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NEW NORTH AMERICAN EPHEMERIDAE.\*

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**Leptophlebia associata** n. sp.

*Male.* (alcoholic specimen) Thorax deep black brown; abdomen brown, semitranslucent on the anterior segments and opaque on the three posterior segments which are a ruddier brown than the preceding ones. Forceps light brown. Wings hyaline, slightly tinged with amber color and with the pterostigmatic region decidedly brownish. Length of body 8 mm.; of forewing 8 mm.

*Holotype*—♂, Fry's Harbor, Santa Cruz Is., Calif., (C. H. Kennedy); No. 818 in the Canadian National Collection, Ottawa.

*Paratypes*—13 ♂, same data, in the Canadian National Collection and collection of C. H. Kennedy.

The species is allied to *gregalis* Eaton, as I have determined it from specimens collected in Santa Clara Co., Calif., by C. H. Kennedy which agree well with Eaton's original description. In *gregalis* the inferior processes of the penes are long and acuminate whereas in *associata* they are short and of equal width throughout; the apices of the penes (fig. 4) are also bent inward and closely approximate in the latter species, a feature not found in *gregalis*.

**Leptophlebia brunneipennis** n. sp.

*Male.* Head and thorax blackish, abdomen deep red-brown, the last ventral segment and the bifid subgenital plate blackish, forceps paler brown, penes only united at the extreme base, slender and slightly bent outwards apically, the whole organ in the shape of the letter U; setae pale smoky brown. Forelegs deep blackish-brown, the tarsi somewhat paler; four posterior legs with femora brown, tibiae somewhat paler, more golden brown. Wings unicolorous deep amber, the crossveins very numerous; about 14 costal veins before the bulla and 23 or more beyond it, many of these latter anastomosing. Length of body 7 mm.; of wing 8 mm.

*Holotype*—♂, May 30, 1914, Rock Lake, Wash., (A. L. Melander); in Washington State College collection, Pullman, Wash.

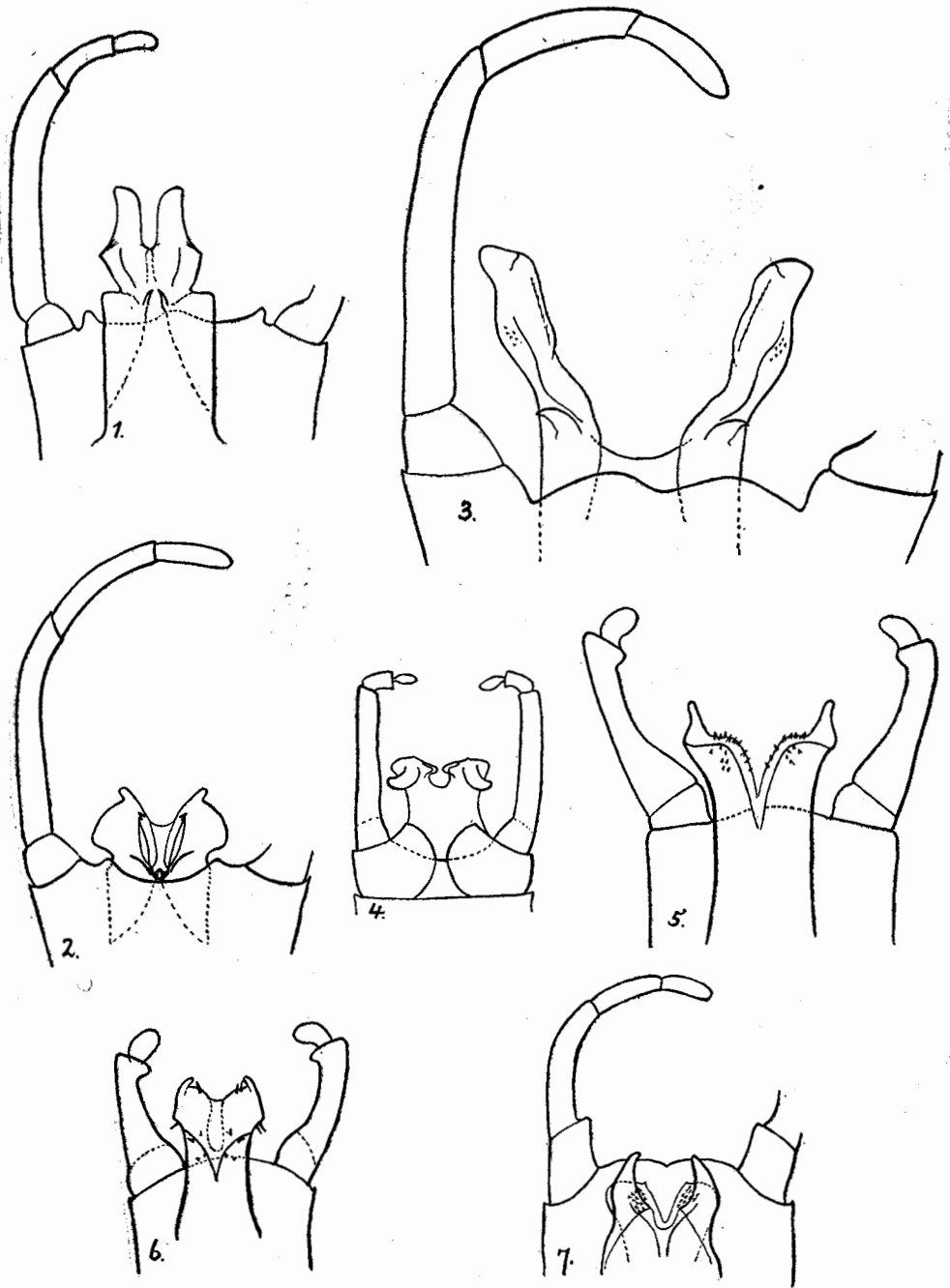
*Paratype*—♂, same data; No. 793 in the Canadian National Collection.

I had at first considered the specimens to be the males of *rufivenosa* Eaton, described from females alone; I believe now however that I have correctly identified this latter species with a female from Vancouver Island, B. C. If I am correct *brunneipennis* may readily be distinguished by the large number of costal and other cross veins as well as by the very deep amber color of the wings.

**Choroterpes albiannulata** n. sp.

*Male.* (in alcohol). Eyes rather flat, oval, deep red-brown; head blackish with bases of antennae tinged with orange; pronotum black with posterior margin centrodorsally tinged with orange; meso- and metanotum deep black, edged with a pale lateral line anterior to base of wings; pleura tinged with orange, especially in the vicinity of the above mentioned pale streak; sternum blackish with bases of legs orange tinged. Abdomen dorsally black-brown, with posterior margin of

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each segment narrowly but very distinctly whitish; faint traces of dark geminate dorsal streak and a small dark blotch on each segment in the stigmatal area; ventrally paler, semitranslucent smoky, the posterior margin ringed with white as on dorsum, this color tending to spread forward in the medioventral area, especially in segments 7-9 which are largely white; traces of three narrow medioventral longitudinal lines, most distinct on anterior segments; setae brownish, forceps and penes basally smoky brown, apically white, the second joint of the former much dilated basally. Foreleg with brown femur and tibia, marked with black-brown at the joint; tarsi whitish; hind legs with tibia also largely whitish. Wings vitreous with small brown patch at base of primaries. Length 5 mm.

*Holotype*—♂, Medicine Hat, Alta., Aug. 23, (F. S. Carr); No. 1237 in the Canadian National Collection, Ottawa.

### ***Ephemerella infrequens* n. sp.**

*Male*. Head light brown with pale yellowish clypeus and bases of antennae; eyes (living) light orange; the pronotum and lateral edges of mesonotum anterior to base of wings purplish brown, mesonotum deep olive brown, shading into ruddier brown posteriorly and with two slightly raised blackish lines just anterior to the scutellum; lateral sutures and bases of wings slightly tinged with ochreous; prosternum yellowish, remainder of sternum brown; legs light yellow, the fore tibiae and tarsi somewhat duller in color than the femora, tarsal joints slightly marked in brown. Abdomen dorsally rather light red-brown with smoky segmental incisures, scarcely paling posteriorly, a narrow yellowish line along lateral edge; ventrally dull purple brown, shading into ochreous brown on posterior segments and with central segments showing traces of pale semitranslucent areas along anterior margins. Forceps ochreous, penes similar with a darker transverse band near base; setae with basal joints yellowish, remainder whitish, narrowly ringed with deep brown. Wings hyaline with pale veins, the crossveins being indistinct, especially in basal costal area. Length of body 8 mm., of forewing 9 mm.

*Holotype*—♂, Waterton Lakes, Alta., July 14, (J. McDunnough); No. 816 in the Canadian National Collection, Ottawa.

*Paratypes*—♂, same data; ♂, Lake Tahoe, Calif., (Coll. Hubbard and Schwarz) in the United States National Museum.

The species is allied to *invaria* Wlk. showing the same type of apically enlarged second joint of the male forceps but differing in shape of penes (fig. 6) and the ruddier color of the abdomen; it is also close to *inermis* Eaton, from Colorado, in general shape of the penes but this latter species is without the enlarged apical section of the second joint of the forceps. According to Ulmer's key (1920, Stett. Ent. Zeit. 81, 119) *infrequens* would fall into the genus *Chitonophora* Bgtss., but I doubt whether his definition of *Ephemerella* is based on an actual knowledge of the genotype, *excrucians* Walsh, and for the present prefer to include all our North American species under the one generic term.

### ***Ephemerella norda* n. sp.**

*Male*. Thorax deep brown, blackish in the median area, shaded laterally below base of wings with ochreous. Abdomen dorsally deep brown with darker segmental joinings and a narrow yellowish lateral area, shaded with ruddy on

three posterior segments; traces (more distinct in older specimens) of a dark, partly geminate, dorsal line. Ventrally ochreous with purplish suffusion on anterior segments and traces of the usual two small dark dots on each segment on both sides of the median line; forceps pale brownish, penes ochreous at base, darker at tips which are strongly bifid; setae dark smoky. Prolegs dark yellow-brown with a smoky tinge; four posterior legs deep yellowish with a faint dark dot or blotch at apex of femur. Wings vitreous, venation pale brown, deeper on costal half of primaries, cross-veins pale and indistinct. Length of body 10 mm.; of forewing 11 mm.

*Holotype*—♂, Nordegg, Alta., July 14, (J. McDunnough); No. 779 in the Canadian National Collection, Ottawa.

*Paratypes*—5 ♂, Popoff Is., Alaska, July 12, (Harriman Alaska Exped.); in the United States National Museum.

The Alaska specimens were recorded as *grandis* Eaton in the report on the Harriman Expedition but this is a much larger Coloradan species with different venation (genus *Drunella*). *Norda* seems to be considerably larger than either of Walker's described species from the Hudson Bay region; the characteristic ♂ genitalia (fig. 5) should render it easily recognizable.

#### ***Ephemerella tibialis* n. sp.**

*Male*. Deep purple-brown, thorax dorsally almost blackish, abdomen narrowly ringed with semitranslucent whitish on anterior margins of segments 3-8; traces of a medioventral series of dark ganglionic spots. Base of forceps ruddy, second and third joints blackish, the former rather broad and laterally compressed; penes strongly bent upwards beyond base, blackish, deeply bifid at tip; setae deep smoky. Fore femur light smoky yellow, fore tibia deep smoky, very long, fully twice the length of femur, tarsi somewhat paler than tibia; four posterior legs dull yellowish with ruddy apical band on the femora. Wings vitreous with pale grey-brown venation, the crossveins slightly tinged with the same color and more distinct than is general in the species of this genus. Length of body 7.5 mm.; of forewing 8 mm.

*Holotype*—♂, Banff, Alta., Sept. 19, (C. B. Garrett); No. 780 in the Canadian National Collection, Ottawa.

The species is a small fragile one, rather resembling a *Leptophlebia* superficially. The banded abdomen and long fore tibia seem characteristic.

#### ***Siphonurus berenice* McD.**

syn. *Siphonurus novangliae* McD. 1924, Occ. Pap. Bost. Soc. Nat. Hist. V, 75.

On making a slide of the genitalia of the unique male type of *berenice* I find that these are identical with those of *novangliae* McD. The figure I gave of these organs in the original description was drawn from the dried specimen and the parts were evidently distorted and partially hidden by the dried exudations. The type of *berenice* is smaller and somewhat duller in coloration than the paratypes of *novangliae* before me, but a long series received this year from Covey Hill, Que., shows intergradations and I believe the two names represent but a single species. It might be noted that the stimuli are generally not so sharply bent in apically as is shown in my drawing of the genitalia of *novangliae* (l. c. Pl. VI, fig. 3); they are more (especially in dried specimens) as in the corresponding parts of fig. 4.

\*—Specimens of *Chitonophora aurivillii* Bgsten., from Lappland, just received from Dr. Bengtsson, show great similarity to *norda*. It is quite probable that the two are identical.

**Siphonurus barbarus** n. sp.

*Male.* Head brown with front edge of clypeus pale and ocelli tipped with whitish; thorax brown, the pleura with the sutures marked in pale ochreous; abdomen dorsally brown with the anterior edge of each segment pale yellowish, semitranslucent; on the posterior segments traces of dark dorsal and subdorsal longitudinal dashes are visible; ventrally pale yellowish with a lateral oblong dark brown patch on each segment except the ninth which is largely dark brown; subgenital plate pale ochreous, forceps smoky brown, setae light ochreous ringed with brown. Legs pale ochreous brown, the forelegs deeper in color; tips of femora and joinings of tarsi marked with dark brown. Wings hyaline with brown venation. Length of body 10 mm.; of forewing 11 mm.

*Holotype*—♂, Big Indian Valley, Catskill Mts., N. Y., June 9, 1910, (R. F. Pearsall); in the collection of the American Museum of Natural History.

*Paratype*—♂, same locality and collector, June 7; No. 815 in the Canadian National Collection, Ottawa.

The species is very similar to *berenice* McD. but with the abdominal markings better defined and with distinctly different male genitalia (fig. 7).

**Heptagenia kennedyi** n. sp.

*Male.* (alcoholic). Head pale with a few slight dark dots on the clypeus; thorax light brown, the prothorax tinged with smoky posteriorly; abdomen pale hyaline with smoky tinges dorsally, tending to form faint bands across the segments on their posterior border. Legs pale; with no markings either at base of coxae or on femora. Forelegs tinged with black at apices of femur and tibia; first joint one-sixth the length of second. Wings vitreous with the veins colorless.

*Female.* Entirely pale ochreous, without obvious maculation. Length of body 7-8 mm.; of forewing 9 mm.

*Holotype*—♂, Calistoga, Napa Co., Calif., (Kennedy); No. 817 in the Canadian National Collection, Ottawa.

*Allotype*—♀, same data.

*Paratypes*—6 ♂, 14 ♀, same data, in the Canadian National Collection, Ottawa, and Collection Kennedy.

The material is not in the best of condition but the genitalia (fig. 2) seem distinct from those of other described species in the group.

**Heptagenia flavianula** n. sp.

*Male.* Clypeus dull gray, crossed by a black band at its base, head in the region of antennae and ocelli ochreous; thorax deep brown, a pale ochreous patch anterior to the wing roots, containing two blackish streaks, base of wings and pleural sutures marked with ochreous. Abdomen deep ruddy brown with the lateral and posterior edges of the dorsal sclerites narrowly light yellow; ventrally the brown color becomes darker on the posterior segments and the posterior edge is banded with yellow as on dorsum; forceps deep brown; setae blackish. Forelegs blackish, posterior legs golden brown, the femora with a black streak on basal half, tarsi blackish. Wings vitreous, tinged with pale amber in pterostigmatic region and with black-brown venation. Length of body 14 mm.; of forewing 15 mm.

*Holotype*—♂, Gunnison, Colo., June, (E. J. Osler); No. 794 in the Canadian National Collection, Ottawa.

*Paratypes*—5 ♂, same data; 3 ♂, Glenwood Spgs., Colo., (Osler).

The species is similar to *brunnea* Hagen but considerably larger, and with brighter coloring, especially on the underside of the abdomen, where the yellow annulations stand out prominently from the general deep brown color of the segments. The ♂ genitalia (fig. 3) show slight points of distinction from those of *brunnea* as figured by Dodds (Trans. Am. Ent. Soc., XLIX, Pl. VIII, fig. 13).

### ***Ecdyonurus lyriformis* n. sp.**

*Male.* Head brown with pale clypeus and black shading around the ocelli; thorax brown, shaded slightly with ochreous on rear of mesonotum and with lateral edge of same anterior to wing bases marked with pale yellow; pale shading on pleura at base of wings. Abdomen dorsally with segments 2-7 pale semi-translucent whitish with the posterior edge of each segment deep brown; traces of a geminate brown dorsal line; midway between this centrodorsal line and the spiracular flange the brown posterior band juts forward triangularly to a point midway between the anterior and posterior margins; three posterior segments almost entirely light brown, opaque. Ventrally the abdomen is pale whitish with the posterior segments tinged with ochreous brown and with a centrodorsal row of small brown spots. Setae dull brown, forceps similarly colored. Fore femora and tibiae light brown, the former twice banded with deeper brown (these bands rather indistinct) and with dark apex, the latter with base and apex narrowly black-brown, fore tarsi pale grayish, the first joint about one half the length of the second; four posterior femora similar to fore femur, tibiae paler. Wings hyaline with fine light brown venation, the cross-veins being almost colorless and very indistinct in the costal region except at apex of wing where they are divided by a fine line running just below costa, forming a series of small costal and much larger subcostal cells. Length of body 11.5 mm.; of forewing 12 mm.

*Holotype*—♂, Banff, Alta., July 30, (C. B. D. Garrett); No. 819 in the Canadian National Collection, Ottawa.

*Paratypes*—2 ♂, same data.

The subimagos, of which there are two before me, show unicolorous smoky wings. The generic position of the species is a little doubtful; the comparative lengths of the fore tarsi point to *Ecdyonurus* but the genitalia (fig. 1) are quite different from the usual characteristic form of this genus, the penes being roughly lyre-shaped; the subdivision of the costal crossveins in the pterostigmatic region is also not typical of *Ecdyonurus*.

#### EXPLANATION OF PLATE 5.

- Fig. 1 Male genitalia of *Ecdyonurus lyriformis* McD.  
 " 2 " " " *Heptagenia kennedyi* McD.  
 " 3 " " " " *flavianula* McD.  
 " 4 " " " " *Leptophlebia associata* McD.  
 " 5 " " " " *Ephemerella norda* McD.  
 " 6 " " " " *infrequens* McD.  
 " 7 " " " " *Siphonurus barbarus* McD.