GEOLOGICAL
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MINES AND RESOURCES

PAPER 67-59

TWO TERTIARY SAWFLIES (HYMENOPTERA-TENTHREDINIDAE) FROM BRITISH COLUMBIA

(Report, 1 plate and 4 figures)

H. M. A. Rice

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ABSTRACT

Two specimens of sawflies from the Tertiary beds of central British Columbia are in the palaeontological collection of the Geological Survey of Canada. These belong to the family Tenthredinidae and subfamily Allantinae. One has been assigned to the genus Eriocampa and one to Pseudosiobla which seem to agree with the previous assignment of similar fossil species. These two specimens are similar to some previously described species from Florissant, Colorado, but until more specimens are found they seem to be sufficiently different to warrant assigning them to new species.

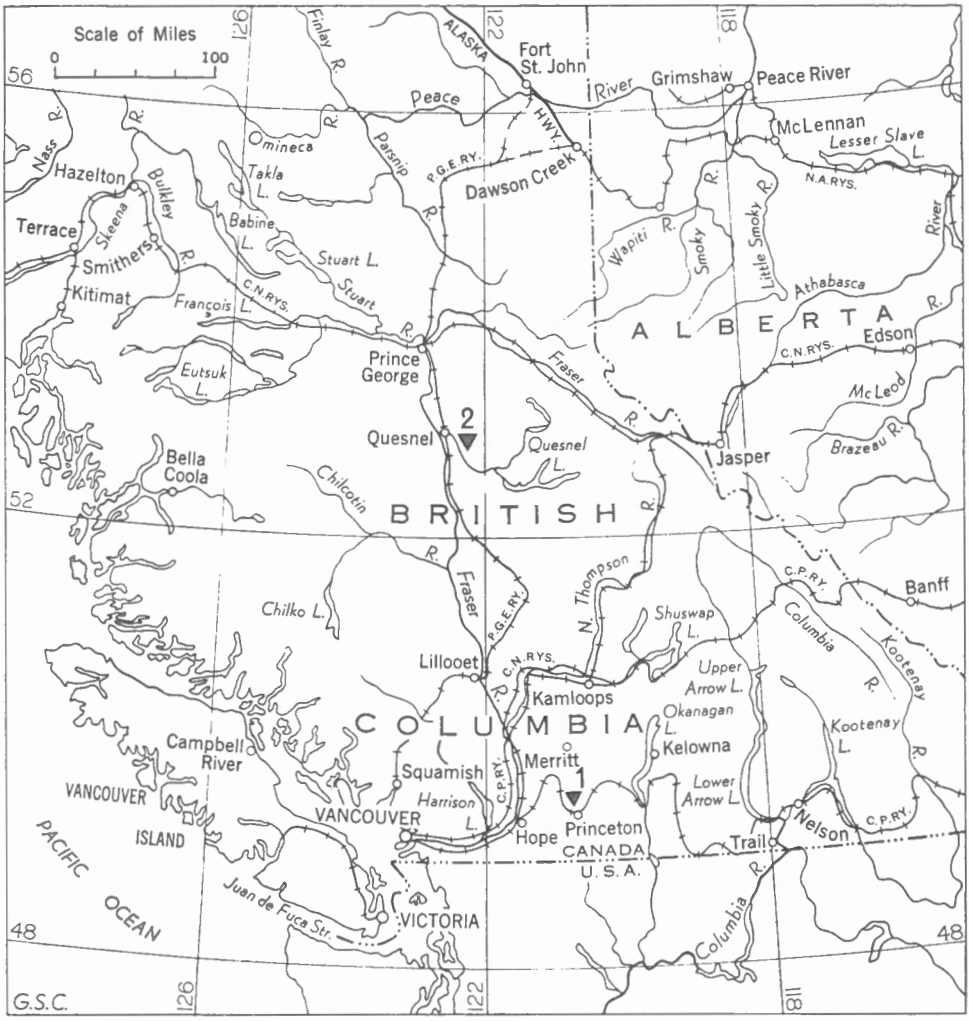

Figure 1. Index Map showing fossil insect localities.
Locality 1. Eriocampa tulameenensis n. sp.;
Locality 2. Pseudosiobla campbelli n. sp.

TWO TERTIARY SAWFLIES (HYMENOPTERA-TENTHREDINIDAE) FROM BRITISH COLUMBIA

INTRODUCTION

In this report are described two new Tertiary sawflies in the fossil insect collection of the Geological Survey of Canada. The Bibionidae in this collection have already been reported (Rice, 1959) and the general nature of the material is fully described there.

Briefly, the Tertiary epoch in British Columbia was marked by widespread vulcanism (Rice, 1947). Throughout the early Tertiary, and perhaps later, small isolated lakes developed on this predominantly volcanic terrain. In these lakes sediments accumulated and in them are preserved the remains of plants and insects. Figure 1 shows the localities at which fossil insects have been recovered, 1 and 2 being those from which the specimens described here were collected. It can be seen from this figure how widely distributed were these lakes although no single one appears to have been large. Indeed there are many others from which as yet no fossil insects have been collected.

Since the writing of the earlier report considerably more is known about the age of the fossiliferous beds. Additional palaeontological, and particularly palynological, studies (Rouse, 1962; Mathews and Rouse, 1963) have supported the Middle Eocene age suggested by the two mammal teeth collected many years ago. Further strong support for this age is provided by four potassium-argon dates determined on the sediments or closely associated volcanic rocks from three different basins (Rouse and Mathews, 1961). These range from 45 to 49 million years, and there seems no longer much doubt that the insect-bearing beds are truly Middle Eocene.

It is interesting to note that Mathews and Rouse (1963) have also recognized a separate and distinctly younger series of sediments and volcanics. The age of these, they suggest, is late Miocene or early Pliocene but, although plant-bearing beds are present, the writer has not heard of any insects being collected from them.

Sawflies are apparently not common in the Tertiary sediments of North America, at least not many descriptions of them were found in a careful search of the literature accessible to the writer. Of these, descriptions of species that seem to be of the same subfamily as the two new species described here are repeated. The literature in which these descriptions appear is scattered and not always easily accessible. Moreover much of it is in nomenclatures no longer in use. The writer, therefore, has not quoted the original text, the references are given for those who wish to examine it, but rather has attempted to present the data in modern, or at least uniform terms.

The writer wishes to express his appreciation for the help and encouragement of members of the Entomology Research Institute of the Research Branch, Department of Agriculture.

PALAEONTOLOGY

The Geological Survey of Canada collection of fossil insects includes representatives of the orders; Orthoptera, Hemiptera, Neuroptera, Hymenoptera, Coleoptera, Trichoptera, and Diptera. By far the bulk of the collection are specimens of the single dipterous family Bibionidae, which were the subject of an earlier report (Rice, 1959). Since its publication more specimens of bibionids have been collected and examined by the writer, and the information they provided supports the conclusions expressed earlier. The two sawfly specimens reported on here come from lake basins at least 200 miles apart, one from near Princeton (Fig. 1, locality 1) and one from near Quesnel (Fig. 1, locality 2), but are probably of roughly the same age. Both are in finely laminated shaly material in which the wings are well preserved. The body of the one from Princeton appears to be in lateral aspect but is too crushed and distorted for any details to be recognizable except for most of one antenna. In the specimen from Quesnel much of the body can be seen well enough to permit some observations. In both specimens the diagnosis must perforce be made mainly on the wing shape and veination, a restriction that is almost universal in the study of fossil insects.

In the sections to follow the writer describes the two specimens referred to, and also attempts to reduce the earlier descriptions of six fossil species of Eriocampa and two of Pseudosiobla to as uniform a format as possible for easier comparison. All measurements, including those given in the earlier descriptions are given in Table I using the terminology of Ross (1937) and Wong (1963). As most of the earlier workers used the illustrations for Eriocampa ovata (Lin) and Pseudosiobla excavata (Norton) given by MacGillivray (1906, Plate XXVIII, Figs. 47 and 48) for reference, these figures are reproduced here (Figs. 2a and 2b). The subsequent generic assignments were apparently based on the resemblance of the specimen in question to these illustrations, those with a long narrow forewing and generally with an angled radial crossvein (2r) being assigned to Pseudosiobla, and those with a broader, rounder wing and a smoothly curved radial crossvein being assigned to Eriocampa. It is unlikely that these generic assignments are correct, indeed Rohwer (1908a, p. 525) throws doubt on one, but as there seems no way in which to make a better assignment from the material available, the writer has followed this practice, which has at least the virtue of keeping the material together. If entirely uninfluenced by earlier work he would probably have assigned both specimens to Dimorphopteryx.

The assignment to higher categories presents fewer problems. Of the general assignment to Symphyta there seems no doubt, indeed in the specimen from Quesnel the broad area of fusion between abdomen and thorax is distinctly visible. Nor does there seem much doubt on the assignment to the family Tenthendrinidae, and, if so, none to the subfamily Allantinae. It is in the generic assignment that the issue becomes fogged.

The following characteristics are believed to be true for the author's specimens, and as far as the information goes also for the others listed here, and are the principal reasons for the conclusions stated above.

Where preserved, the antennae are gently filliform to very slightly clavate, the segments decreasing gradually in length terminally; the anterior margin of the scutellum is v-shaped; anal cell constricted basally but 2A + 3A (see Figs. 3a and 3b for terminology) never fused with 1A; vein

TABLE I

Measurements of wing elements in mm.

	Eriocampa tulameenensis	Eriocampa pristina	Eriocampa wheeleri	Eriocampa scudderi	Eriocampa celata	Eriocampa synthetica	Eriocampa bruesi	Pseudosiobla campbelli	Pseudosiobla megoura	Pseudosiobla misera
1. General dimensions										
Total length		10	9	9	8	7.0	5.0	11	16	17
Abdomen length					4			6	12	
Abdomen width								3.5	5	
Forewing length	8.5	7.5	6.3		6	5.0	4.5	9.5		
Hindwing length	6.1							6.2		
FOREWING										
2. Cell dimensions										
Marginal cell ($2R_1 + 3R_1$)	3.52					2.144		3.93		
$3R_1$ length	2.32	1.955				1.376		2.62		
$1R_1$ length	0.53	0.476	0.450					0.60	0.884	
Anal cell, width at a	0.37							0.43	0.425	
3. Measurements on Rs										
1Rs, anterior edge	0.89		0.450		0.800	0.608		1.13		
2Rs, anterior edge	1.32	0.885	0.750			0.784		1.43		
3Rs, anterior edge	1.34					0.672		1.37		
2r to 2r-m	0.81	0.715	0.450		0.608			1.05		
2r to 3r-m	0.51	0.305			0.368	0.192		0.39	0.850	
4. Measurements on M										
1m-cu to Rs	0.54	0.305	0.195		0.416	0.224		0.56	0.510	
1m-cu to 2r-m	0.73					0.560		0.91		
2m-cu to 2r-m	0.25	0.290				0.128		0.40?		
2m-cu to 3r-m	1.55							1.39?		
5. Measurements along Cu_1										
1M, posterior edge	1.20	1.155	0.555		0.800			1.31	1.734	
M to cu-a	0.59	0.510	0.300		0.248	0.386		0.31	0.374	
6. Vein lengths										
Rs, 1st abscissa	0.37							0.42		
Rs + M	0.52				0.480	0.400		0.61	0.850	
2r-m	0.52							0.55		
3r-m	1.05							1.21		
M	1.08	1.190	0.750		0.832	0.640		1.14	1.275	
1m-cu	0.81	0.680	0.495		0.800	0.512		0.85		
2m-cu	1.10							0.99	1.275	
cu-a	0.60	0.545				0.384		0.76		
a	0.62							0.80	0.510	
7. Ratios										
Ant. edge 1Rs:Rs+M	1.7	1.9	≥1	>2	1.7	±1.5	>2	1.9		
1Rs, basal edge:distal edge	1.9						<1	1.3		
M:1m-cu	1.3	1.75	1.5		1.04	1.3	>1	1.3		
1m-cu to 2r-m: 1m-cu to Rs	1.4					2.5	>1	1.6	±2	
HINDWING										
8. Cell dimensions										
End cell A to cell Cu1	0.41	0.325								
Cu-a	0.66	0.340						0.63		
Cell 1M on cell M-Cu	0.47	0.580						0.60		
Cell 1M on cell R	0.63	0.680						0.97		
1M on M-Cu; 1M on R	0.75	0.85						0.62		

a always present and oblique; 2 r-m and 3 r-m always present, but the latter in some species centrally weak; vein M always joins Sc less than half its length from origin of Rs; Rs + M not markedly curved; M roughly parallel with 1m-cu; PA never shorter than DA. The sculpturing of the various sclerites of the mesothorax, which is diagnostic for some modern species, is never clear in the fossil material, and decisions must be made without this essential information.

It should not be left unremarked that the Allantinae, to which these fossil species seem to belong, is one of the most recent subfamilies to develop, according to the genealogical arrangement figured by Ross (1937, chart 2, p. 62). Moreover the most likely genera to which these specimens can be assigned are the most recent to develop in this subfamily. This is surely rather surprising for creatures that lived nearly 50 million years ago. Admittedly this is but an instant in geological time but it does indicate a considerable antiquity to the order Hymenoptera in its modern sense.

Rohwer prepared a key (1908a, pp. 521-523) for the separation of the Eriocampa and Pseudosiobla, a modified version of part of this key is given here, however, the value of such keys is perhaps open to question as most new specimens discovered will probably be of undescribed species. However, it does point out some of the features in the fossil material that are at present regarded as diagnostic. Only those species with the general characteristics listed above are considered here, although Rohwer's table lists many others.

Key for separation of the species of Eriocampa and Pseudosiobla listed here.

1. Forewing long and narrow, costal margin straighter, 2r generally geniculate apically ..... (2)
   Forewing shorter and broader, costal margin more arched, 2r smoothly arched apically ..... (4)

2. cu-a on 1M more than its length beyond M .....(Pseudosiobla misera)
   cu-a on 1M much less than its own length beyond M ..... (3)

3. Length 17 mm, abdomen 12 mm long..... (Pseudosiobla megoura)
   Length 11 mm, abdomen 5.5 to 6 mm long.....(Pseudosiobla campbelli)

4. Anterior of 1 Rs to posterior of $1R_1$ more than 2..... (5)
   Anterior of 1 Rs to posterior of $1R_1$ less than 2..... (6)

5. Length 9 mm, wings infuscated .....(Eriocampa scudderi)
   Length 5 mm, wings hyaline .....(Eriocampa bruesi)

6. M joins Sc at origin of Rs..... (Eriocampa wheeleri)
   M joins Sc before origin of Rs..... (7)

7. Forewing 5 or 6 mm long ..... (8).
   Forewing 7 to 9 mm long ..... (9)

8. 1m-cu about 4/5 of M ..... (Eriocampa synthetica)
   1m-cu nearly equal to M ..... (Eriocampa celata)

9. 1m-cu about 3/4 M, crossveins of hindwing strong ..... (Eriocampa tulameenensis)
   1m-cu between 1/2 and 1/3 M, crossveins of hindwing absent or weak ..... (Eriocampa pristina)

SYSTEMATIC DESCRIPTIONS

Genus Eriocampa Hartig

Eriocampa Hartig, 1837. Fam. Blattwespen and Holzwespen, nebst Einleitung Naturgesch. Hym., p. 279.

The specimen assigned here to this genus is characterized by having a relatively short broad wing with a curved costal margin, closely resembling Eriocampa ovata (Fig. 2a). However, no parts of the thorax are recognizable and the generic assignment is very much in doubt. This is probably as true of the other species of Eriocampa discussed here but there is no evidence on which a better assignment can be made. As there seems little doubt that the species described here closely resembles the fossil Eriocampa spp. of earlier workers, it seems best to keep them together under a common generic name.

Eriocampa tulameenensis n. sp.

Plate Ia, Figure 3a-e

Description Head, much of thorax, and posterior part of abdomen dark brown or black; legs, in part, and antennae (Fig. 3a) dark brown to fuscous; antennae filiform, not clavate, thickness at about 1.6 mm 0.16 mm; at least 7 segments visible but probably only 9 or 10 in the entire flagellum. Wings excellently preserved; hyaline with dark brown or dark amber veins; no sign of any vestiture despite excellence of preservation.

Forewing shaped as in E. ovata (Fig. 2a) with a pronounced curvature of the costa from stigma to apex (all dimensions measured are listed in Table I and will not be repeated here). Marginal cell normal except that $2R_1$[1] appears to be truncated basally because vein 1r cuts directly across to the subcosta from the angle of 1Rs instead of continuing backward more or less in line with its anterior margin; 2r moderately oblique and smoothly convex anteriorly, inserted in Rs slightly beyond middle of cell 2Rs; apex of cell 1Rs a little less than twice as long as the base of $1R_1$ (Rs + M); 2r-m inserted in Rs about midway between 1r and 2r, and 3r-m a little more than one third the distance to the apex of cell $3R_1$; central parts of veins 2r-m and 3r-m probably weakly developed. Vein M almost straight; cell 1M nearly quadrate, transverse diagonal nine-tenths the length of

---

[1] See Figures 3b and 3c for symbols used throughout for veins and cells respectively (after Ross, 1937).

longitudinal diagonal, much more nearly equal than in E. ovata; cu-a straight, not at all oblique, inserted in Cu_1 at middle of cell 1M, its own length from M; basal part of anal cell strongly constricted.

Hindwing with all crossveins strongly developed, anal cell relatively wide.

Remarks This is probably the largest of the Eriocampa considered here, but the body is too dismembered to be measured. It is characterized by its broad stout wing, curved costal margin, and the position of the insertion of cu-a in Cu_1. The forewing of E. bruesi is scarcely half as long and there are other differences that seem quite sufficient to separate the two species. The forewing of E. synthetica is less than three fifths as long. Other differences are not so marked, but this, together with the absence of m-cu and cu-a in the hindwing of E. synthetica seem to justify the separation of the two. The forewing of E. celata is not much longer than that of E. synthetica, much shorter than that of E. tulameenensis, and M is only very slightly longer than 1m-cu, whereas in E. tulameenensis it is a third longer. Other differences can be seen in the measurements. E. tulameenensis is closer to E. scudderi and E. wheeleri in size but the former has infuscated wings and other distinguishing features and in the latter cu-a is inserted near the basal corner of cell 1M, not at its middle. Other differences can be seen in Table I.

E. tulameenensis most nearly resembles E. pristina, and a good case could be made for regarding them as con-specific. There are differences, however, and in view of the policy the writer outlines below, he is separating them. In E. tulameenensis 1m-cu is inserted far nearer the cell 1Rs than in E. pristina, and vein M is much nearer 1m-cu in length. There are marked differences, too, in the hindwing.

From all the Pseudosiobla, Eriocampa tulameenensis can be distinguished by the broad, arched shape of the forewing and the smoothly curved 2r.

The naming of fossil insects presents its own special problems; specimens are scarce and there is never an opportunity to study a population, consequently variation within a species cannot be recognized. When faced with specimens that show certain differences should they be assigned to a single species or separate species? The species discussed here came from localities very remote from each other geographically and who can say precisely how remote in time; at present a difference of half a million years can rarely be detected in separate basins of early Tertiary sedimentation, how much change can evolution produce in a species in that time? Therefore if we assign to a single species specimens that were in fact half a million years apart in time their identity will be taken as sufficient evidence to correlate the beds in which they were found and an error will have been made; here the writer speaks as a geologist. If on the other hand the two were given separate specific names this error would have been avoided, although the similarity between the two species would suggest a tentative correlation of the beds concerned. The writer therefore feels that it is better to be a splitter than a lumper unless or until enough specimens can be secured to permit the establishment of an integrated series.

Locality and Type Princeton Group, on Canadian Pacific Railway west of Princeton Station, British Columbia (Fig. 1, locality 1); coll. W.L. Fry, 1957. Holotype, GSC No. 22688.

Eriocampa pristina Cockerell

Eriocampa pristina Cockerell, 1910, Bull. Am. Mus. Nat. Hist., vol. XXVIII, Art. XXV, pp. 276, 277.

Description Based on Cockerell's original description. Head and thorax black, abdomen light ferruginous; wings hyaline.

Forewing generally resembles Eriocampa ovata. Costal cell large as in Eriocampa, apparently with crossvein; stigma large; anterior edge of 1Rs much longer than Rs + M but not twice as long; 3r-m arched inwards; lower apical corner of 2M a little less than a right angle; anal cell with strong basal constriction, vein a oblique.

Hindwing with veins m-cu and 2r-m apparently absent or very weak; 1M on R only one sixth longer than 1M on M-Cu.

Locality and Type Miocene shales, Florissant, Colorado, 1909; coll. George Sternberg, Am. Mus. Nat. Hist., No. 10314.

Eriocampa wheeleri Cockerell

Eriocampa wheeleri Cockerell, 1906, Bull. Am. Mus. Nat. Hist., vol. XXII, Art. XXVI, pp. 500, 501, Figure 2.

Description The following is based on Cockerell's original description with additional information from Brues (1908, p. 264), Rohwer (1908b, p. 592, and 1908a, pp. 522, 525, 526) and Cockerell (1911, p. 75). Moderate sized species, type probably a little smaller than E. scudderi and considerably smaller than E. tulameenensis. Head and perhaps extreme base of abdomen and posterior end of thorax black, rest of thorax and abdomen brown; wings hyaline, veins brown; thorax about 2 mm broad.

Forewing generally like E. ovata; vein 2r less oblique; 1r deflected anteriorly to subcosta, not extending directly back from corner of 1Rs; 1Rs on Rs not much longer than Rs + M; M inserted at basal corner of $1R_1$ (Cockerell's Fig. 2 shows a free segment of Rs present posteriorly but the figure is of doubtful reliability); M about 1 1/2 times as long as 1 m-cu; anal cell as in E. ovata.

Locality and Type Tertiary shales, Florissant, Colorado, at Station 14 (some 3/4 mile southwest of Florissant, on hill sloping north); coll. W.M. Wheeler, 1906. Type in Am. Mus. Nat. Hist.

Eriocampa scudderi Brues

Figure 2c

Eriocampa scudderi Brues, 1908, Bull. Mus. Comp. Zool. Harvard College, vol. LI, No. 10, p. 264.

Description The following is based on Brues original description supplemented by information from Rohwer (1908a, p. 522 and 1908b, p. 592) and Cockerell (1911, p. 74). A well preserved specimen except for hindwings and antennae. Moderate size; body including abdomen black, wings infuscated; with legs, femora and tibia.

Forewing, marginal cell long and pointed; 2r strongly oblique and smoothly curved anteriorly, inserted in Rs much nearer tip than base of 2Rs; 1Rs on Rs more than twice Rs + M; $1R_1$ small, narrow at tip, apical side of cell about two thirds Rs + M; 1Rs long and narrow, 2r-m less than one third length of cell. M joins subcosta at origin of Rs; M longer than 1m-cu; vein a only moderately oblique, anal cell weakly constricted basally but 2A + 3A thickened at constriction.

Remarks Differs from Eriocampa tulameenensis by having infuscated wings, a longer narrower 1Rs and other differences, although probably near it in size.

Locality and Type Florissant, Colorado; coll. 8298 S.H. Scudder. Type No. 2040, Mus. Comp. Zool.

Eriocampa celata Cockerell

Eriocampa celata Cockerell, 1914, Proc. Acad. Nat. Sci. Phil., vol. 66, p. 642.

Description Based on Cockerell's original description. Ferruginous; head, posterior half of thorax, and apex of abdomen apparently black, legs ferruginous; forewings reddish hyaline, veins pallid; antennae not clavate, width at about 1.6 mm from base 0.208 mm.

Forewing, vein 1r gently arched, joins stigma 0.208 mm below costa; 1M not quite parallel with 1m-cu, upper end of 1m-cu being about 0.208 mm too far apicad, nearly as in E. ovata; 1M and 1m-cu nearly equal; anal cell constricted basally.

Remarks Differs from E. synthetica, E. pristina, and E. wheeleri by measurements of cell 1M, and from E. scudderi and E. bruesi by comparative measurements of $1R_1$ and 1Rs; much smaller than E. tulameenensis and other differences.

Locality Miocene shales, Wilsons Ranch, Florissant, Colorado; coll. Wickham.

Eriocampa synthetica Cockerell

Eriocampa synthetica Cockerell, 1911, Bull. Am. Mus. Nat. Hist., vol. XXX, Article VI, pp. 74, 75.

Description Based on Cockerell's original description; all measurements given listed in Table I. A small species, head and thorax black, abdomen dark fusco-ferruginous; wings hyaline, veins dark, costal cell entirely fuscous.

Forewing, 2r oblique, arched in middle (as in Pseudosiobla), 1r extends straight back from anterior margin of 1Rs; 1Rs on Rs much longer than Rs + M but not nearly twice as long; 2Rs on Rs twice as long as Rs + M; Rs + M bent anteriorly at base; 3r-m slightly arched inwards; M straight, meets subcosta just before origin of Rs; M longer than 1m-cu; cu-a more oblique than in E. ovata; basal part of anal cell strongly contracted, vein a very oblique.

Hindwing, with m-cu and cu-a probably very weak or absent; and cell narrow, 0.24 mm wide.

Remarks Cockerell suggested that this species resembles E. wheeleri but is smaller, moreover the anal crossvein is more oblique and 1r extends straight back to the subcosta from the angle of 1Rs not angling anteriorly as in E. wheeleri. Other differences can be noted in the measurements listed in Table I.

Locality Miocene shales, south end of Fossil Stump Hill, Florissant, Colorado; coll. W.P. Cockerell, March 1911.

Eriocampa bruesi Rohwer

Eriocampa bruesi Rohwer, 1908, Bull. Am. Mus. Nat. Hist., vol. XXIV, Art. XXX, p. 592.

Description Based on Rohwer's original description with some additional information from Cockerell (1911). This is the smallest species listed here (see Table I). Antennae short, stout, slightly clavate; joints 4, 5, and 6 equal. Head and thorax closely, rather finely granular or punctate; posterior tarsi longer than tibiae, first joint equal to or slightly longer than second plus third. Colour deep brown or black, basal two thirds of abdomen ferruginous. Wings hyaline.

Forewing, intercostal vein apparently absent, lower margin of stigma rounded; 1Rs on Rs more than twice as long as Rs + M; 2r-m shorter than base of cell 1Rs and much shorter than 3r-m; M joins Rs at subcosta; 1m-cu inserted in Rs in basal half of 1Rs, 2m-cu inserted in Rs just before middle of 2Rs; cu-a on Cu_1 in basal third of 1M; anal cell not strongly constricted, anal crossvein decidedly oblique.

Remarks This species is distinguished from all the others by its small size, but other differences are noted above and in the key.

Locality and Type Tertiary shales, Florissant, Colorado, Station 13B; coll. Melford Smith, 1908. Type in the University of Colorado.

Genus Pseudosiobla Ashmead

Pseudosiobla Ashmead, 1893. Can. Ent., vol. 30, p. 308.

The specimen assigned here to this genus is characterized by having a relatively long narrow wing and straight costal margin, the apex of the wing being in the anterior quarter of cell 3Rs, as in Pseudosiobla excavata, not at or below its mid point as in Eriocampa ovata, E. tulameenensis, and, to judge from the original figures, E. wheeleri, and E. scudderi. Furthermore 2r seems to be decidedly geniculate as in Pseudosiobla excavata, not smoothly curved as in Eriocampa ovata. The assignment to Pseudosiobla is extremely doubtful, but it cannot be assigned with any certainty to another genus and this assignment has at least the merit of bringing the fossil material together.

Pseudosiobla campbelli n. sp.

Plate Ib, Figure 4a-f

Description This is the smallest specimen listed here under Pseudosiobla but larger than any of the Eriocampa. Sex, female. It is excellently preserved except for the antennae and legs. Head, thorax, and posterior segments of abdomen dark brown to black, central segments of abdomen probably pale; saw visible in vertical aspect; sculpturing of thorax uncertain but probably neither roughly punctate nor smooth and polished; praescutum more as in Dimorphopteryx than Eriocampa (Ross, 1937, p. 157, Figs. 330 and 331); wings hyaline, veins very dark brown or black, short stout hairs plentiful over entire wing membrane.

Forewing, relatively long and narrow, costal margin not strongly curved, radial sector intersecting it not far from apex of wing; apex well above centre line of 3Rs as in P. excavata, not on or below it as in Eriocampa ovata and E. tulameenensis. Marginal cell somewhat truncated basally because of the anterior deflection of 1r back from the anterior margin of 1Rs; 2r angulate apically as in P. excavata, inserted in 2Rs two thirds distance from basal edge. Cell 1Rs on $2R_1$ not quite twice as long as Rs + M; 3r-m on Rs not quite 1/3 from base of $3R_1$; central parts of 2r-m and 3r-m probably weakly developed; vein M slightly convex basally, joins subcosta slightly basad of origin of Rs; cell 1M slightly more oblique than in Eriocampa tulameenensis, short diagonal about 7/10 as long as longitudinal diagonal; cu-a moderately oblique, inserted in cell 1M nearer basal corner than middle of cell; basal part of anal cell poorly preserved but probably not strongly constricted; vein a very oblique.

Hindwing, not well preserved, but anal cell seems relatively narrower than in Eriocampa tulameenensis.

Remarks Larger than any of the Eriocampa listed here, forewing more than twice as long as for E. bruesi and almost twice as long as for E. synthetica

and E. celata. Wing more than a third larger than for E. wheeleri and M inserted in subcosta well back from origin of Rs. Pigmentation of wings and abdomen different from E. scudderi, 2r not smoothly curved, 1Rs on $2R_1$ less than twice Rs + M, not more than twice. The forewing of E. pristina is considerably shorter and there are other differences.

Pseudosiobla campbelli resembles P. megoura but is considerably smaller, the abdomen in particular is half as long and 4/5 as wide, vein a is also probably more oblique. It is also smaller than P. misera, 1M is much less elongate, and cu-a much less than its own length from M.

Locality and Type Horesefly River, bank at side of Hobson Placer Mine, 4.3 miles north of village of Horsefly (Fig. 1, locality 2); coll. R.B. Campbell, 1959. Holotype, GSC No. 22689.

Pseudosiobla megoura Cockerell

Pseudosiobla megoura Cockerell, 1907. Bull. Am. Mus. Nat. Hist., vol. XXIII, Article XXIV, pp. 612, 613.

Description The following description is based on Cockerell's original description supplemented by information from Rohwer (1908a). This is a large species, the abdomen particularly large, nearly 12 mm long and 5 mm wide; head and thorax apparently black, abdomen with a broad dark band on each segment; wings hyaline.

Forewing, like P. excavata but stigma narrower, hardly as bulging below; costal cell more evident; 2r not quite as genuculate as in P. excavata; 3r-m joins Rs much farther from 2r; Rs + M relatively longer; M at subcosta more basad (.51 mm) from origin of Rs; cu-a in basal quarter of cell 1M; basal constriction of anal cell slight; vein a less oblique.

Remarks Rohwer did not agree that this is a Pseudosiobla but did not care to disturb the assignment. Moreover he regarded it as possible that P. misera is the same species but was not prepared to make the decision.

Locality Florissant, Colorado, Station 13; coll. presumably Cockerell.

Pseudosiobla misera (Brues)

Tenthredo misera Brues, 1908. Bull. Mus. Comp. Zool., vol. LI, No. 10, p. 270.

Pseudosiobla misera Rohwer, 1908. Bull. Am. Mus. Nat. Hist., vol. XXIV, Art. XXV, p. 526.

Description Based on Brues original description supplemented by information from Rohwer (1908a). A large and robust species; head and thorax dark, probably originally black varied with brown; abdomen pale and indistinct; antennae slender and tapering very gradually to the tip, joints towards base of flagellum three or four times as long as wide; wings hyaline, veins rather weak and light in colour.

Forewing, marginal cell long; 2r distinctly arcuate; $1R_1$ narrow above, Rs + M being nearly twice 1r; 1m-cu in basal third of 1Rs; diagonal of 1M 2 1/4 times M; cu-a on Cu_1 more than its own length from M; anal cell constricted imperceptibly at the crossvein and widens gradually behind it; vein a distinctly oblique.

Remarks Rohwer regarded this as probably the same species as P. megoura although the point of insertion of cu-a in Cu_1 is very different. He was certain that it is not a Tenthredo, vein a being oblique.

Locality and Type Tertiary shales, Florissant, Colorado; coll. 12,400, S.H. Scudder. Type No. 2048, Mus. Comp. Zool.

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Plate 1a. Eriocampa tulameenensis n. sp. x 5

Plate 1b. Pseudosiobla campbelli n. sp. x 5

Figure 2

a. Eriocampa ovata (Linneus)
(after MacGillivray, 1906).

b. Pseudosiobla excavata (Norton)
(after MacGillivray, 1906).

c. Eriocampa scudderi Brues
(after Brues, 1908).

Figure 2

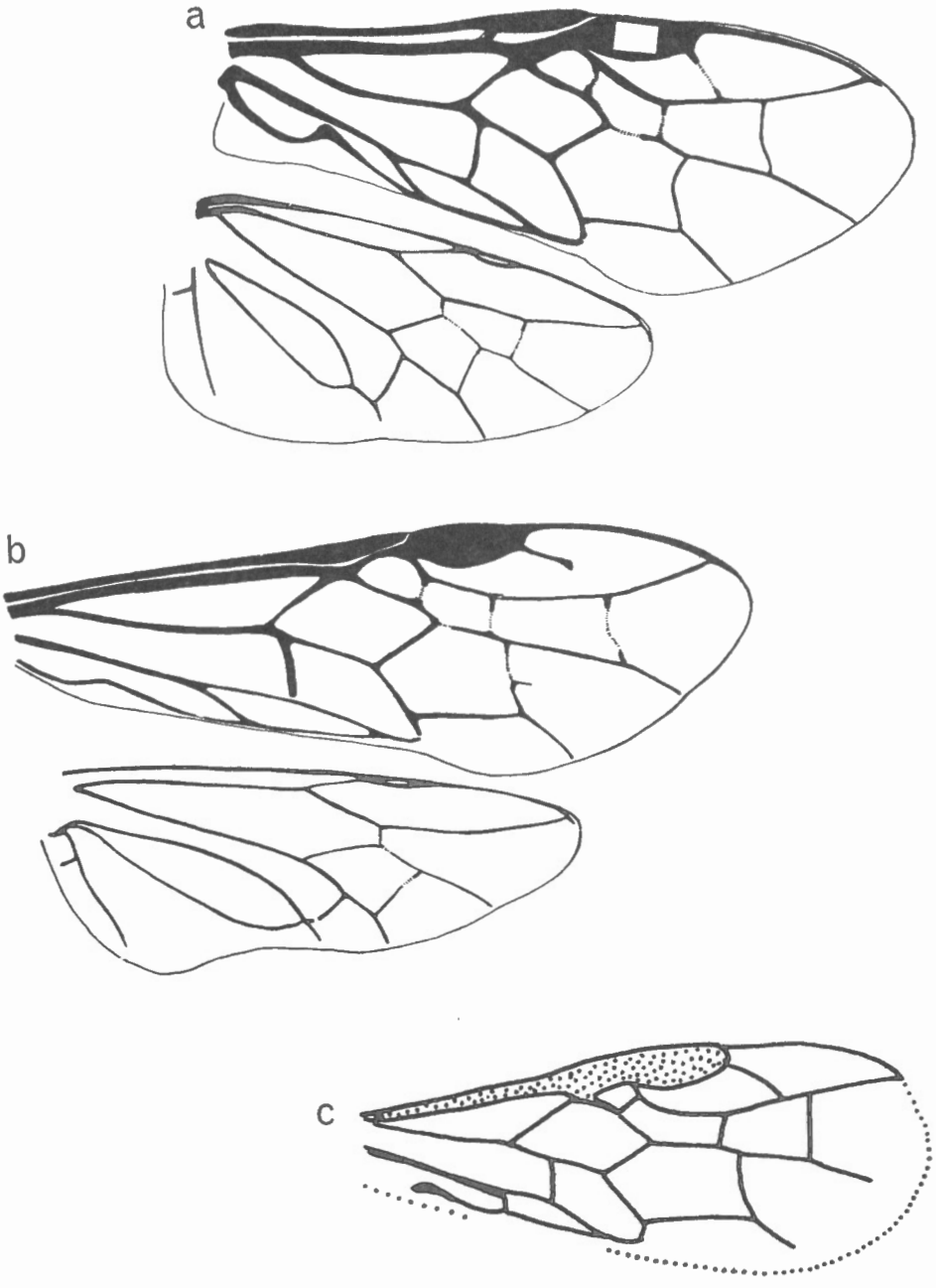

Figure 3

Eriocampa tulameenensis n. sp.

Holotype, GSC No. 22688

a. Antenna.

b. Right forewing, showing nomenclature of veins.

c. Left forewing, showing nomenclature of cells.

d. Right hindwing.

e. Left hindwing, showing nomenclature of cells.

Figure 3

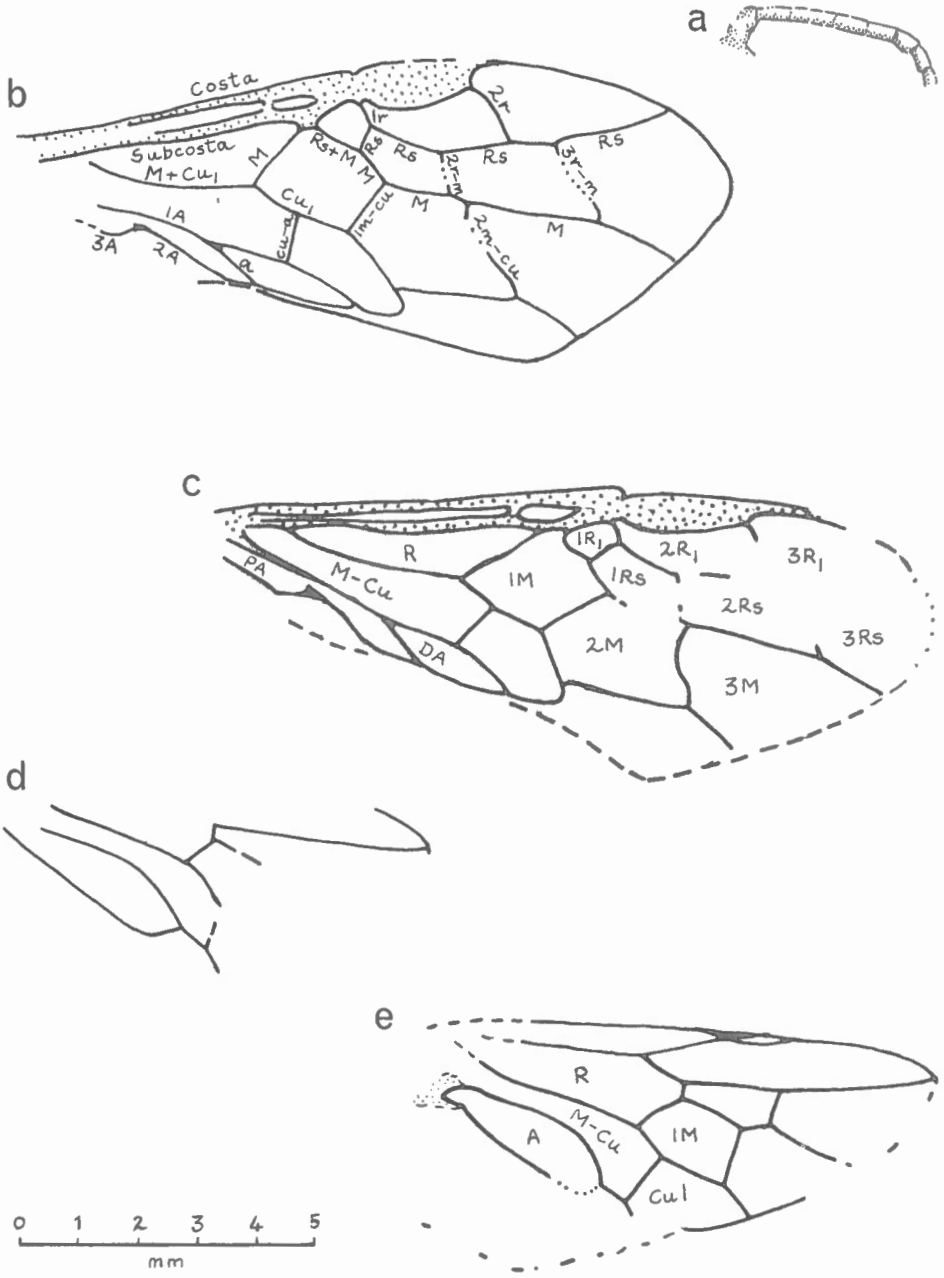
a
b
Costa
Subcosta
M+Cu1
M
Rs+M
Rs
Cu1
1A
3A
2A
R
cu-a
m-cu
1r
2r
Rs
2r-m
3r-m
2m-cu
c
R
PA
M-Cu
DA
1M
1R1
1Rs
2R1
3R1
2Rs
3Rs
2M
3M
d
e
R
M-Cu
A
1M
Cu1
0 1 2 3 4 5
mm

Figure 4

Pseudosiobla campbelli n. sp.

Holotype, GSC No. 22689

a. Dorsal aspect.

b. Dorsal aspect of thorax.

c. Right forewing.

d. Left forewing.

e. Left hindwing.

f. Right hindwing.

Figure 4