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FURTHER NOTES ON THE EPHEMEROPTERA OF THE
NORTH SHORE OF THE GULF OF ST. LAWRENCE*

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In the "Canadian Entomologist" for March, 1930 (pp. 54-62) I commented on the Ephemeroptera collected in 1929 by W. J. Brown at various points along the north shore of the Gulf of St. Lawrence. Further studies by Mr. Brown in 1930 at Thunder River (June 12-28 and Aug. 15-29) and at Bradore Bay (July 4-16 and July 29-Aug. 12) have resulted in a number of additional records which I present in the following paper.

Baetinae

Blasturus cupidus Say. Common. Thunder River, June 13 (nymphs and adults); Bradore Bay, July 6.

Leptophlebia debilis Wlk. Common. Thunder River, Aug. 18-25. Nymphs corresponding to Ide's recent description (1930, Can. Ent. LXII, 210) were found in a small brook and bred through to the imago. Immature nymphs

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of apparently the same species were taken at Bradore Bay, Aug. 4.

Ephemerella aurivillii Bngtssn. Since recording this species under the name *aronii*, which at the time appeared to have priority, Bengtsson has shown in a recent paper (1930, Lunds Univ. Arssk. N. F. Avd. 2, XXVI (3) p. 3) that his name *aurivillii* was first established early in 1908 (K. Sven. Vet. Akad. Arsbok VI, p. 243) on a slight, but probably sufficient, indication; in consequence *aurivillii* Bngtssn. takes precedence over *aronii* Eaton (not Esb. Pet. as I recorded it). The species was found commonly as both nymph and adult at Thunder River, June 24-27, and some specimens were bred through; series were also taken at Bradore Bay, July 6 and 16.

Ephemerella funeralis McD. Nymphs were taken plentifully at Thunder River June 18-24; two were bred through and several females were bred from subimagos emerging from the stream, June 25-27.

Ephemerella verisimilis McD. Several specimens were reared from nymphs at Bradore Bay July 14, establishing the association made in my previous paper as correct.

Genus *Baetis* Leach

Four species of this genus were found in 1930 along the north shore of the Gulf of St. Lawrence and in every instance Mr. Brown was successful in associating nymph and adult. The following key will separate very easily the nymphs of these four species but it should be noted that the characters employed are not entirely specific but more in the nature of group-characters and cannot be used when working over nymphs from a region where several species of the one group may occur together.

1. Gills of segments 6 and 7 narrow, lanceolate *pygmaeus* Hag.
Gills of segments 6 and 7 oval, rounded 2
2. Caudal setae dark-banded beyond the middle *cingulatus* McD.
Caudal setae unbanded 3
3. Mid caudal seta about three-fifths the length of the outer ones; gill-tracheation very indistinct *vagans* McD.
Mid caudal seta about five-sixths the length of the outer ones; gill tracheation well-defined *brunneicolor* McD.

Baetis brunneicolor McD. This species, not included on the previous list, was common at Bradore Bay from Aug. 2-10 and a few odd females were bred at Thunder River later in the month (Aug. 20-25), the main flight being then apparently over.

Baetis vagans McD. Occurred in numbers at Bradore Bay nearly a month earlier than the preceding species (July 5-8).

Baetis cingulatus McD. The earliest date of breeding was July 10 at Bradore and the species was evidently quite common by July 14; numbers of specimens were also taken early in August, these averaging somewhat smaller in size, especially in width of eye, than the earlier ones.

Baetis pygmaeus Hag.? A few females were bred at Thunder River, June 23 and several more females captured as subimagos. All nymphs taken were females and there is quite a possibility that the species will eventually prove distinct from the one occurring further west to which I have applied the name *pygmaeus*.

Centroptilum album McD. A long series was taken of adult males swarming at Bradore Bay on July 31 and Aug. 4. Three further nymphs were also secured which showed considerably more dorsal abdominal dark suffusion than given in my illustration (*op. cit.* Pl. IX, fig. 3), the pale color being confined to a double row of dorsal spots, most evident on the anterior segments. It might be noted that in the very closely allied species, *convexum* Ide (1930, Can. Ent. LXII, 222), the maxillary palp of the nymph (Pl. XVIII, fig. 4a) is represented as two-jointed, whereas my figure (fig. 3d) of the same organ in *album* shows the normal three-jointed condition. Having checked this up on the three additional nymphs and found that all showed a three-jointed palp I called the matter to Mr. Ide's attention who writes me that his *convexum* nymphs agree with *album* in palpal structure and that the line dividing off the apical joint was unfortunately omitted in his drawing.

Cloeon ingens McD. From a small pool in the tundra on an island near Bradore Bay a large collection of nymphs was obtained on Aug. 9. None were bred through but from subimagos found sitting on the surface of the water two female imagos were obtained. In general the nymph is rather pale in color with a broad dark band across the setae near their apices; the head, anterior to the antennae, is light ochre, the posterior portion being brown with a narrow pale ring around the eyes. The prothorax is brown with a pale median longitudinal line, adjacent to which in the middle section are two pale curved dashes; in the latero-anterior angle is a large pale subtriangular spot and behind this in the posterior section a still larger pale inverted U-mark. The mesothorax is brown with the pale median line of prothorax continued and with indistinct paler striping on the dorsum; the wing-pads are paler with the venation marked in dark and anterior to their base are several palish spots. The abdomen dorsally is rather variable in coloration but in general segments I-III and VI are brown whilst the others are pale with brown suffusion; on the dark segments the two pale subdorsal spots and dashes (as shown in my figure *op. cit.* Pl. VII, fig. 5) are distinct and show a tendency on segments II and III to enlarge into pale patches; on the pale segments there is no distinct maculation; venter pale. Legs pale with femora rather long and very finely spiculate; they are also tinged with light brown which in well-marked individuals tends to give the appearance of a pale longitudinal line along the outer side. I have already figured the details of the gills and mouth-parts; it might be noted that the seventh gill is usually somewhat more pointed than the illustration indicates.

Heptageniinae

Ameletus sp. Six rather immature nymphs were taken from a tributary of the Thunder River on June 16 but were not bred through; they differ considerably in dorsal maculation from the few nymphs of *ludens* which are available for study and show none of the central longitudinal dark banding which seems to be characteristic of this species. As it is quite possible, however, that they may belong to one of the Rocky Mt. species whose nymphs are still unknown, I do not care at the present time to describe the species as new.

Parameletus midas McD. This species was referred to in my previous paper as "*Sparrea* sp.". In 1930 (June 16-25) Mr. Brown was successful not only in obtaining a long series of adults from subimagos emerging from small pools

at Thunder River but also in actually breeding the species from the nymphs. A study of this material shows the species to be the one I described as *Siphonuroides midas* (1923, Can. Ent. LV, 49); it, as well as the genotype, *croesus* McD., are apparently distinct from any of the European species formerly placed in the genus *Sparrea*.

Since the publication of my previous paper Bengtsson (1930, *op. cit.*, 13) has resurrected the prior generic name, *Parameletus* Bengtssn., which was very inadequately indicated in the Swedish Academy of Sciences' Year Book for 1908 in a report made by Bengtsson on his expedition; in his more comprehensive paper in 1909 (Lunds Univ. Arsskr. N. F. Afd. 2, V (4) 13) he disregards his former indication and seemingly in ignorance of the International Rules of Nomenclature proposes the new generic term, *Potameis*, over which *Sparrea* Esb. Pet. had a few months priority. The name *Parameletus* will apparently hold and the rather lengthy generic and specific synonymy is given by Bengtsson on page 15 of the above cited work. To this synonymy must now be added *Siphonuroides* McD., which at the time I separated from *Siphonurus* on the strength of the unforked median vein of the secondaries; this character is not mentioned by any of the European authors in the literature available to me at the moment but in view of the fact that other characters, both larval and adult, are similar to those given for *Parameletus* (*Sparrea*) I am sinking *Siphonuroides* to this name. Larval details have already been presented in my previous paper.

Siphonurus quebecensis Prov. A single male was bred, June 28 (adult July 1) from nymphs found in small pools at Thunder River; most of the nymphs were still immature at the time of Mr. Brown's departure from the village so it is probably that the main emergence of the species occurs later in July.

Siphonurus barbarus McD. One male, bred at Thunder River June 28 (adult July 1). The nymphs were taken along with those of *quebecensis* and were unfortunately not recognized as distinct, nymphs and nymphal skins of both species being placed in the same vials. It is not surprising that this happened as the similarity between the nymphs is very great, so much so in fact that, while I have differentiated the material into two groups, I am unable to make exact associations as the nymphs are not mature and cannot be satisfactorily compared with mature ones of *quebecensis* from other sources. One point, however, is clear, viz.: that *barbarus* is a typical *Siphonurus* in that the nymph possesses double gills only on the first two segments.

The above is the first Canadian record for the species and the first time I have encountered it since its description from a few specimens from the Catskill Mts., N. Y.

Arthroplea bipunctata McD. Several immature nymphs of an *Arthroplea* species which I presume to be *bipunctata* were taken at Thunder River, June 17 from a rapid tributary of the main river. In his recent paper (1930, *op. cit.*, 26) Bengtsson notes that *Cinygma bipunctata* McD. should probably be referred to *Arthroplea* and this reference is confirmed by Ide's discovery and description of the nymph of this species (1930, Can. Ent. LXII, 42). The 5-jointed nature of the male forceps is normal and not, as I thought at the time of description, an individual variation; five males before me, from various localities, all show this feature.