

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

Part III

**Synopsis of the
Ichneumoni: Genera *Ichneumon* and *Thyrateles***

by

GERD H. HEINRICH

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Research Associate, Entomology Research Institute, Research Branch,
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THE CANADIAN ENTOMOLOGIST

Supplement 21

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19. Genus *Ichneumon* Linnaeus

Ichneumon Linnaeus, 1758, Syst. Nat., ed. 10, p. 343, 560.

Pterocormus Foerster, 1850, Arch. f. Naturg. 16:71.

Euichneumon Berthoumieu, 1904, In Wytsman, Gen. Ins., 3, Fasc. 18:33.

Pterocormus Townes, 1951, Synoptic Catalog, p. 296.

Type-species.—*Ichneumon extensorius* Linnaeus, designated by Int. Comm. Zool. Nomencl., opin. 159, 1945.

This is the largest group of the subfamily with about 100 species in the eastern part of North America, and probably twice as many in America north of Mexico. *Ichneumon* represents, together with several other closely related genera of the tribe, a group which differs by the regularly striate median field of the postpetiolus, and by the area superomedia, which tends to form a quadrangular shape, from the *Cratichneumon-Melanichneumon* group (see also genus *Cratichneumon*, paragraph 1). Within its group females of the genus *Ichneumon* are characterized by the combination of the following four characters: (1) gastrocoeli and thyridia well developed; (2) claws not pectinate; (3) apex of abdomen oxypygous; (4) clypeus normal, flat, with straight apical border. Only the first two of these characters apply also to the males, for which but one additional generic character is available: hypopygium blunt, slightly rounded apically or truncate, without elongated median process. This means that males of *Chasmias* Ashmead and of *Thyrateles* Perkins can not be distinguished from *Ichneumon*. Also males of *Exephanes* Wesmael can easily be mistaken for *Ichneumon* males.

The genus *Stenichneumon* Thomson is closely related to *Ichneumon* too. Both genera share the above mentioned combination of characters and are in some cases somewhat difficult to distinguish. In the literature *Stenichneumon* is generally characterized by its deep, transverse gastrocoeli with narrow interval. Gastrocoeli of this kind, however, are also found in *Ichneumon gracilicornis* Wesmael and in a number of other palaearctic and nearctic species, which, nevertheless, belong to *Ichneumon* rather than to *Stenichneumon*. Actually *Stenichneumon* is to be distinguished not so much by the form of the gastrocoeli as by the oblique shape and unusual size (width as well as length) of the thyridia, continuing laterally almost to the very border of the second tergite. Besides *Stenichneumon* differs from *Ichneumon* in the shape of the abdomen of the

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

female, which is somewhat elongate, almost parallelsided, with the second tergite being much longer than wide, the third nearly square. *Stenichneumon* species are parasites of Noctuidae, especially of the *Plusia* group, while the *Ichneumon* species of the *gracilicornis* group with transverse gastrocoeli are parasites of *Rhopalocera*.

Chasmius Ashmead can be distinguished from *Ichneumon* only by one reliable diagnostic character: the apical border of the clypeus of the female, which is not straight but slightly emarginate. Males scarcely differ from *Ichneumon* males, but can usually be recognized by a coarser sculpture of the apical part of the clypeus, with some gross punctures running into irregular, short, longitudinal striae. For identification purposes males of *Chasmius* are included here in the key for *Ichneumon* males. The same applies to the males of the genus *Thyrateles*. Females with the strong head and general slender appearance of *Chasmius* but with a normal clypeus with straight apical border are in this paper placed in the genus *Ichneumon*. This includes *Ichneumon saucius* Cresson.

The type-species of the genus *Thyrateles* seems to be generically very well distinguished from *Ichneumon* by the amblypygous apex of the abdomen of the female and also biologically as a parasite of *Rhopalocera*. There exists, however, a continuous chain of forms leading gradually from the amblypygous shape represented by the type-species of *Thyrateles* over subamblypygous and semiamblypygous species like *haereticus* Wesmael to the strongly oxygygous *gracilicornis* Wesmael—all these species being also parasites of *Rhopalocera* in contrast to the bulk of *Ichneumon* species. I believe, nevertheless, that *Thyrateles* stands for a natural group, although still linked with *Ichneumon* by intermediate forms. The difficulty is to decide at which point of the chain the cut separating *Thyrateles* and *Ichneumon* should be made. I intend to cut between *caliginops* n. sp. (which I am placing in *Thyrateles*) and *caliginosus* Cresson (which I am placing in *Ichneumon*), the former being semiamblypygous, the latter rather distinctly oxygygous; but both species are so extremely similar that they were considered as one until now. With other words: there is no clear borderline between *Thyrateles* and *Ichneumon*. This, however, is not the single case where we have to cope with such a situation in the Ichneumoninae, which certainly represents a very young, still violently sprouting branch on the tree of evolution.

Flagellum.—Female flagellum from stout and filiform as in the type of the genus to bristleshaped and slender with all thinkable intermediate forms between these two extremes; tyloides of male flagellum rather uniformly oval-shaped.

Head.—In a few species, parasitic on cryptophagous caterpillars, cheeks and temples strongly developed or inflated, usually of medium strength only; in many species cheeks and temples strongly narrowed; clypeus always normal, with straight apical border; mandibles in the majority of species normal, sometimes somewhat widened, often slender, the subapical tooth sometimes reduced, the upper tooth sometimes a bit elongate.

Thorax.—Mesoscutum usually flat, sometimes convex; scutellum usually flat, not, or little raised above postscutellum, in some species of the *gracilicornis* group, however, rather strongly raised and dorsally convex; horizontal part of propodeum in the females usually nearly as long as the declivity, sometimes, especially in the *gracilicornis* group, more abbreviated, always shorter in males than in females; area superomedia usually parallelsided and quadrangular, either square or rectangular, often longer than wide, sometimes wider than long; costulae in the majority of species obsolete or subobsolete, less so in males.

Legs.—From moderately stout to long and slender; coxae III of females often with a not very distinct and dense scopa, rarely scopa more pronounced or elevated.

Abdomen.—Oxypygous, often strongly pointed at apex with slightly prominent ovipositor, sometimes apically more obtuse with hidden ovipositor; median field of postpetiolus clearly defined, longitudinally striate; gastrocoeli and thyridia distinct, usually of medium size, in the *gracilicornis* group often large with the interval narrower than one of them.

Color.—Female of the numerous palaearctic species display, almost without exception, white anal marks on the apical tergites. This pattern is fairly common also among nearctic species, especially in the Canadian Zone, but by far not so predominantly as in the Old World. Instead the Nearctic Zone has produced many species with unspotted red or brown basic color of the abdomen, several of them with black banded anterior tergites, a pattern not found in Europe. Another typical American color pattern of females combines white annulated tibiae and a black abdomen with white anal marks and sometimes also with white band of anterior tergites. Males of this genus are monotonous in color, in the Nearctic as well as in the Palaearctic Zone, the abdomen in the majority of species being bicolored, black and yellow. There is, however, a distinct difference between the patterns of males of the New and Old Worlds: in palaearctic males the median tergites, usually the second and third, are uniformly yellow, contrasting only with the black base and apex of abdomen, while in the nearctic males the yellow median segments are banded with black.

The great number of species can be divided into two main groups according to the filiform or bristleshaped appearance of the flagellum of the females, as Berthoumieu did. Besides the American females can be grouped according to color as follows:

1. predominantly black, legs rufous (Canadian and Subarctic Zones). Little sexual dimorphism: *artemis* group.
2. Abdomen red, legs black, wings strongly infuscated. Little sexual dimorphism: *imurbanus* group.
3. Abdomen red, brown or ferruginous, often with black bands of basal tergites; wings not infuscated. Strong sexual dimorphism; abdomen of males usually black and yellow banded: *laetus* group.
4. Abdomen black with white anal marks and often white bands of tergites; tibiae with white annulus. Strong sexual dimorphism; abdomen of males black and ivory banded (not many males known yet): *feralis* group.

There are, of course, many species which fit in none of these groups or are intermediate.

Sexual dimorphism.—In some color groups (see above 1. and 2.) no chromatic sexual dimorphism appears, except the sexual differences in the light pattern of head and legs according to the general rules of the sub-family. In other groups (see above 3. and 4.) the sexes are strikingly different in color. Here the abdomen of the female shows various patterns, changing interspecifically considerably, while the abdomens of the males are rather uniformly black, banded with lemon yellow or ivory.

Geographical variability.—In Eastern North America no distinct geographical variability differentiating as in the genus *Craticheumon* northern and southern populations has been observed so far. There are no records either concerning geographical differences between Western and Eastern populations; this, how-

ever, may be due to the fact that our knowledge of the western species of *Ichneumon* is scarcely more than a blank. We shall have to proceed with extreme caution and reluctance in the attempt of subspecific associations in a genus like this containing perhaps 200 species, the definition of which is just beginning to take shape.

Biology.—Females of all species belonging to this genus hibernate as adults. Males appear a few days before their females at different times of the summer between the end of June and the end of September, and they all die in the fall. There seems to be only one generation per year. As R. Hinz has proven (personal communication to the author) the female attacks the freshly pupated pupa of the host, not the caterpillar. I suspect this will apply to all species of the genus. Hosts of the bulk of the species are *Heterocera*, predominantly Noctuidae. Few species have specialized on different hosts, as Arctiidae, Hepialidae, Pyralidae and others. One group of species, characterized by long, slender, bristleshaped flagella of the females combined with deep, transverse gastrocoeli and elevated scutella (*gracilicornis* group) feeds on *Rhopalocera*, mainly Nymphalidae. This group links *Ichneumon* with *Thyrateles*.

Remarks.—*Ichneumon* males, especially of the *laetus* and *feralis* groups, are unusually uniform in morphology as well as in color. This renders their specific separation and also the association of sexes still much more difficult than in the genus *Cratichneumon*. This is true for Europe as well. There the combined efforts of numerous professionals and amateurs, extended over a period of about one century, have still failed to produce satisfactory results in this particular field. The best way to obtain authentic and fundamental records to improve the situation would be the rearing of both sexes from one fertilized female in captivity. Since we know now, thanks to the R. Hinz findings, that eggs are deposited in the pupa of the host, this could be done. It is easy enough to collect the hibernating, fertilized females in the spring, but it remains a difficult task to procure and offer to them the right pupae in the right time.

The user of the following key for the males of *Ichneumon* may realize that the males of many species are still unknown, a fact that automatically renders the achieved identification uncertain.

The treatment of this genus is restricted to the fauna of Eastern North America in general. It was based on the material of C.N.C., C.H.T., C.G.H. and M.C.Z. The material of the U.S.N.M. is not included.

In the following keys and descriptions, the term "white" may include yellow. Some borderline species of *Thyrateles* Perkins are included in the key to the females; all males of *Thyrateles* and of *Chasmodon* Ashmead in the key for the males.

Key to the species of *Ichneumon* Linnaeus of Eastern North America

Females

- | | |
|--|----|
| 1. Abdomen black, often with white pattern, but without tergites of either entirely or predominantly red, ferruginous or brown color. | 2 |
| Abdomen predominantly or entirely red, ferruginous or brown, or at least one tergite entirely or predominantly so colored. | 37 |
| 2. Basic color of femora black, tibiae often with white or yellow pattern. | 3 |
| Femora and tibiae predominantly red, rufous or ferruginous. | 30 |
| 3. Tibiae black or partially brown, without white or yellow pattern. | 4 |
| Tibiae partially white or yellow. | 15 |
| 4. Last tergites without anal marks. | 5 |
| At least sixth and seventh tergites, sometimes also the fifth with white or yellow anal mark. (Scutellum white.) | 9 |

5. Scutellum black; cheeks inflated; temples wide, rounded; mandibles short, strong, with nearly equal teeth. (Wings strongly infuscated; flagellum very short, filiform; abdomen elongate, rather narrow; length 15-17 mm.) 82. *saucius* Cresson
 Scutellum white; cheeks not inflated; temple profile rather strongly narrowed; mandibles normally long and slender, the upper tooth distinctly longer than the lower. 6
6. Pronotal ridge and inner orbits broadly white; flagellum filiform, fairly short, with 30-31 segments; length 10-13 mm. (No scopa; gastrocoeli rather small; costulae distinct.) 81. *mendax* Cresson
 Pronotal ridge black, frontal orbits black or narrowly reddish or narrowly white; flagellum long, bristleshaped with 38-44 segments; length 15-18 mm. 7
7. Flagellum fairly stout, its first segment twice as long as wide, the seventh square; very plump species of 17 mm. length. 79. *melanarcticus*, new species
 Flagellum very slender, its first segment three times as long as wide, none, or the eleventh approximately square; more slender species 15-18 mm. long. 8
8. Flagellum ventrally distinctly flattened and a little widened beyond middle (Fig. 55), with 42-44 segments; apex of abdomen strongly oxygygous, usually a little compressed with the ovipositor somewhat projecting; subalarum black, exceptionally with small white dot. (Wings slightly infuscated; length 15-18 mm.) 80. *caliginosus* Cresson
 Flagellum ventrally not distinctly flattened and not at all widened beyond middle (Fig. 54), with 38-39 segments; apex of abdomen close to semiamblypygous, not laterally compressed, with hidden ovipositor; subalarum entirely or partially white. (Wings scarcely infuscated; length 14-17 mm.) *Thyreates caliginops*, new species
9. Flagellum short, lanceolate, ventrally extremely strongly flattened and widened beyond middle, the widest segment 2.5 to 3 times as wide as long. (Coxae III ventrally shiny, with scattered punctures (Fig. 69); no scopa; two white anal marks; frontal and vertical orbits ferruginous; length 11-14 mm.) 86. *nearcticus* Heinrich
 Flagellum otherwise shaped. 10
10. Gastrocoeli unusually wide, with strongly narrowed interval (Fig. 27); flagellum short, subfiliform with only 28 segments; scopa slightly indicated. (Temple profile scarcely narrowed; two white anal marks; length 8-9 mm.) 89. *dioryctiae*, new species
 Gastrocoeli not unusually widened or flagellum much longer with more than 35 segments; no scopa. 11
11. Tergites 5-7 with large, white anal marks; frontal and vertical orbits broadly white. (Flagellum subfiliform; gastrocoeli triangular, relatively small; length 12-13 mm.) 87. *traculentus* Cresson
 Tergites 6 and 7 with white anal marks; frontal and vertical orbits without or with much more restricted white pattern. 12
12. Flagellum subfiliform; pronotal ridge predominantly white. (Gastrocoeli transverse with narrowed interval; length 14 mm.) 85. *walleyi*, new species
 Flagellum bristleshaped; pronotal ridge predominantly black. 13
13. Small species, 8-9 mm. long; flagellum with 32-33 segments; gastrocoeli small and shallow. 88. *gestuosus* Cresson
 Larger species, 14-16 mm. long; flagellum with 38-45 segments; gastrocoeli large, triangular, their interval narrower or little wider than one of them. 14
14. Cheek and temple profiles strongly narrowed with straight outlines; flagellum long and slender with 42-45 segments, the first 2.5 times as long as wide, the tenth square; femora long and slender; area superomedia square or somewhat wider than long. (Length 14-16 mm.) 83. *bimembris* Provancher
 Cheek and temple profiles slightly narrowed with curved outlines; flagellum stouter, moderately long, with 38 segments (type), the first about twice as long as wide, the seventh square; femora distinctly stouter and shorter; area superomedia 1.5 times as wide as long. (Length 14 mm.) 84. *broweri*, new species
15. One or several of anterior tergites with white apical band, sometimes interrupted or reduced to apico-lateral marks. (Apical tergites with white anal marks.) 16
 Anterior tergites not white banded or marked. (Apical tergites usually with white anal marks.) 24
16. Tergites 5-7 with white anal marks. 17
 Tergites 6 and 7 with white anal marks. 19

17. Coxae III with distinct scopa; flagellum lanceolate, ventrally strongly flattened and strongly widened beyond middle, slightly attenuated at apex. (Postpetiolus and second tergite with white apical bands, the one on postpetiolus sometimes reduced to two apico-lateral marks; mandibles normal; length 15-16 mm.) 72. *uncinatus* Cresson
- Coxae III without scopa; flagellum filiform. 18
18. Mandibles somewhat widened and swollen beyond middle (Fig. 35); second tergite with white apical band, sometimes also the third apically white marked or banded; flagellum with 31-35 segments. (Yellow anal mark on fifth tergite small, often reduced, rarely absent; length 11-14 mm.) 68. *feralis* Cresson
- Mandibles normal; at least second and third tergites, usually also the fourth with white apical bands; flagellum with 37-38 segments. (White anal mark on fifth tergite large and constant; length 14 mm.) 75. *polargus*, new species
19. Flagellum bristleshaped, scarcely widened, considerably attenuated; tergites 1-3 with broad, white apical bands. (Coxae III with distinct scopa; length 15 mm.) 74. *calitergus* Cresson
- Flagellum filiform or lanceolate; never tergites 1-3 simultaneously with uninterrupted white apical bands. 20
20. Mandibles somewhat widened and swollen beyond middle (Fig. 35). (Flagellum exactly filiform; no trace of scopa; second tergite always with uninterrupted white band, sometimes also the third apically white marked or banded; anal marks yellow; tarsi III reddish-brown; length 11-14 mm.) 68. *feralis* Cresson, variety
- Mandibles normal, not swollen. 21
21. Coxae III without trace of scopa; flagellum subfiliform, close to bristleshaped, distinctly attenuated, though not acutely pointed at apex (Fig. 52); white apical band of second tergite medially interrupted or reduced to two apico-lateral marks. (Length 12-14 mm.) 70. *homorus*, new species
- Coxae III with more or less distinct scopa; flagellum exactly filiform or stout and lanceolate; second tergite with uninterrupted white apical band. 22
22. Mesoscutum smooth and shiny, with shallow and sparse puncturation; femora III very stout, in lateral view only 2.9 times as long as medially wide; coxae III with distinct scopa; flagellum stout, lanceolate, with 37-39 segments. (First segment usually with white apico-lateral marks; tarsi a little abbreviated and widened; length 14-16 mm.) 73. *eurypus*, new species
- Mesoscutum not smooth and shiny, with rather strong and dense puncturation; femora less stout and thick; flagellum filiform with 29-35 segments; coxae III with thin scopa. (First tergite without white pattern; tarsi normal.) 23
23. Apical part of cheeks distinctly constricted at carina genalis (Fig. 10); flagellum ventrally flattened and somewhat widened beyond middle, with 33-35 segments; tarsi III almost black; third tergite always without white pattern; length 10-15 mm. 69. *feriens*, new species
- Apical part of cheeks not distinctly constricted at carina genalis (Fig. 12), therefore in appearance in lateral view wider and more flat than in the alternative species; flagellum ventrally not distinctly flattened and not widened beyond middle, with 29-30 segments; tarsi III paler than in the alternative species, reddish; third tergite sometimes with medially interrupted white apical band; length 9-11 mm. 71. *microferiens*, new species
24. Wings strongly and evenly infuscated; mesoscutum and scutellum dark red; abdomen entirely black without white anal marks. (Tibiae II and III yellowish with blackish apex, somewhat infuscated at narrow base; length 18 mm.) 49. *centrator* Say
- Wings clear; mesoscutum black, scutellum white; at least seventh tergite with white anal marks, often also the sixth. 25
25. Seventh tergite only with white anal mark. (Flagellum subfiliform, somewhat attenuated at apex.) 26
- Sixth and seventh tergites with white anal mark. 28
26. Abdomen plain black, tergites 2-4 with narrowly ferruginous apical borders; small species, 9 mm. long; gastrocoeli large, deep, transverse with strongly narrowed interval; flagellum with 29 segments; tarsi III rufous (thin scopa). 18A. *hypermelanos*, new species
- Abdomen deep black with slight bluish tint; large species, 14-16 mm. long; gastrocoeli large, deep, triangular, their interval about as wide as one of them; flagellum with 38-40 segments; tarsi III black (distinct scopa). 27

27. Apex of pronotal ridge and base of segment 1 or 1 and 2 of tarsi III white; all coxae and trochanters black. 78a. *deliratorius deliratorius* Linnaeus (Europe)
- Pronotal ridge entirely and all segments of tarsi III basally white; coxae I and II white except base, coxae III ventrally at apex white marked; all trochantelli and trochanters I and II ventrally white marked. 78b. *deliratorius cinctitarsis* Provancher
28. Flagellum bristleshaped-lanceolate, considerably attenuated at apex, strongly widened and flattened beyond middle, with 44-47 segments; large species, 16-19 mm. long. (No scopa; tarsi III black.) 76. *atrox* Cresson
- Flagellum subfiliform, slightly attenuated at apex, or exactly filiform, not strongly widened beyond middle, with 32-37 segments; medium sized species, 11-14 mm. long. 29
29. Flagellum exactly filiform, with 32 segments; coxae III with thin scopa; tarsi fulvous, a little abbreviated and widened. (Length of type 11 mm.) 77. *neomolitor*, new species
- Flagellum subfiliform, slightly attenuated at apex, with 35-37 segments (Fig. 52); coxae III without trace of scopa; tarsi blackish, more slender. (Length 12-14 mm.) 70. *homorus*, new species, variety
30. Flagellum bristleshaped, long, slender, considerably attenuated with acute apex, its first segment fully twice as long as wide. (Length 14 mm.) 31
- Flagellum filiform or subfiliform, either not distinctly acute at apex or short and stout. 32
31. Flagellum without distinct white annulus; scutellum black. 67a. *cessatorops cessatorops* Heinrich
- Flagellum with distinct white annulus; scutellum white or black. 67b. *cessatorops kazubazuae* Heinrich
32. Scutellum white; tergites 5-7 with conspicuous white anal marks; pronotal ridge white; flagellum with white annulus. (Flagellum subfiliform, distinctly widened and somewhat attenuated; no scopa; length 13 mm.) 63. *gaviscicolor* Heinrich
- Scutellum black or rufous; abdomen uniformly black or tergites 6 and 7 only with white marks; pronotal ridge and flagellum without white pattern. 33
33. Coxae III with more or less distinct scopa; median field of postpetiolus strongly striate; second and third tergites rather strongly and densely punctured. 34
- Coxae III without trace of scopa; median field of postpetiolus often weakly or indistinctly striate; second and third tergites sparsely and weakly punctured. 36
34. Tergite 7 or 6 and 7 with longitudinal, white median mark; tibiae III shorter and somewhat stouter than in the alternative species, in side view 5.4 times as long as apically wide. (Flagellum filiform, slender, sometimes with indistinct indication of annulus; scopa distinct; femora, tibiae and tarsi uniformly fulvous; length 13 mm.) 64. *trigemellus* Heinrich
- Abdomen uniformly black, without anal marks; tibiae III relatively longer. (Flagellum subfiliform, without annulus; thin scopa.) 35
35. Tarsi III black; femora II in side view medially somewhat more widened than in the alternative species (Fig. 56); temple profile scarcely narrowed with distinctly curved outline. (Length 10-14 mm.) 61. *artemis* (Viereck)
- Tarsi III pale rufous or luteous; femora II in side view medially somewhat less widened than in the alternative species (Fig. 57); temple profile more distinctly narrowed with nearly straight outline. (Length 13-16 mm.) 62. *similaris* Provancher
36. Flagellum close to bristleshaped, short and stout, with 37-38 segments, black; scutellum and all coxae black; length 15 mm. 66. *nebularum* Heinrich
- Flagellum exactly filiform, slender, with 40-41 segments, rufous, including scape, with blackish apex; usually at least coxae I, often partially also coxae II and III rufous; scutellum rufous; length 11-12 mm. 65. *perretti* Heinrich
37. Tibiae and tarsi black with white pattern. (One of the largest species, 19-20 mm. long; wings infuscated; abdomen uniformly rufous; flagellum short, subfiliform; temples and cheeks inflated; no scopa.) 21. *devincitor* Say
- Tibiae and tarsi not both patterned black with white. 38
38. Several tergites, or at least the sixth, apically white or yellow banded, never the seventh with white mark. (Scutellum white; femora short and thick; flagellum stout, subfiliform; no scopa.) 39
- No tergite apically white banded; sometimes the seventh tergite, or also the sixth, rarely also the fifth, with white anal mark. 41

39. Subapical tooth of mandible a little reduced, but distinct; second and third tergites basally black, apically broadly yellow banded; tergites 6 and 7 red-brown without white pattern; mesoscutum usually partially or entirely red-brown. (Length 12-16 mm.) 6. *subdolosus* Cresson
- Subapical tooth of mandible subobsolete (Fig. 33); at least the second tergite uniformly red or brown, apically not yellow banded; last tergites black, one or more with white apical band; mesoscutum always black. 40
40. Second tergite uniformly red, the third black with white apical band; legs predominantly pale rufous. (Fourth and sometimes also fifth tergites apically white banded; length 10-15 mm.) 7. *ambulatorius* Fabricius
- Second and third tergites red-brown, the third with black basal band, without white pattern; legs predominantly black. (Abdomen without white pattern, except apical band on sixth tergite; length 14-15 mm.) 8. *neosarcitor*, new species
41. Wings uniformly, strongly infuscated. (Tergites 2-7 in majority of species uniformly red, sometimes black banded; large and medium sized species.) 42
- Wings not uniformly, strongly infuscated. 54
42. Mesoscutum red or ferruginous. (Flagellum bristleshaped, considerably attenuated.) 43
- Mesoscutum black. 44
43. Scutellum white; femora black, stout and thick (Fig. 21); third tergite basally not broadly black. (Length 14-17 mm.) 52. *zelotypus* Cresson, variety
- Scutellum ferruginous; femora predominantly ferruginous, moderately slender; third tergite basally broadly black. (Flagellum tricolored, slender, with 45-47 segments; length 14-19 mm.) 50. *lewisii* Cresson
44. Scutellum white. 45
- Scutellum black. 46
45. Mandibles normal, upper tooth pointed, distinctly longer than the lower (Fig. 39); temple and cheek profiles distinctly narrowed, with almost straight outlines; femora III rather short and thick (Fig. 21), externally smooth with few scattered punctures; flagellum bristleshaped, moderately slender, slightly widened beyond middle; tibiae III red-brown, apically black. (Mesoscutum usually black, varying to partially or entirely red; length 14-17 mm.) 52. *zelotypus* Cresson
- Upper mandible tooth abbreviated, not sharply pointed, scarcely longer than the lower (Fig. 38); temple profile scarcely narrowed, with strongly curved, cheek profile with slightly curved, outline; femora III distinctly more slender than in the alternative species (Fig. 18), externally evenly and densely punctured; flagellum bristleshaped, slender, not at all widened beyond middle; tibiae III uniformly black. (Length 15-16 mm.) 51. *placidus* Provancher
46. Mandibles unusually widened, with shovel-shaped, broadly rounded apex, the lower tooth subobsolete, scarcely indicated by a minute notch (Part 2, Fig. 47). (Flagellum bristleshaped, short and stout, with white annulus; notauli obsolete; legs black, tarsi red-brown; length 16 mm.) see *Spilichneumon obscuricolor* Heinrich (Part II, and *Addenda*, Part VII)
- Mandibles otherwise shaped. 47
47. Flagellum distinctly bristleshaped, slender, considerably attenuated at apex. (Flagellum usually with white annulus; no scopa.) 48
- Flagellum subfiliform or little attenuated at apex. 51
48. Flagellum ventrally distinctly flattened and somewhat widened beyond middle; femora rather stout. (Mandibles normal, with pointed upper tooth; large species, 16-17 mm. long.) 49
- Flagellum ventrally scarcely flattened and not at all widened beyond middle; femora more slender. (Scutellum always black.) 50
49. Tibiae III red-brown, apically black. 54. *perlugubris*, new species
- Legs uniformly black. 53. *grandisops*, new species
50. Mandibles slender, with normally pointed upper tooth; gastrocoeli triangular, rather deep; carina occipitalis a little raised; femora III very slender (Fig. 13); sculpture of second tergite rather coarse and dense, punctures on its middle running into striae; temple profile strongly narrowed, with straight outline. (Scutellum strongly raised above postscutellum; flagellum usually but not always with white annulus; legs usually black, rarely femora and tibiae red; abdomen apically blunt, semiamblypygous; length 14-16 mm.) *Thyrateles lugubrior* (Gravenhorst)
- Upper mandible tooth blunted and abbreviated (Fig. 36); gastrocoeli rather shallow, but large, with very large thyridia, their outline not triangular, as their apical

- border runs parallel with apical border of postpetiolus; carina occipitalis not raised; femora III not quite as slender as in alternative species (Fig. 20); second tergite moderately strongly and densely punctured; temple profile moderately narrowed with slightly curved outline. (Scutellum moderately raised above post-scutellum; flagellum with white annulus; legs black; abdomen apically blunt, semiamblypygous; length 14-16 mm.) 55. *heterodon*, new species
51. Second and third tergites extremely densely punctured with almost no intervals between punctures, nearly opaque; coxae III ventrally polished, including inner edge, with few scattered punctures and without any trace of scopa. (Flagellum subfiliform, black, without annulus, with 41-44 segments; area superomedia longer than wide; legs black; femora stout; length 15 mm.) 57. *foxleei*, new species
- Second and third tergites less densely punctured, with distinct intervals between punctures, not opaque; coxae III ventrally on exterior part sparsely, on the inner edge, however, densely punctured and usually with indication of thin scopa. (Flagellum subfiliform or subbristleshaped, with 38-41 segments, with or without annulus; legs black; femora stout.) 52
52. Upper mandible tooth not prolonged, apically slightly blunted. (Check profile distinctly narrowed; flagellum subfiliform with white annulus; length 12-14 mm.) 59. *homiodon*, new species
- Upper mandible tooth prolonged and sharply pointed, subapical tooth reduced and situated far back from tip of mandible (Fig. 37). 53
53. Cheek profile distinctly though not strongly narrowed, with slightly curved outline; head in front view not almost square; flagellum subbristleshaped, without white annulus, moderately attenuated at apex; area superomedia square or even transverse. (Length 13-15 mm.) 46. *suburbanus*, new species
- Cheek profile scarcely narrowed, with slightly curved outline; head in front view almost square; cheeks between eye and carina genalis wider than in the alternative species; flagellum subfiliform, with broad white annulus, little attenuated at apex; area superomedia in type longer than wide. (Length 14 mm.) 58. *inurbanus* Cresson
54. Flagellum bristleshaped, considerably attenuated at apex, with relatively slender segments (see Plate VI). 55
- Flagellum filiform or subfiliform, not at all or at least not considerably attenuated at apex; if apically somewhat attenuated, then segments relatively short. 83
55. Tibiae III medially yellow or whitish. (Abdomen red except base; thin scopa.) 56
- Tibiae III rufous or red-brown or black, without yellow or white pattern. 57
56. Small species, 8-11 mm. long; mesoscutum usually partially or predominantly red; flagellum subbristleshaped (Fig. 45), slightly attenuated at apex; all tibiae with white annulus; gastrocoeli relatively deep and wide, nearly as wide as interval; seventh tergite with white apical mark. 18. *ultimus* Cresson
- Bigger species, 13-15 mm. long; mesoscutum black; flagellum bristleshaped, slender, considerably attenuated with acute apex; tibiae in majority of specimens medially yellow tinted; gastrocoeli triangular, fairly deep; their interval little wider than one of them; no anal mark. (Tergites 3 and 4 often with black basal bands.) 46. *canadicola*, new species
57. Coxae III with distinct scopa situated on a little tubercle (Fig. 71). (Thorax black, including scutellum; abdomen black, tergites 2 and 3 brown, usually 6 and 7 with white anal mark; gastrocoeli transverse, with narrowed interval; length 11-14 mm.) 44. *volesus* Cresson
- Coxae III without elevated scopa. 58
58. Coxae III with plain, thin scopa. (Scutellum yellow.) 59
- Coxae III without trace of scopa. 60
59. Mesoscutum black; gastrocoeli triangular, their interval little wider than one of them; medium sized species, 13-15 mm. long. 46. *canadicola*, new species, variety
- Mesoscutum red; gastrocoeli transverse, their interval distinctly narrower than one of them; smaller species, 10-12 mm. long. 37. *versabilis* Cresson
60. At least the seventh tergite, often also the sixth with white or yellow anal marks. 61
- Last tergites without white or yellow anal marks. 73
61. One or several anterior tergites red or ferruginous, apical tergites black with white anal marks. 62
- Basic color of tergites 2-7 uniformly red or ferruginous. 67

62. Thorax black, scutellum white. (Tergites 1 and 4-7 black, 2 and 3 red, 5 or 6 and 7 with white anal mark; flagellum bristleshaped, slender, moderately attenuated, with 32-33 segments; length 8-10 mm.) *nereni* Thomson 63
 Thorax partially or predominantly red or ferruginous. 64
63. Usually tergites 5-7 with white anal marks, rarely only 6 and 7; usually basal segments of flagellum black, sometimes ferruginous; flagellum a trifle more widened than in the alternative form. 42a. *nereni nereni* Thomson (Europe)
 Usually tergites 6 and 7 only with white anal marks, rarely also the fifth with small white spot; usually basal segments of flagellum ferruginous; flagellum a trifle less widened than in the alternative form. 42b. *nereni emigrator*, new subspecies
64. Thorax uniformly pale ferruginous. (Small species, 7-9 mm. long; tergites 1-4 ferruginous, 5-7 black, 7 or 6 and 7 with white anal mark; flagellum bristleshaped, very slender and extremely attenuated; legs slender, pale ferruginous, apex of tibiae III and the femora III extensively black; tarsi elongate.) 43. *putus* Cresson
 At least sterna, propodeum and mesopleura black; mesoscutum and sometimes also pronotum red. 65
65. Gastrocoeli very large, transverse, with pronounced thyridia, their interval considerably narrower than one of them; flagellum very slender and extremely attenuated (Fig. 42), with 37-39 segments; pronotum black. (Mesoscutum red, scutellum white; petiolus and tergites 4-7 black, postpetiolus and tergites 2 and 3 ferruginous; tergites 6 and 7 with large white anal marks; legs predominantly black; length 9-11 mm.) 34. *gracilicornops*, new species
 Gastrocoeli rather small, not transverse, their interval at least as wide as one of them; flagellum slender and considerably, but not quite as extremely attenuated as in the alternative species, with 25-33 segments; usually pronotum red. 66
66. Spiracles of propodeum short-oval, scarcely twice as long as wide; flagellum with 25-27 segments; face and clypeus always ferruginous; pronotum always red. (Interval of gastrocoeli about as wide as one of them; scutellum yellow; usually abdomen uniformly ferruginous, rarely apically infuscated, tergites 6 and 7 with yellowish anal mark; legs predominantly ferruginous including coxae and trochanters; apex of tibiae III and the femora III partially or entirely black; length 8 mm.) 36. *pseudomaius*, new species
 Spiracles of propodeum normal, nearly four times as long as wide; flagellum with 29-33 segments; head black, only middle of face often ferruginous; pronotum usually red, sometimes black. (Interval of gastrocoeli wider than one of them; scutellum yellow or ferruginous; abdomen ferruginous or tergite 5 (apex) to 7 black, the seventh always, often also the sixth with white anal mark; length 8-10 mm.) 35. *maius* Cresson
67. Mesoscutum extremely densely punctured, no intervals between punctures (Fig. 62), opaque. 68
 Mesoscutum less densely punctured, not entirely opaque. 69
68. Small species, 8 mm. long; mesoscutum and scutellum ferruginous; gastrocoeli triangular, with somewhat narrowed interval. (Second and third tergites densely punctured and opaque as the mesoscutum; anal mark on seventh tergite not very distinct; coxae and femora predominantly black.) 41. *valdopacus*, new species
 Conspicuous species, 13-14 mm. long; basic color of mesoscutum black, scutellum white; gastrocoeli not transverse, their interval distinctly wider than one of them. (Frontal and vertical orbits broadly white; marks on coxae II, usually also on coxae III white; abdomen rufous, yellow anal mark on seventh, usually also on sixth tergite; often yellow apico-lateral marks on tergites 1 or 1-3; flagellum long and slender, extremely attenuated; abdomen slender.) 47. *fuscifrons* Cresson
69. Mesoscutum entirely red. 66
 Mesoscutum entirely, or at least its median lobe, black. (Scutellum white.) 70
70. Flagellum strongly bristleshaped, apically considerably attenuated with acute apex; sixth and seventh tergites with anal mark. 71
 Flagellum subfiliform, apically not or only very slightly attenuated; seventh tergite only with anal mark. (Gastrocoeli quadrangular.) 72
71. Femora III fairly stout; mesoscutum flat, notauli obsolete; scutellum scarcely raised; gastrocoeli triangular, fairly small and shallow; cheek profile moderately narrowed, with slightly curved outline. (Length 10-12 mm.) 40. *vivax* Cresson

Femora III much more slender; mesoscutum convex, notauli basally distinct; scutellum fairly strongly raised; gastrocoeli rather deep, transverse; cheek profile strongly narrowed with straight outline. (Length 12 mm.)

39a. *pseudocivax*, new species

72. Mesoscutum entirely black; basal segments of flagellum long and slender, the first almost three times as long as wide (Fig. 46). (Tibiae III more or less infuscated, often black; length 9-13 mm.) 16. *anonymus*, new species

Lateral lobes of mesoscutum dark ferruginous; basal segments of flagellum stouter, the first about twice as long as wide. (Tibiae III red-brown, apically black; length 10-12 mm.) 17. *tritus*, new species

73. Thorax pale ferruginous including propodeum, pleura and mesosternum. (Scutellum yellow; abdomen uniformly, legs predominantly pale ferruginous.) 74
At least pleura and sterna black. 76

74. Apices of arcae dentiparae with short, tooth-like projections; mesoscutum extremely densely punctured, opaque, no interval between punctures; scutellum strongly raised, with steep, rounded apical slope; median field of postpetiolus not strongly and regularly longitudinally striate. (Flagellum extremely thin; tarsi III extremely long and slender; length 11-13 mm.) 48. *propitius* Cresson

Apices of arcae dentiparae without projections; mesoscutum less densely punctured; scutellum less strongly raised; median field of postpetiolus regularly longitudinally striate. 75

75. Apex of abdomen distinctly oxygygous (see Fig. 26), ovipositor slightly projecting; flagellum ventrally distinctly flattened beyond middle and a little widened, widest segment slightly wider than long; tarsi III slender, brown or ferruginous. (Length 11-15 mm) 39. *winkleyi* (Viereck)

Apex of abdomen semiamblypygous (see Fig. 25), ovipositor hidden; flagellum ventrally indistinctly flattened beyond middle and not at all widened, all segments longer than wide; tarsi III less slender than in alternative species, in majority of specimens black. (Length 11-14 mm.) *Thyrateles instabilis* (Cresson)

76. Mesoscutum red. (Scutellum usually yellow.) 77
Mesoscutum black. (Scutellum yellow.) 81

77. Coxae III ventrally (at least apical half) smooth and polished with scattered punctures; flagellum rather long and slender, but subfiliform, not acutely pointed at apex; mesoscutum and scutellum flat, the former rather finely and sparsely punctured and shiny. (Scutellum yellow; gastrocoeli triangular, fairly deep, their interval somewhat wider than one of them; length 11 mm.)

14. *pseudowinkleyi*, new species

Coxae III ventrally densely punctured; flagellum clearly bristleshaped, considerably attenuated at apex; mesoscutum and scutellum more or less convex, usually more densely punctured and less shiny. 78

78. Scutellum ferruginous; mesoscutum and tergites 2 and 3 finely and extremely densely punctured, without intervals between punctures, opaque; small species, 8 mm. long. (Mesoscutum and scutellum rather strongly convex; gastrocoeli triangular, moderately deep, with somewhat narrowed interval; flagellum apically not quite as sharply pointed as in the alternative species; seventh tergite in type with indistinct anal mark; no scopa.) 41. *valdopacus*, new species

Scutellum yellow, mesoscutum and tergites 2 and 3 stronger and less densely punctured, not opaque; bigger species, 10-15 mm. long. (Gastrocoeli large and deep, with narrowed interval.) 79

79. Femora II and III rather long and slender; scutellum strongly raised, convex; fourth tergite distinctly punctured; flagellum with 36-40 segments. (No scopa; length 11-15 mm.) 75

Femora II and III distinctly stouter than in the alternative species; scutellum but slightly raised above postscutellum, dorsally rather flat; fourth tergite more finely or indistinctly punctured; flagellum with 35-38 segments. (Length 10-12 mm.) 80

80. Coxae III with indistinct scopa; clypeus, face, cheeks and pronotal ridge, except apex, black; tarsi II and III a little more slender than in the following species. 37. *versabilis* Cresson

Coxae III without trace of scopa; head and pronotal ridge entirely ferruginous; tarsi II and III a little less slender than in the alternative species. 38. *subversatis*; new species

81. Flagellum approaching subfiliform, apically not distinctly attenuated (Fig. 46); gastrocoeli fairly small, approximately quadrangular (Fig. 28.). (Length 9-13 mm.) 16. *anonymus*, new species, variety
- Flagellum clearly bristleshaped, distinctly attenuated at apex; gastrocoeli fairly large, triangular or transverse. (No scopa.) 82
82. Fourth tergite without distinct puncturation (Fig. 61); femora moderately stout and thick; scutellum but a little raised above postscutellum, dorsally rather flat, laterally at the base slightly carinate or with sharp edge. (Abdomen red including postpetiolus, rarely tergites 3 and 4 basally black; length 13-15 mm.) 45. *trizonatus* Provancher
- Fourth tergite with distinct puncturation; femora more slender; scutellum strongly raised above postscutellum, convex, without lateral edges or carinae at the base. 75
83. Medium sized species above 10 mm. length. 84
- Small species, 10 mm. long and less (no scopa). 105
84. Coxae III with more or less distinct scopa. 85
- Coxae III without trace of scopa. 92
85. Tibiae banded with white or yellow. (Scutellum white.). 86
- Tibiae not white or yellow banded. 87
86. Flagellum filiform, stout; mesoscutum black; gastrocoeli triangular, moderately deep, their interval much wider than one of them; tergites 2-7 ferruginous, at least third and fourth with black basal bands; length 11-13 mm. 5. *canadensis* Cresson
- Flagellum subbristleshaped, slender, slightly attenuated (Fig. 45); mesoscutum entirely or partially red; gastrocoeli relatively deep and wide, their interval about as wide as one of them; tergites 2-7 uniformly ferruginous, the seventh always with white anal mark; length 8-11 mm. 18. *ultimus* Cresson
87. Flagellum filiform, but long and slender, of even width throughout (Fig. 48), usually without white annulus; striation of postpetiolus fine, indistinct or obsolete; mesoscutum and scutellum ferruginous. (Scopa fairly indistinct or absent; length 10-13 mm.). 88
- Flagellum stout, rather short, distinctly widened beyond middle and somewhat attenuated at apex, always with white annulus; median field of postpetiolus strongly and regularly striate; mesoscutum ferruginous or black, scutellum white. 90
88. Head entirely, pleura and propodeum more or less extensively black; discs of tergites 2-4 or 5, or 6, or 7 more or less extensively black marked. 15a. *lariae laeiae* Curtis
- Melanistic pattern more or less reduced in extent. 89
89. Smaller than the alternative form, 10-11 mm. long; melanistic pattern reduced, abdomen entirely ferruginous. 15b. *lariae subarcticus* Heinrich
- Bigger than the alternative form, average length 12.5 mm.; uniformly ferruginous except the following: prosternum, prepectus, mesosternum, all being partially or entirely black. 15c. *lariae labradoris* Heinrich
90. Femora III uniformly ferruginous, rarely their apex narrowly black; mesoscutum in majority of specimens ferruginous, rarely varying to entirely black. (Tergites 2-7 pale ferruginous, usually the third and fourth with black basal bands; length 13-14 mm.) 1. *laetus* Brullé
- At least femora III predominantly black; mesoscutum black. 91
91. Femora III black except base, femora I and II uniformly ferruginous; postpetiolus and tergites 2-7 uniformly red-brown; flagellum stout, distinctly widened beyond middle, a little attenuated toward apex. (Mesoscutum in type with two longitudinal, dark ferruginous lines; length 13 mm.) 12. *conscopa*, new species
- All femora predominantly black; tergites 2-7 ferruginous, the sixth and seventh with yellow anal mark, first and second with yellow apico-lateral mark; flagellum stout, slightly widened beyond middle, scarcely attenuated at apex. (Sometimes third and fourth tergites basally black; scopa indistinct; length 11 mm.) 11. *stagniphilus*, new species
92. Mandibles strong and long, gradually tapering and pointed toward apex, subapical tooth subobsolete (Fig. 33). (Ferruginous including scutellum; tergites 3 and 4 sometimes also the second with black basal bands; femora III very stout, varying from ferruginous to black; flagellum short and stout, apically distinctly attenuated; length 12-15 mm.) 4. *creperus* Cresson
- Mandibles normal. 93

93. Temple profile widened rather than narrowed, with strongly curved outline; cheeks inflated, head in front view square or almost so; mesoscutum and area supero-media distinctly longer than wide; mandibles wide, with short, strong apical teeth. (Abdomen slender, elongate, sharply pointed at apex; general appearance of *Chasmodon*.) 94
- Temple profile normal, more or less narrowed; head in front view not almost square; mesoscutum not or little longer than wide; mandibles normal. 95
94. Head in front view almost square (Fig. 8); temple profile slightly widened; mandibles not quite as wide as in the alternative species (Fig. 40); femora predominantly, tibiae III apically black; tibiae usually medially yellow; tergites 4-7 black, sixth and seventh with white anal mark; length 12-14 mm. (Scutellum white or ferruginous.) 19. *chasmodon*, new species
- Head in front view fully square (Fig. 6); temple profile rather strongly widened; mandibles still wider than in the alternative species (Fig. 41); femora, tibiae and tarsi uniformly ferruginous; white anal marks subobsolete; length 16 mm. 20. *pynocephalus*, new species
95. Coxae III ventrally smooth toward the outer-apical portion, with few scattered, gross punctures (Figs. 67, 73). (Gastrocoeli triangular, their interval as wide as one of them or wider.) 96
- Coxae III ventrally densely punctured (Fig. 70). 100
96. Mesopleura, pronotum predominantly or entirely, mesoscutum usually including scutellum, propodeum, femora I and II, usually also femora III predominantly and abdomen pale ferruginous; tergites 3 and 4 with black basal bands. (Flagellum moderately stout, a very little attenuated at apex, with 36-39 segments; length 11-12 mm.) *oblitus*, new species 97
- Mesopleura and pronotum always black, scutellum always white; mesoscutum and propodeum black, varying to red; all femora entirely or predominantly black; abdomen red-brown, often with black basal bands on several tergites. 98
97. Black pattern on sterna, coxae and femora III on the average more extensive than in the alternative form: femora III usually predominantly black, basally ferruginous; prosternum and prepectus entirely, mesosternum usually from middle to sternauli black; coxae II and III predominantly black. 2a. *oblitus oblitus*, new subspecies
- Black pattern reduced: femora III entirely or almost entirely, sterna and coxae predominantly ferruginous. 2b. *oblitus polyglaucos*, new subspecies
98. All tibiae medially more or less distinctly yellow; flagellum stout, subfiliform, considerably widened beyond the middle and gradually tapering toward apex. (Mesoscutum entirely or predominantly, postpetiolus and tergites 2-7 uniformly red-brown; length 12-13 mm.) 13. *heterocampae* (Cushman)
- Tibiae without yellow pattern; flagellum otherwise shaped, either more slender or apically more blunted. 99
99. Flagellum stout, filiform, scarcely attenuated toward apex (Fig. 49), first segment 1.5 times as long as wide; mesoscutum usually entirely black; often partially, rarely entirely ferruginous; femora stout and thick. (Abdomen usually uniformly red-brown except petiolus, sometimes with black basal bands on anterior tergites; frequently postpetiolus with yellow apico-lateral marks; sometimes seventh tergite with yellow apical mark; length 10-13 mm.) 9. *annulatus* Fabricius
- Flagellum slender, subfiliform, distinctly attenuated though not acutely pointed at apex, first segment 2.5 times as long as wide; mesoscutum ferruginous; femora more slender than in the alternative species. (Abdomen uniformly red-brown including the entire first segment; exceptionally third tergite with black basal band; length 11 mm.) 14. *pseudowinkleyi*, new species
100. All femora and tibiae ferruginous, except sometimes apex of femora III and of tibiae III; median field of postpetiolus not clearly defined, weakly or indistinctly striate. (Mesoscutum and abdomen ferruginous, the latter sometimes with black pattern; scutellum ferruginous or white.) 101
- All femora entirely or predominantly black; median field of postpetiolus rather clearly defined, distinctly and regularly longitudinally striate. (Mesoscutum black or ferruginous; abdomen red-brown, sometimes with black pattern; scutellum white; interval of gastrocoeli wider than one of them.) 102
101. Flagellum filiform, but slender and long, of even width throughout, usually without white annulus, with 35-39 segments; femora, tibiae and tarsi uniformly ferruginous; scutellum as ferruginous as the mesoscutum; area supero-media square or slightly wider than long, no costulae; gastrocoeli triangular, moderately deep. (Pleura,

- propodeum, head and abdomen in Hudsonian populations entirely or predominantly ferruginous, in Arctic populations more or less extensively black; length 10-13 mm.) 88
- Flagellum filiform, short, with white annulus, with 32 segments; apex of femora III and tibiae III black; scutellum yellow; area superomedia longer than wide, costulae fairly distinct; gastrocoeli very small and shallow. (Pleura, propodeum and pronotum ferruginous; tergites 3 and 4 basally black; length 10 mm.) 3. *vicinus* Cresson
102. Flagellum stout, scarcely tapering at apex, first segment not more than 1.5 times as long as wide, the fourth or fifth square. (Mesoscutum ferruginous or black; gastrocoeli triangular; seventh, or sixth and seventh tergite with white anal mark.) 103
- Flagellum more slender, first segment two or three times as long as wide, the eighth or twelfth segment square. (Mesoscutum entirely or predominantly black; outline of gastrocoeli more quadrangular; seventh tergite usually with white anal mark.) 104
103. Flagellum with 34-35 segments; sixth and seventh tergite with yellow anal mark; postpetiolus and second tergite with yellow apico-lateral marks; femora III in dorsal view less wide than in the alternative species, sculpture of second and third tergite denser and stronger. (Mesoscutum entirely, propodeum partially ferruginous; sometimes tergites 3 and 4 with black basal bands; usually thin scopa visible; length 11 mm.) 11. *stagnipilos*, new species
- Flagellum with 31-33 segments; seventh tergite only with yellow anal mark, no apico-lateral marks on anterior tergites; femora III inflated, in dorsal view wider than in alternative species, sculpture of second and third tergites less dense and strong. (Mesoscutum usually entirely or medially extensively ferruginous, exceptionally black; rarely tergites 3 and 4, exceptionally 1-4 basally black; no trace of scopa; length 10-12 mm.) 10. *glaucopygos*, new species
104. Flagellum very slender, first segment three times as long as wide, the eleventh or twelfth approximately square (Fig. 46); thorax entirely black except the white scutellum and subalarum; tibiae III often infuscated, sometimes black. (Seventh tergite usually with white anal mark; length 9-13 mm.) 26. *anonymus*, new species
- Flagellum less slender, first segment two times as long as wide, eighth segment square; lateral lobes of mesoscutum dark ferruginous; tibiae III red-brown, apically black. (Seventh tergite with white anal mark; length 10-12 mm.) 19. *tritius*, new species
105. Flagellum exactly filiform with blunt apex. (Tergites 1-3 ferruginous, 4-7 black, usually the seventh or sixth and seventh with white anal mark.) 106
- Flagellum subfiliform with pointed apex. 110
106. Flagellum very short, with 21-23 segments. (Mesoscutum ferruginous, head predominantly black.) 107
- Flagellum a little longer (Fig. 51), with 25-27 segments. (Mesoscutum ferruginous or black.) 109
107. Pronotum black; propodeum ferruginous; tergites 6 and 7 with white anal marks; femora III entirely, I and II predominantly black; flagellum imperceptibly tapering toward apex. (Prosternum black, mesopleura more or less extensively, sometimes even mesosternum ferruginous; length 5-6.5 mm.) 29. *pusillamoenus* new species
- Pronotum ferruginous, propodeum black; only tergite 7 with white anal mark; femora ferruginous, except apex of femora III; flagellum not at all tapering. 108
108. Mesopleura, prosternum, clypeus and face ferruginous; scutellum yellow. (Seventh tergite with white anal mark; length 7 mm.) 25. *tumidifrons* Cresson
- Mesopleura, prosternum and clypeus, usually also face black; scutellum ferruginous. (Seventh tergite with or without anal mark; length 6-7 mm.) 26. *terminatus* Provancher
109. Mesoscutum entirely, pronotum usually partially or predominantly ferruginous; scutellum usually yellow, more seldom ferruginous; legs including coxae usually predominantly red; apex of tibiae III and the femora III on apical half or predominantly black; exceptionally also coxae predominantly black; seventh tergite usually, rarely also the sixth with white anal mark; length 7-8 mm. 27. *lachrymans* Provancher
- Thorax including pronotum and mesoscutum black, scutellum white; legs uniformly red including coxae and trochanters, apex of femora III and of tibiae III black; seventh tergite with white anal mark; length 8-8.5 mm. 28. *hospitus* Cresson

110. Flagellum stout, scarcely pointed at apex, without annulus; tibiae III apically not at all infuscated. (All tibiae and tarsi, femora I and II, head, mesoscutum, scutellum and abdomen uniformly pale ferruginous; pleura, sterna, propodeum, coxae, trochanters and femora III predominantly black; femora stout; mesoscutum flat, fairly densely punctured, not much longer than wide; flagellum with 31 segments, ferruginous with blackish apex; length 9 mm.) 33. *browni*, new species
- Flagellum more strongly pointed at apex, usually with distinct annulus; tibiae III apically infuscated. 111
111. Mesoscutum convex, fairly densely punctured; femora rather slender; scutellum usually yellow or white; flagellum more slender and apically gradually longer tapering than in the alternative group; apex of abdomen more strongly pointed, ovipositor usually a little projecting; last tergites with white anal marks. 112
- Mesoscutum flat, more sparsely punctured and more shiny; femora very short and stout; scutellum black or ferruginous; flagellum stouter, apically short-pointed; apex of abdomen blunt, ovipositor usually hidden; sometimes last tergite with white anal mark. 115
112. Head and thorax black, scutellum white; trochanters and coxae I and II white marked. (Postpetiolus or entire first segment and tergites 2 and 3 red-brown, 4-7 black, 6 and 7 white marked; flagellum rather slender, somewhat tapering toward apex, its first segment twice as long as wide; length 8-9 mm.) ... 24. *leucocoxalis*, new species
- At least mesoscutum red; trochanters and coxae I and II not white marked. (Tergites 1-7 ferruginous, sometimes 5-7 infuscated, 6 or 6 and 7 with light anal marks; flagellum distinctly attenuated at apex.) 113
113. Mesopleura and propodeum black; spiracles of propodeum short-oval, about twice as long as wide; flagellum slender, bristleshaped, considerably attenuated at apex, with 25-27 segments. 66
- Mesopleura and propodeum ferruginous; spiracles of propodeum more elongate; flagellum less slender, subfiliform, but slightly attenuated at apex, with 28-32 segments. (Mesoscutum, pronotum and propodeum ferruginous; sterna black; scutellum usually yellow; flagellum tricolored.) 114
114. Gastrocoeli triangular, short and wide, strongly transverse, their interval strongly narrowed (Fig. 29); tergites 5-7 in fresh specimens probably blackish. (Seventh or sixth and seventh tergites with white anal mark; length 9-10 mm.) 22. *bippisleyae*, new species
- Gastrocoeli longer and less wide, with approximately quadrangular outline, their interval distinctly wider than one of them; tergites 1-7 ferruginous. (Tergites 4 or 4 and 5, sometimes basally black, the seventh or sixth and seventh with white anal mark; length 8-9 mm.) 23. *substituens*, new species
115. Head and thorax black, including scutellum; tergites 4-7 black, the seventh with white anal mark; legs I and II uniformly rufous including coxae; coxae III and femora III predominantly black; somewhat bigger species, 10-11 mm. long; flagellum with 27 or 28 segments. (Mesoscutum and area superomedia considerably longer than wide.) 31. *curticerus* Provancher
- Head and thorax partially or predominantly ferruginous, at least the scutellum ferruginous; abdomen ferruginous, the last three or four tergites often partially infuscated; all coxae simultaneously rufous or simultaneously infuscated or black; smaller species, 5-9 mm. long; flagellum with 22-26 segments. 116
116. Mesoscutum and area superomedia considerably longer than wide; somewhat bigger than the alternative species, 8-9 mm. long; head distinctly wider, temple profile less narrowed than in the alternative species; flagellum with 23-26 segments (Fig. 50); color of head and thorax varying from almost entirely ferruginous to almost entirely black; abdomen ferruginous, often apically more or less extensively infuscated. 30. *nigrovariegatus* Provancher
- Mesoscutum and area superomedia little longer than wide; smaller than the alternative species, 5-6 mm. long; head distinctly narrower, temple profile more strongly narrowed than in the alternative species; flagellum with 22-24 segments; color rather constant: head and thorax black, mesoscutum and scutellum ferruginous; abdomen uniformly pale ferruginous. 32. *pumiliops*, new species

Males

1. Abdomen entirely black, rarely the second tergite with two irregular whitish marks. 2
 Abdomen partially (at least either one entire tergite or apical bands on several tergites)
 red, brown, yellow or white. 13
2. Femora black. 3
 Femora rufous or fulvous. 10
3. Wings strongly and evenly infuscated. 4
 Wings not strongly and evenly infuscated. 6
4. Flagellum predominantly ivory. (Scutellum and legs black; length 19-20 mm.) 49. *centrator* Say 5
 Flagellum black with white annulus. 5
5. Median field of postpetiolus distinctly striate; scutellum black; all tibiae with narrow,
 white semiannulus beyond base. (Pronotal ridge and subalarum white marked;
 length 18-20 mm.) 82. *saucius* Cresson
 Median field of postpetiolus smooth; scutellum partially white; all tibiae uniformly
 black. (Thorax not white marked except scutellum; length 17 mm.)
Chasmodon scelestus Cresson
 (Part IV)
6. Gastrocoeli deep and extremely wide, with very narrow interval; tarsi III almost
 entirely white; small species, 10 mm. long. 89. *dioryctiae*, new species
 Gastrocoeli not extremely wide, their interval not extremely narrowed; tarsi III with
 more or less extensive black pattern; bigger species, 11-18 mm. long 7
7. Tarsi III white, each segment with black apex; abdomen with slight bluish tint;
 gastrocoeli deep as in *Coelichneumon*. (All coxae and trochanters white marked;
 length 16-18 mm.). 78. *deliratorius cinctitarsis* Provancher
 Only base of first and second segment or of first segment of tarsi III white; abdomen
 without blue tint; gastrocoeli usually less deepened. 8
8. Scutellum strongly raised above postscutellum, dorsally convex; gastrocoeli large and
 deep. (Elongate-oval tyloides on flagellar segments 6 or 7 to 19 or 20; second
 tergite often with two irregular white marks; length 17-18 mm.)
Thyrateles caliginops, new species
 Scutellum flat; gastrocoeli smaller and shallow. 9
9. Large species, 20 mm. long; cheeks, pronotal base and vertical orbits without white
 pattern; short, narrow, lanceolate tyloides on segments 7-17. 76. *atrox* Cresson
 Small species, 11-13 mm. long; cheeks partially, pronotal base and frontal as well as
 vertical orbits broadly white; long, longish-oval tyloides on segments 5-10.
 81. *mendax* Cresson
10. Face and clypeus uniformly yellow. (Femora, tibiae and tarsi uniformly pale rufous;
 head and thorax covered by long, dark hair; length 17-18 mm.).
 62. *similaris* Provancher
 Face and clypeus entirely or predominantly black. 11
11. Tarsi III blackish except base of metatarsus; white stripe on facial orbits. (Scutellum
 rather strongly elevated; temple profile strongly narrowed; length 15 mm.)
 67. *cessatorops* Heinrich
 Tarsi III pale rufous like the femora and tibiae. 11a
- 11a. Clypeus laterally yellow-marked; facial orbits usually with yellow stripe or mark.
 (Apex of tibiae III black.) *Thyrateles camelinops*, new species
 Clypeus and face entirely black. 12
12. Temple profile not narrowed, broadly rounded; head and thorax covered by long,
 fuscous hair; second and third tergites sparsely punctured, alutaceous between
 punctures; femora more slender than in the alternative species. (Scutellum con-
 siderably raised above postscutellum; length 15-16 mm.) 66. *nebularium* Heinrich
 Temple profile distinctly narrowed; head and thorax with normal hair; second and
 third tergites densely and coarsely sculptured; femora moderately stout. (Scutel-
 lum moderately raised; length 16 mm.) 97. *pedalis* Cresson
13. Tergites 2-7 uniformly red or ferruginous. 14
 Tergites 2-7 not uniformly red or ferruginous. 23
14. Wings strongly and evenly infuscated. 15
 Wings not, or scarcely infuscated. 20
15. Tibiae and tarsi I and II white with restricted black pattern; area superomedia very
 large, approximately square, with rounded anterior corners; large species, 20-21
 mm. long. (Face and clypeus predominantly, scutellum usually partially white;

Males

1. Abdomen entirely black, rarely the second tergite with two irregular whitish marks. 2
 Abdomen partially (at least either one entire tergite or apical bands on several tergites)
 red, brown, yellow or white. 13
2. Femora black. 3
 Femora rufous or fulvous. 10
3. Wings strongly and evenly infuscated. 4
 Wings not strongly and evenly infuscated. 6
4. Flagellum predominantly ivory. (Scutellum and legs black; length 19-20 mm.) 49. *centrator* Say 5
 Flagellum black with white annulus. 5
5. Median field of postpetiolus distinctly striate; scutellum black; all tibiae with narrow,
 white semiannulus beyond base. (Pronotal ridge and subalarum white marked;
 length 18-20 mm.) 82. *saucius* Cresson
 Median field of postpetiolus smooth; scutellum partially white; all tibiae uniformly
 black. (Thorax not white marked except scutellum; length 17 mm.)
Chasmodon seclustus Cresson
 (Part IV)
6. Gastrocoeli deep and extremely wide, with very narrow interval; tarsi III almost
 entirely white; small species, 10 mm. long. 89. *dioryctiae*, new species
 Gastrocoeli not extremely wide, their interval not extremely narrowed; tarsi III with
 more or less extensive black pattern; bigger species, 11-18 mm. long 7
7. Tarsi III white, each segment with black apex; abdomen with slight bluish tint;
 gastrocoeli deep as in *Coelichneumon*. (All coxae and trochanters white marked;
 length 16-18 mm.). 78. *deliratorius cinctitarsis* Provancher
 Only base of first and second segment or of first segment of tarsi III white; abdomen
 without blue tint; gastrocoeli usually less deepened. 8
8. Scutellum strongly raised above postscutellum, dorsally convex; gastrocoeli large and
 deep. (Elongate-oval tyloides on flagellar segments 6 or 7 to 19 or 20; second
 tergite often with two irregular white marks; length 17-18 mm.)
Thyreates caliginops, new species
 Scutellum flat; gastrocoeli smaller and shallow. 9
9. Large species, 20 mm. long; cheeks, pronotal base and vertical orbits without white
 pattern; short, narrow, lanceolate tyloides on segments 7-17. 76. *atrox* Cresson
 Small species, 11-13 mm. long; cheeks partially, pronotal base and frontal as well as
 vertical orbits broadly white; long, longish-oval tyloides on segments 5-10. 81. *mendax* Cresson
10. Face and clypeus uniformly yellow. (Femora, tibiae and tarsi uniformly pale rufous;
 head and thorax covered by long, dark hair; length 17-18 mm.). 62. *similaris* Provancher
 Face and clypeus entirely or predominantly black. 11
11. Tarsi III blackish except base of metatarsus; white stripe on facial orbits. (Scutellum
 rather strongly elevated; temple profile strongly narrowed; length 15 mm.) 67. *cessatorops* Heinrich
 Tarsi III pale rufous like the femora and tibiae. 11a
- 11a. Clypeus laterally yellow-marked; facial orbits usually with yellow stripe or mark.
 (Apex of tibiae III black.) *Thyreates camelinos*, new species
 Clypeus and face entirely black. 12
12. Temple profile not narrowed, broadly rounded; head and thorax covered by long,
 fuscous hair; second and third tergites sparsely punctured, alutaceous between
 punctures; femora more slender than in the alternative species. (Scutellum con-
 siderably raised above postscutellum; length 15-16 mm.) 66. *nebularium* Heinrich
 Temple profile distinctly narrowed; head and thorax with normal hair; second and
 third tergites densely and coarsely sculptured; femora moderately stout. (Scutel-
 lum moderately raised; length 16 mm.) 97. *pedalis* Cresson
13. Tergites 2-7 uniformly red or ferruginous. 14
 Tergites 2-7 not uniformly red or ferruginous. 23
14. Wings strongly and evenly infuscated. 15
 Wings not, or scarcely infuscated. 20
15. Tibiae and tarsi I and II white with restricted black pattern; area superomedia very
 large, approximately square, with rounded anterior corners; large species, 20-21
 mm. long. (Face and clypeus predominantly, scutellum usually partially white;

- often also tibiae and tarsi III white banded; tyloides very small, short-oval, on segments 8 or 9 to 17 or 18.) 21. *devinctor* Say
- Tibiae and tarsi I and II or at least tibiae I and II dorsally black or fuscous; area superomedial comparatively smaller; smaller species, 16-18 mm. long. 16
16. Tarsi III yellowish; longish-oval tyloides on flagellar segments 6-16 or 18, on segments 9-14 almost reaching from bases to apices; notauli obsolete. (Upper mandible tooth somewhat prolonged, not slender and apically not sharply pointed; face and clypeus predominantly, scutellum usually partially or predominantly yellow; length 16 mm.) see *Spilichneumon obscuricolor* Heinrich (Part II, and *Addenda*, Part VII)
- Tarsi III black; tyloides shorter, the longest by far not reaching apices of segments; notauli usually basally distinct. 17
17. Scutellum, pronotal ridge and coxae I and II extensively white. (Face and clypeus entirely or predominantly white; length 17 mm.) 51. *placidus* Provancher
- Scutellum, pronotal ridge and coxae I and II black. 18
18. Femora III slender; head narrow compared with width of mesothorax; temple profile strongly narrowed; carina occipitalis forming a slightly raised ridge; scutellum very strongly raised above postscutellum. (Clypeus and sides of face yellow or face and clypeus black; length 14-18 mm.) *Thyrateles lugubator* (Gravenhorst)
- Femora III moderately stout; head of normal width compared with mesothorax; temple profile moderately narrowed; carina occipitalis not raised; scutellum moderately raised above postscutellum. 19
19. Face and clypeus entirely or predominantly yellow. (Length 16-18 mm.) 60. *semicoccineus* Cresson
- Head entirely black. (Length 16-17 mm.) 56. *suburbanus*, new species
20. Areae dentiparae with toothlike projections; flagellum with white annulus; thorax predominantly ferruginous, including pleura and propodeum; smaller species, 12-13 mm. long. (Scutellum strongly elevated, yellow; abdomen ferruginous; tibiae III, except apex, and tarsi III pale yellow.) 48. *propitius* Cresson
- Areae dentiparae without projections; flagellum without annulus; thorax predominantly black; bigger species, 18-21 mm. long. (Legs with extensive white or pale yellow pattern; scutellum usually white.) 21
21. Scutellum strongly raised above postscutellum, with steep apical slope; tergites 2-5 unusually coarsely sculptured, irregularly rugose and punctate; tarsi III white; basic color of second and following tergites dirty yellowish-brown, the last tergites usually infuscated or black; length 18-19 mm. *Thyrateles procer* (Cresson)
- Scutellum not, or moderately raised; sculpture of tergites 2-5 less coarse; tarsi III at least partially black; tergites 2-7 uniformly clear red; length 17-21 mm. 22
22. Femora III stout and rather short; lower part of cheeks narrowed between eye and carina genalis and strongly constricted at the latter; all trochanters, coxae II except base and apical band of postpetiolus pale yellow. 90. *mystificans*, new species
- Femora III moderately slender and rather long; lower part of cheeks not narrowed, wide between eye and carina genalis, somewhat inflated and gradually constricted toward carina genalis; trochanters at least dorsally, coxae II and postpetiolus entirely black. 21. *devinctor* Say
23. Wings strongly and evenly infuscated. (Large species, 16-19 mm. long; scutellum usually white.) 24
- Wings not strongly and evenly infuscated. 25
24. Tergites 1-4 with narrow, yellowish or reddish apical bands; apical tergites ferruginous. (Length 16-19 mm.) 50. *lewisi* Cresson
- Tergites 1-4 uniformly black; last tergites dark red-brown. (Length 17 mm.) 96. *?klagesi* Viereck
25. One, or several tergites entirely rufous, ferruginous or brown, or several tergites rufous, ferruginous or brown banded with black. 26
- Abdomen without rufous, ferruginous or brown pattern; with lemon yellow, ivory or white bands on tergites instead. 40
26. Tergites 5-7 or 4-7 rufous, tergites 1-3 or 1-4 apically broadly yellow, basally black or dark red-brown. (Scutellum and marks of propodeum yellow; scutellum considerably raised above postscutellum; abdomen relatively wide, third tergite much wider than long; length 18-21 mm.) 52. *zelotypus* Cresson
- Abdomen otherwise colored. 27

27. Second tergite rufous, apically whitish; all other tergites black with ivory apical bands, absent sometimes on the fifth tergite. (Length 14-17 mm.) 7. *ambulatorius* Fabricius, variety
Abdomen without yellow or ivory apical bands on tergites except sometimes on post-
petiolus. 28
28. Average sized species, 13 mm. long and above. 29
Small species 7-10 mm. long. (Tergites 2 and 3 pale rufous.) 37
29. Tergites 2-7 red or ferruginous with black basal bands on tergites 2 or 3 to 5 or 6. 30
Tergites 2-7 otherwise colored. 32
30. Mesoscutum, mesopleura, femora III except narrowly yellow base and flagellum ven-
trally and dorsally black. (Apical part of propodeum including entire declivity
and the postpetiolus lemon-yellow; tergites 2-7 red with black basal bands on
tergites 2-5 or 6; length 15-16 mm.) 4. *creperus* Cresson
Mesoscutum partially (often predominantly) ferruginous; mesopleura extensively
ferruginous or yellow; femora III basally or predominantly ferruginous; flagellum
ventrally pale brown. (Length 15-16 mm.) *oblitus*, new species ... 31
31. Mesoscutum ferruginous with black longitudinal band from base to middle of median
lobe; propleura medially extensively black; mesopleura and propodeum predom-
inantly ferruginous; femora III apically broadly or predominantly black.
2a. *oblitus oblitus*, new subspecies
Mesoscutum with yellowish median mark behind a black median band; propleura,
mesopleura and propodeum predominantly yellow; femora III pale ferruginous
with narrowly black apex. 2b. *oblitus polyglaucus*, new subspecies
32. Head and thorax including scutellum uniformly black. (Abdomen black, tergites 2
and 3 brown.) 33
Face, clypeus and scutellum yellow. 34
33. Flagellum black ventrally as well as dorsally; head and thorax covered by long fuscous
hair; gastrocoeli moderately deep, their interval wider than one of them; basal
flagellar segments short, the first scarcely 1.5 times as long as wide, the third or
fourth square. 91. *approximans* Provancher
Flagellum ventrally pale brown; head and thorax without long, fuscous hair; gastro-
coeli rather deep and large, their interval narrower than one of them; basal flagel-
lar segments much longer than in the alternative species, the first more than twice
as long as wide, the eighth or ninth square. (Length 15-16 mm.). 44. *volesus* Cresson
34. Femora I and II predominantly or at least dorsally black. (Femora III black; gastro-
coeli deep and wide with narrowed interval.) 35
Femora I and II without black pattern, uniformly pale rufous. 36
35. Scutellum strongly raised above postscutellum with steep apical slope; sculpture of
tergites 2-5 extremely coarse, very strongly rugose and punctate; at least tergites
2-5 pale reddish-brown; tarsi III whitish; length 18-19 mm. (Last two tergites
usually infuscated or black; all femora predominantly black.)
Thyrateles procax (Cresson)
Scutellum moderately raised above postscutellum, gradually sloping apically; sculpture
of tergites 2-5 not extremely coarse; only second and third tergites light colored,
reddish yellow; tarsi III apically black; length 15 mm. (Femora I and II dorsally
predominantly black.) 37. *versabilis* Cresson, variety
36. Gastrocoeli deep and wide with narrowed interval; scutellum strongly raised above
postscutellum; at least apex of first tergite and tergites 2 and 3, often tergites 2-4,
the entire first and the last tergite pale rufous, close to orange. (Length 13-15
mm.) *Thyrateles instabilis* (Cresson)
Gastrocoeli fairly shallow, not widened, their interval wider than one of them; scutel-
lum not much raised above postscutellum; abdomen black, tergites 2 and 3 red.
(Upper mandible tooth in type apically blunted; length 15 mm.). 92. *restrictus* Cresson
37. Face, clypeus, scutellum and coxae I and II black in type specimen. (Sometimes cly-
peus, facial orbits, apex of scutellum and marks on coxae I and II white; abdomen
black, second and third tergites and sometimes postpetiolus pale rufous; length
9-10 mm.) 27a. *lachrymans*, variety *cervulus* Provancher
Face, clypeus and scutellum predominantly, coxae I and II sometimes partially white. 38
38. Flagellum with white annulus. (Legs ferruginous with apex of femora III and of
tibiae III black.) 28. *hospitus* Cresson
Flagellum without annulus. 39

39. Femora I and II varying from rufous to predominantly black; femora III black except narrowly rufous base; coxae III black. (Coxae I and II apically more or less extensively yellow; length 9-10 mm.) 27. *lachrymans* Provancher
Legs, including femora I and II, basal half of femora III and the coxae III pale rufous. (Coxae and trochanters I and II yellow; length 7 mm.) 94. *citrifrons* Cresson
40. Flagellum with white annulus. (Tergites 1-3 apically broadly yellow; head and thorax and propodeum with extensive yellow pattern; tarsi III pale yellow except last segment; second tergite gradually rather strongly narrowed toward base; length 12-15 mm.) 47. *fuscifrons* Cresson
Flagellum without white annulus. 41
41. Small species, 10 mm. long and less. (Tergites 1-3 apically broadly yellow, 4-7 black; clypeus, face and scutellum yellow.) 42
Larger species, 12 mm. long and more. 44
42. Pronotal ridge, cheeks partially, trochanters III, usually also marks on propodeum and the vertical orbits yellow. (Area superomedia approximately square; gastrocoeli quadrangular, fairly deep; length 10 mm.) 18. *ultimus* Cresson
Pronotal ridge, cheeks, trochanters III, propodeum and vertical orbits black. (Area superomedia approximately half-oval.) 43
43. Coxae I and II partially yellow; femora, especially femora I short and wide; flagellum with 27-30 segments; length 8-9 mm. 30. *nigrovariegatus* Provancher
All coxae black; femora, especially femora I distinctly less stout; flagellum with more than 30 segments; length 9 mm. 93. *parvus* Cresson
44. Abdomen black with ivory or white bands on tergites. 45
Abdomen black with yellow bands on tergites. 49
45. Wings distinctly infuscated; tarsi III, tergites 4-7 and coxae I and II entirely deep black; second and third tergites ivory, their bases, apices and sides narrowly black; notauli long, reaching to about middle of mesoscutum. (Length 17-19 mm.) 80. *caliginosus* Cresson
Wings clear; tarsi III at least basally white; fourth tergite, sometimes also the following tergites with white apical bands; coxae I and II often partially white; second and third tergites basally broadly black, with white apical bands; notauli short or obsolete. 46
46. Tergites 1-4 with broad ivory or pale yellow apical bands, tergites 5-7 entirely black; femora I and II dorsally, femora III entirely black. (The following are white: face, clypeus, frontal orbits, pronotal ridge, subalarum, scutellum, postscutellum, tegulae, collare, all trochanters, coxae I and II; length 16-18 mm.) 47
Tergites 1-7 or at least 1-4 and 6 and 7 with narrow, white apical bands; femora I and II entirely, femora III partially rufous. (Length 14-17 mm.) 48
47. Propodeum entirely black; notauli basally sharply impressed; sculpture of basal half of first tergite very coarse, irregularly rugose; thyridia slightly oblique; abdomen somewhat wider and stouter than in the alternative species. (Light pattern ivory, close to white; length 17 mm.) 74. *calitervus* Cresson
Propodeum with two large, white marks, covering most of areae dentiparae and areae posteroexternae; notauli basally slightly indicated; sculpture of basal half of first tergite somewhat less coarse; thyridia strongly oblique; abdomen slender. (Light pattern pale yellow tinted; length 16-18 mm.) 69. *feriens*, new species
48. Coxae and propodeum not white marked; all tergites, except the fifth, apically white banded; bands on second and third tergites wider than the following and medially narrowed; band of fourth tergite narrow, often medially interrupted. (Femora pale rufous, femora III apically broadly black; length 15 mm.) 7. *ambulatorius*, variety *multor* Cresson
Coxae and propodeum usually white marked; all tergites with white apical bands. (Length 14-17 mm.) 7. *ambulatorius* Fabricius
49. Abdomen black, second and third tergites entirely yellow or narrowly infuscated at bases, apices, sides and sometimes along middle. (Femora I and II dorsally, III almost entirely black; scutellum, face and clypeus white.) 50
Abdomen black, second and third tergites, or also the fourth, rarely the fifth basally black, apically yellow banded. (Face, clypeus, scutellum and postpetiolus white.) 51
50. Gastrocoeli quadrangular, exteriorly longer than medially wide, their interval about as wide as one of them; short, bacilliform tyloides on flagellar segments 7-15, the longest not reaching apices of segments; pronotal ridge, subalarum and frontal orbits black; scutellum short, considerably raised above postscutellum, dorsally

- Cheeks or at least their apical margin above base of mandibles and the malar space black; yellow pattern of thorax less extensive. (Yellow bands of abdomen sometimes partially orange or pale ferruginous tinted; in one species yellow pattern paler, close to ivory.) 57
57. Yellow pattern of abdomen and thorax pale, approaching ivory; tarsi III deep black except base of metatarsus; flagellum ventrally and dorsally deep black; tibiae I and II ventrally on apical part with black, wedge-shaped stripe; tibiae III often basally narrowly black. (No yellow pattern on mesoscutum and mesopleura; propodeum with large yellow marks; length 16-18 mm.) 69. *seriens*, new species
- Yellow pattern of thorax and abdomen bright, on the latter sometimes partially ferruginous or orange; tarsi III less strongly infuscated; flagellum usually ventrally brownish; tibiae I and II without black ventral line; tibiae III basally never black. 58
58. Cheeks sometimes yellow marked; two large yellow marks on propodeum, often confluent and covering the entire declivity; femora I and II pale reddish-brown, sometimes dorsally partially black; yellow color of frontal and vertical orbits orange tinted in the upper part; pronotal ridge yellow. (Yellow bands of abdomen tending to a slight or sometimes more intense orange tint; mesoscutum and mesopleura sometimes yellow marked; length 15-17 mm.) 1. *laetus* Brullé
- Cheeks entirely black; propodeum usually entirely black; sometimes with small yellow marks; femora I and II ventrally yellow, dorsally predominantly black; frontal orbits yellow, vertical orbits black; yellow on pronotal ridge usually restricted to its apex. (Second and third tergites sometimes ferruginous tinted between black base and yellow apex; length 15-16 mm.) 5. *canadensis* Cresson

Grouping of the Species

The grouping of the numerous species of the genus could be done on account of either chromatic or morphological characters, in the latter case by using the differentiation of female flagellum for group distinction. For practical reasons I have given preference to the chromatic point of view and grouped the species according to color pattern of females. The first (*laetus*) and the second (*gracilicornis*) groups however, are chromatically alike and separated only by the shape of female flagellum, while the third, fourth and fifth groups represent mere chromatic sections containing all different types of flagellar structures of the females.

I. *laetus* group

Species 1-33

Female flagellum filiform or subfiliform, not or little attenuated at apex; abdomen of female ferruginous or red-brown, often with black bands on anterior tergites; wings not strongly infuscated. Sexual dimorphism considerable; abdomen of males usually black and yellow banded.

This group would include the European type-species.

The color pattern as represented by the species *Ichneumon laetus* Brullé itself is found in several species of this group. It is characterized by a pale ferruginous, black banded abdomen. It is typical North American and repeated by species of many other genera of the tribe, as *Eutanyacra*, *Pseudamblyteles*, *Spilichneumon*, *Barichneumon*, *Cratichneumon* and *Exephanes*.

1. *Ichneumon laetus* Brullé

Fig. 32

Ichneumon laetus Brullé, 1846, Hist. Nat. Ins. Hym., v. 4, p. 303, ♂.

Ichneumon leucaniae Fitch, 1861, Boston Cultivator, Aug. 3, 23:276, ♀.

Ichneumon seminiger Cresson, 1864, Ent. Soc. Phila. Proc., 3:167, ♀.

Types

Holotypes.—*Ichneumon laetus* Brullé, ♂ labeled "Bastard, Am. du Nord, 1932", Musée National d'Histoire Naturelle, Paris. *Ichneumon leucaniae* Fitch, ♀, not seen. *Ichneumon seminiger* Cresson, ♀, Virginia. A.N.S.

Hosts

According to H. Townes 1951: "*Hemerocampa leucostigma* (A. & S.); *Amathes c-nigrum* (L.); *Cirphis unipuncta* (Haw.)".

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Transition Zone".

Preamble

The synonymy given above was quoted from Townes 1951. I have not seen the type either of *Ichneumon laetus* Brullé or of *Ichneumon leucaniae* Fitch. The female of this species is rather similar in color to *creperus*, but in case of doubt easy to recognize by its normal mandibles (Fig. 32). The male resembles very much *annulatorius* Fabricius (syn. *funestus* Cresson). I could not find any reliable morphologic differences between these two species. Their chromatic distinction will be given below.

Male

Black with yellow pattern, which on vertex, propodeum, tergites and femora tends to show an orange tint; scutellum and two marks or sometimes apical part of propodeum yellow; tergites 1-4 yellow with broad black basal bands (rarely absent on second tergite); at least apex of cheeks and the malar space black; pronotal base black; base of femora III more or less extensively orange; length 15-17 mm.

Flagellum.—Tyloides on segments 6-14 or 15, elongate-bacilliform, the longest reaching from base to almost apex of segments. Black, ventrally usually brown or yellowish-red, rarely black; scape ventrally yellow.

Head.—Malar space one third as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal and vertical orbits (turning orange on vertex), often a small or moderately sized mark on lower outer orbits, which sometimes may occupy the whole width of cheeks, but never covers their apex at base of mandible and the malar space; sometimes upper part of outer orbits orange.

Thorax.—Area superomedia usually square, sometimes wider than long; costulae distinct. Black; the following are yellow: collare, pronotal ridge, subalarum, tegulae, scutellum, postscutellum, two marks on propodeum (which occupy at least the areae dentiparae, posteroexternae and apices of spiraculiferae, usually, however, are more extensive, covering often the whole declivity or even the greatest part of propodeum), sometimes mark on mesopleura, more rarely two short, longitudinal median marks on mesoscutum, two short lateral stripes on mesoscutum near tegulae and marks on prescutellar carinae; pronotal base black.

Legs.—The following are yellow: all trochanters and trochantelli, coxae I and II except base (or yellow marked at apex only), sometimes dorsal mark on coxae III, all tibiae and tarsi (tibiae III except apex); tarsi III apically usually slightly infuscated or reddish; femora I and II pale reddish-brown, sometimes dorsally partially black; femora III black, basally on exterior side more or less extensively orange, base on interior side often narrowly lemon-yellow.

Abdomen.—Black, tergites 1-4 yellow, tending to a slight or sometimes more intense orange tint; tergites 1-4 with broad black basal bands, rarely absent on second tergite.

Female

Ferruginous, scutellum white; usually tergites 3 and 4, sometimes 1-4 or 1 and 3-4 with black basal bands; sterna and pleura black, the latter sometimes partially ferruginous; femora moderately stout, ferruginous; flagellum subfiliform, close to bristleshaped; mandibles normal; distinct scopa, length 13-14 mm.

Flagellum.—Stout, rather short, distinctly flattened and somewhat widened beyond middle, distinctly attenuated at apex, with 37-39 segments, the first scarcely 1.5 times as long as wide, the sixth square, the widest fully 1.5 times as wide as long. Usually the first three segments ferruginous, followed by three black segments and then by the white annulus on segments 7 or 8 to 14, the apex black; sometimes all segments before annulus ferruginous or rarely all blackish.

Head.—Temple and cheek profile considerably narrowed, the former with slightly curved, the latter with straight outline; malar space nearly as long as width of base of mandible; mandibles normal with well developed subapical tooth. Ferruginous; supraantennal cavities and sometimes patches on lateral fields of face black.

Thorax.—Mesoscutum flat, moderately densely punctured, fairly shiny; notauli scarcely indicated at base; area superomedia square. Black, scutellum white; the following are usually ferruginous: collare, pronotal ridge, tegulae, mesoscutum, postscutellum, patches on horizontal part of propodeum or propodeum predominantly; pleura usually black, middle of mesopleura often more or less extensively ferruginous; rarely propodeum entirely, mesoscutum predominantly or entirely black.

Legs.—Moderately stout; coxae III fairly densely punctured, shiny, with distinct scopa. Uniformly ferruginous including trochantelli; rarely narrow apex of femora III or of tibiae III black; coxae and trochanters black, sometimes partially ferruginous.

TABLE I

Differential diagnosis between males of *I. laetus* Brullé and *I. annulatorius* Fabricius

<i>laetus</i>	<i>annulatorius</i>
cheeks at least apically black, malar space also black	including apex and malar space pale lemon-yellow
pronotal base black	more or less extensively lemon-yellow
orbits frontal orbits yellow, turning orange on vertex	lemon-yellow on frons and vertex as well
tyloides on segments 6-14 or 15, elongate, the longest reaching from base to almost apex of segments	on segments 6-13, distinctly shorter
base of femora III exteriorly more or less extensively orange	pale lemon-yellow
predominant color of tergites 2-4 usually more or less extensively orange tinted	always pale lemon-yellow
femora I and II pale reddish-brown, usually dorsally not black	pale lemon-yellow, dorsally black

Abdomen.—Gastrocoeli triangular, moderately deepened, their interval much wider than one of them; tergites 2 and 3 fairly densely punctured. Ferruginous; usually tergites 3 and 4 with black basal bands; often also base of first tergite black, rarely base of second.

2. *Ichneumon oblitus*, new species

Fig. 73

Distribution

Maine, Quebec, Ontario, New York, South Dakota.

Preamble

A species of the *laetus* group; female in general appearance similar to *creperus*, but on the average smaller. The female's most important species character is presented by the sculpture of coxae III, which are ventrally smooth with a few scattered punctures only. Mandibles more slender than in *creperus*, with small but distinct subapical tooth, temples and cheeks considerably narrower, femora III less stout. The male differs chromatically strongly from *creperus*. Two subspecies are distinguished.

Female

Ferruginous including scutellum, the latter sometimes yellowish; tergites 3 and 4 usually with black basal bands; sterna, coxae and femora III varying from predominantly black to predominantly ferruginous; flagellum subfiliform, moderately stout; femora III moderately stout; mandibles slender, with reduced, but distinct subapical tooth; coxae III ventrally smooth with few punctures; no scopa; length 11-12 mm.

Flagellum.—Moderately stout, distinctly flattened and somewhat widened beyond middle, slightly attenuated at apex, with 36-39 segments, the first 1.5 times as long as wide, the seventh square, the widest 1.5 to two times as wide as long. Basal 6-7 segments usually ferruginous, rarely partially blackish, segments 7 or 8 to 12, 13 or 14 with white annulus, apex black.

Head.—Temple and cheek profiles considerably narrowed, the former with slightly curved, the latter with straight outline; malar space scarcely shorter than width of base of mandible; mandibles slender with small, but distinct subapical tooth. Uniformly ferruginous.

Thorax.—Mesoscutum flat, fairly sparsely punctured, shiny; area superomedia square. Ferruginous; color of pro- and mesosternum varying between predominantly ferruginous and predominantly black; propodeal and scutellar sutures and usually area coxalis black; scutellum sometimes yellowish.

Legs.—Moderately stout; coxae II and III ventrally smooth with few scattered punctures; no trace of scopa. Ferruginous; coxae and femora III varying between predominantly black and ferruginous; narrow apex of tibiae III black.

Abdomen.—Gastrocoeli triangular, moderately deepened, their interval much wider than one of them; tergites 2 and 3 moderately densely punctured. Ferruginous, tergites 3 and 4 with black basal bands, which exceptionally may be absent.

Male

Ferruginous with black and yellow pattern; scutellum yellow; mesoscutum ferruginous with black longitudinal band from base to middle of median lobe; abdomen ferruginous with black basal bands on tergites 2 or 3 to 5 or 6, tergites 5 and 6 sometimes predominantly black; femora III varying between predominantly black and ferruginous with black apex; length 15-16 mm.

marked with white; coxae black, marked with white; femora, tibiae and tarsi pale rufous, apices of femora and tibiae III black, tarsi III usually apically narrowly infuscated; tibiae and tarsi yellowish tinted; length 14-17 mm.

Flagellum.—With longish-oval tyloides on segments 5-21 or 23, the longest nearly reaching from bases to apices of segments. Flagellum dorsally more or less extensively black, ventrally yellowish-brown; scape ventrally white, dorsally black or partially ferruginous.

Head.—Malar space one third as long as width of base of mandible; mandibles with long, pointed upper and small but distinct lower tooth. Black, the following white: mandibles except teeth, face and clypeus.

Thorax.—Notauli distinct at base; scutellum convex, distinctly raised above postscutellum; area superomedia usually a little wider than long. Black; the following are white: collare, pronotal ridge apically or entirely, subalarum, tegulae, scutellum, sometimes postscutellum, rarely marks on prescutellar carinae, usually marks on propodeum.

Legs.—Coxae and trochanters black, coxae I and II apically, coxae III dorsally white marked, usually also trochanters I and II apically light; trochantelli, femora, tibiae and tarsi pale rufous, narrow apex of femora III and tibiae III black, tarsi III apically narrowly infuscated; basic color of tibiae and tarsi III pale yellow.

Abdomen.—Black, all tergites with white apical bands, the band on second tergite usually somewhat wider than the others; basal part of second tergite sometimes rufous instead of black.

Remarks

The coloration described above can be regarded as the basic and "normal" pattern of the male. There is, however, evidence of a considerable degree of variability, tending toward restriction of white markings. Strongly melanistic specimens can well approach and reach the coloration of *sarcitorius* with immaculate coxae and propodeum and restriction of the white bands of fourth and fifth tergites (variety *multor* Cresson).

8. *Ichneumon neosarcitor*, new species

Types

Holotype.—♀, Maine, Bangor. C.G.H.

Allotype.—♂, Maine, Mt. Blue. C.G.H.

Paratypes.—8 ♀♀, Maine, Weld; 5 ♂♂, Maine, Mt. Blue. C.G.H.

Distribution

Found so far in Maine only. Inhabits dry mountain meadows.

Preamble

In color of abdomen and in morphology, particularly of mandibles and flagellum, the female is very closely allied to *sarcitorius* Linnaeus from the Palaearctic, differing, however, in somewhat less stout femora III, very slightly longer basal segments of flagellum and entirely black color of legs. The association of sexes as given below seems to be sufficiently certain, as males and females were collected on the same isolated mountain meadow, and match perfectly in every regard.

Female

Head and thorax black, including subalarum; scutellum white; collare and narrow frontal orbits usually obscure ferruginous; abdomen tricolored; black,

2b. *Ichneumon oblitus polyglaucos*, new subspecies**Types**

Holotype.—♂, New York, Bemus Point, 16.VII.1937, H. K. Townes. C.H.T.

Allotype.—♀, New York, Bemus Point. C.H.T.

Paratypes.—4 ♂♂, New York, Bemus Point; 1 ♂, South Dakota, Elk Point. C.H.T.

Distribution

New York, South Dakota.

Male

Yellow pattern much more extensive than in *oblitus oblitus* especially on pleura, black pattern more reduced; the following are additionally yellow: propleura usually predominantly, often entirely, mesopleura predominantly, coxae I and II entirely, coxae III dorsally extensively, a median mark on mesoscutum behind the black median band; often apices of anterior tergites and the propodeum extensively yellow tinted. Femora III blackish at narrow apex only; black bands on tergites 5 and 6 not more extensive than the preceding bands, sometimes sixth tergite even without black.

Female

Black pattern reduced; sterna and coxae predominantly, femora III entirely or almost entirely ferruginous; scutellum in type yellowish; flagellum with 38-39 segments.

3. *Ichneumon vicinus* Cresson

Ichneumon vicinus Cresson, 1864, Ent. Soc. Phila. Proc., 3:169, ♀.

Types

Holotype.—♀, Illinois. A.N.S.

Distribution

According to H. Townes 1951: "Illinois".

Preamble

No specimens other than the type seem to have been found. I examined the type. I am not sure about its generic position. It is not a typical *Ichneumon* and is perhaps to be placed in the genus *Cratichneumon*. Until, however, further specimens are collected, this question is better left open. The following description was based on the type.

Female

Ferruginous, sterna black, scutellum yellow; tergites 3 and 4 with black basal bands; apex of tibiae III and femora III broadly black; flagellum short, filiform, tricolored; gastrocoeli shallow and very small; postpetiolus without clearly defined median field, shiny, finely and indistinctly longitudinally rugose with few scattered punctures; coxae III densely punctured, no scopa; length 11 mm.

Flagellum.—Short, filiform, with 32 segments, the first fully 1.5 times as long as wide, the sixth square, the widest 1.3 times as wide as long. Base ferruginous, white annulus on segments 7-12, apex black.

Head.—Cheek profile distinctly narrowed; malar space a little longer than width of base of mandible; median field of face somewhat prominent; mandibles strong. Ferruginous; frontal orbits indistinctly yellow.

Thorax.—Horizontal part of propodeum distinctly shorter than declivity; area superomedia longer than wide, almost parallel-sided, anterior corners rounded; area basalis short. Ferruginous; the following are black: prosternum, mesosternum, prepectus, band on mesopleura below subalarum, scutellar and propodeal sutures; the following are yellow: collare, spot on subalarum, scutellum, postscutellum.

Legs.—Coxae III densely punctured, without scopa. Ferruginous including coxae and trochanters; apices of femora III and tibiae III black.

Abdomen.—Postpetiolus rather wide, median field not clearly defined, shiny, indistinctly longitudinally rugose, with few scattered punctures; gastrocoeli very small, shallow. Ferruginous; third and fourth tergites with black basal bands.

4. *Ichneumon creperus* Cresson

Figs. 33, 72

Ichneumon creperus Cresson, 1807, Amer. Ent. Soc. Trans., 1:298, ♂.

Amblyteles (Pterocormus) footei Viereck, 1917, Conn. State Geol. and Nat. Hist. Bull., 22: 353, 357, ♂.

Types

Holotypes.—*Ichneumon creperus* Cresson, ♂, Canada. A.N.S. *Amblyteles footei* Viereck, ♂, Connecticut, Stafford. Connecticut Agricultural Experimental Station, New Haven.

Neallotype.—♀, Massachusetts, Concord. C.G.H.

Host

Actebia fennica Tausch. (C.N.C.).

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition Zone". New records: Alaska, Fairbanks; Northwest Territories, Norman Wells; British Columbia, Prince George and Victoria (C.N.C.).

Male

Thorax black with yellow pattern; scutellum and apical part of propodeum including entire declivity yellow; abdomen tricolored; postpetiolus entirely yellow, tergites 2-7 red with black basal bands on tergites 2-5 or 6; flagellum black also ventrally; femora, tibiae and tarsi I and II entirely yellowish; lower mandible tooth somewhat reduced, the gap subobsolete; length 15-16 mm.

Flagellum.—With narrow, bacilliform tyloides on segments 4 or 5 to 14 or 15. Black; scape ventrally yellow.

Head.—Malar space one third as long as width of base of mandible; lower mandible tooth reduced, the gap subobsolete. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits up to lower ocellus.

Thorax.—Anterior third of notauli indicated; scutellum distinctly raised above postscutellum, convex; area superomedia somewhat wider than long. Black; the following are yellow: collare, pronotal ridge, pronotal base entirely or partially, subalarum, tegulae, scutellum, postscutellum, apical part of propodeum (usually including the whole declivity, areae dentiparae, apical half of areae spiraculiferae and apex of area superomedia); rarely mesopleura with yellow mark or a short, yellow line on each side of mesoscutum near tegulae.

Legs.—Predominantly yellow; black are: coxae I and II except apices, coxae III, femora III usually except base, apex of tibiae III; rarely coxae III with yellow dorsal mark.

Abdomen.—First segment except black petiolus or base of petiolus bright yellow; tergites 2-7 red, 2-6 with black basal bands; bands on sixth tergite often narrowed, sometimes absent; in rare mutants the basic red color of tergites 2-7 can be replaced by yellow.

Female

The association of sexes, which is also indicated by corresponding characters of mandibles, was proven by rearing of male and female from the same host (see above).

Ferruginous, including scutellum; tergites 3 and 4, sometimes also second tergite with black basal bands; sterna black; femora III very stout, red or black, usually red with black apex; flagellum bristleshaped but stout and short; mandibles strong, gradually tapering toward apex, subapical tooth subobsolete; no scopa; length 12-15 mm.

Flagellum.—Stout, rather short, distinctly flattened and somewhat widened beyond middle, distinctly attenuated at apex, with 36-39 segments, the first scarcely 1.3 times as long as wide, the fourth or fifth square, the widest fully 1.5 times as wide as long. Tricolored: basal 6-7 segments ferruginous, white annulus on segments 7 or 8 to 12 or 13, apex black.

Head.—Temple and cheek profiles little narrowed, with distinctly curved outlines; cheeks slightly inflated; malar space shorter than width of base of mandible; clypeus wide; mandibles long, gradually tapering toward apex, with subobsolete subapical tooth. Ferruginous, supraantennal cavities black.

Thorax.—Mesoscutum flat, moderately densely punctured, fairly shiny; notauli slightly indicated at base; area superomedia square or a little wider than long. Ferruginous; the following are black: prosternum, prepectus, mesosternum, areae coxales, middle of propleura more or less extended, usually narrow band below subalarum, scutellar and propodeal sutures.

Legs.—Stout, femora short and thick; coxae III moderately densely punctured, without scopa. Ferruginous with black pattern of variable extent; coxae I, II and III varying from entirely ferruginous to entirely black, coxae III usually dorsally partially ferruginous; femora III also varying from entirely ferruginous to entirely black, usually ferruginous with black apex; tibiae III with or without black apex.

Abdomen.—Rather stout and wide; second tergite at apex distinctly wider than medially long, the third more than twice as wide as long; gastrocoeli triangular, moderately deepened, their interval much wider than one of them; tergites 2 and 3 moderately densely punctured. Ferruginous; usually third and fourth tergites with black basal bands, rarely also the second; exceptionally black bands entirely absent; sometimes postpetiolus with apical lateral yellowish marks.

5. *Ichneumon canadensis* Cresson

Ichneumon canadensis Cresson, 1867, Amer. Ent. Soc. Trans., 1:308, ♀.

Ichneumon canadensis Heinrich, 1959, Entom. News, 70:104, ♀ (designation of new lectotype).

Types

Holotypes.—First lectotype designated 1916 in Mem. Amer. Ent. Soc. No. 1: ♀, Canada. A.N.S. No. 940 (= *Ichneumon ctenuchae* Cushman ♀ = *Ichneumon trizonatus* Provancher ♂). New lectotype designated 1959 in Entom. News, 70:104: ♀, Canada. A.N.S.

Neallotype.—♂, Maine, Dryden. C.G.H.

Host

Evidently rather specialized on *Pseudoletia unipuncta* (Haw.). Reared from this host in New Brunswick, Nova Scotia and Ontario (C.N.C.).

Distribution

Maine, Quebec, Ontario (C.G.H.); Nova Scotia, New Brunswick, Newfoundland, Prince Edward Island (C.N.C.). Open, grassy areas. Transition and Canadian Zones. Western limits not known yet.

Female

Thorax black, scutellum white; abdomen ferruginous, at least tergites 3 and 4 with black basal bands; all tibiae yellow, tibiae III or II and III apically black; flagellum stout, filiform; distinct scopa; length 11-13 mm.

Flagellum.—Filiform, stout, ventrally flattened, but little widened beyond middle, scarcely attenuated at apex, with 33-36 segments, the first 1.5 times as wide as long, the fifth square, the widest 1.5 times as wide as long. Black, with white annulus on segments 6 or 7 to 12 or 13; exceptionally basal segments brown or ferruginous.

Head.—Temple and cheek profile distinctly narrowed with almost straight outlines; malar space shorter than width of base of mandible; mandibles normal, the upper tooth little longer than the lower. Black, narrow frontal and vertical orbits ferruginous, usually widened on vertex.

Thorax.—Mesoscutum flat with shallow, not dense puncturation, shiny; notauli subobsolete; area superomedia usually square or a little wider than long. Black; scutellum, partially collare and sometimes postscutellum white; tegulae often ferruginous; sometimes white dot on subalarum; sometimes areae dentiparae with obscure reddish mark.

Legs.—Fairly stout; coxae III with rather dense, shallow puncturation and a few scattered deeper punctures; scopa distinct. Black; the following ferruginous: trochantelli, apex narrowly of femora I and II, base narrowly of all tibiae and apex of tibiae I or sometimes I and II, all tarsi; apices of segments of tarsi III usually somewhat infuscated; apices of tibiae III or II and III broadly black.

Abdomen.—Gastrocoeli triangular, moderately deepened, much narrower than interval; tergites 2 and 3 moderately strongly and densely punctured. Ferruginous; at least tergites 3 and 4, usually also petiolus black; the second tergite laterally basally black marked or with a medially interrupted black basal band, sometimes without black pattern or with full basal band; postpetiolus sometimes with two apical lateral yellow marks, rarely also the second tergite apically yellow marked.

Variability

The chromatic variability of females is illustrated by the following table.

TABLE II

Chromatic variability of 23 *Ichneumon canadensis* Cresson females from Poltimore, Quebec

3	postpetiolus with two apical lateral yellow marks
3	besides scutellum, also postscutellum white
1	propodeum dorsally marked with ferruginous
1	base of flagellum ferruginous instead of black
3	black basal bands on tergites 3 and 4 medially interrupted
8	full black bands on tergites 1 and 3-4
9	additionally tergite 2 with basal lateral black marks
2	additionally tergite 2 with medially interrupted black basal band
1	tergites 1-4 with full black basal bands

Remark

References given by Townes, 1951, Synoptic Catalog, under this name refer to another species (see *Ichneumon ctenuchae* Cushman).

Male

Association of sexes was confirmed by several rearings of both sexes from the same host.

Extremely similar to *annulatorius* F. (= *funestus* Cresson); differing by much more reduced yellow pattern of head and thorax; cheeks, pronotal base and mesoscutum being always entirely black, propodeum often so; abdomen a very little less slender (tergites relatively a little wider); scutellum a little less raised above postscutellum.

Black with yellow pattern; scutellum yellow, sometimes reduced yellow marks on propodeum; tergites 1-4 yellow with broad black basal bands; second and third tergites sometimes ferruginous tinted between black base and yellow apex; cheeks, pronotal base and mesoscutum entirely black; pronotal ridge usually yellow at apex only; length 15-16 mm.

Flagellum.—With short, narrow, bacilliform tyloides on segments 6-13 or 14, the longest by far not reaching base and apex of segments. Dorsally black, ventrally brownish; scape ventrally yellow.

Head.—Malar space scarcely one third as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits almost up to level of lower ocellus.

Thorax.—Area superomedia distinctly wider than long. Black; the following are yellow: collare, apex of pronotal ridge (exceptionally its whole length), subalarum, tegulae, scutellum, postscutellum, sometimes a mark on each side of propodeum (exceptionally covering more than apex of areae dentiparae).

Legs.—The following are yellow: all trochanters and trochantelli, coxae I and II except base, or apically only; all tibiae and tarsi except the broadly black apex of tibiae III and the slightly infuscated apex of tarsi III; apices and ventral side of femora I and II (at the base of femora II the black from dorsal side usually extending over the ventral side too).

Abdomen.—Tergites 1-4 apically broadly yellow, the yellow color on second, or second and third tergites sometimes ferruginous tinted between black base and yellow apex; exceptionally fifth tergite with a narrow, light apical band.

6. *Ichneumon subdolosus* Cresson

Ichneumon subdolosus Cresson, 1867, Amer. Ent. Soc. Trans., 1:298, ♀.

Amblyteles (Pterocormus) quadrizonatus Viereck, 1917, Conn. State Geol. and Nat. Hist.

Survey Bull., 22:352, 357, ♂.

Ichneumon subdolosus Heinrich, 1959, Entom. News, 70:208, ♀ ♂.

Types

Holotypes.—*Ichneumon subdolosus* Cresson, ♀, Massachusetts. A.N.S. *Amblyteles quadrizonatus* Viereck, ♂, Connecticut, Branford. Connecticut Agricultural Experimental Station, New Haven.

Host

According to H. Townes 1951: "*Hydroccia immanis* Guen."

Distribution

According to H. Townes 1951: (*subdolosus*) "Nova Scotia and Quebec to

North Carolina". (*quadrizonatus*) "Connecticut, New York, Alberta". New records: Ontario, Nipigon; Prince Edward Island (C.N.C.).

Female

Thorax black, scutellum white, mesoscutum usually entirely or partially red-brown; abdomen tricolored: red-brown, anterior tergites broadly banded with yellow and black; flagellum subfiliform; distinct scopa; length 12-16 mm.

Flagellum.—Subfiliform, rather stout, ventrally flattened and somewhat widened beyond middle, a little attenuated at apex, with 38-39 segments, the first scarcely 1.5 times as long as wide, the fifth square, the widest fully 1.5 times as wide as long. Black, segments before annulus dorsally at apices and ventrally more extensively brownish; white annulus on segments 7 or 8 to 14 or 15.

Head.—Temple and cheek profile distinctly though not strongly narrowed, with slightly curved outlines; malar space shorter than width of base of mandible; mandibles nearly normal, the upper tooth somewhat prolonged, the lower somewhat reduced. Red-brown and black to a varying extent; usually middle of face and clypeus, cheeks, entire frons and vertex red-brown, the rest black; sometimes almost entirely black with only frontal and vertical orbits red.

Thorax.—Mesoscutum flat, moderately densely punctured, shiny; notauli subobsolete; scutellum flat; area superomedia square or a little wider than long, a little narrowed toward apex, the apical border usually angularly curved inward; costulae fairly distinct. Scutellum white; usually collare, mesoscutum, tegulae and pronotal ridge at least apically red-brown; rarely thorax black except the white scutellum and brown collare and tegulae.

Legs.—Stout, femora thick; coxae III moderately densely punctured, shiny, with distinct scopa. Black; tibiae, tarsi and trochantelli brown, usually also apices of femora I and II and ventral side of femora I.

Abdomen.—Fairly stout, with blunt apex; second tergite apically considerably wider than medially long; gastrocoeli small, triangular, moderately deepened; second and third tergites, rather finely and densely punctured. Red-brown; tergites 2-4 with broad, black basal bands; the following are yellow: two lateral apical marks or apical band on postpetiolus, about apical half of second tergite and usually a narrower, more or less distinct band on third tergite.

Male

Black, scutellum and marks on areae dentiparae yellow; tergites 1-4 with broad, yellow apical bands, often the fifth with a narrow one; cheeks, temples, mesoscutum and pleura entirely black; flagellum entirely black; abdomen relatively wide, tergites 3 to 6 at least 1.5 times as wide as long; length 18-20 mm.

Flagellum.—With narrow, bacilliform tyloides on segments 5 or 6 to 15 or 16, the longest reaching neither base nor apex of segments. Black, scape ventrally yellow.

Head.—Upper mandible tooth somewhat prolonged, gap between upper and lower tooth subobsolete. Black, the following are yellow: mandibles except teeth, clypeus, face, frontal orbits basally or up to lower ocellus.

Thorax.—Mesoscutum rather strongly and densely punctured; notauli basally indicated; area superomedia rectangular, considerably wider than long. The following are yellow: collare, pronotal ridge, subalarum, tegulae, scutellum, post-scutellum, marks on propodeum occupying the areae dentiparae entirely or partially; rest black.

Legs.—The following are yellow: coxae I and II except base more or less extensively, all trochanters and trochantelli, all tibiae except broad apex of tibiae III, femora I and II apically and ventrally, all tarsi; segments of tarsi III apically from segment to segment increasingly infuscated.

Abdomen.—The following are yellow: postpetiolus, approximately apical half of second, third and fourth tergites and often a narrow apical band on the fifth; rest black; last tergite sometimes reddish.

Remarks

In color pattern this male is almost identical with *canadensis*. It differs by considerably bigger size, relatively wider tergites and the subobsolete gap between mandibular teeth.

7. *Ichneumon ambulatorius* Fabricius

Ichneumon ambulatorius Fabricius, 1775, Syst. Ent., p. 329, ♀.

Ichneumon jucundus Brullé, 1846, Hist. Nat. Ins. Hym., v. 4, p. 305, ♀.

Ichneumon flavizonatus Cresson, 1864, Ent. Soc. Phila. Proc., 3:156, ♂.

? *Ichneumon multor* Cresson, 1867, Amer. Ent. Soc. Trans., 1:299, ♂.

Pterocormus jucundus Townes, 1951, Synoptic Catalog, p. 299, ♀ ♂.

Ichneumon ambulatorius Perkins, 1952, Ent., 85: 66, 67, ♀.

Ichneumon sarcitorius ssp. Heinrich, 1953, Wash. Acad. Sci. Jour., 43:149, ♀.

Ichneumon ambulatorius Walkley, 1958, Synoptic Catalog Suppl. p. 51, ♀.

Types

Holotypes.—*Ichneumon ambulatorius* Fabricius, ♀, without data, British Museum, London; *Ichneumon jucundus* Brullé, ♀, "Coll. Serville, Amer. Sept." Turin; Instituto e Museo di Zoologia, Università di Torino; *Ichneumon flavizonatus* Cresson, ♂, Virginia. A.N.S.; *Ichneumon multor* Cresson, ♂, Canada. A.N.S.

Hosts

According to H. Townes 1951: "*Cirphis unipuncta* (Haw.); *Crymodes devastator* (Brace); *Luperina stipata* (Morr.); *Macronoctua onusta* Grote; *Papaipema circumlucens* Sm.; *Papaipema nebris* (Guen.)." New records: *Faronta diffusa* Wlk. in Saskatchewan; *Hydroecia immanis* Gn. (C.N.C.).

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition and Upper Austral Zones". New records: British Columbia, Okanagan Valley; Canadian Zone: Quebec, Rupert House and Newfoundland, Harmon Field (C.N.C.).

Preamble

My postulation (Heinrich, 1953, Journ. Wash. Acad. Sci. 43:149) of considering *ambulatorius* Fabricius as a subspecies of *sarcitorius* Linnaeus (Old World) was based mainly on a series of males, collected in Maine, which I presumed to belong to *ambulatorius* and which I found to be absolutely congruent with European males of *sarcitorius*. For some time I believed that the mentioned males might perhaps belong to *neosarcitor*, new species, which in such a case would have had to have been considered as the Nearctic subspecies of *Ichneumon sarcitorius*. Recently, however, the doubtlessly correct male of *neosarcitor* has been discovered, and it turned out to be rather different from *sarcitorius*. I must therefore presume that the *sarcitorius*-like males from Maine represent indeed mutants of *ambulatorius* males. So I am still convinced that *ambulatorius* is the American vicariant of the Palaearctic species *sarcitorius* Linnaeus. But it

Legs.—The following are yellow: coxae I and II except base more or less extensively, all trochanters and trochantelli, all tibiae except broad apex of tibiae III, femora I and II apically and ventrally, all tarsi; segments of tarsi III apically from segment to segment increasingly infuscated.

Abdomen.—The following are yellow: postpetiolus, approximately apical half of second, third and fourth tergites and often a narrow apical band on the fifth; rest black; last tergite sometimes reddish.

Remarks

In color pattern this male is almost identical with *canadensis*. It differs by considerably bigger size, relatively wider tergites and the subobsolete gap between mandibular teeth.

7. *Ichneumon ambulatorius* Fabricius

Ichneumon ambulatorius Fabricius, 1775, Syst. Ent., p. 329, ♀.

Ichneumon jucundus Brullé, 1846, Hist. Nat. Ins. Hym., v. 4, p. 305, ♀.

Ichneumon flavizonatus Cresson, 1864, Ent. Soc. Phila. Proc., 3:156, ♂.

? *Ichneumon multor* Cresson, 1867, Amer. Ent. Soc. Trans., 1:299, ♂.

Pterocormus jucundus Townes, 1951, Synoptic Catalog, p. 299, ♀ ♂.

Ichneumon ambulatorius Perkins, 1952, Ent., 85: 66, 67, ♀.

Ichneumon sarcitorius ssp. Heinrich, 1953, Wash. Acad. Sci. Jour., 43:149, ♀.

Ichneumon ambulatorius Walkley, 1958, Synoptic Catalog Suppl. p. 51, ♀.

Types

Holotypes.—*Ichneumon ambulatorius* Fabricius, ♀, without data, British Museum, London; *Ichneumon jucundus* Brullé, ♀, "Coll. Serville, Amer. Sept." Turin; Instituto e Museo di Zoologia, Università di Torino; *Ichneumon flavizonatus* Cresson, ♂, Virginia. A.N.S.; *Ichneumon multor* Cresson, ♂, Canada. A.N.S.

Hosts

According to H. Townes 1951: "*Cirphis unipuncta* (Haw.); *Crymodes devastator* (Brace); *Luperina stipata* (Morr.); *Macronoctua onusta* Grote; *Papaipema circumlucens* Sm.; *Papaipema nebris* (Guen.)." New records: *Faronta diffusa* Wlk. in Saskatchewan; *Hydroecia immanis* Gn. (C.N.C.).

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition and Upper Austral Zones". New records: British Columbia, Okanagan Valley; Canadian Zone: Quebec, Rupert House and Newfoundland, Harmon Field (C.N.C.).

Preamble

My postulation (Heinrich, 1953, Journ. Wash. Acad. Sci. 43:149) of considering *ambulatorius* Fabricius as a subspecies of *sarcitorius* Linnaeus (Old World) was based mainly on a series of males, collected in Maine, which I presumed to belong to *ambulatorius* and which I found to be absolutely congruent with European males of *sarcitorius*. For some time I believed that the mentioned males might perhaps belong to *neosarcitor*, new species, which in such a case would have had to have been considered as the Nearctic subspecies of *Ichneumon sarcitorius*. Recently, however, the doubtlessly correct male of *neosarcitor* has been discovered, and it turned out to be rather different from *sarcitorius*. I must therefore presume that the *sarcitorius*-like males from Maine represent indeed mutants of *ambulatorius* males. So I am still convinced that *ambulatorius* is the American vicariant of the Palaearctic species *sarcitorius* Linnaeus. But it

may, nevertheless, be called a full species for the time being, as the existence of some male mutants congruent with *sarcitorius* males is perhaps not proof enough yet of subspecific status.

Female

Head and thorax black, subalarum and scutellum white; head with some ferruginous pattern; abdomen tricolored: second tergite red, rest black, tergites 3, 4 and 6 with white apical bands, rarely the postpetiolus with white apical marks or the fifth tergite with narrow, medially interrupted white apical stripe; legs pale rufous, coxae black, apically more or less extensively ferruginous; flagellum filiform; mandibles as in creperus (see fig. 4); coxae III with thin scopae; length 10-15 mm.

Flagellum.—Filiform, stout, ventrally distinctly flattened and slightly widened beyond middle, a little attenuated at apex, with 39-40 segments (only 36 in small specimens from Manitoba), the first about 1.3 times as long as wide, the sixth square, the widest about 1.5 times as wide as long. Scape and basal segments 1-5 or 6 pale ferruginous, the following segments to the thirteenth or fourteenth with white annulus (indistinct in two specimens from Manitoba), apex blackish.

Head.—Temple and cheek profiles slightly narrowed, with slightly curved outlines; malar space a little shorter than width of base of mandible; cheeks rather wide between eye and *carina genalis* and a little inflated; upper mandible tooth long and pointed, the lower subobsolete, indicated only by a small notch. Black; the following ferruginous: frontal and vertical orbits, usually malar space, narrow apex of cheeks and upper part of frontal orbits, sometimes clypeus apically or entirely.

Thorax.—Mesoscutum rather flat, densely punctured; notauli slightly indicated at base; area superomedia square or a little wider than long. Black; the following are white: collare, subalarum, scutellum, rarely postscutellum; tegulae red-brown.

Legs.—Stout, femora short; coxae III fairly densely punctured and with indistinct, thin scopae. Coxae and trochanters black, usually apically more or less extensively, sometimes (Manitoba) entirely ferruginous; trochantelli, femora, tibiae and tarsi pale ferruginous.

Abdomen.—Second tergite apically wider than medially long; gastrocoeli small, triangular, slightly deepened; second and third tergites rather strongly and very densely punctured, opaque. Black, second tergite red; third tergite apically with broad, fourth and sixth with narrow white band; sometimes also the fifth tergite with narrow, medially interrupted white apical stripe; rarely postpetiolus with two white lateral-apical marks or also the seventh tergite with white apical band.

Male

Since we know now that in northern New England (probably not much further south) two similar species occur side by side, it seems to be better to proceed carefully with regard to identification and diagnosis of males. Therefore I shall refrain from giving the range of variability of this male and restrict the description to reared males only, the association of which with *ambulatorius* female is beyond doubt.

Black with rich white pattern; scutellum white; all tergites with white apical bands; broad base of second tergite sometimes rufous instead of black; propodeum

marked with white; coxae black, marked with white; femora, tibiae and tarsi pale rufous, apices of femora and tibiae III black, tarsi III usually apically narrowly infuscated; tibiae and tarsi yellowish tinted; length 14-17 mm.

Flagellum.—With longish-oval tyloides on segments 5-21 or 23, the longest nearly reaching from bases to apices of segments. Flagellum dorsally more or less extensively black, ventrally yellowish-brown; scape ventrally white, dorsally black or partially ferruginous.

Head.—Malar space one third as long as width of base of mandible; mandibles with long, pointed upper and small but distinct lower tooth. Black, the following white: mandibles except teeth, face and clypeus.

Thorax.—Notauli distinct at base; scutellum convex, distinctly raised above postscutellum; area superomedia usually a little wider than long. Black; the following are white: collare, pronotal ridge apically or entirely, subalarum, tegulae, scutellum, sometimes postscutellum, rarely marks on prescutellar carinae, usually marks on propodeum.

Legs.—Coxae and trochanters black, coxae I and II apically, coxae III dorsally white marked, usually also trochanters I and II apically light; trochantelli, femora, tibiae and tarsi pale rufous, narrow apex of femora III and tibiae III black, tarsi III apically narrowly infuscated; basic color of tibiae and tarsi III pale yellow.

Abdomen.—Black, all tergites with white apical bands, the band on second tergite usually somewhat wider than the others; basal part of second tergite sometimes rufous instead of black.

Remarks

The coloration described above can be regarded as the basic and "normal" pattern of the male. There is, however, evidence of a considerable degree of variability, tending toward restriction of white markings. Strongly melanistic specimens can well approach and reach the coloration of *sarcitorius* with immaculate coxae and propodeum and restriction of the white bands of fourth and fifth tergites (variety *multor* Cresson).

8. *Ichneumon neosarcitor*, new species

Types

Holotype.—♀, Maine, Bangor. C.G.H.

Allotype.—♂, Maine, Mt. Blue. C.G.H.

Paratypes.—8 ♀♀, Maine, Weld; 5 ♂♂, Maine, Mt. Blue. C.G.H.

Distribution

Found so far in Maine only. Inhabits dry mountain meadows.

Preamble

In color of abdomen and in morphology, particularly of mandibles and flagellum, the female is very closely allied to *sarcitorius* Linnaeus from the Palaearctic, differing, however, in somewhat less stout femora III, very slightly longer basal segments of flagellum and entirely black color of legs. The association of sexes as given below seems to be sufficiently certain, as males and females were collected on the same isolated mountain meadow, and match perfectly in every regard.

Female

Head and thorax black, including subalarum; scutellum white; collare and narrow frontal orbits usually obscure ferruginous; abdomen tricolored; black,

tergites 2 and 3 red-brown, the third with black basal band, sixth tergite white banded; legs black, sometimes tibiae III medially brownish; flagellum filiform; mandibles as in *creperus* (see fig. 4); coxae III with thin scopa; length 14-15 mm.

Flagellum.—Filiform, rather stout, ventrally distinctly flattened and slightly widened beyond middle, a little attenuated at apex, with 37-39 segments, the first about 1.5 times as long as wide, the fifth square, the widest 1.3 times as wide as long. Black, with white annulus on segments 5 or 6 to 15 or 16; scape black.

Head.—Temple profile slightly narrowed with slightly curved outline; cheek profile distinctly narrowed with straight outline; malar space a little shorter than width of base of mandible; cheeks moderately wide between eye and carina genalis and not at all inflated; upper mandible tooth long and pointed, the lower subobsolete, indicated only by a small notch. Black; frontal orbits sometimes narrowly obscure ferruginous; vertical orbits rarely with a minute light dot.

Thorax.—Mesoscutum rather flat, densely punctured; notauli indicated at base; area superomedia usually square. Black, scutellum white, collare usually obscure ferruginous or whitish marked.

Legs.—Moderately stout; femora III not quite as short and stout as in the European *sarcitorius*; coxae III ventrally rather strongly and densely punctured, shiny, with an indistinct, thin scopa. Black; anterior tibiae and tarsi partially, tibiae III sometimes medially dark brownish.

Abdomen.—A little narrower than in *sarcitorius*; second tergite apically not wider than medially long, the third distinctly less than twice as wide as long; second and third tergites rather strongly and very densely punctured, opaque; gastrocoeli small, triangular, slightly deepened. Black, second and third and often sides of fourth tergite narrowly red-brown; base of third tergite black, sixth tergite apically white banded.

Male

Black, scutellum white; tergites 1-3 yellow with black basal bands, the black basal color on the third, sometimes also on the second, tergite medially angularly projecting into the yellow; sometimes the sixth tergite, rarely the sixth and seventh, in the middle with a transverse, white mark; basal third to two-thirds of femora III yellow; coxae and trochanters I and II extensively yellow; tibiae and tarsi yellow, tibiae III apically broadly, basally more narrowly, black, tarsi III black, segments 1-2 yellow with black apices; length 14-17 mm.

Flagellum.—With 39-40 segments and with longish-oval tyloides on segments 4 or 5 to 19 or 20, the longest reaching nearly from bases to apices of segments. Dorsally black, ventrally brownish; scape ventrally yellow.

Head.—Malar space about half as long as width of base of mandible; mandibles with long, pointed upper, and reduced lower, tooth. Black; the following are yellowish-white: mandibles except teeth, clypeus, face, frontal orbits up to lower ocellus.

Thorax.—Mesoscutum strongly and fairly densely punctured; notauli basally distinct; scutellum slightly raised above postscutellum, convex; area superomedia wider than long, rectangular. Black; the following are yellow: collare, usually apex of pronotal ridge (sometimes almost whole length), subalarum, mark on tegulae, or tegulae predominantly, scutellum, sometimes postscutellum.

Legs.—Coxae I and II more or less extensively yellow marked, basally black; coxae III usually black, sometimes dorso-laterally yellow marked; trochanters I and II at least ventrally and apically, sometimes entirely, yellow; trochanters III

tergites 2 and 3 red-brown, the third with black basal band, sixth tergite white banded; legs black, sometimes tibiae III medially brownish; flagellum filiform; mandibles as in *creperus* (see fig. 4); coxae III with thin scopa; length 14-15 mm.

Flagellum.—Filiform, rather stout, ventrally distinctly flattened and slightly widened beyond middle, a little attenuated at apex, with 37-39 segments, the first about 1.5 times as long as wide, the fifth square, the widest 1.3 times as wide as long. Black, with white annulus on segments 5 or 6 to 15 or 16; scape black.

Head.—Temple profile slightly narrowed with slightly curved outline; cheek profile distinctly narrowed with straight outline; malar space a little shorter than width of base of mandible; cheeks moderately wide between eye and carina genalis and not at all inflated; upper mandible tooth long and pointed, the lower subobsolete, indicated only by a small notch. Black; frontal orbits sometimes narrowly obscure ferruginous; vertical orbits rarely with a minute light dot.

Thorax.—Mesoscutum rather flat, densely punctured; notauli indicated at base; area superomedia usually square. Black, scutellum white, collare usually obscure ferruginous or whitish marked.

Legs.—Moderately stout; femora III not quite as short and stout as in the European *sarcitorius*; coxae III ventrally rather strongly and densely punctured, shiny, with an indistinct, thin scopa. Black; anterior tibiae and tarsi partially, tibiae III sometimes medially dark brownish.

Abdomen.—A little narrower than in *sarcitorius*; second tergite apically not wider than medially long, the third distinctly less than twice as wide as long; second and third tergites rather strongly and very densely punctured, opaque; gastrocoeli small, triangular, slightly deepened. Black, second and third and often sides of fourth tergite narrowly red-brown; base of third tergite black, sixth tergite apically white banded.

Male

Black, scutellum white; tergites 1-3 yellow with black basal bands, the black basal color on the third, sometimes also on the second, tergite medially angularly projecting into the yellow; sometimes the sixth tergite, rarely the sixth and seventh, in the middle with a transverse, white mark; basal third to two-thirds of femora III yellow; coxae and trochanters I and II extensively yellow; tibiae and tarsi yellow, tibiae III apically broadly, basally more narrowly, black, tarsi III black, segments 1-2 yellow with black apices; length 14-17 mm.

Flagellum.—With 39-40 segments and with longish-oval tyloides on segments 4 or 5 to 19 or 20, the longest reaching nearly from bases to apices of segments. Dorsally black, ventrally brownish; scape ventrally yellow.

Head.—Malar space about half as long as width of base of mandible; mandibles with long, pointed upper, and reduced lower, tooth. Black; the following are yellowish-white: mandibles except teeth, clypeus, face, frontal orbits up to lower ocellus.

Thorax.—Mesoscutum strongly and fairly densely punctured; notauli basally distinct; scutellum slightly raised above postscutellum, convex; area superomedia wider than long, rectangular. Black; the following are yellow: collare, usually apex of pronotal ridge (sometimes almost whole length), subalarum, mark on tegulae, or tegulae predominantly, scutellum, sometimes postscutellum.

Legs.—Coxae I and II more or less extensively yellow marked, basally black; coxae III usually black, sometimes dorso-laterally yellow marked; trochanters I and II at least ventrally and apically, sometimes entirely, yellow; trochanters III

usually black, sometimes apically broadly yellow; all trochantelli yellow; femora yellow, apical third or half of femora III black, femora I and II dorso-laterally black; tibiae and tarsi I and II yellow; tibiae III yellow, basally more narrowly, apically broadly, black; tarsi III black, the first and second segments yellow with black apices.

Abdomen.—Hypopygium medially angularly projecting. Tergites 1-3 with broad, yellow apical bands which occupy more than half of second and third tergites; black basal color of third tergite, sometimes also of second, medially angularly projecting into the yellow; sometimes seventh tergite with an irregular, sometimes interrupted or indistinct, white crossband, or the sixth with a narrow, white, median apical band, rarely both of these tergites white marked.

9. *Ichneumon annulatorius* Fabricius

Figs. 2, 3, 30, 31, 49, 64

Ichneumon annulatorius Fabricius, 1775, Systema Entomologica, p. 330-31, ♂.

Ichneumon funestus Cresson, 1864, Ent. Soc. Phila. Proc., 3:166, ♀.

Ichneumon haesstans Provancher, 1875, Nat. Canad., 7:24, 80, ♀.

Types

Holotypes.—*Ichneumon annulatorius* Fabricius, ♂, probably Massachusetts. British Museum, London. *Ichneumon funestus* Cresson, ♀, Pennsylvania. A.N.S. *Ichneumon haesstans* Provancher, ♀, Canada. Provincial Museum Quebec.

Host

According to H. Townes 1951: "*Cirphis unipuncta* (Haw.)."

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition Zone". New records: Newfoundland (C.N.C.).

Male

Black with rich lemon-yellow pattern; scutellum and in the great majority of specimens two short median lines on mesoscutum yellow; propodeum always with extensive yellow lateral marks; usually mesopleura yellow marked; postpetiolus and tergites 2-4 yellow with rather narrow, black basal bands; pronotal base at least partially and cheeks yellow; abdomen narrow, third tergite square; length 12-15 mm.

Flagellum.—With short, very narrow tyloides on segments 6-13 or 14. Black, ventrally light brown; scape ventrally yellow.

Head.—Black; the following are lemon-yellow: mandibles except teeth, clypeus, face, frontal orbits, vertical marks, outer orbits except temple region, extending below over the whole apex of cheeks and the malar space.

Thorax.—Scutellum rather strongly raised above postscutellum, dorsally convex; area superomedia usually square, sometimes wider than long. Black, the following are lemon-yellow: collare, pronotal ridge, pronotal base usually entirely or predominantly, rarely at apex only, subalarum, tegulae, two short median lines on mesoscutum (often confluent), scutellum, postscutellum, often marks on prescutellar carinae, two extensive marks on propodeum, covering usually the whole areae dentiparae, areae posteroexternae and the apex of areae spiraculiferae, often also apex of areae superoexternae, usually a small or medium size mark on mesopleura.

Legs.—Black; the following are lemon-yellow: all trochanters and trochantelli, coxae I and II, femora I and II ventrally entirely and dorsally at base, and apex and base of femora III and all tibiae and tarsi; tibiae III apically broadly black, tibiae I and II ventrally infuscated toward apex, apex of metatarsus III and the following segments rather strongly infuscated.

Abdomen.—Narrow, third tergite square, fourth little wider than long. Black; the following are lemon-yellow: postpetiolus and tergites 2-4 except comparatively narrow, black basal bands, sometimes the apical margin of fifth tergite on each side.

Female

Mesoscutum black, rarely with ferruginous pattern of varying extent; *scutellum* white; *propodeum* black; *abdomen* usually uniformly ferruginous except petiolus; in few specimens bases of tergites 2-4 black or black marked; sometimes postpetiolus yellow marked laterally at apex; legs black, tibiae and tarsi partially ferruginous; *flagellum* filiform, stout; main diagnostic character of species: ventral side of coxae III smooth, with few scattered punctures; no *scopa*; length 10-13 mm.

Flagellum.—Filiform, scarcely attenuated toward apex, ventrally flattened and slightly widened beyond middle, with 32-35 segments, the first 1.5 times as long as wide, the fifth square, the widest approximately 1.5 times as wide as long. Black with white annulus on segments 7 or 8 to 13 or 14; scape ventrally often ferruginous, apically or in whole length.

Head.—Temple profile slightly narrowed with curved outline, cheek profile distinctly narrowed with straight outline; cheeks slightly inflated; malar space a little shorter than width of base of mandible; subapical tooth of mandibles rather reduced. Black with ferruginous pattern of varying extent; at least frontal and vertical orbits broadly and apex of cheeks ferruginous; more often ferruginous color more extensive, covering vertex or frons and vertex entirely, outer orbits, middle and sides of face and apex of clypeus; sometimes small yellowish marks on vertical orbits or also on frontal orbits partially yellowish.

Thorax.—*Mesoscutum* flat, moderately densely punctured, shiny; notauli basally indicated; *scutellum* flat; area superomedia square or a little longer than wide. Black, *scutellum* yellow, *mesoscutum* usually entirely black, rarely almost entirely ferruginous, sometimes black with ferruginous longitudinal bands; *collare*, narrow apex of pronotal ridge and *tegulae* usually ferruginous; *subalarum* and *postscutellum* often yellowish.

Legs.—Stout, femora thick; coxae III ventrally smooth and shiny with a few scattered punctures; no *scopa*. Black; trochantelli, tibiae and tarsi ferruginous; tibiae III apically black, tibiae I and II apically more or less extensively infuscated, sometimes predominantly blackish-brown; segments of tarsi III apically infuscated, the last one or two usually entirely dark.

Abdomen.—*Gastrocoeli* triangular, moderately deepened, their interval much wider than one of them; tergites 2 and 3 moderately strongly and densely punctured. Usually uniformly ferruginous except petiolus; sometimes whole first segment black, the third or third and fourth tergite with black basal bands, rarely also the second tergite with black lateral patches at base; postpetiolus frequently with yellow lateral marks at apex; exceptionally also the second tergite with such marks or the seventh with indication of a yellowish anal spot.

ruginous, tibiae III narrowly infuscated at apex, tibiae I and II and tarsi III apically not infuscated; femora III sometimes basally and dorsally, femora I and II often entirely ferruginous; in melanistic specimens all femora black.

Abdomen.—Gastrocoeli triangular, moderately deepened, their interval much wider than one of them; tergites 2 and 3 more finely and less densely punctured than in *annulatorius*, especially the third tergite. Ferruginous, seventh tergite with yellow anal mark; sometimes postpetiolus with yellow lateral apical marks; sometimes tergites 1-4 or 3 and 4 with black basal bands.

11. *Ichneumon stagniphilos*, new species

Types

Holotype.—♀, Ontario, Ottawa, Mer Bleue, J. McDunnough, 13.V.1932. C.N.C. No. 7133.

Paratypes.—1 ♀, from type locality and date; 2 ♀♀, from type locality, 10.V.1933, G. S. Walley. C.N.C.

Preamble

This species too is very similar to certain mutants of *annulatorius*, and even more to *glaucopygos*, almost agreeing with both also in general morphology and especially flagellar structure. It differs from *annulatorius* in the somewhat more narrowed cheek profile and especially in the ventrally densely punctured coxae III, from *glaucopygos* by structure of flagellum, which is a little longer, more widened and distinctly more blunted at apex; furthermore the sculpture of second and third tergites is denser and stronger and the femora III are not inflated.

Female

Mesoscutum entirely, *propodeum* extensively ferruginous, *scutellum* white; *abdomen* ferruginous except *petiolus*; *postpetiolus* and *second tergite* with yellow lateral-apical marks, *sixth and seventh tergites* with yellow anal mark; *tergites 3 and 4* in one specimen with black basal bands; *femora black, tibiae and tarsi* pale ferruginous, *tibiae III* apically black, medially yellowish tinted; *flagellum* filiform, blunt at apex; *coxae III* ventrally densely punctured; indistinct, thin *scopa*; length 11 mm.

Flagellum.—Filiform, ventrally flattened and somewhat widened beyond middle, scarcely attenuated toward apex, the apical cone itself short and blunt, with 34-35 segments, the first about 1.4 times as long as wide, the fourth square, the widest nearly twice as wide as long. Segments 1-7 black or gradually changing from basally ferruginous into blackish-brown, 8-12 with white annulus, apex black; *scape* ventrally or entirely ferruginous.

Head.—Temple profile moderately narrowed with slightly curved outline; cheek profile more distinctly narrowed than in *annulatorius*, with straight outline; malar space scarcely shorter than width of base of mandible; mandibles normal. Predominantly ferruginous; the following black: patch on each side of median field of face, supraantennal cavities, temple region behind ferruginous orbits.

Thorax.—*Mesoscutum* flat, moderately densely punctured, shiny; notauli subobsolete; *scutellum* flat; area superomedia rectangular, a little longer than wide. Black, *scutellum* yellow; *mesoscutum* entirely, horizontal part of *propodeum* and declivity entirely or predominantly ferruginous including *areae spiraculiferae* except base; ferruginous are also: *collare*, pronotal ridge, *subalarum*, *tegulae*, *postscutellum*.

ruginous, tibiae III narrowly infuscated at apex, tibiae I and II and tarsi III apically not infuscated; femora III sometimes basally and dorsally, femora I and II often entirely ferruginous; in melanistic specimens all femora black.

Abdomen.—Gastrocoeli triangular, moderately deepened, their interval much wider than one of them; tergites 2 and 3 more finely and less densely punctured than in *annulatorius*, especially the third tergite. Ferruginous, seventh tergite with yellow anal mark; sometimes postpetiolus with yellow lateral apical marks; sometimes tergites 1-4 or 3 and 4 with black basal bands.

11. *Ichneumon stagniphilos*, new species

Types

Holotype.—♀, Ontario, Ottawa, Mer Bleue, J. McDunnough, 13.V.1932. C.N.C. No. 7133.

Paratypes.—1 ♀, from type locality and date; 2 ♀♀, from type locality, 10.V.1933, G. S. Walley. C.N.C.

Preamble

This species too is very similar to certain mutants of *annulatorius*, and even more to *glaucopygos*, almost agreeing with both also in general morphology and especially flagellar structure. It differs from *annulatorius* in the somewhat more narrowed cheek profile and especially in the ventrally densely punctured coxae III, from *glaucopygos* by structure of flagellum, which is a little longer, more widened and distinctly more blunted at apex; furthermore the sculpture of second and third tergites is denser and stronger and the femora III are not inflated.

Female

Mesoscutum entirely, *propodeum* extensively ferruginous, *scutellum* white; *abdomen* ferruginous except *petiolus*; *postpetiolus* and *second tergite* with yellow lateral-apical marks, *sixth and seventh tergites* with yellow anal mark; *tergites 3 and 4* in one specimen with black basal bands; *femora black*, *tibiae and tarsi* pale ferruginous, *tibiae III* apically black, *medially yellowish tinted*; *flagellum* filiform, *blunt at apex*; *coxae III* ventrally densely punctured; *indistinct, thin scopa*; *length 11 mm*.

Flagellum.—Filiform, ventrally flattened and somewhat widened beyond middle, scarcely attenuated toward apex, the apical cone itself short and blunt, with 34-35 segments, the first about 1.4 times as long as wide, the fourth square, the widest nearly twice as wide as long. Segments 1-7 black or gradually changing from basally ferruginous into blackish-brown, 8-12 with white annulus, apex black; *scape* ventrally or entirely ferruginous.

Head.—Temple profile moderately narrowed with slightly curved outline; cheek profile more distinctly narrowed than in *annulatorius*, with straight outline; malar space scarcely shorter than width of base of mandible; mandibles normal. Predominantly ferruginous; the following black: patch on each side of median field of face, supraantennal cavities, temple region behind ferruginous orbits.

Thorax.—Mesoscutum flat, moderately densely punctured, shiny; notauli subobsolete; scutellum flat; area superomedia rectangular, a little longer than wide. Black, scutellum yellow; mesoscutum entirely, horizontal part of propodeum and declivity entirely or predominantly ferruginous including areae spiraculiferae except base; ferruginous are also: collare, pronotal ridge, subalarum, tegulae, postscutellum.

Abdomen.—As in *annulatorius*, but slightly more elongate and pointed. Uniformly ferruginous except black petiolus.

13. *Ichneumon heterocampae* (Cushman)

Amblyteles heterocampae Cushman, 1933, U.S.N. Mus. Proc., 82 (Art. 14):2, ♀.

Types

Holotype.—♀, Massachusetts, North Heath, ex *Heterocampa guttivitta* (Wlkr.). U.S.N.M.

Host

Heterocampa guttivitta (Wlkr.).

Distribution

According to H. Townes 1951: "Massachusetts, New York, New Jersey, Maryland, Ohio". New records: Quebec, Gatineau (C.G.H.); Ontario, Pennsylvania (C.N.C.).

Preamble

Related and similar to *annulatorius*, but flagellum a trifle more widened beyond middle and a little more attenuated at apex, tibiae usually distinctly yellowish tinted in the middle, femora III relatively a little longer.

Female

Mesoscutum entirely or predominantly ferruginous, *scutellum* white; *propodeum* black, exceptionally partially ferruginous; *abdomen* ferruginous including usually postpetiolus; legs black, tibiae and tarsi ferruginous, tibiae III apically blackish, all tibiae medially yellowish; flagellum stout, subfiliform; ventral side of coxae III polished with few scattered punctures; no scopa; length 12-13 mm.

Flagellum.—Subfiliform, stout, ventrally flattened and distinctly widened beyond middle, somewhat attenuated at apex, with 35-36 segments, the first 1.5 times as long as wide, the sixth or seventh square, the widest approximately two times as wide as long. Black with white annulus on segments 7 or 8 to 13 or 14; scape sometimes ventrally, rarely entirely ferruginous.

Head.—Temple and cheek profiles a little more narrowed than in *annulatorius*, the former with slightly curved, the latter almost straight outline; malar space almost as long as width of base of mandible; mandibles normal. Ferruginous; the following black: lateral fields of face, supraantennal cavities, ocellar and occipital regions; rarely head entirely ferruginous.

Thorax.—Mesoscutum flat, moderately densely punctured, shiny; notauli basally slightly indicated; area superomedia usually square. Black; scutellum and postscutellum white, collare and subalarum white or ferruginous; the following are ferruginous: mesoscutum, pronotal ridge apically, rarely entirely; exceptionally horizontal part of propodeum and mesopleura extensively ferruginous.

Legs.—Rather stout; femora III thick, but comparatively a little longer than in *annulatorius*; coxae III ventrally polished with scattered punctures; no trace of scopa. Black; trochantelli, tibiae and tarsi ferruginous; all tibiae medially more or less distinctly yellow; tibiae III and II or only III apically and sometimes narrowly also at base infuscated; apices of segments of tarsi III usually slightly infuscated; exceptionally femora I and II predominantly, femora III basally and dorsally ferruginous.

Abdomen.—Gastrocoeli triangular, moderately deepened, their interval distinctly wider than one of them; tergites 2 and 3 moderately strongly and fairly

sparsely punctured. Uniformly ferruginous except black petiolus; rarely the entire first segment black.

14. *Ichneumon pseudowinkleyi*, new species

Types

Holotype.—♀, Maine, Dryden, G. Heinrich. C.G.H.

Paratypes.—1 ♀, Maine, Chesterville. C.G.H.; 5 ♀♀, Manitoba, Dauphin Lake; 1 ♀, Ontario, Almonte; 1 ♀, Quebec, Laniel; 1 ♀, New York, Hunter. C.N.C. 1 ♀, Alberta, Grimshaw. C.H.T.

Distribution

Maine, Quebec, Ontario, New York, Manitoba, Alberta.

Preamble

By the ferruginous mesoscutum and by the sparsely punctured coxae III similar to *heterocampae*, but legs and flagellum much more slender, tibiae never medially yellow and sculpture of second tergite denser; may also be mistaken for *winkleyi* but differs by the less attenuated flagellum and by sculpture of coxae III.

Female

Mesoscutum ferruginous, *scutellum* white, sometimes ferruginous; *propodeum* and *pleura* black; *abdomen* uniformly ferruginous including *petiolus*; *femora* black, *tibiae* and *tarsi* ferruginous, *apex of tibiae* III black. *Flagellum* slender, subfiliform, somewhat attenuated; *coxae* III ventrally smooth, sparsely punctured; *no scopa*; *length* 11 mm.

Flagellum.—Fairly long, slender, subfiliform, not at all widened beyond middle, ventrally indistinctly flattened toward apex, distinctly but not strongly attenuated at apex, with 40-41 segments, the first about 2.5 times as long as wide, the ninth or tenth approximately square, the last 12-15 segments before the apical cone transverse. Black with white annulus on segments 8 to 15 or 16; scape usually ventrally ferruginous.

Head.—Temple and cheek profile rather strongly narrowed, the former with very slightly curved, the latter with straight outline; malar space about as long as width of base of mandible; mandibles normal. Black; the following are ferruginous; facial, frontal and vertical orbits, middle of face and often clypeus.

Thorax.—Mesoscutum almost flat, rather sparsely and finely punctured, shiny; notauli indicated only at the very base; scutellum flat; area superomedia usually approximately square. Black, mesoscutum ferruginous, scutellum and post-scutellum from entirely yellow to entirely ferruginous; the following ferruginous: collare, pronotal ridge apically, or sometimes entirely, tegulae, sometimes subalarum.

Legs.—Moderately slender; femora III considerably more slender than in *heterocampae*, less slender than in *winkleyi*; coxae III ventrally in the apical part smooth and shiny, with scattered, or sparse punctures. Black; the following are reddish-brown: trochantelli, tibiae and tarsi and femora I partially; tibiae III apically narrowly black; tibiae II sometimes apically somewhat infuscated, tarsi not.

Abdomen.—Moderately slender; gastrocoeli fairly deeply impressed, triangular, their interval somewhat wider than one of them; third and especially

the second tergite distinctly and rather densely punctured, on the second tergite no intervals between punctures. Uniformly ferruginous including the whole first segment; exceptionally third tergite with black basal band.

15—*Ichneumon lariae* Curtis

Fig. 48

Distribution

Arctic and Hudsonian Zones of the New World and probably Arctic Zone of Siberia; in the New World boreoalpine as found in Greenland, Arctic and Hudsonian parts of Canada and also in high mountain region of New Hampshire (Mt. Washington).

Preamble

In a critical study of this species and its closely related forms (1956, Can. Entom., 88:686-691) I gave a detailed report concerning its taxonomy, synonymy, characters, distribution and geographical variability. The female of *lariae* is especially distinguished by its peculiar, exactly filiform, slender, neither widened nor attenuated structure of flagellum, its weak sculpture of postpetiolus and predominantly ferruginous color. The male is not yet known with certainty.

Female

Ferruginous with geographically varying black pattern of head, sterna, pleura and abdomen; flagellum ferruginous, infuscated toward apex, without white annulus (except specimen from Mt. Washington); mesoscutum, scutellum and all femora, tibiae and tarsi always ferruginous; flagellum slender, exactly filiform, not at all widened and not at all attenuated; striation of postpetiolus fine, indistinct or obsolete; gastrocoeli triangular; coxae III fairly densely punctured, with thin, indistinct scopa; length 10-13 mm.

Flagellum.—Filiform, slender, fairly long, of even width throughout, neither widened beyond middle nor attenuated at apex, inconspicuously flattened ventrally toward apex, with 35-39 segments, the first 1.5 times as long as wide, about the ninth or tenth square, about the last fifteen segments before the end cone transverse. Blackish except the ferruginous base.

Head.—Temple profile but slightly, cheek profile considerably narrowed, the former with curved, the latter with almost straight outline; malar space about as long as width of base of mandible; mandibles normal; rather strongly punctured except apical part of cheeks. Color varying from entirely black to entirely ferruginous.

Thorax.—Mesoscutum flat, moderately densely and finely punctured, shiny; notauli obsolete; scutellum slightly convex, smooth; propodeum fairly short, area superomedia square or slightly wider than long. Mesoscutum and scutellum always ferruginous; pleura and propodeum varying from nearly entirely black to entirely ferruginous; sterna entirely or predominantly black.

Legs.—Moderately stout; coxae III rather strongly, irregularly punctured, with thin, indistinct scopa. Coxae and trochanters varying from almost entirely black to entirely ferruginous; femora, tibiae and tarsi always entirely ferruginous.

Abdomen.—Median field of postpetiolus rather ill-defined, shiny, entirely smooth or with some indistinct striae and a few scattered punctures; gastrocoeli triangular, fairly deep, their interval as wide as or distinctly wider than one of them; second and third tergites fairly sparsely and not strongly punctured. Ferruginous; in Arctic populations usually with some black marks of variable size on the disks of several tergites; exceptionally seventh tergite with light anal mark.

Male

Roman associated (see below, *loc. cit.* 1933) an entirely black male having the legs red except for coxae and trochanters with his species *aurivillii*. I am inclined rather to associate another male having the second and third tergite pale rufous. Both associations, however, are mere hypotheses.

15a. *Ichneumon lariae lariae* Curtis

Ichneumon lariae Curtis, 1835, in Ross, Appendix to the Narrative of a Second Voyage in Search of a North-West Passage, p. LXI, fig. Pl. A, 1, ♀.

Craticheumon aurivillii Roman, 1916, Arkiv for Zoologi, 10, 22, p. 5, ♀.

Ichneumon aurivillii Roman, 1933, Skrifter om Svalbard, 53:617, ♀ ♂.

Ichneumon lariae Heinrich, 1956, Canad. Entom., 88:686-691.

Types

Holotype.—Lost. According to G. F. Perkins (*in litt.*), no type could be found in England.

Neotype.—♀, Greenland, Sonderstrom Air Base. C.N.C. No. 7165.

Distribution

Greenland, Boothia Peninsula, Baffin Island, Southampton Island.

Female

Head and sterna black, face usually medially ferruginous; pleura and propodeum ferruginous and black in different extent, varying from nearly entirely ferruginous to nearly entirely black; abdomen ferruginous with black marks of variable size and extent on the disk of tergites 2-4, or 5, or 6, or 7, rarely tergites 4-7 entirely black; legs ferruginous; coxae and trochanters varying from partially ferruginous to entirely black; flagellum fuscous, basally ferruginous, without annulus; exceptionally seventh tergite with light anal mark; length 10-11 mm.

15b. *Ichneumon lariae subarcticus* Heinrich

Ichneumon lariae subarcticus Heinrich, 1956, Canad. Entom., 88:689, ♀.

Types

Holotype.—♀, Northwest Territories, Salmita Mines, C.N.C. No. 6410.

Distribution

Northwest Territories, Hudsonian Manitoba and Quebec (Fort Chimo). (C.N.C.).

Female

Differs from *lariae lariae* by decrease of melanistic color pattern; abdomen entirely ferruginous, head and pleura entirely or predominantly so; mesosternum and often prosternum black, the former at least from mesolcus to the line of sternauli; legs ferruginous, rarely coxae II and III partially black; length 10-11 mm.

Variable in color, sculpture and to a certain degree even in proportions of flagellar segments; for chromatic variability see table in Heinrich (*loc. cit.*).

15c. *Ichneumon lariae labradoris* Heinrich

Ichneumon lariae labradoris Heinrich, 1956, Canad. Entom., 88:690, ♀.

Types

Holotype.—♀, Newfoundland, Labrador, Hopedale. C.N.C. No. 6411.

Distribution

Labrador. New record ? : New Hampshire, Mt. Washington.

Female

Differs in broad series from *lariae lariae* and *lariae subarcticus* in size; average length of ten specimens 12.5 mm.; sculpture of postpetiolus as in the preceding two subspecies varying between smooth and finely striate; color less variable than in the other subspecies. Ferruginous; only the following are black: mesosternum from mesolcus to line of sternauli, sometimes entirely, prepectus and prosternum entirely or partially, sometimes base of coxae III and areae coxales.

Mutant or subspecies

One female from New Hampshire, Mt. Washington, 14.VIII.1958, J. R. Vockeroth (C.N.C.) comes close to *lariae labradoris*, but differs by presence of a fairly distinct yellowish annulus on flagellar segments 10-14, somewhat smaller size and more extensively black coxae. I suspect that this specimen represents a subspecies different from *lariae labradoris*, but one specimen is not enough to establish a subspecific diagnosis.

Remarks

A further subspecies has been described from Siberia: *asiaticus* Roman (see Heinrich, *loc. cit.* 1956).

16. *Ichneumon anonymus*, new species

Figs. 28, 46

Types

Holotype.—♀, Maine, Dryden, 13.VI.1956, G. Heinrich. C.G.H.

Paratypes.—7 ♀♀, Maine, Dryden; 3 ♀♀, Massachusetts, Concord; 2 ♀♀, West Virginia, Harpers Ferry; 1 ♀, Quebec, Gatineau. C.G.H.; 2 ♀♀, New York, Ithaca; 1 ♀, Maryland, Takoma Park; 1 ♀, Pennsylvania, Spring Bridge. C.H.T.; 5 ♀♀, Ontario, Ottawa and Merivale; 4 ♀♀, Quebec, Aylmer. C.N.C.

Distribution

Maine, Quebec, Massachusetts, West Virginia (C.G.H.); New York, Maryland, Pennsylvania (C.H.T.); Ontario (C.N.C.).

Preamble

In color pattern somewhat similar to *annulatorius*, but strongly distinguished by the filiform, but nevertheless very slender flagellum with elongate basal segments, by the strongly narrowed temples and shape of gastrocoeli (see below).

Female

Mesoscutum and *propodeum* always black; *scutellum* and *subalarum* white, often also vertical spot; *abdomen* ferruginous except base; exceptionally third tergite with black basal band; seventh tergite in majority of specimens with yellow apical mark; legs black, *tibiae* and *tarsi* predominantly ferruginous, *tibiae* III at least apically, often entirely blackish; *flagellum* filiform, very slender; *coxae* III very densely punctured, without *scopa*; length 9-13 mm.

Flagellum.—Filiform, but very slender, with long, basal segments, ventrally flattened but not widened beyond middle, scarcely attenuated at apex, with 30, rarely 31 segments, the first almost 3 times as long as wide, the twelfth or thirteenth approximately square. Black with white annulus on segments 6 or 7 to 12.

Head.—Temple and cheek profiles strongly narrowed, the former with very slightly curved, the latter with straight outline; malar space about as long as width of base of mandible; mandibles normal. Black; vertical and frontal orbits down to the level of antennal sockets pale ferruginous, usually with one white dot on vertex and another on level with antennal sockets, rarely frontal and vertical orbits altogether white; in one specimen ferruginous color extensive, covering clypeus, cheeks, and middle and lateral parts of face.

Thorax.—Mesoscutum distinctly convex, densely punctured, nearly opaque; anterior third of notauli distinct; scutellum slightly raised above postscutellum; area superomedia square or a little longer than wide. Black, scutellum yellow, subalarum always white or white dotted, exceptionally the postscutellum white; collare usually obscure ferruginous or whitish marked.

Legs.—Moderately slender, femora III rather stout; coxae III very densely punctured, without scopa. Black; the following ferruginous: trochantelli, apex of femora I ventrally, tibiae and tarsi; all tibiae, especially tibiae III, usually apically more or less strongly and extensively infuscated, tibiae III often entirely blackish; also tarsi III sometimes infuscated.

Abdomen.—Gastrocoeli not as usual triangular, but rather quadrangular, as the inner apex of their apical border does not converge or meet with the apical border of postpetiolus; interval of gastrocoeli considerably wider than one of them; second and third tergites densely and rather strongly punctured. Ferruginous except black petiolus; sometimes also postpetiolus almost entirely blackish, rarely third tergite with black basal band; seventh tergite usually with more or less distinct yellowish anal mark.

17. *Ichneumon tritus*, new species

Types

Holotype.—♀, Quebec, Mt. Orford, 9.IX.1937, Shewell. C.N.C. No. 7090.

Paratypes.—2 ♀♀, Quebec, Hemmingford and Meach Lake; 1 ♀, New York, Ithaca. C.N.C.; 1 ♀, Quebec, Ste. Flore, C.G.H.

Distribution

Quebec, Ontario, New York. (C.N.C.).

Preamble

Closely related to *anonymus* but at once distinguished by the shorter basal segments of flagellum and distinctly less narrowed temple profile, also chromatically by the presence of ferruginous pattern on mesoscutum and often on propodeum. Easier to be mistaken for *glaucopygos*, but mesoscutum anteriorly more convex, notauli basally distinct and flagellum distinctly more slender, its basal segments relatively longer.

Female

Mesoscutum black with ferruginous lateral lobes; propodeum black or partially dark ferruginous; scutellum and subalarum, usually also postscutellum white; abdomen ferruginous except petiolus and rarely basal band on third tergite; seventh tergite with yellowish apical mark; femora black, tibiae and tarsi ferruginous, tibiae III apically black; flagellum subfiliform, more slender than in *annulatorius* and *glaucopygos*, less so than in *anonymus*; coxae III densely punctured, without scopa; length 10-12 mm.

Flagellum.—Subfiliform, moderately slender, ventrally flattened and a very little widened beyond middle, slightly attenuated toward apex, with 32-34 segments, the first almost two times as long as wide, the eighth square, the widest about 1.3 times as wide as long. Black with white annulus on segments 6 or 7 to 12 or 13.

Head.—Temple profile moderately strongly narrowed with slightly curved outline, cheek profile considerably narrowed with straight outline; malar space a little shorter than width of base of mandible; mandibles normal. Black; the following pale ferruginous: clypeus, frontal and vertical orbits ending below usually in a whitish spot at level of antennal sockets, sometimes also facial orbits, usually a patch in the middle of outer orbits, sometimes middle of face.

Thorax.—Mesoscutum slightly convex anteriorly, moderately densely and finely punctured, shiny; notauli basally distinct; area superomedia square. Black, scutellum, postscutellum and subalarum yellow; lateral lobes of mesoscutum dark ferruginous, often also horizontal part of propodeum and areae spiraculiferae partially; ferruginous are also: collare, apex of pronotal ridge (sometimes almost its whole length) and tegulae.

Legs.—Femora III rather stout; coxae III ventrally very densely punctured, without scopa. Black; trochantelli, tibiae and tarsi ferruginous, apices of tibiae I and II slightly infuscated, of tibiae III black.

Abdomen.—Gastrocoeli shaped as in *anonymus*, their interval wider than one of them; second and third tergites moderately strongly and densely punctured. Ferruginous except petiolus, rarely base of third tergite black banded; seventh tergite with yellowish apical mark.

18. *Ichneumon ultimus* Cresson

Fig. 45

Ichneumon ultimus Cresson, 1877, Amer. Ent. Soc. Trans., 6:178, ♀.

Types

Holotype.—♀, New Hampshire, White Mountains. A.N.S.

Neallotype.—♂, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania". New records: Maine, Ontario, Quebec, Maryland, West Virginia (C.G.H.) Canadian and Transition Zones. Confined to deciduous woods.

Female

Thorax black, scutellum white; mesoscutum partially or predominantly red; abdomen red; one white anal mark; legs black, all tibiae with white annulus, all tarsi ferruginous; flagellum slender, subfiliform; gastrocoeli rather wide, approximately as wide as interval; thin scopa; length 8-11 mm.

Flagellum.—Slender, between bristleshaped and filiform, ventrally flattened beyond middle but not widened, slightly attenuated at apex, with 32 segments, the first twice as long as wide, the sixth (Canada and New England) square. Black with white annulus on segments 7 or 8 to 12; scape ventrally ferruginous.

Head.—Temple and cheek profiles rather strongly narrowed, the former with straight, the latter with nearly straight outline; malar space about as long as width of base of mandible; median field of face distinctly convex; mandibles

normal. Black with varying ferruginous pattern; at least the following ferruginous: middle of clypeus, middle of face, orbits broadly around eyes, except on temple region; more often ferruginous color diffused over the whole face (usually except a black mark on each side of median field), clypeus and apical part of cheeks.

Thorax.—Mesoscutum slightly convex, moderately densely punctured; notauli obsolete; area superomedia square or a little longer than wide. Black, scutellum and usually subalarum white; mesoscutum varying between black and obscure red, rarely entirely black or entirely red; usually median lobe obscure red; collar, apex of pronotal ridge and tegulae ferruginous; horizontal part of propodeum often more or less extensively marked with obscure red.

Legs.—Moderately stout; coxae III densely and finely punctured with small scopa. Black; tarsi, apex of tibiae I and narrow apices of femora I and II ferruginous; all tibiae broadly yellow banded, their narrow bases blackish or infuscated, apices of tibiae II and III broadly black.

Abdomen.—Gastrocoeli relatively deep and wide, nearly as wide as their interval; tergites 2 and 3 moderately densely punctured. Red, base of first segment black, last tergite with white mark.

Variability

Except for the varying distribution of red on head, mesoscutum and propodeum, the species is chromatically relatively constant. Among several hundreds of specimens, however, the following rare mutants have been recorded:

1. Tergites 3 and 4 at base and apex, 6 and 7 entirely blackish.
2. Yellowish apical lateral marks on tergites 1 and 2.
3. Yellow annulus of tibiae obsolete.

There is a slight geographical variation in morphology of flagellum: in populations from Maryland and West Virginia the flagellum is a little more slender than in northern populations, not the sixth, but the eighth or ninth segment of flagellum being square. By contrast, specimens from British Columbia, Robson (C.N.C.) have the flagellum still wider than northeastern specimens and the scopa obsolete. I am in doubt whether they represent another species or subspecies, and therefore have not included them in the above distribution.

Male

The association of sexes is beyond doubt as the neallotype described below was caught in copula, July 27, 1952.

Black with yellow pattern; scutellum yellow, yellow marks on propodeum; postpetiolus with yellow apical band, tergites 2 and 3 yellow with broad, black basal bands; cheeks, frontal and vertical orbits, pronotal ridge and base yellow; tergites 3-6 wider than long; length 10 mm.

Flagellum.—Longish-oval tyloides on segments 6 to 14 or 16, the longest reaching nearly the base but not quite the apex of segments. Black, ventrally pale brown; scape ventrally yellow.

Head.—The following are yellow: mandibles except teeth, clypeus, face, frontal and vertical orbits, somewhat widened at level of lower ocellus.

Thorax.—Mesoscutum rather densely punctured; notauli obsolete; area superomedia a little wider than long or square. Black; the following are yellow: collar, pronotal ridge, pronotal base, subalarum, scutellum, postscutellum, two marks on propodeum (covering areae dentiparae and apex of areae spiraculiferae), sometimes small, irregular marks on lower part of mesopleura.

Legs.—Black; the following are yellow: all trochanters and trochantelli, coxae I and II, sometimes irregular, longitudinal dorsal mark on coxae III, apex and ventral side of femora I and II, all tibiae, tibiae III except usually narrowly infuscated base and broadly black apex, tibiae I and II except an infuscated, longitudinal stripe ventrally toward apex; tarsi yellowish, tarsi III or II and III slightly infuscated toward apex.

Abdomen.—Black; the following are yellow: postpetiolus apically or entirely, broad apical bands on tergites 2 and 3.

Biology

By far the most common of the wood-dwelling *Ichneumon* species of Eastern North America. Females hibernate gregariously in rotten stumps and logs, sometimes in great numbers. Once in the middle of October on a warm day, when some *Ichneumon* females were still flying, I opened a stump in the depth of which I found 50 specimens of this species already assembled. While I was at work I observed four specimens landing at intervals on the stump and disappearing into its interior. I suppose that females searching for hibernating quarters are attracted by a specific scent of others already hidden and that this explains the strange fact of specific accumulation in hibernation.

18A. *Ichneumon hypermelanos*, new species

Type

Holotype.—♀, Ontario, Sudbury, 1890. C.N.C. No. 7172.

Female

Entirely black except white scutellum, white anal mark on seventh tergite, narrowly ferruginous frontal orbits and narrowly ferruginous apical borders of tergites 2-4; legs black, tibiae with pale yellowish annulus. Gastrocoeli still wider than in average specimens of typical *ultimus*, their interval more strongly narrowed. Otherwise like *ultimus*.

Remarks

This could perhaps be a melanistic variety of *ultimus* Cresson.

19. *Ichneumon chasmodops*, new species*

Figs. 8, 40

Types

Holotype.—♀, Maine, Dryden, hibernating. C.G.H.

Allotype.—♂, Maine, Dryden. C.G.H.

Paratypes.—2 ♀♀, Maine, Dryden; 1 ♀, Maine, Mt. Katahdin; 1 ♀, New York, Richfield Springs; 2 ♀♀, Ontario, Nipigon; 2 ♀♀, Ontario, Raith and Beardmore. C.G.H.; 3 ♀♀, Ontario, Smoky Falls; 2 ♀♀, Manitoba, Dauphin Lake; 1 ♀, Manitoba, Aweme; 1 ♀, Minnesota, Bena; 2 ♀♀, Ontario, Toronto; 1 ♀, Quebec, Cascapedia. C.N.C.; 1 ♀, New York, Mt. Marcy. C.H.T.

Distribution

Maine, Ontario, Quebec, New York, Minnesota, Manitoba. Transition and Canadian Zones.

*See Part VII, Addenda, *Ichneumon chasmodops* Heinrich (correction of association of sexes).

Preamble

A slender-bodied species with a strongly-built head, which has the appearance of *Chasmias*, but differs by the straight apical border of clypeus. According to morphology evidently adapted to a cryptophagous host.

Female

Mesoscutum ferruginous, *scutellum* white or, in the northern part of distribution, usually red; *tergites* 1-3 red, 4-7 black, 6 and 7 with white anal marks; *femora* in majority of specimens black; *tibiae* usually medially yellowish; *temples* wide; *head* in front view subquadrate; *flagellum* short, filiform; *no scopa*; *length* 12-14 mm.

Flagellum.—Filiform, short, ventrally flattened beyond middle but not widened, not attenuated at apex, with 31-33 segments, the first twice as long as wide, the sixth square. Black with white annulus on segments 7 or 8 to 14; often basal segments dorsally at apex and ventrally brownish or ferruginous; *scape* ventrally usually ferruginous.

Head.—Temple profile widened rather than narrowed, with strongly curved outline; cheek profile scarcely narrowed, head in front view almost square; cheeks inflated, very wide between eye and *carina genalis*; *malar space* shorter than width of base of mandible; *mandibles* wide, with rather short, strong apical teeth. Black; at least frontal and vertical orbits, clypeus, middle of face and apex of cheeks ferruginous; varying to entirely ferruginous except supraantennal cavities and ocellar region.

Thorax.—*Mesoscutum* distinctly longer than medially wide, slightly convex, fairly densely and strongly punctured; *notauli* obsolete; *scutellum* slightly raised above *postscutellum*; *area superomedia* usually longer than wide and a little narrowed anteriorly. Black, *mesoscutum* red, *scutellum* white or red; the following are ferruginous: *collare*, *pronotal ridge* entirely or apically, *tegulae*, *postscutellum*, rarely *subalarum*, exceptionally horizontal part of *propodeum* partially.

Legs.—Moderately stout, *coxae* III fairly densely punctured, without *scopa*. *Coxae*, *trochanters* and *femora* usually black; *femora* I or I and II sometimes partially (exceptionally entirely), *femora* III sometimes basally ferruginous; *tibiae* and *tarsi* ferruginous, the former usually medially more or less distinctly yellowish.

Abdomen.—Rather slender, elongate, sharply pointed at apex; second tergite longer than apically wide, third about 1.5 times as wide as long; *gastrocoeli* triangular, fairly deep, their interval about as wide as one of them; second and third tergites fairly strongly and densely punctured, punctures on middle of second tergite tending to run into striae. Tergites 1-3 and often tergite 4 laterally ferruginous, tergites 4-7 black, 6 and 7 with white anal mark; sometimes base of third tergite black banded and second tergite apically indistinctly yellowish; exceptionally (one specimen from Sudbury, Ontario) second and third tergites basally black banded, apically yellowish tinted.

Male

The sexes were associated by morphologic correspondence, which was manifested in the male by the elongate *mesoscutum*, *area superomedia* and *abdomen*.

Black with lemon-yellow pattern; scutellum yellow; mesoscutum, propodeum and pleura entirely black; tergites 2-4 yellow with black basal bands; apex

of postpetiolus yellow; tarsi III pale yellow; area superomedia longer than wide; abdomen narrow, third tergite square; length 15 mm.

Flagellum.—With longish, narrow tyloides on segments 7-12 or 13, the longest not reaching apices of segments. Black, ventrally blackish-brown; scape ventrally yellow.

Head.—Temple profile strongly narrowed with straight outline; malar space about one third as long as width of mandible base. Black; the following are yellow: mandibles except teeth, clypeus, face frontal orbits up to level of lower ocellus, outer orbits below temple region, covering sometimes apical part of cheeks, but not their apical margin and the malar space.

Thorax.—Strongly convex; notauli obsolete; scutellum raised above postscutellum, longer than basally wide and strongly narrowed toward apex; area superomedia longer than wide, somewhat narrowed basally. Black; the following are yellow: collare, pronotal ridge, pronotal base entirely or apically, tegulae, subalarum, scutellum, postscutellum.

Legs.—Black; the following are yellow: all trochanters and trochantelli, coxae I and II, coxae III ventrally at apex, femora I and II apically and ventrally, all tibiae and tarsi except black apex of tibiae, III; narrow base of all femora usually reddish-brown.

Abdomen.—Narrow; second tergite much longer than apically wide, tergites 3-5 approximately square. Black; median field of postpetiolus apically narrowly, the two lateral fields more broadly yellow; tergites 2-4 yellow with black basal bands.

20. *Ichneumon pycnocephalos*, new species

Figs. 6, 41

Types

Holotype.—♀, British Columbia, Robson, 26.X.1937, H. R. Foxlee. C.N.C. No. 7163.

Paratype.—1 ♀, Yukon Territory, Rampart House. C.N.C. No. 7163.

Distribution

Yukon Territory, British Columbia.

Preamble

Geographically this species lies beyond the limits of this paper. It was included on account of its close relationship to *chasmodops* and of the surmise that it perhaps represents the western vicariant of the latter, although the differences in structure of head and mandibles caused me to call it a species rather than a subspecies. The relationship of the two forms, especially the questions whether they really replace one another geographically and whether they are linked by intergrades or not, needs further observation.

Female

Agrees with *chasmodops* except for the following characters: cheeks and temples still more widened; head in front fully square, temple profile widened; mandibles more strongly widened; white anal marks subobsolete, faintly indicated only by a lighter patch on seventh tergite; femora, tibiae and tarsi pale ferruginous without black pattern; flagellum longer, in type specimen with 36 segments; length 16 mm.

21. *Ichneumon devinctor* Say

Figs. 1, 11

Ichneumon devinctor Say, 1825, Amer. Ent., 2:48, ♀.

Ichneumon tibialis Brullé, 1846, Hist. Nat. Ins. Hym. v. 4, p. 300, ♀.

Ichneumon montivagus Cresson, 1865, Ent. Soc. Phila. Proc., 4:255, ♂.

Types

Holotypes.—*Ichneumon devinctor* Say, ♀, lost. *Ichneumon tibialis* Brullé, ♀, labeled "Philadelphia", Musée National d'Histoire Naturelle, Paris. *Ichneumon montivagus* Cresson, ♂, Colorado. A.N.S.

Host

According to H. Townes 1951: "*Sthenopsis thule* (Str.)".

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide, mostly in Transition Zone". New records: Ontario, Smoky Falls; Alberta, Jasper, McMurray, Peace River; Northwest Territories, Ft. Simpson (C.N.C.).

Preamble

A very large, aberrant species, showing in the strong head, somewhat elongate abdomen and short flagellum adaptations to the cryptophagous host (Hepialidae) and so some convergency with *Chasmias*.

Female

Black, abdomen rufous except first segment; wings moderately infuscated; seventh tergite often with small yellowish anal mark; scutellum white; all tibiae and tarsi white banded, tarsi III sometimes black; flagellum short, subfiliform; temples and cheeks inflated; area superomedia large, about as wide as long, no scopa; length 19-20 mm.

Flagellum.—Subfiliform, relatively short, ventrally not distinctly flattened and not widened beyond middle, little attenuated at apex, with 37-39 segments, the first twice as long as wide, the seventh square. Black with white annulus on segments 8 to 16 or 17.

Head.—Temple profile and cheek profile scarcely narrowed, the former with strongly, the latter with slightly curved outline; head in front view approximately square; malar space a little shorter than width of base of mandible; mandibles rather stout, with strong, short teeth; cheeks wide between eye and carina genalis, distinctly inflated, constricted toward junction of carina genalis and oralis, which forms an almost right angle and is raised to a sharp projection. Black, frontal orbits more or less extensively white.

Thorax.—Mesoscutum slightly convex, finely and sparsely punctured, shiny; scutellum flat; area superomedia large, approximately quadrangular, slightly narrowed toward apex, with rounded anterior corners; lower part of pleura transversely wrinkled. Black; scutellum (except usually base), and collare white.

Legs.—Fairly stout; coxae III moderately densely punctured, without scopa. Black; the following are white: wide annulus on all tibiae, annulus on segment 1 of tarsi I, on segments 1 and 2 (rarely only 1) of tarsi II, usually on segments 1 or 1 and 2 of tarsi III.

Abdomen.—Somewhat elongate; median field of postpetiolus well defined, finely striate; gastrocoeli triangular, moderately impressed; second and third tergites moderately strongly and densely punctured. Rufous except black first segment; last tergite often with small, longitudinal yellowish mark.

TABLE III

Distribution of white on eight *Ichneumon devinctor* Say females from Dryden, Maine.

-
-
- 4 anal mark on seventh tergite (yellowish)
 - 8 frontal orbits more or less extensively
 - 8 collare
 - 8 scutellum more or less extensively
 - 8 annulus on tibiae I, II and III
 - 8 annulus on segment I of tarsi I
 - 7 annulus on segments 1 and 2 of tarsi II
 - 1 annulus on segment 1 only of tarsi II
 - 3 annulus on segment 1 only of tarsi III
 - 2 ventral semi-annulus on segment I of tarsi III
 - 2 annulus on segments 1 and 2 of tarsi III
 - 1 no annulus on tarsi III
-
-

Male

Black, abdomen rufous except first segment; wings slightly to strongly infuscated; white of scutellum more or less reduced, sometimes absent; tibiae and tarsi I and II always white banded; white pattern of tibiae and tarsi III usually reduced, often absent; area superomedia very large, about square, the anterior corners rounded; length 20-21 mm.

TABLE IV

Distribution of white on 13 *Ichneumon devinctor* Say males from Dryden, Maine.

-
-
- 13 clypeus
 - 13 face entirely or predominantly
 - 13 frontal orbits
 - 13 collare
 - 5 scutellum except base
 - 6 scutellum at apex only
 - 2 scutellum black
 - 11 marks on mandibles
 - 8 mark on subalarum
 - 1 apex of pronotal ridge
 - 11 apex of femora I and II on inner side
 - 2 apex of femora I only
 - 13 annulus on tibiae II
 - 12 tibiae I dorsally
 - 1 tibiae I dorsally except apex
 - 1 annulus on tibiae III
 - 5 ventral semi-annulus on tibiae III
 - 2 small spot laterally beyond base on tibiae III
 - 5 tibiae III entirely black
 - 7 annulus on segments 1-3 of tarsi I
 - 3 annulus on segments 1-4 of tarsi I
 - 2 annulus on segments 1-2 of tarsi I
 - 6 annulus on segments 1-3. of tarsi II
 - 4 annulus on segments 1-4 of tarsi II
 - 3 annulus on segments 1-2 of tarsi II
 - 7 tarsi III entirely black
 - 6 annulus on segments 1-2 of tarsi III
 - 5 mark on trochanters I ventrally
 - 2 mark on trochanters I and II ventrally
 - 1 mark on trochanters I, II and III ventrally
 - 5 trochanters entirely black
 - 2 mark on coxae I
-
-

Flagellum.—With very small, narrow, short-oval tyloides on segments 8 or 9 to 17 or 18, the longest scarcely covering half of the length of segments and reaching neither their base nor their apex. Black.

Head.—Malar space scarcely half as long as width of base of mandible; junction of carina oralis and genalis shaped as in female and forming a prominent corner. Black; face, clypeus and frontal orbits white, mandibles usually white marked, median field of face often surrounded by black sutures.

Thorax.—Black; the following are white: always collare, usually marks on tegulae and the scutellum except base or its apex only, sometimes subalarum partially, rarely apex of pronotal ridge.

Legs.—Black with very variable white pattern; tibiae and tarsi I and II always extensively white, tibiae and tarsi III usually with reduced white pattern, often entirely black; sometimes trochanters I, rarely trochanters I and II or I to III ventrally white marked; coxae I exceptionally with white dot; apex of femora I and II usually white on inner side; on tarsi I and II segments 1-2 or 1-3 or 1-4 may be banded with white, on tarsi III never more than segments 1-2; tibiae I usually dorsally entirely white, exceptionally apically black; tibiae II always black at narrow base and at apex; tibiae III sometimes with full white annulus beyond base, more often with ventral semi-annulus, often also entirely black,

Variability

The species displays an unusual variability of white pattern, especially on legs of males. Tables III and IV illustrate the varying distribution of white on 8 females and 13 males from the same locality.

22. *Ichneumon hippisleyae*, new species

Fig. 29

Types

Holotype.—♀, Manitoba, Dauphin Lake, 3.IV.1919, Mrs. W. Hippisley. C.N.C. No. 7162.

Paratypes.—9 ♀ ♀, Manitoba, Dauphin Lake, 3.IV.1919, Mrs. W. Hippisley. 7 ♀ ♀, C.N.C. 2 ♀ ♀, C.G.H.

Distribution

Manitoba.

Preamble

A rather small, predominantly ferruginous species, very similar to *substituens* Heinrich from Massachusetts, but differing by transverse gastrocoeli with narrowed interval and by a little longer and less narrowed temple profile. Rather constant in color.

Female

Ferruginous, scutellum yellow; sterna, femora III and coxae II and III ventrally black; last tergites infuscated (perhaps black in fresh specimens), seventh or sixth and seventh tergites with white anal mark. Flagellum subfiliform, apically somewhat attenuated; gastrocoeli fairly deep, transverse, with narrowed interval; no scopa; length 9-10 mm.

Flagellum.—Subfiliform, moderately short, ventrally distinctly flattened and a little widened beyond middle, somewhat attenuated at apex, with 30-32 segments, the first less than twice as long as wide, the tenth square, the widest 1.3

times as wide as long. Ferruginous including scape, segments 9 to 11 or 12 with somewhat indistinct white annulus, apex black.

Head.—Temple profile moderately narrowed, with curved outline, cheek profile distinctly narrowed, with almost straight outline; malar space scarcely longer than width of base of mandible; middle of face convex; mandibles normal. Ferruginous; the following black: supraantennal cavities, ocellar region and a patch behind temples on each side; sometimes occiput and temple region entirely black.

Thorax.—Mesoscutum slightly convex, fairly densely punctured, not very shiny; notauli obsolete; scutellum little raised above postscutellum; area supero-media usually square. Ferruginous, scutellum yellow; the following are black: prosternum, prepectus, mesosternum, areae coxales, scutellar and propodeal sutures.

Legs.—Moderately stout; coxae III ventrally densely punctured, without scopa. Ferruginous, the following are black: coxae II and III ventrally except apices, femora II usually dorsally in part, femora III except base and narrow apex, apex of tibiae III.

Abdomen.—Fairly slender; gastrocoeli moderately deep, transverse, their interval narrower than one of them; second and third tergites finely and rather densely punctured. Ferruginous, tergites 5-7 usually more or less intensively infuscated (perhaps black in fresh specimens), the seventh or sixth and seventh tergites with white anal mark.

23. *Ichneumon substituens*, new species

Types

Holotype.—♀, Cambridge, M.C.Z.

Paratypes.—9 ♀♀, Cambridge, M.C.Z.; 3 ♀♀, Cambridge. C.G.H.

Distribution

Massachusetts, Cambridge.

Preamble

A rather small species of predominantly pale ferruginous color, very similar to *hippislei*, but differing by the not-transverse, approximately quadrangular gastrocoeli with wide interval, and by a little more strongly narrowed temple profile; mesoscutum less densely punctured, more shiny; head and legs I and II including coxae never black marked. Rather constant in color.

Female

Ferruginous, scutellum yellow or yellowish; sterna, femora II apically or predominantly and ventral mark of coxae III black; abdomen uniformly ferruginous, rarely fourth or fourth and fifth tergites with black basal band; seventh, or sixth and seventh tergites with yellowish anal mark; flagellum subfiliform, apically somewhat attenuated; gastrocoeli slightly deepened, quadrangular, with wide interval; no scopa; length 8-9 mm.

Flagellum.—Subfiliform, moderately short, ventrally distinctly flattened, but scarcely widened beyond middle, somewhat attenuated at apex, with 28-31 (usually 30 or 31) segments, the first less than twice as long as wide, about the tenth square, the widest scarcely wider than long. Ferruginous, including scape, segments 7 or (usually) 8 to 12 with white annulus, apex black.

Head.—Temple profile rather strongly narrowed with scarcely curved outline, cheek profile distinctly narrowed with almost straight outline; malar space

a little shorter than width of base of mandible; middle of face convex; mandibles normal. Uniformly ferruginous.

Thorax.—Mesoscutum slightly convex, rather finely and not densely punctured, shiny; notauli scarcely indicated at the very base; scutellum somewhat raised above postscutellum, dorsally nearly flat; area superomedia as long as wide or little longer, slightly narrowed anteriorly. Ferruginous, scutellum yellow or yellowish; the following are black: prosternum, prepectus, mesosternum, propleura partially, band below subalarum, areae coxales, scutellar and propodeal sutures.

Legs.—Moderately stout; coxae III ventrally densely punctured, shiny, without scopa. Ferruginous; the following are black: ventral mark of coxae III, apex of tibiae III, femora III predominantly (except base) or apically; exceptionally femora III entirely ferruginous..

Abdomen.—Fairly slender, gradually attenuated toward apex, ovipositor slightly projecting; gastrocoeli slightly deepened with approximately quadrangular outline, their interval distinctly wider than one of them; second and third tergites fairly finely and not densely punctured, shiny. Uniformly ferruginous, rarely the fourth, or fourth and fifth tergites with black basal band, the seventh, or sixth and seventh with somewhat indistinct yellowish anal mark.

Remarks

The broad series of this species in the M.C.Z. dates from the year 1874. It seems remarkable that the species, evidently common around Cambridge at that time, was never again collected either there or elsewhere.

24. *Ichneumon leucocoxalis*, new species

Types

Holotype.—♀, Maine, Dryden, G. Heinrich. C.G.H.

Paratype.—♀, Pennsylvania, Spring Br. C.H.T.

Distribution

Maine, Pennsylvania.

Preamble

A very distinct, rather small species of European color pattern, chromatically distinguished by white marked coxae I and II.

Female

Head and thorax uniformly black, scutellum white; tergites 2 and 3 and postpetiolus or entire first segment red, tergites 4-7 black, 6 and 7 with white anal marks; coxae and femora predominantly black; coxae I and II and trochanters I and II white marked; tibiae and tarsi red-brown and black; flagellum tricolored, subfiliform, somewhat attenuated at apex; gastrocoeli fairly small and shallow; no scopa; length 8-9 mm.

Flagellum.—Subfiliform, ventrally flattened but not widened beyond middle, a little tapering toward apex, with 27-29 segments, the first twice as long as wide, the seventh square, the apical segment conical. Tricolored: black, segments 1-3 ferruginous, 4 or 4 and 5 brownish, 5 or 6 to 12 or 13 with white annulus; scape black.

Head.—Temple and cheek profiles fairly strongly narrowed with almost straight outlines; malar space shorter than width of base of mandible; mandibles normal, slender. Black.

Thorax.—Slightly convex, rather strongly and densely punctured; notauli scarcely indicated at the very base; scutellum a little raised above postscutellum, dorsally slightly convex and gradually sloping toward apex; costulae distinct; area superomedia almost as wide as long, a little narrowed from costulae toward area basalis. Black; scutellum yellow; in specimen from Pennsylvania subalarum yellow.

Legs.—Moderately slender; coxae III ventrally finely and densely punctured, without scopa. Black, trochantelli, tibiae and tarsi red-brown; trochanters I and II ventrally and apically, trochanters III apically and apical marks of coxae I and II yellowish-white; apex of tibiae II, apical third of tibiae III and tarsi III except bases of segments black; also tarsi II apically infuscated.

Abdomen.—Longish-oval, slightly pointed at apex, ovipositor slightly projecting; gastrocoeli shallow, quadrangular, their interval scarcely wider than one of them; second and third tergites distinctly, but not very densely punctured, shiny. Postpetiolus (type) or entire first segment (paratype) and tergites 2 and 3 red, 4-7 black, 6 and 7 with white anal marks.

25. *Ichneumon tumidifrons* Cresson

Ichneumon tumidifrons Cresson, 1867, Amer. Ent. Soc. Trans., 1:311, ♀.

Pterocormus citrifrons Townes, 1951, Synoptic Catalog, p. 297, partim (♂).

Types

Holotype.—♀, Illinois. A.N.S.

Distribution

Illinois. Further range of distribution remains to be separated from *terminatus* Provancher and *lachrymans* Provancher.

Preamble

With this species we are entering a group of small forms, corresponding with Berthoumieu's *latrator*-group of Europe. It is in America the most insufficiently explored part of the genus, probably by the simple reason that these small insects, usually collected by sweeping, escaped direct observation in the field. As they are also most rarely reared, an entire default of biological data renders the recognition of specific limits and the association of sexes very difficult. It is evident that the group contains numerous similar species, of which few are already clearly understood and defined. Under these circumstances any association of sexes seems to be premature in most cases, and I prefer therefore to keep the description of males and females separated for the time being rather than to attempt hypothetical combinations. In the following this principle has been applied also to the species *tumidifrons* Cresson, ♀, which H. Townes has synonymized with *citrifrons* Cresson ♂. I have not achieved a fully satisfactory concept yet, either of the species *tumidifrons* or of *citrifrons*. There are no rearings of both sexes or any other evidence proving it, while on the other hand too many similar species exist with equally good reason for association.

So far I have not seen another female matching the type of *tumidifrons* exactly. *I. terminatus* Provancher comes nearest in color and morphology but is chromatically so different that at least subspecific differentiation has to be suspected. The peculiar features of this form are: (1) the short flagellum with (in the type) 21 segments only, excluding identity with *lachrymans* Provancher; (2) ferruginous color of face, clypeus, prosternum and mesopleura, differing considerably from *terminatus*.

Female

(Description based on type specimen.)

Head black; face, clypeus and partially frontal orbits ferruginous; thorax mainly ferruginous, including mesoscutum, pronotum, prosternum and mesopleura; scutellum yellow; tergites 1-4 rufous, 5-7 black, the seventh with anal mark; flagellum exactly filiform, tricolored, with 21 segments; no scopa; length 7 mm.

Flagellum.—Exactly filiform, short and stout, not widened beyond middle, with 21 segments, the first about 1.3 times as long as wide, the third or fourth square. Basal segments ferruginous, white annulus on segments 6-10, apex black.

Head.—Black; the following are ferruginous: face, clypeus, inner orbits partially, apex of cheeks indistinctly.

Thorax.—Area superomedia distinctly longer than wide, approximately half oval. Black; the following are red: pronotum, mesoscutum, prosternum, mesopleura, tegulae; scutellum and postscutellum yellow.

Legs.—Coxae III ventrally finely and densely punctured, without scopa. Ferruginous including coxae and trochanters; apex of tibiae III and apical half of femora III black.

Abdomen.—Gastrocoeli wider than long, their interval about as wide as one of them. Tergites 1-4 red, 5-7 black, the seventh with white anal mark.

26. *Ichneumon terminatus* Provancher

Ichneumon terminatus Provancher, 1882, Nat. Canad., 13:335, 357, ♀.

Types

Holotype.—♀, Quebec, Cap Rouge. Provincial Museum Quebec.

Distribution

Quebec, Ontario (C.N.C.); Michigan (C.H.T.); Maine (C.G.H.).

Preamble

Evidently closely and perhaps subspecifically related to *tumidifrons*, but differing by considerably less extensive red color pattern, particularly prosternum, mesopleura and head entirely or predominantly black. Very similar to *lachrymans* Provancher. Differing from the latter by smaller size, smaller number of flagellar segments, blunter apex of flagellum with stouter apical segment, entirely red color of pronotum, usually predominantly or entirely black head and antennal scape.

Female

Head black, sometimes face (but not clypeus) partially or predominantly ferruginous; mesoscutum, entire pronotum and scutellum red; tergites 1-3 red, 4-7 black, the seventh usually with white anal mark; legs including coxae predominantly rufous, femora III and sometimes also coxae III predominantly black; flagellum tricolored, with 22-23 segments, the apical segment stout and blunt; face more receding than in lachrymans; no scopa; length 6-7 mm.

Flagellum.—Short, exactly filiform, not widened beyond middle and not at all attenuated at apex, slightly tapering toward base, with 22-23 segments, the first 1.3 times as long as wide, the fourth square, the last stout and blunt. Segments 1-5 ferruginous, 6-10, or rarely 11 with white annulus, apex black; scape at least dorsally black, ventrally usually ferruginous.

Head.—Temple profile and cheek profile fairly strongly narrowed, the former with distinctly curved, the latter with straight outline; face a little more receding than in *lachrymans*; malar space scarcely as long as width of base of mandible; mandibles normal, slender. Usually entirely black, sometimes with ferruginous mark on facial orbits, rarely middle of face, exceptionally entire face but not clypeus, ferruginous.

Thorax.—Mesoscutum fairly flat, finely and sparsely punctured, shiny; notauli obsolete; area superomedia little longer than wide or as wide as long, sometimes hexagonal with rather distinct costulae. Mesoscutum, pronotum, scutellum, postscutellum and tegulae red; rest black; mesopleura often with small, irregular ferruginous mark.

Legs.—Rather stout; coxae III ventrally finely and densely punctured, without scopa. Rufous including coxae; apex of tibiae III and the femora III on apical half or predominantly black, rarely also coxae III predominantly, coxae I and II basally black.

Abdomen.—Median field of postpetiolus ill-defined, finely striate; gastrocoeli slightly deepened, wider than long, their interval approximately as wide as one of them. Tergites 1-3 red, 4-7 black, the seventh usually with white anal mark, exceptionally the sixth tergite too with a small anal spot.

27. *Ichneumon lachrymans* Provancher

Fig. 51

Ichneumon lachrymans Provancher, 1875, Nat. Canad., 7:24, 78, ♂.

Types

Holotype.—♂, Canada. Provincial Museum Quebec.

Neallotype.—♀, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Canadian Zone". New records: (♂ ♀) Maine (C.G.H.); (♂ ♀) New York (C.H.T.).

Preamble

The female associated below with this species agrees with the male in distribution. It is the most common of all species of this group, corresponding in this regard too with *lachrymans*, the most common of the males within the shared limits of distribution. As morphology and color match well enough, the association seems to have a reasonable degree of probability.

Male

Head and thorax black; face, clypeus and scutellum white; first segment apically to entirely, second and third uniformly pale rufous; femora I and II varying from entirely rufous to predominantly black; femora III black except narrowly rufous base; coxae, black, coxae I and II apically more or less extensively, sometimes almost entirely yellow; tibiae III pale yellow, apically black; tarsi III extensively infuscated; gastrocoeli quadrangular, about as wide as long, a little wider than interval; length 9-10 mm.

Flagellum.—With small, narrow and short tyloides on segments 5 to usually 11. Dorsally black, ventrally pale brown; scape ventrally yellow.

Head.—Temple profile strongly narrowed with scarcely curved outline; malar space half as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus and face; rarely frontal orbits narrowly.

Thorax.—Mesoscutum fairly densely punctured; notauli basally indicated; scutellum rather strongly raised above postscutellum; carination of propodeum strong and complete; area superomedia about as long as wide or slightly longer, somewhat narrowed anteriorly, approximately hexagonal. Black; the following are white: collare, scutellum entirely or partially, usually apex of pronotal ridge, mark on subalarum, part of tegulae; sometimes postscutellum white or ferruginous.

Legs.—Moderately stout; coxae and trochanters black, coxae I and II usually apically more or less extensively, sometimes predominantly yellow; trochanters I and II usually ventrally, trochanters III apically yellow; femora I and II varying from uniformly rufous to predominantly black; femora III always black, basally narrowly rufous; tibiae I and II yellowish-rufous, tibiae II usually with short, black apical stripe on ventral side; tarsi II apically slightly infuscated; tibiae III pale yellow, apically broadly black, tarsi III strongly infuscated except base.

Abdomen.—Gastrocoeli quadrangular, about as long as wide, each a little wider than interval; second and third tergites rather densely punctured, shiny. Black; the following pale rufous: apex of first segment narrowly, or the whole postpetiolus, rarely the entire first segment, the second and third tergites always entirely and usually the narrow base of the fourth tergite.

Female

Extremely similar to *terminatus*; differs by slightly bigger size and longer flagellum, composed of 26 or 27, rarely only 25 segments, furthermore by less receding face, more strongly punctured mesoscutum and by certain color patterns. Pronotum usually predominantly black, antennal scape entirely ferruginous, face and clypeus tending to be more extensively ferruginous colored.

Head black, usually at least middle of face and facial orbits ferruginous marked, often clypeus, median and lateral fields of face predominantly ferruginous; pronotum (except in rare mutants) predominantly black; mesoscutum red, scutellum usually yellow, more seldom red; legs including coxae predominantly red; apex of tibiae III and the femora III on apical half or predominantly black; exceptionally coxae too predominantly black; tergites 1-3 red, 4-7 black, the seventh sometimes with white anal mark, exceptionally also the sixth tergite with small apical dot; flagellum with 25-27 segments, tricolored, filiform; face scarcely receding; no scopa; length 7-8 mm.

Flagellum.—Fairly short, exactly filiform, ventrally somewhat flattened, but scarcely widened beyond middle, almost imperceptibly tapering at apex, with 25-27, in the majority of specimens 26 or 27 segments, the first 1.3 times as long as wide, the fourth square, the last not quite as stout and short as in *terminatus*. Segments 1-5 or 6 ferruginous, six or seven to 10 or 11 with white annulus, scape always entirely ferruginous.

Head.—Temple and cheek profiles rather strongly narrowed, with almost straight outlines; malar space scarcely as long as width of base of mandible; face scarcely receding; mandibles normal. Black; the following are usually ferruginous: median and lateral fields of face, frontal orbits and clypeus entirely or apically; ferruginous pattern of face often reduced to a mark on median field and on facial orbits; exceptionally head entirely black.

Thorax.—Mesoscutum fairly flat, distinctly more strongly and less sparsely punctured than in *terminatus*, shiny; notauli obsolete; area superomedia usually distinctly longer than wide. Black, mesoscutum red, scutellum usually yellow,

more rarely red; pronotum predominantly black, pronotal ridge, collare and usually pronotal base partially or entirely red; in rare mutants pronotum predominantly, mesopleura partially red; subalarum, tegulae and postscutellum ferruginous.

Legs.—Rather stout; coxae III ventrally finely and densely punctured, without scopa. Rufous, including coxae, apex of tibiae III and the femora III on apical half or predominantly black; rarely all coxa predominantly black.

Abdomen.—Moderately slender, pointed toward apex, ovipositor slightly projecting; gastrocoeli slightly deepened, wider than long, their interval about as wide as one of them. Tergites 1-3 and often sides of fourth tergite red, 4-7 black, the seventh often with white anal mark, exceptionally the sixth with small white anal spot.

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

Ichneumon cervulus Provancher, 1875, Nat. Canad., 7:24, 83, ♂.

Types

Holotype.—♂, Canada. Provincial Museum Quebec. No. 613.

Distribution

According to H. Townes 1951: "Transcontinental in Canadian Zone", New record: Maine (C.G.H.).

Preamble

This male is about as common in Maine and Quebec as the typical *lachrymans*. It differs from the latter only by black face, clypeus, scutellum and coxae I and II. I can not find any structural difference. Chromatically intermediate forms with white clypeus, white facial orbits, apically white or reddish scutellum and with light apices of coxae I and II were frequently found. I therefore strongly suspect that this is a melanistic phase of *lachrymans*, a rather polychromatic species also in the other sex.

Male

Head and thorax black, including face and clypeus (sometimes clypeus and sides of face white; sometimes also apex of scutellum ferruginous or whitish); abdomen black, tergites 1 and 2 (sometimes also postpetiolus or entire first segment) pale rufous; femora I and II varying from entirely rufous to predominantly black; femora III black except narrowly rufous base; coxae black, coxae I and II sometimes with ferruginous or yellowish apical spot; tibiae III pale yellow, apically black; tarsi III partially infuscated; gastrocoeli quadrangular, about as wide as long; a little wider than interval; length 9-10 mm.

Flagellum with small, narrow and short tyloides on segments 5-11 or 12. Dorsally black; ventrally brown.

28. *Ichneumon hospitus* Cresson

Ichneumon hospitus Cresson, 1867, Amer. Ent. Soc. Trans., 1:306, ♀ ♂.

Holotype.—♀, Canada. A.N.S.

Distribution

According to H. Townes 1951: "Illinois, Canada." New records: Maine (C.G.H.).

Preamble

Mainly distinguished by entirely black basic color of thorax including mesoscutum and pronotum. Otherwise I see no decisive differences from *lachrymans* female. If we suppose, however, that this may be a melanistic mutant only of the mentioned species, it seems to be strange that the thorax should become strongly melanistic (without known intergrades), while all coxae and the femora III, frequently infuscated or black in *lachrymans*, should stay as clear and uniformly red as they are in *hospitus*. Therefore I presume that *hospitus* is a distinct species. I doubt the correctness of the association of the male as described by Cresson.

Female

Head and thorax black, scutellum white, face with ferruginous pattern; tergites 1-3 red, 4-7 black, the seventh with white anal mark; legs bright red including coxae and trochanters; apex of femora III and of tibiae III black; flagellum filiform, tricolored, with 25-27 segments; no scopa; length 8-8.5 mm.

Flagellum.—Fairly short, exactly filiform, ventrally somewhat flattened but scarcely widened beyond middle, almost imperceptibly tapering at apex, with 25-27 segments, the first 1.5 times as long as wide, the fifth square. Segments 1-5 ferruginous, 6-11 with white annulus, apex black; scape ferruginous.

Head.—Temple profile rather strongly narrowed with almost straight outline. Black; mark on middle of face, marks on facial orbits, clypeus and sometimes lower part of frontal orbits ferruginous.

Thorax.—As in *lachrymans*. Black, scutellum white; collare, extreme apex of pronotal ridge and tegulae ferruginous.

Legs.—Moderately stout; coxae III ventrally finely punctured, without scopa. Bright red including coxae; apex of femora III and of tibiae III black; apex of tarsi III infuscated.

Abdomen.—Structure as in *lachrymans*. Tergites 1-3 and sides of 4 red, 4-7 black, the seventh with white anal mark.

Male

I have not seen either Cresson's allotype or any *Ichneumon* male matching the description which contains the following characters.

Flagellum long, dorsally black, ventrally fulvous, with white annulus; legs ferruginous with apex of femora III and tibiae III black; scutellum and face yellowish.

29. *Ichneumon pusillamoenus*, new species

Types

Holotype.—♀, Quebec, Kazubazua, hibernating. C.G.H.

Paratypes.—4 ♀ ♀, Quebec, Kazubazua, hibernating. C.G.H. 1 ♀, Ontario, Chatham, C.N.C.

Distribution

Quebec, Ontario.

Preamble

Another very small species, chromatically similar to *terminatus* and *lachrymans*, but certainly distinct, differing in flagellar structure and scheme of color pattern.

Female

Head and pronotum black; mesoscutum (at least medially), scutellum, propodeum, mesopleura and sometimes mesosternum dark ferruginous; tergites 1-3 red, 4-7 black, 6 and 7 with white anal marks; legs pale brown, coxae and femora predominantly black; coxae II and III dorsally ferruginous, tibiae III apically black; flagellum filiform with 22-24 segments; no scopa; length 5-6.5 mm.

Flagellum.—Filiform, ventrally distinctly flattened beyond middle but not widened; distinctly tapering toward base, scarcely perceptibly toward apex, the apical segment not being abbreviated and strongly blunted as in *terminatus* but rather conical. Black; segments 1-3 reddish-brown, 4-5 or 6 blackish-brown, 6 or 7 to 10 with white annulus; scape black, sometimes ventrally obscure ferruginous.

Head.—Narrow; temple and cheek profiles strongly narrowed with slightly curved outlines; malar space scarcely as long as width of base of mandible. Black; usually middle of face indistinctly brownish.

Thorax.—Mesoscutum slightly convex, finely and fairly densely punctured, shiny; notauli obsolete; scutellum somewhat raised above postscutellum; area superomedia about as wide as long, or a little wider, slightly narrowed anteriorly. Black; the following are dark ferruginous: collare, at least median lobe of mesoscutum or its whole surface, mesopleura except black band below subalarum, propodeum except basal and apical sutures, scutellum, postscutellum, tegulae, often pronotal base, sometimes mesosternum; in one extremely melanistic specimen ferruginous pattern of mesopleura and propodeum reduced to a mark on mesopleura and a mark on metapleura.

Legs.—Rather stout; coxae III ventrally finely and densely punctured, without scopa. Coxae, trochanters and femora of black basic color; coxae I apically, coxae II and III dorsally ferruginous; the following are pale brown; femora I and II apically, often on whole inner surface, narrow base of femora III, usually trochanters II and III dorsally, all trochantelli, tibiae and tarsi; tibiae III apically black.

Abdomen.—Fairly slender, pointed toward apex, ovipositor scarcely projecting; gastrocoeli shallow, their interval about as wide as one of them; second tergite finely and fairly densely, third less densely and very finely punctured. Tergites 1-3 red, 4-7 black, 6 and 7 with white anal marks; in one extremely melanistic specimen the third tergite also black.

30. *Ichneumon nigrovariegatus* (Provancher)

Fig. 50

Phygadeuon dorsalis Provancher, 1874, Nat. Canad., 6:285, ♀ (preocc.).

Ichneumon humilis Provancher, 1875, Nat. Canad., 7:24, 82, "♂" = ♀ (preocc.).

Phygadeuon nigrovariegatus Provancher, 1875, Nat. Canad., 7:182, 183, ♀.

Ichneumon humillimus Dalla Torre, 1902, Cat. Hym., v. 3, p. 923 (new name for *dorsalis*).

Types

Holotypes.—*Phygadeuon dorsalis* Provancher, ♀, Canada, Provincial Museum Quebec; *Ichneumon humilis* Provancher, ♀, Canada, Provincial Museum Quebec, No. 635; *Phygadeuon nigrovariegatus* Provancher, ♀, Canada, Provincial Museum Quebec.

Neallotype.—♂, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Maine and Quebec to South Carolina". New record: Newfoundland, Harmon Field (C.N.C.).

Preamble

A small species. Females of ferruginous and black color in extremely variable combination. Distinguished by the prolonged thorax with the mesoscutum being considerably, the area superomedia distinctly longer than wide, by the short, inflated femora and the shape of flagellum (see below). *Ichneumon curticus* Provancher and *pumiliops* Heinrich are closely related species and share the structure of flagellum and femora with *nigrovariegatus*.

Female

Head and thorax varying from almost entirely ferruginous to almost entirely black; scutellum ferruginous; abdomen ferruginous, the last three or four tergites often partially infuscated to entirely black; sometimes one indistinct, light anal mark visible; legs, including coxae, ranging from ferruginous to predominantly black; mesoscutum much longer than wide, convex, shiny; flagellum short, apically somewhat pointed; femora short and thick; no scopa; length 8-9 mm.

Flagellum.—Short, subfiliform, ventrally neither flattened nor widened beyond middle, distinctly attenuated at apex, with 23-26 (usually 24 or 25) segments, the first 1.3 times as long as wide, the fifth square. Scape and usually the basal six or seven segments ferruginous, the following three or four with more or less indistinct white annulus or also ferruginous; apex black; rarely flagellum black with distinct white annulus on segments 7-10.

Head.—Temple and cheek profiles rather strongly narrowed, with slightly curved outlines; face a little receding; malar space shorter than width of base of mandible; cheeks smooth with few scattered fine punctures; mandibles narrow with small teeth. Varying from entirely ferruginous to predominantly black with only inner orbits narrowly ferruginous.

Thorax.—Comparatively long and narrow; mesoscutum considerably longer than wide, slightly convex, rather sparsely and finely punctured, shiny; notauli obsolete; scutellum a little raised above postscutellum, dorsally flat, area superomedia gradually somewhat narrowed toward anterior border, usually distinctly longer than wide. Pleura and propodeum ferruginous with varying black pattern, sometimes predominantly ferruginous, sometimes predominantly black; sterna and areae coxales always black, scutellum always ferruginous; mesoscutum usually ferruginous or black with ferruginous longitudinal bands or stripes; rarely entirely black.

Legs.—Femora unusually short and thick, especially femora I and II; coxae III finely and rather densely punctured, shiny, without scopa. Coxae, trochanters and femora varying from ferruginous to black; tibiae and tarsi ferruginous, tibiae III always apically black.

Abdomen.—Longish-oval, apically fairly blunt, ovipositor not projecting; postpetiolus finely striate, its median field not sharply defined; gastrocoeli shallow, transverse, their interval about as wide as one of them; second and third tergites fairly sparsely punctured. Varying from entirely ferruginous to apically black from fourth to seventh tergites; the last tergite often with more or less distinct light anal mark.

Male

Head and thorax black, face, clypeus and scutellum yellow; pronotol ridge black, except sometimes a light dot on its very apex; apex of postpetiolus and second and third tergites, except black basal bands, obscure yellow, often partially ferruginous tinted; coxae I and II apically yellow; femora predominantly black;

tibiae and tarsi yellow, tibiae III apically, tarsi III predominantly black; length 8-9 mm.

Flagellum.—With elongate-oval tyloides on segments 4-11 or 12, the longest on segments 5-9 reaching from bases to apices of segments. Black, ventrally brown; scape ventrally yellow.

Head.—The following are yellow: mandibles except teeth, clypeus, face and frontal orbits narrowly, only about halfway up to level of lower ocellus or less.

Thorax.—Mesoscutum convex, as in female rather sparsely punctured, shiny and considerably longer than wide, without notauli; scutellum distinctly raised above postscutellum; area superomedia narrowed anteriorly, about as long as wide, or somewhat longer. Black; scutellum, tegulae partially, and subalarum yellow; sometimes collare and extreme apex of pronotal ridge yellow marked.

Legs.—Fairly stout; coxae black, coxae I and II apically extensively yellow; trochanters and trochantelli I and II yellow, trochanters III black, trochantelli III pale rufous; femora I and II pale rufous, dorsally black except narrow bases and apices, femora III black except narrow base; tibiae and tarsi yellow, tibiae III apically black, tarsi III black except narrow bases and apices of segments.

Abdomen.—Black; apical band of postpetiolus and apical part of tergites two and three extensively yellow, usually partially ferruginous tinted; rarely second tergite without black basal band.

31. *Ichneumon curticus* (Provancher)

Phygadeuon curticus Provancher, 1888, Addit. Corr. Faune Ent. Canada Hym., p. 360, ♀.

Types

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

Distribution

Quebec, Chicoutimi (type specimen); new record: Manitoba, The Pas (C.N.C.).

Preamble

This species is morphologically so closely related to *nigrovariegatus* that I doubted its distinctness in spite of the larger size of the type and its chromatic peculiarities. The appearance, however, of a second, congruent specimen from Manitoba has strengthened my confidence. But, nevertheless, this species needs further observation and confirmation.

Differs from *nigrovariegatus* by somewhat larger size, distinctly and densely punctured upper part of cheeks and seemingly a little flatter anterior part of mesoscutum. Chromatically distinguished mainly by the contrast between the uniformly clear rufous legs I and II (including coxae) and the black coxae and femora III (in *nigrovariegatus* I found so far all coxae to be either simultaneously rufous or simultaneously variegated with black or black).

Female

Head and thorax uniformly black including scutellum; middle of face obscure ferruginous; tergites 1-3 ferruginous, 4-7 black, the seventh with anal mark; legs I and II including coxae uniformly rufous, coxae III and femora III predominantly black; apex of tibiae III black; flagellum short, apically somewhat pointed; femora short and thick; no scopa; length 10-11 mm.

Flagellum.—Short, subfiliform, ventrally neither flattened nor widened beyond middle, distinctly attenuated at apex, with 27-28 segments, the first 1.3

times as long as wide, the fifth square. Scape and basal segments ferruginous followed by a light annulus, apex black.

Head.—As in *nigrovariegatus*. Black, middle of face ferruginous; in specimen from Manitoba inner orbits also with ferruginous mark level with antennal sockets.

Thorax.—Comparatively long and narrow as in *nigrovariegatus*; mesoscutum considerably longer than wide, basally a little flatter than in *nigrovariegatus*, fairly sparsely punctured, shiny; notauli obsolete; scutellum a little raised above postscutellum, dorsally flat; area superomedia almost twice as long as wide, parallel-sided. Uniformly deep black; tegulae and collare medially rufous.

Legs.—Femora short and thick, especially femora I and II; coxae III finely and rather densely punctured, without scopa. Legs I and II uniformly rufous including coxae and trochanters; the following parts of legs III are black: coxae (except ferruginous dorsal mark in specimen from Manitoba), trochanters predominantly (not trochantelli), femora except narrow base, apex of tibiae III; tarsi III apically infuscated.

Abdomen.—Median field of postpetiolus rather ill-defined, finely striate; gastrocoeli shallow, transverse, their interval distinctly wider than one of them; tergites 2 and 3 rather sparsely and finely punctured, shiny. Tergites 1-3 ferruginous, 4-7 black, the seventh with a small white anal mark.

32. *Ichneumon pumiliops*, new species

Types

Holotype.—♀, Quebec, Gatineau, hibernating, C. D. Miller. C.N.C. No. 7103.

Paratypes.—18 ♀♀, Ontario, Ottawa; 11 ♀♀, Quebec: Hull, Gatineau, Montreal, St. Jean. C.N.C.; 4 ♀♀, Ontario, Ottawa. C.G.H.; 1 ♀, Quebec, Stoneham; 3 ♀♀, Massachusetts, So. Hadley; 1 ♀, New York, Ithaca. C.H.T.

Distribution

Quebec, Ontario, New York, Massachusetts.

Preamble

One of the smallest species of the genus in Eastern North America. In structure of flagellum and femora rather closely related to *nigrovariegatus*, but distinctly smaller, thorax and abdomen less elongate, head narrower, second and third tergites more finely and more sparsely punctured, gastrocoeli comparatively wider with narrowed interval. Chromatically rather constant.

Female

Head and thorax black, mesoscutum and scutellum ferruginous; abdomen usually uniformly pale ferruginous, the last three or four tergites sometimes partially slightly infuscated; legs usually predominantly pale rufous, usually all coxae ventrally or more extensively and femora I and II dorsally infuscated; femora III varying from apically narrowly to predominantly black; mesoscutum little longer than wide; area superomedia usually as long as wide; flagellum short, apically pointed; femora short and thick; no scopa; length 5-6 mm.

Flagellum.—Short, subfiliform, ventrally neither flattened nor widened beyond middle, in majority of specimens with 23, exceptionally with 22 or 24 segments, the first 1.3 times as long as wide, the sixth square. Usually black, the basal segments apically brown, with white annulus on segments 7 (rarely 6 or 8)

to 10 or 11; exceptionally segments 1-6 ferruginous; scape black, rarely ventrally brown.

Head.—Temple and cheek profiles strongly narrowed with slightly curved outlines; face a little receding; malar space shorter than width of base of mandible; mandibles narrow, with small teeth. Always entirely or predominantly black; often apex of clypeus and a small mark on middle of face obscure ferruginous; sometimes a ferruginous or whitish spot on facial orbits level with antennal sockets.

Thorax.—Mesoscutum little longer than wide, slightly convex, finely and not densely punctured, shiny; notauli obsolete; scutellum a little raised above post-scutellum, dorsally flat; area superomedia usually approximately as wide as long, anteriorly slightly narrowed and rounded. Pleura, sterna and propodeum always uniformly black, mesoscutum and scutellum ferruginous, the former rarely partially infuscated; the following are also ferruginous: collare, apex of pronotal ridge, tegulae, postscutellum, exceptionally subalarum.

Legs.—Femora short and thick; coxae III finely and rather densely punctured, shiny, without scopa. Predominantly pale rufous; usually all coxae ventrally or entirely, trochanters partially, and femora I and II dorsally, more or less strongly infuscated; femora III usually predominantly, sometimes only at apex black; apex of tibiae III black, tarsi III usually apically somewhat infuscated.

Abdomen.—Comparatively shorter than in *nigrovariegatus*; median field of postpetiolus fairly well defined, finely striate; gastrocoeli shallow, transverse, their interval narrower than one of them; second tergite rather finely and not densely, the third still finer and less densely punctured, both shiny. Usually uniformly pale ferruginous; sometimes tergites 4 or 5 to 7 partially indistinctly infuscated; no anal mark.

33. *Ichneumon browni*, new species

Types

Holotype.—♀, Quebec, Mt. Lyall (Gaspé), 1500 ft., 8.VIII.1933, W. J. Brown. C.N.C. No. 7166.

Preamble

A species similar to *nigrovariegatus* but distinctly differing by the shorter and wider mesoscutum, apically less attenuated flagellum, denser sculpture and greater number of flagellar segments.

Female

Uniformly pale ferruginous are: head, flagellum except apex, mesoscutum, scutellum, abdomen, all tibiae and tarsi and femora I and II; pleura, sterna, propodeum, coxae and trochanters black; flagellum short, subfiliform, tapering very little toward apex; gastrocoeli shallow, triangular; no scopa; length 9 mm.

Flagellum.—Short, subfiliform, ventrally not distinctly flattened and not widened beyond middle, very slightly tapering toward apex, with 31 segments, the first scarcely 1.5 times as long as wide, the sixth square. Segments 1-13 ferruginous, apex blackish; scape ferruginous.

Head.—Temple profile moderately narrowed with curved outline, cheek profile distinctly narrowed with almost straight outline; malar space a little longer than width of base of mandible; mandibles normal. Uniformly pale ferruginous.

Thorax.—Mesoscutum flat, little longer than medially wide, fairly strongly and densely punctured, shiny; notauli obsolete; scutellum flat; area superomedia about square, no costulae. Black; the following are ferruginous: collare, mesoscutum, pronotal ridge, subalarum, tegulae, scutellum, postscutellum; scutellum slightly yellowish tinted.

Legs.—Stout, femora short; coxae III ventrally densely punctured, without scopa. Pale ferruginous, coxae entirely, trochanters partially black; femora III blackish, except dorsally, apically and basally; tarsi and apex of tibiae III not infuscated.

Abdomen.—Postpetiolus rather wide, its median field not clearly defined, striate; gastrocoeli triangular, shallow; second tergite distinctly and rather densely, the third finely and less densely punctured. Uniformly ferruginous.

II. *gracilicornis* group

Species 34-48

Female flagellum bristleshaped, slender, strongly attenuated at apex; basic color of abdomen of females ferruginous or red-brown, sometimes apical tergites black or anterior tergites black banded; wings not strongly infuscated; gastrocoeli and thyridia usually pronounced. Sexual dimorphism considerable.

34. *Ichneumon gracilicornops*, new species

Fig. 42

Types

Holotype.—♀, Ontario, Raith, 20.VI.1956. C.G.H.

Paratypes.—1 ♀, Maine, Dryden. C.G.H.; 2 ♀♀, Ontario, Smoky Falls; 1 ♀, Quebec, Wright; 1 ♀, Manitoba, Riding Mt.; 1 ♀, Labrador, Cartwright. C.N.C.; 2 ♀♀, Alberta, Edmonton; 2 ♀♀, Saskatchewan. C.H.T.

Distribution

Maine, Ontario, Quebec, Labrador, Manitoba, Saskatchewan, Alberta.

Preamble

Very closely related to and identical in morphology with the European *gracilicornis* Wesmael, differing only chromatically by the red mesoscutum and postpetiolus and by the restriction of white anal marks to the sixth and seventh tergites (*gracilicornis* white-marked on fifth to seventh). Somewhat similar also to *maius* Cresson, but strongly differing in the large, wide gastrocoeli with narrow interval, the much more slender femora III, the more strongly attenuated flagellum and black pronotum.

Female

Head and thorax black, scutellum white; mesoscutum and frontal orbits red; abdomen tricolored: postpetiolus and tergites 2 and 3 red, 4-7 black, 6 and 7 with white anal mark; legs black, tibiae and tarsi predominantly ferruginous; flagellum bristleshaped; gastrocoeli large with narrowed interval; no scopa; length 9-11 mm.

Flagellum.—Bristleshaped, very slender, distinctly flattened beyond middle but not widened, extremely attenuated at apex, with 37-39 (specimen from Labrador with 33) segments, the first more than three times as long as wide, the tenth (in small specimens sometimes the eighth or ninth) square, the last 4-6

segments before the apical cone distinctly longer than wide. Segments 1-5 or 6 or 7 pale ferruginous, segments 6, 7 or 8 to 11 or 12 with white annulus, apex black; scape black, often ventrally ferruginous at apex.

Head.—Temple and cheek profile rather strongly narrowed with almost straight outlines; malar space a little longer than width of base of mandible; mandibles slender, normal. Black, at least frontal orbits, usually also vertical orbits ferruginous; sometimes pale ferruginous or whitish spot on facial orbits at level of antennal sockets; sometimes middle of face ferruginous.

Thorax.—Mesoscutum convex, longer than medially wide; notauli subobsolete; scutellum distinctly raised above postscutellum, apically rounded; area superomedia about as wide as long, sometimes somewhat longer than wide. Black, mesoscutum red, scutellum yellow; the following red: narrow apex of pronotal ridge, tegulae, sometimes collare, subalarum, postscutellum.

Legs.—Long, femora III long and slender; coxae III ventrally densely punctured, without scopa. Ferruginous, the following black: all coxae, trochanters, broad apex of tibiae III and femora II ventrally at apex, femora I often ventrally or predominantly ferruginous.

Abdomen.—Rather wide; ovipositor usually a little projecting; gastrocoeli very large, moderately deepened, with pronounced, transverse thyridia, their interval distinctly narrower than one of them; second and third tergites moderately strongly and fairly densely punctured. Petiolus and basic color of tergites 4-7 black, 6 and 7 with large white anal marks, the rest ferruginous.

35. *Ichneumon maius* Cresson

Ichneumon maius Cresson, 1867, Amer. Ent. Soc. Trans., 1:307, ♀.

Types

Holotype.—♀, Massachusetts. A.N.S.

Host

Lexis bicolor (Grote) in New Brunswick.

Distribution

Massachusetts (type); Quebec (C.G.H.); Ontario (C.N.C.).

Preamble

Ichneumon maius is a small species of the *gracilicornis* group (slender, considerably attenuated flagellum) with two (rarely one) white anal marks, differing from the females of *gracilicornops* and *versabilis* by small, not transverse gastrocoeli, the interval of which is more than two times as wide as one of them. H. Townes must have overlooked this difference just in the type specimen, as he had long associated with *versabilis* Cresson male the correct female with transverse gastrocoeli. All host records and distributional notes given in the Synoptic Catalog for the species *maius* Cresson consequently are here regarded as not referring to this species but to *versabilis*.

Female

Head and thorax black, scutellum yellow or red; mesoscutum and in the great majority of specimens also pronotum red; abdomen usually tricolored: tergites 1-5 ferruginous, apex of 5-7 black, 6 and 7, rarely only 7 with white anal marks; basic color of tergites 5-7 varies strongly between entirely black and entirely ferruginous; legs predominantly ferruginous, femora III varying between

ferruginous and black; flagellum bristleshaped, coxae III without scopa; gastrocoeli small with large interval; length 8-10 mm.

Flagellum.—Bristleshaped, slender, indistinctly flattened and not widened beyond middle, considerably attenuated toward apex, with 29-33 segments, the first more than two times as long as wide, the ninth square, the last 4-6 segments before the apical cone not longer than wide as in *gracilicornops*. Segments 1-6 or 7 usually ferruginous, sometimes brownish, exceptionally black; segments 7 or 8 to 12 or 13 with white annulus, apex black.

Head.—Temple and cheek profiles rather strongly narrowed with almost straight outlines; malar space slightly longer than width of base of mandible; mandibles slender, normal. Black, usually including all orbits; middle of face usually ferruginous; inner orbits at level with antennal sockets in the type with white dot.

Thorax.—Mesoscutum slightly convex; notauli anteriorly distinct; scutellum but slightly raised above postscutellum; propodeum somewhat abbreviated, the declivity nearly twice as long as the horizontal part medially; area superomedia usually a little wider than long, rarely a little longer than wide. Black, scutellum yellow to ferruginous; mesoscutum always, pronotum in the majority of specimens entirely red, sometimes only its upper part or the pronotal ridge; collare and usually subalarum and tegulae ferruginous.

Legs.—Moderately stout, femora III fairly thick; coxae III densely and finely punctured, without scopa. Usually predominantly rufous; coxae, trochanters and apex of tibiae III black; coxae sometimes partially red; femora III varying between entirely rufous and entirely black, usually black dorsally toward apex only; femora I and II rarely black, usually entirely rufous.

Abdomen.—Broad-oval; second tergite apically wider than medially long, the third more than twice as wide as long; gastrocoeli comparatively small and shallow, their interval much wider than one of them; second and third tergites moderately densely and finely punctured. Usually tricolored; tergites 1-5 ferruginous, apex of fifth to seventh black, 6 and 7 or the seventh only with white anal marks; basic color of last three tergites very variable between entirely black and entirely ferruginous.

Variability

The above description was based on the type and a series of 22 specimens collected near Kazubazua, Quebec in gregarious hibernation. In occasional erythristic mutants the ferruginous color may be still more extensive than described above, covering in addition parts of mesopleura and propodeum, the clypeus, apex of cheeks, sides of face and frontal orbits.

36. *Ichneumon pseudomaius*, new species

Types

Holotype.—♀, Massachusetts, Cambridge. M.C.Z.

Paratypes.—9 ♀♀, Massachusetts, Cambridge. M.C.Z.; 3 ♀♀, Massachusetts, Cambridge. C.G.H.

Distribution

Massachusetts, Cambridge.

Preamble

Chromatically similar to *maius*, but at once can be distinguished by the shorter flagellum with only 25-27 segments (*maius* 34-36), the small, short-oval

spiracles of propodeum, the ferruginous face and coxae and the more slender, apically more attenuated abdomen. Rather constant in color.

Female

Head black, face and clypeus always ferruginous; thorax black, mesoscutum and pronotum ferruginous (the latter rarely predominantly black); scutellum yellow; abdomen ferruginous except petiolus (sometimes apically infuscated), tergites 6 and 7 with indistinct yellow anal marks; legs, including coxae ferruginous, apex of tibiae III and femora III entirely or partially black; flagellum tricolored, bristleshaped; spiracles of propodeum small and short; gastrocoeli small; no scopa; length 8 mm.

Flagellum.—Bristleshaped, slender, fairly short, ventrally not distinctly flattened and not at all widened beyond middle, distinctly attenuated at apex, with 25-27 segments, the first little less than twice as long as wide, the twelfth approximately square. Pale ferruginous with white annulus on segments 7-11, apex blackish; sometimes last segments before annulus also infuscated; scape ferruginous, sometimes dorsally blackish.

Head.—Temple and cheek profiles very strongly narrowed with almost straight outlines; malar space a very little longer than width of base of mandible; mandibles narrow with small teeth. Black; clypeus and face always ferruginous, usually also frontal orbits, sometimes mark on apex of cheeks too.

Thorax.—Mesoscutum slightly convex, not densely and not strongly punctured, shiny; notauli scarcely indicated only at the very base; scutellum somewhat raised above postscutellum; carination of propodeum complete, including costulae, and fairly strong; area superomedia scarcely longer than wide; spiracles of propodeum small, short-oval. Black, scutellum yellow; mesoscutum and usually the entire pronotum ferruginous; rarely the pronotum predominantly black, in this case at least collare and pronotal ridge ferruginous; the following are also ferruginous: subalarum, tegulae and usually postscutellum.

Legs.—Moderately slender; coxae III ventrally finely and densely punctured, without scopa. Pale ferruginous including coxae and trochanters; apex of tibiae III and the femora III entirely or at least their apical half black; rarely coxae III partially or femora I and II dorsally black.

Abdomen.—Fairly slender, tapering toward apex; gastrocoeli slightly deepened with approximately quadrangular outline, their interval about as wide as one of them or a little wider; second and third tergites not very densely punctured, shiny. Usually uniformly ferruginous except petiolus, tergites 6 and 7 with somewhat indistinct anal marks; sometimes basic color of last tergites more or less extensively infuscated.

Remarks

The remark at the end of the description of *substituens* applies also here.

37. *Ichneumon versabilis* Cresson

Ichneumon versabilis Cresson, 1877, Amer. Ent. Soc. Trans., 6:161, ♂.

Amblyteles (Pterocormus) brittoni Viereck, 1917, Conn., State Geol. and Nat. Hist. Survey Bull., 22:347, 348, 358, ♀.

Ichneumon maius Townes (nec Cresson), 1951, Syn. Cat., p. 299, ♀ ♂.

Ichneumon versabilis Heinrich, 1959, Entom. News, 70:208, ♂.

Types

Holotypes.—*Ichneumon versabilis* Cresson, ♂, New York. A.N.S. *Amblyteles brittoni* Viereck, ♀, Connecticut, Torrington. Connecticut Agricult. Experimental Station, New Haven.

Hosts

According to H. Townes 1951: (*maius*) "*Euphydryas phaeton* (Drury), *Polygonia faunus* (Edw.), *Lycaena hypophaeas* (Bdvl.)".

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Canadian Zone and cooler part of Transition Zone".

Preamble

Another species of the *gracilicornis* group, in size a little below average for the genus, distinguished in both sexes by large, rather deep, transverse gastrocoeli with narrowed interval.

Male

Black, scutellum yellow; basic color of tergites 2 and 3 yellow, narrow bases, apices and sides of these two segments more or less infuscated (either reddish or black), the third often also, the second tergite with longitudinal infuscated or blackish median line, sometimes third tergite predominantly black; cheeks and pronotal base always black; third tergite wider than long; scutellum strongly elevated; length 12-14 mm.

Flagellum.—With elongate-oval tyloides on segments 6 or sometimes 7 to 16, the longest reaching from base to apex of segments. Black, ventrally brown or yellowish-brown; scape ventrally yellow.

Head.—Malar space relatively long, more than half as long as width of base of mandible. The following yellow: mandibles except teeth, clypeus, face, frontal orbits usually up to lower ocellus only, exceptionally up to vertex; cheeks always black.

Thorax.—Mesoscutum strongly and densely punctured; notauli basally distinct; scutellum strongly raised above postscutellum, with gradually rounded apical slope; areolation of propodeum strong and complete; area superomedia usually wider than long. Black; the following yellow: scutellum, subalarum, apex or sometimes whole length of pronotal ridge, tegulae partially or entirely, usually collare, rarely postscutellum.

Legs.—The following yellow: almost always marks on coxae I and apices of trochanters I and II, often also marks on coxae II, usually all trochanters, always all tibiae and tarsi except the broadly black apex of tibiae III and the usually more or less blackish infuscated apex of tarsi III; femora I and II usually ventrally at apex, sometimes ventrally entirely yellowish-brown; narrow base of femora III sometimes ferruginous, on interior side yellow.

Abdomen.—Moderately widened in the middle, third tergite considerably wider than long; second and third tergites coarsely sculptured, punctures between gastrocoeli and in the middle of second tergite running into longitudinal, irregular striae; gastrocoeli deep and wide, with pronounced thyridia, their interval considerably narrower than one of them. Black; postpetiolus sometimes with yellow apical band or with two apical lateral spots; second and third tergites of yellow basic color, each basally, apically and laterally narrowly infuscated, either

reddish or blackish, both tending to develop a longitudinal, infuscated stripe along the middle; all infuscations more intensive and extensive on third than on second tergite, the former in some specimens predominantly black with a yellow patch on each side in the middle.

Female

The association of sexes seems to be satisfactorily confirmed by corresponding morphology, size, ecology and frequency.

Mesoscutum entirely or predominantly ferruginous, *scutellum* yellow; *pleura*, *sternum* and *propodeum* black; *abdomen* uniformly ferruginous except *petiolus*; *coxae* and *femora* black, *tibiae* and *tarsi* ferruginous, apex of *tibiae* III black; *flagellum* tricolored, bristleshaped; *gastrocoeli* large, deep with narrowed interval; *coxae* III with thin, rather indistinct *scopa*; length 10-12 mm.

Flagellum.—Bristleshaped, moderately long and slender, distinctly flattened and a very little widened beyond middle, fairly strongly attenuated at apex, with 35-38 segments, the first about 2.3 times as long as wide, the seventh square, the widest scarcely 1.5 times as wide as long. Base, usually segments 1-6 or 7, rarely 1-3 only, pale ferruginous; white annulus on segments 7 or 8 to 12, 13 or 14; apex black; *scape* entirely ferruginous, sometimes blackish.

Head.—Temple and cheek profile considerably narrowed, the former with very slightly curved, the latter with straight outline; malar space a little longer than width of base of mandible. Black; ferruginous are: at least frontal and vertical, sometimes also facial orbits; more often entire frons and vertex including temple orbits; rarely low part of cheeks.

Thorax.—*Mesoscutum* slightly convex, distinctly and fairly densely punctured; *notauli* basally indicated; *scutellum* but slightly raised above *postscutellum*, dorsally rather flat. Black; *mesoscutum* ferruginous, rarely medially partially infuscated; *scutellum* yellow; the following ferruginous: usually apex of pronotal ridge and the *tegulae*, sometimes *collare* and *subalarum*.

Legs.—Moderately stout; *coxae* III rather densely punctured and with thin, somewhat indistinct *scopa*. Black; the following are ferruginous: *trochantelli*, apices of *femora* I or I and II ventrally, sometimes *femora* I ventrally, sometimes base of *femora* III, all *tibiae* and *tarsi*; *tibiae* III apically black, apices of segments of *tarsi* III usually infuscated.

Abdomen.—Fairly broad; second tergite at apex wider than medially long, the third more than twice as wide as long; *gastrocoeli* large, rather deep and wide with pronounced *thyridia*, their interval narrower than one of them; second and third tergites strongly and densely punctured, punctures tending to run into striae between *gastrocoeli*. Uniformly ferruginous, *petiolus* or sometimes whole first segment except apical border black; no anal mark.

Remarks

See also the following species, *subversatus* female, which is extremely similar to *versabilis*.

38. *Ichneumon subversatus*, new species

Types

Holotype.—♀, Quebec, Poltimore. C.G.H.

Paratypes.—1 ♀, Maine, Dryden; 1 ♀, Ontario, Low. C.G.H.; 1 ♀, Ontario. Ottawa. C.N.C.

Distribution

Maine, Ontario, Quebec.

Preamble

This form is so extremely similar to *versabilis* female that I hesitated to name it as a distinct species. Each of the three subtle characters in which it differs from *versabilis* could, if considered separately, very well pass as a matter of individual variation. The fact, however, that these three characters were found in combination only, as represented by the 4 type specimens, seems to indicate a specific status rather than a mere variation.

Female

In morphology and color congruent with *versabilis* except for the following three differences:

1. Coxae III without trace of scopa, a little more densely punctured than in *versabilis*, especially exteriorly.
2. Tarsi II and III a very little less slender than in *versabilis*; this difference is very subtle, and practically not measurable, but can be seen by a trained eye in direct comparison.
3. Ferruginous color more extensive than in *versabilis*, including also the following parts: entire head, entire collare, upper part of pronotum, tegulae, subalarum, entire femora I and II, basal part of femora III and tarsi III except apex of last segment.

39. *Ichneumon winkleyi* (Viereck)

Figs. 17, 60, 63

Amblyteles (*Pterocormus*) *winkleyi* Viereck, 1917, Conn. State Geol. and Nat. Hist. Survey Bull., 22:347, 348, 358, ♀.

Ichneumon instabilis Townes, 1951, Synoptic Catalog, p. 229, ♀ (partim).

Ichneumon winkleyi Heinrich, 1959, Entom. News, 70:208, ♀.

Types

Holotype.—♀, Connecticut, Branford. Connecticut Agricultural Experimental Station, New Haven.

Distribution

Connecticut (type); Maine (C.G.H.); Quebec, Ontario (C.N.C.).

Preamble

The two species *winkleyi* Viereck and *instabilis* Cresson have been regarded as synonyms until now. They are rather similar indeed, but without doubt both distinct species. Their relationship represents an exact parallel to the case of *caliginosus* Cresson and *caliginops* Heinrich, one species of each pair (*winkleyi* and *caliginosus*) being a typical *Ichneumon* of the *gracilicornis* group, the other (*instabilis* and *caliginops*) rather a *Thyreates*. *Ichneumon winkleyi* can be distinguished from *instabilis* by the strongly oxygygous abdomen with usually slightly projecting ovipositor, by the ventrally more distinctly flattened and a little widened flagellum and by the more slender, never entirely black tarsi III (in *instabilis* usually, but not always, black).

Much more difficult to solve is the problem of classifying the multitude of very differently colored, but structurally undifferentiated specimens which remain for disposal after *instabilis* has been separated from the complex. Are all these multicolored forms varying from entirely ferruginous to almost entirely

black individual variants of one and the same species, *winkleyi*? The question can not be answered yet with certainty. I do not doubt that *winkleyi* is indeed a highly variable species, but I do not feel absolutely sure yet about the real status of the mutants described below.

The general diagnosis of the species given below is based on the type and a series of specimens obviously agreeing with it, while strongly differing chromatical variations will be mentioned separately in addition.

Female

Head and mesoscutum entirely or predominantly ferruginous, scutellum yellow; abdomen ferruginous except petiolus; femora varying from predominantly black to ferruginous; tibiae and tarsi ferruginous, tibiae III apically black, tarsi III not, or indistinctly infuscated; flagellum usually tricolored, bristleshaped, long; femora III long, much more slender than in versabilis; gastrocoeli large, deep, with narrowed interval; coxae III densely punctured, without scopa; length 11-15 mm.

Flagellum.—Bristleshaped, long and slender, distinctly flattened and very little widened beyond middle, extremely attenuated at apex, with 37-40 segments, the first fully 2.5 times as long as wide, the eleventh approximately square, the widest about 1.3 times as wide as long. Segments 1-6 varying from ferruginous to blackish with brown apices; white annulus on segments 7 to 12 or 13; apex black; scape usually entirely ferruginous.

Head.—Temple and cheek profiles strongly narrowed, the former with almost straight, the latter with straight outline; malar space longer than width of base of mandible; mandibles normal; rather strongly punctured. Usually ferruginous except cheeks and sometimes except occiput; sometimes entirely ferruginous.

Thorax.—Mesoscutum convex, strongly and rather densely punctured, especially anterior part; notauli basally distinct; scutellum rather strongly raised above postscutellum, convex; area superomedia usually somewhat wider than long or square. Black, scutellum yellow; collare partially, pronotal ridge apically or entirely, tegulae and mesoscutum ferruginous.

Legs.—Long and slender; femora III long and much more slender than in *versabilis*; coxae III strongly and densely punctured, without scopa. Coxae and trochanters black; trochantelli, tibiae and tarsi ferruginous, tibiae III apically black; femora varying from predominantly black to predominantly ferruginous; usually femora I entirely, II ventrally, III basally ferruginous.

Abdomen.—Strongly oxypygous, ovipositor usually a little projecting; gastrocoeli large, rather deep, transverse, their interval as wide as one of them or a little narrower; second and third tergites strongly and densely, middle of second tergite usually coarsely punctured with irregular, longitudinal striae. Ferruginous, petiolus black.

Variability

I suppose, that the following chromatically strongly differing, but structurally congruent forms represent mere mutants of *winkleyi*.

Mutant 1.—(Melanistic). Thorax black including mesoscutum and pronotal ridge, scutellum yellow; sometimes mesoscutum with two longitudinal, dark ferruginous stripes; cheeks, whole occiput and middle of frons and vertex black. 2 ♀ ♀ from Maine.

Mutant 2.—(Erythristic). Almost uniformly ferruginous including propodeum, pleura and sterna. 2 ♀ ♀ from Maine and New Brunswick.

39. *Ichneumon pseudovivax*, new species

Holotype.—♀, Maine, Dryden, 20.VI.1952. C.G.H.

The type specimen combines all structural characters of *winkleyi* with the color pattern of *vivax*. It is somewhat smaller than the average *winkleyi* female and differs from the latter by black head, mesoscutum and first segment and by yellow anal marks on tergites 6 and 7. Nevertheless, it may perhaps represent only a strange variety of *winkleyi*.

Female

Head and thorax black, scutellum yellow, frontal orbits ferruginous; abdomen ferruginous, first segment black, tergites 6 and 7 with yellow anal mark; coxae, trochanters and femora black; apex of femora I, all tibiae and tarsi ferruginous, except black apex of tibiae III; basal segments of flagellum ventrally entirely, dorsally partially brown, segments 7-12 with white annulus, apex black; length 12 mm.

Morphology and sculpture as in *winkleyi*.

Remarks

The male of *winkleyi* is still unknown. I suspect that certain specimens presumed to belong to *versabilis*, but surpassing the normal size of that species considerably, may belong to *winkleyi*. I did not find, however, diagnostic characters to support this hypothesis.

40. *Ichneumon vivax* Cresson

Fig. 19

Ichneumon vivax Cresson, 1877, Amer. Ent. Soc. Trans., 6:178, ♀.

Types

Holotype.—♀, New Hampshire. A.N.S.

Distribution

New Hampshire. New Record: Ontario (C.N.C.).

Preamble

Rather similar to *maius* Cresson and to *pseudovivax* Heinrich as well. Differs from *maius* chromatically by the black mesoscutum and pronotum, and morphologically by longer and more slender femora III. Agrees in color with *pseudovivax* but differs distinctly in structure by the flat scutellum and mesoscutum, much smaller gastrocoeli, less narrowed cheek profile and shorter basal segments of flagellum. The type is a small specimen, in which the originally black coxae, femora, petiolus and parts of head and thorax have been discolored by age into reddish. The two specimens from Ontario are also more than 60 years old. The species does not seem to have been found since.

Female

Head and thorax black, scutellum white; abdomen ferruginous except petiolus; tergites 6 and 7 with white anal marks; coxae, trochanters and femora black; trochantelli, tibiae and tarsi ferruginous, apex of tibiae III black; flagellum slender, bristleshaped; gastrocoeli small, triangular, rather shallow; mesoscutum and scutellum flat, the former rather densely punctured; no scopa; length 10-12 mm.

Flagellum.—Bristleshaped, slender, ventrally indistinctly flattened and not widened beyond middle, considerably attenuated at apex, with 33 (type) to 35

segments, the first nearly 2.5 times as long as wide, the eighth approximately square. Black with white annulus on segments 7-13 (type) or 14; scape black.

Head.—Temple and cheek profiles moderately narrowed with distinctly curved outlines; malar space somewhat longer than width of base of mandible; middle of face convex; mandibles normal. Black; in the two specimens from Ontario frontal orbits narrowly white, widening downward to a small white mark at level of antennal sockets.

Thorax.—Mesoscutum flat, rather densely punctured, not very shiny; notauli obsolete; scutellum flat, scarcely raised above postscutellum; area superomedia a little wider than long. Black, scutellum white; in specimens from Ontario also collare and subalarum white.

Legs.—Moderately slender; femora III more slender than in *maius*, considerably less so than in *pseudovivax*; coxae III ventrally densely punctured, without scopa. Coxae, trochanters and femora black; apex of femora I, all trochantelli, tibiae and tarsi ferruginous, except black apex of tibiae III.

Abdomen.—Moderately slender, strongly oxygygous, ovipositor somewhat projecting; median field of postpetiolus clearly defined, finely striate; gastrocoeli triangular, fairly small and shallow, their interval wider than one of them; second and third tergites moderately densely and finely punctured. Ferruginous, first segment black except apical part of postpetiolus (in the type by discoloration the entire first segment ferruginous); tergites 6 and 7 with anal marks.

41. *Ichneumon valdopacus*, new species

Types

Holotype.—♀, Maine, Greenville. C.G.H.

Preamble

A small species of the *gracilicornis* group, in general appearance like a dwarf specimen of *winkleyi*, but distinguished by the very dense and fine, opaque sculpture of tergites 1 and 2 and of the mesoscutum, by the ferruginous scutellum and by the flagellum not being quite as attenuated at apex.

Female

Head black with extensive ferruginous pattern; thorax black, mesoscutum and scutellum ferruginous; abdomen red-brown except petiolus, last tergite with whitish anal mark; legs black, tibiae and tarsi red-brown; flagellum tricolored, bristleshaped; gastrocoeli triangular with narrowed interval; mesoscutum and second tergite very finely and densely punctured, opaque; no scopa; length 8 mm.

Flagellum.—Bristleshaped, slender; ventrally distinctly flattened beyond middle and slightly widened, not quite as attenuated at apex as in *winkleyi*, the last three segments before the end-cone being square (longer than wide in *winkleyi*) first segment twice as long as wide, the tenth approximately square, the widest scarcely wider than long. Segments 1-6 pale ferruginous, 7-12 with white annulus, apex black; scape black, partially ferruginous.

Head.—Temple profile strongly, cheek profile distinctly narrowed, both with slightly curved outlines; malar space a little longer than width of base of mandible; median field of face distinctly convex. Black; the following ferruginous: frontal and vertical orbits, middle of frons, face, clypeus and cheeks, except a black patch above each clypeal fovea.

Thorax.—Mesoscutum fairly strongly convex, finely and densely punctured, opaque; notauli scarcely indicated at extreme base; scutellum convex, distinctly

raised above postscutellum, rather strongly punctured; area superomedia a little wider than long. Black; the following are ferruginous: collare, mesoscutum, scutellum, postscutellum, pronotal ridge, subalarum and tegulae.

Legs.—Rather slender; coxae III finely and densely punctured, without scopa. Black; trochantelli, narrow apices of femora I and II, all tibiae and tarsi red-brown; tibiae III apically slightly infuscated on ventral side.

Abdomen.—Fairly slender, apically pointed, ovipositor a little projecting; postpetiolus with clearly defined, strongly striate median field; gastrocoeli shallow, triangular, their interval narrower than one of them; second and third tergites rather finely and very densely punctured, opaque, third tergite a little shiny toward apex. Petiolus black, rest red-brown, seventh tergite with somewhat indistinct whitish anal mark.

Remarks

Also similar to *maius*, especially in flagellar structure, but distinctly differing in shape of gastrocoeli, opaque sculpture of second tergite and more slender femora.

42. *Ichneumon nereni* Thomson

Distribution

Holarctic.

Female

Head and thorax black, scutellum white; abdomen tricolored: tergites 1 and 4-7 black, 2-3 red, in Europe 5-7 (rarely only 6 and 7) with white anal mark, in North America 6 and 7. (rarely 5-7) with white anal mark; femora III predominantly black, tibiae and tarsi red, tibiae III apically black. Flagellum bristle-shaped, with 32-33 segments, often tricolored; no scopa; length 8-10 mm.

Flagellum.—Bristleshaped, moderately long, ventrally flattened but scarcely widened beyond middle, considerably attenuated at apex, with 32-33 segments, the first approximately 2.5 times as long as wide, the eighth square, the widest a little wider than long. Black with white annulus on segments 7 or 8 to 12 or 13, often segments 1-6 or 7 pale ferruginous; scape black or ventrally ferruginous.

Head.—Temple and cheek profiles considerably narrowed with almost straight outlines; malar space about as long as width of base of mandible; mandibles normal. Black; sometimes frontal orbits narrowly ferruginous.

Thorax.—Mesoscutum slightly convex, about as wide as medially long, densely punctured; notauli obsolete; scutellum rather strongly raised above postscutellum, dorsally slightly convex, apically somewhat truncate with steep slope; area superomedia usually distinctly wider than long. Black, scutellum white; tegulae usually reddish-brown.

Legs.—Moderately slender; coxae III densely punctured, without scopa. Reddish-brown; the following are black: coxae, trochanters, apex of tibiae III, femora III except narrow base, usually femora II dorsally, often femora I dorsally; tarsi III apically more or less extensively infuscated.

Abdomen.—Short-oval; third tergite more than twice as wide as long; gastrocoeli distinctly impressed, their interval wider than one of them; second and third tergites moderately strongly and densely punctured. Tergites 1 and 4-7 black, 2 and 3 and often sides of 4 narrowly red; tergites 6 and 7 with large, sometimes the fifth with a small white anal mark.

Remarks

In the European fauna this species can easily be confounded with *insidiosus* Wesmael, *minutorius* Desvignes and *caproni* Perkins. It differs from *insidiosus* by the relatively longer basal segments of flagellum, from the other two species by the more slender femora III. The American population was compared with series of all three European species and showed unmistakably the characters of *nereni* Thomson.

42a. *Ichneumon nereni nereni* Thomson

Ichneumon nereni Thomson, 1887, Ann. Soc. Ent. France, p. 8, ♀ ♂.

Ichneumon raptorius Gravenhorst and authors (nec Linnaeus).

Ichneumon nereni Perkins, 1953, Bull. Brit. Mus. (Nat. Hist.), 3:146, 147, ♀.

Host

(*Satyrus janira* (L.)) = *Maniola jurtina* (L.).

Distribution

Europe.

Female

Usually tergites 5-7 with white anal mark, rarely only 6 and 7; usually basal segments of flagellum black, sometimes ferruginous; flagellum a trifle more widened than in American populations.

Remarks

Schmiedeknecht describes the female with anal marks in tergites 6 and 7 only, Perkins (*loc. cit.*) with anal marks on tergites 5-7. My own experience concerning European populations agrees with Perkins.

42b. *Ichneumon nereni emigrator*, new subspecies

Ichneumon nereni subsp. Heinrich, 1953, Journ. Wash. Acad. Sci., 43:149, ♀ ♂.

Types

Holotype.—♀, Maine, Dryden, 21.VIII.1955. C.G.H.

Allotype.—♂, Maine, Dryden. C.G.H.

Paratypes.—5 ♀ ♀, 1 ♂, Maine, Dryden, C.G.H.; 2 ♀ ♀, Quebec, Hull and Granby. C.N.C.; 1 ♀, Ontario, Thunder Bay Beach. C.H.T.

Distribution

Maine, Quebec, Ontario, Prince Edward Island.

Female

Usually only tergites 6 and 7 with white anal mark, rarely also the fifth with small white spot; usually basal segments of flagellum ferruginous, rarely blackish; flagellum a trifle less widened than in European populations.

Male

Head black, face and clypeus yellow, medially usually more or less extensively black; thorax black, scutellum white; abdomen black, tergites 2 and 3 uniformly yellow or partially rufous tinted, sometimes base of third tergite infuscated; coxae, trochanters and femora III black; tibiae and tarsi yellow, tibiae III and tarsi III apically black; femora I and II partially rufous; flagellum with rather short, bacilliform tyloides on segments 7-15, the longest not reaching the apices of segments, dorsally black, ventrally pale brownish; scape ventrally yellow.

low; third tergite wider than long; scutellum strongly raised above postscutellum with steep apical slope; area superomedia transverse; length 11 mm.

43. *Ichneumon putus* Cresson

Ichneumon putus Cresson, 1877, Amer. Ent. Soc. Trans., 6:173, ♀.

Types

Holotype.—♀, Connecticut. A.N.S.

Host

According to H. Townes 1951: "*Itame sulphurea* (Pack.)."

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Transition and Upper Austral Zones".

Preamble

A graceful, slender species, the smallest of the *gracilicornis* group, distinguished by a slight peculiarity of the clypeus and predominantly pale ferruginous color.

Female

Head, thorax and tergites 1-4 pale ferruginous; tergites 5-7 black, 6 and 7 or the seventh only with white anal marks; legs pale ferruginous except apex of tibiae III and dorsal side of femora III and all trochanters; flagellum bristleshaped, very slender, without annulus; gastrocoeli fairly deep, as wide as interval; ovipositor projecting; no scopa; length 7-9 mm.

Flagellum.—Bristleshaped, very slender, ventrally flattened but not widened beyond middle, considerably attenuated at apex, with 30-31 segments, the first fully twice as long as wide, about the eleventh square. Pale ferruginous including scape, apex blackish.

Head.—Temple and cheek profile rather strongly narrowed, the former with slightly curved outline; malar space distinctly longer than width of base of mandible; median field of face a little prominent; clypeus basally slightly convex, apically slightly depressed, smooth and shiny, its apical border thin; mandibles slender. Uniformly pale ferruginous.

Thorax.—Mesoscutum slightly convex, fairly densely punctured; notauli basally indicated; scutellum rather strongly raised above postscutellum, smooth and shiny; area superomedia usually longer than wide, sometimes as wide as long, a little narrowed toward base; costulae distinct. Uniformly pale ferruginous.

Legs.—Slender; tarsi elongate; coxae III ventrally very finely and densely punctured, without scopa. Pale ferruginous; the following black: apex of tibiae III, femora III dorsally and laterally, trochanters dorsally.

Abdomen.—Sharply pointed at apex, ovipositor a little projecting; median field of postpetiolus shiny with very fine, sometimes indistinct striation; gastrocoeli fairly deep and wide, their interval as wide as one of them or a little narrower; tergites 2 and 3 distinctly and densely punctured. Pale ferruginous; tergites 4-7 black, the seventh with white anal mark, often also the sixth apically whitish.

Variability

Examined specimens from Connecticut, Michigan and Ontario did not show chromatical differences. A single specimen, however, from Sudbury, Ontario

(C.N.C.) has a black head except face and clypeus, black sterna and partially black coxae but seems to agree morphologically with *putus*. I suppose that it represents an extremely melanistic mutant.

44. *Ichneumon volesus* Cresson

Fig. 71

Ichneumon volesus Cresson, 1867, Amer. Ent. Soc. Trans., 1:304, ♀.

Amblyteles balteatus Hopper, 1938, Amer. Ent. Soc. Trans., 64:97, ♂.

Ichneumon volesus Heinrich, 1939, Entom. News, 70:208, ♀ ♂.

Types

Holotypes.—*Ichneumon volesus* Cresson, ♀, Massachusetts. A.N.S. *Amblyteles balteatus* Hopper, ♂, Maine. A.N.S.

Distribution

According to H. Townes 1951: "Massachusetts, New York, Saskatchewan, Alberta". New records: Maine, Quebec and Ontario, Nipigon (C.G.H.); Manitoba, The Pas and Nova Scotia (C.N.C.).

Preamble

An unmistakable species distinguished from all known eastern American species of the genus by a unique character, by a scopa which is represented by a small, hairy protuberance, furthermore by an unusual low degree of chromatic sexual dimorphism and individual variability.

Female

Thorax entirely black including scutellum; abdomen black, tergites 2 and 3 light brown, sixth and seventh tergites usually with white anal marks; sometimes the seventh only, sometimes none white marked; legs black, tibiae and tarsi brown, tarsi III and the apex of tibiae III infuscated; flagellum bristleshaped; gastrocoeli transverse with narrowed interval; coxae III with small, elevated scopa; length 11-14 mm.

Flagellum.—Bristleshaped, moderately slender, ventrally flattened and slightly widened beyond middle, moderately attenuated at apex, with 39-42 segments, the first 2.3 times as long as wide, the seventh square, the widest about 1.3 times as wide as long. Black, segments 7 or 8 to 14 or 15 with white annulus.

Head.—Temple profile moderately, cheek profile distinctly narrowed, the former with curved, the latter with almost straight outline; malar space a little longer than width of base of mandible; mandibles normal. Black; frontal and vertical orbits narrowly dark ferruginous.

Thorax.—Mesoscutum rather flat, strongly and densely punctured; notauli distinct at very base; scutellum distinctly raised above postscutellum; area supero-media usually a little longer than wide. Uniformly black.

Legs.—Rather stout, femora thick; coxae III densely punctured, shiny, with small scopa on little protuberance. Black, including trochantelli; apex of femora I, tibiae and tarsi brown; tarsi III and the apex of tibiae III broadly blackish.

Abdomen.—Gastrocoeli triangular, rather deep and large, transverse, their interval narrower than one of them; second and third tergites very densely punctured, nearly opaque. Black; second and third tergites light brown, sixth and seventh usually with white anal marks, sometimes only the seventh, sometimes none.

Male

Head and thorax entirely black, rarely facial orbits with short white stripe, often subalarum with white spot; abdomen black, tergites 2-3, sometimes also base of tergite 4 light brown; legs black, apices of femora I and II, tibiae and tarsi brown, apices of tibiae and tarsi III infuscated, rarely tibiae and tarsi III entirely black; flagellum ventrally pale brown, dorsally blackish or brown, with oval tyloides on segments 7 or 8 to 15 or 16; scape always entirely, the first, or first and second flagellar segments usually dorsally black; length 15-16 mm.

45. *Ichneumon trizonatus* Provancher

Figs. 43, 61

Ichneumon trizonatus Provancher, 1877, Nat. Canad., 9:8, ♂.

Amblyteles ctenuchae Cushman, 1933, U.S. Nat. Mus. Proc., 82:3, ♀.

Pterocormus canadensis Townes, 1951, Synoptic Catalog, p. 297, ♀.

Ichneumon trizonatus Heinrich, 1959, Canad. Entom., 91:806, ♀ ♂.

Types

Holotypes.—*Ichneumon trizonatus* Provancher, ♂, Canada. Provincial Museum Quebec, No. 678. *Amblyteles ctenuchae* Cushman, ♀, ex *Ctenucha virginica*. U.S.N.M.

Host

According to H. Townes 1951: "*Ctenucha virginica* (Charp.)". This host is confirmed by several rearings in Canada (C.N.C.).

Distribution

According to H. Townes: (*trizonatus*) "Atlantic to Saskatchewan in Canadian Zone". (*canadensis*) "Atlantic to Continental Divide in Transition Zone". There is a great number of specimens of both sexes from Ontario, Quebec and New Brunswick in the C.N.C., but few of them are from the Canadian Zone.

Male

Black with yellow pattern; scutellum and two lateral longitudinal lines on mesoscutum near tegulae, usually also two short median lines yellow; usually propodeum, often also mesopleura yellow marked; postpetiolus and broad apical bands on second and third tergite yellow; scutellum considerably raised, apically somewhat truncate, lateral-basally carinate; gastrocoeli large; tergites 3-6 distinctly wider than long; length 15-17 mm.

Flagellum.—With narrow-oval tyloides on segments 6-15, the longest not reaching base and apex of segments. Black; scape ventrally yellow.

Head.—Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits up to lower ocellus or even to vertex, outer orbits except about upper third, below usually extending over apical part of cheeks.

Thorax.—Mesoscutum moderately strongly and densely punctured; scutellum considerably raised above postscutellum, apically somewhat truncate, dorsally slightly convex, laterally rather distinctly carinate, at least basally; carination of propodeum strong and complete; area superomedia square or somewhat wider than long. Black; the following are yellow: collare, pronotal ridge, subalarum, tegulae partially or entirely, lateral, longitudinal stripes on mesoscutum near tegulae, scutellum, postscutellum, usually two short median stripes on mesoscutum, sometimes confluent, marks on prescutellar carinae, on propodeum (areae dentiparae) and on mesopleura; pronotal base black.

Legs.—The following are yellow: all trochanters and trochantelli, coxae I and II except base, femora I and II apically and ventrally, all tibiae and tarsi except broad black apex of tibiae III; tibiae I and II ventrally with infuscated stripe toward apex.

Abdomen.—Gastrocoeli large and deep, each as wide, or a little wider than interval; tergites 3 and 4 distinctly wider than long. Black; postpetiolus and apical half or two thirds of tergites 2 and 3 yellow; black color on base of second tergite rarely replaced by ferruginous.

Female

Association of sexes confirmed by several rearings of males and females from the same host.

Thorax black, scutellum white; abdomen red including postpetiolus; very rarely tergites 3 and 4 basally black; legs black, tibiae and tarsi red-brown, tarsi II and III apically blackish, never medially yellowish; scutellum dorsally almost flat with a characteristic sharp edge or fine carina laterally at base; flagellum bristleshaped, slender; no scopa; length 13-15 mm.

Flagellum.—Bristleshaped, long and slender, ventrally flattened but not widened beyond middle, considerably attenuated at apex, with 37-39 segments, the first fully twice as long as wide, about the thirteenth square. Black with white annulus on segments 6 or 7 to 14; basal segments sometimes apically dark brownish.

Head.—Temple and cheek profiles strongly narrowed with almost straight outlines; malar space about as long as width of base of mandible; mandibles normal. Black with ferruginous pattern of somewhat varying extent; frontal and vertical orbits always ferruginous, often also clypeus medially; more rarely ferruginous color diffused over middle of face and cheeks, exceptionally over the whole face.

Thorax.—Mesoscutum slightly convex; notauli basally indicated; scutellum a little raised above postscutellum, apically somewhat truncate, dorsally rather flat, laterally at the very base slightly carinate, or with sharp edge; area superomedia square, often somewhat wider than long. Black; scutellum and sometimes also postscutellum white; subalarum often white or ferruginous, collare sometimes ferruginous marked.

Legs.—Moderately stout; femora somewhat more elongate than in the closely related *canadicola*, tarsi I and II somewhat more slender; coxae densely and fairly strongly punctured without trace of scopa. Black; trochantelli and all tibiae and tarsi red-brown, tibiae II and III apically black.

Abdomen.—Gastrocoeli triangular, fairly deep, their interval little wider than one of them; second and third tergites moderately strongly and densely punctured, except middle of second tergite where punctures are dense and tend to run into irregular longitudinal striae. Red, petiolus black; exceptionally (one specimen out of 25) seventh tergite with indistinct yellow mark; in rare melanistic mutants postpetiolus and base of third and fourth tergite black.

46. *Ichneumon canadicola*, new species

Types

Holotype.—♀, Maine, Dryden, G. Heinrich. C.G.H.

Paratypes.—6 ♀♀, Maine, Dryden; 1 ♀, Massachusetts, Concord. C.G.H.; 2 ♀♀, Ontario, Smoky Falls; 1 ♀, Ontario, Ottawa; 1 ♀, Quebec, Hull; 1 ♀, Newfoundland, Harmon Field. C.N.C.

Distribution

Maine, Massachusetts (C.G.H.); Quebec, Ontario, Newfoundland (C.N.C.). Transition and Canadian Zones. Western limit not known yet.

Preamble

Closely related in flagellar proportions and general appearance to *trizonatus*, but doubtlessly a distinct species, differing by distinctly stouter femora II and III, presence of scopa, and usually yellow banded tibiae.

Female

Thorax black, scutellum white; abdomen red including postpetiolus, usually tergites 3 and 4 with black basal bands; flagellum with white annulus, often basally ferruginous; femora black, tibiae in majority of specimens medially yellow; flagellum bristleshaped, slender; thin scopa; length 13-15 mm.

Flagellum.—Bristleshaped, long and slender, ventrally flattened beyond middle and somewhat widened, considerably attenuated at apex, with 38-39 segments, the first twice as long as wide, the sixth square, the widest 1.5 times as wide as long. Segments 1-5 usually pale ferruginous, sometimes partially or entirely black, white annulus on segments 6-13 or 14, apex black.

Head.—Temple and cheek profiles strongly narrowed with slightly curved outlines; malar space almost as long as width of base of mandible; mandibles normal. Black; frontal and vertical orbits (widened on vertex), and often upper part of facial orbits ferruginous.

Thorax.—Mesoscutum slightly convex; notauli basally indicated; scutellum a little elevated above postscutellum, dorsally rather flat; area superomedia square, sometimes wider than long; costulae usually distinct. Black, scutellum white; collar usually partially reddish; tegulae, apex of pronotal ridge and postscutellum sometimes ferruginous; rarely subalarum or postscutellum white marked.

Legs.—Femora II and III distinctly shorter and thicker, tarsi I and II somewhat stouter than in *trizonatus*; coxae III densely punctured and with thin scopa. Black; in the majority of specimens all tibiae medially yellow, basally narrowly fuscous or reddish, tibiae II and III apically blackish, tibiae I apically rufous; sometimes yellow band of posterior tibiae reduced or indistinct, rarely entirely replaced by rufous; trochantelli III, narrow apex of femora I and all tarsi ferruginous, tarsi III apically often slightly infuscated.

Abdomen.—Gastrocoeli triangular, fairly deep, their interval little wider than one of them; second and third tergites densely and rather strongly, the fourth very finely punctured. Red, always including postpetiolus; base of first tergite more or less extensively black; tergites 3 and 4 in about two thirds of specimens with black basal bands.

47. *Ichneumon fuscifrons* Cresson

Fig. 62

Ichneumon fuscifrons Cresson, 1864, Ent. Soc. Phila. Proc., 3:166, ♀.

Types

Holotype.—♀, Illinois. A.N.S.

Neallotype.—♂, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Atlantic to Iowa in Transition Zone".

Preamble

A prominent species in color and structure, distinguished particularly by the extremely densely punctured, opaque sculpture of mesoscutum.

Female

Head and thorax black with varying ferruginous pattern; always white: frontal and vertical orbits, scutellum, postscutellum and subalarum; abdomen rufous, usually with yellow anal marks on the sixth, always on the seventh tergite and often with apical lateral marks on tergites 1, or 1-3; legs rufous, coxae II always extensively white marked, coxae III often dorsally white; apex of femora III and tibiae III usually, coxae often predominantly black; mesoscutum extremely densely punctured, opaque; flagellum bristleshaped, long and slender; coxae III densely punctured, no scopa; length 13-14 mm.

Flagellum.—Bristleshaped, long and slender, ventrally flattened but scarcely widened beyond the middle, extremely attenuated toward apex, with 37-39 segments the first fully four times as long as wide, the thirteenth approximately square. Segments 1-6 or 7 usually predominantly or entirely ferruginous, sometimes dorsally blackish, rarely entirely black; white annulus on segments 7 or 8 to 12, 13 or 14; apex black or brown; scape dorsally blackish, ventrally ferruginous, sometimes entirely ferruginous.

Head.—Temple and cheek profile strongly narrowed with straight outlines; malar space about as long as width of base of mandible; mandibles slender. Black, frontal and vertical orbits always white, rarely also the upper part of facial orbits or small lateral marks on clypeus; face, clypeus and cheeks varying between black and ferruginous.

Thorax.—Mesoscutum strongly convex, longer than medially wide, very densely punctured, opaque; notauli basally indicated; scutellum distinctly raised above postscutellum, dorsally convex, shiny; carination of propodeum distinct and complete, including costulae; area superomedia usually a little wider than long and a little narrowed anteriorly; areae dentiparae somewhat slanting. Black, scutellum, postscutellum and subalarum always white, collare white or reddish, pronotal ridge entirely or apically ferruginous, sometimes apically white; tegulae ferruginous, rarely blackish; lateral areae of horizontal part of propodeum sometimes ferruginous, rarely also metapleura extensively; areae dentiparae sometimes apically with small, yellow spot; rarely mesopleura medially obscure reddish, exceptionally with yellow mark; mesoscutum often with two short, obscure ferruginous, median stripes, exceptionally replaced by yellow ones; exceptionally prescutellar carinae yellow-marked.

Legs.—Long and slender; coxae III densely punctured, without scopa. Predominantly rufous; basic color of coxae varying from rufous to black; coxae I sometimes apically narrowly, coxae II always extensively yellow-marked; coxae III usually with yellow, dorsal patch; trochanters usually apically yellowish or pale rufous; tibiae III and femora III rarely entirely rufous, usually apically narrowly black; femora III often more extensively black, varying to predominantly black with rufous base.

Abdomen.—Fairly slender, apically strongly pointed, ovipositor a little projecting; gastrocoeli moderately deepened, quadrangular; second and third tergites densely punctured. Rufous; usually petiolus, rarely the whole first segment black; postpetiolus usually with yellow, lateral-apical marks, often also the second and third tergite; seventh tergite and in the majority of specimens also the

sixth with yellow anal mark; exceptionally bases of tergites 2-4 somewhat infuscated.

Variability

The great individual chromatic variability of females is demonstrated by the following table.

TABLE V
Chromatic variability of 22 *Ichneumon fuscifrons* Cresson females from Quebec and Maine

22 frontal and vertical orbits 22 subalarum 22 scutellum and postscutellum 13 collare 2 prescutellar carinae 2 two short median lines on mesoscutum 5 marks on apex of areae dentiparae 18 lateral apical marks on postpetiolus 7 lateral apical marks on second tergite 9 lateral apical marks on third tergite 19 anal mark on sixth tergite 22 anal mark on seventh tergite 22 large marks on coxae II 12 dorsal marks on coxae III 7 apex of pronotal ridge 2 small lateral marks on clypeus 1 mark on mesopleura	white
9 face 10 clypeus 3 cheeks entirely 5 patch on middle of outer orbits 21 tegulae 22 pronotal ridge partially or entirely 11 areae dentiparae and superoexternae partially or entirely 2 also metapleura extensively 5 mesopleura partially 9 collare 9 two short median lines on mesonotum 18 basal six or seven segments of flagellum 2 base of flagellum ventrally only 9 basic color of coxae III	ferruginous
13 basic color of coxae III 11 apex narrowly of femora III 2 apical third of femora III 4 apical half of femora III 3 femora III predominantly 2 basal six or seven segments of flagellum 14 outer orbits and cheeks entirely 10 face and clypeus entirely 11 mesoscutum entirely 4 postpetiolus	black

Male

Association of sexes obvious by reason of corresponding characters. This is the only species of the genus combining a black- and yellow-banded abdomen with a white-banded flagellum in the male.

Black with rich lemon-yellow pattern; scutellum, two short median lines of mesoscutum, prescutellar carinae, marks of meso- and metapleura and propodeum

laterally extensively yellow; tergites 1-3 yellow with black basal bands, often fourth tergite laterally yellow marked; flagellum with white annulus; length 12-15 mm.

Flagellum.—With very narrow, bacilliform tyloides on segments 8 or 9 to 14 or 15 and with white annulus on segments 12, 13 or 14 to 18 or 19, ventrally pale brown, dorsally black; scape ventrally yellow; first segment long, about 4 times as long as wide.

Head.—The following are yellow: mandibles except teeth, clypeus, face, frontal and vertical orbits; outer orbits broadly below temple region. Apex of cheeks and malar space black.

Thorax.—Mesoscutum strongly convex, very densely punctured, opaque; scutellum strongly convex and raised above postscutellum, gradually sloping down to the latter; area superomedia about as wide as long or a little wider than long; areae dentiparae rather strongly sloping downward. Black; the following are yellow: collare, pronotal ridge broadly, pronotal base narrowly, often except apex, subalarum, tegulae, two short median lines on mesoscutum, rarely two short lateral lines near tegulae, always prescutellar carinae, scutellum, postscutellum, a large mark on each side of propodeum (covering areae dentiparae, areae posteroexternae, areae superoexternae entirely or partially, areae spiraculiferae except base), carinal triangle, mark on area metapleuralis, usually two separated marks or one continuous band on lower part of mesopleura and usually apex of prosternum.

Legs.—The following are yellow: all trochanters and trochantelli (except base of trochanters III), coxae I and II entirely or except base, usually dorsal patch on coxae III, all tibiae and tarsi (except black apex of tibiae III) and femora I and II ventrally; tarsi III apically not infuscated; femora I and II dorsally pale rufous varying to blackish; femora III rufous, turning gradually black toward apex, or predominantly black, narrowly rufous at base on the exterior side, narrowly yellow at base interiorly.

Abdomen.—Postpetiolus narrow, second tergite fairly strongly narrowed toward base, the third wider than long; gastrocoeli shallow. Black, tergites 1-3 yellow with black basal bands, often the fourth tergite with yellow lateral marks; tergites 4-7 sometimes dark brownish.

48. *Ichneumon propitius* Cresson

Ichneumon propitius Cresson, 1872, Amer. Ent. Soc. Trans., 4:156, ♂.

Ichneumon tharotis Packard, 1881, Boston Soc. Nat. Hist. Proc., 21:22, ♀.

Hoplismenus propitius Swift, 1946, Ann. Entom. Soc. Amer., 39:407-409, ♂ ♀.

Hoplismenus propitius Townes, 1951, Synoptic Catalog, p. 289, ♂ ♀.

Ichneumon propitius Heinrich, 1959, Entom. News, 70:207/208.

Types

Holotypes.—*Ichneumon propitius* Cresson, ♂, Texas, Bosque Co. A.N.S. *Ichneumon tharotis* Packard, ♀, ex *Phyciodes tharos* (Drury). U.S.N.M. (see Swift loc. cit.).

Hosts

According to H. Townes 1951: "*Melitaea harrisii* Scud.; *Phyciodes tharos* (Drury)". According to H. Swift 1946: "*Anemeca ebrenbergii* (Hbn.) in Mexico".

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Transition and Upper Austral Zones; also Southern Mexico". New records: Maine, Quebec, Gatineau (C.G.H.); Ontario, Smoky Falls (C.N.C.).

Preamble

The taxonomic position of this species is problematic as already discussed by Swift (*loc. cit.*) 1959. My opinion is that the absence of the most important and fundamental characters of the genus *Hoplismenus* (structure of head and clypeus) exclude the possibility of including *propitius* in this taxonomic unit. There remains only the choice either to make it the type of a new genus or to attach it as an aberrant species to the *gracilicornis* group of the genus *Ichneumon*. I chose the latter possibility for the time being. *Ichneumon propitius* is distinguished from all typical species of the genus *Ichneumon* mainly by the type and completeness of the carination of the propodeum, by the sharply prominent apices of areae dentiparae and the extraordinarily flattened clypeus.

Female

Uniformly ferruginous, scutellum usually yellow; the following are black: base of prosternum, prepectus partially, scutellar and propodeal sutures, apices of femora III and tibiae III; flagellum bristleshaped, extremely slender; scutellum elevated; gastrocoeli large and rather deep; apices of areae dentiparae slightly projecting; legs long, extremely slender; no scopa; length 11-13 mm.

Flagellum.—Bristleshaped, extremely thin, with 37-40 segments, ventrally not distinctly flattened beyond middle and not at all widened, all segments being longer than wide, the first 4 to 5 times as long as wide. Basal segments pale ferruginous, turning into blackish before annulus, the latter on segments 6 or 7 to 12 or 14, apex blackish; scape pale ferruginous.

Head.—Temple and cheek profiles moderately narrowed, both with distinctly curved outlines; malar space distinctly longer than width of base of mandible; cheeks wide between eye and carina genalis; mandibles normal; clypeus wide, entirely flat, apical border straight and thin. Uniformly pale ferruginous.

Thorax.—Mesoscutum strongly convex, very densely punctured throughout and opaque; notauli obsolete; scutellum strongly raised above postscutellum, with sharp lateral edges and with steep, rounded apical slope; propodeum with sharp and complete areolation approaching the *Barichneumon* type with the area superomedia being about as wide as long, somewhat narrowed anteriorly and close to hexagonal; apices of areae dentiparae with short, tooth-like projections. Uniformly pale ferruginous; the following are usually black: base of prosternum, prepectus except exterior part, scutellar and some propodeal sutures; scutellum yellow in southern populations, ferruginous, like the mesoscutum in Canadian specimens.

Legs.—Long and extremely slender; coxae III densely punctured without scopa; metatarsus III extremely long in Mexican specimens, not quite as long in Canadian specimens. Pale ferruginous; narrow apex of femora III and apex of tibiae III more broadly black.

Abdomen.—Median field of postpetiolus clearly defined, with some weak, indistinct, longitudinal striation or rugosity and with very few scattered punctures at apex; gastrocoeli large, rather deep, wider than long, with pronounced thyridia, their interval approximately as wide as one of them; tergites rather strongly separated from one another, the second and third tergites evenly and

extremely densely punctured and opaque in Mexican specimens, not quite so densely punctured in Canadian specimens; narrow apical border of second and third tergites smooth and shiny. Uniformly pale ferruginous.

Remarks

The differences between northern and southern populations need further investigation.

Male

Flagellum with broad, white annulus, base and apex dorsally blackish, ventrally yellowish-brown, with narrow, short-oval tyloides on segments 8-20; the following are yellow: face, clypeus, frontal orbits, mark on outer orbits, collar, subalarium, scutellum, postscutellum, marks on coxae and trochanters I and II and all tibiae and tarsi except apex of tibiae III; coxae III ventrally, mesosternum partially, areae coxales and femora III partially usually black; otherwise like female.

III. *inurbanus* group

Species 49-60

Wings uniformly and strongly infuscated; female flagellum bristleshaped or filiform; abdomen of females usually uniformly red, exceptionally black or black-and ferruginous-banded. Little sexual demorphism.

49. *Ichneumon centrator* Say

Ichneumon centrator Say, 1825, Amer. Ent., 2:49, ♀.

Ichneumon flavicornis Cresson, 1864, Ent. Soc. Phila. Proc., 3:140, ♂.

Ichneumon fortis Provancher, 1875, Nat. Canad., 7:24, 79, ♀.

Types

Holotypes.—*Ichneumon centrator* Say, ♀, lost. *Ichneumon flavicornis* Cresson, ♂, New York. A.N.S. *Ichneumon fortis* Provancher, ♀, Canada. Provincial Museum Quebec.

Host

According to H. Townes 1951: "*Isia isabella* (A. and S.)".

Distribution

According to H. Townes 1951: "Atlantic to 100° in Transition and Upper Austral Zones". New records: British Columbia, Robson, Mission City, Ruskin, Pitt Meadows (C.N.C.).

Female

Besides *devinctor* Say, one of the biggest species of Eastern North America.

Black, mesoscutum and scutellum obscure red; wings strongly and evenly infuscated; tibiae predominantly yellowish; flagellum bristleshaped, slender; no scopa; length 18 mm.

Flagellum.—Bristleshaped, slender, distinctly flattened ventrally beyond middle, but not at all widened, extremely attenuated at apex, with 44-45 segments, the first more than twice as long as wide, about the ninth square. Black with yellowish-white annulus on segments 6 or 7 to 16 or 17, the length of annulus being not clearly defined, as the white color usually changes gradually over from yellow and reddish-brown into black toward base of flagellum as well as toward apex.

Head.—Temple and cheek profiles strongly narrowed with straight outlines; malar space about as long as width of base of mandible; mandibles normal. Black; the following usually obscure red: upper part of frons, vertex, occiput, upper part of facial orbits or sides of face, upper border of face, apex of cheeks.

Thorax.—Mesoscutum scarcely convex, rather densely punctured; base of notauli distinct; scutellum distinctly raised above postscutellum; propodeum short, declivity almost twice as long as horizontal part medially; area superomedia 1.5 to 2 times as wide as long. Black; the following are obscure red: collare, mesoscutum, scutellum, apex of pronotal ridge, usually mark on subalarum.

Legs.—Slender; coxae III sparsely punctured without trace of scopa. Black; all tibiae yellowish, tibiae II and III apically blackish, somewhat infuscated at narrow base, tibiae I reddish tinted toward apex; all tarsi blackish except reddish base of tarsi I.

Abdomen.—Broad-oval, second tergite considerably wider at apex than medially long, third tergite about 2.5 times as wide as long; gastrocoeli triangular, rather deep and wide, their interval nearly as wide as one of them; second and third tergites fairly strongly and very densely punctured. Black.

Male

Black, including legs; wings evenly and strongly infuscated; flagellum predominantly ivory, narrow base and the apex dorsally blackish, ventrally brownish; facial orbits white. Very short, oval tyloides on segments 8-17 or 18; length 19-20 mm.

Variability

Light pattern of male varying as follows: White on facial orbits more or less extensive, sometimes occupying the whole face and clypeus; sometimes scape ventrally and subalarum white-marked; exceptionally mesonotum with two longitudinal red stripes.

50. *Ichneumon lewisii* Cresson

Ichneumon lewisii Cresson, 1864, Ent. Soc. Phila. Proc., 3:177, ♀.

? *Ichneumon fulvopictus* Ashmead, 1890, U.S. Nat. Mus. Proc., 12:391, ♂.

Pseudamblyteles lewisii Townes, 1951, Synoptic Catalog, p. 293, ♀ ♂.

Ichneumon lewisii Heinrich, 1959, Ent. News, 70:207, ♀.

Types

Holotypes.—*Ichneumon lewisii* Cresson, ♀, Illinois. A.N.S. *Ichneumon fulvopictus* Ashmead, ♂, Montana. U.S.N.M.

Host

According to H. Townes 1951: "*Apanteles* sp."

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Upper Austral Zone".

Preamble

The type of *Ichneumon fulvopictus* is an abnormal specimen, tergites 2-7 being malformed. It is hard to guess whether the malformation has affected the gastrocoeli too. If not, this male does not belong to *lewisii*, as the gastrocoeli are much larger and wider. Besides, the specimen comes from a locality far west of 100°, the western limit of the species as given by Townes (*loc. cit.*). It differs distinctly in color from the eastern males obviously to be associated with *lewisii* ♀ and described below. I strongly doubt the synonymy.

Female

Ferruginous including head, mesoscutum, scutellum, abdomen and legs; tergite 3 basally extensively black, usually also the first segment black and sometimes base of second partially; wings strongly and evenly infuscated; propodeum, pleura and usually sterna entirely or predominantly black; flagellum bristleshaped, slender, tricolored; gastrocoeli fairly deep, their interval wider than one of them; no scopa; length 14-19 mm.

Flagellum.—Bristleshaped, slender, not at all widened beyond middle, extremely attenuated at apex, with 45-47 segments, the first more than twice as long as wide, the ninth or tenth square. Pale ferruginous at base, turning gradually into ivory toward middle, then again into ferruginous and finally black toward apex.

Head.—Temple and cheek profile strongly narrowed with almost straight outlines; malar space distinctly longer than width of base of mandible; mandibles normal. Ferruginous.

Thorax.—Mesoscutum slightly convex, strongly and densely punctured, almost opaque; scutellum little raised above postscutellum, dorsally flattened; sculpture of whole propodeum very coarse, reticulate-wrinkled; area superomedia approximately square, sometimes wider than long, slightly narrowed toward apex; costulae distinct. Black, mesoscutum and scutellum ferruginous; the latter color tends to appear on sterna, prepectus and propleura.

Legs.—Slender, elongate; coxae III rather densely punctured, shiny, without scopa. Ferruginous including trochantelli; coxae and trochanters black; sometimes also femora III partially blackish.

Abdomen.—Postpetiolus wide, with distinct median field, strongly longitudinally striate including the lateral fields; gastrocoeli triangular, fairly strongly deepened, their interval considerably wider than one of them; second and third tergites fairly strongly and extremely densely punctured, opaque; no interval between punctures. Ferruginous; usually first segment and the third tergite except apex black; sometimes also the second tergite basally infuscated, especially laterally.

Male

Black, scutellum usually yellow or marked with yellow; wings strongly infuscated; tergites 1-4 with narrow, light apical bands, which are yellowish tinted on the first and second, reddish on the following tergites; apical tergites entirely ferruginous; length 16-19 mm.

Flagellum.—With an unusually long row of large, broadly-oval tyloides on segments 4 or 5 to 19 or 20, the longest reaching from base to apex of segments. Dorsally blackish; usually, except narrowly ferruginous base, ventrally brownish.

Head.—Mandibles partially, face and clypeus yellow; cheeks and frontal orbits partially or entirely ferruginous; rest black.

Thorax.—Sculpture as in female; scutellum stronger elevated; area superomedia wider than long. Black; the following are pale yellow: collare, scutellum predominantly or apically, apex of pronotal ridge, subalarum, tegulae partially, often marks on prescutellar carinae.

Legs.—Ferruginous, all tarsi and the tibiae basally yellowish; coxae and trochanters black; coxae and trochanters I and II ventrally marked with white; apex of tibiae III blackish; femora I and II sometimes dorsally somewhat infuscated, femora III more extensively blackish.

Abdomen.—Median and lateral field of postpetiolus both strongly striate as in female; tergites 2-4 strongly and very densely punctured, opaque, also the fifth tergite distinctly and rather densely punctured. Black; tergites 1-4 with narrow, light apical bands, which are yellowish on the anterior, ferruginous on the posterior tergites; apex of tergite 5 more extensively, tergites 6 and 7 entirely ferruginous.

51. *Ichneumon placidus* Provancher

Figs. 18, 38

Ichneumon placidus Provancher, 1875, Nat. Canad., 7:23, 76, ♂.

Types

Holotype.—♂, Quebec. Provincial Museum, Quebec. No. 658.

Neallotype.—♀, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Quebec, New York, Ohio, Alberta". New records: Maine (C.G.H.); Ontario, Utah (C.N.C.).

Male

Wings uniformly infuscated; *head and thorax* black, *face and clypeus*, *scutellum* and the *pronotal ridge* predominantly white; *abdomen* red, *first segment* black; *legs* III entirely black, *anterior legs* black with white pattern; *scutellum* strongly raised; *area superomedia* transverse; *gastrocoeli* large, rather deep, quadrangular; *femora* III moderately slender, *exterior surface* densely punctured; *length* 17 mm.

Flagellum.—With narrow, bacilliform tyloides on segments 7 or 8 to 18 or 20, the longest not reaching the base and by far not the apex of segments. Black, *scape* ventrally yellow.

Head.—Black; the following are white: *mandibles* except apex, *clypeus*, *face*, *frontal orbits* up to lower *ocellus*.

Thorax.—*Notauli* subobsolete; *scutellum* strongly raised above *postscutellum*, dorsally convex, with rounded apical slope; *carination* of *propodeum* strong and complete; *area superomedia* about twice as wide as long. Black; the following are white: *pronotal ridge* except base, *subalarum*, *mark* on *tegulae*, *scutellum* entirely or partially, sometimes *dots* on *prescutellar carinae*, sometimes *mark* on lower edge of *mesopleuron*.

Legs.—Moderately slender; *exterior surface* of *femora* III densely punctured. Black; the following are white: *coxae* I and II except base, *trochanters* and *trochantelli* I and II ventrally, *mark* on *trochantelli* III ventrally, *femora* I and *tibiae* I ventrally, *femora* II ventrally except base.

Abdomen.—*Gastrocoeli* large, rather deep, quadrangular, their interval as wide as one of them, or narrower, longitudinally striate; *sculpture* of *tergites* 2-4 dense and coarse. Red, *first segment* black.

Female

The female described below was associated with *placidus* male on account of corresponding color, size, morphology and sculpture. It is rather similar to *zelotypus* Cresson (syn. *lividulus* Provancher) in general appearance, but is easy to distinguish by the more slender flagellum, abbreviated upper tooth of *mandibles* and densely punctured *exterior surface* of the more slender *femora* III.

Also similar in appearance and structure of mandible teeth to *heterodon* Heinrich, which differs by the exteriorly polished, scarcely punctured femora III and narrower cheeks.

Head and thorax black, scutellum white; subalarum and each side of clypeus with a small white spot; abdomen red, first segment black; wings strongly infuscated; legs black; flagellum slender, bristleshaped; scutellum somewhat raised; femora III rather slender, exterior surface densely punctured; upper mandible tooth scarcely longer than the lower; gastrocoeli large, rather deep; no scopa; length 15-16 mm.

Flagellum.—Bristleshaped, slender, ventrally flattened beyond middle, but not at all widened, considerably attenuated toward apex, with 40-43 segments, the first 2.5 times as long as wide, the seventh square, no segment wider than long. Black with white annulus on segments 5 or 6 to 15 or 16.

Head.—Temple profile scarcely narrowed, with strongly curved outline; cheek profile distinctly narrowed, with slightly curved outline; cheeks a little inflated; malar space distinctly longer than width of base of mandible; apical teeth of mandibles unusually short, the upper tooth scarcely longer than the lower; whole surface of cheeks down to the base of mandibles distinctly and evenly punctured. Black, clypeus laterally with a white spot; sometimes white spot on facial orbits level with antennal sockets; sometimes middle of frontal orbits narrowly white.

Thorax.—Mesoscutum convex, rather strongly and densely punctured; notauli basally distinct; scutellum distinctly raised above postsutellum, dorsally slightly convex, gradually sloping at apex; area superomedia square or wider than long. Black, scutellum white, subalarum with white mark.

Legs.—Moderately slender; femora III distinctly more slender than in *zelotypus*, exteriorly evenly and densely punctured; coxae III ventrally very densely punctured, without scopa. Uniformly black, tibiae I ventrally ivory.

Abdomen.—Oval, blunted at apex, ovipositor not projecting; third tergite about twice as wide as long; gastrocoeli large, rather deep, not triangular (apical border not converging with apical border of postpetiolus), about as wide as interval; second and third tergites densely punctured, striate between gastrocoeli. Red, first segment black; tergite 7 or 6 and 7 usually with rather indistinct yellowish apical mark.

52. *Ichneumon zelotypus* Cresson

Fig. 21

Ichneumon zelotypus Cresson, 1867, Amer. Ent. Soc. Trans., 1:299, ♂.

Ichneumon lividulus Provancher, 1877, Nat. Canad., 9:10, ♀.

Ichneumon zelotypus Heinrich, 1959, Entom. News, 70:209, ♀ ♂.

Types

Holotypes.—*Ichneumon zelotypus* Cresson, ♂, West Virginia. A.N.S. *Ichneumon lividulus* Provancher, ♀, Quebec. Provincial Museum, Quebec. No. 644.

Distribution

According to H. Townes 1951: (*lividulus*) "Quebec"; (*zelotypus*) "New York, West Virginia, Michigan, Alberta". New records: Maine, Ontario (C. G.H.).

Male

Black with rich yellow pattern; scutellum and marks on propodeum yellow; tergites 1-3 or 4 basally black, apically broadly yellow, the black basal color of second and third tergites tending to project medially into the yellow and to interrupt it; tergites 4 or 5 to 7 red (type 4-7), mutating to black; coxae I and II apically yellow-marked, coxae III often exteriorly; scutellum considerably raised, convex; area superomedia square or transverse; third tergite wider than long; length 18-21 mm.

Flagellum.—With longish-oval tyloides on segments 6 or 7 to 18 or 19, the longest by far not reaching the apices of segments. Black, ventrally usually a little lighter or pale brown; scape ventrally yellow.

Head.—Temple profile distinctly narrowed with almost straight outline. The following are yellow: mandibles except teeth, clypeus face and frontal orbits up to vertex (usually turning pale ferruginous at upper end); outer orbits sometimes yellow marked on lower third, rarely yellow color extending over apex of cheeks and malar space.

Thorax.—Scutellum rather strongly raised above postscutellum, convex; area superomedia usually considerably wider than long, sometimes square. Black; the following are yellow: collare, subalarum, pronotal ridge usually at apex only, sometimes entirely, scutellum, usually postscutellum, sometimes two short, median marks or two short lateral lines near tegulae on mesoscutum, often marks on prescutellar carinae, always two marks of varying size on propodeum, which are sometimes reduced to the apex of areae dentiparae, sometimes rather extensive and joining another on the apex of area superomedia.

Legs.—Moderately slender, femora III rather stout. Black; the following are yellow: apical marks on coxae I and II, often latero-dorsal marks on exterior side of coxae III, usually all trochanters and trochantelli (sometimes trochanters III partially or predominantly black), femora I and II apically and ventrally, femora III basally (more extensively interiorly than exteriorly), tibiae and tarsi I and II (rarely tarsi II apically infuscated), tibiae III except black apex, base of segments 1, or 1 and 2 of tarsi III.

Abdomen.—Gastrocoeli large, rather deep, their interval striate, about as wide as one of them or somewhat narrower; hypopygium apically a little triangularly projecting. Postpetiolus apically or entirely yellow; tergites 2 and 3 or 2-4 basally black, apically extensively yellow, the black basal color tending to project medially into the yellow band, sometimes interrupting it medially; tergites 4 or 5 to 7 red, mutating to black.

Female

The sexes were associated by their matching size and morphology and by field observations concerning corresponding ecology and frequency.

The female is in New England and southeastern Canada considerably more common than the allied and similar species *placidus*, *heterodon* and *perlugubris*. It differs from *placidus* and *heterodon* by having shorter and thicker femora III, normally pointed upper mandible tooth, ventrally slightly widened flagellum and (except apex) red-brown tibiae III. The differences from *perlugubris* and *grandisops* are subtle and even problematic (see the mentioned species).

Wings moderately infuscated; head and thorax black, scutellum white; frontal and vertical orbits or entire frons and vertex ferruginous; mesoscutum sometimes partially or entirely ferruginous; abdomen red, except first segment or at least

petiolus; femora black, tibiae and tarsi predominantly red-brown; mandibles normal, upper tooth pointed; flagellum bristleshaped, slightly widened; femora III stout, exteriorly scarcely punctured; no scopa; length 14-17 mm.

Flagellum.—Bristleshaped, moderately slender, ventrally distinctly flattened beyond middle and slightly widened, considerably attenuated at apex, with 42-45 segments, the first little more than twice as long as wide, the seventh square, the widest scarcely 1.5 times as wide as long. Black, segments 5, 6 or 7 to 14, 15 or 16 with white annulus, basal segments sometimes apically and ventrally brownish; scape rarely ventrally ferruginous.

Head.—Temple and cheek profiles distinctly narrowed with almost straight outlines; malar space little longer than width of base of mandible; apex of cheeks smooth, sparsely punctured; mandibles normal, the upper tooth pointed; cheeks fairly narrow between eye and carina genalis, distinctly constricted at the latter. Black, frontal and vertical orbits and sometimes upper part of facial orbits ferruginous; sometimes clypeus and lateral fields of face, entire frons and vertex, temple orbits and exceptionally even cheeks ferruginous.

Thorax.—Mesoscutum scarcely convex; notauli basally slightly indicated; scutellum a little raised above postscutellum, dorsally flat; area superomedia square, or wider than long. Black; mesoscutum sometimes with two longitudinal, obscure ferruginous bands, varying to entirely ferruginous; scutellum white; collare partially white or ferruginous; tegulae usually dark brown, rarely ferruginous.

Legs.—Moderately stout; femora III rather short and thick, exteriorly smooth with few, scattered, weak punctures; coxae III ventrally moderately densely punctured, without scopa. Black; tibiae and tarsi red-brown, apices of tibiae II and III, tarsi II and III except base and often tibiae I dorsally infuscated.

Abdomen.—Broadly oval, apically blunt, ovipositor not projecting; gastrocoeli rather wide and deep, triangular, their interval somewhat wider than one of them; second tergite apically wider than medially long, the third at least twice as wide as long; second and third tergites rather densely, but not strongly punctured, interval of gastrocoeli usually striate. Red, first segment black; postpetiolus sometimes partially or entirely red.

53. *Ichneumon grandisops*, new species

Figs. 23, 39

Types

Holotype.—♀, New York, Ithaca, 24.V.1946, Howard E. Evans. C.N.C. No. 7159.

Paratypes.—1 ♀, Connecticut, E. Hartford. C.G.H.; 1 ♀, North Carolina, Highlands. C.N.C.; 1 ♀, Ohio, Columbus. C.H.T.

Distribution

New York, Connecticut, Ohio, North Carolina.

Preamble

A large form, which seems to agree in morphology with *zelotypus*, differing only in color by black scutellum, black legs, and evenly and more strongly infuscated wings. On account of the morphological congruence subspecific association with *zelotypus* seems to suggest itself. I feel uncertain, however, about the correct relationship of this form to *perlugubris* on one side and to *zelotypus* on the other. Therefore I prefer to treat them all as species until further evidence is found.

Female

Wings strongly and evenly infuscated; thorax including scutellum, black; at least frontal and vertical orbits ferruginous; abdomen red, except first segment; legs black, tibiae I ventrally ivory, or red-brown; otherwise like zelotypus; length 16-17 mm.

Flagellum.—Bristleshaped, moderately slender, ventrally distinctly flattened and somewhat widened beyond middle, considerably attenuated at apex, with 45-46 segments, the first two times as long as wide, the ninth or tenth square, the widest 1.3 times as wide as long. Black, with white annulus on segments 6 or 7 to 15, 16 or 17; scape ventrally ferruginous.

Head.—Black, the following are ferruginous: at least frontal and vertical orbits, usually sides of face and clypeus, sometimes whole face and cheeks.

54. *Ichneumon perlugubris*, new species**Types**

Holotype.—♀, Quebec, Park Reserve, A. R. Gobeil, 25.VI.1936. C.N.C. No. 7158.

Paratype.—♀, Saskatchewan, Waskesiu, F. S. Thompson. C.H.T.

Preamble

Another large species in morphology closely allied to *zelotypus* and to *grandisops*, differing from the former by black scutellum and strongly and evenly infuscated wings, from the latter by red-brown tibiae and tarsi. A few subtle morphological differences from *zelotypus* seem to indicate specific distinction from the latter: cheeks are a little wider between eye and carina genalis and a little less constricted at the latter; the scutellum is more raised above postscutellum; the lower part of mesothorax is somewhat more widened as can be seen by ventral view on the mesosternum. The species needs further observation and confirmation.

Female

Wings strongly and evenly infuscated; thorax, including scutellum, black; frontal and vertical orbits ferruginous; abdomen red except first segment; legs black, all tibiae and tarsi red-brown, apices of tibiae II and III, narrow base of tibiae III and apex of tarsi II and III infuscated; otherwise like zelotypus; length 17 mm.

Flagellum.—With 43 segments, structure as in *zelotypus*.

In the paratype all tarsi and tibiae I and II more extensively infuscated than in the type.

55. *Ichneumon heterodon*, new species

Figs. 20, 36

Types

Holotype.—♀, Ontario, Marmora, 24.V.1952, J. R. McGillis. C.N.C. No. 7157.

Paratypes.—1 ♀, Ontario, Putnam. C.N.C.; 5 ♀♀, New York, Ithaca and Cayuga L. C.H.T.

Distribution

Ontario, New York.

Preamble

In general appearance similar to *grandisops* and *placidus*, but well distinguished from both by structure of gastrocoeli (see below); besides differing from *placidus* by the straight and narrow cheek profile and by the femora III being exteriorly smooth and very sparsely punctured; differing from *grandisops* and the *zelotypus* complex by the abbreviated, blunt upper mandible tooth.

Female

Wings strongly and evenly infuscated; head and thorax black, including scutellum; abdomen red, except first segment; legs black; upper mandible tooth truncate, scarcely longer than the lower; flagellum bristleshaped, not widened; cheek profile strongly narrowed; femora III moderately slender, exteriorly smooth, nearly impunctate; no scopa; length 14-16 mm.

Flagellum.—Bristleshaped, slender, ventrally flattened beyond middle, but not widened, strongly attenuated at apex, with 40-42 segments, the first fully twice as long as wide, the sixth square. Black with white annulus on segments 7-14, scape sometimes ventrally ferruginous.

Head.—Temple profile distinctly narrowed with slightly curved outline, cheek profile rather strongly narrowed, with straight outline; malar space about as long as width of base of mandible; cheeks not at all inflated, rather distinctly constricted at carina genalis, apically smooth and sparsely punctured; mandibles strongly punctured, with abbreviated, blunted apical teeth, the upper scarcely longer than the lower. Black; sometimes white spot on facial orbits, level with antennal sockets; rarely clypeus obscure reddish.

Thorax.—Mesoscutum slightly convex, moderately densely punctured, shiny; notauli obsolete; scutellum rather strongly raised above postscutellum, convex; area superomedia wider than long. Usually uniformly black; rarely white apical mark on scutellum.

Legs.—Rather slender; femora III distinctly more slender than in *zelotypus*, less slender than in *Thyrateles lugubator*; coxae III fairly strongly and densely punctured, without scopa. Black, tibiae I ventrally yellowish.

Abdomen.—Oval, apically blunt, ovipositor not projecting; gastrocoeli rather shallow, thyridia very large; outline of gastrocoeli (including thyridia) not triangular, as the apical border of thyridia does not distinctly converge with apical border of postpetiolus; second and third tergites moderately strongly and densely punctured; no striation between gastrocoeli. Red, first segment black.

56. *Ichneumon suburbanus*, new species

Figs. 14, 16, 37

Types

Holotype.—♀, Maine, Dryden, hibernating, G. Heinrich. C.G.H.

Allotype.—♂, Maine, Dryden. C.G.H.

Paratypes.—6 ♀♀, 5 ♂♂, Maine, Dryden. C.G.H.; 2 ♀♀, Manitoba, Ninette; 1 ♀, Connecticut, E. Hartford; 7 ♀♀, Quebec, (5) Aylmer, (1) Pinks Lake, (1) Kazubazua. C.N.C.; 1 ♀, Michigan, Midland Co.; 1 ♀, Alberta, Calgary; 1 ♀, Ontario, Thunder Bay Beach. C.H.T.

Distribution

Maine (C.G.H.); Quebec, Ontario, Nova Scotia, Prince Edward Island, Connecticut, Manitoba, Alberta (C.N.C.); Michigan (C.H.T.); Massachusetts (M.C.Z.). On open fields.

Preamble

Extremely similar to *inurbanus* Cresson. I was a long time in doubt concerning the specific distinction from the mentioned species. Twice I have examined the type of *inurbanus* and carefully compared it with specimens of *suburbanus*. As a result I am now convinced that both are distinct species. *Ichneumon suburbanus* differs from *inurbanus* by having the cheek profile distinctly more narrowed, cheeks between eye and carina genalis less wide, a square or even transverse area superomedia and trifle more pointed apex of flagellum. Except in rare mutants (known to me only from Manitoba and Alberta) *suburbanus* has no white flagellar annulus.

Female

Wings strongly and evenly infuscated; black, including scutellum and usually flagellum and legs; head with some ferruginous pattern; abdomen red except first segment, or at least petiolus; flagellum bristleshaped, rather stout; upper mandible tooth long and sharply pointed, the lower strongly reduced; femora III stout and thick; area superomedia square or slightly transverse; coxae III ventrally in the outer part rather sparsely punctured, on the inner side, however, densely and finely punctured, and with indication of a slight scopa; length 13-15 mm.

Flagellum.—Bristleshaped, close to subfiliform, rather stout, ventrally distinctly flattened and widened beyond middle, moderately attenuated at apex, with 38-41 segments, the first 1.5 times as long as wide, the fifth square, the widest about 1.5 times as wide as long, the apical cone longer than wide, the last four segments before it little wider than long. Black, sometimes with indistinct, brownish annulus on segments 9-13.

Head.—Cheek and temple profiles slightly narrowed with slightly curved outlines; malar space a little shorter than width of base of mandible; carina oralis a little raised; mandibles with long, pointed upper tooth, the lower strongly reduced and situated far back from the mandible tip. Black with varying ferruginous pattern; at least frontal and vertical orbits narrowly ferruginous, often also clypeus, cheeks and outer orbits; rarely middle of face and entire frons and vertex.

Thorax.—Mesoscutum rather flat, fairly sparsely and not strongly punctured, shiny; notauli basally distinct; scutellum dorsally flat, scarcely raised above post-scutellum; area superomedia square or little wider than long. Black, collare sometimes partially obscure ferruginous.

Legs.—Stout; femora III short and thick; coxae III ventrally irregularly and rather sparsely punctured on the exterior part, the interior stripe on ventral side, however, densely and finely punctured, often with slight indication of a thin scopa. Black, tibiae I ventrally ivory; in a mutant femora III and tibiae III clear red.

Abdomen.—Oval, slightly pointed at apex; second tergite apically wider than medially long; gastrocoeli moderately deepened, their interval distinctly wider than one of them; second and third tergites moderately densely and not very strongly punctured, without striation. Red, first segment usually black, sometimes only petiolus.

Male

Corresponding color, morphology and ecology leave scarcely any doubt concerning the correctness of association. The male is especially distinguished by the constantly entirely black color of face and clypeus.

Wings strongly and evenly infuscated; black, including scutellum, flagellum, legs and entire head; apex of femora I and the tibiae I ventrally ivory; tergites 2-7 red; upper mandible tooth long and strongly pointed; femora III stout and thick; scutellum considerably raised above postscutellum; notauli basally distinct; area superomedia usually transverse; carina oralis a little raised; length 16-17 mm.

Flagellum.—With narrow, oval, rather short tyloides on segments 5 or 6 to 14 (usually) or 15, the longest not quite reaching the bases of segments and by far not the apices. Entirely deep black including scape.

Variability

Broad series of males from Maine, Quebec and Ontario are constant in color; in one male from Michigan (C.H.T.) bases of tergites 2-5 are black banded.

57. *Ichneumon foxleei*, new species

Types

Holotype.—♀, British Columbia, Robson, 7.VI.1949, H. R. Foxlee. C.N.C. No. 7160.

Paratypes.—3 ♀♀, British Columbia, Robson; 1 ♀, Yukon Territory. C. N.C.; 2 ♀♀, British Columbia, Robson. C.G.H.; 1 ♀, Wyoming, Powder R. Pass, 9000 ft., M. and H. Townes. C.H.T.

Distribution

Yukon Territory, British Columbia, Wyoming.

Preamble

Very similar in color and appearance to *suburbanus*, but a distinct species, differing mainly in flagellar structure and in sculpture of coxae III and anterior tergites. The geographical distribution of this species seems to lie beyond the limits of this paper. It was included on account of its close relationship and great similarity to *suburbanus*.

Female

Wings strongly and evenly infuscated; black, including scutellum, flagellum, and legs; frontal and usually vertical orbits ferruginous; abdomen red except first segment; flagellum subfiliform; upper mandible tooth not quite as long and pointed as in suburbanus; femora III stout and thick; area superomedia longer than wide; whole ventral surface of coxae III polished with very few scattered punctures; no trace of scopa; length 15 mm.

Flagellum.—Subfiliform, rather stout, ventrally distinctly flattened and a little widened beyond middle, very slightly attenuated at apex, with 41-44 segments, the first scarcely 1.5 times as long as wide, the sixth square, the widest 1.3 times as wide as long, the apical cone about as wide as long, last segments before it considerably wider than long. Black; sometimes with indistinct brownish annulus on segments 7-14.

Head.—Temple profile slightly and cheek profile more distinctly narrowed, the former with slightly curved and the latter with straight outline; malar space scarcely as long as width of base of mandible; mandibles close to normal, the upper tooth considerably longer than the lower, but not quite so much as in *suburbanus* and less sharply pointed. Black; frontal and usually vertical orbits ferruginous.

Thorax.—Mesoscutum flat (more so than in *suburbanus*), fairly sparsely and finely punctured, shiny; notauli subobsolete; scutellum flat; area superomedia longer than wide, usually somewhat narrowed toward apex. Black.

Legs.—Stout; femora III short, very thick; whole ventral surface of coxae III including interior stripe polished, with very few scattered punctures; no trace of scopa. Black, tibiae I ventrally ivory or brownish.

Abdomen.—Comparatively more elongate and apically more pointed than in *suburbanus*; gastrocoeli moderately deepened, triangular, their interval about as wide as one of them; second and third tergites very densely and rather strongly punctured, nearly opaque. Red, first segment black.

58. *Ichneumon inurbanus* Cresson

Ichneumon inurbanus Cresson, 1864, Ent. Soc. Phila. Proc., 3:179, ♀.

Ichneumon semicoccineus Heinrich, 1959, Entom. News, 70:207, ♀.

Ichneumon inurbanus Walkley, 1958, Syn. Cat. Suppl., p. 51, ♀.

Types

Holotype.—♀, Virginia. A.N.S.

Distribution

Virginia; according to L. Walkley (*loc. cit.*) "New York".

Preamble

The type specimen differs from *suburbanus* by considerably wider cheek profile with nearly square outline, by the area superomedia being longer than wide and by presence of a broad white annulus on flagellum. This may be the female of *semicoccineus* Cresson male as I suggested (*loc. cit.*) the association of sexes, however, has become uncertain (see *semicoccineus*, preamble).

So far I have not seen a single specimen matching the type. See also species *homoiodon*, new species.

Female

(Description below based on the type specimen only.)

Wings evenly and strongly infuscated; head and thorax black including scutellum; frontal and vertical orbits, clypeus, middle of face and cheeks obscure ferruginous; abdomen red, except first segment; legs black; head in front view nearly square; area superomedia longer than wide; no scopa; flagellum subfiliform with white annulus; length 14 mm.

Flagellum.—Subfiliform, fairly stout, ventrally distinctly flattened and somewhat widened beyond middle, little attenuated at apex, with 40 segments, the first a little less than twice as long as wide, the fifth square, the widest fully 1.5 times as wide as long, last two segments before apical cone square, the next (counted from the apex) wider than long. Black, with white annulus on segments 8-15.

Head.—Cheek profile scarcely narrowed, with slightly curved outline, head in front view almost square; cheeks wider between eye and carina genalis than in *suburbanus*; upper mandible tooth long and pointed, the lower subobsolete, situated rather far back from mandible tip. Black; the following are obscure ferruginous: frontal orbits up to vertex, middle of face, clypeus, cheeks.

Thorax.—Scutellum flat, little raised above postscutellum; area superomedia distinctly longer than wide, rectangular; costulae distinct. Black.

Legs.—Moderately stout; femora III not quite as thick as in *suburbanus*; coxae III ventrally on the exterior part sparsely, on the interior part more densely punctured, without scopa. Black, tibiae I ventrally ivory.

Abdomen.—Second and third tergites moderately densely and not strongly punctured. Red, first segment black.

59. *Ichneumon homoiodon*, new species

Types

Holotype.—♀, New Jersey, Newfoundland, 7.VI.1925. C.N.C. No. 7156.

Paratype.—1 ♀, Michigan, Ann Arbor. C.H.T.

Distribution

New Jersey and Michigan.

Preamble

I am reluctantly naming this form as a species. The types differ from *suburbanus* by nothing else than a broad, clear white annulus of flagellum and by the upper tooth of mandibles not being prolonged and not sharply pointed. In the white flagellar annulus they agree with *inurbanus*, but differ from this species by their distinctly narrowed cheek profile and also in the shape of the upper mandible tooth. Is it possible that both the abbreviation of upper mandible tooth and the white flagellar annulus as well represent abnormal mutations only? This does not seem to be very likely, but it is also not impossible. The scarcity of material does not allow decisive conclusions in one or the other direction. The species needs further observation.

Female

Wings strongly and evenly infuscated; black, including scutellum and legs; flagellum subfiliform, with clear white annulus; abdomen red, except first segment; frontal and vertical orbits ferruginous; upper mandible tooth not prolonged and not strongly pointed, considerably shorter than in suburbanus, moderately blunt at apex; lower tooth subobsolete; cheek profile distinctly narrowed; all the rest as in suburbanus; length 12-14 mm.

60. *Ichneumon semicoccineus* Cresson

Ichneumon semicoccineus Cresson, 1864, Ent. Soc. Phila. Proc., 3:179, ♂.

Ichneumon rufiventris Townes, 1951, Synoptic Catalog, p. 300, ♂ (partim).

Ichneumon semicoccineus Heinrich, 1959, Entom. News, 70:207, ♂.

Types

Holotype.—♂, "Western Territory" (= Western U.S.A.). A.N.S.

Distribution

Western U.S.A. (type specimen); Delaware (paratype in Cresson collection); South Carolina, New York (C.H.T.).

Preamble

As I have pointed out (*loc. cit.*) the type specimen of *semicoccineus* Cresson represents without doubt a species distinctly different from *lugubrator* Gravenhorst (syn. *rufiventris* Brullé). It is also different from *suburbanus*, new species, ♂, not only by the extensive yellow color of face and clypeus, but also by considerably longer flagellum with more elongate segments.

At the time when I associated (*loc. cit.*) *inurbanus* Cresson, ♀, as the other sex and as a synonym with *semicoccineus* I was not aware yet of the complexity of this group. Since then I learned to distinguish the females of two further species, both existing in Eastern North America and both rather similar to *inurbanus* (*heterodon*, new species, and *homoiodon*, new species). I failed to find convincing evidence excluding the possibility that *semicoccineus* could be associated with one of these two new females instead of *inurbanus*. Consequently it

seems to be the best to treat *inurbanus* ♀ once more as a distinct species until the correct association of sexes can be proven.

Male

Wings strongly and evenly infuscated; black, including scutellum and flagellum; face and clypeus entirely, or predominantly, yellow; legs predominantly black including tarsi III; tergites 2-7 red; upper mandible tooth long and strongly pointed, femora III rather stout; scutellum considerably raised above postscutellum; notauli basally distinct; area superomedia usually transverse; flagellar segments and flagellum considerably longer than in suburbanus; length 16-18 mm.

Flagellum.—With narrow, oval, rather short tyloides on segments 6-14 or 15 (in the type 6-12), the longest not quite reaching the bases and by far not the apices of segments. Black, scape ventrally yellow.

Head.—Temple profile moderately narrowed (distinctly less so than in *placidus*) with slightly curved outline; malar space about one third as long as width of base of mandible. Black; the following are yellow: mandibles partially, face and clypeus entirely or except middle, sometimes lower part of frontal orbits.

Thorax.—Mesoscutum fairly sparsely and finely punctured, shiny; notauli basally distinct; scutellum considerably raised above postscutellum, dorsally flat, apically sloping gradually; area superomedia usually wider than long, sometimes square; costulae distinct; mesopleura shiny, more sparsely and less strongly punctured, especially on lower half, than in *suburbanus* and *placidus*. Black; collare and subalarum usually partially white.

Legs.—Moderately slender; femora III about as stout as in *suburbanus*, considerably more so than in *placidus*. Black; tibiae I, or I and II and apices of femora I and II ventrally ivory or brownish; sometimes tibiae III ventrally yellowish at base.

Abdomen.—Gastrocoeli fairly deep, quadrangular, exteriorly about as long as apically wide, their interval as wide as one of them or a little narrower. Red, first segment black.

IV. *artemis* group

Species 61-67

Abdomen of females black; legs predominantly rufous; flagellum filiform or bristleshaped; wings not strongly infuscated. Little sexual dimorphism.

61. *Ichneumon artemis* (Viereck)

Figs. 7, 56

Cratichneumon artemis Viereck, 1902, Ent. News, 13:87, ♀.

Ichneumon artemis Heinrich, 1956, Can. Entom., 88:486, ♀ (partim).

Types

Holotype.—♀, Colorado. A.N.S.

Distribution

According to H. Townes 1951: "Colorado". New records: Labrador, Hopedale; Manitoba, Churchill; Alberta, Waterton Lake (C.N.C.).

Preamble

When I treated this species (*loc. cit.*) in 1956 I was still in doubt whether the 12 Canadian females before me, differing as it seemed in color only of tarsi

III, represented one or two species. Since I found that the mentioned series was indeed composed of two different species, one of them being identical with the type of *artemis*, the other representing probably the female of *similaris* Provancher. Both species are extremely similar in color and morphology. They can be distinguished by the color of tarsi III which are black or blackish in *artemis*, pale rufous or luteous in *similaris*. Besides there is a small but distinct difference in the relative width of femora II and in the shape of temples.

In all Palearctic species of this color group known to me the color of tarsi III agrees in both sexes. Therefore I expect the male of *artemis* to have dark tarsi III. For this reason *I. pedalis* Cresson is probably not the matching male of *artemis*, which stays unknown so far.

Female

Black, including scutellum; no anal marks; legs rufous including trochantelli; coxae and trochanters black; tarsi III black or blackish; no flagellar annulus; flagellum slender, not widened, subfiliform; fairly distinct scopa; length 10-14 mm.

Flagellum.—Subfiliform, long, slender, not widened beyond middle, ventrally flattened toward apex only, slightly attenuated at the very apex, with 39-42 segments, the first more than twice as long as wide, the tenth square, segments of about the apical quarter seen from flattened side somewhat wider than long. Black.

Head.—Temple profile scarcely narrowed with strongly curved outline; cheek profile distinctly narrowed with straight outline; malar space about as long as width of base of mandible; mandibles normal. Black including orbits.

Thorax.—Mesoscutum slightly convex, moderately densely punctured, shiny; basal third of notauli distinct; scutellum gradually slanting down toward post-scutellum; propodeum short; area superomedia approximately 1.5 times wider than long. Black.

Legs.—Moderately stout; coxae III irregularly, moderately densely punctured with fairly distinct scopa; femora II medially more widened than in *similaris*. Rufous; coxae, trochanters (not trochantelli) and tarsi III black.

Abdomen.—Median field of postpetiolus clearly defined, strongly striate; gastrocoeli triangular, moderately deep, their interval wider than one of them; second and third tergites rather densely and strongly punctured, punctures between gastrocoeli running into longitudinal striae. Black.

62. *Ichneumon similaris* Provancher

Figs. 9, 47, 57

Ichneumon similaris Provancher, 1875, Nat. Canad., 7:26, ♂.

Automalus nigropilosus Ashmead, 1902, Wash. Acad. Sci. Proc., 4: 148, ♂.

Ichneumon artemis Heinrich, 1956, Can. Entom., 88:486, ♀ (partim).

Types

Holotypes.—*Ichneumon similaris* Provancher, ♂, Quebec, Cape Rouge. Provincial Museum Quebec. *Automalus nigropilosus* Ashmead, ♂, Alaska, Juneau. U.S.N.M.

Neallotype.—♀, Labrador, Hopedale. C.N.C. No. 7173.

Distribution

According to H. Townes 1951: "Quebec, Washington, Alaska". New records: (♂♂) British Columbia, Mt. Revelstoke; Northwest Territories, Ft. Simpson; Alberta, Lake Louise. (♀♀) British Columbia, Mt. Revelstoke;

Northwest Territories, Ft. Smith; Yukon Territory, Rampart House; Labrador, Hopedale (C.N.C.).—Transcontinental in Canadian Zone.

Preamble

The association of sexes results with reasonable degree of probability from corresponding morphology, color, distribution and frequency. See also preamble to *Ichneumon artemis*.

Male

Black, face and clypeus yellow; legs uniformly pale rufous, close to luteous, including trochantelli and tarsi III; coxae and trochanters black; flagellum black; head and thorax covered by long, black hair; length 17-18 mm.

Flagellum.—With narrow, lanceolate tyloides usually on segments 7 or 8 to 18 to 19 (type 7-16), the longest ones reaching almost from base to apex of segments. Black, scape ventrally yellow marked.

Thorax.—Anterior third of notauli rather distinct; scutellum fairly strongly raised above postscutellum, gradually slanting down to the latter; area superomedia strongly transverse, usually more than twice as wide as long. Black.

Abdomen.—Median field of postpetiolus clearly defined and strongly striate; second to fourth tergite strongly and very densely punctured without space between punctures, the latter running into striae between gastrocoeli; gastrocoeli large and rather deep, almost as wide as their interval. Black.

Female

Black, including scutellum; no anal marks; legs uniformly pale rufous including trochantelli and tarsi III; no flagellar annulus; frontal orbits usually reddish; flagellum slender, not widened, subfiliform; fairly distinct scopa; length 13-16 mm.

Flagellum.—Subfiliform, long, slender, not widened beyond middle, ventrally flattened toward apex only, slightly attenuated at the very apex, with 42-46 segments, the first more than twice as long as wide, the tenth square, segments of about the apical quarter seen from flattened side somewhat wider than long. Black; ventrally and the apices of segments also dorsally often brownish; rarely basal part entirely brown.

Head.—Temple and cheek profiles distinctly though not strongly narrowed with nearly straight outlines;; malar space scarcely longer than width of base of mandible. Black; usually frontal orbits more or less narrowly reddish, sometimes also upper part of facial orbits.

Thorax.—Mesoscutum slightly convex, moderately densely punctured, shiny; notauli basally indicated; scutellum gradually slanting down toward postscutellum; area superomedia distinctly wider than long. Black.

Legs.—Moderately stout; coxae III moderately densely punctured with fairly distinct scopa; femora II medially distinctly less widened than in *artemis*. Uniformly pale rufous including trochantelli and tarsi III; coxae and trochanters black.

Abdomen.—Median field of postpetiolus clearly defined, strongly striate; gastrocoeli triangular, moderately deep, their interval wider than one of them; second and third tergites on the average somewhat less strongly and densely punctured than in *artemis*. Black.

63. *Ichneumon gavisicolor* Heinrich

Ichneumon gavisicolor Heinrich, 1956, Can. Entom., 88:485, ♀.

Types

Holotype.—♀, Quebec, Fort Chimo, R. H. MacLeod, 18.VI.1948. C.N.C. No. 6406.

Distribution

Subarctic Quebec.

Female

Black; scutellum, pronotal ridge and conspicuous marks on tergites 5-7 white; legs uniformly rufous including trochantelli, trochanters and coxae black; inner orbits white; flagellum subfiliform, distinctly widened beyond middle, with white annulus; no scopa; length 13 mm.

Flagellum.—Subfiliform, distinctly widened and ventrally flattened beyond middle, somewhat attenuated at apex, with 39 segments, the first 1.3 times as long as wide, the fourth square, the widest twice as wide as long. Black with white annulus on segments 8-13.

Head.—Temple and cheek profile moderately narrowed with slightly curved outlines; malar space a little longer than width of base of mandible; mandibles normal. Black, facial, frontal and vertical orbits white.

Thorax.—Mesoscutum rather strongly and densely punctured; notauli obsolete; scutellum slightly raised above postscutellum; area superomedia longer than wide, parallel-sided. Black, scutellum, pronotal ridge, subalarum and collare white.

Legs.—Moderately stout; coxae III strongly and densely punctured; shiny, sparsely hairy, without scopa. Uniformly rufous, except coxae and trochanters which are black.

Abdomen.—Strongly oxyptygous, ovipositor distinctly projecting; median field of postpetiolus clearly defined, regularly longitudinally striate; gastrocoeli large, triangular, their interval about as wide as one of them, somewhat striate; second and third tergites strongly and densely, the fourth tergite sparsely and very finely punctured.

64. *Ichneumon trigemellus* Heinrich

Ichneumon trigemellus Heinrich, 1956, Can. Entom., 88:484, ♀.

Types

Holotype.—♀, Northwest Territories, Norman Wells, C. D. Bird, 25.VI.1953. C.N.C. No. 6402.

Paratype.—♀, Manitoba, Gillam, J. F. McAlpine, II.VI.1950. C.G.H.

Distribution

Northwest Territories, Manitoba.

Female

Black, including scutellum, tergites six and seven with more or less distinct white longitudinal median mark; legs rufous including trochantelli, coxae and trochanters black; inner orbits yellowish red; flagellum filiform, not widened beyond middle, without distinct annulus; scopa distinct; length 13 mm.

Flagellum.—Filiform, slender, not widened beyond middle, scarcely attenuated at apex, with 42 segments, the first 1.8 to 2 times as long as wide, the ninth

or tenth square, the last twelve segments before apex wider than long. Blackish-brown basally, becoming gradually lighter toward the middle, with slight indication of a lighter annulus between about the ninth and fourteenth segments, the apex blackish, ventrally reddish-brown.

Head.—Temple and cheek profile distinctly, though not strongly narrowed, with slightly curved outlines; malar space about as long as the width of base of mandible. Black, frontal and sometimes upper end of facial orbits and the vertical orbits narrowly yellowish-red.

Thorax.—Mesoscutum strongly and rather densely punctured; notauli obsolete even at base; scutellum somewhat convex; area superomedia parallel-sided, tending to be longer than wide. Black; tegulae and in the type also collar reddish-brown; scutellum of the type medially indistinctly obscure reddish tinted.

Legs.—Moderately stout; tibiae III stouter than in *artemis* and *similaris*, in side view 5.4 times longer than wide at apex; coxae III with distinct scopa. Uniformly rufous including trochantelli; coxae and trochanters black.

Abdomen.—Postpetiolus with distinct, rather irregularly longitudinally striate median field; gastrocoeli large, triangular, their interval about as wide as one of them; second and third tergites strongly and moderately densely, the fourth sparsely and weakly punctured in the type, almost smooth in the paratype. Black; sixth tergite with small, indistinct, seventh with larger, longitudinal white mark; in the type second tergite partially indistinctly tinted with obscure reddish.

65. *Ichneumon perretti* Heinrich

Ichneumon perretti Heinrich, 1956, Can. Entom., 88:482, 483, ♀.

Types

Holotype.—♀, Labrador, Hopedale, W. W. Perrett. C.N.C. No. 6399.

Paratypes.—29 ♀♀, from type locality, W. W. Perrett. C.N.C. and C.G.H.

Distribution

Labrador.

Female

Black, scutellum yellowish or reddish; legs rufous including at least coxae I, sometimes also coxae II and III partially; flagellum without annulus, basally rufous, apically blackish, filiform; no scopa; length 11-12 mm.

Flagellum.—Exactly filiform, slender, moderately long, not at all widened beyond middle, not attenuated at apex, indistinctly flattened ventrally toward apex only, with 40-41 segments, first segment 1.3 times as long as wide, seventh segment square. Rufous including scape, without annulus, with blackish apex; rarely predominantly blackish with rufous base.

Head.—Temple profile scarcely, cheek profile more distinctly narrowed, both with slightly curved outlines; malar space distinctly longer than width of base of mandible; cheeks wide between eyes and carina genalis, smooth with few scattered punctures; rest of head rather strongly and densely punctured, with fairly long reddish hair. Black; apex of clypeus and middle of face usually obscure reddish.

Thorax.—Mesoscutum flat, not very strongly and densely punctured, shiny; notauli obsolete; scutellum slightly convex; propodeum fairly short, area superomedia subquadrate or somewhat wider than long. Black; the following are

rufous: collare, narrow apex of pronotal ridge, scutellum, postscutellum, sometimes an indistinct median mark or two longitudinal stripes on mesoscutum.

Legs.—Moderately stout; coxae III ventrally strongly and fairly sparsely, at the inner side less strongly and more densely punctured, without scopa. Rufous including trochanters and coxae; coxae II and III usually partially, rarely entirely black.

Abdomen.—Longish; postpetiolus wide, the median field rather ill-defined, finely and somewhat irregularly, sometimes indistinctly longitudinally striate, sometimes almost smooth; gastrocoeli triangular, shallow, transverse, their interval distinctly wider than one of them; second and third tergites with shallow, fairly sparse punctures, alutaceous between them. Black; sometimes tergites 5 or 6 to 7 indistinctly obscure reddish; exceptionally seventh tergite with white anal mark.

66. *Ichneumon nebularum* Heinrich

Ichneumon nebularum Heinrich, 1956, Can. Entom., 88:483/484, ♀.

Types

Holotype.—♀, Labrador, Hopedale, W. W. Perrett. C.N.C. No. 6400.

Neallotype.—♂, Labrador, Hopedale, W. W. Perrett. C.N.C.

Paratypes.—12 ♀♀, Labrador, Hopedale, W. W. Perrett. C.N.C. and C.G.H.

Distribution

Labrador.

Preamble (female)

In general appearance like an enlarged copy of *peretti*. Easily to distinguish not only from the latter but also from all species of the *artemis* group by morphology of flagellum. Shares with *peretti* the weak and sparse puncturation of second and third tergites.

Female

Black, including scutellum; legs rufous including trochantelli; coxae and trochanters black; flagellum blackish, without annulus, subbristleshaped, stout, short, widened; no scopa; length 15 mm.

Flagellum.—Close to bristleshaped, but short and stout, flattened ventrally and somewhat widened beyond middle, distinctly attenuated at apex, with 37-38 segments, the first 1.2 times as wide as long, the fourth square, the widest nearly twice as wide as long. Black; median part ventrally and the basal segments apically usually more or less distinctly reddish-brown.

Head.—Temple profile scarcely, cheek profile more distinctly narrowed, both with slightly curved outlines; malar space distinctly longer than width of base of mandible; cheeks smooth with a few scattered punctures; rest of head rather strongly and densely punctured, covered with long, fuscous hair. Black.

Thorax.—Mesoscutum slightly convex, fairly strongly but not very densely punctured, shiny; notauli basally indicated; scutellum considerably raised above postscutellum, sparsely punctured and glossy; anterior upper part of mesopleura distinctly swollen; propodeum fairly short; area superomedia usually somewhat wider than long, sometimes 1.5 times as wide as long, its posterior border usually strongly curved inward. Black; collare sometimes obscure reddish.

Legs.—Moderately stout; coxae III rather strongly and densely punctured, without scopa. Rufous including trochantelli; coxae and trochanters black.

Abdomen.—Longish, apex fairly blunt, ovipositor almost entirely hidden; postpetiolus wide, with clearly defined, usually strongly striate median field, which is distinctly prominent at the knee; gastrocoeli triangular, transverse, moderately deep, their interval about as wide as one of them; second and third tergites with shallow, sparse puncturation; distance between punctures averages several times greater than diameter of one; interval between punctures finely alutaceous, almost opaque. Black.

Preamble (male)

There is no doubt that a series of males collected by W. W. Perrett at Hopedale along with series of females of *perretti* and of *nebularum* belongs to one of these two species, as it matches their color pattern and especially their characteristic sculpture of second and third tergites. It is, however, hard to decide with which of the two species it has to be associated. The basally fairly distinct notauli and the strongly raised, black scutellum seem to give some preference to *nebularum*.

Male

Uniformly black including face and clypeus; legs rufous except coxae and trochanters; narrow, nearly bacilliform tyloides on flagellar segments 7 or 8 to 17 or 18, the longest almost reaching base but not apex of segments; head and thorax covered by long, fuscous hair; notauli basally distinct; length 15-16 mm.

Temples broadly rounded; scutellum convex, considerably raised above postscutellum; area superomedia wider than long; postpetiolus distinctly striate; gastrocoeli rather large, triangular, moderately deep; second to fourth tergites finely and sparsely punctured, alutaceous between punctures; punctures in the middle of second tergite running into some irregular striae; femora more slender than in *similaris* and *pedalis*; similar in color to *pedalis*, strongly different, however, by sculpture of second and third tergites, by shape and depth of gastrocoeli and by more slender femora III.

Remark

Three males from New Hampshire, Mt. Washington (C.H.T.) agree with the male described above in color and sculpture of anterior tergites, but have the notauli subobsolete and a square area superomedia. They are certainly closely related if not conspecific.

67. *Ichneumon cessatorops* Heinrich

Distribution

Yukon Territory and Quebec.

Preamble

In general appearance and especially in the unusually slender, extremely attenuated flagellum of the female this species approaches the European *I. cessator* Mueller and it might very well represent the Nearctic vicarious form of the latter. It differs from the European species by the less elevated scutellum and the slightly less slender flagellum.

Female

Black, scutellum black or white; flagellum with or without annulus; legs rufous including trochantelli; coxae and trochanters black; apex of tibiae III and the tarsi III infuscated; inner orbits usually more or less extensively yellowish-red; flagellum bristleshaped, long and unusually slender; no scopa; length 14 mm.

Flagellum.—Bristleshaped, very slender, extremely attenuated at apex, ventrally distinctly flattened beyond middle, but little widened, with 41-42 segments, the first segment fully twice as long as wide, the tenth square, the widest 1.3 times as wide as long, the last 3-4 segments longer than wide. Black, often basal segments ventrally extensively, dorsally at the apices obscurely brownish; a light annulus may be clearly developed or only indistinctly indicated.

Head.—Temple and cheek profile strongly narrowed with almost straight outlines; occiput immediately sloping down from hind margin of eyes and ocelli; malar space longer than width of base of mandible; cheeks narrow in side view; mandibles normal, the upper tooth considerably longer than the lower. Black; frontal orbits up to vertex and upper part of facial orbits usually yellowish red.

Thorax.—Mesoscutum strongly and densely punctured; notauli basally indicated; scutellum rather strongly elevated above postscutellum, convex with rounded apical slope; area superomedia wider than long or square, declivity of propodeum considerably longer than the horizontal part. Black; scutellum in one specimen from Quebec white.

Legs.—Femora long and slender; coxae III strongly and densely punctured, without scopa. Rufous including trochantelli, coxae and trochanters black; tarsi III and apex of tibiae III infuscated.

Abdomen.—Rather slender, strongly oxyptygous; ovipositor distinctly projecting; median field of postpetiolus clearly defined and regularly longitudinally striate; gastrocoeli large, triangular, their interval distinctly wider than one of them and striate; second and third tergites strongly and densely, the fourth less strongly and somewhat less densely punctured. Black.

67a. *Ichneumon cessatorops cessatorops* Heinrich

Ichneumon cessatorops Heinrich, 1956, Can. Entom., 88:484, ♀.

Types

Holotype.—♀, Yukon Territory, Watson Lake, W. R. Mason, 23.VI.1948. C.N.C. No. 6404.

Distribution

Yukon Territory.

Female

Flagellum without distinct white annulus, segments 9-12, however, slightly heightened in tint; scutellum black; area superomedia about 1.5 times wider than long.

67b. *Ichneumon cessatorops kasubazuae* Heinrich

Ichneumon cessatorops kasubazuae Heinrich, 1956, Can. Entom., 88:485, ♀.

Types

Holotype.—♀, Quebec, Kazubazua, R. H. MacLeod, 18.VI.1948. C.N.C. No. 6405.

Neallotype.—♂, Alberta, Edmonton, E. H. Strickland, 27.VI.1941. C.H.T.

Distribution

Quebec (C.N.C.). Alberta (C.H.T.).

Female

Flagellum with distinct, white annulus on segments 7 or 8 to 13 or 14; scutellum white (in type specimen) or black; discs of second and third tergites

sometimes partially obscure reddish tinted; area superomedia approximately as wide as long.

Male

Flagellum black, with narrow, longish-oval tyloides on segments 8-18; scape black; stripe on facial orbits and labrum yellow; scutellum black; otherwise like female.

V. *feralis* group

Species 68-89

Abdomen of females black in the typical species with one or several white bands on anterior tergites and with white anal marks, the tibiae medially white; flagellum filiform, sometimes bristleshaped; femora black; wings not strongly infuscated.

All other species combining black basic color of abdomen with black color of femora are annexed to this group. Sexual dimorphism considerable, with pattern of the males sometimes as in the *laetus* group.

68. *Ichneumon feralis* Cresson*

Fig. 35

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

Types

Holotype.—♀, Massachusetts. A.N.S.

Host

Two specimens bred from the same species of pupa, probably *Hepialus mustelinus* Pack. (C.N.C.).

Distribution

According to H. Townes 1951: "Massachusetts, New Hampshire, Quebec, Alberta". New records: Maine (Bucksport and Winter Harbour) (C.G.H.); Labrador (Goose Bay) (C.N.C.). Evergreen woods.

Preamble

Distinguished from all other species of this color group by the shape of mandibles, which are somewhat widened and swollen beyond middle (Fig. 35).

Female

Black, scutellum white; second tergite with uninterrupted white apical band, sometimes also the third apically white marked or banded; three white anal marks, the mark on the fifth tergite often reduced; rarely absent; tibiae white banded; tarsi III reddish-brown; mandibles distinctly widened and somewhat inflated beyond middle; flagellum filiform; no scopa; length 11-14 mm.

Flagellum.—Exactly filiform, not distinctly flattened ventrally beyond middle and not widened, not attenuated at apex, with 31-35 segments, the first less than 1.5 times as long as wide, the sixth square. Black with white annulus on segments 7 or 8 to 13 or 14.

Head.—Temple and cheek profiles little narrowed, the former with strongly curved, the latter with nearly straight outline; malar space a little shorter than width of base of mandible; mandibles somewhat widened and swollen beyond

*See Part VII, Addenda, *Ichneumon feralis* Cresson (description of male).

middle. Black; frontal orbits up to vertex and down to beyond antennal sockets red; clypeus usually, sometimes also cheeks obscure reddish.

Thorax.—Somewhat elongate; notauli obsolete; area superomedia usually longer than wide. Black, scutellum white, exceptionally also postscutellum; collare usually whitish.

Legs.—Stout; coxae III rather densely punctured, without scopa. Black, all tibiae with white annulus, base and apex of tibiae I and tarsi I and II pale-reddish, tarsi III reddish-brown.

Abdomen.—Median field of postpetiolus finely striate; gastrocoeli relatively small and shallow; second and third tergites fairly densely and finely punctured. Black; second tergite with broad, uninterrupted white apical band; third tergite apically sometimes with an indistinct, irregular white pattern at the apex; usually tergites 5-7 with white anal marks, the mark on the fifth tergite often reduced, sometimes absent.

69. *Ichneumon feriens*, new species

Figs. 10, 34, 53

Types

Holotype.—♀, Maine, Dryden, G. H. Heinrich. C.G.H.

Allotype.—♂, Quebec, Gatineau, C.G.H.

Paratypes.—9 ♀♀, Quebec, Kazubazua, G. H. Heinrich; 1 ♀, Ontario, Constance Bay; 1 ♀, Quebec, Laniel; 1 ♀, New Brunswick, St. Stephen. C.N.C. 12 ♀♀, Maine, Dryden. C.G.H. 2 ♀♀, New Hampshire, Pinkham Notch; 1 ♀, New York, Ithaca. C.H.T.

Distribution

Transcontinental in Transition and Canadian Zones. Inhabitant of deciduous woods. Maine, Quebec, Ontario, Michigan (C.G.H.); New Brunswick, Manitoba (Aweme), Alberta (Midnapore), British Columbia (Robson, Adams Lake, Likely), Alaska (Cold Bay, Anchorage) (C.N.C.); New Hampshire, New York, Alberta (C.H.T.).

Female

Black, scutellum white; second tergite with uninterrupted white apical band, two white anal marks; tibiae white banded, tarsi III blackish; mandibles normal, slender; flagellum filiform; thin scopa; length 10-15 mm.

Flagellum.—Filiform, ventrally flattened and somewhat widened beyond middle, imperceptibly attenuated at apex, with usually 33-35 segments (eastern populations), the first scarcely twice as long as wide, the sixth square, the widest almost twice as wide as long. Black with white annulus on segments six or seven to 13 or 14.

Head.—Temple and cheek profiles distinctly, though not strongly narrowed, with slightly curved outlines; malar space about as long as the width of base of mandible; cheeks in the apical part distinctly constricted at carina genalis; mandibles normal, slender. Black, frontal orbits up to vertex red.

Thorax.—Mesoscutum and scutellum rather flat; notauli basally indicated; area superomedia square, tending to become a little longer than wide. Black; collare obscure whitish; scutellum white.

Legs.—Moderately stout; coxae III fairly densely, irregularly punctured, with thin scopa. Black; all tibiae with white annulus; tarsi I and II reddish brown, tarsi III almost black except the reddish narrow base of metatarsus.

Abdomen.—Gastrocoeli relatively small and shallow; second and third tergites fairly densely and finely punctured. Black; second tergite with broad, uninterrupted white apical band, sixth and seventh tergite with white mark.

Male

I collected this male so many times in localities and frequency corresponding with the female that I have no doubt concerning the correctness of association. It is very similar in general appearance and color pattern to *annulatorius* Fabricius (= *funestus* Cresson) and as far as I can see morphologically not to be distinguished. It differs, however, constantly in certain color patterns.

Like *annulatorius* black, with scutellum, broad apical bands on tergites 1-4, two large marks on propodeum and tibiae predominantly yellow; differs from *annulatorius* by the more ivory tint and lesser extension of yellow pattern; flagellum deep black ventrally, as well as dorsally; at least apical margin of cheeks and malar space always black; no yellow pattern on mesoscutum and mesopleura; tibiae I and II with black ventral stripe, tibiae III often basally narrowly black; tarsi III black except base of metatarsus; black basal bands of tergites on the average more extensive; length 16-18 mm.

Flagellum.—Deep black ventrally as well as dorsally; scape ventrally yellow; short, narrow-oval tyloides of segments five or six to 13 or 14.

The following are ivory-yellow: mandibles except teeth, face, clypeus, scape below, frontal orbits, rarely a dot on vertical orbits, a longitudinal mark on lower part of exterior orbits (somewhat varying in size but never covering the apex of cheeks and the malar space), collare, subalarum, pronotal ridge, line (sometimes interrupted or reduced) on apical part of pronotal base, tegulae, scutellum, postscutellum, a mark on each side of propodeum, (covering areae dentiparae except base, areae posteroexternae and usually upper part of apex of area spiraculiferae), postpetiolus, apical half of second and more than half of third and fourth tergites all trochanters and trochantelli, coxae I and II except narrow base, femora I and II ventrally, usually extreme base of femora III, tibiae I and II except a longitudinal wedge-shaped line on ventral side, tibiae III except apex and often (as in neallotype) except the narrow base, tarsi I and II predominantly and metatarsus III except apex.

Never yellow marks on mesoscutum, prescutellar carinae or mesopleura as so often in *annulatorius*.

Variability

Very little chromatic variability in females, little in males.

70. *Ichneumon homorus*, new species

Fig. 52

Types

Holotype.—♀, Quebec, Poltimore, 4.XI.1956, hibernating, G. H. Heinrich. C.G.H.

Paratypes.—1 ♀, Quebec, Poltimore; 2 ♀♀ Maine, Mt. Blue; 1 ♀, Vermont, Gorham. C.G.H.; 1 ♀, Ontario, Marmora; 2 ♀♀, New Brunswick, Sillikers. C.N.C.; 1 ♀, New York, Slide Mt. C.H.T.

Distribution

Maine, Vermont, Ontario, Quebec, New York, New Brunswick.

Preamble

Similar to *feriens* in size and appearance; differs by the more attenuated flagellum, the absence of scopa, and the white band of second tergite being interrupted.

Female

Black, scutellum white; second tergite with medially interrupted white apical band or with two apical lateral marks instead; two white anal marks; tibiae white-banded; tarsi III blackish; mandibles normal, slender; flagellum bristleshaped, close to subfiliform, distinctly attenuated at apex; no scopa; length 12-14 mm.

Flagellum.—Almost bristleshaped, ventrally flattened and somewhat widened beyond middle, distinctly though not strongly attenuated at apex, with 35-37 segments, the first scarcely twice as long as wide, the sixth square, the widest 1.5 times to nearly twice as wide as long, the apical cone more elongate than in *feriens*. Black with white annulus usually on segments 7-14, in one specimen 5-15.

Head.—Temple and cheek profiles distinctly narrowed with slightly curved outlines; malar space about as long as width of base of mandible; mandibles normal, slender. Black, frontal orbits up to vertex and down to level of antennal sockets red.

Thorax.—Mesoscutum and scutellum a trifle more convex than in *feriens*, the former more narrowed anteriorly; notauli basally indicated; area superomedia tending to be somewhat longer than wide and a little narrowed toward apex. Black; collar partially whitish, scutellum white.

Legs.—Moderately stout; coxae III fairly densely punctured without trace of scopa. Black, all tibiae with white annulus; tarsi I and II dark or reddish brown, tarsi III blackish, the intersections of their segments and base of metatarsus sometimes reddish.

Abdomen.—Gastrocoeli relatively small and shallow; second and third tergites fairly densely and finely punctured. Black; second tergite with medially more or less broadly, rarely scarcely interrupted white apical band, which is sometimes reduced to two apical lateral marks; exceptionally (one specimen from Great Smoky Mountains National Park, C.H.T.) second tergite entirely black.

71. *Ichneumon microferiens*, new species

Fig. 12

Types

Holotype.—♀, Ontario, Upsala, 25.VI.1956, G. H. Heinrich.

Paratypes.—1 ♀, Ontario, Smoky Falls, 1 ♀, Ontario, Nipigon, 1 ♀, Manitoba, Aweme, 1 ♀, Alberta, C.N.C.; 2 ♀♀, Alberta, Wabamun and Edmonton, C.H.T.

Distribution

Canadian Zone in Quebec, Ontario, Manitoba, Alberta. Also Alaska, Anchorage and Kenai Peninsula (C.N.C.).

Preamble

The smallest species of the *feralis* group, in appearance similar to a small specimen of *feriens* from which it differs mainly by the structure of cheeks (see below).

Female

Black, scutellum white; second tergite with uninterrupted white apical band, the third sometimes (specimens from Nipigon) with interrupted white band or white lateral marks; exceptionally also first tergite with apical band; two white anal marks; tibiae white banded; tarsi III predominantly reddish; flagellum exactly filiform, with 29-30 segments; thin scopa; length 9-11 mm.

Flagellum.—Exactly filiform, not flattened ventrally and not widened beyond middle, blunt at apex, constantly with 29-30 segments, the first about 1.3 times as long as wide, the fourth square. Black with white annulus on segments 6-12.

Head.—Temple and cheek profile distinctly, though not strongly narrowed, with slightly curved outlines; malar space about as long as width of base of mandible; apical part of cheeks slightly convex, not distinctly constricted toward carina genalis as in *feriens*, wider and more flat in appearance. Black, frontal orbits usually very narrowly red.

Thorax.—Mesoscutum and scutellum flat; notauli scarcely indicated even at the very base; area superomedia usually square, sometimes a little longer than wide. Black, scutellum white, collare sometimes whitish.

Legs.—Moderately stout; coxae III densely punctured, with thin scopa. Black, tibiae II and III with white annulus, tibiae I white, slightly tinted with reddish at the very apex; tarsi paler than in *feriens*, reddish, the apices of the segments of tarsi III usually infuscated.

Abdomen.—Gastrocoeli fairly shallow; second and third tergite finely and rather densely punctured. Black; second tergite with broad, uninterrupted, white apical band, the third sometimes with interrupted white apical band or lateral marks; exceptionally also first tergite with white apical band; tergites six and seven with white anal marks.

72. *Ichneumon uncinatus* Cresson

Fig. 22

Ichneumon uncinatus Cresson, 1877, Amer. Ent. Soc. Trans., 6:159, ♀.

Ichneumon uncinatus Walkley, 1958, Synoptic Catalog, 1st Suppl., p. 52, ♀.

Types

Holotype.—♀, Canada, A.N.S.

Distribution

According to H. Townes 1951: "Alberta"; according to L. Walkley 1958: "Alaska". New records: Ontario, Hamilton (C.N.C.); Michigan, Osceola Co. (C.H.T.).

Preamble

A rather big and stout species of the *feralis* group, distinguished from all other known forms of this type of coloration by the presence of a large, white anal mark also on the fifth tergite. Otherwise very similar in appearance to *eurypus*, but femora III distinctly less stout.

Female

Black, scutellum white; second tergite with uninterrupted white apical band, first tergite with white apical band or lateral marks; three large, white anal marks; tibiae white banded; tarsi III blackish; mandibles normal; flagellum lanceolate, strongly widened and distinctly attenuated; distinct scopa; length 15-16 mm.

Flagellum.—Stout, lanceolate, ventrally flattened and rather strongly widened beyond middle, distinctly attenuated at apex, with 38-40 segments, the first 1.5

times as long as wide, the fourth or fifth square, the widest fully twice as wide as long. Black with white annulus on segments four, five or six to 15 or 16.

Head.—Temple and cheek profile distinctly, though not strongly narrowed with slightly curved outline; malar space scarcely as long as width of base of mandible; mandibles normal. Black, frontal orbits up to vertex red; vertical orbits sometimes with a small white dot.

Thorax.—Mesoscutum and scutellum flat, the former fairly densely and distinctly punctured; area superomedia square or a little wider than long. Black, scutellum white.

Legs.—Moderately stout; femora III in side view 3.3 times as long as wide medially; coxae III rather densely punctured with distinct scopa. Black; tibiae II and III with white annulus, tibiae I entirely white, ventrally toward apex reddish tinted; tarsi I and II brownish, tarsi III blackish.

Abdomen.—Median field of postpetiolus rather strongly prominent at the base; gastrocoeli of moderate depth and size; second and third tergites fairly densely and finely punctured. Black; first and second tergites with broad, white apical bands, the band on the first tergite sometimes reduced to lateral marks on the postpetiolus; third tergite apically usually with two small lateral marks.

73. *Ichneumon eurytus*, new species

Fig. 24

Types

Holotype.—♀, Ontario, Nipigon (20 m. north), 2.VII.1956, G. H. Heinrich. C.G.H.

Paratypes.—1 ♀, Ontario, Nipigon; 1 ♀, Alberta, McMurray, C.G.H.; ♀, Northwest Territories, Fort Smith, 1 ♀, Alberta, McMurray, 2 ♀♀, Quebec, Cap Rouge and Laurentides, C.N.C.

Distribution

Quebec, Ontario (Nipigon), Alberta (McMurray), Northwest Territories (C.N.C.).

Preamble

Similar in appearance with *uncinatus* and identical with the latter in flagellar structure. Differing by the considerably stouter femora III, slightly less narrowed temple profile, smoother and more shiny mesoscutum and the presence of only two anal marks.

Female

Black, scutellum white; second tergite with uninterrupted white apical band, the first with white lateral marks; two large white anal marks; tibiae white banded, tarsi III blackish; mandibles normal; flagellum lanceolate, strongly widened and distinctly attenuated; femora III very stout; mesoscutum rather smooth and shiny; distinct scopa; length 14–16 mm.

Flagellum.—Stout, lanceolate, ventrally flattened and rather strongly widened beyond middle, distinctly attenuated at apex, with 37–39 segments, the first 1.5 times as long as wide, the fifth square, the widest fully twice as wide as long. Black with white annulus on segments 6–14.

Head.—Temple profile scarcely, cheek profile distinctly narrowed, both with slightly curved outlines; malar space about as long as width of base of mandible; mandibles normal. Black; frontal orbits up to vertex red.

Thorax.—Mesoscutum and scutellum flat, smooth and shiny; mesoscutum with shallow, not dense puncturation; area superomedia square or somewhat wider than long. Black, collare partially and scutellum white.

Legs.—Stout, femora III thick and short, in side view 2.9 times as long as wide medially; coxae III irregularly and fairly sparsely punctured, with distinct scopa. Black, tibiae II and III with white annulus, tibiae I entirely white (ventrally reddish toward apex); tarsi I and II reddish-brown, tarsi III blackish.

Abdomen.—Gastrocoeli of moderate depth and size; second and third tergites fairly densely and finely punctured. Black; postpetiolus with white lateral marks, second tergite with uninterrupted white apical band; white anal marks on sixth and seventh tergites.

Variability

Four specimens from McMurray, Alberta have no white pattern on collare and postpetiolus; one of them has a small white dot on the fifth tergite.

74. *Ichneumon calitergus* Cresson

Ichneumon calitergus Cresson, 1867, Amer. Ent. Soc. Trans., 1:299, ♀.

Types

Holotype.—♀, Maine, A.N.S.

Neallotype.—♂, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Maine, Massachusetts, Ontario, Michigan, New York, Maryland, West Virginia, Transition Zone". New record: Quebec (C.N.C.). In contrast to the other species of the *feralis* group, which are confined to woods, this one is found in open meadows.

Female

Black, scutellum white; tergites 1-3 with broad white apical bands, six and seven with white anal marks; tibiae white banded; tarsi III reddish-brown; mandibles normal; flagellum bristleshaped; distinct scopa; length 15 mm.

Flagellum.—Bristleshaped, distinctly flattened ventrally beyond middle but scarcely widened, considerably attenuated at apex, with 40-42 segments, the first almost twice as long as wide, the sixth square, the widest little wider than long. Black with white annulus usually on segments 6 or 7 to 14 or 15, in one specimen on segments 5-16.

Head.—Temple and cheek profiles distinctly narrowed, the former with slightly curved, the latter with rather straight outline; malar space almost as long as width of base of mandible; mandibles normal. Black; frontal orbits up to vertex and down to level of antennal sockets or beyond red; vertical orbits sometimes with yellow dot on the red ground.

Thorax.—Mesoscutum slightly convex; notauli indicated at base; area superomedia fairly large, square or a little wider than long. Black; collare and scutellum white.

Legs.—Moderately stout; coxae III fairly sparsely punctured with distinct scopa. Black; all tibiae with white annulus; tarsi reddish-brown; segments of tarsi III apically infuscated.

Abdomen.—Gastrocoeli fairly large and fairly strongly impressed, their interval wider than one of them; second tergite strongly and densely punctured, punctures running into irregular striae between gastrocoeli and on the middle

of the tergite; third tergite fairly strongly and densely punctured. Black; tergites 1-3 with broad white apical bands, the band of the third tergite a little narrower than the others and sometimes medially a little constricted; sixth and seventh tergite with white anal mark.

Male

The association of the sexes seems to be secured by field observations (congruent ecology and frequency) and also by corresponding color and morphology. In the distribution of light color pattern and in their ivory tint similar to *feriens*. Differing from the latter by larger and deeper gastrocoeli, coarser sculpture of second tergite and transverse shape of third and fourth tergites (square in *feriens*), also chromatically by the entirely black propodeum.

Black; scutellum and broad apical bands of tergites 1-4 ivory; tibiae predominantly ivory; propodeum entirely black; flagellum deep black ventrally as well as dorsally; apex of cheeks and the malar space black; no yellow pattern on mesoscutum and mesopleura; tibiae I and II with black ventral stripe, tibiae III basally narrowly, apically broadly black; tarsi III blackish except base; length 17 mm.

Flagellum.—Ventrally and dorsally deep black; scape ventrally yellow. Short, narrow, lanceolate tyloides on segments six or seven to 15.

Abdomen.—Gastrocoeli strongly impressed, fairly large, nearly quadrangular; sculpture of second tergite very coarse, irregularly striate or partially reticulate medially; tergites 3-6 considerably wider than long.

Color.—The following are ivory: mandible except teeth, face, clypeus, scape below, frontal orbits, a longitudinal mark on lower part of exterior orbits, collare, subalarum, pronotal ridge, rarely a narrow stripe on apex of pronotal base, tegulae, scutellum, postscutellum, postpetiolus, broad apical bands of tergites 2-4, sometimes lateral apical marks of tergite 5, all trochanters and trochantelli, coxae I and II except base, femora I and II ventrally and dorsally at apex, usually extreme base of femora III internally, tibiae I and II except a longitudinal wedge-shaped line ventrally toward apex, tibiae III except narrow base and broad apex, tarsi I and II except last segment, base of first segment of tarsi III.

75. *Ichneumon polargus*, new species

Types

Holotype.—♀, Labrador, Hopedale, 5.VI.1923. C.N.C. No. 7094.

Paratypes.—1 ♀, Manitoba, Gillam; 1 ♀, Ontario, Moose Factory; 1 ♀, Labrador, Hopedale. C.N.C.; 2 ♀ ♀, Labrador, Hopedale. C.G.H.

Distribution

Canadian Zone in Ontario, Labrador, Manitoba.

Female

Black, scutellum white; at least tergites 2 and 3, usually 2-4 with uninterrupted white apical bands, tergites 5-7 with white anal marks; tibiae white banded; tarsi III reddish-brown; mandibles normal; flagellum filiform; no scopa; length 14-15 mm.

Flagellum.—Filiform, not widened beyond middle, ventrally flattened toward apex only, not attenuated apically, with 37-38 segments, the first 1.3 times as long as wide, the fifth square, the last twelve segments before apical cone ventrally flattened and somewhat wider than long. Black with white annulus on segments 7-14; basal segments sometimes partially brownish.

Head.—Temple profile somewhat narrowed with slightly curved outline, cheek profile distinctly narrowed with straight outline; malar space a trifle longer than the width of base of mandible; mandibles normal. Black, frontal orbits up to vertex and down to level of flagellar sockets red; sometimes clypeus obscure reddish brown.

Thorax.—Mesoscutum slightly convex; notauli weakly indicated at base; area superomedia approximately square. Black, scutellum white; collare usually obscure reddish.

Legs.—Moderately stout; coxae III not very densely punctured, somewhat hairy ventrally at inner side but without distinct scopa. Black, all tibiae with white annulus (on tibiae III sometimes considerably narrowed); tarsi reddish-brown.

Abdomen.—Gastrocoeli relatively small and shallow; second and third tergites fairly densely and finely punctured. Black; usually second to fourth tergite with uninterrupted white apical bands, becoming gradually narrower from segment to segment; tergites 5-7 with white anal marks; apical band of fourth tergite sometimes incomplete or entirely absent (specimen from Manitoba).

76. *Ichneumon atrox* Cresson

Ichneumon atrox Cresson, 1877, Am. Ent. Soc. Trans., 6:151, ♀.

Ichneumon atrox Walkley, 1958, Synoptic Catalog, first Suppl., p. 61, ♀.

Types

Holotype.—♀, Canada. A.N.S.

Neallotype.—♂, Manitoba, Aweme. C.N.C. No. 7128.

Distribution

According to H. Townes 1951: "South Dakota, Alberta". According to L. Walkley 1958: "Alaska". New records: Ontario (Raith) (C.G.H.); Labrador (Cartwright); Manitoba (Gillam); British Columbia (Metlakatla); Alaska (Big Delta) (C.N.C.).

Female

Large species; black, scutellum white; two white anal marks, no white bands; tibiae white banded; tarsi III black; mandibles normal; flagellum bristleshaped; mesoscutum shiny; no scopa; length 16-19 mm.

Flagellum.—Bristleshaped, widened and ventrally strongly flattened beyond middle, attenuated at apex, with 44-47 segments, the first 1.4 times as long as wide, the fifth square, the widest about twice as wide as long. Black with white annulus on segments 5 or 6 to 14 or 16.

Head.—Temple profile little narrowed with curved outline, cheek profile distinctly narrowed with straight outline; malar space about as long as width of base of mandible; mandibles normal, fairly slender. Black; frontal orbits usually narrowly obscure reddish.

Thorax.—Mesoscutum with shallow puncturation, shiny; basal third of notauli distinct; area superomedia large, square or a little wider than long. Black; scutellum and collare white.

Legs.—Moderately stout; coxae III irregularly and rather sparsely punctured, without scopa. Black; tibiae yellow banded, tibiae I almost entirely yellow, reddish at the very apex, ventrally brownish except base.

Abdomen.—Gastrocoeli triangular, fairly deeply impressed; second and third tergites strongly and densely, the fourth very finely punctured. Black, tergites 6 and 7 with white anal mark.

Male

I am associating the sexes by their corresponding color and size without further proof.

Black; scutellum white; tibiae and tarsi III white banded, tibiae and tarsi I and II predominantly white; cheeks, temples and vertex black; flagellum black; area superomedia large, somewhat wider than long; length 20 mm.

Flagellum.—Ventrally and dorsally black; scape with white dot ventrally near apex. Short, narrow, lanceolate tyloides on segments 7-17.

The following are white: mandibles except teeth, clypeus, face (except a little black mark on each side of the median field), frontal orbits, dot on scape ventrally, collare, apex of pronotal ridge, tegulae, subalarum, scutellum, marks on coxae I and II, all trochanters and trochantelli, ventral stripe on femora I and II, apex of femora I and II, tibiae and tarsi I and II (except the brown apical segments of tarsi and a wedge-shaped longitudinal mark ventrally at apex of tibiae), annulus of tibiae III beyond base, metatarsus III except apex, base of second segment of tarsi III.

77. *Ichneumon neomolitor*, new species

Types

Holotype.—♀, Alberta, Banff, B. D. Garrett, 9.VI.1922. C.N.C. No. 7127.

Distribution

Alberta.

Preamble

Very similar and closely related to the European *crassifemur* Thomson. Both species agree in color and in flagellar structure. *I. neomolitor* differs by more slender femora III, more narrowed cheek profile and smaller size.

Female

Black, scutellum white; two white anal marks; tibiae white banded; tarsi III yellowish-red; mandibles normal; flagellum filiform; thin scopa; length 11 mm.

Flagellum.—Exactly filiform, indistinctly flattened and not widened beyond middle, not attenuated at apex, with 32 segments, the first not quite twice as long as wide, the sixth square. Black, segments 7-12 with white annulus.

Head.—Temple profile somewhat narrowed with slightly curved outline, cheek profile considerably narrowed with straight outline; malar space a little longer than width of base of mandible; mandibles normal. Black; frontal orbits narrowly red, facial orbits with minute yellowish mark near the level of antennal sockets.

Thorax.—Mesoscutum densely punctured, notauli obsolete; area superomedia a little longer than wide. Black, scutellum and collare white.

Legs.—Moderately stout; coxae III distinctly and densely punctured with thin scopa. Black; tibiae yellow banded; tibiae II and III black at apices; narrowly infuscated at base; tibiae I yellow, reddish at apex; tarsi pale ferruginous, apices of segments of tarsi III infuscated.

Abdomen.—Gastrocoeli relatively small and shallow; second and third tergites finely and fairly densely punctured. Black; sixth and seventh tergite with white anal mark.

• 78. *Ichneumon deliratorius* Linnaeus

Distribution

Holarctic. In Palaearctic Zone from Europe east to Japan and Sachalin; in Nearctic Zone Transcontinental in Transition and Canadian Zones.

Preamble

This species links in several regards *Ichneumon* with *Coelichneumon*. The structure of propodeum and gastrocoeli approaches *Coelichneumon* so far that males are scarcely to be distinguished from those of the latter genus. Also the chromatic pattern fits well enough into the genus *Coelichneumon* except for the one white anal mark of the female. Biologically, too, this species is rather strongly differentiated from the rest of *Ichneumon*, as females do not hibernate as adults.

Female

Black, scutellum white, abdomen with slight bluish tint; one white anal mark; all tibiae broadly white banded; tarsi black or blackish brown; flagellum subfiliform, somewhat attenuated at apex; gastrocoeli rather deep and large; distinct scopa; length 14-16 mm.

Flagellum.—Subfiliform, distinctly flattened ventrally and somewhat widened beyond middle, somewhat attenuated at apex, with 38-40 segments, the first fully twice as long as wide, the seventh square, the widest, not much less than twice as wide as long. Black with white annulus on segments 6 (apex) to 14.

Head.—Temple and cheek profiles distinctly narrowed, the former with curved, the latter with straight outline; malar space as long as width of base of mandible; mandibles normal. Black.

Thorax.—Mesoscutum slightly convex, densely and finely punctured, anterior half almost opaque; basal third of notauli rather strongly impressed; area superomedia on the average as wide as long, sometimes slightly narrowed anteriorly; costulae usually distinct. Black, scutellum white.

Legs.—Moderately stout; coxae III rather densely punctured with dense and distinct scopa. Black; all tibiae white, their bases narrowly, their apices broadly black, or blackish-brown.

Abdomen.—Median field of postpetiolus strongly prominent, strongly and regularly longitudinally striate; gastrocoeli relatively large and deep, triangular, their interval about as wide as one of them; second and third tergites strongly and densely punctured, punctures between gastrocoeli and in the middle of second tergite usually running into striae. Black, anterior tergites with slight dark bluish tint; last tergite with white, longitudinal median mark.

Male

Black, scutellum white; abdomen with slight metallic-blue tint; flagellum without annulus; tibiae and tarsi III white banded. Interval of gastrocoeli narrower than one of them; narrow, short tyloides on flagellar segments 6-14 or 15; length 16-18 mm.

White pattern of legs and thorax varies subspecifically. See subspecies below.

Remark

Females of Palaearctic and Nearctic populations are almost identical, while males display a distinct subspecific differentiation in white color pattern which are considerably more extended in the American *deliratorius cinctitarsis* than in the European *deliratorius deliratorius*.

78a. *Ichneumon deliratorius deliratorius* Linnaeus

Ichneumon deliratorius Linnaeus, 1761, Fauna Suecica, p. 401, ♂.

Types

Holotype.—♂, Linnaean Society of London.

Male

The following are white: clypeus, face, scape ventrally, apex of pronotal ridge, subalarum, mark of tegulae, scutellum (often apically only), rarely femora I ventrally, tibiae I and II except apical half of ventral side, tibiae III except apex, tarsi I and II except the apical 2-4 segments, base of metatarsus or sometimes of segments 1 and 2 of tarsi III. Mandibles, coxae and trochanters not white marked.

78b. *Ichneumon deliratorius cinctitarsis* Provancher

Ichneumon varipes Provancher, 1875, Nat. Canad., 7:22, 50, ♂. Preocc.

Ichneumon signatipes Provancher, 1875, Nat. Canad., 7:22, 52, ♀. Preocc.

Ichneumon cinctitarsis Provancher, 1877, Nat. Canad., 9:7, ♂. New name for *varipes*.

Ichneumon stygicus Cresson, 1877, Amer. Soc. Trans., 6:151, ♀. New name for *signatipes*.

Pterocormus cinctitarsis Townes, 1951, Synoptic Catalog, p. 297, ♂.

Pterocormus stygicus Townes, 1951, Synoptic Catalog, p. 301, ♀.

Ichneumon deliratorius cinctitarsis Heinrich, 1953, Journ. Wash. Acad. Science, 31:149, ♂ ♀.

Ichneumon deliratorius Heinrich, 1959, Canad. Entom., 91:806, ♂ ♀. Synonymy.

Types

Holotypes.—*Ichneumon varipes*, ♂, Canada, Provincial Museum, Quebec, No. 619. *Ichneumon signatipes* ♀, Canada, Provincial Museum, Quebec, No. 675.

Host

According to H. Townes 1951: "Reported from *Hyphantria cunea* (Drury)". As from the same host by R. Mitchell *Coelichneumon navus*, a species rather similar to *deliratorius cinctitarsis*, has been reared (Synoptic Catalog, suppl. 1., 1958, p. 52), the correctness of the report above becomes a matter of some doubt.

Distribution

According to H. Townes 1951 (*cinctitarsis*): "Quebec to North Carolina, West to Michigan"; (*stygicus*): "Quebec, Massachusetts, New York". New records: Manitoba, Aweme; Saskatchewan, Great Deer; Alberta, McMurray; British Columbia, Robson, Jesmond and Vancouver Island; Ontario, Smoky Falls, Prince Edward Island (C.N.C.).

Male

Distinctly differing from *deliratorius deliratorius* by considerably more extended white pattern, especially on legs. Mandibles, pronotal ridge and tegulae entirely white; all segments of tarsi III basally white, apically black; tarsi I and II entirely white except apex of last segments; coxae I and II white except base, coxae III white marked ventrally at apex; all trochantelli and the trochanters I and II ventrally white or white marked; vertical orbits sometimes with small white marks.

79. *Ichneumon melanarcticus*, new species**Types**

Holotype.—♀, Quebec. Bradore Bay, 23.VII.1929, W. J. Brown. C.N.C. No. 7170.

Distribution

Quebec (type specimen); Labrador (Rama). M.C.Z.

Preamble

A large species; in size and appearance close to *zelotypus*, but with entirely black abdomen and legs and the very apex of flagellum being less acute.

Female

Wings scarcely infuscated; uniformly black, scutellum white; frontal and vertical orbits ferruginous; morphology as in *zelotypus*, except for the very apex of flagellum (see below); puncturation of second and third tergites less dense; no striation between gastrocoeli; no scopa; length 17 mm.

Flagellum.—Bristleshaped, moderately slender, ventrally rather indistinctly flattened beyond middle and slightly widened, moderately attenuated at the apex, with 42 segments, the first twice as long as wide, the seventh square, the widest about 1.3 times as wide as long, the last five segments before the apical cone slightly transverse. Black with white annulus on segments 7-14.

Head.—As in *zelotypus*, but outline of temples more rounded and (in the type) upper tooth of mandible a little shorter and blunter.

Thorax.—Mesoscutum somewhat less densely and strongly punctured than in *zelotypus*; notauli obsolete; area superomedia strongly transverse, somewhat narrowed toward apex. Black, scutellum white.

Legs.—Femora III moderately stout, lower half of exterior side sparsely, upper half fairly densely punctured; coxae III densely punctured, without scopa. Uniformly black; tibiae I, base of tibiae II and the tarsi I and II all ventrally brownish.

Abdomen.—Oval, blunt at apex, ovipositor not projecting; gastrocoeli triangular, their interval scarcely narrower than one of them; second and third tergites distinctly but not so densely punctured as in *zelotypus*, interval of gastrocoeli clearly punctured without trace of striation. Uniformly black.

80. *Ichneumon caliginosus* Cresson

Figs. 26, 55

Ichneumon caliginosus Cresson, 1864, Ent. Soc. Phila. Proc., 3:144, ♀.

Types

Holotype.—♀, Colorado. A.N.S.

Neallotype.—♂, West Virginia, Bolivar, 24.IX.1942. C.H.T.

Hosts

As under the name *caliginosus* two different species have been confused until now, all previous host records have to be revised and are omitted here. The following records are confirmed for the new, restricted concept of this species: *Polygona interrogationis* Fabricius in Ontario (C.N.C.) and in Maine (C.G.H.). *Polygona gracilis* Grote and Robinson in Quebec; *Polygona satyrus* Edwards in British Columbia (C.N.C.).

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition Zone". New records: Northwest Territories, Alaska, British Columbia (Trinity Valley), Newfoundland (St. John's), Ontario (Ogoki). (C.N.C.).

Preamble

I found the species *caliginosus* of authors to be composed of two different, though extremely similar species, the females of which can be distinguished by differences in the shape of flagellum and in the degree of sclerotization of the

posterior sternites, usually also in the structure of the apex of abdomen (Fig. 26). Cresson's type represents the species described below. The other species will be treated in the genus *Thyrateles* Perkins as *caliginops* new species.

Female

Black including legs; scutellum white, no anal marks; wings usually somewhat infuscated; flagellum slender, bristleshaped, distinctly flattened ventrally beyond middle and a little widened; apex of abdomen oxygygous, the ovipositor usually a little projecting, sternites 2-4 with median fold; subalarum black, very rarely dotted with white; length 15-18 mm.

Flagellum.—Bristleshaped, long and slender, gradually very strongly attenuated at apex, ventrally distinctly flattened and a little widened beyond middle, with 42-44 segments, the first nearly three times as long as wide, the eleventh square, the widest 1.25 to 1.33 times as wide as long. Black with white annulus on segments five or six to 14 or 15.

Head.—Temple and cheek profiles strongly narrowed with straight outlines; cheeks long, malar space somewhat longer than width of base of mandible. Black; frontal orbits usually partially or with their whole length narrowly reddish or yellowish, sometimes also upper part of facial orbits; rarely orbits entirely black.

Thorax.—Anterior third of notauli distinct; scutellum rather strongly raised above postscutellum; area superomedia usually more or less strongly transverse, sometimes square. Black scutellum white; subalarum black, exceptionally with a white dot.

Legs.—Long and slender; coxae III very densely and rather strongly punctured, without scopa. Black; tibiae I interiorly ivory.

Abdomen.—Gastrocoeli large, triangular, their interval nearly as wide as one of them; second and third tergites strongly and densely, the fourth finely and less densely punctured; punctures between gastrocoeli and on the middle of tergite two usually running into longitudinal striae; apex oxygygous, usually a little compressed; ovipositor usually a little projecting; sternites 2-4 not strongly sclerotized, with distinct median fold. Uniformly black.

Male (tentative)

The male described below could theoretically be associated with three different females: *bimembris*, *caliginosus* and *Thyrateles caliginops*. The prolonged notauli, however, and the distinctly infuscated wings match *caliginosus* and *caliginops* much better than *bimembris*. If this conclusion is correct, we know now two specifically different males, evidently belonging to *caliginosus* and *T. caliginops*, but there is no clue to decide which of them belongs to the former and which to the latter female. The association proposed tentatively is based on the following reasons: (1) The male described below has more strongly infuscated wings than the other and thus seems to match *caliginosus* better than *caliginops*. (2) The other male corresponds in color pattern with the male of the European *hereticus* Wesmael, the female of which is in turn very closely and perhaps even conspecifically related to *caliginops*. Both reasons are rather hypothetical and the associations therefore need further confirmation.

Wings distinctly infuscated; black, scutellum and pronotal ridge white; basic color of tergites 2 and 3 ivory, their narrow apices, bases and sides black, their middle sometimes with longitudinal infuscation; apical third of tibiae III and the tarsi III entirely deep black; all coxae and trochanters uniformly black without white marks; cheeks, pronotal base and flagellum ventrally and dorsally black;

scutellum strongly elevated; notauli long, reaching to about the middle of mesoscutum; length 17-19 mm.

Flagellum.—With narrow, bacilliform tyloides on segments 8 to 16 or 17, the longest reaching the bases but by far not the apices of segments. Ventrally and dorsally black; scape ventrally white.

Head.—Malar space almost as long as width of base of mandible. The following are white: mandibles except teeth, clypeus, face, sometimes frontal orbits narrowly; cheeks black.

Thorax.—Mesoscutum strongly convex, densely punctured; notauli unusually well developed reaching to approximately the middle of mesoscutum; scutellum strongly elevated above postscutellum and convex; area superomedia transverse. The following are white: collare, pronotal ridge, subalarum, scutellum, postscutellum and usually marks of tegulae.

Legs.—Long and slender, especially femora and tibiae III. Black; the following are white: femora I ventrally, apices of femora I and II, tibiae and tarsi I and II, basal two thirds of tibiae III; trochantelli light marked.

Abdomen.—Gastrocoeli large, deep, transverse, their interval somewhat narrower than one of them and longitudinally striate; tergites 2-4 coarsely sculptured, opaque. Black; tergites 2 and 3 predominantly ivory, sometimes with a longitudinal median infuscation, their narrow bases, apices and lateral borders black; first tergite with ivory apical band or with apico-lateral marks.

81. *Ichneumon mendax* Cresson

Fig. 4

Ichneumon mendax Cresson, 1877, Amer. Ent. Soc. Trans., 6:149, ♀.

Phygadeuon guignardi Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., p. 50, ♀.

Types

Holotypes.—*Ichneumon mendax*, Cresson ♀, Canada. A.N.S. *Phygadeuon guignardi* Provancher, ♀, Canada. Provincial Museum, Quebec.

Neallotype.—♂, Quebec. C.G.H.

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Transition and Upper Austral Zones".

Preamble

The strong and complete areolation of propodeum with very distinct costulae and area basalis would render the choice somewhat problematic whether this species would better be placed in the *Melanichneumon* group or in *Ichneumon*. The fact, however, that females hibernate as adults represents a rather strong reason in favour of the latter genus.

Female

Black, including legs; scutellum, pronotal ridge and inner orbits broadly white; no anal marks; flagellum filiform; areolation of propodeum pronounced and complete; no scopa; length 10-13 mm.

Flagellum.—Filiform, ventrally somewhat flattened beyond middle, but scarcely widened, very little attenuated at apex, with 30-31 segments, the first about 2.3 times as long as wide, the seventh square. Black with white annulus on segments 7 or 8 to 12.

Head.—Temple and cheek profiles rather strongly narrowed, the former with curved, the latter with straight outline; malar space distinctly shorter than width of base of mandible; mandibles normal. Black; upper part of facial orbits, frontal and vertical orbits broadly white; sometimes also sides of clypeus white marked.

Thorax.—Mesoscutum slightly convex, finely and in the anterior part rather densely punctured, fairly shiny in the posterior part; notauli basally distinct; scutellum a little raised above postscutellum, laterally carinated at the very base; carination of propodeum strong and complete including costulae; area superomedia about as long as wide, usually a very little widened at insertion of costulae, sometimes a little narrowed toward base. Black; white are: collare, pronotal ridge broadly, subalarum, scutellum except base; tegulae black.

Legs.—Rather stout; coxae III finely and very densely punctured, without scopa. Uniformly black except apex of femora I and inner side of tibiae I which are ivory.

Abdomen.—Median field of postpetiolus finely striate; gastrocoeli rounded, rather small, moderately deepened; second tergite finely and fairly densely, third tergite very finely and much less densely punctured. Uniformly black.

Male

Black; coxae, trochanters, femora I and II and all tibiae and tarsi white marked; scutellum and pronotal ridge white; flagellum without annulus, with long, longish-oval tyloides on segments 5-10, reaching from base to end of segments; area superomedia approximately hexagonal or horseshoe-shaped; length 11-13 mm.

The following are white: mandibles except teeth, clypeus, face, frontal and vertical orbits broadly, lower half of outer orbits, scape below, collare, pronotal base, pronotal ridge, subalarum, tegulae, scutellum except base, coxae I and II except base, all trochantelli, trochanters I and II, apex of trochanters III, tibiae I dorsally, tibiae II dorsally except apex, tibiae III dorsally except narrow base and broad apex, femora I ventrally, femora II ventrally except base, segments 1 and 2 of tarsi I dorsally, segment I of tarsi II and III dorsally.

82. *Ichneumon saucius* Cresson

Ichneumon saucius Cresson, 1864, Ent. Soc. Phila. Proc., 3:137, ♀.

Ichneumon torvinus Cresson, 1867, Amer. Ent. Soc. Trans., 1:292, ♂.

Chasmodon saucius Townes, 1951, Synoptic Catalog, p. 292, ♀.

Chasmodon torvinus Townes, 1951, Synoptic Catalog, p. 292, ♂.

Chasmodon saucius Heinrich, 1959, Entom. News, 70:209, ♀ ♂.

Types

Holotypes.—*Ichneumon saucius* Cresson, ♀, Pennsylvania. A.N.S. *Ichneumon torvinus* Cresson, ♂, Illinois. A.N.S.

Host

Paranthrene palmii Henry Edwards (Aegeriidae). (U.S.N.M.).

Distribution

According to H. Townes 1951 (*saucius*): "Massachusetts to North Carolina, West to Michigan". (*torvinus*): "New York, Michigan". New record: Quebec, Aylmer (C.N.C.).

Preamble

The association of sexes is proven by a series of both females and males, reared from the same host (see above). Why I prefer to place this species in

the genus *Ichneumon* rather than in *Chasmias* has been discussed in the treatment of the former genus. *I. saucius* comes very close to the European *lugens* Gravenhorst, also a parasite of Aegeriidae. I think that both species are as closely related to the bulk of *Ichneumon* species as to the type of the genus *Chasmias*, but that by practical reasons both are better placed in the genus *Ichneumon*.

Female

Uniformly black; wings strongly and evenly infuscated; flagellum filiform, very short; temples and cheeks strongly widened; abdomen slender, elongate; ovipositor distinctly prominent; no scopa; length 15-17 mm.

Flagellum.—Short, filiform, ventrally scarcely flattened and not widened beyond middle, very little attenuated at apex, with about 29 segments, the first twice as long as wide, the eighth or ninth square. Black with white annulus on segments 6 or 7 to 13 or 15.

Head.—Temple profile not narrowed, broadly rounded; cheek profile slightly narrowed with strongly curved outline; cheeks inflated and very wide between eye and carina genalis; malar space scarcely more than half as long as width of base of mandible; mandibles short and strong, apical teeth short and of nearly equal length. Black.

Thorax.—Mesoscutum slightly convex, distinctly longer than medially wide, finely and sparsely punctured; notauli obsolete; scutellum somewhat raised above postscutellum, with rounded apical slope; propodeum long, the horizontal part medially about as long as the declivity; area superomedia longer than wide, narrowed toward apex, anteriorly usually rounded. Black, collare white marked.

Legs.—Fairly slender; coxae III smooth and shiny, sparsely punctured, without trace of scopa. Black.

Abdomen.—Elongate, narrow, strongly oxypygous, ovipositor distinctly projecting; median field of postpetiolus densely striate; gastrocoeli rather small and shallow; second and third tergites fairly strongly and densely punctured; punctures between gastrocoeli and in the middle of second tergite usually running into striae. Black.

Male

Black, including scutellum; flagellum with white annulus; wings infuscated; head and thorax with some white pattern; all tibiae beyond base with narrow, white semiannulus; area superomedia about as wide as long; length 18-20 mm.

Flagellum.—Black with white annulus on segments 10-14 and with narrow, lanceolate, fairly short tyloides on segments 5 or 6 to 13 or 14.

The following are white: clypeus and face except middle, frontal orbits, scape ventrally, short stripe on lower half of external orbits, collare, apex of pronotal ridge, usually mark on subalarum, mark on tegulae, rarely a mark on scutellum, narrow semiannulus beyond base of all tibiae, the semiannulus of tibiae III often reduced to a small mark laterally or ventrally-laterally beyond base.

83. *Ichneumon bimembris* Provancher

Ichneumon bimembris Provancher, 1877, Nat. Canad., 9:8, ♀.

Ichneumon languidus bimembris Heinrich, 1953, Journ. Wash. Acad. Sci., 43:149, ♀.

Types

Holotype.—♀, Quebec, Provincial Museum, Quebec, No. 608.

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition Zone". New records: Canadian Zone, Ontario, Nipigon. (C.G.H.); Alberta, McMurray. (C.N.C.).

Preamble

After renewed comparisons of series of *bimembris* with European specimens of *languidus* Wesmael, I prefer to consider both as distinct species rather than as associated subspecies in spite of their great similarity. In *languidus* ♀ not only is the apex of flagellum somewhat less attenuated than in *bimembris*, as I mentioned (*loc. cit.*), but there is also a difference in the femora III which are distinctly more slender in *bimembris* than in *languidus*.

Female

Black, scutellum and anal marks on tergites 6 and 7 white; flagellum bristle-shaped, long and extremely attenuated; no scopa; length 14-16 mm.

Flagellum.—Bristleshaped, long and slender, gradually and extremely attenuated at apex, scarcely widened beyond middle, with 42-45 segments, the first slender, fully 2.5 times as long as wide, the tenth square, the widest not, or scarcely, wider than long. Black with white annulus on segments 4, 5 or 6 to 15 or 16, basal segments apically and apex of flagellum ventrally brownish.

Head.—Temple and cheek profile strongly narrowed with straight outlines; cheeks long, malar space somewhat longer than width of base of mandible. Black; frontal orbits always narrowly reddish.

Thorax.—Notauli basally distinct; scutellum distinctly, though not strongly raised above postscutellum, dorsally rather flat; area superomedia square or somewhat wider than long. Black, scutellum white.

Legs.—Long and slender; coxae III very densely and rather strongly punctured, without scopa. Black; tibiae and tarsi I and II usually, and sometimes also middle of tibiae III dark brownish.

Abdomen.—Gastrocoeli large, triangular, their interval a little wider than one of them; tergites 2 and 3 strongly and very densely, tergite 4 finely and less densely punctured, punctures between gastrocoeli and on the middle of second tergite usually running into longitudinal striae; ovipositor a little projecting. Black; tergites 6 and 7 with large longitudinal median mark.

84. *Ichneumon broweri*, new species

Types

Holotype.—♀, Maine, Mt. Katahdin, 31.VII.1954, A. E. Brower. C.G.H.

Distribution

Maine.

Female

Similar to *bimembris*, but flagellum and femora considerably stouter, abdomen broad-oval, head differently shaped.

Black, scutellum white; two white anal marks; flagellum bristleshaped, moderately long; no scopa; gastrocoeli transverse, each a little wider than their interval; propodeum abbreviated, area superomedia transverse; length 14 mm.

Flagellum.—Bristleshaped, moderately long, not widened beyond middle, considerably attenuated at apex, with 38 segments, the first about twice as long as wide, the seventh square. Black with white annulus on segments 7-14.

Head.—Transverse; temple and cheek profiles somewhat narrowed, both with distinctly curved outlines; malar space a little longer than width of base of mandible; clypeus and median field of face slightly convex; mandibles normal. Black.

Thorax.—Mesoscutum slightly convex, fairly densely punctured, notauli basally indicated; propodeum abbreviated; area superomedia about 1.5 times as wide as long, rectangular; declivity about twice as long as horizontal part medially. Black, scutellum white.

Legs.—Moderately stout, femora relatively short; coxae III densely punctured, without scopa. Black.

Abdomen.—Broad-oval, short; postpetiolus wide, its median field very densely and very finely striate; gastrocoeli triangular, deep, transverse, each a little wider than their interval; second tergite at the apex considerably wider than medially long, the third tergite nearly 3 times as wide as long; second and third tergites rather finely and densely, the fourth very finely punctured; apex blunt. Black; white anal mark on sixth and seventh tergites.

85. *Ichneumon walleyi*, new species

Types

Holotype.—♀, Ontario, Smoky Falls (Mattagami R.), 5.VII.1934, G. Stuart Walley, C.N.C. No. 7082.

Distribution

Ontario (Canadian Zone).

Female

Black including legs; the following white: scutellum, pronotal ridge predominantly, subalarum, marks on tergites six and seven and a short, narrow stripe on frontal orbits; flagellum subfiliform, slightly attenuated toward apex; no scopa; gastrocoeli transverse with narrow interval; length 14 mm.

Flagellum.—Subfiliform, close to bristleshaped, slightly attenuated toward apex and slightly widened beyond middle, with 39 segments, the first almost twice as long as wide, the sixth square, the widest 1.5 times as wide as long, all following segments up to the apical cone wider than long. Black with white annulus on segments 8-15.

Head.—Temple profile slightly narrowed with slightly curved outline; cheek profile distinctly narrowed with almost straight outline; malar space longer than width of base of mandible; mandibles normal. Black with minute white line on frontal orbits.

Thorax.—Notauli distinct at narrow base only; scutellum distinctly raised above postscutellum, gradually slanting to the latter; area superomedia longer than wide, somewhat narrowed anteriorly, costulae obsolete; area dentiparae more strongly sloping toward coxae III than usual. Black; the following are white: collare, almost whole length of pronotal ridge, subalarum and scutellum.

Legs.—Moderately slender; coxae III densely punctured, without scopa. Black; tibiae and tarsi with blackish brown tint, tibiae I ventrally obscure yellowish.

Abdomen.—Gastrocoeli triangular, deep and wide, their interval distinctly narrower than one of them, thyridia pronounced and oblique; apex strongly oxygygous, ovipositor somewhat projecting. Black; large white marks on tergites six and seven; apical margin of tergites two and three narrowly brownish.

86. *Ichneumon nearctivernus* Heinrich

Figs. 44, 69

Ichneumon computatorius nearctivernus Heinrich, 1956, *Canad. Entom.*, 88:648, ♀.**Types***Holotype*.—♀, Ontario, Smoky Falls, G. S. Walley. C.N.C. No. 6408.*Paratypes*.—3 ♀♀, Ontario, Smoky Falls; 1 ♀, Northwest Territories, Norman Wells; 1 ♀, Alberta, McMurray; 1 ♀, Yukon Territory, Rampart House; 1 ♀, Saskatchewan, Christopher Lake; 1 ♀, Alaska, Fairbanks. C.N.C. 2 ♀♀, Maine, Dryden. C.G.H.**Distribution**

Transcontinental in Transition and Canadian Zones. New records: Quebec, Manitoba (C.N.C.); New Hampshire (C.H.T.).

Preamble

I. computatorius Mueller and *I. nearctivernus* agree in color and general morphology. They are, in the Palearctic and Nearctic Zones respectively, the single species of the genus with short, lanceolate flagellum. I still think that they represent vicarious forms replacing one another on the two continents but as in the case of *I. bimembris* and *languidus* I have changed my opinion with regard to the question whether they should be called subspecies or not. The differentiation as evident in the structure of the coxae is perhaps too far advanced to assume a mere subspecific status.

Female

Black, scutellum white; two white anal marks; legs predominantly black; flagellum lanceolate, short, strongly widened and ventrally flattened beyond middle; coxae III shiny, sparsely punctured, without trace of scopa; length 11-14 mm.

Flagellum.—Short, lanceolate, ventrally strongly flattened beyond middle and strongly widened, considerably attenuated at apex, with 35-38 segments, the first 1.5 times as long as wide, the fifth square, the widest 2.5 to 3 times as wide as long. Black with white annulus on segments 5 or 6 to 13 or 14.

Head.—Temple profile slightly narrowed with slightly curved outline; cheek profile distinctly narrowed with straight outline; malar space about as long as width of base of mandible; mandibles normal. Black; frontal and vertical orbits red.

Thorax.—Mesoscutum slightly convex, densely punctured; notauli subobsolete; area superomedia usually a little longer than wide. Black, collare and scutellum white.

Legs.—Moderately stout; coxae III ventrally shiny with scattered gross punctures; no trace of scopa. Black; tibiae and tarsi I and II brownish, tibiae II apically infuscated; tibiae III brownish toward base.

Abdomen.—Gastrocoeli fairly small and shallow; second and third tergites densely and rather strongly punctured. Black; sixth and seventh tergites with white anal mark.

87. *Ichneumon truculentus* Cresson*Ichneumon truculentus* Cresson, 1877, *Amer. Ent. Soc. Trans.*, 6:150, ♀.**Types***Holotype*.—♀, New Hampshire, White Mountains. A.N.S.

Distribution

According to H. Townes 1951: "New Hampshire (White Mountains)". New record: Quebec, Cascapedia R. (C.N.C.).

Female

Black, scutellum white; tergites 5-7 with white anal marks; frontal and vertical orbits broadly pale yellow; legs predominantly black, tibiae sometimes reddish-brown; abdomen slender; flagellum subfiliform, apically a little attenuated; no scopa; length 12-13 mm.

Flagellum.—Subfiliform, distinctly flattened ventrally beyond middle but little widened, a little attenuated at apex, with 37-38 segments, the first scarcely 1.5 times as long as wide, the sixth square, the widest 1.5 times as wide as long. Black with white annulus on segments 7 or 8 to 14, in the type on segments 6-16.

Head.—Temple profile somewhat narrowed with slightly curved outline, cheek profile distinctly narrowed with straight outline; malar space a little longer than width of base of mandible; mandibles normal, slender. Black; vertical and frontal orbits down to level of antennal sockets broadly pale yellow.

Thorax.—Mesoscutum slightly convex, densely punctured; area superomedia longer than wide. Black; scutellum, collare and sometimes apex of pronotal ridge white.

Legs.—Moderately slender; coxae III densely punctured, shiny, without trace of scopa. Black; tibiae blackish or sometimes reddish-brown with black apex of tibiae III; tarsi reddish or brownish.

Abdomen.—Slender, strongly oxypygous; gastrocoeli triangular, relatively small; second and third tergites densely and moderately strongly punctured. Black; tergites 5-7 with white anal marks.

88. *Ichneumon gestuosus* Cresson

Ichneumon gestuosus Cresson, 1877, Amer. Ent. Soc. Trans., 6:156, ♀.

Melanichneumon gestuosus Townes, 1951, Synoptic Catalog, p. 285 (partim).

Ichneumon gestuosus Heinrich, 1959, Entom. News, 70:207, ♀.

Types

Holotype.—♀, New Hampshire, White Mountains. A.N.S.

Host

Choristoneura fumiferana (Clem.) in Ontario (C.N.C.).

Distribution

Maine, Portage (C.G.H.); Ontario (C.N.C.); New Hampshire (type).

Female

Rather small; black, scutellum white, two white anal marks; legs black, tibiae and tarsi predominantly brown; flagellum bristleshaped, slender; gastrocoeli small and shallow; no scopa; propodeum short; length 8-9 mm.

Flagellum.—Bristleshaped, slender, moderately long, ventrally flattened beyond middle but not widened, considerably attenuated, with 32-33 segments, the first about twice as long as wide, the tenth square. Black, with white annulus on segments 7 or 8 to 12 or 13; basal segments sometimes apically and ventrally brownish.

Head.—Transverse; temple and cheek profiles distinctly narrowed, both with rather strongly curved outlines; cheek profile distinctly narrowed with slightly curved outline; malar space distinctly shorter than width of base of mandible. Black.

Thorax.—Mesoscutum longer than medially wide, densely and finely punctured, nearly opaque; notauli obsolete; area superomedia about as wide as long. Black, scutellum white.

Legs.—Short and rather stout; coxae III finely and very densely punctured, with indication of a thin scopa. Black; tarsi and partially tibiae obscure brownish.

Abdomen.—Striation of postpetiolus rather fine; gastrocoeli short and very wide, not oblique, with narrow interval; second and third tergites fairly densely and very finely punctured. Black; sixth and seventh tergites with white anal mark.

Male

Black, scutellum white; tibiae and tarsi extensively, face and clypeus entirely white; flagellum dorsally black, ventrally pale brown, with bacilliform tyloides on segments 6-12; length 10 mm.

The following are white: mandibles except teeth, clypeus, face, sometimes frontal orbits narrowly, scape ventrally, collare, pronotal ridge apically, subalarum, tegulae partially or entirely, scutellum, sometimes postscutellum, sometimes marks on coxae I and II, femora I ventrally, all tibiae and tarsi predominantly; tibiae III broadly black at apex, tibiae I and II ventrally somewhat infuscated toward apex; narrow apical border of anterior tergites usually reddish-brown.

89. *Ichneumon dioryctiae*, new species

Fig. 27

Types

Holotype.—♀, New Brunswick, Carlton Co., ex *Dioryctia reniculella* (Grote) 10.VIII.1954, FIS 54-1639-01. C.N.C. No. 7102.

Allotype.—♂, New Brunswick, Green River, ex *Dioryctia reniculella* (Grote). C.N.C. No. 7102.

Paratypes.—5 ♀ ♀, 2 ♂ ♂, Quebec, Laniel; 2 ♀ ♀, New Brunswick, Gloucester Co.; 1 ♂, New Brunswick, Tobique; 2 ♂ ♂, Ontario, Magpie and Quibell; all 12 specimens reared from *Dioryctia reniculella* (Grote). C.N.C. 2 ♀ ♀, Maine, Masardis and Sinclair. C.G.H.

Host

Dioryctia reniculella (Grote).

Distribution

Quebec, Ontario, New Brunswick (C.N.C.); Maine (C.G.H.).

Preamble

A small, aberrant species, distinguished from all others of the genus by unusually wide gastrocoeli with narrow interval, and biologically as a parasite of Pyralidae.

Female

Black, scutellum white; two white anal marks; legs predominantly black; gastrocoeli unusually wide, with narrow interval; flagellum short, subfiliform, with 28 segments; scopa indicated; length 8-9 mm.

Flagellum.—Subfiliform, short, slightly flattened but not widened beyond middle, a little attenuated at apex, with 28 segments, the first nearly twice as long as wide, the sixth square. Black with white annulus on segments 6 or 7 to 12.

Head.—Transverse; temple profile scarcely narrowed, with rounded outline; cheek profile distinctly narrowed, with slightly curved outline; malar space distinctly shorter than width of base of mandible. Black.

Thorax.—Mesoscutum longer than medially wide, densely and finely punctured, nearly opaque; notauli obsolete; area superomedia about as wide as long. Black, scutellum white.

Legs.—Short and rather stout; coxae III finely and very densely punctured, with indication of a thin scopa. Black; tarsi and partially tibiae obscure brownish.

Abdomen.—Striation of postpetiolus rather fine; gastrocoeli short and very wide, not oblique, with narrow interval; second and third tergites fairly densely and very finely punctured. Black; sixth and seventh tergites with white anal mark.

Male

Black, scutellum white; tibiae and tarsi extensively, face and clypeus entirely, white; flagellum dorsally black, ventrally pale brown, with bacilliform tyloides on segments 6-12; length 10 mm.

The following are white: mandibles except teeth, clypeus, face, sometimes frontal orbits narrowly, scape ventrally, collare, pronotal ridge apically, subalarum, tegulae partially or entirely, scutellum, sometimes postscutellum, sometimes marks on coxae I and II, femora I ventrally, all tibiae and tarsi predominantly; tibiae III broadly black at apex, tibiae I and II ventrally somewhat infuscated toward apex; narrow apical border of anterior tergites usually reddish-brown.

90. *Ichneumon mystificans*, new species

Types

Holotype.—♂, Maine, Dryden, 4.VIII.1955. C.G.H.

Paratypes.—3 ♂♂, Maine, Dryden and Bar Harbor. C.G.H.; 1 ♂, Labrador, Goose Bay. C.N.C.

Distribution

Maine; Labrador.

Preamble

This beautifully colored, handsome male puzzled me for a long time. During a period of 8 years I collected 5 specimens (one was lost), never more than one within one year and all, except the type specimen, during October. I can not imagine with which of the known females it possibly could be associated. The category of size is above average and thus excludes the majority of species. The size could match females like *lividulus*, but the slender, narrow abdomen of this male does not at all match the plump, obtuse abdomen of all females of this group. Perhaps the matching female is not discovered yet. I am naming this species in order to draw attention to its existence and to initiate its observation.

Male

Wings clear; head and thorax black with ivory pattern, scutellum ivory; abdomen uniformly red, first segment black with ivory apical band; in the specimen from Labrador tergites 2-4 with irregular pale yellow apico-lateral marks; legs black with rich ivory pattern; flagellum black; length 17-20 mm.

Flagellum.—With narrow, almost bacilliform tyloides on segments 5 or 6 to 14 or 15, the longest reaching not quite the bases and by far not the apices of segments. Ventrally and dorsally black; scape ventrally ivory.

Head.—Quite different in structure from *devinctor* with which the species has a superficial chromatic similarity. Temple profile rather strongly narrowed with almost straight outline; malar space shorter than half the width of base of mandible; cheeks apically strongly constricted at carina genalis, the latter slightly curved inward before its apex; carina oralis slightly raised before and beyond junction; mandibles distinctly more slender than in *devinctor*, the upper tooth longer in comparison to the lower. Black; the following are ivory: mandibles except teeth, clypeus, face, frontal orbits up to lower ocellus, and a mark on lower part of outer orbits, varying strongly in size, sometimes minute.

Thorax.—Mesoscutum distinctly longer than wide, convex, fairly strongly and moderately densely punctured, shiny; notauli slightly indicated at base; scutellum a little raised above postscutellum, varying from dorsally flat to distinctly convex; area superomedia square or a little longer than wide; no costulae; spiracles large and very long. Black; the following are ivory: collare, pronotal ridge except base or on whole length (the yellow stripe always narrowed anteriorly), subalarum, tegulae, scutellum and postscutellum.

Legs.—Moderately stout, femora III rather strong. Black; the following are ivory: coxae I and II except bases, all trochanters and trochantelli entirely, all femora narrowly at bases, femora I and II also ventrally and dorso-apically, all tibiae except apical third of tibiae III, tarsi I and II, metatarsus III except apex, usually also base of second segment of tarsi III; tarsi II sometimes fulvous; in specimen from Labrador also tarsi III fulvous, narrow apices of their segments infuscated, base of metatarsus ivory.

Abdomen.—Narrow, second tergite almost 1.5 times as long as apically wide, following tergites approximately square; postpetiolus with clearly defined, strongly striate median field; gastrocœli quadrangular, distinctly deepened with distinct thyridia, their interval slightly wider than one of them; sculpture of anterior tergites strong and dense. Bright red; first segment black with ivory apical band; in specimen from Labrador tergite 2-4 apico-laterally with irregular pale yellow patches.

91. *Ichneumon approximans* Provancher

Ichneumon approximans Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., p. 32, ♂.

Types

Holotype.—♂, Ontario, Toronto. Provincial Museum, Quebec.

Preamble

The type specimen of *approximans* has head and thorax covered by long, black hair, a characteristic feature of several species of the Hudsonian and Arctic Zones. It is furthermore distinguished by entirely black color of head, thorax and flagellum, by the short basal segments of the latter and by the strongly transverse area superomedia, agreeing in all these characters with a male known to me from Arctic and Hudsonian Canada and probably belonging to *I. lariae* Curtis. The latter species, however, is certainly not to be expected around Toronto. In the more than 70 years since the description of *approximans* a second specimen matching the type has never been collected either in Ontario or in the Canadian Zone of Quebec. Summing up these facts I suspect that the type locality is incorrect. Whether the type indeed is identical with the male of *I. lariae labradoris* Heinrich needs further confirmation.

Male

(Description based on type specimen.)

Head and thorax entirely black, covered by long, black hair; abdomen black, tergites 2 and 3 predominantly rufous-brown; coxae and trochanters entirely,

femora predominantly black; tibiae and tarsi rufous, tibiae III apically black; flagellum uniformly black. Length 12-13 mm.

Flagellum.—Basal segments relatively short, the first scarcely longer than the second, scarcely 1.5 times as long as wide, the third or fourth square; tyloides relatively wide-oval, on segments 5-15, the longest not quite reaching apices of segments. Dorsally and ventrally black.

Head.—Covered by long hair; malar space fully as long as width of base of mandible; mandibles normal, fairly wide. Uniformly black.

Thorax.—Notauli basally distinct; scutellum convex, considerably raised above postscutellum; area superomedia transverse, almost twice as wide as long; no costulae. Uniformly black, covered by long hair.

Legs.—Moderately slender. Black; the following are rufous: femora I and II ventrally and apically, femora III apically, tibiae and tarsi except apex of tibiae III.

Abdomen.—Postpetiolus with rather well defined, distinctly striate median field; gastrocoeli moderately deepened, their interval wider than one of them. Black; tergites 2 and 3 rufous-brown, the former apically a little, the latter basally and apically infuscated.

92. *Ichneumon restrictus* Cresson

Ichneumon restrictus Cresson, 1877, Amer. Ent. Soc. Trans., 6:109, ♂.

Types

Holotype.—♂, New York. A.N.S.

Preamble

It is unlikely that the female to which this male belongs is still unknown. But I do not know to which of the known species it possibly could be associated.

Male

(Description based on the type specimen.)

Head and thorax black with yellow pattern, scutellum yellow; abdomen black, tergites 2 and 3 ferruginous, the fourth with indistinct obscure reddish tint; legs predominantly yellow, femora I and II dorsally, femora III interiorly rufous, black on the outer side; apex of tibiae III black; length 15 mm.

Flagellum.—With longish-oval tyloides on segments 5-16, the longest almost reaching the bases but not the apices of segments; scape predominantly yellow.

Head.—Outline of temple profile broadly rounded; cheeks in the upper part slightly inflated, in the apical part, however, distinctly constricted at carina genalis; malar space less than half as long as width of base of mandible; upper mandible tooth blunted, the lower situated rather far back from apex of mandible, reduced, but distinct. Black; the following are yellow: mandibles except teeth, face and clypeus.

Thorax.—Notauli basally indicated; scutellum dorsally black, somewhat raised above postscutellum; area superomedia a little wider than long. Black; the following are yellow: collare, apex of pronotal ridge, subalarum, tegulae, scutellum.

Legs.—The following are yellow: apex of coxae I and II, all trochantelli, trochanters I and II ventrally, femora I and II except fulvous dorsal side, all tibiae except black apex of tibiae III, all tarsi; rest of trochanters and coxae and outer side of femora III black, their inner side fulvous.

Abdomen.—Postpetiolus with clearly defined, striate median field; gastrocoeli slightly deepened with quadrangular outline and distinct thyridia; their interval

wider than one of them; hypopygium medially short-triangularly projecting. Black, tergites 2 and 3 red, the fourth with indistinct obscure reddish tint.

93. *Ichneumon parvus* Cresson

Ichneumon parvus Cresson, 1864, Ent. Soc. Phila. Proc., 3:159, ♂.

? *Ichneumon xanthopsis* Ashmead, 1809, U.S. Nat. Mus. Proc., 12:390, ♂.

Types

Holotypes.—*Ichneumon parvus* Cresson, ♂, Illinois. A.N.S. *Ichneumon xanthopsis* Ashmead, ♂, Montana. U.S.N.M.

Preamble

One of the numerous black- and yellow-banded males of the genus which perhaps never will be properly associated. Similar to *nigrovariegatus*, but distinctly differing from this species by greater number of flagellar segments, longer malar space and not partially yellow colored coxae.

I doubt the identity of this species with *xanthopsis* Ashmead (described from Montana) as assumed by H. Townes, because the tyloides of both types are rather different in shape. There seems to be also a difference in the relative length of basal segments of flagellum.

Male

(Description based on type specimen.)

Head and thorax black; face, clypeus, lower part of frontal orbits and scutellum yellow; pronotal ridge black; tergites 1-3 yellow with black basal bands, 4-7 black; coxae entirely, femora predominantly black; tibiae and tarsi yellow, tibiae III apically black, tarsi apically infuscated; length 9 mm.

Flagellum.—With 39 segments; longish-oval tyloides on segments 5-12, the longest nearly reaching bases and apices of segments; basal segments comparatively short, the first about 1.5 times as long as wide. Dorsally black, ventrally pale brown.

Head.—Malar space nearly as long as width of base of mandible; clypeus not separated from face, smooth and rather sparsely punctured. Black; face, clypeus and lower part of frontal orbits yellow.

Thorax.—Mesoscutum fairly densely punctured, shiny; scutellum convex, considerably raised above postscutellum; area superomedia approximately half-oval, scarcely longer than wide; no costulae. Black, scutellum yellow.

Legs.—Black; the following are yellow: femora I ventrally and apico-dorsally, femora II ventrally on apical half and apico-dorsally, tibiae and tarsi except black apex of tibiae III; tarsi II and III apically somewhat infuscated.

Abdomen.—Gastrocoeli normal, rather small, their interval wider than one of them. Petiolus, basal bands of second and third tergites and tergites 4-7 black; apices of tergites 1-3 broadly yellow.

94. *Ichneumon citrifrons* Cresson

Ichneumon citrifrons Cresson, 1867, Amer. Ent. Soc. Trans., 1:307, ♂.

Types

Holotype.—♂, Pennsylvania. A.N.S.

Distribution

According to H. Townes 1951: "Ontario, New York, New Jersey, Pennsylvania, Maryland, Michigan, Illinois".

Preamble

This male differs from *lachrymans* as far as I can see only chromatically by the pale rufous coxae III and basal half of femora III. It could perhaps be a geographical variety of *lachrymans* or it could represent the other sex of *tumidifrons* or *pusillamoenus* or *terminatus*. As there is no convincing evidence in favour of one or the other association, I have temporarily kept the description separated (see also preamble of *tumidifrons* Cresson), leaving the problem open for further research.

Male

Head and thorax black; face, clypeus and scutellum white; abdomen black, second and third tergites pale rufous; legs including coxae III and all femora pale rufous; apical half of femora III and apex of tibiae III black; coxae and trochanters I and II yellow; gastrocoeli quadrangular, about as wide as long; length 7 mm.

Flagellum.—With small, narrow and short tyloides on segments 5-11. Dorsally black, ventrally pale brown; scape ventrally yellow.

The following are white (in addition to the white pattern already mentioned above); collare partially, apex of pronotal ridge, subalarum, tegulae and postscutellum.

95. *Ichneumon nigratorius* Fabricius (Preocc.)

Ichneumon nigratorius Fabricius, 1804, Systema Piezatorum, p. 55, ♀.

Pterocormus nigratorius Townes, 1951, Synoptic Catalog, p. 300.

Ichneumon nigriculus Walkley, 1958, Synoptic Catalog Suppl., p. 52.

Types

Holotype.—♀, without locality label. Copenhagen, Denmark.

H. Townes, who has recently examined the type of this species, kindly communicated to me that the type specimen is a female of the well known *Amblyjoppa proteus* (Christ), a species confined to the Palearctic Zone. The species thus has been erroneously recorded from "America borealis" and has to be eliminated from the list of the nearctic fauna.

96. *Ichneumon klagesi* Viereck

Ichneumon flavofacialis Viereck, 1906, Amer. Ent. Soc. Trans., 32:245, ♂ (preocc.).

Ichneumon klagesi Viereck, 1912, U.S. Nat. Mus. Proc., 43:591, ♂ (new name).

Types

Holotype.—♂, Pennsylvania, Allegheny Co. Not found.

Preamble

The type was sought in vain in A.N.S., U.S.N.M. and Kansas University Museum. The original description fails to give some of the most important information, as about structure of propodeum and of gastrocoeli. Therefore it permits several different possibilities of interpretation, including also the genus *Coelichneumon*. Most likely it applies perhaps to a large *Ichneumon* male, represented by three specimens in C.H.T. and identified by H. Townes tentatively as *klagesi*. In this male, however, the last tergites are partially or entirely dark red-brown, a character not mentioned in the original description. I have incorporated this male under the name *klagesi* with question mark in the key for the males of the genus *Ichneumon*. But no definite interpretation of this species can be made until the type has been found or has been proven to be lost.

Male

(According to original description.)

Black; wings infuscated; the following are white: face, clypeus, scape ventrally, coxae I and II apically, all trochantelli, all trochanters apically, trochanters I and II also basally, femora I and II ventrally at apex; length 17 mm.

97. *Ichneumon pedalis* (Cresson)

Ichneumon pedalis Cresson, 1864, Ent. Soc. Phila. Proc., 3:141, ♂.

Ichneumon pedalis Walkley, 1958, Synoptic Catalog, suppl. 1. p. 52, ♂.

Types

Holotype.—♂, Colorado. A.N.S.

Distribution

According to H. Townes 1951: "Saskatchewan, Alberta, Colorado". According to L. Walkley, 1958: "Alaska".

Preamble

The depth and shape of gastrocoeli of this male, the pronounced thyridia and the coarse, dense sculpture of tergites 2-4 exclude its association with any of the known *Ichneumon* species of the *artemis* color group.

Male

Uniformly black including face and clypeus; legs pale rufous including trochantelli; coxae and trochanters black; puncturation of head and body strong and dense; scutellum considerably raised; area superomedia strongly transverse; length 16 mm.

Flagellum.—Tyloides on segments 6-16, elongate-oval, the longest leaving about the apical fifth of segment's length uncovered. Black including scape.

Head.—Temple profile moderately narrowed with straight outline; frons above supraantennal cavity transversely striate; malar space shorter than width of base of mandible; mandibles normal; densely and strongly punctured including cheeks and clypeus. Black.

Thorax.—Strongly and rather densely punctured including scutellum and pleura; notauli subobsolete; scutellum considerably raised above postscutellum; area superomedia distinctly wider than long (in the type nearly twice as wide); costulae rather distinct; anterior upper part of mesopleura distinctly swollen. Black, tegulae brown.

Legs.—Moderately stout; coxae and trochanters ventrally strongly and densely punctured, black; rest pale rufous including trochantelli; tip of tibiae III interiorly narrowly blackish.

Abdomen.—Postpetiolus with clearly defined, striate median field; gastrocoeli about as wide as exterior-laterally long, their posterior part strongly deepened with pronounced thyridia; second and third tergites strongly and almost contiguously punctured (except for a restricted lateral-apical area); punctures at base of second tergite medially running into irregular, coarse, longitudinal striae; fourth tergite also fairly densely and strongly punctured, though not quite as strongly as the second and third; apical border of hypopygium short-triangularly projecting. Black.

11. Genus *Thyrateles* Perkins

Fig. 66

Thyrateles Perkins, 1953, Bull. Brit. Mus. Entom., 3:149.

Type-species.—*Amblyteles camelinus* Wesmael, monobasic.

This genus is clearly separated from *Ctenichneumon* Thomson and from *Pseudamblyteles* Ashmead by the strongly developed thyridia, as pointed out by the author. In this regard and also otherwise it agrees with *Ichneumon*, from which it differs only by the amblypygous apex of the abdomen of the female. The close relationship of the two genera was already discussed above (see genus *Ichneumon*).

The following characters distinguish *Thyrateles* females from those of *Ichneumon*: (1) abdomen amblypygous or semiamblypygous; (2) flagellum extremely slender, the ventral flat beyond middle usually indistinct and ill-defined, not at all widened, usually all flagellar segments longer than wide; (3) the fourth sternite usually without plica; (4) gastrocoeli rather large and deep with pronounced thyridia; (5) scutellum strongly raised above postscutellum; (6) tarsi of female tending to become thickened and densely covered by short, stiff, bristlelike hairs.

Abdomen black, red or ferruginous, sometimes with anal marks.

All species are parasites of Rhopalocera, mainly Nymphalidae; females hibernate as adults.

Remarks

The Nearctic species *procax* Cresson combines the characters of the genus as given above but differs from all other species by the striking multitude of stiff bristles covering tarsi, tibiae and last tergites and chromatically by the presence of white anal marks in the female.

Key to the Species of *Thyrateles* Perkins of America North of Mexico

Females¹

1. Last tergites with white anal marks. (Scutellum white.) 2
 Last tergites without white anal marks. 3
2. Tergites 2 and 3 clear red, with normal sculpture; hair on tarsi normal. (Length 12 mm.) 7. *amoenapex*, new species
 Tergites 2 and 3 black or partially brownish tinted, with unusually coarse, rugose sculpture for the tribe; tarsi densely covered by stiff bristles. (Length 14-17 mm.) 6. *procax* (Cresson)
3. Entire abdomen or at least one entire tergite red or ferruginous. 4
 Entire abdomen black or at the most some tergites with narrowly ferruginous apical borders. 5
4. Wings uniformly and strongly infuscated; scutellum black. (Abdomen uniformly red; legs usually entirely black, in rare mutants femora and tibiae red; length 14-16 mm.) 5. *lugubator* (Gravenhorst)
 Wings clear; scutellum yellow. (Entire abdomen or at least tergites 2 and 3 ferruginous; legs black and ferruginous in variable extent; length 11-14 mm.) 4. *instabilis* (Cresson)
5. Legs uniformly deep black; scutellum white. (Length 14-17 mm.) 3. *caliginops*, new species
 Femora, tibiae and tarsi predominantly rufous; scutellum black. (Apex of tibiae III and the tarsi III black.) 6

¹The females of some borderline species are included also in the key to the genus *Ichneumon*.

6. Tarsi III abbreviated and thickened. (Length 13 mm.) 2. *mormonus* (Cresson)
 Tarsi III normal, neither abbreviated nor thickened. (Length 14 mm.)
 1. *camelinops*, new species

Males

I see no reliable generic characters for the distinction of males of *Thyrateles* and *Ichneumon*. Males are therefore included in the key of the latter genus.

1. *Thyrateles camelinops*, new species

Types

Holotype.—♀, Alberta, Banff Park, ex. *Polygonia* 26.VIII.1944, F.I.S. B.C. 44-457. C.N.C. No. 7161.

Allotype.—♂, Alberta, Banff Park, ex. *Polygonia* 25.VIII.1944. C.N.C. No. 7161.

Paratypes.—2 ♀♀, 4 ♂♂, Alberta, Banff Park, ex. *Polygonia* 22-29.VIII. 1944. C.N.C. 1 ♀, 2 ♂♂ same locality and host. C.G.H. 1 ♀, British Columbia, Victoria, I.VI.1900; 1 ♀, Kootenay National Park, ex. *Nymphalis milberti* 18.VII.1957. C.N.C.

Hosts.—*Nymphalis milberti* Godt. in British Columbia; *Polygonia* sp. in Alberta (C.N.C.).

Distribution.—British Columbia and Alberta.

Preamble

Extremely similar to the European *camelinus* Wesmael, the type of the genus. Differs only in the somewhat more elongate basal segments of flagellum, the somewhat less elongate hypopygium and the entirely black color of the flagellum, Also very closely related to *mormonus* Cresson, but differing in the not abbreviated tarsi III.

Female

Black including scutellum and flagellum; the following are pale rufous: trochantelli, femora, tibiae and tarsi; apex of tibiae III and the tarsi III black; abdomen semiamblypygous; scutellum strongly raised; anterior third of notauli distinct; gastrocoeli large and rather deep; no scopa; length 14 mm.

Flagellum.—Bristleshaped, slender, ventrally not distinctly flattened beyond middle and not at all widened, considerably attenuated toward apex; first segment approximately four times as long as wide (in *camelinus* three times), the fifteenth approximately square. Uniformly black.

Head.—Temple profile distinctly narrowed with slightly curved outline, cheek profile rather strongly narrowed with straight outline; malar space distinctly longer than width of base of mandible; clypeus between foveae and the middle of face slightly convex. Black.

Thorax.—Mesoscutum convex, fairly densely punctured; basal third of notauli distinct; scutellum strongly raised above postscutellum, dorsally convex, apically with steep slope; area superomedia strongly transverse. Black, tegulae dark brown.

Legs.—Fairly slender; coxae III ventrally densely punctured, without scopa; tarsi III a little thickened, but not abbreviated as in *mormonus*. The following are black: coxae, trochanters, apex of tibiae III and the tarsi III; rest rufous.

Abdomen.—Semiamblypygous, apex blunt, ovipositor not projecting; gastrocoeli large and rather deep, their interval slightly narrower than one of them; second and third tergites densely and strongly punctured, punctures running into

striae between gastrocoeli. Black; apical border of second and third tergites narrowly pale ferruginous.

Male

Black; labrum, clypeus laterally and mark or stripe on facial orbits yellow, flagellum and scape black; legs rufous, including trochantelli; coxae, trochanters and apex of tibiae III black; length 13-15 mm.

Flagellum.—With long, narrow tyloides on segments 8 or 9 to 16 or 18. Uniformly black.

Head.—Temple rather strongly narrowed with almost straight outline; carina occipitalis slightly raised. Black; the following are yellow: labrum, sides of clypeus and a mark or short stripe on facial orbits.

Thorax.—Mesoscutum convex, strongly and fairly densely punctured; notauli basally distinct; scutellum strongly raised above postscutellum; area superomedia strongly transverse. Uniformly black.

Legs.—Slender. Rufous, including trochantelli; coxae, trochanters and apex of tibiae III black; tarsi III not black as in the female.

Abdomen.—Gastrocoeli deep, triangular, about as wide as or slightly wider than their interval; 2nd and 3rd tergite coarsely and densely sculptured, base of 2nd tergite irregularly reticulate-rugose or longitudinally striate. Uniformly black.

2. *Thyrateles mormonus* (Cresson)

Fig. 67

Amblyteles mormonus Cresson, 1877, Amer. Ent. Soc. Trans., 6:190, ♀.

Ichneumon adjunctus Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., p. 29, ♀.

Cratichneumon pedalis var. *varitarsis* Viereck, 1902, Ent. News, 13:87, ♀.

Pseudamblyteles mormonus Townes, 1951, Synoptic Catalog, p. 293, ♀.

Thyrateles mormonus Heinrich, 1959, Ent. News, 70:210, ♀.

Types

Holotypes.—*Amblyteles mormonus* Cresson, ♀, Utah. A.N.C.; *Ichneumon adjunctus* Provancher, ♀, Quebec. Provincial Museum, Quebec. No. 597; *Cratichneumon pedalis* var. *varitarsis* Viereck, ♀, Colorado. A.N.C.

Host

Polygonia sp. (C.N.C.).

Distribution

According to H. Townes 1951: "Quebec, Alberta, Colorado, Utah." New record: Ontario (C.N.C.).

Preamble

Very similar to the European *camelinus* Wesmael and even more so to the Nearctic *camelinops* Heinrich, but uniquely distinguished by the abbreviated and thickened tarsi III.

Female

Black, including scutellum and flagellum; the following are pale rufous: trochantelli, femora, tibiae and tarsi; narrow apex of femora III, entire tibiae III and tarsi III black; abdomen semiamblypygous; scutellum strongly raised; anterior third of notauli distinct; gastrocoeli large; no scopa; length 13 mm.

Flagellum.—Bristleshaped, slender, ventrally not distinctly flattened beyond middle and not at all widened, considerably attenuated at apex, with 35 segments,

the first approximately four times as long as wide, the fifteenth approximately square. Uniformly black.

Head.—Temple profile distinctly narrowed with slightly curved outline; cheek profile fairly strongly narrowed with straight outline; malar space scarcely longer than width of base of mandible. Black.

Thorax.—Mesoscutum convex, fairly densely and strongly punctured; basal third of notauli distinct; scutellum strongly raised above postscutellum, dorsally convex, apically with steep slope; area superomedia transverse. Black, tegulae brown.

Legs.—Stout; femora III distinctly stouter than in *camelinops*; all tarsi, especially tarsi III strongly abbreviated and thickened; also apex of tibiae III widened in dorsal-ventral direction. The following are black: coxae, trochanters, apex of femora III, the tibiae III and tarsi III; tibiae III at narrow base, especially ventrally brownish tinted; rest rufous.

Abdomen.—Semiamblypygous, apex blunt, ovipositor not projecting; gastrocoeli large and deep, their interval slightly narrower than one of them; second and third tergites coarsely punctured, punctures running into striae between gastrocoeli. Black, apical border of second and third tergites sometimes narrowly pale ferruginous.

3. *Thyrateles caliginops*, new species

Figs. 25, 54

Types

Holotype.—♀, Maine, Dryden, 22.VII.1952. C.G.H.

Neallotype.—♂, Maine, Dryden, C.G.H.

Paratypes.—1 ♀, West Virginia, 1 ♀, Quebec, C.G.H. 3 ♀♀, Ontario (Marmora, Merivale, Rondeau Park), 2 ♀♀, Quebec (Knowlton, Norway Bay), C.N.C. 2 ♀♀, West Virginia and Minnesota, C.H.T.

Host

Vanessa atalanta Linnaeus in Ontario (C.N.C.).

Distribution

Maine, Quebec, West Virginia (C.G.H.); Ontario, Connecticut, New York (C.N.C.); Minnesota (C.H.T.).

Preamble

This species is extremely similar to *Ichneumon caliginosus*. It is placed here in the genus *Thyrateles* on account of the more semiamblypygous abdomen of the female and the structure of its flagellum, which has no distinct ventral flat beyond middle and is not the least widened.

T. caliginops agrees almost exactly with the European *T. haereticus* Wesmael, except that the femora III and the flagellum are a trifle more slender. The answer to the question whether *caliginops* is a subspecies of *haereticus* may be delayed until the male of the former is confirmed by rearing.

Female

Black including legs, scutellum white; wings not infuscated; flagellum slender, bristleshaped, not distinctly flattened ventrally beyond middle and not at all widened, all segments being longer than wide; apex of abdomen nearly semiamblypygous, ovipositor not projecting; fourth sternite without distinct plica; subalarum usually white or white marked; length 14-17 mm.

Flagellum.—Bristleshaped, very slender, considerably attenuated at apex, ventrally not clearly flattened beyond middle and not the least widened, all segments distinctly longer than wide, with 38-39 segments (on the average 3-5 segments less than *caliginosus*), the first fully three times as long as wide, none square and none wider than long. Black with white annulus on segments 6 or 7 to 14 or 15.

Head.—Temple and cheek profile strongly narrowed with straight outlines; cheeks long, malar space a little longer than width of base of mandible. Black; frontal orbits usually with a very narrow, short white line.

Thorax.—Anterior third of notauli distinct; scutellum rather strongly raised above postscutellum, dorsally convex; area superomedia usually wider than long, sometimes square. Black; scutellum and in the majority of specimens, subalarum entirely or partially white.

Legs.—Rather long and slender; coxae III densely and rather strongly punctured, without scopa. Black; tibiae I anteriorly ivory.

Abdomen.—Gastrocoeli large, triangular, their interval somewhat wider than one of them; second and third tergites very strongly and densely, the fourth finely and less densely punctured; punctures between gastrocoeli and on the middle of the second tergite running into irregular longitudinal striae; apex close to semiamblypygous, not laterally compressed, ovipositor hidden; fourth sternite without plica, usually entirely plain, sometimes with indication of an imperfect fold. Uniformly black.

Male (Tentative)

Black, scutellum white; tibiae III exteriorly with white stripe in the basal half, or white except narrow base and broad apex; sometimes base of metatarsus III white; legs I and II more extensively white colored; wings somewhat infuscated; length 17-18 mm.

Flagellum.—Black, scape ventrally white; tyloides on segments 6 or 7 to 19 or 20, elongate-oval, the longest reaching almost from base to apex of the segments.

Area superomedia strongly transverse; scutellum strongly raised above postscutellum and dorsally convex. The following white: mandibles except teeth, clypeus, face entirely or except middle, collare, subalarum, pronotal ridge partially or entirely, sometimes tegulae, tibiae and tarsi I and II predominantly (tibiae except a blackish stripe ventrally toward apex), apex of femora I and II, apical border of trochanters I and II, trochantelli I and II, usually mark on coxae I, sometimes on coxae I and II, tibiae III exteriorly from beyond base to beyond middle or entirely except narrow base and broad apex, sometimes base of metatarsus III.

4. *Thyrateles instabilis* (Cresson)

Ichneumon instabilis Cresson, 1867, Amer. Ent. Soc. Trans., 1:303, ♀ ♂.

Pterocormus instabilis Townes, 1951, Synoptic Catalog, p. 299, ♀ ♂ (partim).

Types

Holotype.—♀, New York. A.N.S.

Hosts

According to H. Townes 1951: "*Oeneis melissa* (F.); *Colias notatus* (Megerle)." New record: *Colias philodice* Latreille in Ontario (C.N.C.). The two records of a *Colias* species seem to indicate that *instabilis* is perhaps specialized as

parasite of this genus. The host record *Oeneis melissa* (Satyridae) needs further confirmation, especially as *instabilis* and *winkleyi* had not been separated before.

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition Zone; also California".

Preamble

This species is similar to *Ichneumon winkleyi* and has often been confused with it. For the differences see preamble of the mentioned species.

Female

Head and thorax varying from entirely ferruginous to entirely black, scutellum always yellow, usually a yellow spot on inner orbits level with antennal sockets; at least tergites 2 and 3, usually entire abdomen, ferruginous; legs varying from predominantly ferruginous to (more rarely) predominantly black; apex of tibiae III and in majority of species the tarsi III black; often apex of femora III, exceptionally all femora entirely, coxae and trochanters black; flagellum bristle-shaped, not at all widened; no scopa; length 11-14 mm.

Flagellum.—Bristleshaped, long and slender, ventrally flattened beyond middle, but not at all widened, with 36-40 segments, the first nearly three times as long as wide, about the fifteenth approximately square. Usually the first segments or the base up to white annulus pale ferruginous, sometimes black; white annulus usually on segments 6 or 7 to 14 or 15; apex black; scape ferruginous, or ventrally ferruginous, rarely entirely black.

Head.—Temple and cheek profiles strongly narrowed, the former with slightly curved, the latter with straight outline; cheeks a little less constricted at carina genalis than in *winkleyi*; malar space longer than width of base of mandible; mandibles normal, slender. Varying from entirely ferruginous to entirely black; almost always a small yellowish mark on inner orbits, level with antennal sockets; sometimes frontal and vertical orbits pale ferruginous or yellowish.

Thorax.—Mesoscutum rather strongly convex, strongly and not quite as densely punctured as in *winkleyi*, a little more shiny; notauli basally distinct; scutellum rather strongly raised above postscutellum, dorsally slightly convex; area superomedia square or wider than long. Varying from entirely ferruginous to entirely black; scutellum always yellow, subalarum sometimes.

Legs.—Long and slender; tarsi II and III distinctly less slender than in *winkleyi*; coxae III densely punctured, without scopa. Coxae and trochanters varying from entirely black to entirely ferruginous, in the great majority of specimens, however, black; apex of tibiae III always, apex of femora III usually more or less extensively black, sometimes femora III entirely black; tarsi III in the majority of specimens entirely black, rarely ferruginous or brown.

Abdomen.—Oval, semi-amblypygous, blunt at apex, ovipositor never projecting; gastrocoeli large, rather deep and wide, with pronounced thyridia, their interval somewhat narrower than one of them; second and third tergites rather strongly and densely punctured, punctures running into striae between gastrocoeli and on middle of second tergite. The majority of specimens uniformly ferruginous, usually except petiolus; rather common are melanistic mutants, in which the whole first segment and tergites 4, or 4-6 more rarely tergites 4-7 are black; exceptionally last tergite with white anal mark.

Male

I have not studied the male series in Cresson's collection; judging, however, from his description of the male, I presume that several species have been confused. The male described below is associated with *instabilis* female on account of matching characters, ecology and frequency; I feel sure that the association is correct.

Head and thorax black with restricted yellow pattern; scutellum yellow; always black are pronotal base, propodeum and pleura, usually cheeks and mesoscutum; apex of first tergite and tergites 2-3, sometimes also the fourth partially, pale rufous, close to orange, the last tergite usually red-brown; rest of abdomen black; all tibiae and tarsi pale yellow, tibiae III apically black; femora III from rufous, apically black to black, basally rufous; length 13-15 mm.

Flagellum.—With elongate-oval tyloides on segments 7 or 8 to 16 or 17, the longest reaching almost from base to apex of segments; black, ventrally varying from black to yellowish-brown; scape ventrally yellow.

Head.—Malar space more than half as long as width of base of mandible. The following are yellow: mandibles except base, face, clypeus, rarely frontal and vertical orbits or a mark on cheeks.

Thorax.—Anterior third of notauli rather strongly impressed; scutellum strongly elevated; area superomedia transverse. Black; the following are yellow: collare, pronotal ridge entirely or apically, always subalarum and scutellum, rarely postscutellum, short, lateral lines on mesoscutum near tegulae or two short, converging median lines on mesoscutum (which may be ferruginous instead of yellow).

Legs.—Basic color of coxae and of trochanters III black; coxae I and II always yellow marked, often predominantly yellow, trochanters III apically yellow; trochanters I and II and all trochantelli pale yellow, the former sometimes dorsally black; femora I and II pale rufous, femora III varying from rufous with black apex to black with rufous base; all tibiae and tarsi pale yellow, tibiae III apically broadly black, tarsi III never infuscated.

Abdomen.—Apex of postpetiolus or the entire postpetiolus and tergites 2 and 3, usually also tergite 4 laterally or predominantly, exceptionally all tergites pale rufous, close to orange; usually the fourth tergite partially and the fifth and sixth entirely black, the seventh red-brown, sometimes tergite 4-7 entirely black; apical edges of rufous tergites usually narrowly blackish.

5. *Thyrateles lugubator* (Gravenhorst)

Figs. 5, 13, 15

Ichneumon lugubator Gravenhorst, Vergl. Ubers. Zool. System., 1807, p. 256, n. 3729, ♂.

Ichneumon rufiventris Brullé, 1846, Hist. Nat. Ins. Hym., v. 4, p. 301, ♂ ♀.

Ichneumon hunterae Packard, 1881, Boston Soc. Nat. Hist. Proc., 21:22, ♂ ♀.

Ichneumon incertus Cresson, 1864, Ent. Soc. Phila. Proc., 3:180, ♀.

Ichneumon californicus Cresson, 1864, Ent. Soc. Phila. Proc., 3:180, ♂.

Types

Holotypes.—*Ichneumon lugubator* Gravenhorst, ♂, locality unknown, Breslau (Wroclaw), Poland; *Ichneumon rufiventris* Brullé, ♀, Museum National d'Histoire Naturelle, Paris; *Ichneumon incertus* Cresson, ♀, New Jersey. A.N.S. *Ichneumon hunterae* Packard, ♀, Virginia, M.C.Z. (Holotype not originally designated by Packard; the female however was considered as holotype by H. Townes in 1941, and therefore I have selected it as such; the specimen was not found in 1959).

Hosts

According to H. Townes 1951: "*Vanessa cardui* (L.); *Vanessa virginiensis* (Drury); *Polygonia comma* (Harr.); *Nymphalis milberti* (Godt.)". *Vanessa cardui* and *virginiensis* as typical hosts confirmed by many rearings in Ontario, Manitoba, Saskatchewan and British Columbia (C.N.C.).

Distribution

According to H. Townes 1951: "Transcontinental in Canadian and Transition Zones".

Preamble

This species too combines a subsemiamblypygous abdomen of the female with all other decisive characters of *Thyrateles* including parasitism on Nymphalidae. The credit for examining Gravenhorst's type in Poland and for discovering its specific identity with *rufiventris* Brullé belongs to H. Townes, who kindly communicated his finding to me. There are several species of the same color in North America, but *lugubrador* is well distinguished from the others in both sexes by the more elevated scutellum, strongly narrowed temples, elevated carina occipitalis and strongly transverse area superomedia. Femora mutata black and red without geographical restriction. It is the red-legged form to which the name *incertus* Cresson refers.

Male

Head and thorax black, facial orbits usually, clypeus sometimes laterally or entirely yellow; abdomen red, first tergite usually black; legs usually black, sometimes (var. incertus) femora and tibiae red except tibiae III apically; tibiae usually, tarsi sometimes ventrally partially ivory; wings uniformly and strongly infuscated; temple profile strongly narrowed; carina occipitalis raised, gastrocoeli fairly deep, large; anterior third of notauli distinct; scutellum strongly raised; area superomedia strongly transverse; length 14-18 mm.

Flagellum.—With longish-oval tyloides on segments 7 or 8 to 18, 19 or 20, the longest by far not reaching apices of segments; black including scape.

Head.—Narrow compared with width of thorax; temple profile strongly narrowed with straight outline; carina occipitalis somewhat elevated. Black; facial orbits usually yellow, sometimes also clypeus laterally; not so frequently whole clypeus and lateral fields of face yellow.

Thorax.—Anterior third of notauli distinct; scutellum strongly raised above postscutellum, dorsally convex, apically steeply sloping; area basalis strongly deepened, area superomedia strongly transverse; mesothorax widened. Black.

Legs.—Slender. Black; in the fairly rare mutant *incertus* Cresson all femora and tibiae red except apex of tibiae III; apex of femora I and the tibiae and tarsi I ventrally yellow; tibiae II and III and often also their tarsi ventrally more or less distinctly ivory tinted at the base only or more extensively.

Abdomen.—Sculpture of anterior tergites coarse and dense; punctures on the middle of second and third tergites running into striae. Red, first segment black, rarely postpetiolus apically or entirely red.

Female

Black including scutellum, tergites 2-7, often also postpetiolus partially or entirely red; wings strongly and evenly infuscated; legs black, rarely (var. incertus) femora and tibiae red; abdomen subsemiamblypygous, ovipositor never projecting; flagellum bristleshaped, not widened; femora long and slender; gastrocoeli rather deep; no scopa; length 14-16 mm.

Flagellum.—Bristleshaped, slender, ventrally not distinctly flattened beyond middle and not at all widened, considerably attenuated at apex, with 37-40 segments, the first nearly three times as long as wide, about the fourteenth approximately square. Black with white annulus on segments 8 or 9 or 10 to 13, 14 or 15; rarely annulus reduced to a narrow, white spot or entirely absent.

Head.—Narrow compared with thorax; temple and cheek profiles strongly narrowed with straight outlines; malar space scarcely longer than width of base of mandible; mandibles normal, fairly slender, the upper tooth a little prolonged and sharply pointed. Black; frontal orbits sometimes more or less narrowly ferruginous; exceptionally face and clypeus with obscure reddish tint.

Thorax.—Mesoscutum convex, moderately densely punctured, shiny; anterior third of notauli distinct; mesothorax widened; scutellum strongly raised above postscutellum with steep apical slope; propodeum rather short; area basalis deepened; area superomedia usually wider than long. Black.

Legs.—Slender; coxae III densely punctured, without scopa. Usually black; sometimes femora and tibiae red except apex of tibiae III; apex of femora I and the tibiae I ventrally ivory.

Abdomen.—Oval, semiamblypygous, apically blunted, ovipositor never projecting; gastrocoeli triangular, rather deep, their interval about as wide as one of them or a little narrower; second and third tergites rather strongly and fairly densely punctured, punctures running into striae between gastrocoeli and on middle of second tergite; fourth tergite sparsely and finely punctured. Red; first tergite usually black, often postpetiolus apically or entirely red.

6. *Thyrateles procax* (Cresson)

Figs. 58, 59, 68

Ichneumon procax Cresson, 1877, Amer. Ent. Soc. Trans., 6:170, ♂.

Amblyteles torontosus Davis, 1898, Amer. Ent. Soc. Trans., 24:351, ♀.

Amblyteles torontosus Townes, 1951, Synoptic Catalog, p. 295, ♀.

Pterocormus procax Townes, 1951, Synoptic Catalog, p. 300, ♂.

Thyrateles procax Heinrich, 1959, Entom. News, 70:210, ♂ ♀.

Types

Holotypes.—*Ichneumon procax* Cresson, ♂, Canada. A.N.S. *Amblyteles torontosus* Davis, ♀, Ontario, Toronto. A.N.S.

Host

Vanessa antiopa (L.) in Ontario (C.N.C.).

Distribution

According to H. Townes 1951: (*procax*) "Canada"; (*torontosus*) "Ontario".

Preamble

The association of sexes was confirmed by broad series of males and females reared from the same host. The female displays all typical characters of the genus *Thyrateles*; it is, however, especially distinguished by a dense cover of short, stiff, bristlelike hair on all tarsi and by the presence of three white anal marks; both sexes are distinguished by unusually coarse sculpture of anterior tergites.

Male

Head black, mandibles, face and clypeus white; thorax black; the following are white: collare, apex of pronotal ridge, subalarum, scutellum, marks on tegulae;

first segment black, the following obscure reddish-brown, last tergites usually black or infuscated; tibiae and tarsi white, tibiae III apically black; coxae, trochanters and femora predominantly black; tergites 2-5 very densely and coarsely sculptured; length 18-19 mm.

Flagellum.—With longish-oval tyloides on segments 8 or 9 to 19, the longest not reaching apices of segments; black, ventrally obscure brownish; scape ventrally yellow.

Legs.—The following are black: basic color of coxae, trochanters and femora and apex of tibiae III; the following are white: marks on coxae I and II, usually small, dorsal mark on coxae III, trochanters I and II ventrally or apically, trochantelli I and II, all tibiae and tarsi; apices of segments of tarsi III slightly and narrowly infuscated.

Female

Black, scutellum white; all tibiae broadly white banded; tergites 5-7 with white anal marks; white pattern of thorax as in male; flagellum bristleshaped; tarsi III thickened, densely covered by short, stiff bristles; anterior tergites unusually coarsely sculptured; no scopa; length 14-17 mm.

Flagellum.—Bristleshaped, moderately slender, not ventrally flattened and not widened beyond middle, considerably attenuated at apex, with 37-39 segments, the first 2.5 times as long as wide, the thirteenth approximately square. Black with white annulus on segments 7 or 8 to 16.

Head.—Temple profile moderately, cheek profile fairly strongly narrowed, the former with curved, the latter with nearly straight outline; malar space a little longer than width of base of mandible; mandibles normal. Black; middle of frontal orbits very narrowly yellowish.

Thorax.—Mesoscutum convex, strongly and densely punctured; notauli but slightly indicated at very base; scutellum strongly raised above postscutellum, apically sloping down in a steep curve; area superomedia large, usually wider than long, sometimes square. Black; the following are white: collare, apex of pronotal ridge, subalarum, scutellum, sometimes mark on tegulae.

Legs.—Moderately stout, femora III rather slender; coxae III coarsely and densely punctured, without scopa; all tarsi thickened and densely covered by short, bristlelike hair. Black, all tibiae broadly white banded; metatarsus I usually dorso-basally whitish.

Abdomen.—Broadly oval, amblypygous; gastrocoeli fairly deep, approximately triangular, their interval wider than one of them; second and third tergites extremely densely and coarsely rugose-punctate; fourth tergite still distinctly but sparsely punctured; apical tergites laterally and apically covered by bristlelike, stiff hair. Black, tergites 5-7 with white anal marks; sometimes second tergite partially brownish.

7. *Thyrateles amoenapex*, new species

Types

Holotype.—♀, Northwest Territories, Norman Wells, C. B. Bird, 20.V. 1953. C.N.C. No. 7132.

Female

Head and thorax black, scutellum white; abdomen tricolored (typical color of European specimens); black, tergites 2 and 3 red, 5-7 with white anal marks; legs red, femora III partially black; flagellum with annulus; no scopa; length 12 mm.

Flagellum.—Bristleshaped, slender, ventrally indistinctly flattened and not widened beyond middle, considerably attenuated at apex, with 38 segments, the first fully twice as long as wide, about the eighth square. Black with white annulus on segments 7-13, the basal segments ventrally entirely and dorsally at apices reddish-brown.

Head.—Temple and cheek profiles distinctly narrowed, with slightly curved outlines; malar space somewhat longer than width of base of mandible; whole surface except narrow apex of cheeks strongly and unusually densely punctured; mandibles slender, with short, blunt apical teeth (perhaps worn down). Black, middle and sides of face ferruginous.

Thorax.—Rather convex, strongly and very densely punctured, opaque; notauli obsolete; scutellum moderately raised above postscutellum; area superomedia about as wide as long; costulae and lateral carinae of area posteromedia obsolete. Black, scutellum white.

Legs.—Slender; coxae III densely punctured without trace of scopa. Rufous including trochantelli; coxae and trochanters black; femora III black except broadly rufous base.

Abdomen.—Oval-oblong, amblypygous; postpetiolus wide, irregularly longitudinally striate with some punctures between striae; gastrocoeli large, deep, wide, with pronounced thyridia, their interval a little narrower than one of them; tergites 2 and 3 moderately strongly and densely punctured, except basally in the middle of second tergite where punctures are dense and coarse, running into short striae. Black; tergites 2 and 3 red, 5-7 with large, white anal marks; in type the fourth tergite also with a small, irregular, white apical mark (probably not constant).

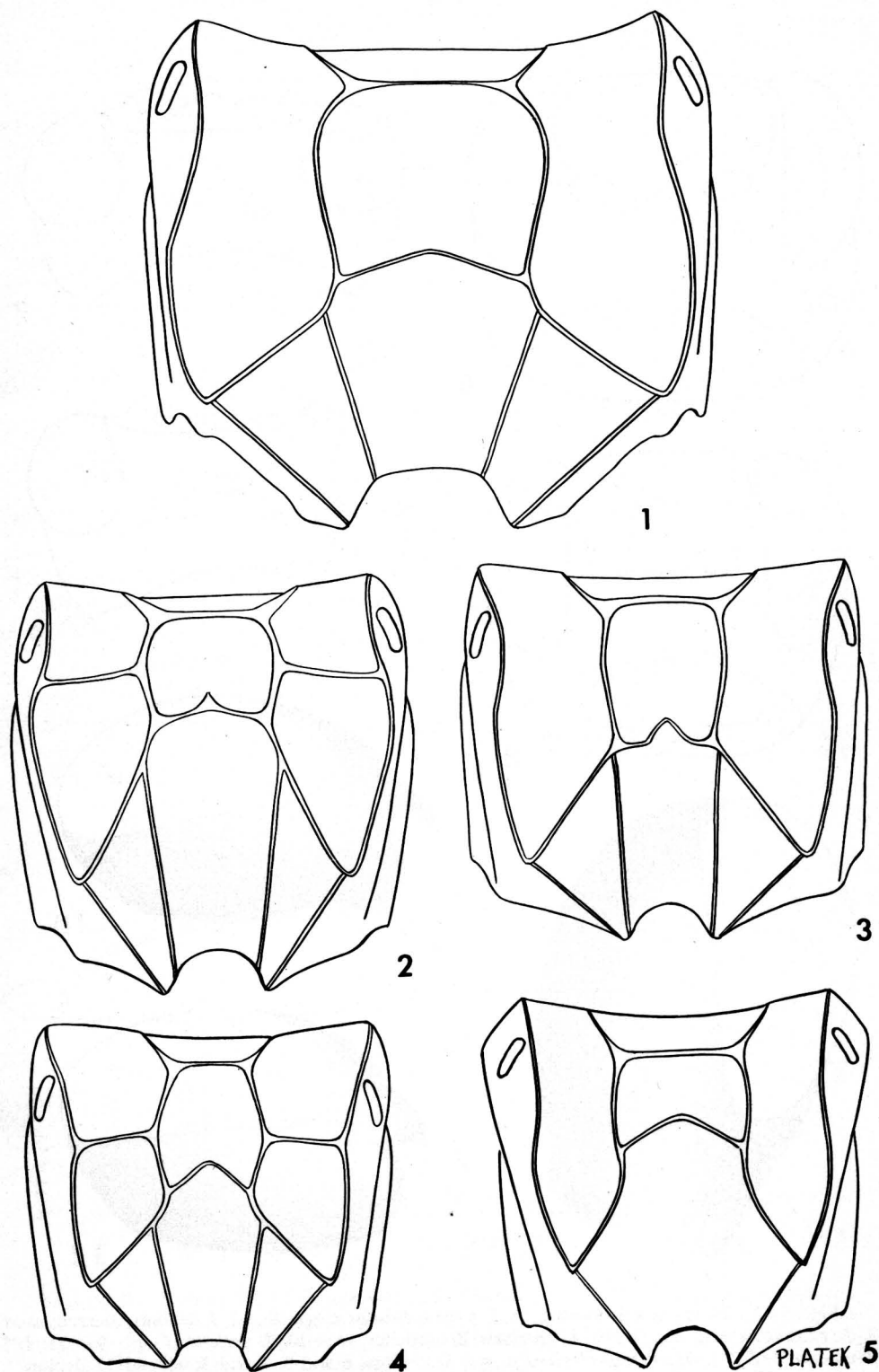
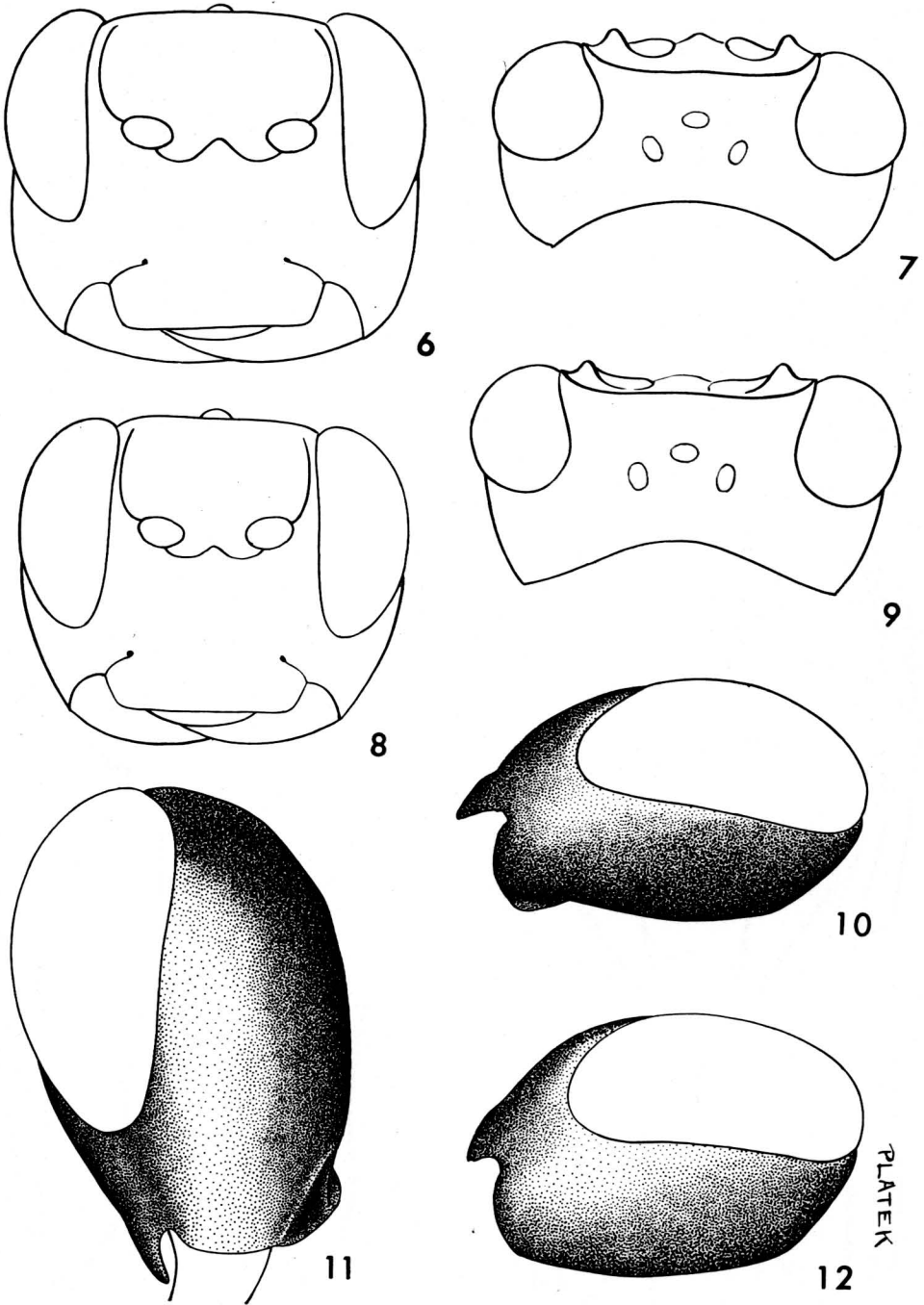
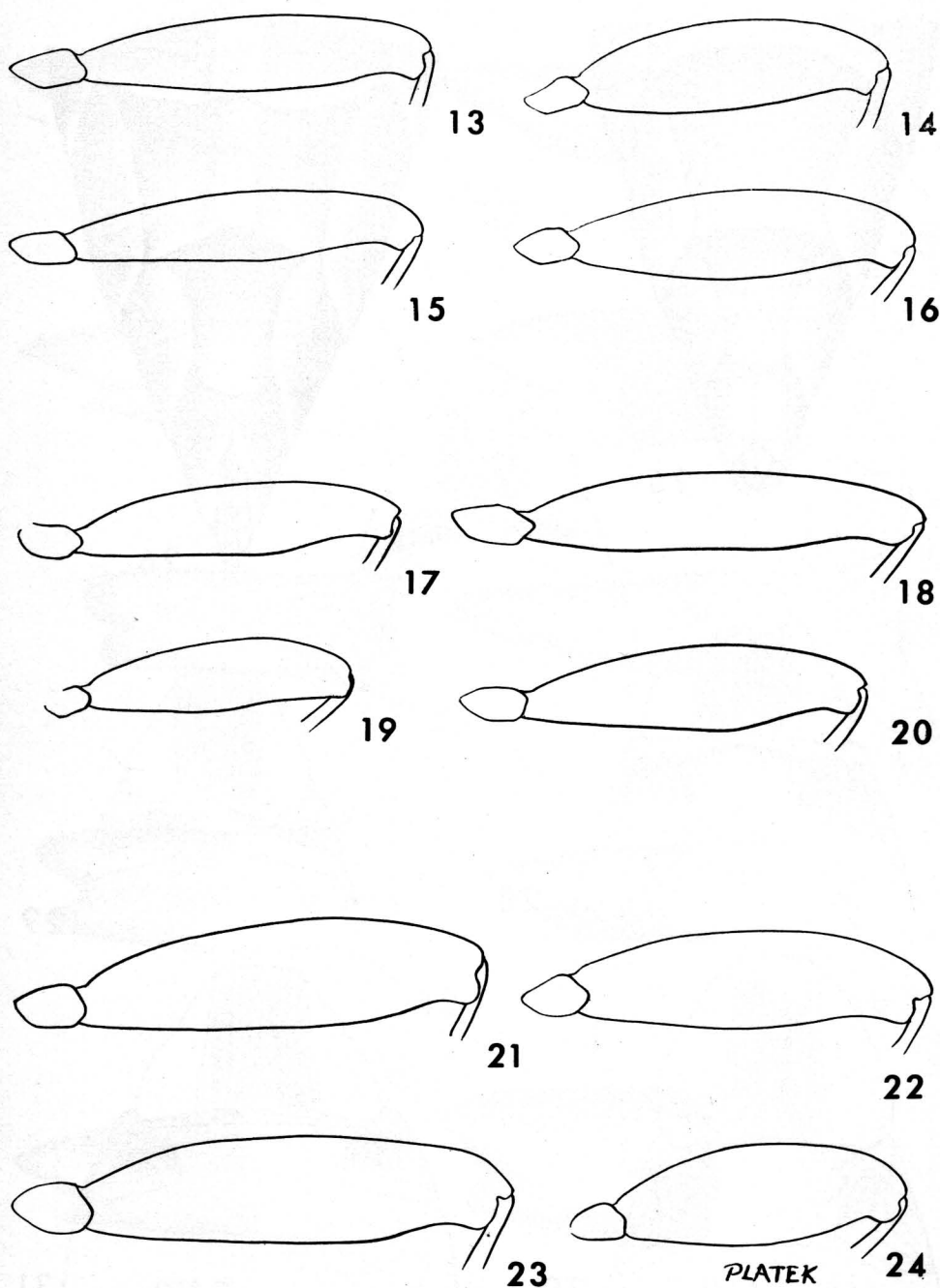


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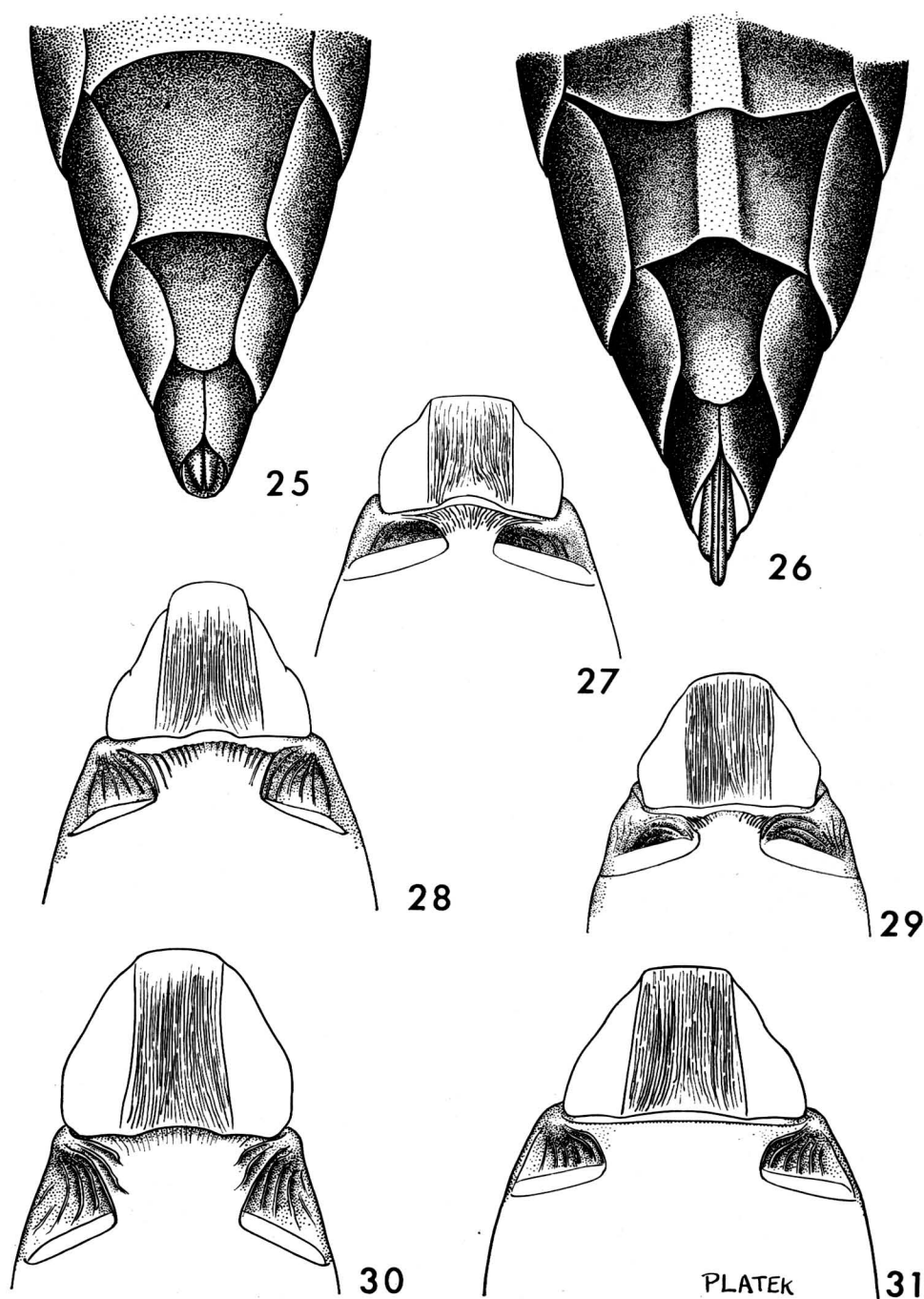
Figs. 1-5. Carinations of propodea of *Ichneumon* and *Thyrateles*. 1, *I. devinctor* Say, ♀; 2, 3, *I. annulatorius* Fabricius, ♂, ♀; 4, *I. mendax* Cresson, ♀; 5, *T. lugubator* (Gravenhorst), ♂.



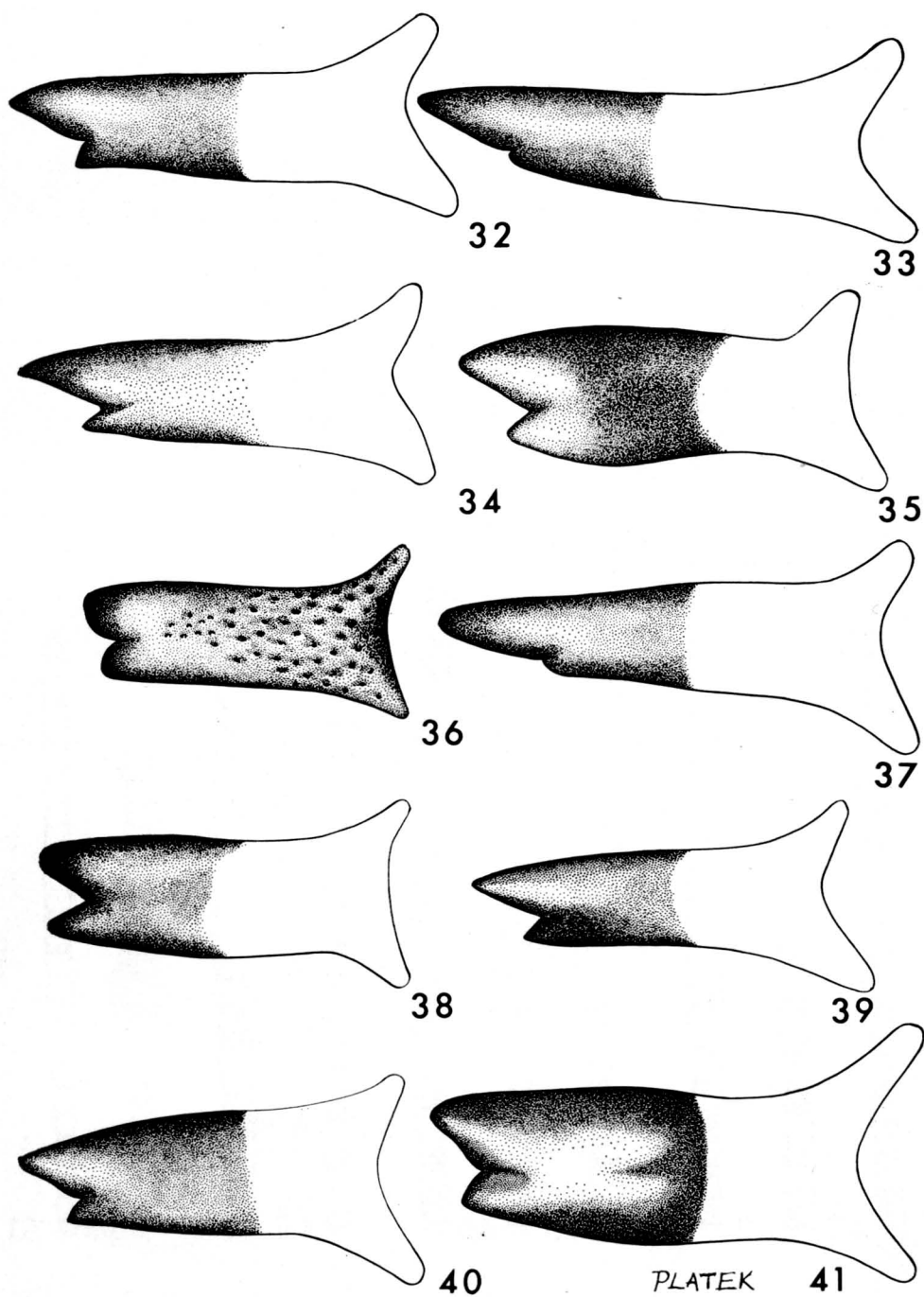
Figs. 6-12. Heads of *Ichneumon*. 6, *I. pycnocephalus* n. sp., ♀; 7, *I. artemis* Viereck, ♀; 8, *I. chasmodops* n. sp., ♀; 9, *I. similis* Provancher, ♀; 10, *I. feriens* n. sp., ♀; 11, *I. devinctus* Say, ♀; 12, *I. microferiens* n. sp., ♀. (Figs. 6 and 8, 7 and 9, 10 and 12 demonstrate the differences in head structure of three pairs of very similar species.).



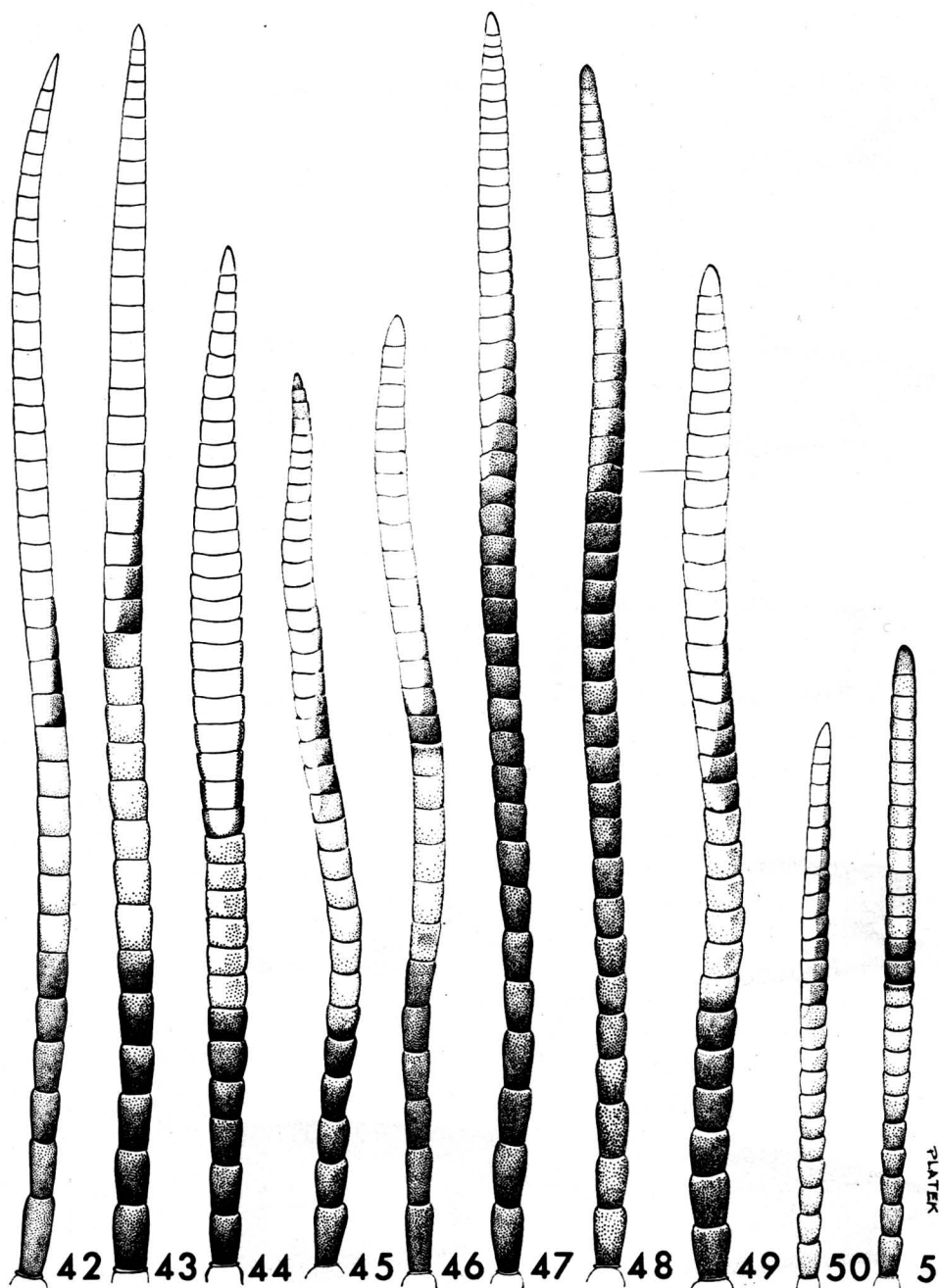
Figs. 13-24. Femora III of *Ichneumon* and *Thyrateles*. 13, 15, *T. lugubator* (Gravenhorst), ♀, ♂; 14, 16, *I. suburbanus* n. sp., ♀, ♂; 17, *I. winkleyi* Viereck, ♀; 18, *I. placidus* Provancher, ♀; 19, *I. vivax* Cresson, ♀; 20, *I. heterodon* n. sp., ♀; 21, *I. zelotypus* Cresson, ♀; 22, *I. unctatus* Cresson, ♀; 23, *I. grandisops* n. sp., ♀; 24, *I. eurytus* n. sp., ♀.



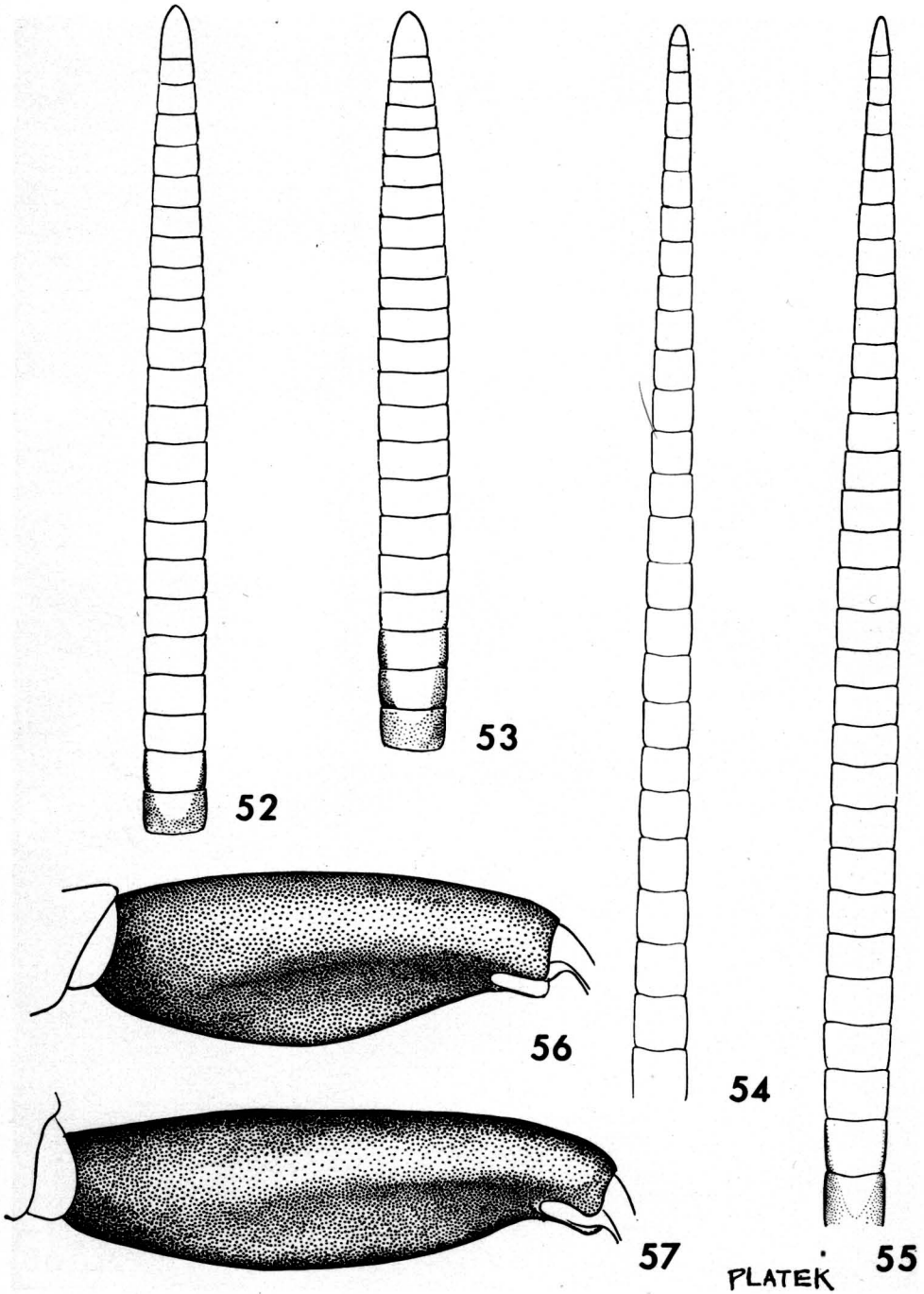
Figs. 25 and 26. Ventral view of apex of abdomen. 25, *Thyrateles caliginops* n. sp., ♀; 26, *Ichneumon caliginosus* Cresson, ♀. Figs. 27-31. Gastrocoeli of *Ichneumon*. 27, *I. diorictiae* n. sp., ♀; 28, *I. anonymus* n. sp., ♀; 29, *I. hippisleyae* n. sp., ♀; 30, 31, *I. annulatorius* Fabricius, ♂, ♀.



Figs. 32-41. Mandibles of *Ichneumon*. 32, *I. laetus* Brullé, ♀; 33, *I. creperus* Cresson, ♀; 34, *I. feriens* n. sp., ♀; 35, *I. feralis* Cresson, ♀; 36, *I. heterodon* n. sp., ♀; 37, *I. suburbanus* n. sp., ♀; 38, *I. placidus* Provancher, ♀; 39, *I. grandisops* n. sp., ♀; 40, *I. chasmodops* n. sp., ♀; 41, *I. pycnocephalus* n. sp., ♀.



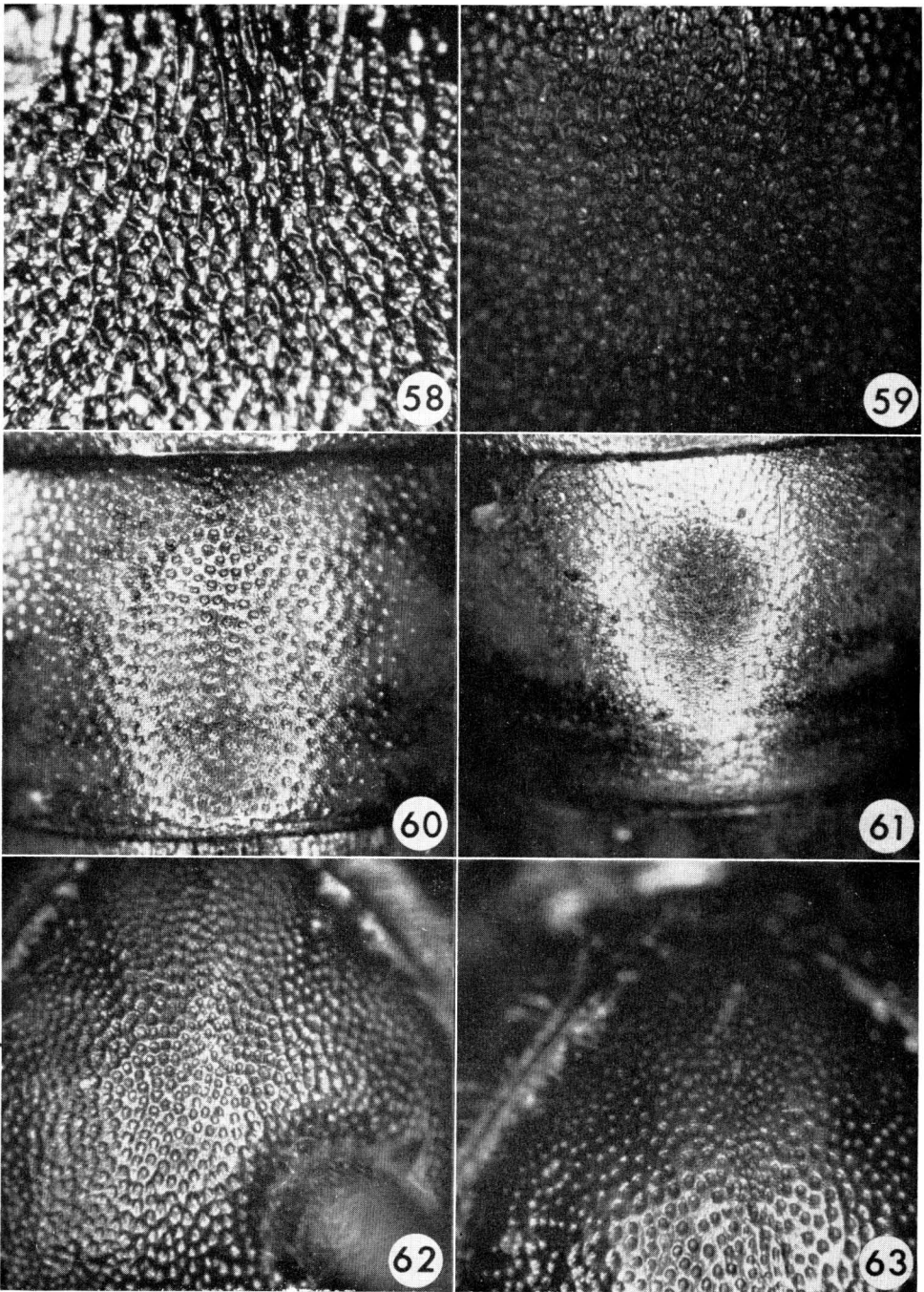
Figs. 42-51. Flagella of *Ichnumon* (females). 42, *I. gracilicornops* n. sp.; 43, *I. trizonatus* Provancher; 44, *I. nearcticivernus* Heinrich; 45, *I. ultimus* Cresson; 46, *I. anonymus* n. sp.; 47, *I. similis* Provancher; 48, *I. lariae* Curtis; 49, *I. annulatorius* Fabricius; 50, *I. nigrovariegatus* Provancher; 51, *I. lacrymans* Provancher. (In the text of this paper the flagella figs. 42-51 are characterised as follows: 42 and 43 as bristleshaped; 44, as bristleshaped lanceolate; 45 and 48, as subfiliform; 46, 47, 49, 50, as filiform; 51, as exactly filiform.)



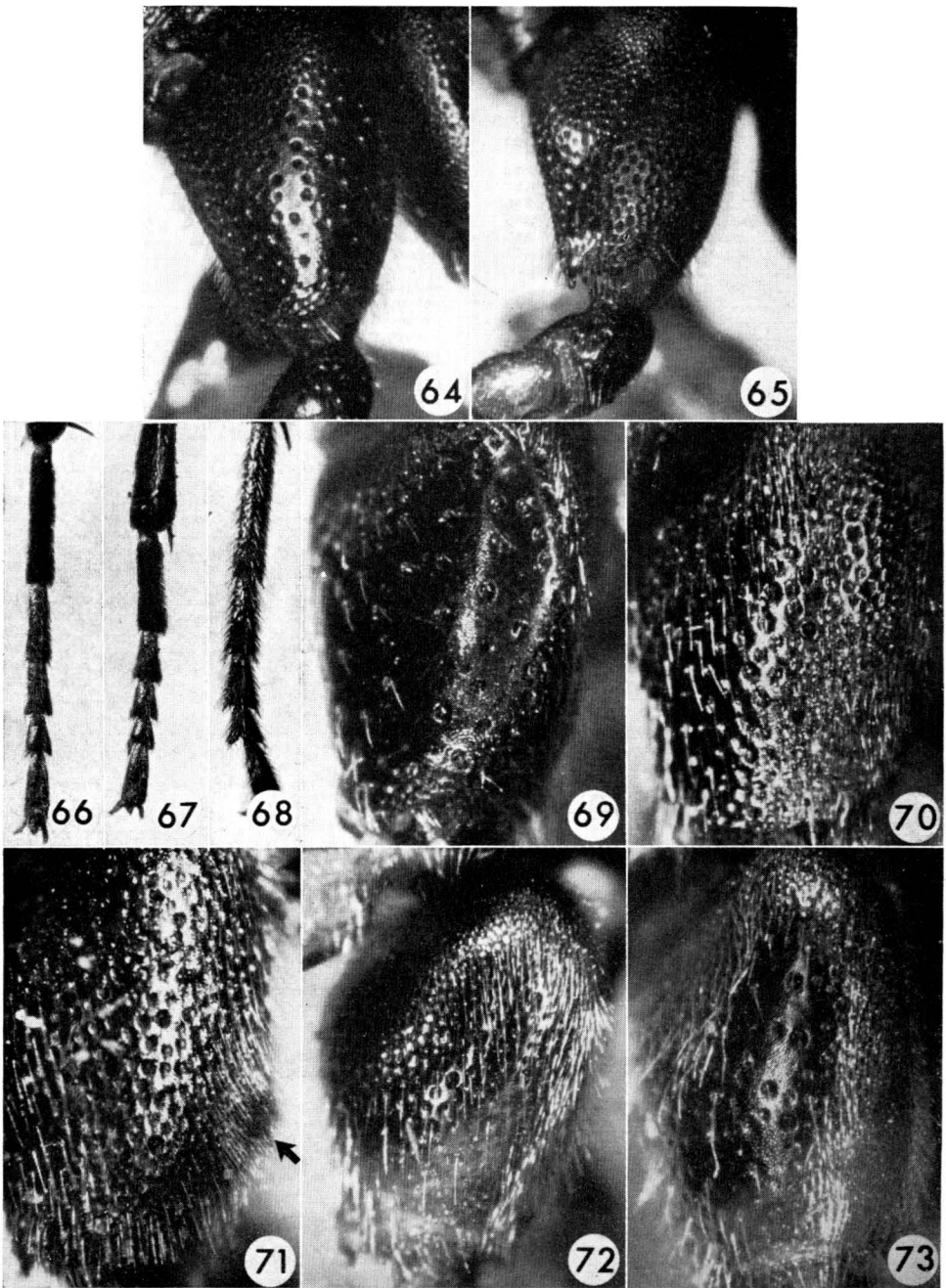
PLATEK

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Figs. 52-55. Ventral view of apices of flagella (females) of two pairs of very similar species. 52, *Ichneumon homorus* n. sp. and 53, *Ichneumon feriens* n. sp.; 54, *Thyrateles caliginops* n. sp. and 55, *Ichneumon caliginosus* Cresson. Figs. 56 and 57. Lateral view of femora II of *Ichneumon artemis* Viereck, ♀ and *Ichneumon similis* Provancher, ♀.



Figs. 58-63. Sculpture of *Ichneumon* and *Thyrateles*. 58, *T. procax* (Cresson), ♀, 2nd tergite; 59, same species, ♂, 4th tergite; 60, *I. winkleyi* Viereck, ♀, 4th tergite; 61, *I. trizonatus* Provancher, ♀, 4th tergite; 62, *I. fuscifrons* Cresson, ♀, mesoscutum; 63, *I. winkleyi* Viereck, ♀, mesoscutum.



Figs. 66-68. Tarsi III of *Thyrateles* (females). 66, *T. camelinops* n. sp.; 67, *T. mormonus* (Cresson); 68, *T. procax* (Cresson). Figs. 64 and 65, 69-73. Ventral view of coxae III of *Ichneumon* (females). 64, *I. annulatorius* Fabricius; 65, *I. glaucopygus* n. sp.; 69, *I. nearcticivernus* Heinrich; 70, *I. computatorius* Mull.; 71, *I. volesus* Cresson; 72, *I. creperus* Cresson; 73, *I. oblitus* n. sp. (The arrow on fig. 71 indicates the position of the scopa, situated on a small gibbosity.).

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