcys ladogensis* n. sp., imago.

Fig. 4. Penis of *Polymitarcys ladogensis* n. sp., imago.

Subimago, ♂. Thorax above blackish gray, abdomen gray, setae pubescent, their length 10—13.5 mm., the wings grayish white.

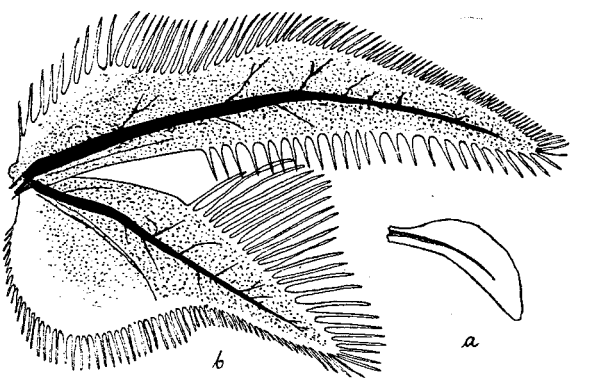


Fig. 5. First (a) and sixth (b) tracheal branchia of *Polymitarcys ladogensis* n. sp., nymph.

Subimago, ♀. Abdomen on the segments 4—8 yellowish, before the eggs are discharged. Wings grayish white. Length of body 10—13.5, forewing 12—13.5, setae 11.5—13 mm.

Nymph. General colour yellowish gray; in a full grown ♀-nymph the 4—8 segments of abdomen are yellowish translucent. Head above with brownish tinge. On the fore wing-sheaths five transversal brown stripes, thorax above brownish, prothorax above with faintly brown tinge. On the underside of thorax appear the same dark figures as in imago, although fainter. Tracheal branchiae on the I segment single, lamellous and with a dark vein (fig. 5 a), on the II—VI pairs the posterior lobe is about $^2/_3$, on the VII pair about $^3/_4$ of the anterior one. The marginal fringes proportionally long, especially on the fore margin of the posterior lobes. On the posterior lobes the hind margin is broad and diaphanous at the base (fig. 5 b).

Lenght of the full grown nymph: ♂ 10—12 mm, ♀ 10—13.5 mm, setae of ♀ 4—5 mm, lateral setae of ♂ 9—10 mm, the middle one 5.5—6 mm.

Types no. 6538—6540 in Mus. Zool., Helsinki.

Localities: Salmi: Karkku and the islands Mantsinsaari and Lunkulansaari. Flying period in August (observations 11—17. VIII).

This species lives at the surgy shoal-coasts of the Ladoga. In many places, both in very shallow and 0.5 meter deep water, I found its nymphs in the bottom-sand. These do not ascend on to the stones of the shore in order to emerge, and with their weak legs they would not even be able to do so, but they emerge directly at the surface of the water. I could never exactly see, how this happens, but at short intervals subimagines appeared in the evening, in flight from the surface of the water, and the wind brought them to the shore in an unbroken stream. They were able to cast their nymphal skin in spite of the hard wind and the powerfull waves rolling in from the wide bay. Apparently the emergence occurs in a couple of seconds in the same way, as has been observed with *Cloëon* and *Palingenia* (see *Ulmer:* Unsere Wasserinsekten, pp. 25—26). Having cast its skin, the *Polymitarcys*-subimago hastens to fly up, before the approaching foamy wave-tops overtake it.

The first few ♂-subimagines appear at about 18 o'clock. After having flown a rather long time, they descend on to the stones on the shore in order to cast their subimaginal skin. This lasts about

2 minutes. Having got out its wings, the imago immediately flies up, dragging its subimaginal skin supported by the abdomen and the setae. First when in the air, the setae free themselves, and the skin falls to the ground. About 19.30 there are already thousands of imagines and subimagines flying in the neighborhood of the shore-line. First at about 20 o'clock the first ♀-subimagines appear; later, after sunset, the emerging specimens are solely females. These stay the whole time of their short flight in subimaginal stage. When the sun sets, the number of specimens flying has already risen to millions.

When the wind is weak, the *Polymitarcys*-individuals are able to stay by the shore. But the wind, blowing from the open sea causes the swarms to be packed together in the bends of the bays, where they are seen as white, misty clouds against the wooded capes. The wind also forces them to stay low, whereby the greatest part of the swarms is at a height of only about 0.5—1.5 m. From such a dense swarm with a few strokes of a net one can get in the bottom of it a 5—10 cm thick layer of a living mass, the weight of which is quite noticeable.

One evening there was such a brisk wind, that the flying specimens were not able to linger by the shore. The wind drove them over a strip of dense woods, bordering the rocky shore, to open meadows, where they had enough shelter from the wind. The sight there resembled a dense snow-storm. When subimagines came down to cast their skin, they chose especially light spots on the ground, such as stones and paths, where they sat closely side by side. A throng of them even settled on my face, causing a tickeling sensation. Others flew up, dragging their subimaginal skins, which constantly dropped from the air, and millions of specimens flew their wavy weddingflight. A great part of those individuals, that went down in the meadows to emerge, became entangled there in spiders webs, in grasses' inflorescences or in the soil, because this species has such weak legs, that it is impossible for them to climb up stalks. The specimens, which had flown that evening, had lived their lives in vain, because in the hard head-wind it was impossible for the females to get back to the edge of the water to lay their eggs.

One evening was quite calm. Then the *Polymitarcys*-swarms were flying above the water, at the protruding points of the capes. The

greater part of the swarms was at a high of 6—10 m, perhaps even higher, out of sight. But a large part also flew low. Now I could also distinctly constate the manner of flying. The males fly at a quick speed in the direction of the coast-line in an undulating route about 10 m. or even longer, make a sudden turn and fly back along the same route. The females fly in the same way back and forth, but not undulating. The copulation, which occurs in the air in a few seconds goes on in full swing during the sunset. The females go afterwards immediately to the surface of the water, dangling their egg-masses under the abdomen, and soon die. Still at 23 o'clock when blindly striking in the dark, I got a few males into my net. The males also probably die at the latest already at about midnight. In the morning there only are carcasses along the shores, on the ground and in the spider-webs, which are torn by the weight of the crowds of mayflies. In the water-line there is a grey sediment, which has been heaped up by the waves and contains dead females and nymphal skins. But when the evening comes, millions of nymphs again begin to emerge.

It is curious, that *Polymitarcys ladogensis*, which until now has been unknown to science, is nevertheless very well known to the inhabitants of Salmi. This »white butterfly», as they call it, is a signal for them, that they are to go fishing for white-fish (*Coregonus albula* L.). One only gets a good prey of white-fish, while this insect is swarming. Evidently the white-fish then gather together in the shore-waters in order to devour *Polymitarcys*-nymphs, that appear from the bottom-sand.

EPHEMERIDAE

Ephemera L.

E. danica MÜLL. — Sortavala: brook of Pyörölampi (fig. 2), 24. VI. 1931, 1 ♀-im. Also SILTALA has taken 1 ♀-subim. at Sortavala.

E. vulgata L. — Salmi: Karkku, Tulema and Uuksu. Impilahti: Sumeria. Harlu: Rautalahti and Läskelä. Sortavala: Rantue, Sipilä, Hympölänjärvi, Saavainjoki, Lahnoja, Hotinlahti, Liikolanjärvi, Lohioja, Kirjavalahti, Ristoja and Rytty. Lumivaara: Ihalanjoki and Kesvalahti. Valamo (CHYDENIUS). Observ. 7. VI—16. VIII. The males swarm at the beach meadows a little before sunset and in

cloudy weather also in the middle of the day. The nymphs develop in almost all kinds of larger waters. The species occurs most abundantly soon after the flying-period has begun, in the middle of June; at Ristoja, for instance, simply by the thousands.

ECDYONURIDAE

Heptagenia (WALSH) SCHOEN.

H. fuscogrisea RETZ. — Harlu: Retoja. Sortavala: Rantue, Sipilä, Tohmajoki, Ristoja, Ristijärvi and Rytty. Valamo (CHYDENIUS). Flying period: 31.V—12.VII. Flies in the evening, in cloudy and cooler weather also in the middle of the day, above rivers, and at the shores of lakes, in thin swarms, on the same spot. Disappears from the smaller waters already in the middle of June, and from the rivers at the end of June, but first in July from the coasts of the Laatokka. Nymphs are to be found in shallow water on the vegetation-bottom. I have also kept them in an aquarium. When emerging, they left their larval skin on a vertical stalk, about 1.5—2 cm. under the surface, — from there the subimago ascended to the surface. The age of the subimago was 33—45 hours, dependant on the temperature.

H. sulphurea MÜLL. — Salmi: Tulemajoki and Uuksu. Sortavala: Hotinjoki, Ristoja and Rytty. Lumivaara: Tervunjoki. Observ. 16. VI—27. VIII. Appears as the above species: in sultry weather in flight first during sunset, but in June, when the weather is still rather cool, also in cloudy weather in the middle of the day. Thrives only in running waters, where nymphs were found in many places on the surface of stones.

f. *denervosa* n. f. — Cross-veins almost entirely disappeared. 1 ♂-im. Sortavala: Rytty, 27. VII. 1934.

H. dalecarlica BGTN. — Salmi: Mantsinsaari, Lunkulansaari and Karkku. Sortavala: Ristoja and Rytty. Lumivaara: Ihalanjoki (nymphs). Käkisalmi (K. M. LEVANDER), (nymph). Flying observ. 9. VI—16. VIII. Begins to fly about $^1/_2$ an-hour before sunset in July—August, but in June, in cloudy weather, it flies all day long. The swarms are thin, but they continue along the coasts for a length of tens of kilometers, so that there are probably millions of specimens in flight. In calm weather the males at the open shores of the Laatokka

are at a height of 8—10 m, tarrying at the shore-line and a little further out. In windy weather they remain low, about 1—3 m. from the watersurface. Nymphs are to be found at these surge-shores everywhere under the bottom-stones. At the same time one finds every possible stage of development. Subimagines fly up especially at 20—21 o'clock in the evening. In the evening-dusk, when the eye can no longer discern the swarms at a greater height, their existance is often proved by dragonflies (*Aeschna grandis*) and bats, which together fly back and forth in the air, hawking *Heptageniae*.

Arthroplea BGTN.

A. congener BGTN. — Impilahti: Hunttila, Syskyä, Sumeria and the churchvillage. Sortavala: Kuorejoki, Myllykylä (SILTALA) and Rytty. Flying period 19. VI—13. VII. Solitary specimens in small brooks, where the stream is slow, and at the beaches of lakes in the mouths of brooks.

AMETROPODIDAE

Metretopus ETN.

M. norvegicus ETN. — Salmi: Mantsinsaari, 14, 15.VIII. 1934, 3 ♂-im. Lumivaara: Tervunjoki 29.VII. 1934, 2 ♀-im. In both cases I got the species after sunset, above brooks with slow stream.

SIPHLONURIDAE

Siphlonurus ETN.

S. lacustris ETN. — Sortavala: Rytty, 7, 17.VII. 1928 several subimagines and 1 ♀-imago at a brook. Valamo (CHYDENIUS), 1 ♂.

S. aestivalis ETN. — Sortavala: Lohioja 4/7 1928, many ♂ in flight above a brook before sunset. Sortavala: Kuorejoki 14. VI. and Hotinjoki 27. VI. 1902 (SILTALA) (ARO det. *S. lacustris*).

Siphlurella BGTN.

S. Linnaeana ETN. — Harlu: Retoja. Sortavala: Hympölänjärvi, Liikolanjärvi, Kukkassaari, Vorssu, Kirjavalahti, Myllykylä, Lohioja

aud Rytty. Jaakkima (J. SAHLBERG). Lumivaara: Kesvalahti. Observ. 29. VI—9. VIII. Occurs with rather a few specimens about sunset, by the banks of both lakes and rivers.

Melanameletus n. gen.

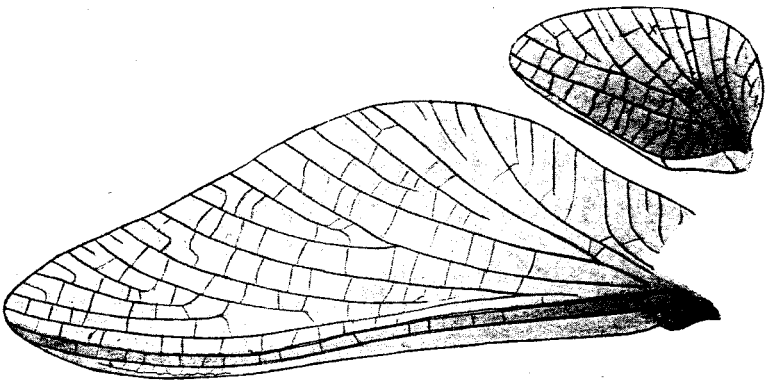


Fig. 6. Wings of *Melanameletus brunnescens* n. sp., imago, ♀.

Imago, ♀. Forewing in form markedly elongated (fig. 6). Analveins as in genus *Ameletus*, thus A_2 and A_3 turn rather abruptly and parallelly against the back edge of the wing, meeting it relatively near the base of the wing. Between A_1 and A_2, 4 straight veins of the intermediate area, which are united with A_1 by weak, colorless veins. Cu_1 and Cu_2 start from the same commencing-vein; between them 2 long veins of the intermediate area. The other longitudinal nervures of the forewing are essentially of the *Siphlonurus*-type. Between *C* and *Sc* there are cross-veins only in the pterostigmatical area, even they very weak, crooked and united with one another. Even otherwise cross-veins are relatively sparse and they are quite weak and colorless, visible only in fitting light. In the hindwing, between *C* and *Sc*, only 2 stronger and 4 very weak cross-veins; subcostal area very broad, its cross-veins stronger than the

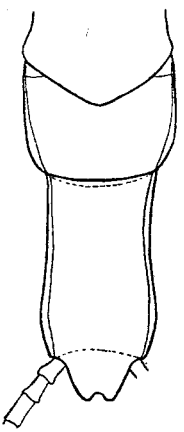


Fig. 7. *Melanameletus brunnescens* n. sp., imago, ♀. Ventral view of terminal segments of abdomen. Drawn from dried specimen.

others. Claws of middle- and hindlegs of different size and different: the one claw small and sharp, the other one bigger, broad and blunt. The intermediate seta seems to be altogether wanting.

M. brunnescens n. sp. — Imago, ♀. I have found only one specimen, and even it is defective (the forelegs are wanting); therefore I content myself with a quite short description. — Body rather robust, wholly tar-brown. Setae greyish white with joints blackish brown. Legs yellowish brown, both femora and tibiae with 2 dark brown spots, apices of 1—3 tarsal joints with black spots. Length of hind tarsus about $^2/_3$ of hind tibia, I tarsal joint a little shorter than II, which is twice as long as III; IV joint longest, a little longer than II. The IX abdominal segment comparatively long, subcaudal plate prominent, with a notch in the end (fig. 7). Wing-venation weak in color, brownish, cross-veins colorless. Forewing with costal and subcostal spaces and basal part of wing yellowish brown, hindwing wholly brownish, although lighter at the edges. Length of body 10, forewing 11.5, setae 13.5 mm.

Type no. 6541 in Mus. Zool., Helsinki.

Locality: Sortavala: Ristoja, 18.VI.1931, 1 ♀-imago, in flight above a rapid in the middle of the day, in the sunshine.

BAËTIDAE

Baëtis LEACH

B. niger L. — Sortavala: Ristoja and Rytty. Observ. 2. VII—1. IX. A few specimens along briskly flowing brooks.

B. muticus L. — Impilahti: Hunttila. Sortavala: Lohioja, Hotinjoki, Ristoja and Rytty. Flight-observ. 9.VI—3.VIII. Occurs in June along brooks in rapid places, even by thousands, but in the end of July only with a few specimens. I also reared several specimens from nymphs, which I kept in an aquarium. Although I often shifted fresh water, the nymphs died at the latest after 4 days, if they had not emerged before that.

B. scambus ETN. — Sortavala: Hotinjoki 20. VI. and 30. VI. 1934, 2 ♂, 5 ♀.

B. Rhodani PICT. — Sortavala: Rytty and Ristoja, 9—16.VI., a few specimens. I also found 3 nymphs, which probably are of this species,

in a rapid of a small brook. They were of very weak vitality, and died after a couple of hours in the aquarium.

B. pusillus BGTN. — Sortavala: Rytty 3, 27.VIII. 1934. in all 1 ♂ and 5 ♀, along a brook.

B. gemellus ETN. — Salmi: Tulemajoki. Impilahti: Syskyä. Sortavala: Hotinjoki, Lahnoja, Lohioja, Ristoja and Rytty. Lumivaara: Kesvalahti. Observ. 3. VI—1. IX. At brooks and rivers, a few specimens.

B. bioculatus L. — Salmi: Lunkulansaari. Sortavala: Paassilta (SILTALA), Tohmajoki, Lohioja, Läppäjärvi, Sipilä and Rantue. Found both at running waters and at the grassy shores of the Laatokka, all through the summer (8. VI —14. IX). The nymph lives evidently also in stagnant water. In flight as rather sparse swarms, at the shore-meadows, before sunset.

Centroptilum ETN.

C. diaphanum MÜLL. — Salmi: Lunkulansaari and Uuksu. Impilahti: Sumeria and church-village. Harlu: Rautalahti and Läskelä. Sortavala: Saavainjoki, Otsoinen, Rantue, Sipilä, Karmalanjärvi, Liikolanjärvi, Tohmajoki, Kirjavalahti, Ristijärvi and Rytty. Jaakkima: Miinalanjoki and Lahdenpohja. Lumivaara: Kesvalahti, Ihalanjoki and Tervunjoki. Kurkijoki: church-village. Parikkala (J. SAHLBERG). Observ. 31. V—8. IX. Swarms above the water, and also, driven by the wind, above the shore-meadows, in the glow of the evening-sun, in small swarms. Occurs at almost all kinds of waters.

C. ?stenopteryx ETN. — Sortavala: Ristoja and Rytty. Lumivaara: Tervunjoki. Observ. 27. VII—9. VIII. Solitary specimens in flight after sunset, above brooks. This species is imperfectly described, so that the decision of the species is uncertain. EATONS short description fits to these specimens well, in every case; terminal joint of forceps is thick, almost knoblike; length 3.5—4.5 mm, wing 4—5 mm.

Cloëon LEACH

C. inscriptum BGTN. — Sortavala: Kasinlahti, Sipilä, Rantue, Vakkosalmi, Kirjavalahti and Rytty. Observ. 27. V—4. IX. The males swarm in sparse swarms near the shores of lakes, and at pools, in

the evening, or even in the middle of the day in cloudy weather.

C. rufulum (MÜLL.) ETN. — Salmi: Mantsinsaari. Sortavala: Sipilä and Ryttyjärvi. Observ. 10. VII—2. IX. Occurs generally in large numbers.

C. simile ETN. — Salmi: Mantsinsaari. Sortavala: Sipilä, Rantue, Rautakangas and Rytty. Jaakkima (MONTELL). Käkisalmi (K. M. LEVANDER; larvae). Flying observ. 4. VII—3. IX.

Procloëon BGTN.

P. bifidum BGTN. — Salmi: Tulemajoki. Sortavala: Paksuniemi (SILTALA) and Ristoja. Lumivaara: Tervunjoki and Ihalanjoki. Observ. 5. VII—25. VIII. At all the localities, I captured this species at the shores of slowly flowing rivers, during sunset.

LEPTOPHLEBIIDAE

Paraleptophlebia LEST.

P. submarginata STEPH. — Sortavala: Rytty. Every summer I have got a few specimens at a couple of brooks (fig. 2), 9. VI—7. VII.

P. cincta BRAU. (ETN.). — Impilahti: Hunttila. Sortavala: Rytty. Kurkijoki: Ihojärvi. Observations: 22. VI—8. VIII. Occurs above slowly flowing brooks, in the sunshine, often even in large swarms.

P. Strandi ETN. — Impilahti: Hunttila and Syskyä. Sortavala: Rytty. Lumivaara: Huhtervu and Kesvalahti. Observ. 2. VII—29. VII. The males swarm at brooks in small swarms, in the glow of the evening-sun, but now and then also in the middle of the day. In calm weather, they are at a height of 4—6 m. On account of their small size and quick motions, it is often rather difficult to notice them.

Leptophlebia WESTW.

L. marginata L. — Harlu: Jänisjoki and Retoja. Sortavala: Yhinlahti, Vakkosalmi, Liikolanjärvi, Kirjavalahti, Tohmajoki and Rytty. Valamo (CHYDENIUS). Flying period 23. V—15. VI. The males swarm both at the shores of lakes and along slowly flowing brooks, in rather sparse swarms, in the sunshine, generally rather low, but in calm weather even at a height of 10 m.

L. vespertina L. — Harlu: Retoja. Sortavala: Markatsin (SILTALA) Yhinlahti, Sipilä, Rantue, Liikolanjärvi, Karmalanjärvi, Saavainjoki, Lohioja, Kirjavalahti, Ristoja, Ristijärvi and Rytty. Lumivaara: Kesvalahti. Valamo (CHYDENIUS). Observ. 27. V—3. VIII. The nymphs thrive in all kinds of waters, except in very quickly flowing ones. In the spring, one finds nymphs abundantly in the shore-waters, on the surface of decaying parts of vegetable matter. The nymphs, that I reared in aquarium, placed themselves on a horizontal stalk, in order to emerge, in a way that the dorsum of the thorax touched the surface. Subimagines they were 18 à 70 hours, dependant on the temperature. When it was on an average + 8° C, the subimaginal stage lasted 60—70 hours; when it was + 20°, it lasted only 18—20 hours. Males often appear in large swarms at shore-meadows, swarming in the sunshine.

Habrophlebia ETN.

H. lauta (MCLACH) ETN. — Impilahti: Sumeria. Sortavala: Rytty. Jaakkima: Vaarajoki. Lumivaara: Tervunjoki. SILTALA has taken this species at Lohioja. Observ. 22. VI—29. VII. Occurs at briskly flowing brooks, and along rivers, at rapids. Nymphs I got from bottom-stones of brooks.

EPHEMERELLIDAE

Ephemerella WALSH

E. ignita PODA. — Salmi: Karkku, Lunkulansaari and Mantsinsaari. Sortavala: Hotinjoki, Ristoja and Rytty. Jaakkima: Miinalanjoki and Vaarajoki. Lumivaara: Tervunjoki and Ihalanjoki. Käkisalmi (S. SAHLBERG). Observ. 20. VII—27. VIII. Occurs at rivers and larger brooks, and at the open shores of lakes (fig. 1). Males I have seen in flight in the sunshine, above the shore-meadows, at 18—19.30 o'clock, but later in the evening not at all, although females simply throng at the edge of the water. Probably the males have then ascended so high, that one does not see them. The nymphs live both in stony waters, and on the vegetation-bottom.

Eurylophella n. gen.

Nymph (fig. 8). Body flat, comparatively broad, sparse- and shorthaired. Thorax only a little longer than broad, wing-sheaths very short. Abdomen about as broad, head a little narrower than thorax. Mouth-parts (fig. 9—10) of the same type as in genus *Ephemerella*. 1 joint of labial palpi noticeably longer than 2, 3 joint quite small and short. V—VII abdominal segments, which are the broadest, are very short. I—VII segments' hind-edge, on both sides of the medial line of the back, with 2 backward directed tubercles in each segment. 5 pairs of tracheal branchiae (fig. 11); they are situated on the segments I and IV—VII. The branchiae of I segment are situated a little behind the middle of the segment, dorsally, near the side-edges, and are directed sidewards. They are 2-jointed; the basal joint is short, the second joint narrow, filiform, sparse-haired.

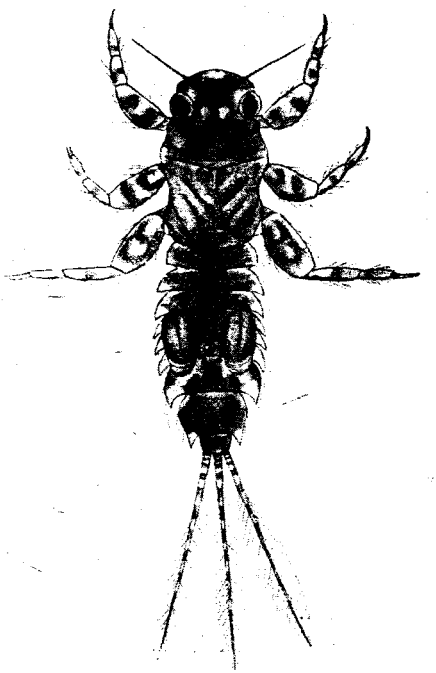


Fig. 8. *Eurylophella karelica* n. sp., nymph.

Fig. 9. Maxillulae and hypopharynx of *Eurylophella karelica* n. sp., nymph.

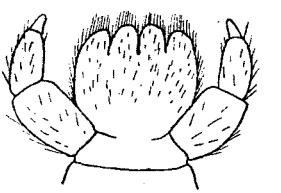


Fig. 10. Labium of *Eurylophella karelica* n. sp., nymph.

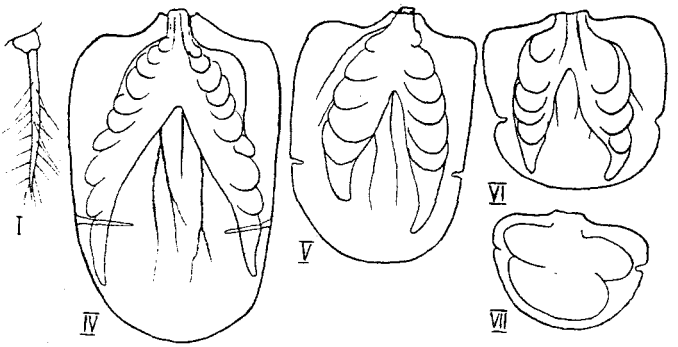


Fig. 11. Tracheal branchiae of *Eurylophella karelica* n. sp.

The tracheal branchiae of IV—VII segments are situated dorsally; they are fastened in notches in the hind-edges of the backplates, and bipartite, as in genus *Ephemerella*. Upper part of IV segments tracheal branchiae plate-like, broad, truncate at the base, strongly pigmented, with translucent dots, covering shield-like almost entirely the following branchial laminae. There are rather abundant veins in it; they are faintly visible. Branches of the lower part pointed, in both branches 9 à 10 transparent lobes with broadly rounded points, partly covering one another, smallest at the base. V and VI segment's tracheal branchiae similar, but gradually shorter; their upper half is quite thin, colourless and translucent, and in the branches of the lower part there are only 4—5 lobes. VII segment's tracheal branchiae broader than long, also quite thin and translucent; their lower half is 3-lobed. V—VII segments' branchial laminae with notches in both edges, as a trace of 2-jointedness; their distance from the base of the branchial lamina is in V and VI segments' branchial laminae $^2/_3$ of its length; in VII segment's branchial lamina $^1/_3$ of its length. In IV segment's branchial lamina transparent cross-lines correspond to this notch; their distance from the base of the branchial lamina is about $^2/_3$ of its length.

E. karelica n. sp. —Nymph. General colour dark, greenish brown. Lateral spines of abdomen yellowish, translucent, likewise the legs, where there are dark-brown designs. Femora very broad. Setae yellowish, with dark-brown, broad circles, longhaired, except the basal part, which is quite short-haired; their length a little more

than $^1/_2$ of the body's length. Length of body 5—7.5, setae 3.5—5 mm. — Subimago and imago unknown.

Type no. 6542 in Mus. Zool., Helsinki.

Locality: Kurkijoki, in a clayey, small river, flowing through the church-village, on the surface of stones, 30. VII. 1934, 12 specimens.

This species belongs, because of the structure of the tracheal branchiae, to the same genus as a certain one, described by EATON: »nameless North American nymph, allied to *Ephemerella*» (see EATON: Rev. Monograph of Rec. *Ephem.*, pp. 133—134. Nymph No. V, Pl. XL, 18—20 and LXIV, 3—7).

CAENIDAE

Caenis STEPH.

C. horaria L. var. *fennica* ARO. — Salmi: Tulemajoki and Uuksu. Impilahti: Sumerianjoki. Sortavala: Vorssu, Sipilä, Vakkosalmi, Liikolanjärvi, Paassilta and Lahnoja. Observ. 26. VI—27. VIII. Occurs along rivers, and at grassy lake-shores, in the evenings.

C. nivea BGTN. — Salmi: Lunkulansaari and Mantsinsaari. Flight-obs. 2. VII.—15. VIII. At surgy coasts of the seaside, in large swarms. In the beginning of July at 18.30 o'clock there were already on the shore-meadows small swarms, driven by the wind. After sunset, at 22—23 o'clock, there were millions of specimens in the swarms. Now, when the wind had calmed down, they were above the water, around the rocks (fig. 1). In August I no longer found anything except solitary specimens.

C. nocturna BGTN. — Salmi: Lunkulansaari, 13. VIII. 1934. Small swarms during sunset, by the sheltered beach of the island, in the bend of a shallow bay with mud-bottom.

For the determination of the species, especially the following works have been used: 1) BENGTSSON, S.: Beiträge zur Kenntnis der paläarktischen Ephemeriden. Lunds universitets årsskrift. N.F. Afd. 2. Bd. 5. Nr 4. — 2) Ibid.: Neue Epherimeriden aus Schweden. Entom. Tidskrift 1912, p. 107—117. — 3) Ibid.: Weitere Beiträge zur Kenntnis der nordischen Eintagsfliegen. Entom. Tidskrift 1917, p. 174—194. — 4) Ibid.: Kritische Bemerkungen über einige nordische Ephemeropteren, nebst Beschreibung neuer Larven. Lunds universitets årskrift. N.F. Avd. 2. Bd. 26. Nr 3. — 5) EATON, A. E.: A revisional

monograph of recent Ephemeridae or Mayflies. Transactions of Linn. Soc. of London. 2. Serr. Zool., Vol. 3. 1883—8. — 6) SCHOENEMUND, E.: Ephemeroptera. Die Tierwelt Deutschlands, 19 Teil. Jena 1930. — 7) ULMER, G.: Übersicht über die Gattungen der Ephemeropteren, nebst Bemerkungen über einzelne Arten. Stettiner Entom. Zeitung 1920, p. 97—144.

Lyctus planicollis Le Conte varastotuholaisena Suomessa.

ESKO KANGAS.

Helmikuun lopulla tänä vuonna ilmoitettiin Metsätieteelliselle Tutkimuslaitokselle eräästä helsinkiläisestä tuontiliikkeestä, että mainitun liikkeen varastossa oli jokin tuhohyönteinen täydelleen pilannut n. kaksisataa tusinaa lapion varsia. Lapiot oli tuotu maahan Englannista varrellisina eikä niissä aluksi huomattu mitään erikoista. Mutta sittemmin havaittiin, että niiden varsissa oli runsaasti pieniä pyöreitä reikiä ja että tällaiset varret murtuivat aivan helposti. Kun asiaa lähemmin tarkastettiin, havaittiin, että varret olivat joidenkin hyönteistoukkien syömiä aivan läpeensä, toukkakäytäviä ja -jauhoa oli koko varsi sisältä täynnä, vaikka pinnalla ei ollut havaittavissa kuin pieniä pyöreitä reikiä.

Kun sitten tämän kirjoittaja joutui tarkastamaan po. tuhoa liikkeen varastossa, oli helppoa heti päätellä, että oli kysymys jonkin *Lyctus*-lajin (*Lyctidae, Col.*) tuhoista, mutta minkä lajin, oli vaikeata suoraan sanoa. Kuitenkin oli jo ko. varastossa talteen otetun parin kuolleen ja melkoisesti rikkoutuneen yksilön perusteella heti pääteltävissä, että kysymyksessä ei ollut maamme ainoa luonnonvarainen laji, *Lyctus linearis* GOEZE, vaan ilmeisesti jokin toinen ko. tavaran mukana maahamme kulkeutunut tuholainen.

Lähempi tarkastelu ja vertailu meiltä tähän asti tavattujen *Lyctus*-lajien kanssa osoitti pian, että oli kysymyksessä jokin meillä aikaisemmin tuntematon laji. Yliopiston Hyönteistieteellisen Museon palearktisessa kokoelmassa ei ollut nyt kysymyksessä olevaa lajia, mutta siellä löytyvien lajien kanssa suoritetun vertailun ja E. J. KRAUSIN (1911) *Lyctidae*-heimoa koskevan selvittelyn mukaan saatiin ko. tuholainen lajiksi *Lyctus planicollis* LE CONTE. Lajimääräystä