

**Synopsis of
Nearctic Ichneumoninae
Stenopneusticae with
Particular Reference to the
Northeastern Region
(Hymenoptera)**

Part VII

**Synopsis of the Trogini
Addenda and Corrigenda**

by

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Synopsis of Nearctic Ichneumoninae Stenopneusticae with Particular Reference to the Northeastern Region (Hymenoptera)

Part VII¹

Synopsis of the Trogini Addenda and Corrigenda

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VI. Tribe Trogini

The tribe Trogini represents, in my view of the evolutionary growth of the subfamily Ichneumoninae, its uppermost branch. The high specialization of this tribe is manifested firstly by the reduction of the last two tergites in favour of the extremely sclerotized, extremely coarsely sculptured and strangely moulded anterior tergites (as evident for example in *Trogus* Panzer and *Cryptopyge* Kriechbaumer), and secondly especially by the hump-shaped abbreviation of the propodeum, which culminates in a smooth and shiny boss, or arched transverse ridge, resulting from the extreme reduction of the area superomedia. If we look over the multitude of forms included in the Ichneumoninae, it seems that the changing structure of the propodeum reflects the different steps of evolution within the subfamily better than any other part of the body, and that the propodeum therefore offers a useful and indeed almost the only character for tribal distinction.

From the simple and primitive box-shaped propodeum of the genus *Ichneumon* Linnaeus an almost uninterrupted chain of gradually changing propodeal structures leads over the more and more abbreviated and apically rounded shape of the Protichneumonini to the extremely reduced, hump-shaped propodeum of *Trogus* Panzer. In 1934 (Mitt. Zool. Mus. Berlin, XX) I cut this chain into three parts: the tribes Ichneumonini, Protichneumonini and Trogini. Neither between the Ichneumonini and the Protichneumonini, nor between the Protichneumonini and the Trogini, exists there an absolutely clear-cut separating line. As can not be expected otherwise, a few intermediate forms occur here and there. But the overwhelming majority of forms fit well into one of the three taxonomic categories (or else in one of the other tribes which have branched off sideways from the huge basal tribe Ichneumonini).

For the separation of the Trogini from the Protichneumonini I used the structure of the propodeum as the most important and deciding character, attributing to the Trogini all forms which display a raised, smooth boss or ridge as the culminating part of the propodeum, instead of a regular area superomedia, the propodeum being abbreviated and slanting downward from the raised boss not only backwards toward the base of coxae III, but also anteriorly in the direction toward the postscutellum. All genera included in the tribe Trogini since 1934, on account of the mentioned structure, seem to me distinctly more closely related to the genus *Trogus* than to the genus *Protichneumon*. This status of relationship is also confirmed by the peculiar, irregularly quadrangular (often petiolate) shape of the areolet in the forewing of the Trogini, a characteristic feature in their wing venation not shared by the Protichneumonini. Only the Holarctic

¹Parts I and II of this paper were published as Supplements 15 and 18 accompanying Volume XCII and Parts III, IV, V, and VI as Supplements 21, 23, 26 and 27 accompanying Volume XCIII of *The Canadian Entomologist*. The pagination of Part VII is continuous with that of Part VI. Unless otherwise specified, footnote, figure and table references apply only to the part in which they are found.

genus *Catadelphus* Wesmael, included by Hopper and also here in the tribe Trogini occupies an intermediate position in propodeal structure as well as in wing venation, suggesting a slightly closer relationship to the Protichneumonini than to the Trogini.

In the recently published Catalogue of the Oriental Ichneumonidae², in which I took part as a co-author of the section Ichneumoninae, H. Townes has stated³ that he favoured a different hypothesis concerning the interpretation of the Trogini. We have discussed this matter at length without reaching agreement. Starting from the fact that the group of genera represented by *Trogus* shows certain differences in the carination of the propodeum (and other differences also) from the *Callajoppa* group (which is represented in North America for example, by *Conocalama* Hopper, *Gnamptopelta* Hopper and *Tricyphus* Szépligeti), Townes decided to restrict the tribe Trogini to the group of genera around *Trogus*, lumping the entire *Callajoppa* group with the tribe Protichneumonini. In other words he prefers to cut the chain of forms "above" the *Callajoppa* group instead of "below" as done until now (see Heinrich, 1934, Mitt. Zool. Mus. Berlin, XX, Tafel 1). The difference between the *Callajoppa* group and the *Trogus* group is obvious. But nevertheless the relationship between both groups is closer, in my opinion, than the relationship between the *Callajoppa* group and *Protichneumon*, as discussed above. Besides, we should be aware that when we ignore the striking difference in propodeal structure, which exists between the Protichneumonini and the *Callajoppa* group, as a distinct tribal character, we would be forced by logical conclusion to lump also the tribe Ichneumonini with the tribe Protichneumonini, because their distinction is likewise based entirely on differences in propodeal structure, which are certainly not more pronounced than those between the *Callajoppa* group and the Protichneumonini. Therefore I see neither the need nor an advantage in the change proposed by H. Townes, which would replace an existing minor and perhaps tolerable diversity within the traditional tribe Trogini by creating another, perhaps greater diversity in the so-far rather homogenous tribe Protichneumonini. The solution of the problem which I would prefer, and which I have applied in the following treatment, is more conservative and at least not less in accordance with the morphological evidence.

I propose introducing for the two groups of the tribe Trogini the new status and names as subtribes: (1) Callajoppina, based on the genus *Callajoppa* Cameron and (2) Trogina, based on the genus *Trogus* Panzer. The Callajoppina have evidently ascended from the Protichneumonini; they are linked with the latter by intermediate forms, particularly by the genus *Catadelphus* Wesmael. The Trogina seem to represent the more highly specialized group of the two. The morphology of each subtribe will be treated separately under its name.

Biology

The Trogina are parasites of Rhopalocera, mainly of the genus *Papilio* L. The Callajoppina are parasites exclusively of Sphingidae. As far as known, they are particularly specialized on the evolutionally oldest groups of hawk-moths, the Acherontiinae and Ambulicinae, seemingly in contrast to the likewise sphingid-feeding *Protichneumon* species, which prefer the evolutionally younger Sphingidae Semanophorae as hosts. One species of the oriental genus *Neofacydes* Heinrich, which belongs morphologically clearly in the subtribe Trogina, but is in its abdominal structure less specialized than the genus *Trogus*, has been

²See Townes, Townes and Gupta, 1961, A Catalogue and Reclassification of the Indo-Australian Ichneumonidae, p. 335. American Entomological Institute, 5950 Warren Road, Ann Arbor, Michigan, U.S.A.

reared in China from a sphingid of the subfamily Ambulicinae. This record hints at the correctness of my morphological hypothesis, that the Rhopalocera-feeding Trogina may have ascended from the slightly less specialized sphingid-feeding Callajoppina, and that both groups can be united in one tribe.

Remarks

This tribe has already been treated by H. Pearson Hopper in 1939 (Trans. Amer. Ent. Soc., 65: 307-346). His synoptical revision represents a careful study based on nearly all material available in North America at the time of publication. In spite of the more than 20 years passed since then, the work as a whole still stands, and my following treatment of the tribe is based in many parts on Hopper's publication. Besides minor changes and additions which I have made, only one major point in Hopper's monograph was found to be in need of critical revision: his subspecifical associations concerning the species *Conocalama occidentalis* (Cresson). Considering the great structural similarity of species which is characteristic of this tribe, the paucity of available material and of biological records, Hopper's attempts to associate certain similar forms as subspecies was premature. Unfortunately the mentioned conditions have not changed very much since 1939, and especially the biological research on this group seems to have stagnated in the meantime. Consequently my own treatment of the tribe could make relatively small progress, leaving numerous problems still unsolved.

VI. A. Subtribe Callajoppina, new subtribe

Morphological characters

Flagellum.—Of females bristleshaped, long, ventrally flattened beyond middle and sometimes widened, extremely attenuated at apex; of males with weakly developed, bristle-topped, transverse ridges on inner side; tyloides distinct or obsolete.

Head.—Temple and cheek profiles never strongly, sometimes moderately, narrowed, the former always with curved outline, sometimes widened, the latter sometimes buccate; cheeks wide between eyes and carina genalis; mandibles robust, bidentate.

Thorax.—Mesoscutum but slightly convex, scutellum always considerably raised above postscutellum, sometimes semiglobular or subpyramidal; propodeum longitudinally compressed and abbreviated in such a way that the area superomedia is strongly reduced — usually to a small, raised and smooth boss (see Part I, figs. 5 and 10) — from which the propodeum slopes steeply down, in front toward the postscutellum, as well as apically toward the petiolus.

Legs.—Moderately stout and long; coxae III of females never with scopa, as so frequently found in the Protichneumonini.

Wings.—Areolet in the forewing irregularly quadrangular (except in *Catadelphus* Wesmæl); wings sometimes with dark pattern, often uniformly, deeply infuscated.

Abdomen.—Of females amblypygous; postpetiolus, in one genus, with conical elevation at elbow; gastrocoeli distinct but of moderate size and depth; tergites not much narrower at base than at the apex of each preceding one, dorsally normally convex, not longitudinally striate or coarsely rugose but densely and finely punctate or coriaceous, usually opaque or subopaque.

Color

Black or ferruginous (red) or both colors in combination; no white pattern except (rarely) flagellar annulus. Chromatic sexual dimorphism inconspicuous.

Biology

Females do not hibernate. All species are specialized parasites of Sphingidae, some feeding on a single host species, other on groups of closely related species. Evolutionally-old Sphingidae, as the Acherontiinae and the Ambulicinae, seem to be the favoured hosts. The female deposits the egg into the larva of the host. In the Temperate Zones, only one generation is produced per year, both sexes appearing in the middle of the summer.

Distribution

Callajoppina occur in the Temperate and Subtropical Zones of the Old and New Worlds, and are especially numerous in North America; a restricted number of species is known from the Oriental and American Tropics; one species is recorded from Madagascar.

Remarks

The species of all genera of this subtribe show unusually little structural and sculptural differentiation from each other, a fact which renders the specific distinction very difficult.

The following genera are included in the subtribe Callajoppina: *Catadelphus* Wesmael, *Callajoppa* Cameron, *Conocalama* Hopper, *Tmetogaster* Hopper, *Gnamptopelta* Hopper, *Tricyphus* Kriechbaumer, *Dimaetha* Cameron, *Erythrojoppa* Cameron.

The genus *Catadelphus* Wesmael, included below in this subtribe, is intermediate in structure and wing venation between it and the Protichneumonini. For the species *Catadelphus* (*Trogus*) *buccatus* (Cresson), a new genus (2a. *Catadelphops*) has been erected, which is treated in the *Addenda* of this part and attributed to the tribe Protichneumonini. "*Trogus*" *atrocoeruleus* Cresson is treated under genus No. 23, *Protopelmus* Heinrich in part V.

54. Genus *Catadelphus* Wesmael

Figs. 1, 2, 12, 13, 24

Catadelphus Wesmael 1854, Acad. Sci. Belg. Bul. Suppl., p. 134.

Type-species.—*Ichneumon arrogator* Fabricius. Monobasic.

Morphologically the genus *Catadelphus* occupies an intermediate position between the tribes Trogini and Protichneumonini. Although I think the deciding characters call for a position in the latter tribe rather than in the former, I have retained *Catadelphus* here in the tribe Trogini as arranged by Hopper and by Townes.

The genus differs from all others of the Callajoppina in structure of the areolet in the forewing and of the propodeum, approaching in both regards the Protichneumonini, particularly the genus *Amblyjoppa* Cameron. The areolet is regularly quadrangular, the intercubital veins being of about equal length, as are likewise the abscissae I and II of cubital vein. The shape of the areolet thus displays, in contrast to the other Callajoppina, the basic pentagonal structure characteristic for the bulk of the subfamily Ichneumoninae, except that the two intercubital veins converge anteriorly into one point, making the areolet subpetiolate (as in many other groups of the Ichneumoninae, except the Trogini). The propodeum is not as abbreviated as in the other genera of the tribe, sloping apically more gradually and roundly, and anteriorly scarcely at all. Consequently the area superomedia is less reduced, not forming the polished boss or transverse carina typical for the Trogini, but a more or less distinct small area surrounded by carinae (Fig. 12).

The rather strongly elevated scutellum (Fig. 13), the prominent, lamelliform carinae dentiparae exteriores (Fig. 12), and the wide, rounded temples (Fig. 2) are trogine-like characters. But none of them would actually contradict an association with the *Protichneumonini*, where the genus should be placed at the end of the evolutionary row, next to *Amblyjoppa*, if included in that tribe.

Males of *Catadelphus* have no tyloides.

Remarks

The American forms of this genus offer a startling and interesting problem. They display extreme differences in color of body and wings, but such congruence in morphology and sculpture that it seems to be impossible to find structural characters for specific distinction. Under these circumstances every present hypothesis concerning the status and relationship of the different chromatic forms, which may represent distinct species as well as geographical and individual variants, can be based only on guesswork. This is one of the cases where the taxonomist can not reach satisfactory conclusions without the support of biological observations. We need the knowledge of ecological facts, especially authentic host records for all forms involved, before their true relationship can be recognized.

Key to the Species of *Catadelphus* Wesmael of America North of Mexico

Females and Males

1. Subapical tooth of mandible obsolete; carinae dentiparae exteriores not lamelliform. (Females uniformly ferruginous, males with a more or less extensive melanistic pattern, sometimes predominantly black; flagellum in both sexes black; length 16-19 mm.) see *Addenda: Catadelphops buccatus* (Cresson)
- Subapical tooth distinct; carinae dentiparae exteriores lamelliform, more or less highly projecting. 2
2. Head, thorax, abdomen and legs uniformly fulvous, except black frons and ocellar region. (Flagellum black; length 17 mm.) 3. *ochraceus*, new species
- Head, thorax and legs black. 3
3. Abdomen red, except petiolus or entire first segment. 4
- Abdomen black, often second tergite medially, rarely entirely obscure ferruginous. 5
4. Wings uniformly, deeply infuscated. 1. *semiruber* Hopper
- Wings yellow, narrowly infuscated at base, with dark apical bands. 2. *atrox* (Cresson)
- 1. *semiruber* Hopper variety or subspecies
5. Wings uniformly, deeply infuscated. 2. *atrox* (Cresson)
- Wings yellow, narrowly infuscated at base, and with dark apical bands. variety *marginipennis* (Cresson)

1. *Catadelphus semiruber* Hopper

Figs. 1, 2, 12, 13, 24

Catadelphus semiruber Hopper, 1939, Amer. Ent. Soc. Trans., 65:342, ♀.

Types

Holotype.—♀, Ontario, Nipigon, James Fletcher. C.N.C. No. 4470.

Paratype.—1 ♀, same data. A.N.S.

Distribution

Ontario (type specimen). New records: British Columbia, Osoyoos (C.N.C.); Wyoming, Glendo (U.S.N.M.).

Preamble

The most northern of the American species and the one which is in color the most closely related to the type-species, the European *arrogator* (Fabricius). Differs from it mainly by the lack of a distinct median field on the postpetiolus, and by the red apical tergites. Perhaps the Nearctic vicariant of *arrogator*, but differentiated enough to be regarded as a distinct species.

Female

Uniformly deep black, including flagellum; wings uniformly, deeply infuscated; abdomen red, except black petiolus and sometimes base of postpetiolus; anterior side of tibiae I brownish; length 20-22 mm.

Flagellum.—Bristleshaped, slender, ventrally flattened beyond middle, but scarcely widened, extremely attenuated at apex, with 47-50 segments, the first nearly 3 times as long as wide, about the fourteenth or sixteenth square. Dorsally black, ventrally brownish.

Head.—Temple profile somewhat widened, with broadly curved outline (Fig. 2); cheek profile scarcely narrowed, with slightly curved outline (Fig. 1); cheeks wide between eyes and carina genalis, somewhat inflated; malar space about as long as width of base of mandible; clypeus apically flat, with straight apical border, basally a trifle convex; upper mandible tooth fairly long and slender, apically blunted, the lower tooth reduced but distinct (Fig. 24). Black; sometimes mandibles partially or margins of clypeus obscure ferruginous.

Thorax.—Mesoscutum densely and fairly finely punctured, subopaque; basal part of notauli slightly indicated; scutellum strongly raised above postscutellum, dorsally slightly convex, with nearly vertical apical and lateral slopes (Fig. 13), narrowed toward apex, with rather sharp lateral edges, particularly at base; carination of propodeum fairly complete, area superomedia small, not very clearly defined; basal areae not declivous toward anterior border of propodeum; carinae dentiparae exteriores lamelliformly projecting (Fig. 12). Black.

Legs.—Femora III comparatively wide, tarsi III very long and slender. Black; apices of femora I and the tibiae and tarsi I brownish on anterior side.

Abdomen.—Postpetiolus densely punctured, without clearly defined median field; gastrocoeli considerably narrower than their interval. Red; petiolus and sometimes base of postpetiolus black.

Variability.—The female specimen from Wyoming has yellowish wings, with narrowly infuscated bases and infuscated apical bands. It may perhaps represent a distinct subspecies.

2. *Catadelphus atrox* (Cresson)

Trogus atrox Cresson, 1868, Amer. Ent. Soc. Trans., 2:92, ♀.

Catadelphus atrox Hopper, 1939, Trans. Amer. Ent. Soc., 65:342.

Types

Holotype.—♀, Dakota Territory. A.N.S.

Host

Proserpinus juanita Stkr.

Distribution

According to H. Townes 1951: "Montana, South Dakota, Kansas, Texas, Wyoming, Colorado, California". New record: Oklahoma (C.N.C.).

Preamble

There seem to be no structural differences among *atrox* (Cresson), *semiruber* Hopper and *marginipennis* (Cresson). Should they all be variants and subspecies of one and the same species? Perhaps — but not necessarily. Entomology knows many examples that structural congruence does not always mean specific identity. In problematic cases, as for example in the genus *Trogus*, and in *Catadelphus* as well, the evaluation of biological characters seems to be necessary, in addition to the structural hypothesis, in order to reach any satisfactory conclusion concerning the status of the forms involved. At present I am following Townes, considering *marginipennis* as a mere variant ("phase") of *atrox*. This hypothesis is probably correct, but needs, nevertheless, some final confirmation, as by rearings of both forms from the same host.

Female and Male

Black, disc of second tergite often with an obscure-ferruginous patch of varying extent; wings uniformly and deeply infuscated, stigma ferruginous; general morphology as in semiruber Hopper; length 18-21 mm.

Flagellum.—Of females bristleshaped, slender, ventrally flattened beyond middle, but scarcely widened, extremely attenuated at apex, with 47-50 segments, the first nearly 3 times as long as wide, about the fourteenth or fifteenth square. Black. Of males without tyloides.

2a. *Catadelphus atrox* variety *marginipennis* (Cresson)

Trogus marginipennis Cresson, 1868, Amer. Ent. Soc. Trans., 2:92, ♂.

Catadelphus marginipennis Hopper, 1939, Trans. Amer. Ent. Soc., 65:342.

Catadelphus atrox var. *marginipennis* Townes, 1951, Syn. Cat., p. 304, ♂.

Types

Holotype.—♂, Dakota Territory. A.N.S.

Distribution

According to H. Townes 1951: "Dakota Territory, Wyoming, Kansas, New Mexico". New record: Alberta (C.N.C.).

Female and Male

Wings yellow, with infuscated apices; otherwise like typical *atrox*.

3. *Catadelphus ochraceus*, new species

Types

Holotype.—♂, Oklahoma, Ripley, 8.V.1925. C.N.C. No. 7468.

Distribution

Oklahoma.

Male

Uniformly fulvous including abdomen and legs; only frons (except frontal orbits) and ocellar region, black; flagellum black; wings yellowish, narrowly infuscated at base, with infuscated apical bands; length 17 mm.

Flagellum.—With 44 segments, without tyloides. Uniformly black; scape fulvous, dorsally partially infuscated.

General morphology as in *semiruber* Hopper and *atrox* (Cresson). Temple profile perhaps a trifle less widened; lamelliform elevation of carinae dentiparae exteriores extremely high, triangular.

55. Genus *Callajoppa* Cameron

Callajoppa Cameron, 1903, Entom., 36:236.

Type-species.—(*Callajoppa bilineata* Cameron) = *Ichneumon cirrogaster* Schrank.

Morphological characters

Flagellum.—Of females bristleshaped, long, ventrally flattened beyond middle and, in the type-species, considerably widened, in other species not, or scarcely, widened, always extremely attenuated at apex; of males with distinct tyloides.

Head.—Strong; temples and cheeks broad, with curved outlines; clypeus with approximately straight apical border, usually with slight, gradually curved, median projection, laterally subparallel; frons concave.

Thorax.—Scutellum usually conically elevated into a point, varying sometimes, especially in the type-species, to a dorsally gradually rounded shape; areae dentiparae usually strongly transversely rugose (as in type-species) or coarsely irregularly reticulate-rugose.

Legs.—Moderately stout.

Wings.—Areolet irregularly quadrangular, intercubitus II being longer than intercubitus I and abscissa I of cubitus longer than abscissa II; the areolet not distinctly petiolate; wings yellowish tinted with infuscated apices.

Abdomen.—Of females amblypygous, moderately short to longish-oval; postpetiolus without pyramidal or conical elevation at elbow; gastrocoeli distinctly though not deeply impressed, narrower than their interval; thyridia subobsolete; tergites 1-4 finely and densely punctured, subopaque.

Color

Abdomen light ferruginous or black, or ferruginous with black apex; thorax black, or extensively ferruginous; scutellum and subalarum sometimes yellow; wings yellowish tinted, in type-species without distinct dark patterns, in some other palaearctic species with infuscated apices. Chromatic sexual dimorphism not considerable.

Distribution

Several species in the Palaearctic Zone, one of them recorded from Canada; the latter record still needs further confirmation.

1. *Callajoppa cirrogaster* (Schrank)

Ichneumon cirrogaster Schrank, 1781, Enum. Ins. Austr., p. 348.

Trogus lutorius Gravenhorst, 1818, Nova acta acad. nat. curios., 9:286.

Callajoppa bilineata Cameron, 1903, Entom., 36:236.

Types

Holotypes.—*Ichneumon cirrogaster* Schrank, ♂ lost. *Trogus lutorius* Gravenhorst, sex not stated, probably in Copenhagen; *Callajoppa bilineata* Cameron, ♀, British Museum, London.

Hosts

In the Old World the typical hosts of this species are *Smerinthus populi* L., *Smerinthus ocellatus* L. and *Dilina tiliae* L. Different other hosts have been recorded occasionally, but these records are either errors caused by misidentification of the parasite (*Callajoppa exaltatoria* Panzer can easily be mistaken for *cirrogaster* variety *nigricauda* Retzius) or references to emergency hosts.

Distribution

Palearctic Zone; two old specimens labeled "Toronto, Ont., A. Gibson" in C.N.C.; this single record from North America needs further confirmation.

Preamble

The description of the species as given below was based on an ample European material. The female from Toronto has an unusually low, simply convex (not conically elevated) scutellum, but fits otherwise very well in the diagnosis of the European populations, as does the male also.

Female

Abdomen light ferruginous, sometimes apical tergites black; *thorax* black, with variable, indistinctly red-brown to yellowish markings; *mesocutum* frequently with two obscure ferruginous longitudinal lines; *scutella*, pronotal ridge and subalarum yellow; *legs*, except black coxae, predominantly ferruginous; *flagellum* ferruginous with black apex; *wings* yellowish, the apices usually indistinctly grayish tinted; *length* 20-25 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and distinctly widened, extremely attenuated at apex, with 45-54 segments, the first about 2.5 times as long as wide, about the ninth square, the widest fully twice as wide as long. Scape and segments 1 to about 18 ferruginous; the rest black.

Head.—Malar space scarcely as long as width of base of mandible. Ferruginous; black or blackish are: supraantennal cavities, middle of frons, ocellar region and occipital region more or less extensively; facial and frontal orbits yellowish.

Thorax.—Scutellum usually conically elevated into a point, the dorsal surface ascending in a rather steep curve to this point; sometimes elevation less conspicuous, the culminating point replaced by a gradual, moderately convex surface. Black; the following ferruginous: usually two indistinct, apically often confluent, longitudinal lines on mesoscutum, tegulae, usually more or less extensive markings on the anterior part of propodeum; the following are yellow: collare, pronotal ridge, scutella, subalarum.

Legs.—Ferruginous; coxae black; all trochanters, tibiae and tarsi yellowish tinted; apices of coxae I and II yellowish or pale ferruginous; femora III sometimes partially infuscated.

Abdomen.—Usually light ferruginous; in variety *nigricaudata* Retzius tergites 4 or 5 or 6 to 7 black.

Male

Only a few basal segments of flagellum ferruginous, the rest dorsally black; face and clypeus entirely yellowish; coxae, including coxae III, more extensively, the coxae I usually predominantly yellowish; distinct, oval tyloides on segments 10-21; otherwise like the female.

56. Genus *Conocalama* Hopper

Figs. 3, 4, 15, 19, 22, 23

Conocalama Hopper, 1939, Trans. Amer. Ent. Soc., 65:319.

Type-species.—*Trogus brullei* Cresson, by original designation.

Very closely related to *Callajoppa* Cameron. Differs from *Callajoppa* mainly by a more or less pronounced, subpyramidal elevation on the elbow of the first segment (Fig. 19) and also slightly by the structure of scutellum (Fig. 15). The

elevation on the first segment varies to a certain degree, and is exceptionally, as for example in the type specimen of *copei* Cresson, not at all recognizable.

Flagellum.—Of females bristleshaped, long, ventrally flattened beyond middle, and usually slightly widened, extremely attenuated at apex; of males with distinct, short-oval tyloides.

Thorax.—Scutellum considerably elevated above postscutellum, dorsally convex, with steep, gradually rounded apical slope, never conically elevated into a point (Figs. 15, 22, 23).

Wings.—Areolet irregularly quadrangular as in *Callajoppa*, but with a distinct, sometimes long petiole; color of wings as in *Callajoppa*, or sometimes uniformly and deeply infuscated.

Abdomen.—First tergite with more or less developed, rarely indistinct, subpyramidal elevation at the elbow (Fig. 19).

In all other regards like *Callajoppa* Cameron.

Key to the Species of *Conocalama* Hopper of America North of Mexico

Females

1. Abdomen uniformly deep black. (Thorax uniformly black; wings always deeply and uniformly infuscated; flagellum orange with black tip; length 20-28 mm.) 1. *brullei* (Cresson) 2
- Abdomen not uniformly black. 2
2. Tergites 2-7 red (in rare variants bases of tergites 2-3 or to 4 infuscated); apical tergites never black; head and thorax entirely or almost entirely black. 3
- Tergites 2-7 ferruginous or fulvous (sometimes one or several of anterior tergites with narrow, black, basal bands), or anterior tergites ferruginous or fulvous and several apical tergites black; head and thorax usually partially ferruginous. 5
3. Basal segments of flagellum orange, not at all infuscated; anterior part of subalarum, seen in lateral view, comparatively thin, forming a prominent ridge rather than a wide, gradually convex swelling; scutellum rather strongly elevated and narrowed toward apex; subpyramidal elevation on first tergite pronounced; outline of cheek profile rather straight; notauli long and sharply impressed. (Wings always uniformly and deeply infuscated; length 19-25 mm.) 3. *canadensis* (Provancher)
- Several basal segments of flagellum black or blackish, followed by a broad whitish annulus; anterior part of subalarum, seen in lateral view, widened and forming a broad, gradually convex swelling; scutellum less elevated and less narrowed toward apex than in alternative species; subpyramidal elevation on first tergite less pronounced; outline of cheek profile slightly bulging near apex; notauli, on the average, shorter and less sharply impressed. (Length 24-25 mm.) 4
- 2. *copei* (Cresson)
4. Wings deeply and uniformly infuscated. 2a. *copei copei* (Cresson)
- Wings yellowish, with slightly infuscated apices. 2b. *copei heteropteryx*, new subspecies
5. Sterna, mesopleura and propodeum extensively or predominantly black. 6
- Thorax not at all, or scarcely, black marked. (Head, abdomen and legs likewise without, or with very restricted, black markings.) 8
6. Cheeks entirely or predominantly, face and clypeus entirely or extensively, black; basal segments of flagellum, at least the first, black, or blackish; flagellum usually with 47-49, exceptionally with 51, segments; smaller species, 20-23 mm. long. (Thorax, including mesoscutum, black with restricted yellowish or ferruginous markings; abdomen yellowish-orange, tergites 4-7 almost entirely black, the third with a narrow, black, often bipartite, basal band; widest flagellar segment fully twice as wide as long.) 6. *bolteri* (Cresson)
- Cheeks, face and clypeus pale ferruginous or yellowish; basal segments of flagellum ferruginous, not infuscated; flagellum with 50-55 (usually 52 or 53) segments; larger species, 23-27 mm. long. 7

7. Widest segment of flagellum 2-2.25 times as wide as long. (Entire first segment and the coxae II and III extensively pale ferruginous; abdomen pale ferruginous, tergite 4 or 5-7 almost entirely black; all femora fulvous, femora III sometimes ventrally in part, black; wings yellowish with slightly infuscated apices; length 24-27 mm.) 5. *quebecensis* (Provancher)
- Widest segment of flagellum only 1.5 to 1.75 times as wide as long. (In populations from British Columbia petiolus, or entire first segment, coxae I and II and usually femora III predominantly black; abdomen ferruginous with black basal bands on some anterior tergites, and sometimes with black apical tergites; wings varying from entirely infuscated to yellowish with infuscated apices; length 23-28 mm.) 4. *occidentalis* (Cresson)
8. Thorax and abdomen unusually long and slender; second tergite medially considerably longer, than apically wide, the third square. (Flagellum considerable widened, widest segment 2.5-2.75 times as wide as long; wings predominantly infuscated with yellowish bases or predominantly yellowish with slightly infuscated apices; anterior part of subalarum, seen in lateral view, forming a prominent ridge rather than a gradually convex swelling; lateral fields of face yellow; length 26-27 mm.) 8. *fuscalata* Hopper
- Thorax and abdomen moderately to very stout; second tergite not, or very slightly, longer than apically wide, the third tergite wider than long. 9
9. Medium sized species, about 25 mm. long; temple profile not widened, with gradually rounded outline; cheek profile distinctly narrowed, with straight outline; flagellum but slightly widened beyond middle, widest segment about twice as wide as long; head without yellow pattern, except sometimes indistinctly and narrowly yellow tinted frontal orbits. (Wings always uniformly and deeply infuscated, with strong violaceous reflection; uniformly vivid ferruginous.) 9. *violipennis* Hopper
- One of the largest species, 27-30 mm. long; temple profile slightly widened; cheeks buccate, head, in front view, approximately square; flagellum considerably widened, widest segment 2.5 times as wide as long; head more or less extensively yellow marked. (Anterior part of subalarum, seen in lateral view, wide, forming a gradually convex bulge.) 7. *mellosa* (Cresson) 10
10. Head extensively, and usually also apices of tergites, pale yellowish tinted; basal segments of flagellum pale ferruginous, dorsally not at all infuscated; wings usually yellowish with slightly infuscated apices. 7a. *mellosa mellosa* (Cresson)
- Only lateral fields of face, frontal and outer orbits partially yellow; abdomen without yellowish tinted parts, darker ferruginous than in alternative subspecies; basal 8-10 flagellar segments dorsally partially infuscated; wings predominantly infuscated, usually yellowish along costa. 7b. *mellosa rileyi* (Cresson)

Males

1. Abdomen uniformly deep black. (Thorax uniformly black.) 2
- Abdomen entirely or partially red, ferruginous or fulvous. 4
2. Wings yellowish with distinct, black, apical bands. (Flagellum predominantly black; length 28 mm.) 12. *catalinarum* Heinrich
- Wings uniformly, rather deeply infuscated. 3
3. Clypeus and face uniformly white; flagellum black. (All tibiae and tarsi extensively, and the coxae I and II entirely, dirty-whitish; length 22 mm.) 11. *manitobae*, new species
- At the most, orbits yellowish; flagellum orange with black tip. (All coxae and at least tibiae III uniformly black; length 20-28 mm.) 1. *brullei* (Cresson)
4. Incisions between tergites very pronounced, making tergites appear convex in lateral view; abdomen fulvous, shading to flavous toward apex of each tergite, the extent of flavous coloration increasing caudad, seventh tergite almost entirely flavous; tergites 2-5 with narrow, black basal bands. (Head fulvous with some yellowish markings; thorax extensively black, with ferruginous mesoscutum and other parts; length 30 mm.) 10. *galbinata* Hopper
- Incisions between tergites normal; abdomen otherwise colored. 5
5. Tergites 2-7 red (rarely anterior tergites basally more or less infuscated); thorax and coxae black. 6
- Abdomen entirely or partially ferruginous or fulvous; thorax and coxae, in majority of species, partially or entirely ferruginous. 7

6. Head black, sometimes middle of inner orbits yellowish; anterior part of subalarum, seen in lateral view, thinner and more ridge-like projecting than in alternative species; subpyramidal elevation on first tergite, on the average, more pronounced; tyloides somewhat smaller and narrower; base of flagellum orange or ferruginous. (Wings uniformly and deeply infuscated; length 21-25 mm.) 3. *canadensis* (Provancher)
- Head black, with facial orbits broadly yellow down to base of mandible; anterior part of subalarum, seen in lateral view, widened and gradually sloping ventrad; subpyramidal elevation on first tergite, on the average, less pronounced, exceptionally even subobsolete; tyloides somewhat larger and wider than in alternative species; flagellum black or blackish. (Wings uniformly and deeply infuscated; length 23 mm.) 2. *copei* (Cresson)
7. Sterna and mesopleura, usually also parts of head, black. 8
- Sterna, mesopleura and head ferruginous or fulvous with black parts (except sometimes some black thoracic sutures). 11
8. Mesoscutum and cheeks down to mandible base predominantly black; flagellum dorsally entirely black. (Petiolus basally, thorax predominantly and apex of abdomen, black; wings yellowish with slightly infuscated apices; flagellum with less than 50 segments; length 22 mm.) 6. *bolteri* (Cresson)
- Mesoscutum and/or cheeks predominantly yellow or ferruginous; flagellum dorsally not entirely black. 9
9. Face, clypeus and cheeks ferruginous. Wings uniformly infuscated with violaceous reflection. (Length 22-25 mm.) 9. *violipennis* Hopper, variety
- Face and clypeus yellow, cheeks yellow or predominantly black. (Flagellum with extensively pale ferruginous basal part and with more than 50 segments; length 23-28 mm.) 10
10. Tyloides on segments 2-24, longish-oval; coxae II and III predominantly yellowish or pale ferruginous; first segment not black. 5. *quebecensis* (Provancher)
- Tyloides on segments 4-23 or 24, short-oval; coxae II and III black; petiolus black. 4. *orientalis* (Cresson)
- (population from British Columbia)
11. Head uniformly ferruginous, without yellow markings. (Wings uniformly infuscated with violaceous reflection; color of body vivid ferruginous; cheek profile slightly narrowed, with straight outline; medium sized species, 22-25 mm. long.) 9. *violipennis* Hopper
- Face and orbits more or less extensively yellow. 12
12. Long and slender species; thorax, in dorsal view, more than twice as long as wide; second tergite medially somewhat longer than apically wide, the following tergites at least nearly as long as wide; anterior part of subalarum, seen in lateral view, more ridge-like and thinner than in alternative species; propodeum basally and laterally black. (Face extensively yellow; length 28 mm.) 8. *fuscalata* Hopper
- Stout and very large species; thorax, in dorsal view, less than twice as long as wide; third and following tergites distinctly wider than long; anterior part of subalarum, seen in lateral view, widened and gradually rounded ventrad; propodeum uniformly ferruginous. (Face extensively yellow; length 30-33 mm.) 7. *mellosa* (Cresson) 13
13. Flagellum dorsally black to the very base; wings predominantly infuscated, yellowish along costa. 7b. *mellosa rileyi* (Cresson)
- Flagellum ferruginous with black apex; wings usually yellowish with slightly infuscated apices. 7a. *mellosa mellosa* (Cresson)

1. *Conocalama brullei* (Cresson)

Trogus brullei Cresson, 1877, Trans. Amer. Ent. Soc., 6:196, ♀ & ♂.

Types

Holotype.—♀, Connecticut. A.N.S.

Hosts

According to H. Hopper 1939: *Paonias astylus* Dru., *Paonias myops* S. & A. and *Dolba hylaeus* Dru. New record: *Phlegethontius sexta* Joh., in Long Island (U.S.N.M.).

Distribution

According to H. Hopper, 1939: "Massachusetts, Connecticut, New York, Pennsylvania, Colorado, Texas, Georgia." New records: Ontario, Georgetown (C.N.C.); Maine, Dryden (C.G.H.).

Female

Almost uniformly black; sometimes middle of inner orbits with yellowish or obscure ferruginous mark; legs black, tibiae I pale ferruginous, on anterior side; wings uniformly and deeply infuscated; length 20-28 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and somewhat widened, extremely attenuated at apex, with 52-53 segments (5 specimens counted), the first 3 times as long as wide, about the eighth square, the widest 1.5 to about 2.0 times as wide as long. Orange, infuscated toward apex; scape orange, sometimes infuscated.

Head.—Temple profile somewhat widened rather than narrowed, with broadly curved outline; malar space about as long as width of base of mandible; occiput deeply, almost angularly excavated; apex of clypeus straight, with small median protuberance. Usually uniformly black; middle of inner orbits sometimes with yellowish mark.

Thorax.—Uniformly black.

Legs.—Black; tibiae I ferruginous on anterior side.

Abdomen.—Subpyramidal elevation on first tergite pronounced; interval of gastrocoeli irregularly, longitudinally short-striate; second tergite a little longer than apically wide, the third about 1.5 times as wide as long. Uniformly black.

Male

Generally as the female; head, thorax and abdomen uniformly black, or, sometimes base of mandibles, clypeus partially, facial and lower frontal orbits and outer orbits partially, yellow; tibiae I pale ferruginous, at least on anterior side, sometimes also tarsi I pale.

Flagellum.—With very small, short-oval tyloides on segments 5-22. Entirely orange-yellow, sometimes the very tip infuscated, more rarely (one specimen from Maine) only basal part pale, the rest infuscated; scape orange-yellow to black.

2. *Conocalama copei* (Cresson)

Figs. 23, 29, 30

Preamble

The two species *copei* Cresson and *canadensis* Provancher have been synonymized by Hopper (1939) and by Townes (1951). Examining the type specimen of *copei* I found that it lacks entirely the subpyramidal elevation on elbow of the first tergite, which represents the main character of this entire genus, and which is very pronounced in all specimens of *canadensis* seen by me. This obsolescence of the elevation could perhaps be just a strange individual anomaly, but more likely it could indicate specific distinction. Therefore I proposed (1959, Ent. New, 70: 206) resurrecting *canadensis* from synonymy and keeping the two forms *canadensis* and *copei* separated as distinct species until further research should reveal facts proving their identity.

Since then, I have found doubtless evidence that the species *canadensis*, as interpreted by Hopper and as represented in different collections, was indeed a complex of two very similar but distinct species, one being represented by the

type of *Trogus canadensis* Provancher, ♀, and the other by a female so far undescribed. In the latter species, the characters of which will be given in detail below, the subpyramidal elevation of the first tergite is, on the average, much less pronounced than in *canadensis*; I do not doubt, therefore that the type of *copei* represents a male specimen of this second species with the unusually reduced elevation of the first tergite. Thus, the question of whether *canadensis* and *copei* are two different species can be regarded as answered: yes, they are.

Distribution

Eastern North America from Ontario south to West Virginia. Two subspecies seem to be distinguishable on account of the wing-color of the females.

Male

Extremely similar to *canadensis*; differing as follows: (1) anterior part of subalarum not forming a rather prominent ridge, but a widened, gradually convex bulge; (2) tyloides larger; (3) facial orbits broadly yellow; (4) base of flagellum not orange or ferruginous; (5) subpyramidal elevation on first tergite less pronounced, its posterior upper part usually impunctate; (6) notauli less pronounced.

Head and thorax black, facial orbits broadly yellow for their whole length; abdomen red, except black petiolus; flagellum black or blackish; wings uniformly, deeply infuscated; legs black, tarsi and the tibiae I or I and II brownish; length 23 mm.

Flagellum.—With 46 segments (only one specimen with entire flagellum seen and counted) and with broad-oval tyloides, which are distinctly larger than in *canadensis*, on segments 3 or 4 to 23.

Head.—Cheek profile slightly buccate, its outline, in contrast to *canadensis*, slightly curved in lower part. Black; lowest part of frontal orbits broadly down to base of mandible yellow.

Thorax.—Notauli basally more or less distinctly, and more or less extensively, indicated, but, on the average, considerably shorter and less deeply incised than in *canadensis*; anterior part of subalarum not fairly thin and fairly sharply prominent as in *canadensis*, but widened into a gradual convexity; middle of apical half of propleura and the areae superoexternae, on the average, somewhat less densely punctured than in *canadensis*. Black.

Legs.—Black; tarsi and tibiae I or I and II brownish.

Wings.—Uniformly infuscated.

Abdomen.—Subpyramidal elevation on first segment less pronounced than in *canadensis*, in the type specimen even obsolete, the upper part of its posterior slope, in contrast to *canadensis*, usually impunctate. Uniformly red, except petiolus and usually base of postpetiolus which are black.

Female

Similar to *canadensis* but easily distinguished by the combination of the following characters: (1) notauli comparatively short and indistinct; (2) anterior part of subalarum not forming a rather prominent ridge, but a widened, gradually convex bulge (Figs. 29, 30); (3) flagellum basally narrowly, apically extensively, black, with a broad, whitish annulus in between; (4) scutellum less elevated and less narrowed toward apex, broadly convex, its apical slope shorter and, above the postscutellum, with slight, transverse concavity; (5) tarsi III, in direct comparison, slightly stouter; (6) outline of cheek profile slightly bulging toward apex.

Head and thorax black, abdomen red, except black petiolus; legs black, all tarsi and the tibiae I or I and II obscure brownish; flagellum with broad white annulus, the basal segments being more or less extensively black; wings varying geographically, either uniformly and deeply infuscated in southern specimens, or yellowish with infuscated apices in northern specimens; length 24-25 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and somewhat widened, extremely attenuated at apex, with 50-52 segments (2 southern specimens counted), the first scarcely 3 times as long as wide, about the eighth square, the widest nearly twice as wide as long. Segments 1-3 or to 4 black, particularly dorsally, the following gradually turning into white, the white annulus extending to the sixteenth segment.

Head.—Temple profile somewhat widened, with broadly curved outline; cheek profile scarcely narrowed, its outline not staright as in *canadensis* but slightly curved toward apex, the cheeks being a trifle buccate; malar space fully as long as width of base of mandible. Black; middle of inner orbits with yellow mark.

Thorax.—Notauli, in contrast to *canadensis*, usually subobsolete, only their basal part indicated; scutellum less strongly raised than in *canadensis*, and less narrowed toward apex, broadly convex, the apical slope shorter, with a transverse concavity above the postscutellum; anterior part of subalarum forming a gradually convex bulge rather than a projecting ridge; middle of posterior half of propleura more sparsely punctured than in *canadensis*. Uniformly black.

Legs.—Femora and tarsi III comparatively a trifle shorter than in *canadensis*. Black; all tarsi and tibiae I or I and II brownish.

Abdomen.—Subpyramidal elevation on first tergite on the average less pronounced than in *canadensis*; upper part of its apical slope usually not punctured. Red; postpetiolus black.

Remarks

The credit for discovering the characteristic structure of the subalarum and sculpture of propleura belongs to Miss Lois K. Smith. These characters were found to be important for the association of the sexes of this species.

2a. *Conocalama copei copei* (Cresson)

Trogus copei Cresson, 1868, Amer. Ent. Soc. Trans., 2:94, ♂.

Conocalama copei Hopper, 1939, Trans. Amer. Ent. Soc., 65:323, ♂, partim.

Conocalama copei Townes, 1951, Syn. Cat., p. 305, ♂, partim.

Conocalama copei Heinrich, 1959, Ent. News, 70:206, 207, ♂.

Types

Holotype.—♂, West Virginia. A.N.S.

Neallotype.—♀, Pennsylvania, Spring Brook. C.H.T.

Distribution

Eastern North America; recorded so far from Pennsylvania and West Virginia.

Female and Male

Wings uniformly, deeply infuscated.

2b. *Conocalama copei heteropteryx*, new subspecies

Types

Holotype.—♀, Maine, Rockwood, 6.VII. C.G.H.

Allotype.—♂, Ontario. C.N.C. No. 7465.

Paratype.—1 ♀, Quebec, Laurentides. C.N.C.

Distribution

Quebec, Ontario, Maine.

Female

Wings yellowish, with infuscated apices.

Male

Like *copei copei* (wings uniformly infuscated).

3. *Conocalama canadensis* (Provancher)

Figs. 3, 4, 15, 19, 22, 31, 32

Trogus canadensis Provancher, 1877, Nat. Canad., 9:2, ♀.

Trogus nigrocinctus Hasey, 1925, Ent. News, 36:306, ♂. New synonymy.

Conocalama copei Hopper, 1939, Trans. Amer. Ent. Soc., 45:323, partim.

Conocalama copei Townes, 1951, Syn. Cat., p. 305, partim.

Conocalama canadensis Heinrich, 1959, Ent. News, 70:206, 207, ♀.

Types

Holotype.—♀, Canada. Provincial Museum, Quebec.

Hosts

According to H. Hopper 1939: (*Conocalama copei*) "*Paonias myops* S. & A."

Distribution

According to H. Townes 1951: (*Conocalama copei*) "Atlantic to Continental Divide in Transition and Upper Austral Zones".

Female

Head and thorax black, sometimes apical edge of scutellum, mark on post-scutellum and middle of inner orbits yellowish; abdomen red, except black petiolus; sometimes entire first segment black and bases of tergites 1-3 or to 4 blackish infuscated; wings uniformly, deeply infuscated; all coxae, trochanters and femora usually black, tibiae and tarsi usually brownish, sometimes tibiae and tarsi II and III also black; flagellum orange or ferruginous, with black apex; length 19-25 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and somewhat widened, extremely attenuated at apex, with 49-52 segments, the first 3 times as long as wide, about the tenth square, the widest 1.5 to approximately twice as wide as long. Scape and segments 1-16 or to 20 orange, often with a pale yellowish tint toward apex of the orange part of flagellum, the following segments blackish; sometimes scape dorsally or entirely infuscated.

Head.—Temple profile somewhat widened rather than narrowed, with broadly curved outline (Fig. 4); cheek profile moderately narrowed, with rather straight outline (Fig. 3); malar space fully as long as width of base of mandible; occiput deeply, almost angularly excavated; cheeks constricted at carina genalis; apex of clypeus straight, with a small median protuberance (Fig. 3). Usually uniformly black; mandibles extensively ferruginous; middle of inner orbits often yellowish.

Thorax.—Black; sometimes apical margin of scutellum adjacent to postscutellum and postscutellum partially yellowish or ferruginous.

Legs.—Fairly slender. Black; at least tibiae and tarsi I, usually all tibiae and tarsi lighter or darker brownish; tibiae III often lighter brown than the anterior tibiae, with infuscated apices; sometimes femora I apically ferruginous.

Abdomen.—Finely and densely punctured, alutaceous between punctures, opaque; second tergite apically approximately as wide as medially long, the third about 1.5 times as wide as long; elevation on first segment pronounced (Fig. 19). Red, with melanistic tendency, at least petiolus black; often entire first segment black and bases of tergites 1-3 or to 4 more or less extremely blackish infuscated.

Male

Head and thorax black; sometimes middle of inner orbits yellowish to obscure ferruginous, rarely postscutellum ferruginous; abdomen red except black petiolus; sometimes bases of tergites 1-3 or to 4 infuscated; wings uniformly, deeply infuscated; all coxae, trochanters and femora usually black; tibiae and tarsi varying from fulvous to blackish-brown (usually red-brown); length 21-25 mm.

Flagellum.—With 45-51 segments and with very small, short-oval tyloides on segments 4 or 5 to 22 or 23. Orange to obscure ferruginous or brownish, the apex infuscated, often a few basal segments ventrally yellowish.

Remarks

In 1951 I found a *Tilia* grove frequented by *Conocalama canadensis*. In a fairly short period of time I collected at this place five females and one male. Most of the females were normally colored specimens with red abdomens, but in one female the abdomen was black banded (variety *nigrocinctus* (Hasey)), and the male was entirely black. In this male the orange colored basal part of flagellum is rather restricted, but otherwise it agrees with *C. brullei* (Cresson) and has to be identified as such. I am, however, in doubt whether this male really belongs to another species than the five females collected with it. Supposing that fully melanistic males of *canadensis* occur, which is quite possible, then it would be very difficult to distinguish them from *brullei*. This is perhaps the explanation why both species have been recorded as being reared from the same host. An alternative interpretation would be that *brullei* and *canadensis* are phases of the same species, but this seems to be less probable. Here, too, we need more biological evidence.

4. *Conocalama occidentalis* (Cresson)

Part I (Can. Ent. Suppl. 15), p. 24, Figs. 5, 10

Trogus occidentalis Cresson, 1868, Amer. Ent. Soc. Trans., 2:92, ♂.

Conocalama occidentalis Hopper, 1939, Trans. Amer. Ent. Soc., 65:325.

?*Conocalama occidentalis occidentalis* var. *luteata* Hopper, 1939, loc. cit., p. 326, ♂ ♀.

Types

Holotypes.—*Trogus occidentalis* Cresson, ♂, Dakota. A.N.S., *Conocalama occidentalis* var. *luteata* Hopper, ♀, Colorado. A.N.S.

Hosts

Smerintbus cerisyi Kby. in British Columbia (C.N.C.).

Distribution

Western North America.

Preamble

Hopper's concept of this species (1939), and particularly the subspecific associations and synonymizations he performed under the name *occidentalis* seem to be untenable. There is no doubt that his *occidentalis bolteri* is a complex of two different distinct species, and that his *occidentalis mellosa* represents a distinct species different from *occidentalis*. There is but little doubt that his *occidentalis occidentalis* also includes several forms — either subspecies or species. Consequently in this paper *mellosa* (Cresson), *bolteri* (Cresson), *quebecensis* (Provancher) and *occidentalis* (Cresson) have all been treated as distinct species. This procedure has fairly satisfactorily untangled and cleared three of the species involved. The fourth "species", *occidentalis* itself, still remains complex and problematic.

A thorough investigation and taxonomic clarification of the western "*occidentalis*" represents a special task, which, by lack of time and material, I was unable to accomplish at the present time. Only from British Columbia has ample material of a form originally included by Hopper in *occidentalis occidentalis* been available to me. This material has served as the basis of the treatment below. I have, however, some doubts as to whether the type of *occidentalis* (Cresson), a male from Dakota, is indeed identical with the populations from British Columbia treated below. It may perhaps represent another subspecies or even another species. Until series of both sexes from the type locality and from the States adjacent to the west and south are procured, and until a revisional study of this subject has been made, the following treatment has to be considered as tentative, and it should be understood that it refers to populations from British Columbia only, which may or may not be identical with the type.

Hopper has divided his *occidentalis occidentalis* into two "varieties" on account of differences in wing color. The broad series of specimens from British Columbia in the C.N.C. and C.G.H. indicates that the two types of wing coloration (uniformly infuscated or yellowish with infuscated apices) represent for this species a characteristic pattern of individual variability without any geographic relation. In British Columbian populations both types of wing-coloration, and intergrades between them, are apparent in both sexes, the dark-winged form being not quite as common as the form with yellowish, apically infuscated wings. The name "var. *luteata*" Hopper, based, according to original description, only on wing-color and thus referring to a mere individual variety, could be sunk into synonymy. Only in the event that further research should indicate that the type specimen of this variety (from Colorado) differs subspecifically from the type of *occidentalis* (from Dakota) by characters not mentioned in the original description could the name *luteata* Hopper be resurrected from synonymy and used at a subspecific level.

The species *occidentalis* in the interpretation of the following treatment, based on series from British Columbia, differs from *quebecensis* (also occurring in British Columbia) distinctly (though not very strongly) in coloration and also in the structure of the flagellum of females which is less widened beyond middle than in *quebecensis*. Besides, a slight difference in the tyloides of the males seems to be noticeable. I doubt that both forms could be subspecifically associated. In the present imperfect stage of knowledge of this particular, extremely complicated group, all attempts at subspecific associations seem to be premature anyway, and likely to disturb rather than to clarify.

Female

Large, moderately slender; head usually predominantly, but at least face, clypeus and cheeks, ferruginous; thorax predominantly black, mesoscutum usually entirely or predominantly ferruginous, rarely black with ferruginous longitudinal stripes; abdomen ferruginous, petiolus, rarely entire first tergite, and usually narrow basal bands on third to fourth, sometimes to fifth, tergites black, the fifth and/or sixth to seventh tergites predominantly or entirely black; legs fulvous, all coxae and usually trochanters II and III (sometimes all trochanters), femora III usually predominantly, femora II usually ventrally, sometimes predominantly, black; wings varying individually from yellowish with slightly infuscated apices to nearly uniformly, moderately deeply, infuscated; scutella pale ferruginous; basal 17-20 segments of flagellum always pale ferruginous to yellowish, apex black; length 23-28 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and slightly widened, extremely attenuated at apex, with 50-54 (usually 52 or 53) segments, the first 3 times as long as wide, about the eleventh square, the widest 1.5-1.75 times as wide as long. Always basal 17-20 segments pale ferruginous or yellowish, the apex black; scape usually ferruginous, sometimes dorsally infuscated.

Head.—Temple profile slightly widened rather than narrowed, with broadly curved outline; cheek profile moderately narrowed with rather straight outline; malar space fully as long as width of base of mandible; apex of clypeus straight, with a small median protuberance. Usually predominantly, sometimes entirely, pale ferruginous; usually supraantennal cavities and malar space more or less extensively, sometimes also middle of frons, more rarely also ocellar and entire occipital regions, black.

Thorax.—Black, scutella pale ferruginous or yellowish; mesoscutum usually ferruginous, often with longitudinal, black band on median lobe or on all three lobes, varying to black with longitudinal, ferruginous lines separating the lateral lobes from the median lobe; collare, pronotal ridge broadly, usually pronotal base narrowly, subalarum, regulæ and prescutellar carinae pale ferruginous, sometimes yellowish tinted; propodeum, mesopleura and mesosternum without light sutures or markings.

Legs.—Rather long and slender, fulvous, all coxae and usually trochanters II and III (sometimes all trochanters), femora III usually predominantly and femora II usually ventrally black.

Abdomen.—Fairly slender; second tergite distinctly longer than apically wide, the third less than 1.5 times as wide as long; elevation on first segment pronounced. Ferruginous, petiolus, rarely entire first segment and basal bands on third to fourth tergites, sometimes to fifth tergite, black, the fifth and/or the sixth to seventh tergites predominantly or entirely black.

Male

Generally like the female; trochanters I and II predominantly and the apices of coxae I and II pale ferruginous; face, clypeus, scape ventrally, sometimes base of mandibles and the cheeks partially yellowish tinted; head, mesoscutum and abdomen on the average somewhat more extensively black than in female.

Flagellum.—With 50-52 segments and with very small, short-oval cyloides on segments 4-24; basal segments 1-24 or 28 entirely or predominantly pale ferruginous.

5. *Conocalama quebecensis* (Provancher)

Trogus quebecensis Provancher, 1874, Nat. Canad., 6:335, ♀.

Conocalama occidentalis bolteri Hopper, 1939, Trans. Amer. Ent. Soc., 65:324, 325, ♀.

Conocalama occidentalis bolteri Townes, 1951, Syn. Cat., p. 305, ♀.

Types

Holotype.—♀, Canada. Provincial Museum Quebec.

Hosts

One male in the C.N.C. bears the label "ex *Eacles imperialis* Dru., Quebec, Hunters Point". I doubt very much that a Saturniid should be the typical host of this species; but even the fact that such a one could be successfully attacked as an emergency host (if authentic) would be surprising.

Distribution

Quebec, Ontario, Nova Scotia (C.N.C.); Maine (C.G.H.); 1 ♀ from British Columbia, Vernon (C.N.C.); 1 ♂, Manitoba (C.N.C.). Minnesota (C.H.T.).

Preamble

Similar to *occidentalis* (Cresson), but somewhat slenderer and lighter in color, tergites 1-3 being orange rather than ferruginous. The female differs from *occidentalis* by the distinctly more widened flagellum (the widest segment being 2.25 times as wide as long) and chromatically by the ferruginous dorsal side of coxae III and by the ferruginous trochanters, petiolus and femora II and III (femora III sometimes ventrally in part black); the male differs from *occidentalis* by the row of tyloides beginning on the second flagellar segment, and chromatically by the almost entirely light colored coxae and by the light markings on prepectus, mesosternum and sometimes lower part of mesopleura. Otherwise both sexes are more similar to *occidentalis* than to the smaller and much more melanistic species *bolteri* Cresson.

Female

Head and thorax as in occidentalis, except that the malar space is not black marked and that the propodeum and mesopleura have usually some pale ferruginous sutures or markings; legs considerably less melanistic than in occidentalis: coxae I and II apically, coxae III on dorsal side predominantly, all trochanters entirely, ferruginous, femora III sometimes ventrally in part black; entire first segment and tergites 2 and 3 orange, sometimes the third tergite with an inconspicuous, black basal band; fourth tergite extensively in uscated to predominantly black, the following tergites black, the fourth and fifth usually with narrow, orange, lateral band; scutella yellowish-ferruginous; basal 17-20 segments of flagellum always pale ferruginous to yellowish; apex black; length 24-27 mm.

Flagellum.—As in *occidentalis*, except that the flattened part is distinctly more widened, the widest segment being about 2.25 times as wide as long.

Head.—As in *occidentalis*, except that the malar space is not black marked.

Thorax.—As in *occidentalis*, except that the propodeum, mesopleura and prepectus show a slight erythristic tendency. The following are usually pale ferruginous: apex of prosternum, outer margin of prepectus, anterior and posterior sutures of mesosternum, carina replacing area superomedia and its environment, narrow circumspiracular area of propodeum, apex of area metapleurals at base of coxae, anterior and posterior sutures of mesopleura, sometimes apex of area dentipara, sometimes marks on mesopleura.

Legs.—Pale ferruginous, considerably less melanistic than in *occidentalis*; in contrast to it the following are ferruginous: all trochanters, apices of coxae I and

II, dorsal side of coxae III extensively, femora II and III usually entirely (femora III sometimes ventrally in part black).

Abdomen.—Interval of gastrocoeli without striae. Tergites 1-3 orange, petiolus not black, the third tergite sometimes with inconspicuous, narrow, black basal band; fourth tergite extensively infuscated to predominantly black; tergites 5-7 black, the fourth and fifth usually with narrow, orange, lateral bands.

Male

Generally like the female; the following are yellow: base of mandibles, face, clypeus, cheeks partially, scape ventrally; in contrast to *occidentalis* and in correspondence with the female, coxae extensively pale and thorax with some pale markings; yellowish are: apex of prosternum, prepectus partially, markings on mesosternum between lateral border and sternauli, sometimes lower part of mesopleura, coxae I and II almost entirely; coxae III predominantly pale ferruginous; flagellum with more than 50 segments, segments 1 to beyond 30 pale ferruginous; in contrast to *occidentalis* segment 2 (instead of 4) to 24 with longish-oval tyloides.

6. *Conocalama bolteri* (Cresson)

Trogus bolteri Cresson, 1868, Amer. Ent. Soc. Trans., 2:94, ♂.

Trogus occidentalis bolteri Hopper, 1939, Trans. Am. Ent. Soc., 65:324, 325, partim.

Trogus occidentalis bolteri Townes, 1951, Syn. Cat., p. 305, partim.

Types

Holotype.—♂, Michigan, Lake Superior. Collection A. Bolter. Present location unknown.

Distribution

♂: Lake Superior (holotype); ♀♀: Ontario, Alberta (Banff; top of Mt. Aylmer, Jasper), British Columbia (Jesmond, Chilcotin), Northwest Territories (Fort Norman). New York (C.H.T.).

Preamble

I have not seen the holotype of this species and have no final proof for associating it with the female described below. But I feel sure that this female, which has been confounded until now with *quebecensis* Provancher and with *occidentalis* Cresson, is a distinct species, and I have examined a male of *bolteri* which agrees exactly with Cresson's original description, and which matches the female described below in all important characters.

The distinction between *bolteri* ♂ and *quebecensis* ♀ was originally based on the wholly black coloration of the antennae above in the former, only the apex being black in the latter. Hopper has considered this difference as merely a form "of chromatic antingency, being a common, although not universal, point of divergence between the two sexes throughout the genus". It seems that this very case is one of those which indicate that the chromatic sexual dimorphism under discussion is not universal throughout the genus. All females and all males of *occidentalis* and of *quebecensis* which I have examined, had the base of flagellum extensively pale ferruginous or yellowish, beginning from the first segment. The female associated below with *bolteri* ♂ has the base of flagellum more or less extensively blackish, this being one of its specific chromatic characters corresponding well with the melanistic flagellum of *bolteri* ♂. The male specimen I have before me, considered as identical with the original description of *bolteri*, has likewise a black flagellum. Its flagellum has only 48 segments. This low number of flagellar segments excludes identity with the species *quebecensis* (which

has about 50-54) almost with certainty, but matches perfectly the number in the female described below. So it can be said that both sexes are associated with a rather high probability of correctness, although the association needs, nevertheless, further observation and final confirmation.

The female has the general appearance of a small edition of *quebecensis* ♀. It differs by a somewhat shorter flagellum with a total number of segments below 50 in the great majority of specimens, and by certain constant chromatic characters: black cheeks (except part of outer orbits), partially or entirely black clypeus and face, black or blackish basal segments of flagellum (at least the first), black base of petiolus and usually scutellum; in contrast to *quebecensis* the interval of gastrocoeli is longitudinally short-striate, while the posterior part of metapleura, usually fairly regularly transversely striate in *quebecensis*, is rather irregularly rugosely-punctate in *bolteri*.

Male

(Description based on specimen in C.N.C. Agrees with original description, except for light markings on mesopleura, prepectus and mesoscutum.)

Flagellum dorsally uniformly black to the very base; head and thorax black; the following are yellow: base of mandibles, face, clypeus, frontal orbits, stripe on outer orbits; collare, apex of pronotal ridge, subalarum, tegulae, scutellum except base, postscutellum and two short median lines on mesoscutum ferruginous; exterior margin of prepectus and restricted markings on lower edge of mesopleura yellowish; abdomen orange, tergites 4-7, base of petiolus and indistinct basal band on third tergite black; legs fulvous; coxae III basally and dorsally and femora III ventrally in part black; length 22 mm.

Flagellum.—Black, ventrally dark brownish; with 48 segments, segments 4-22 with very small, short-oval tyloides; scape ventrally yellow.

Female

Flagellum basally (at least first segment) black or blackish, with broad, light annulus, the widest segment about twice as wide as long; head and thorax black, facial orbits yellow; sometimes middle of face and clypeus obscure reddish instead of black; mesoscutum uniformly black, rarely with two longitudinal, ferruginous median stripes, apex of scutellum and postscutellum yellowish; abdomen orange, base of petiolus almost always, base of third tergite narrowly and tergites 5-6 or to 7 almost entirely black; legs orange, tibiae and tarsi yellowish, all coxae and usually femora III ventrally in part black; length 20-23 mm.

Flagellum.—Bristleshaped, moderately short, ventrally flattened and somewhat widened beyond middle, with usually 47-49, exceptionally 51 segments, the first about 3 times as long as wide, about the eleventh square, the widest twice as wide as long. Basal segments up to the seventh to a varying extent, at least the first, black or blackish, the following segments up to the seventeenth or eighteenth pale ferruginous to whitish, apex black.

Head.—Black; facial orbits yellow, sometimes the yellow band prolonged to the upper corner of base of mandible; middle of outer orbits usually ferruginous; base of mandibles yellow.

Thorax.—Deep black, including mesoscutum; apex of pronotal ridge (rarely entire pronotal ridge), tegulae, apex of scutellum and postscutellum always yellowish-ferruginous, sometimes also collare partially, prescutellar carinae and subalarum; rarely mesoscutum with two ferruginous, median stripes.

Legs.—Femora relatively a trifle shorter than in *quebecensis*. Orange, tibiae and tarsi more yellowish; coxae and usually ventral side of femora III partially black; apices of coxae I and II narrowly pale ferruginous.

Wings.—Slightly yellowish tinted, with indistinct, apical infuscation.

Abdomen.—Interval of gastrocoeli longitudinally short-striate; orange, with rare exceptions base of petiolus blackish; third tergite with narrow, often bipartite, black basal band; tergites 4-7, rarely only 4-6 almost entirely black.

7. *Conocalama mellosa* (Cresson)

Preamble

In spite of a certain chromatic convergency, this form is, in my opinion, about as different from *occidentalis* Cresson as a raven from a crow. It is not only distinctly larger than *occidentalis* (the difference in size indicating here a biological differentiation by specialization on other hosts), but, more important than that, also much stouter, the head, thorax and abdomen being not only absolutely, but also relatively wider than *occidentalis*. Differing from *occidentalis* furthermore as follows: (1) flagellum of female considerably more widened beyond middle, the widest segment being nearly 2.5 times as wide as long; (2) anterior part of subalarum in lateral view considerably wider, forming a gradually convex bulge (similar in structure to *copei* Cresson); (3) cheeks wider, more buccate, the head in front view approximately square; (4) sculpture of mesoscutum denser and fully opaque, the striation on the mesopleura, on the average, less distinct or reduced; (5) head, thorax and legs always without black markings.

In the almost uniformly ferruginous color of the entire body *mellosa* agrees with *fuscalata* Hopper and with *violipennis* Hopper. It differs from *fuscalata*: (1) by the much stouter and wider abdomen with the second tergite of females being apically as wide as, or even slightly wider than, medially long, the third tergite being distinctly wider than long; (2) by the structure of subalarum as described above. It differs from *violipennis*: (1) by the structure of head with considerably wider cheek profile and more buccate cheeks; (2) by the structure of flagellum of females, which is wider (as described above).

I have compared females of *rileyi* (Cresson) from Kansas with females of *mellosa* from New Mexico, both identified by Hopper. I found both forms to be identical in general appearance as well as in all important structural characters mentioned above, differing from each other but slightly in color and in the degree of infuscation of wings. The latter character seems to be individually rather variable in several western species of this genus (as in *fuscalata* and *occidentalis*) and thus has little value for specific distinction. I am convinced, therefore, that *rileyi* and *mellosa* represent subspecies of the same species. As the type of *rileyi* is lost, my interpretation of this form has been based on the material identified by Hopper.

Distribution

According to H. Townes 1951 (*mellosa*): "New Mexico, Colorado"; (*rileyi*): "Illinois, South Dakota, Nebraska, Kansas".

Female

One of the largest and stoutest species of North America; almost uniformly ferruginous, without black markings, except sometimes a narrow, black basal line on third tergite; head more or less extensively yellowish tinted; wings, in subspecies *mellosa*, usually yellowish with more or less extensively infuscated apices, in subspecies *rileyi* predominantly to almost entirely dark; length 27-30 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and considerably widened, extremely attenuated at apex, with 51 segments (only one specimen of each subspecies counted), the first about three times as long as

wide, the ninth or tenth square, the widest about 2.5 times as wide as long. Apex black, base orange, turning gradually into whitish; in *rileyi* basal 8-10 tergites dorsally partially infuscated.

Abdomen.—Subpyramidal elevation on first segment pronounced; second tergite apically about as wide as, or slightly wider than, medially long. Ferruginous, third tergite usually with narrow, black basal band; in subspecies *mellosa* tergites sometimes apically yellowish tinted.

Male

Almost exactly like the female; head more extensively yellowish; flagellum with rather narrow, longish-oval tyloides on segments 4-23 or 26, ferruginous with infuscated apex, or (subspecies *rileyi*) dorsally blackish for its whole length; length 30-33 mm.

7a. *Conocalama mellosa mellosa* (Cresson)

Trogus mellosus Cresson, 1875, Rpt. Wheeler Exp. (Eug. Dept. U. S. Army), Zool., v. 5, p. 708, "♂" = ♀.

Conocalama occidentalis mellosa Hopper, 1939, Trans. Amer. Ent. Soc., 65:326, ♀.

Conocalama occidentalis mellosa Townes, 1951, Syn. Cat., p. 305.

Types

Holotype.—♀, New Mexico. A.N.S.

Neallotype.—♂, New Mexico. C.H.T.

Distribution

According to H. Townes 1951: "Colorado, New Mexico".

Female and Male

Head extensively and usually also apices of tergites pale yellowish tinted; basal segments of flagellum pale orange or pale ferruginous, dorsally not infuscated; wings usually yellowish with infuscated apices.

7b. *Conocalama mellosa rileyi* (Cresson), new status

Trogus rileyi Cresson, 1869, Trans. Amer. Ent. Soc., 2:95, ♀.

Conocalama rileyi Hopper, 1939, Trans. Amer. Ent. Soc., 65:327, ♀ ♂.

Types

Holotype.—♀, Illinois. Collection of C. V. Riley, lost.

Neallotype.—♂, no locality. U.S.N.M.

Distribution

According to H. Townes 1951: "Illinois, South Dakota, Nebraska, Kansas".

Female and Male

Lateral fields of face, frontal and outer orbits partially, yellow; abdomen darker ferruginous than in *mellosa mellosa* (Cresson) and without yellowish tinted parts; basal 8-10 flagellar segments of females, entire flagellum of males dorsally infuscated; wings predominantly infuscated, usually yellowish along costa.

8. *Conocalama fuscata* Hopper

Conocalama fuscata Hopper, 1939, Amer. Ent. Soc. Trans., 65:330, ♂ ♀.

Types

Holotype.—♂, New York, Catskill Mts., 1883, W.W.Hill. A.N.S. No. 4218.

Allotype.—♀, Northeast Pennsylvania, 13.VIII.1917, D. Isely. U.S.N.M.

Distribution

According to H. Townes 1951: "New York, Pennsylvania". New record: Ontario, Southampton (C.N.C.).

Preamble

This is probably a distinct species, although closely related to *quebecensis* (Provancher), which has a similarly slender appearance and similarly widened flagellum of female, but differs by extensively black head, thorax and apical tergites. Chromatically distinguished by uniformly fulvo-ferruginous color of abdomen and legs, and nearly uniformly fulvo-ferruginous head and thorax. In this respect similar to *mellosa* (Cresson), but at first glance distinguished by the narrow, elongate abdomen and the narrower thorax; also differing from *mellosa* by the shape of the subalarum which is thinner, not forming a gradually convex bulge, but rather a prominent ridge. The extensive infuscation of wings as present in the type and allotype, and used by Hopper as distinctive specific character in the key for the species of the genus, has been found to be inconstant.

Male

Fulvo-ferruginous; face extensively yellow; median furrow of pronotum, mesopleural, scutellar and postscutellar sutures and the propodeum basally and laterally, black; flagellum dorsally infuscated; second tergite medially slightly longer than apically wide, all tergites at least nearly as long as apically wide; length 28 mm.

Flagellum.—With more than 46 segments, and with tyloides on segments 2-27. Ventrally fulvo-ferruginous, dorsally infuscated.

Head.—Clypeus with projecting, bipartite, median tubercle; occiput strongly concave. Fulvo-ferruginous, vertex black; the following are yellow: face, clypeus, frontal orbits, mandibles except teeth.

Thorax.—In dorsal view more than twice as long as wide; notauli distinct to about middle of mesoscutum; anterior part of subalarum in lateral view not widened, not forming a gradually convex bulge, but rather thin and prominent ridge-like. Fulvo-ferruginous, mesoscutum, pronotum laterally and upper part of mesopleura more ferruginous than the rest; furrow behind collare, sutures of mesopleura and scutella, and propodeum basally and laterally, black; the following are yellow or yellowish: collare, tegulae, pronotal ridge, subalarum, lines in position of sternaui, scutella indistinctly; infuscated mark on base of median lobe of mesoscutum.

Legs.—Fulvo-ferruginous; the following are yellowish; all trochanters, coxae I and II, tarsi extensively, anterior side of femora and tibiae I and II.

Abdomen.—Slender, nearly twice as long as head and thorax together; second tergite medially somewhat longer than apically wide, all tergites at least nearly as long as apically wide. Uniformly fulvo-ferruginous.

Female

Almost uniformly fulvo-ferruginous, only basal sutures of propodeum and usually apical sutures of mesopleura, median furrow of pronotum and basal furrow of scutellum narrowly black; lateral field of face and frontal orbits yellow; flagellum fulvo-ferruginous, turning gradually yellowish toward middle, with black apex; second tergite considerably longer than apically wide, the third square; wings varying from predominantly infuscated with yellowish base to predominantly yellowish with infuscated apices; length 26-27 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened beyond middle and considerably widened, extremely attenuated at apex, with 54 segments (only

one specimen counted), the first about three times as long as wide, about the eleventh square, the widest about 2.5-2.75 times as wide as long. Basal 19-20 segments pale fulvo-ferruginous, turning gradually into yellowish toward middle of flagellum; apex black; scape ferruginous.

Head.—Temple profile slightly widened rather than narrowed, with broadly curved outline; cheek profile moderately narrowed, with rather straight outline; malar space fully as long as width of base of mandible; apex of clypeus medially with projecting, bipartite tubercle. Fulvo-ferruginous; lateral fields of face, frontal orbits, base of mandibles and usually apical part of cheeks yellow.

Thorax.—Mesoscutum considerably longer than medially wide; basal half of notauli sharply impressed. Fulvo-ferruginous; basal sutures of propodeum, apical sutures of mesopleura and usually median furrow of pronotum and basal furrow of scutellum narrowly black; the following are yellow or yellowish: collare, subalarum, pronotal ridge, scutella, apex of prosternum.

Legs.—Fulvous; tarsi and the tibiae partially yellowish.

Abdomen.—Elevation on first segment pronounced; long and narrow; second tergite medially considerably longer than apically wide, the third tergite square, the fourth a little wider than long. Uniformly fulvo-ferruginous.

Remarks

The female from Ontario agrees exactly with the allotype, except for the wing color which is yellowish with infuscated apices.

9. *Conocalama violipennis* Hopper

Conocalama violipennis Hopper, 1939, Trans. Amer. Ent. Soc., 65:327, 328, ♀ ♂.

Types

Holotype.—♀, California. A.N.S. No. 4219.

Allotype.—♂, California. A.N.S.

Distribution

California.

Preamble

Another almost uniformly ferruginous species, similar in appearance to *mellosa rileyi* (Cresson), but at once distinguishable by the distinctly more narrowed cheek profile, the not buccate cheeks and the less widened flagellum of females. Differing also from *fuscalata* Hopper by the less widened flagellum of females and besides by the considerably stouter abdomen and the more vivid, almost red, shade of the general ferruginous color of entire body.

Female

Uniformly vivid ferruginous; wings nearly uniformly and deeply infuscated, with strong, violaceous reflections; flagellum vivid ferruginous, gradually turning black toward apex; head uniformly vivid ferruginous, or at the most with narrow, indistinct yellow lines on inner orbits; length 25 mm.

Flagellum.—Moderately long, bristle-shaped, ventrally flattened and slightly widened beyond middle, extremely attenuated at apex, with 52-53 segments, the first scarcely 3 times as long as wide, about the tenth square, the widest about twice as wide as long. Ferruginous, turning gradually black toward apex, without any indication of a lighter annulus.

Head.—In contrast to the bulk of the species, temple profile not widened, its outline gradually rounded, cheek profile distinctly narrowed, with straight

outline; apex of clypeus medially with a projecting, bipartite tubercle; malar space as long as width of base of mandible. Uniformly ferruginous; frontal orbits sometimes indistinctly and narrowly yellowish.

Thorax.—Mesoscutum not much longer than medially wide, not quite as densely punctured as in *mellosa*; anterior third of notauli distinctly impressed; scutellum dorsally fairly grossly and moderately densely punctured, shiny; anterior part of subalarum, in lateral view, a little widened and rounded, but distinctly less so than in *mellosa*. Uniformly vivid ferruginous.

Legs.—Ferruginous; tarsi somewhat paler.

Abdomen.—Subpyramidal elevation of first tergite moderately developed; second tergite but slightly longer than apically wide, or almost as long as wide, the following tergites at least slightly wider than long. Uniformly vivid ferruginous.

Male

Generally like the female, with a tendency for developing melanistic pattern on head and thorax in some specimens; Hopper mentions one paratype with "rather broadly black sutures of thorax"; another specimen (U.S.N.M.) has the sterna entirely, the pleura predominantly, the median lobe of mesoscutum, middle of frons, ocellar and occipital regions, and the base of propodeum black; length 22 mm.

No specimen with unbroken flagella has been available for examination of the tyloides.

10. *Conocalama galbinata* Hopper

Conocalama galbinata Hopper, 1939, Amer. Ent. Soc. Trans., 65:328, 329, ♂.

Types

Holotype.—♂, New Mexico, Organ Mts., Dripping Spring, T. D. Cockerell. U.S.N.M.

Distribution

New Mexico.

Preamble

The holotype is still the only known specimen of this strange species. The following diagnosis is condensed from Hopper's original description.

Male

Head fulvous with some yellowish markings, thorax predominantly black, with ferruginous and flavo-fulvous markings; abdomen fulvous, shading to flavous toward apex of each tergite to a gradually increasing extent toward apex of abdomen; tergites 1-5 with narrow, black basal bands, 1-7 with very narrow, black apical margins; coxae and femora III predominantly black, all tibiae and tarsi yellowish; flagellum ventrally fulvous, dorsally infuscated; wings fuscous with some paler portions; incisions between tergites strongly impressed so that tergites appear convex in lateral view; length 30 mm.

Flagellum.—Serration very pronounced; first segment very slightly shorter than the second and third together, the fifth and following square. Ventrally fulvous, dorsally narrowly fuscous; scape ventrally yellowish.

Head.—Clypeus with a strong, punctiform, median impression. Fulvous; occiput partially black; the following are yellowish: basal half of mandibles, lateral margins of clypeus, lateral fields of face, frontal and outer orbits extensively.

Thorax.—Black; the following are dull ferruginous: apex of prosternum, collare, about upper half of pronotum, pronotal base, mesoscutum, upper anterior corner and mark on upper posterior part of mesopleura, areae dentiparae; the following are flavo-fulvous: tegulae, scutella and subalarum; mesosternum shading from dirty fulvous to piceous.

Legs.—All tibiae and tarsi yellowish; coxae I and femora I and II fulvo-ferruginous; coxae II partially blackish; coxae III and femora III predominantly black.

Abdomen.—Elevation on first tergite flattened anteriorly and laterally, posteriorly slightly concave; second tergite distinctly wider than long; incisions between tergites pronounced, the latter appearing convex in lateral view. Fulvous, shading to flavous towards apex of each tergite, the extent of flavous coloration increasing caudad, the seventh tergite almost entirely flavous; all tergites with very narrow, black apical margins, tergites 2-5 with narrow, black basal bands; first segment piceous at base; sternites uniformly testaceous.

11. *Conocalama manitobae*, new species

Types

Holotype.—♂, Manitoba, Aweme, 26.VI.1911, N. Criddle. C.N.C. No. 7466.

Distribution

Manitoba.

Male

Head, thorax and abdomen uniformly black, except clypeus, face and mandibles (except teeth) which are white; flagellum black, scape ventrally white; wings uniformly infuscated; legs predominantly black, all tibiae and tarsi extensively, and the coxae I and II dirty-whitish; length 22 mm.

Flagellum.—With 48 segments and with very small, short-oval tyloides on segments 4-20. Black, including scape, the latter ventrally white.

Head.—Temple profile not narrowed, but also not distinctly widened, with broadly rounded outline; cheek profile somewhat narrowed, with slightly curved outline; apical margin of clypeus straight, with small median projection. Black; the following are white: mandibles without teeth, face, clypeus and lowest part of frontal orbits; lower part of outer orbits with indistinct, ferruginous-whitish mark.

Thorax.—Basal third of notauli rather distinct, but not sharply incised; scutellum short and fairly wide, not distinctly narrowed toward apex, its short, dorsal part simply convex, gradually rounded into the long, steeply oblique, wide apical slope, sparsely punctured and shiny; areae superoexternae very densely punctured; metapleura and lower part of mesopleura irregularly and not strongly transversely striate-punctate; anterior part of subalarum not widened and gradually convex, but shaped as in *canadensis*. Uniformly deep black.

Legs.—Rather slender. Predominantly black; dirty-ferruginous-whitish are: coxae I and II, trochanters I and II ventrally, trochantelli III, apices of femora I and II, all tibiae dorsally and ventrally toward base, all tarsi.

Wings.—Uniformly blackish infuscated.

Abdomen.—Subpyramidal elevation on first tergite subobsolete. Black.

Remarks

I have tried in vain to identify the type specimen as an extremely melanistic variant of any of the species to be expected in Canada. The white color of face

and clypeus and the shape of temple profile excludes *canadensis* (Provancher), the structure of the subalarum excludes *copei* (Cresson), the dark wing color seems to exclude *bolteri* (Cresson), although the latter would correspond relatively the best in its minor size and the black color of its flagellum; the weak striation of pleura, the subobsolete elevation of first tergite and the smaller size seems to exclude *quebecensis* (Provancher) as well as *occidentalis* (Cresson). So I came to the conclusion that the type specimen represents, with some probability, a new species.

12. *Conocalama catalinarum* Heinrich

Conocalama catalinarum Heinrich, 1957, Can. Ent., 89:334, ♂.

Types

Holotype.—♂, Arizona, St. Catalina Mts., Mt. Lemmon, 9000 ft., 2-4.VIII.-1948, H. E. Evans. C.N.C. No. 6529.

Paratypes.—7 ♂♂, from type-locality. C.N.C.; Cornell C.; C.G.H.

Distribution

Arizona (St. Catalina Mts.).

Preamble

H. Townes drew my attention to the fact that my species *catalinarum* seemed to be chromatically identical with *Trogus flammipennis* Morley (also belonging to *Conocalama*), described in 1915 (Rev. Ichn., 4:85) from Mexico, Xucumanatlan, 7000 ft. I have sent a paratype of *catalinarum* to London which J. F. Perkins was kind enough to compare with the type of *flammipennis*. He came to the conclusion that "under present circumstances *catalinarum* should be regarded as being distinct specifically from *flammipennis*". The list of structural differences kindly communicated to me by Perkins seems indeed to indicate that the differentiation of the two forms is specific. But it may be possible that this species displays an extraordinary degree of geographical variation, in which case a subspecific association of the two forms could perhaps exist. It will be the task of further research to study the geographical and individual variability of the two forms involved, and their biology.

The following columns demonstrate the differences between *catalinarum* and *flammipennis* as found by Perkins:

Conocalama catalinarum ♂

1. Clypeus with a very weak, broad, central apical projection.
2. Occiput centrally with a deep, short furrow behind the ocellar triangle.
3. Mesopleurum (ventrad) striate with inconspicuous punctures.
4. Area superomedia forming an acute angle, not filled in centrally and about twice as broad as long.

Conocalama flammipennis ♂

- Clypeus with central apical projection sharply incised centrally, so that it has two broad apical tubercles.
- Occiput centrally with a tubercle behind the ocellar triangle which has a very weak central, longitudinal furrow.
- Mesopleurum (ventrad) punctate with only an indication of striae.
- Area superomedia forming a more acute angle, almost entirely filled in, finely punctate and about 3 times as wide as long.

5. Elevation of first tergite more strongly raised, its posterior surface with a polished, triangular area.

Elevation of first tergite less strongly raised, its posterior surface evenly punctured with the general surface of the postpetiole.

Male

Deep black; wings yellowish with distinct black apical band, the base being indistinctly infuscated; inner orbits more or less, middle of clypeus and an indistinctly limited area around the middle of outer orbits obscurely, reddish or yellowish-red; flagellum predominantly black; length 28 mm.

Flagellum.—With 49 segments and with short-oval tyloides on segments 4-25 or to 26; predominantly black, usually ventrally ferruginous, the segments of basal third exteriorly reddish at bases.

57. Genus *Tmetogaster* Hopper², new status

Tmetogaster Hopper (as subgenus of *Conocalama* Hopper), 1939, Trans Amer. Ent. Soc., 65:321.

Type-species.—*Trogus nubilipennis* Haldeman. (Monobasic.)

Preamble

The author of the genus originally erected this taxonomic unit as a mere subgenus of his genus *Conocalama*, mainly under reference to the shape of the aedeagus, which differs considerably from that of all other *Conocalama* species (see figures in Hopper, *loc. cit.*, plate XIX, Nos. 6 and 9). There are, however, some other characters differentiating *Conocalama* from *Tmetogaster*, all of them together seemingly indicating a generic status of the unit rather than a subgeneric. *Tmetogaster* seems to embody a first slight trend of evolutionary development within the subtribe Callajoppina toward the subtribe Trogina.

Flagellum.—Of females as in *Conocalama*; of males without tyloides, the basal segments on outer side somewhat more widely overlapping than in *Conocalama*, both characters indicating a slight approach toward the subtribe Trogina.

Head.—Generally as in *Conocalama*; apical border of clypeus, however, without the small median projection typical for the mentioned genus, and straight or very slightly emarginate.

Thorax.—Scutellum more gibbous than in *Conocalama*, approaching a conical shape, ascending gradually and rather steeply from the basal furrow to the rounded summit and then sloping down abruptly toward postscutellum.

Wings.—Areolet irregularly quadrangular, as in *Conocalama*, short-petiolate.

Legs.—As in *Conocalama*.

Abdomen.—Differing in both sexes from *Conocalama* by the structure of tergites 2-5 which are more strongly sclerotized and sculptured, slightly constricted at bases and very slightly bulging dorsally (in lateral view), and also laterally toward apices. The "subpyramidal" elevation on the elbow of first segment but moderately developed.

1. *Tmetogaster nubilipennis* (Haldeman)

Trogus nubilipennis Haldeman, 1846, Acad. Nat. Sci. Phila. Proc., 3:127.

Conocalama (Tmetogaster) nubilipennis Hopper, 1939, Trans. Amer. Ent. Soc., 65:321.

Conocalama (Tmetogaster) nubilipennis Townes, 1951, Syn. Cat., p. 305.

Types

Holotype.—Lost.

²See *Aoidenda* for correction to couplet 5 of Key to Genera in Part I (Can. Ent. Suppl. 15).

Hosts

According to Hopper 1939: "*Sphecodina abbottii* Swains and *Ampeloeca* sp." One female was captured in 1956 by Bernd Heinrich searching on grape vines inhabited by caterpillars of *Ampeloeca myron* Cr. Hopper also quotes *Isia isabella* S. & A. and *Papilio asterias* Cr. as hosts. I doubt both records, but the latter, if confirmed, would nicely support my hypothesis of the evolutionary descent of the Trogini (*Papilio* parasites) from the Callajoppini (Sphingid parasites).

Distribution

According to H. Townes 1951: "Massachusetts to Georgia, west to Illinois." New record: Maine (C.G.H.).

Female

Head, thorax, tergites 1 and 2 and legs dark ferruginous; tergites 3-7 black; all tarsi and all of tibiae except apices yellow; flagellum black with clearly defined yellowish annulus; wings uniformly and deeply infuscated, with violaceous reflections, sometimes with translucent areas toward base and near middle; length 21-23 mm.

Flagellum.—Moderately long, bristleshaped, ventrally flattened and distinctly widened beyond middle, extremely attenuated at apex, with 46-48 segments, the first slightly more than twice as long as wide, the tenth square, the widest fully twice as wide as long. Deep black, segments 12 or 13 to 17 or 18 with yellowish annulus; scape ferruginous.

Head.—Temple profile not narrowed, with broadly curved outline; cheek profile moderately narrowed, with straight outline; malar space as long as width of base of mandible; apex of clypeus straight or a trifle emarginate, without median tubercle. Ferruginous; middle of inner orbits usually yellowish tinted, supraantennal cavities and middle of frons narrowly infuscated or blackish.

Thorax.—Mesoscutum rather densely punctured and pubescent, subopaque; basal third of notauli distinct; scutellum approaching a conical shape, steeply ascending from basal furrow toward the rounded top, and with steep and long apical slope; carination of propodeum strongly prominent; areae metapleurales and hind half of areae spiraculiferae very coarsely, transversely rugose. Ferruginous; base of prosternum and apical margin of mesosternum usually blackish.

Legs.—Ferruginous, tibiae and tarsi yellow, apices of the former ferruginous.

Abdomen.—Gibbosity on elbow of first segment moderately prominent; gastrocoeli rather deep and wide, their interval narrowed and longitudinally striate; tergites 3-5 basally somewhat constricted, distinctly separated from each other, dorsally slightly bulging in lateral view and also laterally toward apices slightly bulging; tergites 2-5 very densely punctured and hairy, opaque. Tergites 1-2 ferruginous, rest black; sometimes apex of second tergite also black.

Male

Flagellum black, without annulus, ventrally partially, especially at base and toward apex, brownish; face, clypeus, frontal orbits and scape ventrally, yellow; otherwise like female.

58. Genus *Gnamptopelta* Hopper

Figs. 5, 6, 16

Gnamptopelta Hopper, 1939, Trans. Amer. Ent. Soc., 65:333.

Type-species.—*Trogus obsidiamator* Brullé. Orig. design.

The most important feature of this genus, the one separating it at once from all other genera of the subtribe Callajoppina, is represented by the structure of

the clypeus, which is apically considerably emarginate, with oblique sides (Fig. 5). The highly elevated scutellum, approaching a conical shape (Fig. 16), is similar to that of *Tmetogaster*, the irregularly quadrangular, distinctly petiolate areolet agrees with *Conocalama*, but the entire lack of an elevation on the elbow of the first segment differs from both these genera.

In size, color and general appearance the type-species is very similar to *Conocalama brullei* (Cresson).

Hopper has (1939, *loc. cit.*) treated the two North American forms of this genus as distinct species, while Townes (Syn. Cat. 1951) considered them as sub-specifically associated. Convincing evidence does not seem to be at hand for either hypothesis. In the most southern and most northern parts of the entire range of the genus, only one of the two forms has been found, while both are recorded from North Carolina, South Carolina and Georgia. This seems to be a rather wide zone for two subspecies to live side by side without interbreeding. Perhaps advanced knowledge of the biology of the two forms, particularly of their hosts, would help in reaching concrete conclusions.

1. *Gnamptopelta obsidianator* (Brullé)

Figs. 5, 6, 16

Distribution

Eastern North America from Ontario and Quebec, south to Louisiana and Florida, west, so far as recorded, to Manitoba, Kansas and New Mexico. A northern and a southern subspecies are distinguished.

Female

Almost uniformly or predominantly black; in southern subspecies head and mesoscutum red; flagellum yellow with infuscated tip; wings always uniformly and deeply infuscated; legs black, anterior tibiae and tarsi, and in southern subspecies also tibiae and tarsi II, ferruginous or fulvous; length 20-25 mm.

Flagellum.—Bristleshaped, moderately long, ventrally flattened and widened beyond middle, extremely attenuated at apex, with 45-49 segments, the first about 2.5 times as long as wide, the eighth or tenth square, the widest twice as wide as long. Yellow, with infuscated apex; scape ferruginous.

Head.—Temple profile in specimens from New England a trifle narrowed (Fig. 6), in specimens from Florida somewhat widened, always with broadly curved outline; malar space as long as width of base of mandible; clypeus apically distinctly emarginate, its sides oblique (Fig. 5). Black in northern subspecies, with usually middle of inner orbits yellowish, of outer orbits ferruginous; uniformly ferruginous in southern subspecies.

Thorax.—Mesoscutum very densely punctured, opaque; basal third of notauli distinct; scutellum highly elevated, approximately conical, culminating in a pointed, or slightly rounded, summit (Fig. 16); apical slope of propodeum more rounded, less steeply declivous than in *Conocalama*; area superomedia reduced to a small, elevated boss, the upper part of carinae dentiparae interiores very strongly converging toward each other. Either uniformly black, or, in southern populations, at least pronotum and mesoscutum, usually scutellum and prosternum, sometimes mesosternum and parts of mesopleura ferruginous.

Legs.—Black; in northern subspecies only tibiae I and tarsi I more or less fulvous, in southern subspecies legs I and II more extensively ferruginous or fulvous.

Wings.—Always uniformly, deeply infuscated; areolet irregularly quadrangular, distinctly petiolate.

Abdomen.—First segment without trace of elevation on elbow; postpetiolus flat, very densely and fairly strongly punctured and opaque; tergites 2-5 fairly sharply separated from each other, densely and coarsely punctured, pubescent and opaque. Uniformly black; in southern subspecies first segment and sometimes base of second more or less distinctly ferruginous.

Male

Generally like the female; inner orbits more extensively yellow; in southern subspecies, on the average, somewhat less erythristic than the female, head sometimes predominantly black; flagellum colored as in female, with longish-oval tyloides on segments 4 or 6 or 8 to 22 or 23.

Remarks

The question whether the northern, black-headed form (*obsidianator* Brullé) and the southern red-headed one (*austrina* Cresson) have to be considered as distinct species or subspecies seems to be arbitrary. Comparing the head structure of females of *obsidianator* from New England with females of *austrina* from Florida (type locality of this form), I found a distinct difference in the outlines of temple profiles, which were wider in the latter, slightly narrowed in the former. On the other hand I collected in Florida a black-headed male of *austrina* along with red-headed ones. I am following here Townes, treating the two forms as associated subspecies, but the matter needs further attention. See also remarks at end of treatment of the genus.

1a. *Gnamptopelta obsidianator obsidianator* (Brullé)

Trogus obsidianator Brullé, 1846, Hist. Nat. Ins. Hym., 4:299.

Gnamptopelta obsidianator Hopper, 1939, Trans. Amer. Ent. Soc., 65:334, 335.

Gnamptopelta obsidianator obsidianator Townes, 1951, Syn. Cat., p. 304.

Types

Lectotype.—♂, "Philadelphie; coll. Seville". Instituto e Museo di Zoologia, Università di Torino.

Distribution

According to Hopper 1939: "Ontario, Vermont, Illinois, Michigan, Massachusetts, Connecticut, New York, Pennsylvania, Maryland, Virginia, Ohio, Indiana, Missouri, Kansas, Georgia, Louisiana, New Mexico". New records: Quebec, Manitoba (C.N.C.). According to Townes 1951: "Atlantic to Continental Divide in Transition, Upper Austral, and parts of Lower Austral Zones".

Female and Male

Uniformly black; flagellum yellow, infuscated at apex; inner orbits usually medially yellowish; tibiae I and base of tarsi I more or less fulvous; wings uniformly and deeply infuscated; length 20-23 mm.

1b. *Gnamptopelta obsidianator austrina* (Cresson)

Trogus austrinus Cresson, 1869, Trans. Amer. Ent. Soc., 2:92.

Gnamptopelta austrina Hopper, 1939, Trans. Amer. Ent. Soc., 65:335.

Gnamptopelta obsidianator austrina Townes, 1951, Syn. Cat., p. 304.

Types

Holotype.—♀, Florida. A.N.S.

Distribution

According to H. Townes 1951: "North Carolina, South Carolina, Georgia, Florida, in Lower Austral Zone".

Female and Male

Predominantly black; head, pronotum, mesoscutum always, usually scutellum and pronotum, often mesosternum and parts of mesopleura red; legs I usually entirely, legs II partially or predominantly, fulvous or ferruginous; length 21-25 mm.

59. Genus *Tricyphus* Kriechbaumer

Figs. 7, 8, 17

Tricyphus Kriechbaumer, 1898, Ent. Nachr., 24:4, 30.

Type-species.—*Tricyphus cuspidiger* Kriechbaumer. Designated by Viereck, 1914.

I have never seen a specimen of the type-species. The interpretation of the genus is based on Hopper's concept (1939, Amer. Ent. Soc. Trans., 65:335, 337).

The unique character of this genus is shown by the shape of the areolet, which is very different from all other genera of the subtribe. It appears to represent a still further advanced degree of the same trend of differentiation from the usual pentagonal shape of the subfamily Ichneumoninae, which is evident in *Callajoppa*, *Conocalama*, *Gnamptopelta* and *Tmetogaster*, the first intercubitus of the areolet being still more, the second abscissa of cubitus extremely, abbreviated. The areolet thus approaches a triangular outline.

Flagellum.—Of females bristleshaped, ventrally flattened and widened beyond middle, extremely attenuated, of males with narrow, bacilliform tyloides.

Head.—Temple and cheek profile more strongly narrowed than in the other genera of the subtribe (Figs. 7, 8); clypeus with oblique sides and straight apex (without median prominence).

Thorax.—Mesoscutum without distinct notauli; scutellum strongly elevated, approximately wedge-shaped, the dorsal surface ascending from the basal furrow in a fairly steep, flat plane to the short transverse summit-ridge, steeply and abruptly sloping laterally and apically (Fig. 17).

Abdomen.—Of females amblypygous, comparatively short, oval; postpetiolus fairly flat and wide, densely punctured, without basal elevation.

Remarks

The North American forms of the genus *Tricyphus* offer exactly the same problem which was already discussed with regard to the genus *Catadelphus* (see last paragraph of the treatment of the latter genus.).

**Key to the Species of *Tricyphus* Kriechbaumer
of America North of Mexico**

Females and Males

- | | |
|---|--|
| 1. Thorax black. | 2 |
| Thorax uniformly or predominantly ferruginous (abdomen uniformly ferruginous). | 3 |
| 2. Abdomen uniformly black. | 3. <i>ater</i> Hopper
(female unknown) |
| Abdomen apically, rarely entirely, rufous. | 2. <i>apicalis</i> (Cresson) |
| 3. Wings uniformly fuscous. | 1b. <i>elegans vulpinus</i> Szépligeti |
| Wings medially more or less extensively clear, with infuscated apices and bases. | 4 |
| 4. Abdomen ferruginous. | 1a. <i>elegans elegans</i> (Cresson) |
| Abdomen black with ferruginous base. | 1c. <i>elegans floridanus</i> , new subspecies |

1. *Tricyphus elegans* (Cresson)*Distribution*

Eastern North America from Ontario and Quebec, south probably even to Florida (see new subspecies *floridanus*), west, so far as recorded, to Illinois and Kansas. A northern and southern subspecies are distinguished by wing color. In the entire northern range of the species, however, both "subspecies" are recorded simultaneously (up to now from Ontario, New York, Illinois, Massachusetts and Connecticut). The question therefore arises whether the two forms really should be considered as geographical subspecies or rather as mere individual mutants ("phases"). I personally would favour the latter concept but am in the following treatment quoting the arrangement as given by Hopper (1939) and by Townes (1951).

Female and Male

Uniformly ferruginous; sometimes mesoscutum with three dark, longitudinal bands, exceptionally mesopleura predominantly black; inner orbits, clypeus laterally and tibiae I and II partially yellowish; flagellum ferruginous with blackish apex; wings uniformly, rather strongly infuscated (vulpinus Szépligeti) or predominantly clear with infuscated apices and usually a dark band in the middle; length 19 mm.

Flagellum.—Of females bristleshaped, moderately long, ventrally flattened and distinctly widened beyond middle, extremely attenuated at apex, with 44-46 segments, the first nearly 3.5 times as long as wide, the eleventh square, the widest fully twice as wide as long. Ferruginous; from the beginning of the flattened part to the tip infuscated.

1a. *Tricyphus elegans elegans* (Cresson)

Trogus elegans Cresson, 1869, Trans. Amer. Ent. Soc., 2:94.

Tricyphus elegans elegans Hopper, 1939, Trans. Amer. Ent. Soc., 65:337, 338.

Tricyphus elegans elegans Townes, 1951, Syn. Cat., p. 305.

Types

Holotype.—♀, Maine. A.N.S.

Distribution

According to Hopper 1939: Maine, Massachusetts, Connecticut, New York, Illinois, Quebec, Ontario. New record: Prince Edward Island (C.N.C.).

Female and Male

Wings more or less extensively clear, with deeply infuscated apices beyond areolet, and often with a more or less distinct, infuscated, transverse band before stigma.

1b. *Tricyphus elegans vulpinus* Szépligeti

Figs. 7, 8, 17

Tricyphus vulpinus Szépligeti, 1900, Termész. Füzet., 23:288.

Tricyphus elegans vulpinus Hopper, 1939, Trans. Amer. Ent. Soc. 65:138.

Tricyphus elegans vulpinus Townes, 1951, Syn. Cat., p. 305.

Types

Holotype.—♀, "Jeanette"; Magyar Nemzet. Museum, Budapest.

Host

According to Hopper 1939: "*Ampeloeca myron* (Cram.)."

Distribution

According to Hopper 1939: "Ontario, Illinois, Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Kansas." New record: Connecticut (C.N.C.).

Female and Male

Wings uniformly, rather deeply infuscated.

1c. *Tricyphus elegans floridanus*, new subspecies*Types*

Holotype.—♂, Florida, Orlando, March 1944, R. and G. Bohart. C.H.T.

Paratype.—1 ♂, Florida. C.H.T.

Distribution

Florida.

Preamble

The lack of material, especially of females, prevents definite conclusions about the true status of this form; it may, perhaps, represent a distinct species.

Male

Head and thorax predominantly ferruginous; sometimes mesosternum and mesopleura black; abdomen black, with ferruginous base; leg fulvous, the tarsi pale yellowish, coxae II and III basally or predominantly, femora III apically or predominantly; black; flagellum black; wings medially, more or less extensively, clear; length 17-18 mm.

Flagellum.—With 38 segments (2 specimens counted), and with narrow, bacilliform tyloides on segments 4 or 5 to 24 or 26. Black, ventrally dark brownish; scape fulvous.

Head.—Pale ferruginous; base of mandibles, face and clypeus, or lateral fields of face only, pale yellowish.

Thorax.—Entirely or predominantly ferruginous; prosternum, and sometimes prepectus, mesosternum, lower part of mesopleura and of metapleura black.

Legs.—Fulvous; coxae and femora ferruginous, coxae II and III basally to predominantly, femora III predominantly or apically black; tibiae III apically infuscated; all tarsi pale yellowish.

Wings.—Infuscated, with more or less extensive, clear median bands.

Abdomen.—Black, base ferruginous to a variable extent. In type specimen only first segment ferruginous, in paratype also the second tergites predominantly (except apical and lateral black bands) and the third basally ferruginous.

2. *Tricyphus apicalis* (Cresson)

Trogus apicalis Cresson, 1877, Trans. Amer. Ent. Soc., 6:197, ♀.

Tricyphus apicalis Hopper, 1939, Trans. Amer. Ent. Soc., 65:338, ♀.

Types

Holotype.—♀, Georgia. A.N.S.

Host

According to Hopper, 1939: "*Sphinx kalmiae* S. & A."

Distribution

According to Hopper 1939: "Vermont, Michigan, Illinois, Pennsylvania, Virginia, Ohio, Oregon." New records: New York, Maryland, North Carolina, South Carolina (C.H.T.).

Preamble

The chromatic difference between *apicalis* Cresson and *elegans* Cresson is rather striking, but I was unable to find the slightest morphologic distinction between the two forms. As they both occur side by side over almost the entire range of their distribution, a subspecific relationship can not be assumed. We have, therefore, only the choice to consider them either as phases of the same, or as two distinct, species. For the time being, I prefer the latter hypothesis, especially as both forms have been reared from different hosts.

Female

Black, including flagellum and legs; abdomen basally black, apically red in variable combinations; at least petiolus black, usually first and second tergites, sometimes tergites 1-3; wings usually uniformly violaceous-black, in two specimens from Michigan (C.H.T.) either with distinct, clear, median crossband or with some clear median marks; tibiae and tarsi I and II partially obscure ferruginous; length 17-19 mm.

Flagellum.—Bristleshaped, moderately long, ventrally flattened and distinctly widened beyond middle, extremely attenuated at apex, with 43-46 segments, the first nearly 3.5 times as long as wide, the eleventh square, the widest fully twice as wide as long. Black, sometimes blackish-brown toward base.

Male

Description based on two males from New Jersey and Maryland in C.H.T.

Head and thorax black; the following are pale yellow: base of mandibles, clypeus laterally, lateral fields of face, outer orbits partially, frontal orbits nearly up to level of lower ocellus (sometimes face and clypeus entirely); tergites 1-2 or to 3 black, rest of abdomen red; wings violaceous-black; legs black, femora I and II blackish-brown, tibiae and tarsi I and II obscure brownish, tibiae and tarsi I partially ivoryish; length 16-20 mm.

Flagellum.—With narrow, bacilliform tyloides on segments 5 to 25 or to 26. Black.

3. *Tricyphus ater* Hopper

Tricyphus ater Hopper, 1939, Trans. Amer. Ent. Soc., 65:339, ♂.

Types

Holotype.—♂, Illinois, Oakwood, 6.VII.1930, H. H. Ross. Collection of Illinois State Natural History Survey, Urbana, Ill.

Distribution

Illinois; new record: Florida (C.H.T.).

Male

Uniformly black; the following are pale yellow: short line on frontal orbits, lateral fields of face, tarsi and tibiae I and II and apices of femora I and II, second sternite, except laterally, and apical margins of third and following sternites; in type specimen outer side of femora I and II whitish; length 20 mm.

Remarks

In the original description, I missed not having a discussion why this species should not be the male of *apicalis* Cresson; on the contrary, the description stresses that *ater* "differs only in the wholly black abdomen" from *apicalis*. A more pronounced melanism of the male, however, is part of the regular patterns of chromatic sexual dimorphism throughout the subfamily in North America. I suspect, therefore, that *ater* is a synonym of *apicalis*, but too few specimens are known to make a final conclusion.

VI. B. Subtribe *Trogina*, new subtribe*Morphological characters*

Flagellum.—Of females bristleshaped, moderately long, in the typical genus (*Trogus* Cameron) ventrally not flattened and not widened beyond middle, in some genera flattened and widened, apically moderately to extremely attenuated; of males with distinct transverse ridges on exterior side of segments, sometimes strongly nodose, without tyloides; segments (particularly basal) not cylindrical but overlapping each other extensively.

Head.—Temple and cheek profiles moderately to extremely narrowed, the latter never buccate; frons sometimes with two projecting longitudinal carinae or horns; clypeus apically emarginate or straight; mandibles bidentate.

Thorax.—Scutellum always considerably raised above postscutellum, often pyramidal and apically sharply pointed; propodeum, on the average, still more abbreviated than in the subtribe Callajoppina, the area superomedia replaced by a smooth, transverse, curved, or triangular carina from which the propodeum slopes down very steeply to the front, as well as to the apex, of propodeum.

Legs.—Moderately to rather slender, in one neotropical genus extremely prolonged; coxae III of females never with a scopa.

Wings.—Areolet in the forewing as in the Callajoppina, irregularly quadrangular and often petiolate; wings usually with dark pattern, often uniformly, deeply infuscated.

Abdomen.—Of females amblypygous or oxypygous; tergites (except the apical one, two or three) always extremely sclerotized, with extremely coarse sculpture and with the tendency to mould their surface into plastic features such as convexities, concavities, ridges and lateral slopes.

Color

Black (sometimes bluish-black) or ferruginous, or both colors in combination; some oriental and neotropical forms with white pattern.

Biology

Females do not hibernate. Most species are specialized parasites of Rhopalocera, especially of species of the genus *Papilio*, or sometimes of Nymphalidae. There is one record for one species of the oriental genus *Neofacydes* Heinrich, which was reared in China from a Sphingid. This record is of interest in so far as the genus *Neofacydes* seems to be morphologically somewhat closer related to the subtribe Callajoppina than are the rest of the genera of the subtribe *Trogina*. The biological aspect thus would conform with the morphological, both in combination supporting my hypothesis that the Rhopalocera-feeding *Trogina* have descended from the Sphingid-feeding Callajoppina.

Distribution

A restricted number of species inhabit the Temperate Zones of the Old and New Worlds. But the Tropics of the Oriental and especially of the American Tropics, represent the true centers of development of this subtribe, harboring the greatest variety of its species. Surprisingly enough, no *Trogini* have been recorded so far from the Ethiopian Tropics although the genus *Papilio* is abundantly represented here too.

Remarks

I include the following genera in the subtribe *Trogina*: *Trogus* Panzer, *Psilomastax* Tischbein, *Holcojoppa* Cameron, *Pedimopelta* Kriechbaumer, *Cryptopyge* Kriechbaumer, *Ischnopus* Kriechbaumer, *Macrojoppa* Kriechbaumer, *Neofacydes* Heinrich.

60. Genus *Macrojoppa* Kriechbaumer

Macrojoppa Kriechbaumer, 1898, Ent. Nachr., 24:2, 21.

Type-species.—*Trogus blandita* Cresson. Designated by Ashmead, 1900. *Aglaojoppidea* Viereck, 1913, U. S. Nat. Mus. Proc., 46:368.

Type-species.—*Trogus fascipennis* Cresson. Orig. design.

I am not quite sure whether the generic association of *Trogus fascipennis* Cresson with *Trogus blandita* Cresson can be considered as correct. There are some considerable structural differences. In the type-species of *Macrojoppa* the scutellum is conically elevated into a point, the legs III are not very prolonged and the fifth tergite is strongly sclerotized and coarsely sculptured, as are also tergites 1-4. All these mentioned characters, of which the last is perhaps the most important, are reversed in *Trogus fascipennis*—but I do not have a comprehensive enough knowledge of Neotropical forms to support changes in the generic arrangement made by my predecessors.

Flagellum.—Of females bristleshaped, ventrally flattened and distinctly widened beyond middle, extremely attenuated at apex; of males strongly serrate, without tyloides.

Head.—Temple profile very abruptly and extremely narrowed, its outline slightly concave, rather than straight; cheek profile considerably narrowed, rather long, with straight outline; apical margin of clypeus straight, its lateral margins subparallel; frons without distinct horns.

Thorax.—Scutellum in type-species considerably elevated into a blunted point (scarcely pointed at all in *fascipennis*); anterior slope of propodeum almost smooth.

Legs.—Coxae III long; legs III moderately, in the species *fascipennis* very considerably, prolonged.

Wings.—Areolet irregularly, obliquely quadrangular, petiolate; wings at least apically infuscated, usually also with dark spots or bands at base and middle, sometimes uniformly infuscated.

Abdomen.—Of females oxypygous, dorsally somewhat flattened, with rather abruptly and steeply slanting lateral surface; tergites 1-5 (or only 1-4 in *fascipennis*) densely, coarsely and rugosely, longitudinally striate, the following tergites almost without any sculpture; apex of ovipositor slightly surpassing apex of abdomen; claspers of male rather broadly truncate at apex.

Color

Basic color black or ferruginous, or both colors in combination; white patterns occur.

Distribution

Neotropical; according to Hopper, known so far from Texas to Brazil and Bolivia; the genus seems to be rather closely related to the Oriental *Neofacydes* Heinrich.

Biology

I have not found any host records for this genus. To know whether Rhopalocera or Sphingidae are the host would, in this case, be particularly interesting and to a certain degree conclusive for the exact taxonomic position of this genus (relationship to *Neofacydes*) as well as for our concept of the evolution of the entire tribe.

1. *Macrojoppa fascipennis* (Cresson)

Trogus fascipennis Cresson, 1877, Trans. Amer. Ent. Soc., 6:195, ♀.
Aglaojoppa fascipennis Viereck, 1913, U. S. Nat. Mus. Proc., 46:368, ♀.
Macrojoppa fascipennis Hopper, 1939, Trans. Amer. Ent. Soc., 65:314, ♀.

Types

Holotype.—♀, Texas. A.N.S.

Distribution

Known only from the type specimen from Texas.

Female

Ferruginous, tergites 6-7, femora III, tibiae III except about basal third, and the tarsi III black; flagellum black, segments 8-10 slightly paler than the rest; wings yellowish, with clearly defined blackish median and apical bands; basal third of tibiae III, scape ventrally, clypeus and face, yellowish; widest segment of flagellum about twice as wide as long; length 18 mm.

61. Genus *Trogus* Panzer

Figs. 9, 10, 18, 20, 21, 26-28

Trogus Panzer, 1806, Krit. Rev. Insektenf. Deutschlands, 2:80.
Dinotomus Foerster, 1868, Naturh. Ver. Rheinlande Verh., 25:188.

Type-species.—*Ichneumon coerulator* Fabricius. Designated by Viereck, 1914.

Psilomastax Tischbien, listed by Hopper, 1939, and by Townes, 1951, as a synonym of this genus, differs morphologically in structure of tergites and of flagellum, biologically by parasitism on Nymphalidae (genus *Apatura* F.) considerably enough from *Trogus* to be considered as a distinct genus.

Morphological characters

Flagellum.—Of females slender, bristleshaped, moderately long, ventrally not distinctly flattened and not widened beyond middle very slightly nodose; of males with distinct, transverse ridges on exterior side of segments, without tyloides (Figs. 26-28).

Head.—Temple profile considerably, but not extremely and not abruptly, narrowed, with slightly curved outline; cheek profile considerably narrowed, with straight outline; clypeus slightly convex, the thick apical border distinctly emarginate (Fig. 9); frons strongly concave, with two median, longitudinal ridges, which on their upper end are usually elevated into more or less prominent, pointed horns (Fig. 10).

Thorax.—Mesoscutum grossly and not densely punctured, shiny; notauli obsolete, basally replaced by a shallow, gradual deepening; scutellum conically elevated into a culminating point, its posterior declivity usually slightly concave in profile (Fig. 18); the degree of elevation of the scutellum varies individually and may, in rare cases, be diminished to a mere convexity; apical declivity of propodeum smooth, steep, scarcely curved; area superomedia replaced by an arched, comparatively wide, smooth carina; area posteromedia consequently basally not considerably narrowed as in the subtribe Callajoppina, but approximately parallel-sided.

Legs.—Moderately long and slender.

Wings.—Clear, with slightly infuscated apices to uniformly, deeply infuscated; areolet irregularly quadrangular, as in the Callajoppina, not distinctly petiolate.

Abdomen.—Of females amblypygous, apically blunt; tergites 1-5 of females (Fig. 20) and tergites 1-6 of males (Fig. 21) extremely heavily sclerotized, extremely coarsely sculptured, with highly specialized plastic features (see *Abdomen* under subtribe *Trogina*); postpetiolus subtriangular, with prominent, longitudinal carinae reaching to near the apex, extremely coarsely, irregularly reticulate-rugose-punctate; gastrocoeli deeply impressed, transverse, about as wide as their interval; tergites 2-5 of females, 2-6 of males extremely coarsely and densely reticulate-rugose and longitudinally striate, separated from each other by deep incisions, their lateral edges becoming gradually more prominent and bulging toward the apex of each tergite, separating the almost perpendicularly sloping lateral surfaces of tergites from their dorsal surfaces; the latter are medially slightly raised, with slightly concave areas between the raised central part and the bulging latero-apical elevations; tergites 6 and 7 of females, 7 of males almost without sculpture, smooth, without plastic features; ovipositor entirely hidden; claspers of males rather narrow, tapering toward apex, with a concave, polished area at antero-ventral edge near base.

Biology

All known species are more or less specialized on different species of the genus *Papilio* L. Rearings from Nymphalidae, as for example *Vanessa cardui* L., have been recorded; such records may be erroneous, or at best, they refer to abnormal cases of "emergency hosts".

Distribution

If the genus is limited to the species covered by the diagnosis as given above (which I recommend to do), then its range is limited to the Holarctic Region.

Remarks

Recently Henry Townes, in personal discussions, has expressed the opinion that all American forms of this genus should be considered as representatives of a single species, on account of their morphological congruence. Quite likely some of our forms are subspecifically associated, but certainly not all. As the mentioned morphological uniformity makes it difficult to decide which forms may be associated and which not, it seems the best to maintain, for the time being, the concept of specific distinction for all. Besides the recently as Holarctic recorded species *lapidator* Fabricius (which astonishingly has followed its host *Papilio machaon* L. into the northwestern part of Canada), we have at least two distinct species; they occur in Maine side by side without intergradation, and they are biologically distinctly differentiated, and show even some differences in sculpture (*pennator* Fabricius and *fulvipes* Cresson).

Key to the Species of *Trogus* Panzer of America North of Mexico

Females and Males

1. Wings clear or yellowish, with slightly infuscated apices. 2
- Wings uniformly, deeply infuscated. 3
2. Abdomen uniformly black, with bluish-violaceous tint; head and thorax uniformly black. (All femora and tibiae and the tarsi I rufous, rest of legs black; length 14-18 mm.) 1. *lapidator coeruleator* (Fabricius)
- Tergites 1-2 black, the rest of abdomen predominantly dull yellow; head ferruginous; thorax predominantly black, scutella and tegulae fulvous. (Coxae and posterior femora black, all tibiae, tarsi and anterior femora fulvous; length 18 mm.) 3. *flavipennis* Cresson

3. Head, thorax, abdomen and legs uniformly light ferruginous. (Fulvous pubescence of abdomen rather dense and long; length 16-20 mm.) 2. *pennator* (Fabricius) 4
 Thorax and/or abdomen partially to entirely black.
 4. Inner and outer orbits broadly yellow; mesoscutum never uniformly black; abdomen varying from (exceptionally) entirely black to (exceptionally) entirely ferruginous; usually discs of one or several tergites partially black. (Length 18 mm.) 5. *edwardsii* Cresson
 Orbits not yellow; thorax, including mesoscutum uniformly black; abdomen black with slight violaceous tint, sometimes tergite 1 or tergites 1-2 and/or last two tergites partially or entirely obscure ferruginous. (Length 16-18 mm.) 4. *fulvipes* Cresson

1. *Trogus lapidator* (Fabricius)

This species is characterized by its uniformly black color with deep, bluish-violaceous tint of the abdomen, combined with rufous color of legs, except that all coxae and trochanters and tarsi II and III are black. Biologically it is clearly distinguished as a monophagous parasite of *Papilio machaon* Linnaeus. Two subspecies are separated below on account of different wing color; one of the two subspecies has been recorded recently from northwestern Canada. The south European *violaceus* Mocšary, differing from *lapidator* by black legs and biologically as parasite of *Papilio hospiton* Géné., is regarded by the author of this paper as a distinct species.

Female

Black, abdomen with bluish-violaceous tint; legs rufous, coxae, trochanters (not trochantelli), entire tarsi III and usually tarsi II more or less extensively, black; length 14-18 mm.

Flagellum.—With 30-36 segments, the first more than 3 times as long as wide. Black, ventrally usually brownish at base.

All structural characters according to the description of the genus.

1a. *Trogus lapidator lapidator* (Fabricius)

Ichneumon lapidator Fabricius, 1787, Mant. Ins., 1:266, no. 79, ♂.

Dinoionus lapidator Morley, 1915, Rev. Ichn., 4:65.

Dinoionus lapidator Uchida, 1926, Journ. Coll. Agr. Hokk. Imp. Univ., 18:48, 49, ♂ ♀.

Types

Holotype.—♂, perhaps in Copenhagen.

Host

Papilio machaon L. (Spain, Japan.)

Distribution

Mediterranean Europe and Mediterranean Africa; Japan.

Female and Male

Wings uniformly and deeply infuscated with violaceous reflection.

Remarks

Morley has (*loc. cit.*) stated that the dark-winged (south European) subspecies has to be considered the nominate form.

1b. *Trogus lapidator coeruleator* (Fabricius)

Ichneumon coeruleator Fabricius, 1804, Syst. Pic., p. 68, no. 79, ♂.

Trogus lapidator Heinrich, 1956, Can. Ent., 88:647, ♂.

Types

Holotype.—♂, location unknown.

Hosts

Typical host: *Papilio machaon* L. (Europe, countless records; Yukon Territory, C.N.C.); twice Nymphalidae have been recorded as hosts: *Argynnis pandora* Schiff. by Mocšary and *Vanessa atalanta* L. by Habermehl. Both must be considered as exceptional emergency hosts.

Distribution

Middle and northern Europe, north to Finland, Sweden (Gotland) and Eastern England; east to eastern Siberia (Ussuri Region) and northwestern China (Kansu); one record from northwestern Canada (Yukon Territory).

Female and Male

Wings almost clear, with slightly infuscated apical bands.

Remarks

Numerous publications referring to this and the former subspecies in the European literature have not been quoted above.

2. *Trogus pennator* (Fabricius)

Figs. 9, 10, 18, 20, 21, 26-28, 34, 36, 38, 40

Ichneumon pennator Fabricius, 1793, Ent. Syst., v. 2, p. 155.

Trogus vulpinus Gravenhorst, 1829, Ichn. Europaea, v. 2, p. 389.

Trogus exesorius Brullé, 1846, Hist. Nat. Ins. Hym., v. 4, p. 298, ♀ ♂.

Ichneumon asteriae Jaeger, 1859, Life of N. Amer. Ins., p. 240.

Macrojoppa californica Cameron, 1911, Soc. Ent., 26:35.

Types

Holotypes.—*Ichneumon pennator* Fabricius, ♀, stated to be from Georgia. *Trogus vulpinus* Gravenhorst, ♀, type locality unknown. Breslau (Wrocław), Poland. *Trogus exesorius* Brullé, ♂, Carolina. Musée National d'Histoire Naturelle, Paris. *Ichneumon asteriae* Jaeger, no sex stated, ?New Jersey, lost. *Macrojoppa californica* Cameron, sex unknown, California. Lost.

Hosts

In northeastern North America *Papilio ajax* L. and *Papilio brevicauda* Saund. (both feeding on umbellifers) are evidently the typical hosts of this species; according to H. Townes 1951, the following further *Papilio* species have been reported as hosts: "*eurymedon* Luc., *glaucus* L., *marcellus* L., *rutulus* Luc., *troilus* L., *zelicaon* Luc."

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Transition, Upper Austral and Lower Austral Zones; also Washington, Oregon, California, Nevada."

Preamble

This is the most common and most widespread of the nearctic species of the genus, distinguished by its uniformly pale ferruginous color of head, thorax, abdomen and legs. In Maine *pennator* occurs side by side with *fulvipes* Cresson. Both forms are practically congruent in structure, but strikingly different in color, as in *fulvipes* the basic color of head, thorax, femora III and abdomen is black, always with a violaceous reflection on the abdomen. Besides, in *fulvipes* the pubescence of the body, particularly of the surface of the abdomen, is shorter and less dense, and the sculpture of tergites seemingly, on the average, coarser and more striate than in *pennator* (Figs. 33-40). I have observed both forms in Maine for a long time and found a noticeable ecological difference between them: while *pennator*, evidently specializing on the umbellifer-feeding *Papilio* larvae, was frequently found flying low above open meadows and clearings, *fulvipes* females

have been usually observed somewhat higher above the ground, searching for their tree-feeding host larvae, along edges of woods and hedge rows. All these differences together support the conclusion that we are dealing here with two distinct species, and thus strongly contradict the hypothesis that all nearctic forms of the genus *Trogus* can be regarded as associated subspecies. Among dozens of specimens collected in Maine over a period of about ten years, I have found only one specimen looking like an "intergrade" between *pennator* and *fulvipes*, this specimen having the propodeum and the anterior two tergites ferruginous, and the rest of the thorax and abdomen black. According to the pubescence and the sculpture of the abdomen, I would guess that this specimen is an erythristic *fulvipes* rather than a melanistic *pennator*. Both types of chromatic variability are to be expected anyway, and would create the impression of "intergrades" without actually being such.

Female and Male

Uniformly light ferruginous; inner and outer orbits more or less extensively, tibiae and tarsi, yellowish; wings uniformly and deeply infuscated; not rarely scutellar sutures black marked, very rarely mesopleura more or less extensively, never legs or abdomen partially, black; length 16-20 mm.

Flagellum.—Usually with 31-33, rarely (specimens from North Carolina and Missouri) 35 or 36 segments. Ferruginous, dorsally often (toward apex or entirely) dark brownish or sometimes blackish infuscated.

Remarks

A startling number of different host species (see quotation above), feeding on very different plants, have been recorded for *Trogus pennator*. Besides, an unusual degree of structural variability can be observed in this species, if a great number of specimens from different parts of North America are examined. It seems that these two facts hint at the existence of certain unknown facts which may deserve special investigation. I think that, as mentioned above under *Hosts*, the typical hosts of *Trogus pennator* are the umbellifer-feeding *Papilio* species, and I have seen a great number of specimens authentically reared from such. So the *Papilio* species *ajax* L., *brevicauda* Saund. and *zelicaon* Luc. need not be questioned as hosts. Very surprising as host records for *Trogus pennator* are, however, the tree-feeding *Papilio* species *marcellus* L., *rutulus* Luc and especially *glaucus* L., the latter being in several cases authentically recorded in eastern North America as host of *Trogus fulvipes* Cresson as well. It is possible that some of these records are erroneous, referring, for example, to partially ferruginous, partially black parasites, which may have been erythristic specimens of *fulvipes* but were identified as melanistic specimens of *pennator*. But this matter needs thorough investigation.

The authenticity of *Papilio troilus* L. as host of *pennator* is well established and also confirmed by two rearings in Canada (C.N.C.). Both Canadian specimens reared from *P. troilus* are distinguished by simply convex, instead of subpyramidal, scutella.

It would be a rewarding task for further research to investigate the varying host choice of this species and its structural variability, both in relation to each other and to the geographical factor as well.

3. *Trogus flavipennis* Cresson

Trogus flavipennis Cresson, 1863, Proc. Ent. Soc. Phila., 3:287, ♂.

Types

Holotype.—♂, Colorado. A.N.S.

Distribution

According to H. Townes 1951: "Colorado, New Mexico, Utah, Arizona".

Preamble

Besides the northern *lapidator coeruleator* (Fabricius), this is the only nearctic form which has the wings not uniformly and deeply infuscated, but yellowish-clear, with smoky apices.

Female and Male

Head light ferruginous, thorax predominantly black, scutella and tegulae fulvous; first, or first and second tergites black, rest of abdomen dull yellow, more or less fulvous between the black and yellow part; coxae and posterior femora black, all tibiae and tarsi and anterior femora fulvous; wings yellow, apical margins smoky; flagella fulvous with blackish tips; length 18 mm.

4. *Trogus fulvipes* Cresson

Figs. 33, 35, 37, 39

Trogus fulvipes Cresson, 1868, Amer. Ent. Soc. Trans., 2:93, ♂.

Trogus apicatus Davis, 1898, Amer. Ent. Soc. Trans., 24:352, ♂.

Types

Holotypes.—*Trogus fulvipes* Cresson. ♂, Maine. A.N.S.; *Trogus apicatus* Davis, ♂, New Hampshire, Crawford Notch. A.N.S.

Hosts

Typical host in northeastern North America: *Papilio glaucus* L. (syn. *turnus* L.). According to H. Townes, 1951, also reared from *Papilio eurymedon* Luc.

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Canadian Zone". The northern parts of Transition Zone seem to represent the real home of this species.

Female and Male

Head partially to entirely, thorax and abdomen predominantly or entirely, black, the latter with slight violaceous reflection; wings uniformly and deeply infuscated; tibiae and tarsi always yellowish; coxae, trochanters and femora varying geographically from predominantly or almost entirely black to predominantly or almost entirely ferruginous and fulvous; flagellum dorsally black; variants with yellowish or ferruginous pattern on thorax and on two basal, two apical tergites occur (see variability below); length 16-18 mm.

Flagellum.—With 33-38 segments, dorsally black, ventrally dark brownish.

Variability

Head.—Usually entirely black, except labrum and middle of mandibles; face and clypeus show an erythristic tendency and are often partially, sometimes entirely, ferruginous, also outer orbits sometimes partially or entirely ferruginous.

Thorax.—In specimens from Maine usually entirely black, sometimes post-scutellum and very tip, or apical margin of scutellum, yellowish or ferruginous; in one male from Ontario and one female from Quebec (C.N.C.) with rather rich, yellow markings; yellow in these two specimens: prescutellar carinae, entire scutellum, propodeum partially, prepectus, apical carinae of mesopleura, in the female even mesoscutum and mesosternum partially; in specimens from British Columbia tegulae usually ferruginous.

Legs.—Tibiae and tarsi always yellow with slight orange tint; coxae, trochanters and femora II and III, in eastern populations, usually predominantly or entirely black, sometimes even femora I blackish; in western populations legs more erythristic: coxae and trochanters I and II more often partially to predominantly ferruginous, femora I and II almost always, femora III sometimes, fulvous-ferruginous.

Abdomen.—Usually uniformly black with slight violaceous reflection; in rare variants tergites 1-2 partially to entirely ferruginous, or first tergite (in specimens mentioned under *Thorax*) yellowish; sometimes apical margins of all tergites narrowly obscure ferruginous, or tergites 6 and 7 of females brownish.

5. *Trogus edwardsii* Cresson

Trogus edwardsii Cresson, 1877, Amer. Ent. Soc. Trans., 6:195, ♂.

Trogus fletcherii Harrington, 1894, Canad. Entom., 26:245, "♀" = ♂.

Trogus edwardsii Hopper, 1939, Trans. Amer. Ent. Soc., 65:317.

Types

Holotypes.—*Trogus edwardsii* Cresson, ♀, Vancouver Island. A.N.S.; *Trogus fletcherii* Harrington, ♂, Vancouver Island. C.N.C.

Host

Papilio eurymedon Luc.

Distribution

According to H. Townes 1951: "British Columbia, Washington, Idaho".

Preamble

By its combination of ferruginous and black color this form looks like an "intergrade" between *pennator* Fabricius and *fulvipes* Cresson. In his 1939 treatment of *edwardsii* Cresson, Hopper mentions "this species may prove to be merely a subspecies of *vulpinus*" (= *pennator* Fabricius), but, on the other hand, he points out that certain structural and chromatic characters are actually not in favor of such a hypothesis. I agree with Hopper that *edwardsii* and *pennator* probably can not be associated as subspecies, but instead I strongly suspect that *edwardsii* represents the most western vicariant of *fulvipes* Cresson. There are two good reasons supporting this hypothesis, the first of which refers to biological, the second to chromatic facts. *Papilio eurymedon*, the host of *edwardsii*, feeds on *Rhamnus californica*. It seems somewhat more likely, that a geographical subspecies of *fulvipes*, which is known as the parasite of the free-feeding *Papilio glaucus* L., would adapt to the *Rhamnus*-feeding *Papilio eurymedon*, than that *pennator*, the parasite of the *Daucus*-feeding *Papilio ajax* L. would do so; and indeed both, *Trogus fulvipes* as well as *Trogus edwardsii*, have been reared from *Papilio eurymedon* already. The chromatic evidence points in the same direction. We know that populations of *Trogus fulvipes* from Robson, British Columbia are distinctly more erythristic than eastern populations from New England, Ontario and Quebec. The chromatic pattern of *edwardsii* (living beyond the Continental Divide), seems to represent just a higher degree of development of the same erythristic tendency which is already evident in eastern British Columbia (Robson), a case paralleled by that of *Stenichneumon salvus bioculatus* (Cresson) and *S. salvus salvus* (Cresson). I am treating *edwardsii* here as a distinct species in spite of my opinion that it probably is a vicariant of *fulvipes*, because I feel that the matter needs further, more extensive zoogeographical studies before taxonomic changes should be made.

Female and Male

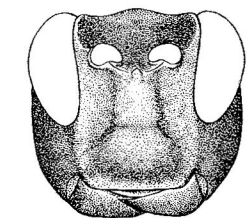
Black and ferruginous to an individually variable extent of both colors respectively; inner and outer orbits broadly yellow, femora, tibiae and tarsi always yellowish-ferruginous; flagellum dorsally blackish, ventrally brownish; length 18 mm.

Variability

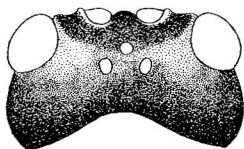
Head.—Varying from predominantly ferruginous to extensively black; usually ocellar region and occipital region black.

Thorax.—Ferruginous with at least prosternum and pleura black marked; varying in extremely melanistic specimens to entirely black; usually predominantly black, the mesoscutum with two longitudinal, ferruginous lines; scutellum and tegulae ferruginous, the postscutellum usually yellow.

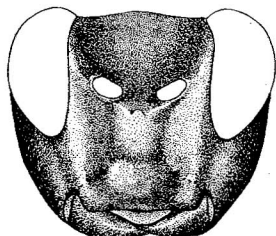
Abdomen.—Varying from entirely ferruginous to (according to Hopper 1939) entirely black; usually the disc of one, or several, tergites (to an increasing extent toward apex of abdomen) infuscated.



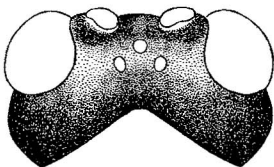
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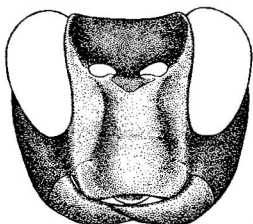
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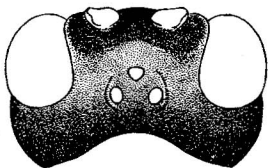
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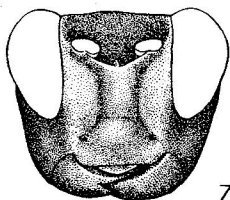


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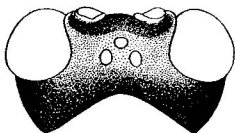


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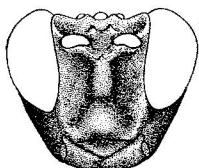
Figs. 1-6. Figs. 1-2. *Catadelphus semiruber* Hopper, ♀. 1, head in front view; 2, head in dorsal view. Figs. 3-4. *Conocalama canadensis* (Provancher), ♀. 3, head in front view; 4, head in dorsal view. Figs. 5-6. *Gnamptopelta obsidianator* (Brullé), ♀. 5, head in front view; 6, head in dorsal view.



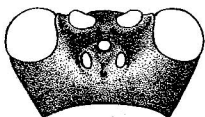
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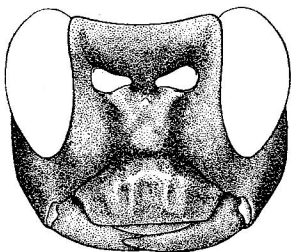
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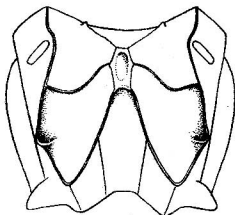
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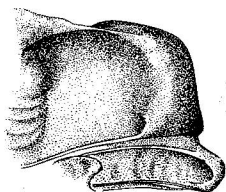


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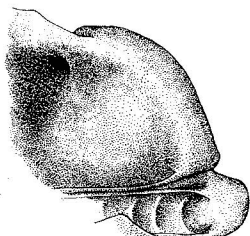


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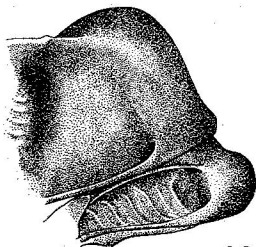
Figs. 7-12. Figs. 7-8. *Tricyphus elegans vulpinus* Szépligeti, ♀. 7, head in front view; 8, head in dorsal view. Figs. 9-10. *Trogus pennator* (Fabricius), ♀. 9, head in front view; 10, head in dorsal view. Fig. 11. *Neamblyjoppa nasuta* n. sp., ♀, head in front view. Fig. 12. *Catadelphus semiruber* Hopper, ♀, carination of propodeum.



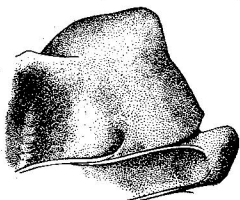
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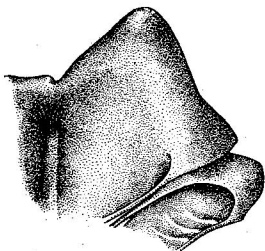
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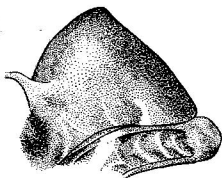
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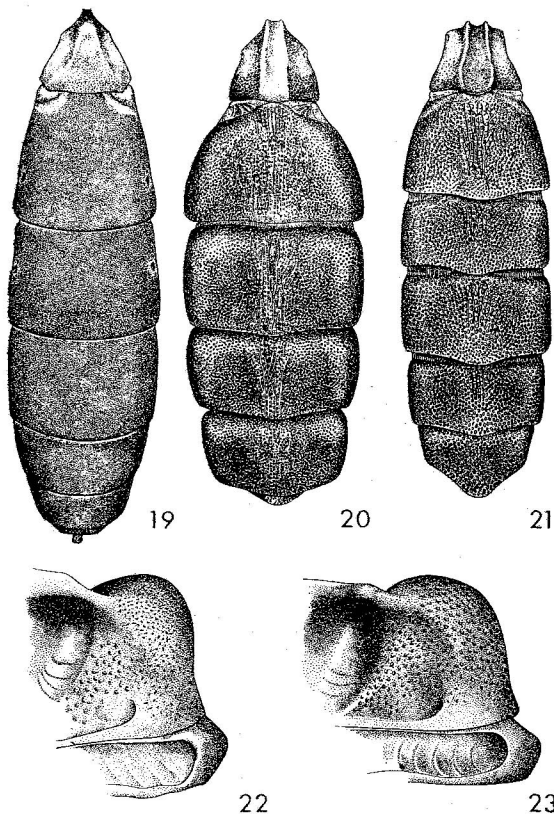


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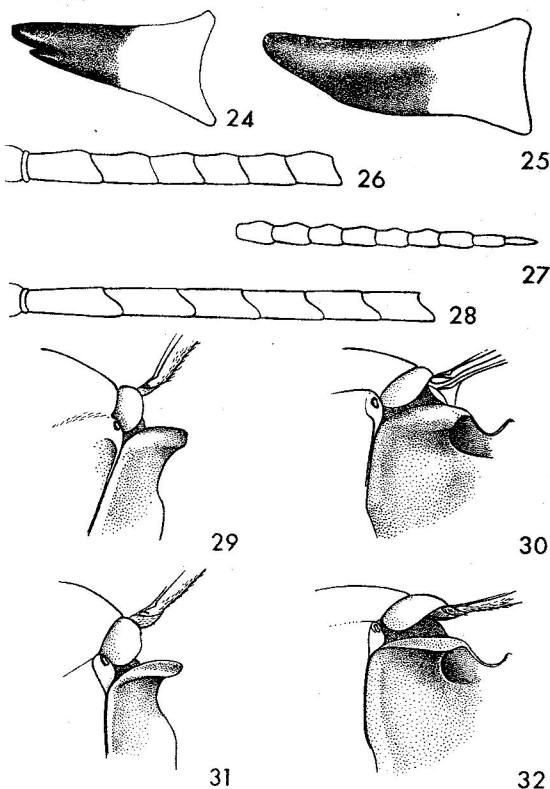


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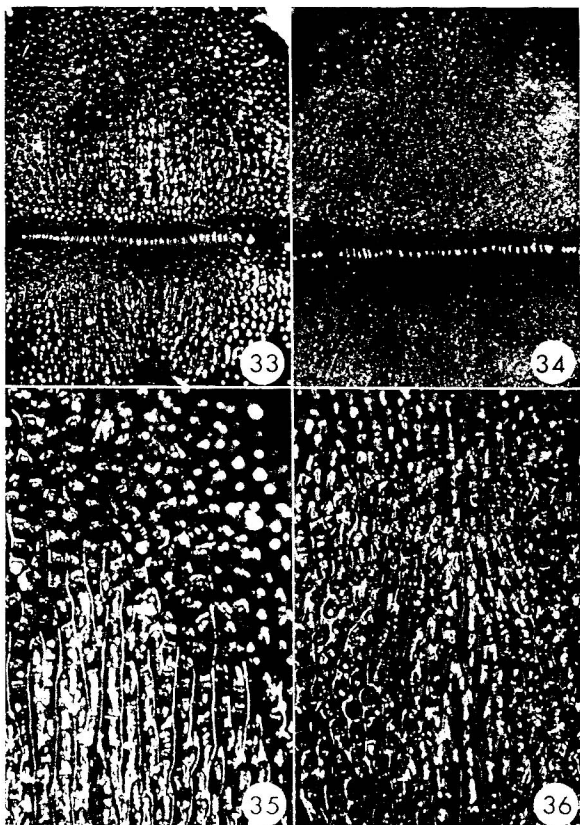
Figs. 13-18. Scutella of females. 13, *Catadelphus seniruber* Hopper; 14, *Neamblyjoppa nasuta* n. sp.; 15, *Conocalama canadensis* (Provancher); 16, *Gnampelopelta obsidianator* (Brullé); 17, *Tricyphus elegans* *culpini* Szépligeti; 18, *Troglus pennator* (Fabricius).



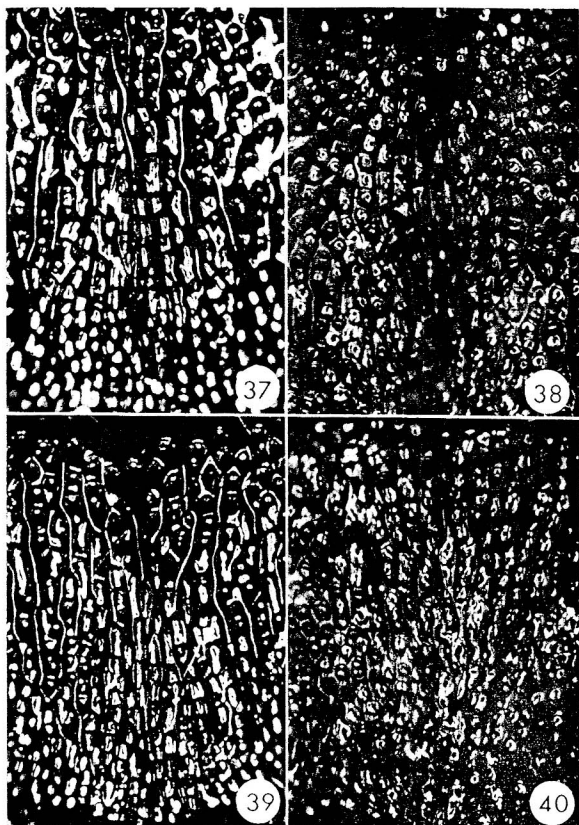
Figs. 19-23. Figs. 19-21. Abdomina. 19, *Conocalama canadensis* (Provancher), ♀; 20, *Trogus pennator* (Fabricius), ♀; 21, same species, ♂. Figs. 22-23. Scutella (males). 22, *Conocalama canadensis* (Provancher); 23, *Conocalama copei* (Cresson).



Figs. 24-31. Figs. 24-25. Mandibles (females). 24, *Catadelphus semiruber* Hopper; 25, *Neamblyjoppa nasuta* n. sp. Figs. 26-28. Parts of flagella of *Trogus pennator* (Fabricius). 26, basal part, male; 27, apical part, male; 28, basal part, female. Figs. 29-32. Subalara. 29, *Conocalama copei* (Cresson), ♀, straight lateral view; 30, same species, ♀, latero-frontal view; 31, *Conocalama canadensis* (Provancher), ♀, straight lateral view; 32, same species, ♀, latero-frontal view.



Figs. 33-36. Sculpture of tergites. 33, *Trogus fulvipes* Cresson, ♀, second and third tergites; 34, *Trogus pennator* (Fabricius), ♀, same; 35, *Trogus fulvipes* Cresson, ♀, second tergite; 36, *Trogus pennator* (Fabricius), ♀, same.



Figs. 37-40. Sculpture of tergites 1-3 (males). 37, 39, *Trogus fulvipes* Cresson; 38, 40, *Trogus pectorator* (Fabricius).

ADDENDA and CORRIGENDA

The following treatments represent additions and corrections to parts of this synopsis already published. The place where a new genus described in this addenda is supposed to lie in the sequence of previously treated genera will be indicated by using the number of the particular genus after which the new genus should be inserted, with addition of an "a". Mere completions to already-described genera and species will appear under the original numbers of the latter.

Key to Genera

Part I (Can. Ent. Suppl. 15), p. 12, couplet 5.

Should be: "1-2 red, 3-7 deep black."

Part I (Can. Ent. Suppl. 15), p. 15, couplet 31.

Evidently the difference of the two types of propodeal structure separating in couplet 31 the tribe Protichneumonini from the tribe Ichneumonini is often extremely difficult to recognize for an eye not especially trained yet for this character. The following is an amended and supplemented version of the originally given differential diagnosis of the propodeal structure, perhaps helpful in overcoming the difficulty:

31. Areae dentiparae slanting down backward in a long, gradually curved slope, their apices reaching close to the base of coxae III; carinae dentiparae exteriores, seen in lateral view, running to their very end or nearly to their end parallel with the carinae metapleurales, and at a comparatively short distance from them, sometimes even slightly converging toward them; apices of areae dentiparae, seen in dorsal view, never forming a triangular, distinctly prominent corner; area posteromedia, corresponding with areae dentiparae, slanting in a slightly curved slope, its upper part adjacent to the apex of area superomedia thus being slightly convex and forming with the apex of the area superomedia a common, gradual curve rather than a sharp angle. (Tribe Protichneumonini) 32
- Areae dentiparae not or not so far curved downward, their apices not reaching as close to the base of coxae III; carinae dentiparae exteriores, seen in lateral view, running on the average at a greater distance from the areae metapleurales, and usually not quite parallel, but gradually more or less diverging from them toward the apex of propodeum; apices of areae dentiparae, seen in dorsal view, often forming a triangular, distinctly prominent corner; area posteromedia slanting in a straight slope, its upper part adjacent to the area superomedia usually tending to be slightly concave rather than convex, forming with the apex of area superomedia usually a sharp angle. (Tribe Ichneumonini) 36

I. Tribe Protichneumonini

1. Genus *Protichneumon* Thomson1a. *Protichneumon grandis grandis* (Brullé)

Part I (Can. Ent. Suppl. 15), p. 25.

Under holotype of *Ichneumon grandis* Brullé, ♀, replace "Museum National d'Histoire Naturelle, Paris" by "Istituto de Museo di Zoologia, Università di Torino, Torino".

Recently H. Townes has written to me that by some mistake on one or the other side I have misinterpreted his opinion concerning the lectotype of *Protichneumon grandis* Brullé, which he indeed considers as intermediate between the northern and southern subspecies, but closer to the latter rather than to the former. As the fact that the lectotype is intermediate between the two subspecies is thus beyond doubt, the decision as to whether the sum of its external characters points a fraction more in one direction or in the other seems to be arbitrary in any case, depending to a large degree on personal opinion, and the importance attributed to one or another character by one or the other author. If we consider the subspecies as a genetic unit, as today probably generally accepted, the morphological characters of a single intermediate specimen become even less decisive, and comprehensive research concerning the entire population of the type area would be necessary in order to answer the question whether the morphologically intermediate type specimen can be regarded as the type of one or the other subspecies. Therefore it seems to me inadvisable to alter, for the time being, the present taxonomic status, which I, as the first reviser, have published, in spite of the fact that my decision was caused by a misunderstanding of Townes' opinion⁴.

1b. *Protichneumon grandis regnatrrix* (Cresson)

Part I (Can. Ent. Suppl. 15), p. 25.

After "1 b. *Protichneumon grandis regnatrrix* (Cresson)" add: ", new status".

3. *Protichneumon polytropus* Heinrich

Part I (Can. Ent. Suppl. 15), p. 22, couplet 4.

Replace the name "*polytropus*" by "*polytropus*".

⁴See also *Ichneumon grandis* Townes, 1961, Proc. Ent. Soc. Wash. 63:108, ♀.

The quoted publication has recently appeared while my Addenda paragraph dealing with the same subject was waiting for print. The author states that the types of *grandis* are "almost intermediate but a little closer to the southern than to the northern form". Consequently he reverses my application of the name *grandis* (1961, Can. Ent. Suppl. 15:25), designating the southern subspecies *Protichneumon grandis grandis* Brullé, and the northern subspecies *Protichneumon grandis ambiguus* (Cresson), although the type localities of both *grandis* and *ambiguus* are situated in Pennsylvania. I doubt that in a case as delicate and arbitrary as the present, the given reason (that the type of *grandis* looks "a little closer" to the southern subspecies than the sympatric type of *ambiguus*) justifies a taxonomic reversion of the status established by the publication of the first reviser of the group. I therefore feel not able to change my opinion as explained in the above Addenda paragraph — the less so, as Townes has given no detailed comment which characters make the types appear a little closer to the southern than to the northern subspecies, and besides does not mention at all the sculpture (in my opinion the most distinctive character of the two subspecies).

The discrepancy of opinions underlying this small controversy does not actually concern the question at all, whether the admittedly intermediate type of *grandis* appears to be a little closer to one or the other subspecies, but instead a problem of a principle of general importance: is the subspecies to be considered as a genetic, geographical or more or less sharply limited, unit, or does the subspecific name refer to a certain mutant, determined by morphologic and chromatic characters without much regard to the geographical or genetic factors? Under the former concept, which I am advocating, the subspecific association of one particular specimen nearly intermediate between two given geographical subspecies can not be properly identified without a study of the entire population involved. As long as this population study is not done, each attempt of subspecific classification of the said specimen bears merely a tentative character. The latter is true for my arrangement of the subspecific nomenclature of *grandis* as well as for its reversion by Townes. My publication has, however, priority, and its alteration by an equally tentative arrangement seems neither advisable nor agreeable with the basic principles of nomenclature and taxonomic progress.

Finally, I want to quote a sentence from a letter from Professor E. Stresemann, an authority in ornithology, with whom I discussed some time ago the question treated above: "We understand under a subspecies not a particular genetic type, but a population, which may often be composed by several different color-types..."

2a. *Catadelphops*, new genus

Type-species.—*Trogus buccatus* Cresson.

Preamble

Trogus buccatus Cresson was included by Hopper (1939) in the genus *Catadelphus* Wesmael on account of generally corresponding structure, sculpture and appearance. These resemblances may indeed indicate a relationship to the mentioned genus, but on the other hand there are differences of evolutionary importance which seem to demand generic separation. The weightiest of the characters distinguishing *Catadelphops* from *Catadelphus* is presented by the mandibles, which are not bidentate, as in the latter genus, but unidentate, gradually tapering toward the apex into one long tooth. Furthermore, the carination of the propodeum is more complete and regular than in *Catadelphus*, the area superomedia being clearly defined, hexagonal, narrowed toward the base and apex, and usually wider than long. In this respect the type-species is still more closely related to *Amblyjoppa* Cameron than is *Catadelphus*, and therefore the genus *Catadelphops* seems better placed in the tribe Protichneumonini than in the tribe Trogini. In all American species of the genus *Catadelphus* and in the European type-species as well, the carinae dentiparae exteriores are lamelliform and highly projecting. Not so in *Trogus buccatus*. This is the third important character separating the two genera.

In the peculiar structure of the mandibles *Catadelphops* agrees with the following closely related new genus, *Neamblyjoppa*.

Morphological characters

Flagellum.—Of females moderately long, bristleshaped, ventrally flattened beyond middle and considerably widened, but only moderately attenuated toward apex; of males with pronounced, bristle-topped, transverse ridges on the segments and without tyloides.

Head.—Generally as in *Catadelphus*; temple profile not narrowed, with broadly rounded outline; cheek profile somewhat narrowed, with slightly curved outline; cheeks not quite as strongly buccate as in *Catadelphus*; clypeus with straight apical and somewhat oblique lateral borders, its apical part slightly depressed; mandibles long, unidentate, gradually tapering toward the apex into one tooth.

Thorax.—Notauli subobsolete, scarcely indicated at base; scutellum strongly raised above postscutellum, dorsally flattened, narrowed toward apex, with vertical lateral, and steeply rounded apical slopes, laterally weakly carinate at the very base; propodeum somewhat abbreviated, with gradually rounded apical slope, and with complete, regular carination (except carina coxalis); area superomedia comparatively small, hexagonal, wider than long, narrowed toward apex at base.

Legs.—Moderately stout.

Wings.—Areolet in the forewing as in *Catadelphus* regularly quadrangular, the intercubiti being about equal in length, as are likewise abscissae I and II of cubitus.

Abdomen.—Of females fairly short, amblypygous; postpetiolus gradually widened from base to apex with more or less distinct median field, punctate, punctures on median field sometimes running into some indistinct, longitudinal rugosity; gastrocoeli approaching a quadrangular outline, moderately deepened, with indistinct thyridia; tergites densely and finely punctured, scarcely shiny; sternites without plica in both sexes.

Color

The single known species ferruginous; sexual dimorphism considerable, as males are, on the average, much more melanistic than females.

Distribution

The genus is perhaps of Neotropical origin; it is unknown in the Old World; in North America recorded so far only from the Western United States north to Vancouver Island.

Biology

Unknown; it will be of special interest to find the hosts of the type-species; I doubt that they will be Sphingidae, as for *Catadelphus*.

Remarks

Catadelphops and *Neamblyjoppa*, new genus, run together, at first to couplet 30 of the key to genera. Here we come into trouble already. The alternative in couplet 30 is "mandibles sickles shaped, the subapical tooth situated at their inner side . . ." or "mandibles not sickles shaped, subapical tooth on level with the upper tooth or almost so . . ." In both new genera the subapical tooth is subobsolete. So actually neither of the two alternative possibilities applies to them. But, as the other characters of *Pseudoplatylabus* (first part of couplet 30) show that these must be something else, one would probably go ahead and thus come to the first part of couplet 32; where both genera would have to be branched off on account of their unidentate mandibles. See *Preamble* under *Neamblyjoppa* for distinction of these genera.

1. *Catadelphops buccatus* (Cresson), new combination

Trogus buccatus Cresson, 1877, Amer. Ent. Soc. Trans., 6:199, ♀.

Catadelphus buccatus Hopper, 1939, Amer. Ent. Soc. Trans., 65:341, ♀ ♂.

Types

Holotype.—♀, Vancouver. A.N.S.

Distribution

According to H. Townes 1951: "British Columbia, Washington, Oregon, Nevada, California."

Female

Uniformly ferruginous; flagellum black, except basal 1 or 2 or 3 segments; wings usually uniformly moderately infuscated; length 16-18 mm.

Flagellum.—Bristleshaped, moderately long, ventrally flattened and considerably widened beyond middle, apically moderately attenuated, with 44-46 segments, the first three times as long as wide, about the eleventh square, the widest 2 times as wide as long.

Head.—Face and the very slightly convex basal part of clypeus densely punctured, the apical part of clypeus smooth with few scattered punctures.

Thorax.—Base of mesoscutum densely punctured, subopaque, its apical half more sparsely punctured and shiny; propodeum very densely punctured, opaque; area posteromedia and lower part of metapleura transversely striate; carina coxalis and inner bordering carinae of areae posteroexternae obsolete.

Male

Differing from female by pronounced melanism of an individually very variable degree (see below); flagellum black, including base; length 17-19 mm.

Flagellum.—With 41-42 segments, without tyloides, all segments, except the first, with pronounced, bristle-tipped, transverse ridges on inner side. Uniformly black; scape usually ferruginous, exceptionally black.

Head.—Usually ferruginous, with middle of frons broadly, ocellar region and middle of occipital region black, sometimes cheeks black along carina occipitalis; exceptionally entire head uniformly black.

Thorax.—Usually black except the following ferruginous parts: collare, pronotal ridge, mesoscutum (except longitudinal, black band on median lobe), scutellum, postscutellum, median mark on mesopleura, mark on metapleura and areae dentiparae; melanism may be more extensive to a variable degree; in extremely melanistic specimens thorax entirely black, except apical margin of scutellum.

Legs.—Varying from (usually) uniformly ferruginous to (exceptionally) predominantly black, with only tibiae and tarsi dirty ferruginous or brownish.

Abdomen.—Usually ferruginous, with base of tergites 2 or 3 to 4 or 6 or 7 more or less extensively infuscated, sometimes petiolus and tergites 4-6 predominantly black; exceptionally entire abdomen uniformly black.

2b. *Neamblyjoppa*, new genus

Type-species.—*Neamblyjoppa nasuta*, new species.

Figs. 11, 14, 25

Preamble

The type-species agrees with *Catadelphops buccatus* (Cresson) in the peculiar shape of the elongate mandibles, which gradually tapers into one slightly blunted tooth (Fig. 25), and in the general appearance of the amblypygous abdomen of the female as well as in the gradually rounded structure of propodeum. The genus therefore is best placed in the tribe Protichneumonini, next to *Catadelphops*. It differs from the latter genus mainly by: (1) the obsolescence of almost the entire carination and areolation of the propodeum (except carina metapleurals and carinae dentiparae interiores, which are more or less distinct); (2) a very strange formation of the base of clypeus which I at first took for an anomaly until two other specimens turned up, confirming its constancy; the median part of the base clypeus bears a swelling which becomes bipartite below, by branching toward the apical border of the clypeus (Fig. 11) into two longitudinal, narrow ridges, separated from each other by a longitudinal deepening; (3) the entire body covered by dense, short, pale pubescence.

Morphological characters

Flagellum.—Of females bristleshaped, long, slender, ventrally flattened beyond middle, but not widened, extremely attenuated toward apex.

Head.—Temple profile scarcely narrowed, with rounded outline; cheek profile slightly narrowed, with almost straight outline; cheeks not distinctly buccate; mandibles unidentate, gradually tapering into one apical tooth; median field of face convex; base of clypeus with median convexity, separated from the median field of face by a transverse impression, and giving rise to two narrowed projections of the swelling downward toward the apex of the clypeus; face and clypeus densely punctured, subopaque.

Thorax.—Notauli basally slightly indicated; scutellum moderately raised above postscutellum, narrowed toward apex, with rather gradually rounded apical and lateral slopes, dorsally slightly convex (Fig. 14); propodeum somewhat abbreviated, its apical slope rather steeply curved down to the base of coxae;

opaque, with subobsolete carination, only carinae metapleurales and carinae dentiparae interiores more or less distinct; area superomedia indicated by a somewhat smoother place.

Legs.—Rather long and slender.

Abdomen.—Of females longish-oval, amblypygous; postpetiolus finely and densely punctured, without median field; gastrocoeli rounded, moderately deepened; thyridia obsolete.

Wings.—Areolet regularly quadrangular, the intercubiti being of about equal length, as are likewise abscissae I and II of cubitus; dark, with longitudinal, clear bands.

Distribution

Probably Neotropical; type-species recorded so far only from Arizona.

Color

Of type-species predominantly pale ferruginous, with infuscated bases and pale yellowish tinted apical parts of several tergites.

Remarks

See also *Remarks* under *Catadelphops*, new genus.

1. *Neamblyjoppa nasuta*, new species

Figs. 11, 14, 25

Types

Holotype.—♀, Arizona, Santa Rita Mts., Florida Canyon, 4000 ft., 31.VII. 1946, H. E. Evans. C.N.C. No. 7467.

Paratypes.—1 ♀, Arizona, Santa Rita Mts., C.N.C.; 1 ♀, Arizona, Tucson, Sabina Canyon. C.H.T.

Distribution

Arizona.

Female

Pale ferruginous; head and thorax with some yellowish tinted parts; bases of tergites 2-3 blackish infuscated; apices of tergites 1-3 extensively pale yellowish tinted; legs pale ferruginous, tibiae and tarsi predominantly pale yellowish; flagellum fulvous with infuscated apex; wings infuscated, with irregular, pale yellowish, longitudinal bands along the anterior and posterior borders of all wings; length 18-19 mm.

Flagellum.—Bristleshaped, long, very slender, ventrally flattened beyond middle, but not widened, extensively attenuated toward apex, with 42-44 segments, the first about 4 times as long as wide, the fourteenth square, the widest square. Very pale ferruginous with blackish apex.

Head.—Pale ferruginous; environment of eyes and base of mandibles pale yellowish tinted.

Thorax.—Pale ferruginous; collare, subalarum and scutella indistinctly pale yellowish tinted.

Legs.—Pale ferruginous; tibiae and tarsi pale yellowish.

Abdomen.—Pale ferruginous; second and third tergites with blackish infuscated, basal bands; apical parts of tergites 1-3 extensively pale yellowish tinted.

3. Genus *Coelichneumon* Thomson

Part I (Can. Ent. Suppl. 15), pp. 34 and 35, key to males.

Replace couplets 32 and 33 as follows:

- "32. Wings uniformly and rather strongly infuscated. _____ 33
 Wings not, or slightly, infuscated. _____ 33a
33. Mesosternum slightly concave in the posterior part, its apical border distinctly raised; length 18-22 mm. _____ 33. *bistricus* (Cresson), variety
 Mesosternum not concave, its apical border not distinctly raised; length 16-18 mm.
 (Scutellum strongly convex, strongly and rather densely punctured, laterally carinated at the base; tyloides on flagellar segments 9-22 or 6-21.) _____
 _____ 46. *citinus* (Cresson)
 _____ and 45. *neocitinus* Heinrich
- 33a. Abdomen with dark metallic-blue tint; anterior part of mesoscutum opaque, densely punctured, alutaceous between punctures. (Length 16-19 mm.) _____
 _____ 22. *barnstoni* Morley
 Abdomen without metallic-blue tint; anterior part of mesoscutum shiny between punctures. (Length 17-18 mm.) _____ 23. *ater* (Cresson)"

3. *Coelichneumon magniscopa* Heinrich

Part I (Can. Ent. Suppl. 15), p. 37.

Under "Distribution" add: "Maine (C.G.H.)."

16. *Coelichneumon eximiops* Heinrich

Part I (Can. Ent. Suppl. 15), p. 49.

Under "Distribution" add: "Maine (C.G.H.)."

48. *Coelichneumon nigrosignatus* (Viereck)

Part I (Can. Ent. Suppl. 15), p. 82.

After "48. *Coelichneumon nigrosignatus* (Viereck)" add: "new combination".4. Genus *Coelichneumonops* Heinrich1. *Coelichneumonops solutus* Holmgren

Part I (Can. Ent. Suppl. 15), p. 69, Fig. 23.

Replace the name "*Coelichneumon solutus*" by "*Coelichneumonops solutus*".

II. Tribe Ichneumonini

6. Genus *Cratichneumon* Thomson

Part II (Can. Ent. Suppl. 18), p. 105, key to males, couplet 18.

Replace the section "tarsi III basally infuscated" for *vescus* (Provancher) by "basal segments of tarsi III more or less extensively infuscated, usually except their bases."1. *Cratichneumon unifasciatus* (Say)

Part II (Can. Ent. Suppl. 18), p. 108.

To the paragraph describing the legs of the female add the following: In the majority of specimens the ventral side of tibiae I is lighter colored than the dorsal side, ranging in shade from dark brown to whitish. This chromatic feature occurs as a rule in the majority of black-legged species of the subfamily.

1b. *Cratichneumon unifasciatus vancouveriensis* (Provancher)

Part II (Can. Ent. Suppl. 18), p. 109.

Add as second line the citation:

Cratichneumon unifasciatus vancouveriensis Heinrich, 1959, Can. Ent. 91:807, ♂.

14a. *Cratichneumon w-album w-album* (Cresson)

Part II (Can. Ent. Suppl. 18), p. 129.

At end of second citation add: "New synonymy."

19b. *Cratichneumon paratus pusillus* (Cresson)

Part II (Can. Ent. Suppl. 18), p. 137.

After "19b. *Cratichneumon paratus pusillus* (Cresson)" add: ", new status".

20. *Cratichneumon vinnulus* (Cresson)

Part II (Can. Ent. Suppl. 18), p. 139.

Replace "tibiae II" in the first and second lines by "tibiae III".

The male *vinnulus* as represented by the type specimen and as described in Part II, p. 139 has recently been caught in Dryden, Maine by a Malaise trap at the same time and spot with the female of *gracilior* Heinrich. On account of morphological and distributional facts I suspected before that these might have been the proper association, and I am now convinced that this association is correct. Consequently *gracilior* Heinrich is considered as a synonym of *vinnulus* (Cresson), while the female associated with *vinnulus* in Part II is considered to be and named as a new species below.

26. *Cratichneumon gracilior* Heinrich

Part II (Can. Ent. Suppl. 18), pp. 147-149.

Female

To be considered as the associated sex and a synonym of 20. *Cratichneumon vinnulus* (Cresson).

Male

The male tentatively associated evidently represents a distinct species. Its status and association are not clear yet.

31. *Cratichneumon scitulus* (Cresson)

Part II (Can. Ent. Suppl. 18), p. 154.

At end of second citation add: "New synonymy."

32. *Cratichneumon suadus* (Cresson)

Part II (Can. Ent. Suppl. 18), p. 157.

Second line, near the end of short diagnosis of the male, after "tarsi III uniformly whitish", insert ", exceptionally basally infuscated".

Also add to the description of legs below: "Rarely first segment of tarsi III or even segments 1 and 2 of tarsi III infuscated except bases."

33. *Cratichneumon remanens* Heinrich

Part II (Can. Ent. Suppl. 18), pp. 157 and 158.

Under *Distribution* add: "Maryland. C.H.T."

At the end of the treatment of the species add:

"Remarks

From all similar forms (as *paratus* (Say), *vinnulus* (Cresson) and *ritus* Heinrich), this male is distinguished by the sculpture of femora III, which are evenly finely and densely punctured on the entire dorsal and exterior surfaces."

37. *Cratichneumon flavipectus* (Provancher)

Part II (Can. Ent. Suppl. 18), p. 162.

At end of second and third citations add: "New synonymy."

Cratichneumon paraparatus, new species

Cratichneumon vimulus Heinrich, 1961, Can. Ent. Suppl. 18: 138/140, partim (♀).

Types

Holotype.—♀, North Carolina, Pisgah Mt., 2.IX.1950, H. & D. Townes. C.H.T.

Paratypes.—2 ♀♀, North Carolina; 2 ♀♀, South Carolina; 4 ♀♀, New Jersey; 2 ♀♀, New York. C.H.T. 1 ♀, Maryland. C.G.H.

Distribution

New York, New Jersey, Maryland, North Carolina, South Carolina.

Preamble

This female, originally described in this synopsis as the other sex of *vimulus* (see quotation above) and now considered as a distinct species, is extremely closely related to the *paratus* complex, and especially is so similar to the sympatric *paratus pseudovimulus* Heinrich that the specific separation from it seemed to be doubtful. There is however, besides the evident chromatic difference between the two, a slight but well perceptible distinction in the structure of cheeks, which seems to support the assumption of a specific distinction. In *paraparatus* the cheeks are a trifle narrower between the eyes and the carina genalis and less bulging than in *paratus pseudovimulus*.

Female

Thorax more melanistic than in paratus pseudovimulus and simultaneously more extensively yellow marked; sterna always entirely, pleura, mesoscutum and propodeum more or less extensively, black; mesopleura medially more or less extensively ferruginous; the following are yellow: marks on vertical orbits, pronotal frontal and outer orbits more or less extensively, collare, pronotal ridge and pronotal base entirely, tegulae, subalarum, scutellum, postscutellum, marks on propodeum, carinal triangle, all trochanters, coxae I and II, dorsal mark on coxae III, dorsal longitudinal mark beyond base of all tibiae, usually apical band on postpetiolus; rest ferruginous; tibiae III dorsally before and beyond yellow mark blackish infuscated; length 8-12 mm.

Flagellum.—Filiform, fairly stout, ventrally flattened and slightly widened beyond middle, with 29-32 segments, almost identical in structure with *paratus*, the basal segments however a trifle more elongate, the 7th square. Black, with white annulus on segments 8 to 14 or 15; scape ventrally ferruginous.

Head.—As in *paratus*; perhaps the temple profile a very little more narrowed than in *paratus paratus*; cheeks in lateral view narrower than in *paratus pseudovimulus* and less bulging. Ferruginous, vertical orbits always yellow marked, frontal and outer orbits usually more or less extensively yellow tinted; sometimes vertical and occipital region black.

Thorax.—Generally similar to *paratus*, but carination of propodeum on the average more complete and prominent, costulae always distinct; area superomedia and area basalis confluent; sculpture of meso- and metapleura very coarse. Mesoscutum medially or entirely ferruginous; sterna, propleura and prepectus black; mesopleura, metapleura and horizontal part of propodeum black and ferruginous

to a varying extent; mesopleura usually medially more or less extensively ferruginous, and metapleura often partially; declivity of propodeum usually predominantly ferruginous with yellowish markings covering the apex of areae dentiparae; the following are yellow: collare, pronotal ridge and base broadly, tegulae, subalarum, scutellum, postscutellum and carinal triangle.

Legs.—Stout; femora thick but not quite as short as in *paratus paratus*; coxae III ventrally strongly and rather densely punctured, with pale scopa. Ferruginous; the following are yellowish white: all trochanters, coxae I and II, usually dorsal marks on coxae III, a longitudinal dorsal mark beyond base of all tibiae; coxae III sometimes partially black; tibiae III dorsally blackish before and beyond yellow mark; sometimes tip of femora III black.

Abdomen.—Second and third tergites alutaceous-opaque as in *paratus*. Ferruginous, petiolus usually more or less infuscated; postpetiolus with more or less distinct yellow apical band.

Cratichneumon boreovagans, new species

Cratichneumon paratus Heinrich, mutant, 1960, Can. Ent. Suppl. 18:136, ♀.

Types

Holotype.—♀, Maine, Livermore, 28.VI.1961, Bernd Heinrich. C.G.H.

Paratypes.—2 ♀♀, Maine, Dryden; 1 ♀, Quebec, Low. C.G.H.

Distribution

Maine, Quebec.

Preamble

I have mentioned this form before as a mutant of *paratus* (Say), but am now convinced that it represents a distinct species. Agrees with *paratus paratus* in general appearance, alutaceous sculpture of second and third tergites and in flagellar proportions. Differs by more extensive yellow markings on thorax, head, postpetiolus and trochanters, by slightly larger size and by structure of femora III which are not quite as short and thick as in *paratus paratus* and dorso-laterally slightly more densely punctured. Carination of propodeum on the average more prominent. Closely related to *paraparatus*, new species, and perhaps its northern vicariant.

Female

Thorax black with yellow markings; the following yellow: collare, pronotal ridge, subalarum, scutellum and marks on propodeum, sometimes also pronotal base partially and the postscutellum; head varying from predominantly black to predominantly ferruginous; usually clypeus yellow or yellowish, face, lower part of frons and occipital region black; abdomen ferruginous, first tergite black with yellow apical band; legs predominantly black, all tibiae with yellow annulus, all trochanters predominantly, coxae I and II apically yellowish; tarsi ferruginous, segment 1 or 1 and 2 of tarsi III infuscated; coxae III entirely black, or dorsally yellow marked, with black scopa. Length 9-12 mm.

Flagellum.—As in *paratus*; filiform, stout, slightly widened beyond middle, with 28-30 segments, the first 1.3 times as long as wide, the fifth square, the widest about 1.5 times as wide as long. Black, with white annulus on segments 7-14; scape ventrally ferruginous.

Head.—Shaped as in *paratus*; less extensively ferruginous than usual in *paratus*; clypeus yellow or pale ferruginous; the following are ferruginous: upper

part of facial orbits, upper part of frons, vertical and outer orbits broadly; rarely entire face ferruginous.

Thorax.—Carination of propodeum more sharply prominent than in *paratus*, costulae distinct; area basalis and superomedia confluent. Black; the following are yellow: Collare, pronotal ridge, subalarum, scutellum, marks on propodeum (on apices of areae dentiparae), upper part of carinal triangle, sometimes apical stripe on pronotal base and postscutellum; mesoscutum usually with dark ferruginous median mark.

Legs.—Femora stout but not quite as short and wide as in *paratus*, dorsally and on exterior side a trifle less sparsely punctured; coxae III ventrally rather densely punctured, with black scopa. Black; basic color of tibia I and II and apices of femora I and II ventrally brownish; all tibiae with yellow annulus beyond base; all trochanters predominantly, coxae I and II apically yellowish; tarsi ferruginous, segments 1 and 2, or only 1, of tarsi III infuscated; coxae III sometimes dorsally yellow marked.

Abdomen.—Second and third tergites alutaceous. Ferruginous; first tergite black with yellow apical band.

7. Genus *Homotherus* Foerster

The following species should be inserted in Part II (Can. Ent. Suppl. 18), p. 177, as the last species of the genus.

4. *Homotherus erythromelas* McLachlan, new combination

Ichneumon erythromelas McLachlan, 1878, Jour. Linnaean Soc. Soc. Zool, 14:106, ♀.

Craticheumon erythromelas Townes, 1951, Syn. Cat., p. 288, ♀.

Types

Holotype.—♀, Ellesmere Island, at 82° 29', 800 ft., 8.VII.1876, surface of snow. British Museum, London.

Female

Extract from the original description:

Black; mesoscutum, scutellum and second tergite bright red; flagellum black, without annulus; last tergite with small, yellowish anal spot; legs reddish, coxae, trochanters and tibiae shining black; femora externally lined with black, tarsi partially blackish. Length 6 mm.

Flagellum.—Very stout, with 32 segments. Black.

Head.—Finely sculptured.

Thorax.—Scutellum flat; areolation of propodeum well defined; area superomedia narrowed toward base; mesoscutum, propodeum and pleura finely punctured. Black.

Legs.—Reddish; tibiae (except extreme apex), trochanters and coxae shining black; femora externally with black line; tarsi externally blackish, metatarsi II and III almost entirely reddish.

Abdomen.—Very short, ovate, finely punctured; gastrocoeli transverse, oblong. Black; postpetiolus with small red median apical spot, second tergite red with black lateral and apical margins; last tergite with a small, greenish-yellow apical spot.

Remarks

This species by mistake was not included in the preceding synopsis. I have not seen the type. H. Townes, who examined it, made the following note, which

he kindly communicated to me: "this appears to be a *Craticheumon* belonging to the species group which is intermediate to *Aoplus*". This group has been treated in the preceding synopsis under the name *Homotherus* Foerster as a distinct genus.

9. Genus *Spilichneumon* Thomson

4. *Spilichneumon bronteus* (Cresson)

Part II (Can. Ent. Suppl. 18), p. 186.

After "4. *Spilichneumon bronteus* (Cresson)" add: ", new combination".

6. *Spilichneumon citrinus* (Provancher)

Part II (Can. Ent. Suppl. 18), p. 189.

After "6. *Spilichneumon citrinus* (Provancher)" add: ", new combination".

9a. *Obtusodonta*, new genus

Type-species.—*Spilichneumon obscuricolor* Heinrich.

Preamble

The type-species was described in part II of this paper, where it was placed under a question mark as a species with a "still doubtful generic position" in the genus *Spilichneumon* Thomson. Since then, both sexes of a second species, described below, have been discovered in Maine and Quebec. As the male of this new species agrees morphologically with the tentatively associated male of the type-species, it becomes necessary to alter the generic position of the latter, as already predicted in the preamble of the original description. A third species from Manitoba is represented in the C.N.C., indicating that this is a well defined and characterized taxonomic unit with a number of homogenous species.

The genus is mainly distinguished by the very unusual shape of mandibles of the female, which are very broad, shovel-shaped, with an obsolete, scarcely indicated lower tooth. The apex of the abdomen of females is semiamblypygous, the hypopygium being more prolonged than in the genus *Ichneumon* Linnaeus, but not covering the entire slit of the ovipositor. All other characters as in *Ichneumon* Linnaeus.

Obtusodonta differs from *Spilichneumon* Thomson mainly in the male, which has no distinct median projection of the hypopygium. Females are rather similar to *Spilichneumon*, but differ by the not fully amblypygous apex of abdomen, by the coarser, not smooth and shiny sculpture of tergites and the shorter, usually square area superomedia. The Oriental genus *Gyrodonta* Cameron, with somewhat similar shovel-shaped mandibles, is distinguished by the following characters: (1) abdomen of females clearly oxygygous with slightly projecting ovipositor; (2) gastrocoeli almost entirely obsolete; (3) propodeum very long, the area superomedia almost twice as long as wide; (4) median field of face hump-shaped.

Morphological characters

Flagellum.—Of females short, stout, bristleshaped, apically pointed, ventrally flattened beyond middle; of males with a row of bacilliform tyloides.

Head.—Temple and cheek profiles of females scarcely narrowed, with curved outlines; head in front view approaching a square outline; clypeus with straight, apical border, very slightly depressed toward apex; median field of face short, convex; mandibles very wide, apically broadly rounded, shovel-shaped, with obsolete, subapical tooth, its place scarcely indicated by a little notch; mandibles

of males slightly more robust than on the average in *Ichneumon*, the upper tooth somewhat prolonged and with blunted apex, the lower reduced and situated far back from apex of upper.

Thorax.—Generally as in *Ichneumon*; mesoscutum about as long as medially wide, flat in females, convex in males, shiny and fairly sparsely punctured; notauli obsolete; scutellum slightly convex to entirely flat; area superomedia approximately square, or slightly longer than wide, rectangular; costulae obsolete; posterior carina of area superomedia and lateral carinae of area posteromedia indistinct or obsolete.

Legs.—Short and rather stout; no scopa.

Abdomen.—Of females longish-oval, semiamblypygous, ovipositor not projecting; postpetiolus with distinct, longitudinally striate median field; gastrocoeli distinctly impressed, approximately triangular, narrower than their interval, with distinct thyridia.

Color

Head and thorax almost uniformly black; abdomen red or black; sexual dimorphism as in the genus *Ichneumon*.

Biology

Unknown.

Distribution

Nearctic.

Remarks

Obtusodonta females would run to the first part of couplet 60 (*Spilichneumon*) in the key to genera; as couplet 60 is worded now, *Obtusodonta* is included with *Spilichneumon*. In a completed key it would branch off from couplet 60 on account of the semiamblypygous abdomen (*Spilichneumon amblypygous*) and of the shovel-shaped mandibles.

Males run to couplet 67 in the key to genera. They are scarcely distinguishable from *Ichneumon* males, except by a subtle difference in the mandibles. Whether this difference is good for all species of *Ichneumon* remains to be found out.

Key to the Species of *Obtusodonta*, new genus, of America North of Mexico

Females and Males

(♂♂ of *manitobae*, new species, and of *foxleei*, new species, unknown)

- | | |
|---|---|
| 1. Males. | 5 |
| Females. | 2 |
| 2. Abdomen black. | 1. <i>manitobae</i> , new species |
| Abdomen red, except first segment. | 3 |
| 3. All femora and tibiae clear red. (Scutellum usually partially or predominantly ferruginous; length 14-15 mm.) | 2. <i>foxleei</i> , new species |
| All femora and at least tibiae III black. | 4 |
| 4. Wings uniformly infuscated; second and third tergites moderately sparsely punctured, intervals of punctures, on the average, as wide as or wider than punctures, shiny and almost smooth. (Length 14-15 mm.) | 3. <i>obscuricolor</i> Heinrich |
| | (+ some variants of <i>manitobae</i> , new species) |
| Wings clear; second and third tergites very densely punctured, subopaque, intervals between punctures on most of the surface obsolete, where present finely coriaceous. (Length 14 mm.) | 4. <i>montana</i> , new species |
| 5. Predominant color of abdomen red; wings strongly infuscated. | 3. <i>obscuricolor</i> Heinrich |
| Predominant color of abdomen yellow, sometimes orange-tinted; wings not or slightly infuscated. | 4. <i>montana</i> , new species |

1. *Obtusodonta manitobae*, new species

Types

Holotype.—♀, Manitoba, Winnipeg. C.N.C. No. 7469.

Paratypes.—13 ♀♀, Manitoba, Winnipeg; 1 ♀, Alberta, Calgary.

Distribution

Manitoba (Winnipeg); Alberta.

Preamble

This may perhaps be an extremely melanistic subspecies of *obscuricolor* Heinrich. But there are subtle differences in the structure of the head, particularly of the clypeus and cheeks; besides, the time does not seem ripe for a clear understanding of the true relationship of all the different, morphologically so very similar, representatives of this genus. Therefore I prefer to consider this form too for the time being as distinct species.

Female

Black, including abdomen and legs; base of second tergite often more or less distinctly obscure ferruginous (in 2 out of 17 specimens tergites 2-7 entirely red); flagellum usually without annulus; wings slightly infuscated; length 12-13 mm.

Flagellum.—Bristleshaped, stout and short, ventrally flattened beyond middle and slightly widened, considerably attenuated at apex, with 39-43 (usually 42 or 43) segments, the first less than 1.5 times as long as wide, the third approximately square, the widest about 1.5 times as wide as long. Uniformly black; exceptionally with a white or whitish annulus on segments 8 or 9 to 12.

Head.—Temple and cheek profile scarcely narrowed, with distinctly curved outlines; head in frontal view close to square; basal part of clypeus more distinctly convex than in *obscuricolor*, the flattened apical part less extensive; lower part of cheeks slightly wider between eyes and carina genalis than in *obscuricolor*. Uniformly black.

Thorax.—Generally as in *obscuricolor*; area superomedia usually square, sometimes slightly wider than long, or slightly longer than wide. Uniformly black.

Legs.—Black, tarsi sometimes blackish-brown; tibiae I ventrally paler.

Abdomen.—Black; base of second tergite usually more or less distinctly obscure ferruginous; rarely several tergites partially obscure ferruginous tinted; exceptionally tergites 2-7 red.

2. *Obtusodonta foxleei*, new species

Types

Holotype.—♀, British Columbia, Robson, 7.VII.1956, H. R. Foxlee. C.G.H.

Paratypes.—4 ♀♀, British Columbia, Robson. C.G.H.

Distribution

British Columbia.

Preamble

This may well be the western vicariant of *obscuricolor* Heinrich. But, as the coloration is rather different and as, on the other hand, the species of this genus seem to be very little differentiated in structure, I preferred to treat this form, for the time being, as a distinct species. Differs from *obscuricolor* by the red legs, the usually ferruginous scutellum and the indistinct flagellar annulus.

Female

Black; abdomen light red, except the entirely or (usually) predominantly black first segment; wings uniformly infuscated; legs light red, coxae and trochanters entirely or predominantly black; flagellum with indistinct, dirty-whitish annulus; scutellum, in majority of specimens, entirely or partially ferruginous; length 14-15 mm.

Flagellum.—Bristleshaped, stout and short, ventrally flattened beyond middle and slightly widened, considerably attenuated at apex, with usually 42 (in one out of five counted specimens with 41) segments, the first scarcely 1.5 times as long as wide, the fourth square, the widest nearly twice as wide as long. Black, with indistinct, dirty-whitish annulus on segments 8 or 9 to 12 or 13; scape often ventrally ferruginous; basal segments often ventrally and dorsally toward apex obscure brownish.

Head.—Black; often facial orbits and apical part of clypeus, rarely frontal orbits narrowly ferruginous.

Thorax.—Scutellum flat; area superomedia square or slightly longer than wide. Black; the following are ferruginous; collare, scutellum partially or entirely (in one specimen black), rarely postscutellum, often tegulae partially or entirely, exceptionally apex of pronotal ridge.

Legs.—Light red, including trochantelli; coxae and trochanters black, coxae and trochanters III or II and III sometimes ventrally ferruginous.

Abdomen.—Sculpture generally as in *obscuricolor*. Light red, first segment black; apex of postpetiolus usually medially or entirely red.

3. *Obtusodonta obscuricolor* (Heinrich)

Spilichneumon obscuricolor Heinrich, 1961, Can. Ent. Suppl. 18: 195.

Types

Holotype.—♀, Maine, Dryden, 20.IX.1951, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Ontario, Ottawa, 9.IX.1940. C.N.C. No. 6773.

Distribution

Maine, Quebec, Ontario, Connecticut, New York, Saskatchewan.

Female

Black; abdomen red except petiolus or entire first segment; mark on inner orbits level with antennal sockets, and vertical orbits usually obscure ferruginous; wings uniformly and strongly infuscated; legs black, tarsi predominantly red-brown; flagellum black, with broad, white annulus; length 16 mm.

Male

Black; tergites 2-7 red; wings uniformly and strongly infuscated; scutellum usually partially or entirely yellow; sometimes apex of postpetiolus yellow banded; tarsi and tibiae III basally on ventral side yellowish; length 16 mm.

For detailed description see original treatment of the species in part II.

4. *Obtusodonta montana*, new species

Types

Holotype.—♀, Maine, Mt. Blue, 11.VI.1960, G. H. Heinrich. C.G.H.

Allotype.—♂, Quebec, Mt. Orford, 26.VIII.1960. C.G.H.

Paratypes.—1 ♀, 5 ♂♂, Quebec, Mt. Orford, 26.VIII.1960. C.G.H.

Distribution

Maine, Quebec. Inhabits the higher mountain tops.

Remarks

Numerous males of this species were observed flying (August 26, 1960) on top of Mt. Orford, Quebec, frequenting especially an isolated young spruce tree of about 6 ft. in height. Every few minutes another male arrived, circling the tree several times and investigating it up and down, evidently in search of a female. The tree was observed for some time, when suddenly a female arrived and landed on a twig, where it was caught. The circumstances of the catch, as well as the perfect matching of both sexes, leaves no doubt about the correct association of the two sexes described below.

Female

Differs from *obscuricolor* Heinrich by clear wings and considerably denser sculpture of tergites 2 and 3 which are subopaque; otherwise extremely similar to *obscuricolor*.

Head and thorax uniformly black, sometimes scutellum with two lateral, yellowish marks; tergites 2-7 red; legs black, the tarsi and sometimes anterior tibiae partially obscure ferruginous; wings clear; flagellum black, with white annulus; length 14 mm.

Flagellum.—Bristleshaped, stout and short, ventrally flattened beyond middle and slightly widened, considerably attenuated at apex, with 38-40 segments, the first scarcely 1.5 times as long as wide, the fourth square, the widest about 1.5 times as wide as long. Black, with white annulus on segments 6-15.

Head.—Uniformly black; mandibles ferruginous, apically blackish.

Thorax.—Area superomedia parallel-sided, somewhat longer than wide; punctures below middle of mesopleura and on metapleura running into transverse striae. Uniformly black; in the type specimen (from Maine) scutellum with two yellowish lateral marks near apex.

Legs.—Black; all tarsi and tibiae I and II partially obscure ferruginous.

Abdomen.—Puncturation of second and third tergites much denser than in *obscuricolor*; second tergite densely punctured, subopaque; between gastrocoeli and on almost entire median area punctures running into irregular, dense, longitudinal rugosity; on rest of surface of second tergite (except area behind gastrocoeli) interval between punctures narrower than their diameter; third tergite likewise densely punctured, finely coriaceous between punctures; the fourth tergite more finely and less densely punctured than in *obscuricolor*. First segment black, tergites 2-7 red.

Male

In contrast to *obscuricolor*, wings clear, apical tergites black, tergites 2-3 yellow or orange tinted instead of red, anterior femora fulvous instead of black.

Black; tergites 2-3 (sometimes also the third partially) yellow, usually extensively, sometimes entirely, orange tinted; postpetiolus with apico-lateral, yellow marks or with yellow apical band; tibiae and tarsi pale yellow, tibiae III apically black; femora I and II fulvous, femora III black; scutellum and apex of pronotal ridge white; flagellum black; wings clear; length 14-16 mm.

Flagellum.—With 40-43 segments and with narrow, bacilliform tyloides on segments 6-18, which on the tenth to fourteenth segments usually reach almost from end to end; basal segments comparatively short. Black, basal 5 or 6 segments often (on side of tyloides) apically pale brownish; ventral side of scape, and usually also its apical margins on dorsal side, yellow, sometimes scape predominantly yellow.

Head.—Malar space half as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, entire face and clypeus; no yellow on orbits.

Thorax.—Mesoscutum more convex than in female; area superomedia square, or a trifle wider than long. Black; the following are yellow: collare, apical mark on pronotal ridge, subalarum, tegulae (sometimes dark marked), scutellum, sometimes postscutellum.

Legs.—Tibiae and tarsi pale yellow; tibiae III apically broadly black; femora I and II fulvous, yellow on anterior side, rarely femora II dorsally near base black marked; femora III black, rarely partially fulvous on inner side; coxae III black; trochanters and trochantelli III usually predominantly black, ventrally more or less extensively yellow marked; coxae, trochanters and trochantelli I and II varying from predominantly black, with restricted white apical (coxae) or ventral (trochanters) marks, to predominantly white.

Abdomen.—Second and third tergites very densely and rather coarsely punctate, subopaque, medially irregularly, longitudinally rugose-punctate; also the fourth tergite densely and rather strongly punctate; second tergite longer than apically wide, the third nearly 1.5 times as wide as long. Black; tergites 2 and 3 yellowish-orange, sometimes also the fourth more or less extensively orange; apex of postpetiolus with pale yellow apical band or latero-apical marks; sometimes the third or third and fourth tergites with infuscated medio-apical bands or marks.

10. *Genus Ichneumon Fabricius*

Part III (Can. Ent. Suppl. 21), p. 221, key to females, couplet 71.

Replace "39a" by "39A".

9. *Ichneumon annulatorius Fabricius*

Part III (Can. Ent. Suppl. 21), p. 246.

At end of third citation add: "New synonymy."

Add to the citations:

Ichneumon annulatorius Townes, 1961, Proc. Ent. Soc. Wash., 63:106.

19. *Ichneumon chasmodops Heinrich*

Ichneumon chasmodops Heinrich, 1961, Can. Ent. Suppl. 21: 259, partim (♀).

Types

Holotype.—♀, Maine, Dryden. C.G.H.

Distribution

Maine, Ontario, Quebec, New York, Minnesota, Manitoba. New record: New Hampshire (C.G.H.).

Preamble

The male originally (*loc. cit.*) associated with the holotype was found to belong to *Ichneumon feralis* Cresson. The correct male of *chasmodops* was not discovered until the summer of 1961 when a few specimens were caught in Maine in insect traps, and later on some were collected individually in New Hampshire, Quebec and Ontario. The following description is based on a series of 7 specimens.

Shares with *feralis* male the narrow mesoscutum and abdomen, but not the elongate area superomedia and not the head structure. The temple profile is not

narrowed, but curved gradually; the cheeks are relatively wide between eyes and carina genalis and the malar space is abbreviated, about one third as long as width of base of mandible. The head structure of the male thus corresponds very well (in the frame of the regular sexual dimorphism) with the usually strongly built shape of the head of the female. Chromatically the male belongs to the comparatively small number of species of this genus in which the yellow apical bands of the abdomen are restricted to the first three tergites.

In the key to the males, published in part III of this paper, this species would run to the first part of couplet 52a, *trizonatus* Provancher (supposing that we ignore the fact that it did not agree with the material within parentheses in the second part of couplet 51). It differs from *trizonatus* by its slender abdomen with tergites 3-6 not being wider than long, by the lack of the short yellow lateral lines on the mesoscutum and by the broadly rounded, not narrowed temple profile.

Male

Black, with lemon-yellow pattern; scutella yellow; mesoscutum, sterna and pleura not, propodeum usually very restrictedly, sometimes not at all, yellow marked; tergites 2 and 3 yellow with black basal bands, postpetiolus apically broadly to entirely yellow; tibiae and tarsi yellow, tibiae III apically black; area superomedia not longer than wide; temples broad; abdomen narrowed, tergites 2-6 not wider than long; length 12-17 mm.

Flagellum.—With 33-37 segments and with narrow, bacilliform tyloides on segments 6 to 15, 16 or 17. Black, ventrally obscure brownish; scape ventrally yellow.

Head.—Temple profile not narrowed, with gradually curved outline; malar space short, about one third as long as width of base of mandible; cheeks comparatively wide between eyes and carina genalis. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits up to level of lower ocellus, outer orbits below temple region more or less extensively, usually widened at the lower end onto the apical part of cheeks, but only exceptionally covering the very apex of the latter at base of mandibles.

Thorax.—Mesoscutum narrowed, longer than medially wide, rather strongly and fairly densely punctured; notauli subobsolete; scutellum fairly strongly convex and raised above postscutellum; area superomedia about as wide as long, or slightly wider than long, its lateral borders slightly bulging, anterior corners rounded. Black; the following are yellow: collare, tegulae partially to entirely, scutella, subalarum (in one specimen black), usually some narrow lines following the apical carinae of areae dentiparae and/or of area superomedia, sometimes marks on apices of areas dentiparae.

Legs.—Femora III rather short and wide. Coxae black; coxae I, or sometimes I and II, white marked; trochanters black, trochanters I, or I and II ventrally more or less extensively white marked; trochantelli ferruginous; femora I and II ventrally entirely, and dorsally at apices, yellow, dorsally more or less extensively black; femora I sometimes dorsally entirely ferruginous; femora III always black, their very base ferruginous with a yellowish patch on anterior side; tibiae and all tarsi pale yellow; tibiae III apically black.

Abdomen.—Postpetiolus narrow, gradually widened toward apex; second tergite considerably longer than apically wide, the third and fourth square, the fifth almost square; tergites 2-5 very densely punctured, subopaque. Black; postpetiolus apically broadly, or entirely, yellow, tergites 2 and 3 yellow with black basal bands.

27a. *Ichneumon lachrymans*, variety *cervulus* Provancher

Part III (Can. Ent. Suppl. 21), p. 271.

After "27a. *Ichneumon lachrymans*, variety *cervulus* Provancher" add: "new status".39. *Ichneumon pseudovivax* Heinrich

Part III (Can. Ent. Suppl. 21), p. 286.

Change the species number to 39A.

68. *Ichneumon feralis* Cresson*Ichneumon feralis* Cresson, 1867, Amer. Ent. Soc. Trans., 1:361, ♀.

Types

Holotype.—♀, Massachusetts. A.N.S.*Neallotype*.—♂, Maine, Allagash. C.G.H.

Preamble

During the summer of 1961, Bernd Heinrich collected in the evergreen forests of northern Maine (near Ashland) numerous male specimens of an *Ichneumon* which I identified as *Ichneumon chasmodops* Heinrich, described already in Part III, 1961. As *chasmodops* is not likely to be found in evergreen woods, I was wondering whether my association of sexes had been correct, and requested more specimens from the same area. Receiving soon after additional males and females, I found that the latter were *feralis* Cresson females. Certain corresponding characters, particularly the elongate mesoscutum and area superomedia, and the orange or reddish tinted tarsi III, indicated that the two sexes should almost with certainty be considered as associated.

The until now unknown male of *feralis*, described erroneously as the male of *chasmodops* in part II of this paper, is similar to the latter in the narrow mesoscutum and abdomen, but differs by the considerably narrowed temple profile, the on-the-average more elongate area superomedia, and by the presence of a yellow apical band not only on tergites 2 and 3 but also on tergite 4; besides, the apex of coxae III (always black in *chasmodops*) is ventrally more or less yellow marked or lined in *feralis*. The following description is based on a series of 10 specimens.

Male

Black, with lemon-yellow pattern; scutella yellow; mesoscutum, sterna, pleura and propodeum always uniformly black; tergites 2-4 yellow, with black basal bands, the postpetiolus usually with two yellow lateral, and one smaller median, marks which rarely are confluent, forming an apical band; area superomedia scarcely to considerably longer than wide, narrowed and arched anteriorly; temples distinctly narrowed; abdomen narrowed, tergites 2-6 not wider than long; length 13-16 mm.

Flagellum.—With 39 or 40 segments and with narrow, bacilliform tyloides on segments 7 to 12 or 13. Uniformly black; scape ventrally yellow.

Head.—Temple profile strongly narrowed, with straight outline; malar space one third as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits up to level of lower ocellus, outer orbits below-temple region more or less extensively, rarely widened on the lower end onto the apical part of cheeks, exceptionally covering the very apex of the latter at base of mandibles.

Thorax.—Mesoscutum narrowed, longer than medially wide, rather strongly and moderately densely punctured; notauli obsolete; scutellum fairly strongly convex and raised above postscutellum, longer than basally wide and narrowed toward apex; area superomedia slightly to distinctly longer than wide, narrowed and arched anteriorly. Black; the following are yellow: collare, tegulae, subalarum, pronotal ridge, pronotal base more or less extensively, scutella; propodeum never yellow, marked or lined.

Legs.—Femora III rather short and wide. Coxae I and II, all trochanters and trochantelli and apex of coxae III ventrally more or less extensively (sometimes only their apical margin) yellow; femora I and II ventrally entirely, and dorsally at apices, yellow, dorsally predominantly black; femora III black, their very base ferruginous on outer, yellow on inner, side; tibiae and tarsi yellow, tibiae III apically black, tibiae I and II sometimes ventrally toward apex with wedge-shaped black stripes; tarsi III from apex of first segment pale orange, rarely brownish.

Abdomen.—Postpetiolus narrow; second tergite considerably longer than apically wide; tergites 3-5 approximately square; tergites 2-4 very densely punctured, subopaque, the fifth less strongly punctured than in *chasmodops*. Black; apex of postpetiolus usually with two larger lateral, and one small median, mark, which are rarely all confluent, forming an apical band; tergites 2-4 yellow with black basal bands, the black band of the second tergite tending to form lateral projections.

78b. *Ichneumon deliratorius cinctitarsis* Provancher

Part III (Can. Ent. Suppl. 21), p. 331.

In the citation of *Ichneumon deliratorius cinctitarsis* Heinrich, 1953, replace 31:149 by 43:149.

86. *Ichneumon nearctivernus* Heinrich

Part III (Can. Ent. Suppl. 21), p. 339.

After "86. *Ichneumon nearctivernus* Heinrich" add: " , new status".

Ichneumon mainensis, new species

Types

Holotype.—♀, Maine, Dryden, 25.VI.1961, Gerd H. Heinrich. C.G.H.

Distribution

Maine.

Preamble

The holotype resembles in general appearance, basic color pattern and size the common *Ichneumon ultimus* Cresson. It differs, however, from it in so many characters that specific distinction seems to be doubtless, although no other specimens of this species have been seen so far. Coxae III, in contrast to *ultimus*, without trace of scopa; gastrocoeli considerably wider than in *ultimus*, their interval much narrower than one of them; temple profile and femora III somewhat narrower than in *ultimus*; in contrast to *ultimus*, tergites 6 and 7 with rather large and distinct white anal marks, first tergite almost entirely black.

Female

Thorax black, **scutellum** white, **mesoscutum** partially red; **head** black, **only middle of face** obscure red; **abdomen** red, **first segment** almost entirely black, **the sixth and seventh** infuscated with conspicuous white anal marks; **legs** black, **all**

tibiae with narrow, clearly defined, white annulus beyond base; all tarsi ferruginous; flagellum fairly slender, bristle-shaped gastrocoeli transverse with considerably narrowed interval; no trace of scopa; length 9 mm.

Flagellum.—Bristleshaped, moderately long and moderately slender, apically slightly more pointed than in *ultimus*, ventrally flattened beyond middle, but not widened, with 32 segments, the first about twice as long as wide, the eighth approximately square. Black, with white annulus on segments 7-12; scape black.

Head.—As in *ultimus*, but cheeks and temples a trifle more narrowed. Black, except in obscure red median mark on face.

Thorax.—Mesoscutum fairly convex, a somewhat narrower and comparatively longer than in *ultimus*, rather densely punctured; notauli basally distinct; area superomedia scarcely longer than wide. Black; collare, tegulae and partially mesoscutum ferruginous; scutellum white.

Legs.—Femora distinctly slenderer than in *ultimus* and considerably more densely punctured; coxae III distinctly and densely punctured, without trace of scopa. Black; all tibiae with narrow, clearly defined white annulus beyond base; base of tibiae III blackish before white annulus, of tibiae I and II brownish; all tarsi ferruginous.

Abdomen.—Gastrocoeli rather deep, transverse, their interval much narrower than one of them; tergites 2 and 3 more densely punctured than in *ultimus*, nearly opaque. Red; first segment black, except red apical median mark on postpetiolus; tergites 6 and 7 infuscated, with large white apical marks.

Remark

In the key to the females of the genus *Ichneumon* this species runs to couplet 56a (*ultimus* Cresson). It disagrees, however, with two characters mentioned in this couplet for *ultimus*: The gastrocoeli are considerably wider than their interval, and not only the seventh tergite, but the sixth as well, is white marked.

11. Genus *Thyrateles* Perkins

5. *Thyrateles lugubator* (Gravenhorst)

Part III (Can. Ent. Suppl. 21), p. 354.

Add "new combination" after "5. *Thyrateles lugubator*. (Gravenhorst)".

Add "New synonymy." after the third, fourth and fifth citations.

Add to the citations:

Ichneumon lugubator Townes, 1961, Proc. Ent. Soc. Wash., 63:108.

Ichneumon rufiventris Townes, 1961, Proc. Ent. Soc. Wash., 63:109.

14. Genus *Anisopygus* Kriechbaumer

2. *Anisopygus americanus* Heinrich

Part IV (Can. Ent. Suppl. 23), p. 380.

Male, description of thorax: replace the words "costulae obsolete" by "seemingly more often distinct than obsolete."

17. Genus *Trichplabus* Thomson

1. *Tricholabus nortonii* (Cresson)

Part IV (Can. Ent. Suppl. 23), p. 390.

At end of second citation add: "New synonymy."

2. *Tricholabus citatus* (Provancher)

Part IV (Can. Ent. Suppl. 23), p. 391.

At end of second citation add: "New synonymy."

18. Genus *Pseudamblyteles* Ashmead3. *Pseudamblyteles provancheri* (Cushman)

Part IV (Can. Ent. Suppl. 23), p. 404.

After "3. *Pseudamblyteles provancheri* (Cushman)" add ", new combination".

10. *Pseudamblyteles ormenus* (Cresson)

Part IV (Can. Ent. Suppl. 23), p. 414.

After "10. *Pseudamblyteles ormenus* (Cresson)" add: ", new combination".

16. *Pseudamblyteles zebraticolor*, new species

Types

Holotype.—♂, Ontario, Orient Bay, 19.VI.1956, Gerd H. Heinrich. C.G.H.

Paratype.—1 ♂, Quebec, Mt. Orford. C.G.H.

Distribution

Ontario, Quebec. Canadian Zone.

Preamble

This is a striking, evidently very rare and probably northern species, which I have not found in any other collection. On account of the regularly and densely, longitudinally striate median field of the postpetiolus, and of the obsolescence of the thyridia, I have placed the species here in the genus *Pseudamblyteles*, but the general appearance, particularly the broadly rounded temples and also the rather coarse puncturation of head and mesoscutum are at least unusual for this genus. The generic position of this species can not be considered as final before the female is discovered. Chromatically approaching certain species of *Melanichneumon* (subgenus *Vulgichneumon*), especially the species *zebratus* (Cresson).

Male

Black; scutellum and two marks on propodeum white; all tergites, except the seventh or sixth and seventh, with regular, continuous, white apical bands; which are wider on tergites 1-3 or to 4 than on the following two segments; tibiae and tarsi yellowish-white; the tarsi III and apices of tibiae III black; flagellum without annulus; gastrocoeli scarcely impressed, without thyridia; length 12 mm.

Flagellum.—With 38 or 39 segments and with longish-oval tyloides on segments 6-16 or to 17. Black, ventrally brownish; scape ventrally yellow; no indication of transverse ridges.

Head.—Fairly densely and coarsely punctured all over; temple profile not narrowed, with gradually curved outline; malar space distinctly shorter than width of base of mandible; clypeus laterally oblique, with rounded corners, anterior border straight; median field of face but slightly convex; carina genalis and oralis meet almost at base of mandible; mandibles slender with normal, small and short apical teeth. Black; the following are yellow: upper border of mandibles, clypeus, face and frontal orbits narrowly, almost up to level of lower ocellus.

Thorax.—Mesoscutum moderately convex, coarsely and densely punctured, subopaque, without notauli; scutellum somewhat abbreviated, basally wider than

medially long, distinctly raised above postscutellum, dorsally convex, with gradually rounded apical slope, apically somewhat truncate; propodeum moderately short; carination complete; costulae more or less distinct; area superomedia somewhat wider than long, receiving costulae near base; area basalis considerably deepened; mesosternum and propodeum coarsely and rather densely, mesopleura less densely, punctured. Black; scutellum yellowish-white, very narrowly black at base and apex; yellowish-white are furthermore: pronotal ridge entirely or apically, subalarum, two marks on propodeum at apices of areae dentiparae, sometimes apex of pronotal base, sometimes collare, sometimes tegulae partially.

Legs.—Femora slender; coxae III fairly strongly, moderately densely punctured, shiny. Black and yellowish-white; the following are yellowish-white: all trochantelli predominantly, coxae I and II and trochanters I and II ventrally predominantly; femora I and II ventrally, and dorsally at apices; tibiae and tarsi I and II, tibiae III except apices; the rest black, including tarsi III.

Abdomen.—Postpetiolus with clearly defined, densely and distinctly, longitudinally striated median field; gastrocoeli narrower than interval, scarcely impressed, with longitudinal rugae; no thyridia; second and third tergites very densely punctured, subopaque, the second basally, longitudinally striate or rugose between gastrocoeli; the fourth tergite more finely punctate than the second and third, but still very densely, subopaque. Black; tergites 1-5 or to 6 with regular, yellowish-white, continuous, apical bands, which on the first to third or to fourth tergite are wider than on the following two tergites.

Remarks

Pseudamblyteles zebraticolor (male) runs to *Pseudamblyteles* in the key to genera.

In the key to males of this genus we come to couplet 4, where neither of the two alternatives agrees, as femora III and abdomen are predominantly black; tergites 1-5 or to 6, however, bear white apical bands.

19. Genus *Eutanyacra* Cameron

4. *Eutanyacra consignata* (Cresson)

Part IV (Can. Ent. Suppl. 23), p. 430.

After "4. *Eutanyacra consignata* (Cresson)" add: ", new combination".

15. *Eutanyacra saguenayensis* (Provancher)

Part IV (Can. Ent. Suppl. 23), p. 446.

After "15. *Eutanyacra saguenayensis* (Provancher)" add: ", new combination".

20. Genus *Ctenichneumon* Thomson

13. *Ctenichneumon syphax* (Cresson)

Part IV (Can. Ent. Suppl. 23), p. 471.

At end of third citation add: "New synonymy."

Miscellanea

Throughout this Synopsis the term "holotype" has been used in a generalized sense, referring indiscriminately to the genuine holotype or the lectotype.

In this Synopsis the term "neallotype" is used in accordance with the definition given in 1924 by a British author as "a specimen described subsequently as

the type of the other sex" (Bull. of Hill Museum, Vol. 1, p. 7, 1924), not for a new allotype replacing an allotype which has been destroyed. In every case where the other sex of a species is described in this synopsis for the first time consequently, a "neallotype" has been designated.

Wherever the locality "Smoky Falls" appears in this Synopsis it refers to the Smoky Falls on the Mattagami River in northern Ontario.

Descriptions of sculptural characters are in the great majority of cases on a 30 times enlargement of the object.

As the length of the clypeus, I consider the distance between a line connecting the pits and the anterior border.

Conspectus of the Tribes and Genera

In the preceding Synopsis of the Nearctic Ichneumoninae Stenopneusticae I made no attempt to arrange the tribes and genera in a carefully chosen sequence. There are different ways to approach such a goal, of which the most logical seems to be to start with the supposedly most primitive forms and to end with the most highly specialized. If we do this, the sequence has to begin without too much doubt with the Ichneumonini and has to be concluded with the Trogini. Between these two ends, however, the recent forms of the Ichneumoninae represent an entanglement of parallel and lateral branches, which makes an arrangement of the genera in a "single file" highly difficult and arbitrary. The tribes Listrodromini, Acanthojoppini and Platylabini have probably descended from forms similar to those at present included in the tribe Ichneumonini. They are therefore perhaps placed the best after that tribe. The following sequence of the genera represents my suggestion for purposes of future cataloguing of the Ichneumoninae Stenopneusticae of North America. The genus *Catadelphus* Wesmael is placed in the tribe Protichneumonini according to my own preferred arrangement (see discussion under treatment of the genus *Catadelphus* in Part VII).

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