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NEW SPECIES OF NORTH AMERICAN EPHEMEROPTERA*

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Thraulius albertanus n. sp.

Male.—Head and thorax deep black, the membranous portions of the pleura being slightly tinged with ruddy. Abdomen dorsally dirty whitish, the segments crossed by broad and slightly oblique bands of deep smoky which leave traces of ground color only on anterior and posterior margins, thus giving to the naked eye the appearance of a smoky-black abdomen ringed with whitish; ventrally more evenly smoky-black with posterior margins of segments narrowly pale. Forceps dull yellowish with two fine, long spines projecting backward from their bases; setae whitish. Legs with the coxae and trochanters black, femora ruddy-brown with bases and apices tipped with black, tibiae and tarsi pale with brownish tinge and the base of tibia with black ring. Fore-wings semihyaline with basal half strongly tinged with smoky; veins black, crossveins numerous, fine and black, except in the basal half of costa where they are obsolescent; hind-wings largely smoky, with the blunt costal projection before the middle of the wing. Length of body, 8 mm.; of fore-wing, 10 mm.

Female.—Very similar to the male but the wings without smoky tinge. crossveins pale and veins with the exception of the subcostal and radial ones also scarcely tinted; subanal plate narrowed apically with a small V-shaped excision on posterior margin.

Holotype—♂, Medicine Hat, Alta., Aug. 22, (J. H. Pepper); No. 3257 in the Canadian National Collection, Ottawa.

Allotype—♀, same locality, Aug. 21.

Paratypes—35 ♂, 12 ♀, same locality and collector, Aug. 21 and 22.

This is the first record of the occurrence of a member of this genus north of Mexico; the species is evidently allied to *primanus* Eaton but judging by Eaton's figure (Biol. Cent. Am. Neur. Pl. I. fig. 7a) has a longer, narrower hind-wing with the costal projection nearer base of wing. The color of the legs would also appear to be paler.

The species also occurs in Saskatchewan; I have a series of somewhat smaller specimens taken at Saskatoon, Sept. 9, (K. M. King).

Ephemerella cornutella n. sp.

Very similar in every way to *cornuta* Morg. but much smaller and occurring as an adult nearly a month later.

Male.—Head and thorax deep black-brown with slight ruddy tinges on the pleura below the wing-bases. Abdomen dorsally smoky-brown with deeper shadings laterally in the form of indistinct oval patches and the posterior edges of the segments also deeper brown; ventrally light olive-brown, shading into opaque ruddy-brown on the posterior segments. Forceps dull dirty brown, of the same general type as *fuscata* Wlk. Setae dull whitish, with intersegmental areas faintly ringed with ruddy-brown. Legs light brown with faint ruddy tinges at their bases. Wings hyaline with pale venation, the crossveins being almost imperceptible.

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Female.—Head light brown with the vertex rather evenly shaded with ruddy; the general color of thorax and abdomen is rather paler than in the male, being a deep olive-brown, considerably paler on the ventral portion of the abdomen, where the posterior margins are tinged with yellowish. Subanal plate short, flat, rather squarely truncate posteriorly. Legs as in male. Length of body, 7 mm.; of forewing, ♂, 7 mm., ♀, 8 mm.

Holotype—♂, Knowlton, Que., Aug. 2, (G. S. Walley); No. 3273 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—31 ♂, 7 ♀, (one bred) Knowlton, Que., Aug. 2-10, (Walley and McDunnough).

Most of the type series was taken swarming over the tin roof of a schoolhouse near the village of West Bolton. Nymphs from various small streams of the Knowlton region had been under observation for some time and sufficient of these were bred through to make the association of nymph and adult certain. The nymph resembles a small *cornuta* but differs in minor details which I shall enumerate in a later paper; it develops very slowly and is still plentiful when *cornuta* is no longer to be found, this latter species in the Knowlton region maturing in late June and early July, according to altitude. It might be mentioned that it was the nymph of *cornutella* from Covey Hill, Que. which I erroneously associated with *dorothea* Needh. (1928, Can. Ent. LX, 238). This note of mine should be disregarded; breeding has shown that my original determination of *dorothea* was correct.

***Ephemerella serratoides* n. sp.**

Very similar to *serrata* in coloration and genitalic characters and most easily separated by the presence of four minute dark dots placed in a slightly curved row across the anterior portion of each abdominal sternite.

Male.—Eyes (living) orange-red. Head between the eyes yellowish. Pronotum brown, shaded with smoky; mesonotum and sternum rather a bright brown shaded with paler posteriorly; pleura similar, with some paler shading in the sutures. Abdomen dorsally olive-brown or ruddy brown with indistinct darker shadings, indicating a broken median line, and rows of subdorsal and lateral spots; ventrally pale ruddy-brown shading into yellow-brown on posterior segments, segments II-VIII, as indicated above, crossed by a curved row of four fine black dots. Forceps dull ochreous. Setae whitish with intersegmental ruddy rings on at least the basal segments. Wings hyaline with pale venation. Legs dull yellowish with an apical rufo-piceous spot at the apices of the mid- and hind-tibiae.

Female.—Very similar to the male in color. Head light yellow on the vertex with slight brown shades next the eyes and ocelli and some blackish median patches. Subanal plate short, narrowed apically and evenly rounded. Length of body, 5 mm.; of forewing, 5.5-6 mm.

Holotype—♂, Knowlton, Que., Aug. 13, (L. J. Milne) bred from nymph No. 324; No. 3274 in the Canadian National Collection, Ottawa.

Allotype—♀, Knowlton, Que., July 28, (L. J. Milne) from nymph No. 294.

Paratypes—13 ♂, 11 ♀, Knowlton, Que., bred on various dates from July 13-Aug. 13.

The entire type series was bred from nymphs found in the Mid Yamaska river just below the Foster Power Plant (8 miles from Knowlton town) along with nymphs of *serrata*. From these latter they can be separated by the more even brown color with entirely smooth head and prothorax which are sprinkled with pale dots much as in *dorothea*; the abdomen shows the two median rows of tubercles much as in *serrata* and on the ventral surface the characteristic dots of the adult are present, whereas in *serrata* there are merely the two sub-lateral rows of dashes. Our determination of *serrata* is based on a comparison with nymphs of the type series kindly presented to us by Dr. Needham.

***Ephemerella subvaria* n. sp.**

Very similar to *invaria* Wlk. both in coloration and male genital characters and best distinguished by the prominent dark veins and crossveins of both wings.

Male.—Eyes (living) bright red brown; head and thorax deep brown with slight ruddy tinges on the pleura. Abdomen dorsally brown, tinged with ruddy and with some indistinct smoky shading laterally and along the posterior margin of segments; the lateral edges tinged with yellowish; ventrally lighter ruddy-brown, the forceps dull yellowish. Setae pale, distinctly ringed with smoky-brown intersegmentally. Legs deep dull amber, the fore-femora tinged with smoky, the mid- and hind-femora at times with traces of ruddy median shading. Wings hyaline with veins and crossveins decidedly light brown; there are no crossveins in the basal two-thirds of costal and radial interspaces.

Female.—Very similar to the male, the head being yellowish anteriorly and a dull brown or deep clay-color tinged with ruddy or purplish on the vertex, with some deeper smokier shades centrally. Thorax somewhat paler than in the male. Subanal plate yellowish, with the lateral edges curved upward. Legs deeper in color than in the male. Length of body, 9 mm.; of forewing, ♂, 10 mm., ♀, 12 mm.

Subimago with deep smoky wings.

Holotype—♂, Cascades Pt., St. Lawrence Riv., Que., June 3, (G. S. Walley); No. 3272 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—6 ♂, 10 ♀, same data; 25 ♂, 17 ♀, Lachine, Que., June 8-11, (F. P. Ide); 8 ♂, Laprairie, Que., June 9, (F. P. Ide).

I have considered this species heretofore as merely a dark form of *invaria* but definite association of the Cascade Point series with nymphs shows that these latter, while very similar to *invaria* nymphs, possess a double row of quite distinct, though small dorsal abdominal spines based on the posterior margins of the segments, such spines being practically lacking in *invaria*. This and the dark veining in the adult wings seem to constitute good specific characters. The species is quite common in early spring in the Ottawa region; I expect to give fuller details concerning the nymphs in a later paper dealing with the early stages of our eastern species of *Ephemerella*.

Genus *Pseudocloeon* Klap.

In studies conducted at Wakefield, Gatineau region, Que., Cascades Pt., St. Lawrence River, Que. and in the various streams of the Knowlton, Que.

region we have isolated three species of nymphs belonging to this genus. All these nymphs possess two caudal setae, the middle one being reduced to the merest rudiment; the gills are as in *Baetis* and the dorsal edge of each femur is clothed with hairs of varying length; the abdomens show subdorsal dark spots; they evidently connect up closely with the *Acentrella* section of *Baetis*,

Of these three above-mentioned species one matches well with *carolina* Banks as characterized by Ide (1930, Can. Ent. LXII, Pl. 18, fig. 3); a second one of which odd specimens have been bred, I am identifying as *dubium* Walsh for the present, as it fits in well with the rather meagre description and occurs in our prairie provinces as well as in the east; the third species appears nameless. These nymphs may be separated as follows, basing the differences on well marked and fully developed specimens.

1. Caudal setae with median dark band; abdomen with strong color contrasts, segments III, IV, and VIII-X being almost entirely pale; IX with a narrow, but distinct dark lateral dash.....*dubium* Walsh
Caudal setae unbanded; color contrasts on abdomen not so marked.....2
2. Short, chunky species with broad thorax; long hairs on dorsal margins of femora and tibiae; the former with a broad dark median band; abdominal segments II-VIII almost entirely dark*carolina* Banks
More elongate species; hairs on femora and tibiae considerably shorter; maculation of femur consists merely of an anterior longitudinal dark streak, often obsolescent; abdomen paler with segments VIII-X and often IV largely pale; lateral portion of IX with diffuse dark shade but not a distinct streak*cingulatum* n. sp.

***Pseudocloeon cingulatum* n. sp.**

Male.—Eyes (dried) circular, deep red-brown, slightly larger than in *dubium*. Thorax entirely deep black-brown with slight ruddy tinges on the membranous portion of the pleura. Abdomen dorsally with segments II-VI pale hyaline, slightly tinged with smoky on first two segments and with the dorsal portion of the posterior margins finely orange-brown, most distinct on II and III; segments VII-X deep sepia-brown; tracheae marked with black, forming a double line along the lateral edge. Ventrally I-VI pale, hyaline, VII-IX opaque whitish tinged with sepia. Forceps and setae pale. Fore-legs with deep smoky femora and pale, slightly smoky tibiae and tarsi; mid and hind-legs with femora pale amber, tinged with smoky, tibiae and tarsi whitish. Wings hyaline with pale venation.

Female.—Head rather bright brown with a pale yellow band next each eye. Thorax and abdomen dorsally bright brown, the former tinged with yellowish on anterior and posterior portions of mesonotum; ventrally pale whitish yellow. Legs rather deep yellow, paling towards extremities, with fore femora tinged with brown. Wings as in male. Length of body and forewing, 4 mm.

Holotype—♂, Mid Yamaska River, Foster Power Plant, Que., July 10, (G. S. Walley) bred from nymph; No. 3285 in the Canadian National Collection, Ottawa.

Allotype—♀, same data (bred).

Paratypes—1 ♀, same locality, bred, July 11, (L. J. Milne); 4 ♂, 4 ♀.

Wakefield, Que., May 29, (W. J. Brown), 2 ♂, 1 ♀, May 31, (J. McDunnough); 4 ♂, 3 ♀, July 25, (J. McDunnough); 2 ♂, Cascades Pt. Que., July 4, 5, (J. McDunnough), 1 ♂, Aug. 30, bred, 3 ♀, Aug. 27, (L. J. Milne); 5 ♂, Ottawa Golf Club, Que., June 7, (J. McDunnough).

As is usual in the group there are evidently two cycles, at least, the spring one being somewhat larger and with larger eyes. The orange-brown bands across the abdomen separate the males readily from those of *dubium* but as cases appear to occur where this banding is obsolescent the duller sepia-brown color of the posterior segments seems characteristic. The species lacks the subdorsal red dots of *virile* McD. which further has considerably larger eyes and banded femora; it is also without the medio-ventral row of spots of *punctiventris* McD. The nymphs of the two latter species are still unknown to me. The status of *chlorops* McD. as distinct from so-called *dubium* I am inclined to doubt; it was based on the color of the turbinate eyes in living specimens, a character which is not always to be relied upon as I have since discovered.

***Pseudocloeon rubrolaterale* n. sp.**

Male.—Turbinate eyes (dried) moderate, almost circular, red-brown. Head and thorax deep blackish with paler brown shadings on the pleural membrane. Abdomen pale yellowish white on segments II-VI, sepia brown on posterior segments with large lateral maroon or wine-color patches very distinct on the pale segments and in certain lights also visible on the brown segments; ventrally the brown of the posterior segments is paler than dorsally and there is a series of small brown dots in the mid-ventral line, one to each segment in about the centre. Forceps and setae pale. Legs pale yellowish white the fore-femur tinged with smoky. Wings hyaline with pale venation. Length of body and forewing, 4 mm.

Holotype—♂, Milk River, Alta., Sept. 13, (J. H. Pepper); No. 3286 in the Canadian National Collection, Ottawa.

Very easily recognized by the ruddy abdominal patches and the ventral dark dots.

***Pseudocloeon futile* n. sp.**

Male.—Eyes (dried) rather lengthily oval, well separated, light olive or greenish brown; head between the eyes brownish; antennae pale smoky. Thorax deep clay-brown with the posterior projection of the mesonotum and the anterior portion of the metanotum paler and with traces of ruddy shading along the pleural sutures. Abdomen dorsally with the first six segments clay-brown, much the color of the thorax, with the triangular portion of segment I paler, more ochreous; segments VII-X paler, more ochreous. Ventrally considerably paler with the posterior segments shading into cream-color and with traces of ruddy streaks along the lateral edge. Forceps pale creamy, widely separated at base, setae pale. Legs dull dirty whitish. Wings hyaline with pale venation; the paired intercalaries are rather long and well-developed except in the first two interspaces; in the pterostigmatal region there are four or five oblique crossveins without granulations between them. Length of body 3 mm.; of forewing 3.5 mm.

Holotype—♂, Milk River, Alta., Aug. 18, (J. H. Pepper); No. 3258 in the Canadian National Collection, Ottawa.

Paratypes—13 ♂, same data.

This small species is at once distinguished from *turbidum* McD. by the shape and color of its eyes and the dull olivaceous or clay-brown color of thorax and abdomen. Some of my series show traces of ruddy lateral shading on the abdominal tergites, particularly on the paler posterior segments.

Dubium Walsh (or what I am placing under this name) is also common throughout the same region but differs in its deep black thorax and white abdominal segments I-VI.

Centroptilum quaesitum n. sp.

Male.—Eyes (dried) light orange-red, contracted laterally as usual; head and basal joints of antennae light yellowish, rest of antennae smoky. Thorax and pleura rather light brown, the latter with a faint ruddy tinge and a yellow streak anterior to the wing-base; sterna yellowish, shaded with ruddy-brown. Abdomen dorsally, with the exception of a narrow pale lateral area, bright ruddy, this color deepening on segments VII-IX and paling on segment X; a fine black longitudinal line in the pale lateral area on segments II-VI; ventrally pale yellowish. Forceps pale with a plate between their bases having a strongly convex posterior margin. Setae pale. Femora pale amber; fore-tibiae and tarsi with a faint smoky tinge, others pale whitish. Wings hyaline with pale venation, the hind-wing rather narrow with the usual two longitudinal veins.

Female.—Considerably paler than the male. Head pale yellowish with a broad median light brown area on the vertex. Thorax light brown with pale scutellum. Pleura and sterna yellowish with some brown shading on the former. Abdomen pale yellowish; dorsally the posterior margins of the segments II-VI are tinged with brown and besides the black lateral dashes of the male the tracheation shows as fine black veining; on the four opaque posterior segments the light brown shades are more distinct, forming a median band which expands laterally along the posterior margins. Other details as in male. Length of body and forewing, 7 mm.

Holotype—♂, Medicine Hat, Alta., June 17, (J. H. Pepper); No. 3279 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—1 ♂, 3 ♀, same data, 1 ♂, same locality, June 12.

This large species is evidently close to *infrequens* McD., known to me only by three female specimens, the female type from Winnipeg Beach, Man., July 10 and two females from Lethbridge, Alta., July 8 and Aug. 15. In all these the hind-wing is narrower and longer than in the present series of females, and all show a broad ruddy dorsal band (much as in the present male) increasing in intensity on segments VII-IX and containing two pairs of minute hyaline subdorsal dots.

Centroptilum intermediale n. sp.

Male.—Eyes (dried) bright red as in *fragile*. Thorax deep brown with some ruddy shades on posterior portion of mesonotum and along the lateral anterior edge; pleura brown with ruddy shading at base of wing and on the membranous portions; sternum light sepia-brown with intersegmental membrane pale yellowish. Abdomen dorsally with segments II-VI pale hyaline whitish;

a geminate ruddy dorsal line; broad ruddy shading on posterior margin of each segment which projects forward laterally in wedge-shaped marks, extending fully halfway to anterior margin; an inwardly oblique ruddy streak from near apex of these wedges to anterior margin, best defined on segments V and VI, tending to break up into spots on anterior segments; a fine black lateral line, defining the tracheae. Segments VII-X dorsally deep maroon-brown. Ventrally pale yellowish-white, hyaline on segments I-VI, opaque on VII-IX with slight ruddy shading. Forceps and setae white. Legs pale yellowish with very faint traces of ruddy median bands on femora. Wings hyaline with pale venation; hind-wing slightly longer and narrower than in *simile*.

Female.—Head with vertex largely ruddy-brown. Thorax and pleura rather a brighter brown than in male; sternum largely light yellowish with the median portion light sepia-brown. Abdomen dorsally entirely bright brown with the exception of an antero-lateral triangular patch; on most segments traces of small pale, geminate, subdorsal dots or dashes. Ventrally entirely pale whitish-yellow with faint ruddy shades on segment IX. Legs as in male with banding rather more distinct. Length of body and fore-wing, 6 mm.

Holotype—♂, Marsh Creek, Sweetsburg, Que., July 10, (J. McDunnough); No. 3283 in the Canadian National Collection, Ottawa.

Allotype—♀, S. Bolton, Que., July 13, (J. McDunnough).

Paratype—1 ♂, S. Bolton, Que., July 5, (J. McDunnough).

The species may be at once separated from the allied *simile* McD. by the bright red eyes when dried (in *simile* these are blackish brown) and by the paler thorax which is deep brown but not black-brown. The broader abdominal banding and the narrower hind-wings separate it from *bellum* McD.

***Cloeon triangulifer* n. sp.**

Female.—Head almost entirely light pinky-brown slightly paler next the eyes. Thorax rather deep brown, pleura with slight ruddy tinges and sternum only slightly paler than notum. Abdomen dorsally brown with slight ruddy tinges, especially on posterior segments, and the tracheae slightly marked with black in the lateral area of segments; ventrally pale yellowish with light brown, lateral, triangular patches, based on the anterior margin of segments II-VII, the apex almost touching posterior margin; on segments VIII and IX these patches are scarcely indicated. Setae pale. Legs dull, pale yellowish. Wings hyaline with veins faintly amber-tinted and cross-veins, except in pterostigmatic area, scarcely visible. Length of body and fore-wing, 5 mm.

Holotype—♀, Cornwall, Ont., June 29, (F. Ide); No. 3284 in the Canadian National Collection, Ottawa.

Paratypes—3 ♀, same data; 1 ♀, Pt. Bruce, Ont., July 4, (G. S. Walley); 2 ♀, Wakefield, Que., July 13, (F. Ide); 2 ♀, Wakefield, Que., July 26, Aug. 21, (G. S. Walley); 1 ♀, Mississquoi Bay, Que., July 11, (W. J. Brown); 2 ♀, S. Bolton, Que., July 5, (J. McDunnough); 1 ♀, Sutton Mts., Knowlton, Que., July 11, (J. McDunnough).

In the female sex, which is the only one I have secured, the species is easily distinguished from *rubropicta* by the darker thorax (especially the sternum which is brown, not yellowish) and the presence of the brown triangular patches in the lateral corners of the ventral abdominal segments.

Ameletus sparsatus n. sp.

Male.—Head shining black. Pronotum black; mesonotum ruddy-brown on the anterior section, the mid-section being paler, ochreous brown with the lateral edges deep black-brown and a yellowish brown area anterior to the wing-bases; the scutellum is yellow-brown with a broad, shiny blackish area on each side; metanotum largely shining black with brown shading anteriorly. Pleura and sternum black-brown with light brown shading on the membranous portions. Abdomen yellow-brown dorsally on segments II-VI, shading into golden-brown on posterior segments; the lateral edges and posterior margins of all segments shaded rather broadly with deeper brown; ventrally dull smoky-brown on segments II-VI, the posterior ones opaque yellow-brown with an antero-median darker patch on VII and VIII and a broad lateral deep brown edging on IX; subgenital plate yellow-brown with darker shades at base of forceps and along posterior margin; forceps smoky brown. Legs missing. Wings hyaline with a very faint amber tinge; veins and crossveins prominent, brown, the latter, especially in the costal half of wing, basad of the bulla, bordered with smoky, and forming small dark patches below the bulla itself and midway between this and the apex in the radial sector; in pterostigmatic region crossveins strongly anastomosed.

Female.—Head with the anterior projection smoky-brown, the vertex being ochreous with a broad deep brown median stripe. Thorax paler than in male, the black areas of this sex being deep brown. Abdomen rather ruddy-brown with similar shading dorsally as in the male; ventrally almost entirely ruddy-brown. Forelegs deep piceous; mid- and hind-legs yellow-brown with the femora shaded with rufo-piceous. Wings as in male but without the amber tinge. Length of body, 8-9 mm.; of forewing, 10 mm.

Holotype—♂, Blairmore, Alta., July 15, (J. H. Pepper); No. 3271 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratype—1 ♀, Lundbreck, Alta., July 12, (Pepper).

Allied to *subnotatus* in type of wing maculation but smaller and more resembling *dissitus* and *cooki* in abdominal coloration and male genitalia.

Siphonurus autumnalis n. sp.

Male.—Head blackish, paler along the anterior margin. Pronotum deep smoky. Mesonotum deep brown, shaded with black-brown on the scutellum and adjacent area; pleura purplish-brown with the sutures marked in pale ochreous; sterna deep black-brown. Abdomen dorsally deep purplish-brown with the latero-anterior portions paler, with a slight ochreous tinge; lateral edge narrowly ochreous, most distinct on the four posterior segments; ventrally deep purple-brown with the posterior margins narrowly ochreous and the medio-posterior portion of IX with indistinct ochreous shading which extends over to the base of the subgenital plate. Remainder of plate and forceps deep smoky; the first joint of the forceps not squarely truncate apically, (leaving a sharp projecting inner angle, as is found in *occidentalis* and other species), but with the inner margin rounded; furthermore the posterior margin of the subgenital plate

between the forceps-bases is on a level with the apex of this first joint and is weakly and angularly excavate. Setae blackish basally, paling into light ochreous towards apex. Forelegs deep blackish; mid- and hindlegs dull ochreous, tinged with smoky, with the tarsi distinctly smoky. Wings hyaline with deep brown veins and crossveins, the latter weak in the basal two-thirds of costal region and strongly anastomosed in the pterostigmatic area. Length of body, 14 mm.; of forewing, 13 mm

Holotype—♂, Blairmore, Alta., Aug. 28, (J. H. Pepper); No. 3277 in the Canadian National Collection, Ottawa.

Paratype—1 ♂, Fernie, B. C., Sept. 4, (J. H. Pepper).

The species occurs much later in the season than *occidentalis* and is quite distinct from it on both genitalic characters and lack of the ventral abdominal maculation.

***Siphonurus inflatus* n. sp.**

Very similar to *occidentalis* but easily distinguished in the female sex by the presence of a large rounded bulge on the ventral surface of abdominal segment VIII.

Female.—Head with the anterior projecting portion largely dull purplish; vertex dull ochreous, slightly veined with blackish, and with a broad purplish shade behind the ocelli, continued to the occiput by a broad blackish median band. Thorax dull brown, shaded with blackish, with some light ochreous shading on the antero-lateral portions of mesonotum; the scutellum and adjacent areas blackish with orange shading in median area anterior to it. Pleura brown, shaded with purplish and marked with ochreous in the sutures; mesosternum with the anterior portion pale ochreous, crossed by a purplish band, the posterior section deep purplish, shaded laterally with ochreous; metasternum similar to anterior section of mesosternum. Abdomen dorsally purplish-brown, suffused indistinctly with ochreous in the anterior portions of each segment, this pale color projecting backward into the dark area to form poorly defined subdorsal and lateral wedge-shaped patches, best seen on the rear segments. Ventrally pale yellowish with broad lateral purple-black oblique bands which curve forward and join anteriorly forming broad U-shaped marks on segments I-VI, between which are two small dark spots on each segment. On VII the posterior margin is broadly purple-black, leaving an oval pale patch entirely enclosed by the dark areas; on VIII the entire rounded bulge is pale ochreous and connected to the posterior margin by a narrower median band of the same color; it is bordered laterally by broad dark stripes which connect anteriorly by a narrow dark band around the anterior margin of the bulge; IX is largely purple-black with a narrow triangular median pale area, not attaining anterior margin, the base of which includes the subanal plate. Setae blackish, paling somewhat towards apices. Legs shaded rather heavily with purplish over a dull ochreous ground-color; tarsi, especially the fore-tarsi, deep smoky. Wings hyaline with dark veins and crossveins, the costal crossveins faint before the bulla, except the large basal one, and feebly anastomosed in the pterostigmatic area, which shows a very faint purplish tinge. Length of body, 14 mm.; of forewing, 14 mm.

Holotype—♀, Cameron Lake, Waterton Lakes Park, Aug. 31, 1929, (J. H. Pepper); No. 3278 in the Canadian National Collection, Ottawa.

Paratypes—7 ♀, same data; 1 ♀, Blairmore, Alta., Aug. 15, 1930 and 1 ♀, Fernie, B. C., Sept. 4, 1930, (Pepper).

I had at first supposed that this might be the other sex of *autumnalis* but I know of no case among the species of this genus where there is such marked discrepancy in maculation between the sexes and believe therefore that I am justified in considering it as distinct. The present species is very close to *occidentalis* but apart from the bulge of the eighth segment, the ventral maculation on the posterior segments shows points of distinction.

Pseudiron Gen. nov.

Female head with the eyes small and closely appressed, not projecting backward and upward as in *Iron* and *Epeorus* but more as in *Ametropus*; the posterior margin with a rounded median projection, something like that found in *Isonychia*. Hind-legs with the tarsus *fully as long* as the tibia; in all legs the first tarsal joint is *slightly longer* than the second which is subequal to the third, the fourth is one-half the length of the third, and the fifth is equal to the first; claws dissimilar. All femora considerably longer than the tibia. Wings with typical Heptagenine venation. Abdomen very elongate.

Genotype—*Pseudiron centralis* n. sp.

The generic definition is of necessity based on the female sex alone, but the characters found in the length of the leg-joints are striking enough, to my mind, to warrant generic separation. Judging by the shape of the female eyes the genus leads over to the *Ametropus* group and is probably best placed close to *Siphloplecton*.

Pseudiron centralis n. sp.

Female.—Head yellow with basal joints of antennae, most of the area between and exterior to the rear ocelli and the median section of the vertex light ruddy. Pronotum ruddy-brown, yellowish laterally. Mesonotum light brown with a yellowish tinge; pleura light yellow; sternum yellow tinged with brown. Abdomen dorsally light yellow with the rear margins of segments brown and a series of broad, brown, median patches narrowing posteriorly on each segment, thus forming a continuous dorsal band with irregular outer edge much as in *Pentagenia vittigera*; last three segments almost entirely brown; postero-lateral edges of segment I-VII rather deeper in color than remainder of margin, giving an appearance of a lateral row of brown spots. Ventrally pale yellowish; the subanal plate rather short, narrowed posteriorly to about one-half the width of segment IX and with a sharp V-shaped apical excavation. Setae pale, whitish, unbanded. Femora light amber with median and apical reddish-purple bands; tibiae and tarsi pale yellowish. Wings rather narrow, hyaline, with pale longitudinal veins, the subcosta and radius being slightly amber-tinted; crossveins of fore-wings black except the basal crossvein and those in anal area, somewhat thickened in the costal and subcostal areas as far as the bulla; in the pterostigmatic area they are faint and evenly anastomosing. Length of body and forewing, 13 mm.

Holotype—♀, Lawrence, Kan., June 26, (Mrs. L. W. Brown); No. 3238 in the Canadian National Collection, Ottawa.

Paratypes—1 ♀, same data (in alcohol); 1 ♀, Aweme, Man., July 2, (R. M. White).

The rather discolored Manitoba specimen has been before me for several years awaiting further and better material before a description could be drawn up. The species resembles superficially *Heptagenia cruentata* Wlsh. but is widely divergent on structural characters.

***Heptagenia umbratica* n. sp.**

Male.—Head anterior to ocelli light yellow with a blackish streak along the semihyaline clypeus; vertex brown. Thorax and pleura brown, sterna light yellow. Abdomen dorsally with segment II-VI light yellow, semihyaline, the posterior margins narrowly black and a series of brown triangular subdorsal patches based on the posterior margin of each segment, the apex rather blunt and not quite attaining the anterior margin; segments VII-X brown with the dark patches faintly indicated. Ventrally pale yellowish hyaline on segments I-VI, VII-IX being opaque and shaded with brownish. Forceps creamy, tinged with brown at base; setae whitish, unbanded. Legs light yellowish, with scattered black streaks at their bases, the fore femora slightly deeper in color and the fore tibiae and tarsi smoky, the first joint of the tarsus being about one-fifth the length of the second, which is slightly shorter than the third one. Wings hyaline with the fine veins and crossveins brownish in the costal half of forewing and pale elsewhere; only three or four crossveins in the costal area before the bulla.

Female.—Somewhat paler and yellower than the male in coloration but otherwise similar. The head is yellow anteriorly and brown behind the ocelli; the mesonotum is light yellow-brown; the subanal plate is large, yellowish and semicircular.

Holotype—♂, North Hatley, Que., July 25, (J. McDunnough); No. 3275 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—17 ♂, 21 ♀, same data.

The species frequents small, shaded mountain streams. We met with it in various localities around Knowlton, Que. and bred a few from very black nymphs of typical *Heptagenia* appearance with purplish-black gills.

***Heptagenia rusticalis* n. sp.**

Intermediate between *lucidipennis* Clem. and *inconspicua* McD.; size of the latter but coloration more as in the former. In the male genitalia the penes apically lack the inner projection of *lucidipennis* but have the lateral margin drawn out into a slight hook as in the *hebe* group, a feature not present in either of the above-mentioned species.

Male.—Head between the eyes brown, paling into yellowish anteriorly, with ochreous shading at base of antennae. Pronotum brown, shading into yellowish laterally; meso- and metanotum brown; pleura and sternum paler, dull yellowish tinged with brown on pleura. Abdomen dorsally largely brown, paler laterally, the first six segments semi-hyaline, the posterior ones opaque and slightly ruddier in color; a faint pale mid-dorsal line bordered by a pair of indistinct pale streaks, not attaining posterior margin and most distinct on anterior segments; laterally in transmitted light there are evident on each hyaline segment a small pale anterior patch and a larger posterior one, the two separated by a narrow strip of brown. Ventrally dull dirty yellowish, tinged with

ruddy on the opaque posterior segments. Forceps and setae pale smoky. Legs dull yellowish, similar in color to sternum with slight brownish tinges on femora and the fore-tarsus suffused with pale smoky. Wings hyaline with longitudinal veins faint and crossveins almost invisible except the five or six in the pterostigmatic region. Length of body and forewing, 5 mm.

Female.—Very similar to male, but with slightly paler mesonotum. Head largely brown with ochreous shading in the antennal region. Slight brownish shades on pleura and femora. Wings with crossveins in the apical region better marked.

Holotype—♂, S. Bolton, Que., July 13, (J. McDunnough); No. 3287 in the Canadian National Collection.

Allotype—♀, same data.

Paratypes—9 ♂, 7 ♀, same locality, July 5 and 13, (Walley and McDunnough); 16 ♂, 18 ♀, Marsh Creek, Sweetsburg, Que., July 7-15, (Walley, Milne and McDunnough).

Besides being smaller in size the species is somewhat darker in coloration than *lucidipennis* in both sexes and shows a clearer maculation on abdomen dorsally. In tarsal characters it agrees with this species.