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NEW NORTH AMERICAN CAENINAE, WITH NOTES  
(EPHEMEROPTERA)\*

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Genus **Caenis** Steph.

Apart from the small size of the insects the main obstacle in determining material in this genus has been the difficulty in identifying the species described by older authors. For some time we have been amassing material in the group and I believe that, with more or less topotypical specimens of every described species before me, I have tied down these names with a reasonable amount of surety.

Characters drawn from the male genitalia, notably the length of the forceps and the shape of the basal plate, seem to offer good means of separation

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for the various species; the penes, which are united to form a thin eversible membranous sack with the apical portion more or less bent upward, are best observed in either alcohol material or in weak alcohol after treatment with caustic potash; the membrane, due to its delicacy, nearly always collapses during the process of making a slide. In my drawings I have endeavored to reproduce as closely as possible what seems to be the normal shape of this organ but it is probable that this varies to some extent according to the amount of distention and is therefore not a reliable means of separation.

The individual species appear to have a wide range and undergo considerable variation in color and maculation. I have refrained from describing species as new unless they showed tangible genitalic differences but it is quite possible that, when more is known of the early stages, some of these variations may prove to be specific in character; for this reason I have, as far as possible limited my type series to specimens from a single locality.

## KEY TO SPECIES

1. Abdomen without dark stigmatal dots or streaks ..... 2  
Abdomen with dark stigmatal streaks on at least some of the segments.. 3
2. Head and thorax pale; abdomen almost immaculate ..... *ridens* n. sp.  
Head and thorax dark; abdomen with two lateral bands of blackish shading  
..... *tardata* n. sp.
3. Stigmatal streaks confined to posterior abdominal segments; head pale  
..... *hilaris* Say  
Stigmatal streaks present on anterior abdominal segments; head, at least  
partially, dark-shaded ..... 4
4. Hind femora with a dark apical band ..... 5  
Hind femora with the band reduced to a dark dorsal streak ..... 6
5. Femora sprinkled with black dots ..... *punctata* n. sp.  
Femora unsprinkled ..... *diminuta* Wlk.
6. Head crossed by a band of purplish or ruddy shading, leaving the posterior  
portion paler ..... 7  
Head entirely suffused with purplish or blackish ..... 9
7. Mesonotum light yellow-brown; size small (3 mm.) male forceps of moderate  
length ..... *jocosa* n. sp.  
Mesonotum deeper brown; size larger ..... 8
8. Mesonotum light brown; male forceps very long, thin and straight .....  
..... *forcipata* n. sp.  
Mesonotum deep brown; male forceps not so long and slightly curved ....  
..... *latipennis* Banks
9. Size, small (3 mm.); male forceps short ..... *amica* Hagen  
Size large (4-5 mm.); male forceps moderate, curved ..... *simulans* n. sp.

***Caenis hilaris* Say**

Fig. 1.

*Ephemera hilaris* Say, 1839, Jour. Acad. Nat. Sci. Phil. VIII, 43; LeConte, Edit. II, 413.

*Hilaris* was described briefly from specimens taken at light on Sept. 4 in Indiana, presumably at Say's home. The original description reads as follows and I have italicized certain important characters: "Body *white*, eyes black, double; stethidium *pale fulvous*; pleura and pectus with a few abbreviated dusky lines; wings two, ample, costal margin slightly dusky; abdomen depressed, *with*

three brownish punctures on each side towards the tip; seta elongated. Length one-tenth of an inch."

I have before me the following pinned specimens—4 ♂, Oregon, Ill. July 18; 6 ♀, Ames, Ia. July 22; 1 ♂, 1 ♀ subimago, Plummers Is., Md. July 24; 2 ♀, Washington, D. C. Aug.; and a fresh series of 15 females from Lawrence, Kansas, July, and Aug. 14; also alcohol material from Lawrence, Kan. and 1 ♀, Homer Park, Ill. Aug. 10. These specimens agree with Say's description in the salient points and I believe I am justified in applying the name *hilaris* to them. I present a more amplified description, drawn up from the Kansas females:—

*Female*.—Head whitish, with black eyes and pale ocelli heavily ringed with black at base; antennae slightly tinged with smoky beyond the basal joint. Pronotum whitish with two fine black dots posteriorly, situated one on each side of the median line; at times the antero-lateral edges are tinged with blackish. Mesonotum pale yellowish with faint blackish shading in the form of a V-mark before the posterior projection. Pleura and sternum pale with several short blackish streaks at the bases of the wings and legs. Abdomen whitish, frequently tinged with yellowish from the underlying egg-masses; segments I and II dorsally faintly shaded with blackish; on each lateral edge of segments VII-IX a fine, short, blackish streak (I interpret these as the three brownish punctures of Say); venter immaculate. Setae white. Legs white; all femora with a fine, short, black streak on the dorsal edge near apex; fore femora at times slightly tinged with smoky apically; fore coxae situated very close together, mid- and hind-coxae with a small blackish lateral spot. Wings semihyaline whitish with the subcosta and radius purplish-black for a greater part of their length. Length of body 2.5-3 mm.; of wing 2.5 mm.

*Male*.—Apart from secondary sexual characters essentially the same as the female. The head is light ruddy purple in most of my material but I think this is merely discoloration; the fore-femora are possibly slightly more shaded apically with smoky, the fore-tibia faintly smoky and about twice as long as the femur and the tarsus somewhat shorter than the tibia. Forceps short, whitish, evenly narrowing to an apical point, the basal plate projected backward more than usual and covering to a large extent the penes. Size slightly less than that of the female.

### **Caenis ridens n. sp.**

Differs from *hilaris*, amongst other characters, in the entire lack of the lateral black abdominal dashes and the dashes on the dorsal edge of the femora.

*Female*.—Head whitish with slight smoky shading across the posterior portion between the rear ocelli; these and the eyes as in *hilaris*; antennae pale. Pronotum whitish, considerably shaded with smoky. Mesonotum pale yellowish with a slight brownish tinge, the color being somewhat deeper than that of *hilaris*; a faint median dark longitudinal line and considerably smoky shading on the posterior portion; wing bases inwardly with a slight dark streak. Mesonotum with two faint dark transverse streaks near posterior margin. Pleura entirely pale except for a small curved dark mark before the base of the mid-coxa and a slight deepening of color anteriorly; sternum pale. Abdomen dorsally white with the smoky shading of segments I and II confined to the lateral

portions; no traces of the lateral streaks of *hilaris* on segments VII-IX; ventrally immaculate. Setae white, the middle one somewhat longer than the outer ones. Base of forelegs and entire fore femur considerably tinged with smoky, tibia and tarsi paler, the width between the leg-bases wider than in *hilaris*; mid- and hind-legs entirely whitish, immaculate. Wings as in *hilaris*. Size as in *hilaris*.

*Holotype*—♀, Lawrence, Kan., July, (Mrs. L. W. Brown); No. 3235 in the Canadian National Collection, Ottawa.

*Paratypes*—14 ♀, same data.

### ***Caenis diminuta* Wlk.**

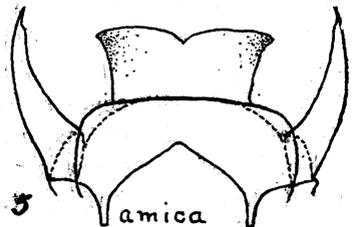
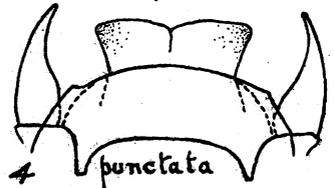
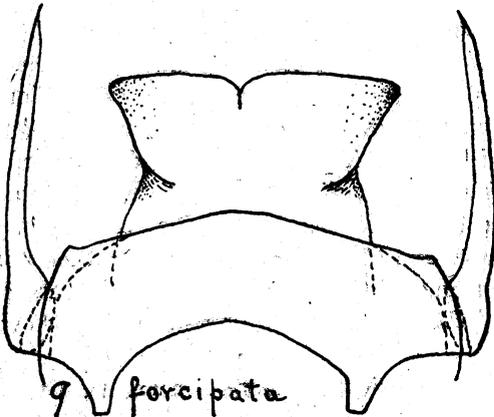
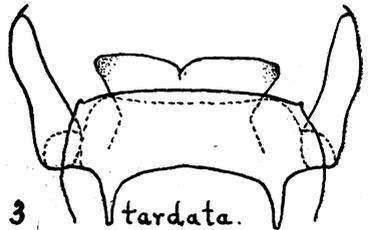
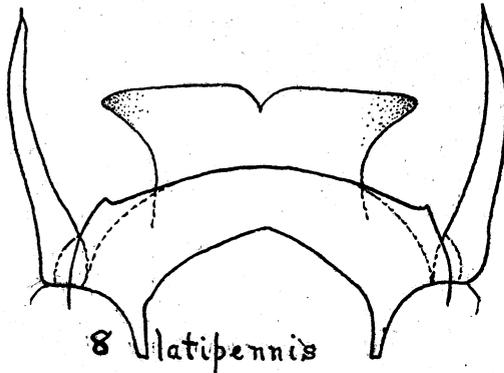
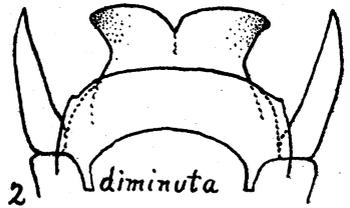
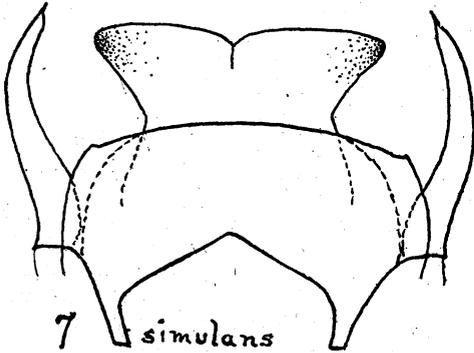
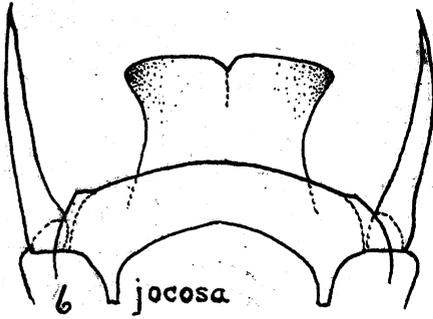
(Fig. 2.)

*Caenis diminuta* Walker, 1853, List Neurop. Ins. Brit. Mus. III, 584; Eaton, 1884, Rev. Mon. Rec. Ephem. 147.

*Male*.—Head blackish over a pale ground-color; antennae pale. Pronotum pale, heavily suffused with blackish, paling slightly laterally; frequently a fine black marginal line along the posterior and lateral borders. Mesonotum deep bronzy brown with slight smoky tinge, the posterior projection paler and shaded with black. Metanotum with a black transverse band. Pleura similar in color to mesonotum, shaded with black on the membranous portion anterior to the wing-base and with a few black streaks below the wing-bases. Sternum pale, slightly tinged with brownish. Abdomen pale yellowish white, shaded heavily dorsally with blackish on segments I-VI; on I and II and a part of III the mid-dorsal section is pale with a median black line; the lateral edge of all these segments is pale with distinct black stigmatal dots and the posterior edge is marked with a black line; on VII and VIII the black shading is reduced to two faint subdorsal patches, a dark stigmatal dash and a narrow posterior border-line; IX is more heavily black-shaded laterally with a deeper yellowish tinge dorsally in which is at times a faint black dot; X is yellowish. Ventrally pale yellowish with fine black streaks in the antero-lateral corners of segments I-VI and two more or less distinct black lateral dots on each side of segments VI-IX, placed obliquely, the posterior one nearest the median line; at times these dots, particularly the outer one, are visible on the anterior sections. Forceps and setae pale. Prolegs with coxae and femora smoky, the latter crossed by an apical blackish band; tibiae and tarsi paler with only tinges of smoky color. Mid- and hind-legs pale, whitish, the coxae faintly tinged with smoky and with a black lateral spot, the femora at times with traces of a fine black line on dorsal edge at base and with a distinct black streak on dorsal edge at apex, *continued downward along the outer side by brown shades so as to form an apical band*. Wings whitish hyaline, as usual with dark subcostal and radial veins. Length of body and wings; 3 mm.

*Female*.—Essential similar to the male in all details of maculation but larger in size, 4 mm.

This species was described from specimens from St. John's Bluff, Fla. and has been generally misidentified. I have before me a few males in alcohol from Stuart, Fla. collected in May and have matched these with a series of 8 ♂, 1 ♀ from Leg Lake, near Gravenhurst, Ont., Aug. 20, (R. Ozburn). The specimens agree well with Walker's and Eaton's descriptions; the extension of the apical femoral black dash into a band seems characteristic; this, along with



the small size, the blackish head, the dark brown mesonotum and the short, stubby male forceps, much as in *hilaris*, should identify the species readily.

### **Caenis amica** Hag.

(Fig. 5.)

*Caenis amica* Hagen, 1861, Syn. Neurop. N. Am., 55.

Following Eaton the species has been sunk as a synonym of *diminuta* but I am not at all certain that this is correct. The type, a male from Baltimore, Md. (Zimmermann), is in the Berlin Museum and through the kindness of Dr. G. Ulmer of Hamburg I have a very full description of this specimen. Two males before me from Indian Head, Md., June 20, seem to fit this description; they are undoubtedly very close to *diminuta* in general maculation but the mesonotum is slightly brighter brown and in the mid- and hind-femora the black apical streak is not continued downward to form a band and there is further a black streak on the outer side of the trochanter, which is lacking in all my specimens of *diminuta*. Combined with this is a slight difference in the male genitalia, the forceps, although short, being somewhat more curved and more finely pointed apically. I am, therefore, for the present holding the name *amica* to these two specimens until more material from this region is available for study.

### **Caenis punctata** n. sp.

(Fig. 4.)

Separable from all species with short male forceps by the presence of scattered black dots over the mid- and hind-femora.

*Male*.—Eyes black, antennae pale; head shaded with purplish over a pale ground, giving a rather ruddy tinge to the whole vertex. Pronotum pale yellowish with a strong black border and heavy blackish shading over the median section, paling laterally; posterior portion paler with black streaking and dots and preceded by a black V-mark, outlining the sutures. Metanotum shaded with black. Pleura yellow-brown as in mesonotum, with blackish streak and shades anterior to wing base, some black suffusion over the episternum and rather heavy black streaking around the bases of the legs and below wing-bases. Sternum pale. Abdomen pale yellowish, suffused with blackish much as in *diminuta*, the pale areas being largely limited to the median sections of I and II and VII-X; black stigmatal dots or dashes on all segments; traces of a median black dotted line on I-III; a median black dot on IX and several minute black dashes on X. Ventrally pale, with the two pairs of obliquely-placed black dots very strong on segments VI-IX and the outer one visible on all the segments anterior to these; the usual black streaks along the lateral border. Setae and forceps pale. Fore-legs shaded with blackish at base, coxa and trochanter largely pale with slight black streaking, femur deep smoky with a blackish apical band and traces of a median one, tibia and tarsus pale whitish with a slight smoky tinge. Mid- and hind-legs whitish with slight sprinkling of small black dots on the femora which show an apical black band as in *diminuta* and also traces of a median one, most marked on mid-femur; coxa and trochanter with black spot; hind tibia with an occasional black dot in basal portion. Wings semihyaline whitish with dark subcostal and radial veins.

*Female*.—Similar to the male in maculation but larger. Size, ♂, 3 mm.; ♀, 4 mm.

*Holotype*—♂, Hemmingford, Que., July 15 (G. H. Hammond); No. 3240 in the Canadian National Collection, Ottawa.

*Allotype*—♀, same data.

*Paratypes*—8 ♂, same data; 1 ♂, Ottawa, Ont., Aug. 26, (F. Ide).

The banding of the femora allies this species with *diminuta* which, however, is without the femoral black dots and has a deeper-colored thorax. The forceps are short, broad at the base, and narrowed considerably at about half their length so that the inner margin shows a strong curve in contradistinction to that of *diminuta*. It is probably this species which Needham figures (1905, Bull. N. Y. Sta. Mus. Pl. XI, fig. 6) as *hilaris* Say.

***Caenis tardata* n. sp.**

(Fig. 3.)

Distinguished from other species with short male forceps by the deep brown mesonotum and the blunt apex of the forceps.

*Male*.—Eyes black, antennae pale whitish, head heavily shaded with blackish. Pronotum pale, shaded with blackish, deepest dorsally; traces of a fine black borderline dorsally but none on the lateral edges. Mesonotum deep brown with the sutures and lateral margins faintly marked in blackish; black shading on the posterior projection. Pleura deep brown with a pale area anterior to the wing-base margined dorsally by a black streak; dark streaks around bases of legs and along anterior margin of episternum. Sternum pale with slight brown tinge. Abdomen dorsally pale yellowish white, the first six segments with broad lateral blackish shading, separated by a pale median area, lateral margins pale, without stigmatal dots, a fine dark line along posterior margin; segments VII and VIII entirely pale, IX and X with faint dark shading and a minute median dot on IX. Ventrally entirely pale yellowish white with the last segment slightly deeper in color and a faint smoky transverse streak (not always present) across the median area near posterior border. Setae and forceps pale. Prolegs with deep brown shading at base, femora smoky with a darker apical spot, tibia and tarsi pale. Mid- and hind-femora pale whitish, coxa with a blackish spot on outer side and another spot on inside at base, femur with a fine dorso-apical black streak (this may be reduced until it is almost imperceptible). Wings as usual. Length of body and wing 3 mm.

*Female*.—Similar to ♂ in maculation but somewhat larger.

*Holotype*—♂, Lethbridge, Alta., Aug. 5 (J. H. Pepper); No. 3243 in the Canadian National Collection.

*Allotype*—♀, same data.

*Paratypes*—15 ♂, same data.

Besides the types I have long series of this species from Milk River., Alta., Sept. 13 (Pepper) and Indian Head, Sask., July 28, 29, Aug. 4, (J. J. deGrise).

***Caenis jocosa* n. sp.**

(Fig. 6.)

Differs from *hilaris* in the rather deeper-colored thorax, the longer forelegs and the much longer and narrower male forceps.

*Male*.—Head pale yellowish, tinged with pale purplish between the eyes but with the rear margin paler again; antennae pale; eyes black. Pronotum

pale yellowish with two blackish dots posteriorly, one on each side of the median line, the area between and anterior to them faintly tinged with ruddy; lateral edge with slight black streaks. Mesonotum light yellow-brown, the posterior projection paler with faint smoky tinges; a faint smoky median V anterior to this section and a dark lateral streak anterior to the wing-bases. Metanotum with a transverse blackish median shade. Pleura pale yellowish, lightly shaded with yellow-brown, most intense on the episternal region; dark streaks at bases of wings and legs and along the anterior margin of mesopleura. Sternum pale yellowish. Abdomen pale yellowish with the dorsal area of segments I-VI suffused with blackish, leaving a pale lateral border cut by a dark line along the posterior margin of each segment; faint black stigmatal dots on segments I, II, V, VI; the blackish area on segment VII is reduced to two subdorsal patches but there is a larger and better defined stigmatal dot; segments VIII-X pale with very faint lateral black shading on VIII, faint median dark dot on IX, and two slight, blackish, median, longitudinal streaks on X; ventrally pale yellowish with a faint transverse lateral black streak on each of the segments I-V and two very faint, obliquely placed, dark dots on each side of segments VI-VIII, the anterior one near the lateral margin and the posterior one about one-half way between this margin and the median line. Forceps pale. Setae whitish. Fore-legs tinged with blackish at base; femora smoky with a black dorso-apical streak; tibiae pale smoky rather more than twice as long as the femora; tarsi pale. Mid- and hind-femora pale yellowish with a black dot on coxa, a faint black streak on trochanter and a strong dorso-apical black streak on femur below which on the outer side is a small black dot. Wings semihyaline whitish with the subcosta and radius purplish-black as usual. Length of body and wings 3 mm.

*Holotype*—♂, Put-in-Bay, S. Bass. Isl. Ohio, July 1-10; No. 3236 in the Canadian National Collection, Ottawa.

*Paratypes*—8 ♂, same data, received through the kindness of Dr. C. H. Kennedy.

The type series shows considerable variation in the amount of black streaking and suffusion on the individual specimens. The holotype is one of the darkest specimens. In the palest one the dark shading of the head and prothorax has almost disappeared and only the two black dots are left of the prothoracic markings, the black dorsal suffusion on the abdomen is so faint as to be almost lacking and only the stigmatal dot of segment VII remains, even this being less prominent than in the holotype; ventrally there is no trace of the obliquely-placed dots. The mid- and hind-legs still show the black spot on the coxa and the apical dash on the femur but the basal dark shading is lacking. All manner of intergrades between these two extremes occur.

The species appears to be widespread and variable; apart from the variation as noted for the type series, I find in specimens from other localities that there is frequently a streak of black shading along the outer side of the two hinder femora and that the black abdominal shading can be even more intensified than in the holotype.

I have examined series from Homer Park, Ill., (Aug. 10); Orillia, Ont., (July 21); Arnprior, Ont., (Sept. 1); Black Rapids, Rideau Riv. Ont., (Aug.

21); Aylmer, Que., (July 20); Knowlton, Que., (June 20); Covey Hill, Que., (June 25); and Fredericton, N. B., (July 8).

***Caenis forcipata* n. sp.**

(Fig. 9.)

Separable from *jocosa* by its larger size and darker mesonotum and from both *jocosa* and *latipennis* by the much longer and thinner male forceps.

*Male*.—Eyes black, antennae pale, head crossed by a blackish or purplish shade between the eyes but paler before the posterior margin. Pronotum pale yellowish, shaded with blackish in the median area; traces of a fine black border line, most distinct on lateral margins. Mesonotum dark yellow-brown with slight black shading on the paler posterior projection and a dark streak anterior to wing-base. Pleura similar in color to mesonotum except for paler areas anterior to and below the wing-bases; some dark streaks around the leg-bases. Sternum pale, with faint brownish tinge. Abdomen pale yellowish, suffused heavily with blackish dorsally on segments I-VI the pale color being restricted to small lateral areas around the stigmal black dots and to a median area on segments I and II which show traces of a dotted black median line; segment VII with black subdorsal shades anteriorly, remaining segments pale; stigmal dots present on segments I-VII, very heavy on VII, obsolescent on posterior segments; three black streaks dorsally on X. Ventrally pale yellowish with only faint traces of the pairs of obliquely-situated black dots on segment VI-VIII. Forceps and setae pale. Prolegs shaded with smoky at base and on coxae and femora, the latter showing a black dorso-apical spot; tibiae and tarsi pale with faint smoky tinge. Mid- and hind-legs pale yellowish, coxa with a black streak on outer side and a black dot on the postero-ventral edge, trochanter with a black streak on outer side and femur with a triangular dorso-apical streak, the apex pointing forward. Wings as usual. Length of body and wings 4 mm.

*Female*.—Similar to the male in maculation but larger and slightly paler, notably the head, prothorax and fore-femora; the head shows two median transverse black streaks at the posterior margin (probably present in the ♂, but hidden by shrivelling) and also the usual two black dots on the pronotum.

*Holotype*—♂, Algonquin Park, Ont., June 19, (J. McDunnough); No. 3242 in the Canadian National Collection, Ottawa.

*Allotype*—♀, Hemmingford, Que., July 15, (G. H. Hammond).

*Paratypes*—1 ♂, same data as holotype; 1 ♂, same data as allotype.

Four male specimens from Victoria Beach, Lake Winnipeg, Man., July 19 (Wallis) seem to belong here. They are slightly paler than the type series in the coloration of the thorax.

***Caenis latipennis* Banks**

(Fig. 8.)

*Caenis latipennis* Banks, 1907, Ent. News, XVIII, 14.

I have two male specimens before me from the type locality, Pullman, Wash. collected on June 7 and July 11, 1898, which agree well with Banks' characterization. The forceps, as noted by him, are practically similar to those figured by Needham under the name *diminuta* (1905, Bull. 86, N. Y. Sta. Mus. Pl. XI, fig. 5).

Three males from Indian Head, Sask. I associate with these Pullman

specimens; they are very close in maculation to *forcipata*, showing the same coloration of head and pronotum as in this species; the mesonotum is darker brown and the black abdominal shading extends over on to the posterior segments to a greater extent; the forceps are also shorter as a comparison of my figures will show.

A small series of 3 ♂, 1 ♀ from Prescott, Ont. would, according to the male forceps, also fall here. These specimens are considerably paler than the western ones in thoracic coloration and in the amount of black abdominal suffusion but this seems to be the usual difference between eastern and western forms; it is probable that Needham's figure of so-called *diminuta* was based on similar specimens.

### ***Caenis simulans* n. sp.**

(Fig. 7.)

Allied to *jocosa* but differing in the larger size, blacker head, lack of the two black spots on pronotum, broader and darker mesonotum and the thicker and more curved male forceps.

*Male*.—Eyes black, antennae pale, head above entirely suffused with blackish. Pronotum pale yellowish with a fine black border line and the median section strongly suffused with blackish which extends laterally along the anterior margin; two black dots of *jocosa* not evident. Mesonotum bronzy-brown, rather deeper in color than *jocosa*, posterior projection paler, with faint black shading; a black streak and black shading anterior to the wing-base. Metanotum pale with black shading. Pleura of same shade of brown as mesonotum, paler around bases of legs with a few faint black streaks; anterior margin with a fine black line. Sternum light yellowish. Abdomen dorsally pale yellowish with black shading as in *jocosa* and black stigmatal dots well-developed on the first seven segments; a median broken black line on the first two or three segments; segments IX and X slightly deeper yellowish with traces of the dorsal dots found in *jocosa*; ventrally pale with the pairs of oblique black dots as in *jocosa*, faint black lateral dashes on the anterior segments and a rather faint row of small, round, brownish spots midventrally, one spot to a segment. Forceps with a faint smoky tinge. Setae pale. Forelegs shaded with blackish at base and on coxae; femora blackish with only a trace of the apical dark band or spot; tibiae and tarsi faintly smoky. Mid- and hind-legs pale yellowish, coxa and trochanter with slight black streaks and dots, dorso-apical femoral black streak present but fainter than in *jocosa*. Wings whitish hyaline with purplish subcostal and radial veins. Length of body and forewing 3.5-4 mm.

*Female*.—Very similar in maculation to male but larger, the average length of body and wing being nearly 5 mm.

*Holotype*—♂, Orillia, Ont., July 21, (C. H. Curran); No. 3239 in the Canadian National Collection, Ottawa.

*Allotype*—♀, same data.

*Paratypes*—9 ♂, 12 ♀, same data.

There is some variation in the amount of black abdominal shading in the type series and occasional specimens occur which show dark shades and faint lateral black dashes on segments VIII-X but in general these segments are less marked than in *jocosa*; the middorsal dotted line may extend as far as

IV and on the ventral surface the midventral spots may be lacking.

The species appears to be wide-spread and rather variable. I have examined specimens from the following eastern localities:— Scotch Lake, N. B. June 19; Knowlton, Que. July 20; Hemmingford, Que. July 15; Rideau Riv. Ottawa, Aug. 21-26; Leg Lake, near Gravenhurst, Ont. Aug. 20; Georgian Bay, Ont. July 2; Algonquin Park, Ont. June 19. Some of these, notably those from Knowlton and Algonquin Park, are considerably darker than the types.

From the west I have long series from Aweme, Man. June 14, Indian Head, Sask. July 10-11 and 26-28 and Waterton Lakes, Alta. July 6-9, which fall here on genitalic characters. The specimens are on the whole larger (notably the females) than eastern ones with darker mesonotum and a tendency for the black suffusion and lateral maculation to extend to the posterior abdominal segments; otherwise I can point to no definite distinctive features and for the present, until more knowledge of the early stages can be obtained, include them all under the name *simulans*.

### **Eurycaenis prudens** n. sp.

(Fig. 10)

*Male*.—Head lightly suffused with pale brownish; antennae pale, eyes black. Pronotum pale yellowish white with faint smoky tinge in the median section posteriorly. Mesothorax rather a bright brown with slight sepia shading in median area, paler laterally and posteriorly. Metathorax light brown. Pleura pale with episternal area tinged with brown. Abdomen entirely pale yellowish white; forceps very faintly tinged with smoky; setae white. Fore-legs with coxae and femora pale smoky, the former widely separated at base; tibiae and tarsi whitish. Mid- and hind-legs entirely whitish. Wings semi-hyaline whitish with subcosta and radius dark for the greater part of their length. Length of body and wing 3 mm.

*Female*.—Similar to male. Length 3.5 mm.

*Holotype*—♂, Saskatoon, Sask., Sept. 9, (K. M. King); No. 3235 in the Canadian National Collection, Ottawa.

*Allotype*—♀, same data.

*Paratypes*—8 ♂, same data.

The species is closely related to the recently described *E. pallida* Ide but shows no black shading on the abdomen; the male forceps are also distinctly shorter. I have four pinned females and a number of specimens of the same sex in alcohol from Lawrence, Kan., July, (Mrs. L. W. Brown) which I think belong here; these show some slight ruddy tinges on the mid-dorsal section of the abdomen but are otherwise similar.

### **Tricorythodes allectus** Needham

*Caenis ?allecta* Needham, 1905, Bull. 86, N. Y. Sta. Mus. 47, figs. 8, 9, (*partim*, imago nec nymph).

*Tricorythus allectus* Cockerell, 1906, Univ. Colo. Studies III (3) 136; Morgan, 1911, Ann. Ent. Soc. Am. IV, 115 (nymph?).

*Tricorythodes allectus* Ulmer, 1920, Arch. fur Naturg., 85, Abt. A, 11, 51.

The identity of this species still puzzles me and while I incline to think the name will eventually be found to take priority over *atratus* McD., I cannot fit the original description to my series of the latter species. Needham's description made, as is his custom, from alcohol material, follows, and I have italicized those portions which conflict with characters in *atratus*:—

"Length 3.5-4.5 mm.; setae about 10 mm. additional; expanse of wings, 8 mm.; foreleg of male 3.5 mm.

General color brown, marked with purplish or slaty grey; head and thorax brown, carinae and margins of ocelli blackish. Wings hyaline, with the usual purplish streak along the radius for two-thirds its length. *Abdomen pale yellowish brown on base and apex, the middle two-thirds washed with grey; some elongate blackish marks on the lateral margins of the 7th to 9th segments; setae white; antennae, femora and forceps yellowish; tibiae and tarsi except the terminal joint, white*".

I have been in correspondence with Dr. Needham regarding *allectus* and he writes me that he can unfortunately find no alcoholic material of the species in his collection; he has kindly forwarded me a slide on which he states 'is mounted what is undoubtedly type material'. This consists of the posterior portions of several male abdomens with genitalia, a single leg and a wing. The genitalia agree with the original figure, except that in the drawing the characteristic oval projection at base of second joint has been omitted; they also seem identical with my slides of *atratus*, especially in the depth of the emargination of the subgenital plate. The leg shows decided traces of black sprinkling on the femur and also a faint ruddy apical band which is often met with in alcohol material of *atratus*.

Based on this slide material I should not have much hesitation in sinking *atratus* to *allectus*. There remains, however, the discrepancy in the abdominal maculation and the fact that at least two species of *Tricorythodes* occur at Ithaca, as material before me, collected by Dr. W. Clemens, distinctly shows. The one, *atratus* (?*allectus*) agrees in size and genitalic characters with Needham's description; the other is considerably larger and might in the female sex fit the description of abdominal maculation given for *allectus*. This larger species I am inclined to consider, on genitalic characters, as an eastern form of *explicatus* Eat. to which, however, it is possible that the name *allectus* might apply; close study at Ithaca is necessary to decide the matter and I leave both names standing for the present in consequence.

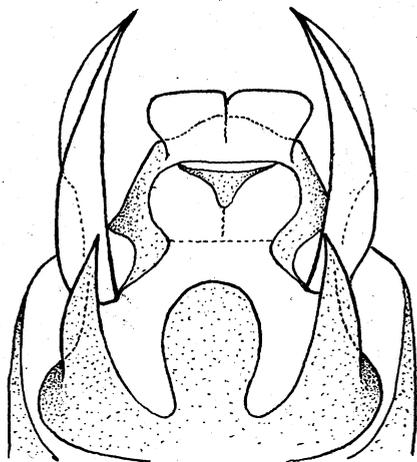
### ***Tricorythodes atratus* McD.**

(Fig. 11)

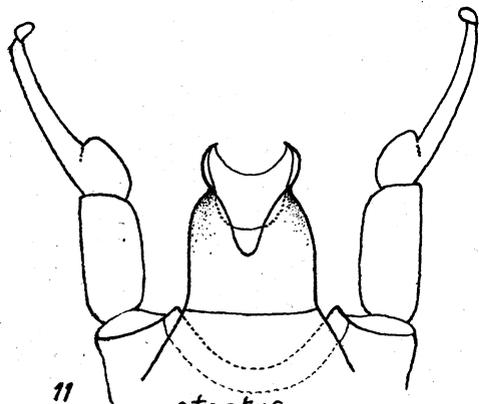
*Tricorythus atrata* McDunnough, 1923, Can. Ent. LV, 39.

This species will require a more careful characterization than the rather brief one given in the original description.

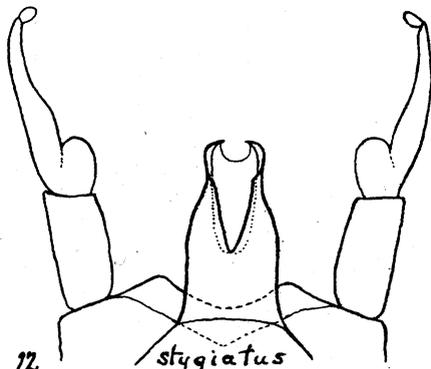
*Male*.—Eyes and posterior ocelli black; antennae with basal joint tinged with ruddy; head dull blackish with a slight ruddy tinge between the eyes and the posterior excrescences shiny brown. Pronotum dull blackish with some shiny black lateral patches. Mesonotum, pleura and sternum deep shiny black-brown with duller, paler, membranous areas anterior to the wing-bases and around the leg-bases. Abdomen appears dorsally blackish in dried specimens due to black shading over a dirty grey ground color; the lateral areas are rather paler and show traces of a row of small blackish spots; each segment on both its dorsal and ventral edges shows black streaks; ventrally dull, smoky grey. Legs with the coxae and trochanters brownish with slight smoky shading; femora smoky grey, overlaid to a varying extent with black streaks and spots, tending to coalesce to form an apical band which at times (especially in alcohol material) shows



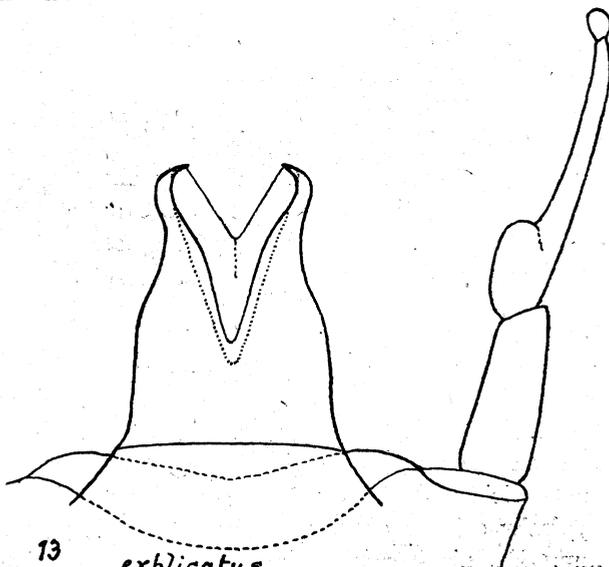
10 prudens



11 atratus



12 stygiatus



13 explicatus

a ruddy tinge; fore tibia 2 mm. in length, brownish, tarsi pale smoky; mid- and hind-tibiae about as long as the femora, dull whitish with a black basal spot and faint black sprinkling across the middle which frequently shows a ruddy tinge; tarsi whitish. Setae pale with faint smoky tinge on basal joints. Forceps smoky at base, paler apically. Wing length 4-4.5 mm.

*Female*.—Essentially similar to the male in color and maculation but with the femora and abdomen slightly paler.

Besides the type series from Wakefield, Que. Aug. 6, I have a series of pinned females from Fulford, Que. Aug. 7 and 1 ♂, 2 ♀, in alcohol from the same locality. Characteristic is the sprinkling of black over the dull gray hind femora and the same sprinkling across the mid-section of the pale tibiae.

### **Tricorythodes stygiatus** n. sp.

(Fig. 12)

*Male*.—Eyes and posterior ocelli black, antennae with basal joint black, paler apically; head dull black with shiny black posterior tubercles. Pronotum dull black on median area, shiny black laterally, a faint ruddy tinge around the mid-dorsal section. Mesonotum shiny blackish, the posterior projection tinged with ruddy. Pleura shiny black with dull areas anterior to wing-bases and at bases of legs. Sternum dull black. Abdomen, dorsally, completely suffused with dull blackish, with slight ruddy tinges in the median area, mostly on the anterior segments; ventrally dull blackish, slightly shiny along lateral edges and with the posterior margin of segments faintly whitish. Genitalia dull whitish. Setae blackish at base, paling to faint smoky outwardly. Prolegs with coxae and trochanters black, femora blackish with a pale longitudinal hyaline streak, tibiae and tarsi whitish with faint ruddy tinge; tibia 1½ mm. in length. Mid- and hindlegs with blackish coxae and trochanters, femora shiny rufo-piceous, tibiae largely rufo-piceous, paling apically, tarsi whitish. Wings whitish hyaline with dark subcostal and radial veins. Length of body 2.5-3 mm.; of wing, 3.5 mm.

*Holotype*—♂, Cascades Pt., St. Lawrence Riv. Que., Aug. 30, (L. J. Milne); No. 3245 in the Canadian National Collection, Ottawa.

*Paratypes*—34 ♂, same data.

The species is still blacker than *atratus*; the small size, the deep rufo-piceous hind-femora and the dark tibiae are characteristic. In all the legs the tibiae are shorter than the corresponding joints in *atratus*. Specimens in alcohol show more extended ruddy suffusion dorsally and traces of a fine, pale mid-dorsal abdominal line. The male genitalia are quite similar to those of *atratus* but the excavation between the bases of the forceps is not so deep and the apical edges of this excavation more rounded.

### **Tricorythodes explicatus** Eaton

(Fig. 13)

*Tricorythodes explicatus* Eaton, 1892, Biol. Cent. Am. Neurop. 11.

Through the kindness of the British Museum authorities a male of the type lot, labelled N. Sonora, Mexico (Morrison) is before me; this series was probably captured on the Arizona-Mexico border. I have a number of male specimens from the vicinity of Ft. Davis, Tex. which undoubtedly belong here; the species is typically a large one, as species go in this genus, having a wing length of 6-7 mm. Eaton's description is quite good but it might be noted that, while the eyes and the head are dull black, all three ocelli are shining milky-

white with dark rings only at their bases; the posterior tubercles are shiny. The pronotum is dull black centrally with a broad truncate band of same color extending along the posterior edge, separated from the dull black lateral area by a somewhat hourglass-shaped shiny brown-black patch. The abdomen is entirely dull black with a slight satiny lustre; the forceps are whitish but the penes are shiny black-brown, paler at base, and bent upward almost at right angles. The foretibia is 2.5 mm. long and light brown in color; all femora are deep pitchy brown, the mid- and hind-tibiae shaded with same color, paling apically into yellowish white; tarsi yellowish white. I have seen no females.

A series from Yellowstone Park, Wyo., July 28 and Sept. 30, also appears to belong here although the specimens are somewhat smaller, with rather paler-colored legs; females taken at the same time (Sept. 30) and which I presume can be associated with the males, are much paler; the lateral portions of the abdominal segments III-VII being broadly yellowish and the ventral surface entirely pale; the legs, except the fore femur and tibia are pale with some blackish streaks on the mid- and hind-femora and a black dot on the coxa. I have before me a similar series from Waskesiu Lake, Prince Albert Nat. Park, Sask., Aug. 25, (King), some of the specimens being almost as large as the Texan ones. In southern Alberta (Lethbridge, Medicine Hat) a much smaller form occurs in number in late August and early September, the wing length averaging about 5 mm. I should have been disposed to consider this a distinct species if it were not for the fact that nymphs from this region agree with some I have from the Yellowstone Park rivers; it would appear therefore, as if the smaller size were due to climatic conditions.

Attention might be called to the fact that in the Alberta form the posterior ocelli are generally black-brown and only occasionally with traces of the milky color so prominent in the typical race; the femora are paler and not so completely suffused with dark shading and this shading is less brownish and more sooty in color. I can find no genitalic differences apart from size; from the two preceding species *explicatus* differs in the very shallow excavation of the sub-genital plate.

A form of this species which I have mentioned under *allectus*, occurs in the east; it is rather duller in color than western specimens but shows no genitalic differences. I have examined several specimens from Wakefield, Que., July 26, others from Knowlton, Que. (Aug.) including nymphs from Brome Lake, Lake Nipigon, Ont., July 27 and a small series from Fall Creek, Ithaca, N. Y., June 29 (Clemens).