

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

Part V

**Synopsis of the Ichneumonini: Genera *Protopelmus*,
Patrocloides, *Probolus*, *Stenichneumon*, *Aoplus*,
Limonethe, *Hybophorellus*, *Rubicundiella*,
Melanichneumon, *Stenobarichneumon*, *Platylabops*,
Hoplismenus, *Hemihoplis*, *Trogomorpha***

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24. Genus *Protopelmus* Heinrich

Protopelmus Heinrich, 1959, Proc. Ent. Soc. Wash., 61:200.

Type-species.—*Trogus atrocoeruleus* Cresson. Monobasic.

An amblypygous genus, related to *Hepiopelmus* Wesmael in the shape of gastrocoeli with rather distinct thyridia, the tendency to form an elevated scutellum, the punctured, non-striated postpetiole, and biologically by parasitism on Arctiidae. It differs from *Hepiopelmus* mainly by the stronger sclerotization of sternites which are not partially membranous, by the more abbreviated propodeum, by the area superomedia which is distinctly raised above the level of the surrounding horizontal part of the propodeum, by the much more highly elevated scutellum and by the presence of distinct notauli in the anterior third of the mesoscutum.

Evidently a thermophilous genus of neotropical origin reaching the southeastern United States in Texas, Florida and Louisiana.

The single known species is a very handsome, metallic-blue insect which by color, general appearance and size reminds one strongly of a *Tricyphus* or a *Catadelphus*.

Protopelmus atrocoeruleus (Cresson)

Trogus atrocoeruleus Cresson, 1868, Trans. Amer. Ent. Soc., 11:62, ♀.

Protopelmus atrocoeruleus Heinrich, 1959, Proc. Ent. Soc. Wash., 61:200, ♀ ♂.

Types

Holotype.—♀, Louisiana. Lost.

Neotype.—♀, Florida, Ft. Pierce, ex *Ecpantheria deflorata* (F.), 20.V.1957, A. S. Gellime. U.S.N.M.

Neallotype.—♂, Texas, Victoria, ex *Ecpantheria muzina* Oberth. I. D. Mitchell. U.S.N.M.

Hosts

Ecpantheria deflorata (F.) and *Ecpantheria muzina* Oberth. (Arctiidae).

Distribution

Louisiana, Florida, Texas.

¹Parts I and II of this paper were published as Supplements 15 and 18 accompanying Volume XCII and Parts III and IV as Supplements 21 and 22 accompanying Volume XCIII of *The Canadian Entomologist*. The pagination of Part V is continuous with that of Part IV. Unless otherwise specified, footnote, figure and table references apply only to the part in which they are found.

Female

Uniformly bluish black; wings strongly infuscated; pleura and propodeum brighter metallic-blue tinted than the rest; flagellum black without annulus; length 23 mm.

Flagellum.—Bristleshaped, considerably attenuated and acutely pointed at apex, not widened beyond middle, with 45 segments, the first about four times as long as wide, the eleventh square. Black.

Head.—Temple and cheek profile strongly narrowed, with straight outlines; temples and occiput sloping down immediately and steeply from the hind margin of eyes and ocelli; frons distinctly concave; malar space almost as long as width of base of mandible; mandibles normal, the upper tooth scarcely longer than the lower. Bluish-black.

Thorax.—Mesoscutum somewhat convex, densely punctured and alutaceous, opaque; anterior third of notauli distinct; scutellum very strongly elevated above postscutellum, rather short, apically truncate with rounded border and almost vertical slope, dorsally slightly convex, densely punctured; propodeum short; area superomedia somewhat raised above the level of the surrounding part of propodeum, wider than long, distinctly narrowed toward apex which is slightly emarginated, laterally somewhat bulging outward in the anterior part, anterior margin medially curved backward, thus shaped like a heart with a truncated apex. Bluish-black, pleura and propodeum more distinctly metallic-blue tinted than the rest.

Legs.—Moderately slender; coxae III densely punctured. Black.

Abdomen.—Amblypygous, oval, second tergite wider than long, the third more than twice as wide as long; median field of postpetiolus fairly distinct, densely punctured as are the lateral fields; gastrocoeli moderately impressed, of normal, triangular outline, their interval about as wide as one of them, with narrow, but distinct thyridia; tergites 2 and 3 very finely and very densely punctured, opaque. Bluish-black.

Male

Bluish-black; scutellum and marks on tergites 1-4 yellow; length 20 mm.

The following are yellow: face, clypeus, subalarum, tegulae, scutellum, postscutellum, spot at the end of areae spiraculiferae, tibiae I and II and segments 1-4 of tarsi I and II (all except the narrowly black apex), outer side of tibiae III (except apex), large, apico-lateral marks on postpetiolus, the second tergite (except the gastrocoeli, their interval, the narrow, apical margin of the tergite and a median, longitudinal stripe which is narrowed or interrupted at the base), large, lateral marks on the third tergite and small, lateral spots on the fourth tergite.

Remarks

It seems that the metallic-blue tint of this species tends to diminish or even vanish in old specimens.

25. *Patrocloides* Heinrich

Patrocloides Heinrich, 1961, Can. Ent. Suppl. 15 : 16.

Type-species.—*Amblyteles perluctuosus* Provancher.

Agrees with *Patroclus* Cresson in some of the main characters, as in the large, transverse gastrocoeli with narrowed interval and with large, wide thyridia, and in the amblypygous apex of abdomen of females. Differs from *Patroclus* by the

claws which are not (as in the type-species of the latter genus, *Patrochus nigroaeruleus* (Cresson) strongly and densely pectinate the whole length from the base to the beginning of the apical curve, but have either no pectination at all (as in *perluctuosus*), or a few, inconspicuous, short projections at the very base only (as in *Patrocloides montanus* (Cresson)). Besides, in *Patrocloides* the flagellum of the male has normal, clearly visible and clearly defined tyloides, while the flagellum of the male of *Patrochus* does not show shaped tyloides at all (as in *Platylabus* Wesmael and *Tricholabus* Thomson).

The group of species which I propose to associate generically under the new name includes the European *Ichneumon chalybeatus* Gravenhorst (closely related to *perluctuosus*), *Ichneumon sputator* Fabricius, *Stenichneumon ceauréi* Heinrich, the American *perluctuosus* Provancher, *montanus* Cresson and *Patrochus walleyi* Heinrich. All these species are inhabitants of the Temperate Zones of the Palaearctis and Nearctis, while *Patrochus nigroaeruleus* Cresson evidently originated in the Neotropics, not reaching even the southern border of the United States. Thus, also from the point of view of zoogeography, a very close relationship is apparently not to be expected.

Flagellum.—Bristleshaped, slender, very strongly attenuated and acutely pointed at apex, not widening beyond middle.

Head.—Temple, and especially cheek, profiles considerably narrowed, with straight or nearly straight outlines; cheeks narrow between eyes and carina genalis; middle of face scarcely convex; mandible normal.

Thorax.—Mesoscutum convex, somewhat elongate, longer than medially wide; scutellum rather strongly raised above postscutellum; area superomedia large, quadrangular or somewhat wider than long; costulae obsolete or subobsolete.

Legs.—Moderately slender; coxae III densely punctured, never with scopa; claws not pectinate, in some species with a few, short, inconspicuous projections at the very base.

Abdomen.—Of female longish, nearly, but not as fully amblypygous as in *Patrochus*, as the last tergites are not abbreviated as in the mentioned genus; median field of postpetiolus usually prominent at the elbow of the first segment, flattened out toward apex of postpetiolus, longitudinally striate; gastrocoeli very large, deep, transverse, with strongly narrowed interval; thyridia large, wide and oblique.

Color.—Black with bluish tint, with white-banded tibiae and tarsi, sometimes with white markings on tergites, or uniformly metallic blue; in another chromatic group plain black with the second and third tergite brown or yellowish.

Biology.—I have not found females in hibernation yet. Some collecting data, however, seem to indicate that females do hibernate, but these data are not so early in the spring that hibernation could be regarded as a proven fact. The genus seems to be specialized on Plusiinae as hosts; all European and American species, except *walleyi* and *chalybeatus*, have been reared from *Syngrapha* and *Plusia* species.

Key to the Species of *Patrocloides* Heinrich of America North of Mexico

Females and Males

1. Second and third tergites reddish yellow or yellowish. (Head and thorax black; legs black, tibiae and tarsi yellow with slight orange tint; length, ♀♀, 15-16 mm., ♂♂, 16-17 mm.) 2. *walleyi* (Heinrich)
Abdomen uniformly black or blue. 2

Head.—Temple profile not narrowed, with curved outline; cheek profile distinctly narrowed, with slightly curved outline; malar space half as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, orbits around eyes (always interrupted at malar space, narrowed or sometimes interrupted at temple region).

Thorax.—Mesoscutum slightly convex, strongly and moderately densely punctured, shiny; notauli basally indicated; scutellum distinctly raised above postscutellum, dorsally fairly flat; carination of propodeum sharp and complete; area superomedia large, almost as wide as long, receiving the costulae in the middle, slightly narrowed toward base, horseshoe-shaped or hexagonal. Black; the following are yellow: collar, pronotal ridge (sometimes apically only), usually pronotal base, subalarum, tegulae, scutellum, postscutellum, marks of varying size on propodeum (covering often the entire areae dentiparae, most of the areae spiraculiferae, areae posteroexternae and area posteromedia except apex) and marks on apex of areae metapleurales; rarely border of prepectus yellow marked.

Legs.—Moderately stout. Yellow; the following are black: coxae III, femora III, apex of tibiae III and sometimes femora II dorsally in part; predominant color of femora I and II dorsally rufous tinted; sometimes base of coxae I and II narrowly black; sometimes coxae III with yellow, dorsal mark.

Abdomen.—Median field of postpetiolus moderately clearly defined, with vestiges of longitudinal striation, or rather smooth, always with a few scattered punctures toward apex; gastrocoeli triangular, fairly deeply impressed with distinct thyridia. Yellow; basic color of last three tergites ferruginous; tergites 1-6 with broad, black, basal bands which on the fifth tergite, and sometimes on the fifth and sixth, tend to occupy most of the surface.

Female

Ferruginous, without yellow or white markings; head and thorax with black pattern; tibiae III apically black; tergites 1-4 with black basal bands; flagellum slender, bristleshaped, without white annulus; coxae III with scopa; length 10-12 mm.

Flagellum.—Bristleshaped, rather slender, ventrally flattened beyond middle but not widened, considerably attenuated and pointed at apex, with 40-43 segments, the first not quite 2.5 times as long as wide, the tenth approximately square. Ferruginous, infuscated toward apex.

Head.—Temple profile not narrowed, with curved outline; cheek profile distinctly narrowed, with slightly curved outline; malar space about as long as width of base of mandible; cheeks wide between eyes and carina genalis. Ferruginous; supraantennal cavities and sometimes ocellar region black.

Thorax.—Mesoscutum scarcely convex, fairly strongly and moderately densely punctured, shiny; notauli basally distinct; scutellum slightly raised above postscutellum, dorsally flat; carination as in male. Ferruginous; the following are black; prosternum, propleura predominantly or entirely, prepectus, middle and apex of mesosternum or mesosternum entirely, band on mesopleura below subalarum and mark in front of coxae II (rarely mesopleura predominantly), areae coxales and scutellar and propodeal sutures broadly.

Legs.—Moderately stout; coxae III ventrally polished, with scattered punctures and with distinct scopa. Ferruginous including coxae and trochanters; coxae III sometimes dorsally black marked, rarely predominantly black; apex of tibiae III black; rarely the very apex of femora III slightly infuscated.

Flagellum.—With short-oval, or short-bacilliform tyloides on segments 8-16, or 17, the longest not reaching bases and apices of segments. Black, sometimes with white annulus; scape often ventrally white, or white marked.

Head.—Black; face and clypeus white, medially more or less extensively black; sometimes base of mandibles white, rarely white mark on lower part of cheeks.

Thorax.—White pattern as in female.

Legs.—All tibiae with white annulus beyond base, tibiae I and II often predominantly white with strongly restricted infuscation at bases and apices; the following are also white: coxae I and II partially, often predominantly, sometimes apico-ventral mark on coxae III, sometimes ventral marks on trochanters I and II, femora I and the apex of femora II on anterior side, segments 1-3, or 4 of tarsi I and II except their infuscated apices, segments 1-2, or 3, or 4 of tarsi III medially; apical segments of tarsi I and II usually brown.

Abdomen.—Sculpture of postpetiolus more often coarsely rugose than striate, also sculpture of second tergite usually coarsely rugose in basal part. Uniformly black.

2. *Patrocloides walleyi* (Henrich), new combination

Patrocclus walleyi Heinrich, 1956, Canad. Entom., 88: 486, ♀ ♂.

Types

Holotype.—♀, Ontario, Smoky Falls, 16.VI.1934, G. S. Walley. C.N.C. No. 6407.

Allotype.—♂, Ontario, Smoky Falls, 8.VII.1934, G. S. Walley. C.N.C. 6407.

Paratypes.—1 ♀, Ontario, Ogoki; 3 ♀ ♀, 1 ♂, Northwest Territories, Norman Wells, Fort Smith. C.N.C.; 1 ♀, Ontario, Smoky Falls. C.G.H.

Distribution

Ontario, Northwest Territories, Quebec (Rupert House) (C.N.C.).

Female

Head and thorax black, including scutellum; abdomen black, second and third tergites reddish-yellow, their apical borders very narrowly infuscated; legs black, tibiae and tarsi uniformly yellow with a slight orange tint; flagellum with broad yellowish annulus; length 15-16 mm.

Flagellum.—Bristleshaped, slender, considerably attenuated, with acute apex, ventrally distinctly flattened beyond middle but not widened, with 40 segments, the first 2.7 times as long as wide, the twelfth approximately square, the widest about as wide as long. Black with yellowish annulus on segments 3 or 4 or 5 to 11 or 12.

Head.—Temple and cheek profiles considerably narrowed, with straight outlines; malar space somewhat longer than width of base of mandible; face and base of clypeus strongly and very densely punctured, median field of the former scarcely convex. Uniformly black.

Thorax.—Mesoscutum convex, strongly and very densely punctured, opaque; notauli obsolete; scutellum strongly raised above postscutellum, densely punctured, with rather steep apical slope; area superomedia large, square, sometimes a little longer than wide; costulae obsolete or subobsolete. Uniformly black.

Legs.—Moderately slender. Black; tibiae and tarsi uniformly orange-yellow.

Abdomen.—Median field of postpetiolus clearly defined, usually longitudinally striate, sometimes irregularly rugose. Black, second and third tergites reddish-yellow, their apical borders usually narrowly infuscated.

Male

Head and thorax black, including scutellum, tegulae and subalarum yellow; abdomen black, second and third tergites yellowish, their apices and sometimes also bases a little more extensively infuscated than in females; flagellum without annulus; yellow color of legs lighter and somewhat more extended than in female; length 16-17 mm.

Flagellum.—With bacilliform tyloides on segments 8-18. Black, sometimes base obscure ferruginous; scape ventrally yellowish marked.

Legs.—Femora I usually yellowish, dorsally pale rufous, sometimes basally and dorsally in part blackish infuscated, apices of femora II and III yellowish; tibiae and tarsi lighter yellow than in female.

3. *Patrocloides montanus* (Cresson), new combination***Distribution***

Transcontinental in Canadian and Transition Zones, California and Arizona (C.H.T.).

Female

Metallic blue; tibiae and tarsi black, tibiae I ventrally ivory; flagellum black, in eastern populations with extensive white annulus, in western without, or sometimes with restricted, white annulus; wings rather clear in eastern, infuscated in western, populations; length 13-15 mm.

Flagellum.—Bristleshaped, very slender, extremely attenuated and acutely pointed at apex, ventrally indistinctly flattened beyond middle and not at all widened, with 39-41 segments, the first more than three times as long as wide. Black; in eastern populations with extensive white annulus, covering 6-9 segments, in western populations without or with restricted white annulus.

Head.—Temple profile distinctly, cheek profile strongly, narrowed, the former with nearly straight, the latter with straight, outline; malar space fully as long as width of base of mandible. Metallic blue.

Thorax.—Mesoscutum convex, strongly and rather densely punctured, shiny; notauli obsolete; scutellum strongly raised above postscutellum with steeply rounded apical slope, dorsally densely punctured and convex, laterally carinate at extreme base; area superomedia usually square; costulae obsolete. Metallic blue.

Legs.—Moderately slender; coxae III ventrally densely punctured. Metallic blue; tibiae and tarsi black; apex of femora I and the tibiae I ventrally ivory.

Abdomen.—Median field of postpetiolus strongly prominent at the elbow of first segment, less clearly defined in posterior part, longitudinally striate. Metallic blue.

Male

Chromatically exactly like female, except that the flagellum is always black without annulus; length 16-20 mm.

Flagellum.—With long, narrow, bacilliform tyloides on segments 7-21 or to 22, the longest reaching from bases nearly to apices of segments. Black.

Area superomedia often wider than long; otherwise like female.

3a. *Patrocloides montanus montanus* (Cresson)

Ichneumon montanus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 141, ♀ ♂.

Patroclus montanus montanus Townes, 1951, Syn. Cat., p. 291, ♀ ♂.

Types

Holotype.—♀, Colorado. A.N.S.

Host

Syngrapha sp. (C.N.C.).

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide, mostly in Canadian Zone". Inhabits grassy fields and clearings. As far as I could observe, at least in northern parts of Transition Zone not less common than in Canadian.

Female

Flagellum with extensive white annulus, covering at least 6, usually 7 or 8, sometimes 9 segments (5 or 6 or 7 to 13 or 14); wings nearly clear.

Male

Wings less infuscated; otherwise like *montanus occidentalis*, new subspecies.

Remarks

Unfortunately, the type specimen of *montanus* Cresson comes from Colorado, a region where the eastern and western subspecies meet and both forms evidently intermingle. This becomes evident in the series in C.H.T. There are six ♀ ♀ from Arizona and California. None of these specimens has a white annulus on flagellum and all thus clearly represent the western *montanus occidentalis*. Out of seven ♀ ♀ from Colorado, however, four have a restricted annulus, the remaining three have none. Cresson's type specimen has a slightly restricted annulus too. Its position would be arbitrary and intermediate between the two subspecies, though perhaps closer to the eastern than to the western. Following the decision of the first reviser I considered it as representative of the former.

3b. *Patrocloides montanus occidentalis*, new subspecies

Patroclus montanus, new subspecies, Townes, 1951, Syn. Cat., p. 291, ♀ ♂.

Types

Holotype.—♀, Colorado, Denver, 11.VI.1948, H., M., G. and D. Townes. C.H.T.

Distribution

According to H. Townes 1951: "Pacific to Continental Divide in Canadian and Transition Zones."

Female

Flagellum without (type specimen), or with restricted, white annulus, covering 2-4 segments only (9 or 10 to 11 or 12); wings more or less intensively infuscated.

Male

Wings more infuscated; otherwise like *montanus montanus*.

26. Genus *Probolus* Wesmael

Fig. 26

Probolus Wesmael, 1844, Acad. Sci. Bruxelles Nouv. Mém., 18: 150.

Type-species.—(*Ichneumon alticola* Gravenhorst) = *Ichneumon culpatorius* Linnaeus. Monobasic.

A very distinct genus, in general appearance similar to *Ctenichneumon* Thomson but uniquely distinguished by the obsolete carination of propodeum and peculiar structure and sculpture of first segment of abdomen; the latter bears on the elbow a little conical median elevation, and the postpetiolus is irregularly, coarsely rugose-punctate and has no median field (Fig. 26). Both characters suggest a relationship to the Eurylabini, but I am coming more and more to the conclusion that this is a case of convergency rather than of true affinity. All other characters, including the shape of the ovipositor, agree more with the tribe Ichneumonini than with *Eurylabus*. We may perhaps assume that *Probolus* represents a link between the two tribes, but even then the genus comes closer to the former than to the latter. I never found a specimen of *Probolus* in hibernation, but Berthoumieu recorded females of both European species as hibernating. If this is correct, it would be an additional and rather strong reason for placing the genus in the tribe Ichneumonini rather than in the Eurylabini. It seems to be a faunistic peculiarity of the Nearctic region that it shares all other tribes of the subfamily with the Palaearctic region except the Eurylabini (*sensu stricto*), which is not represented by a single species.

Flagellum.—Of female bristleshaped, more or less slender, extremely attenuated and acutely pointed at apex, ventrally flattened beyond middle (the flat however without a bordering edge on inner side and sometimes a little widened; of males not nodulose, with a normal row of oval tyloides.

Head.—Transverse; temple and cheeks but moderately narrowed, with slightly curved outlines; clypeus slightly convex transversally.

Thorax.—Mesoscutum slightly convex, shiny, rather sparsely punctured, without notauli; scutellum somewhat raised above postscutellum, moderately convex; carination of propodeum incomplete; area superomedia faintly indicated by a slight convexity of the horizontal part, but not defined by carinae.

Legs.—Moderately slender; coxae without scopa.

Abdomen.—Apex of female abdomen amblypygous; petiolus dorsally flattened and somewhat widened; elbow of first segment bearing a little, conical elevation; postpetiolus without median field, its dorsal surface as well as the lateral surface of the first segment coarsely, irregularly rugose-punctate; gastrocoeli but slightly indicated, subobsolete; no thyridia; sternites strongly sclerotized as in *Ctenichneumon*, the second sternite usually without distinct plica; tergites of female shiny, their anterior tergites fairly sparsely punctured; anterior tergites of males rather coarsely and densely sculptured, scarcely shiny.

Color.—Color pattern and chromatic sexual dimorphism as in *Ctenichneumon*; abdominal segments beyond first usually red in females, always black in males. Metallic-blue species occur in the Himalayas.

Distribution.—Temperate Zones of the New and Old Worlds.

Biology.—According to Berthoumieu (*"Ichneumonides de l'Europe et des pays limitrophes, p. 401"*) females hibernate. I have not found hibernating females nor do my collecting data confirm the fact of hibernation. I have, however, seen one female from Pennsylvania in C.H.T. dated May 10th, 1945, a datum which seems to indicate that the specimen hibernated.

The European type-species was reared from Noctuidae of the genera *Hadena* and *Abrostola*. No host record yet from America.

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

Females

1. Abdomen black. see *expunctus* (Cresson)
variety 1
- Abdomen red. 2
2. First flagellar segment about 1.5 times as long as wide, the fifth square (Fig. 48),
the widest somewhat wider than long. (Length 12-13 mm.) ... 2. *expunctus* (Cresson)
- First flagellar segment fully 2 times as long as wide, the twelfth square (Fig. 50),
none wider than long. (Length 12-15 mm.) ... 1. *detritus* (Brullé)

Males

1. Legs, including coxae, rufous; tibiae and tarsi III predominantly black. (Length
14-16 mm.) ... 1. *detritus* (Brullé)
- Basic color of legs black, tibiae and tarsi I and II predominantly, tibiae III usually
dorsally more or less extensively white. (Length 12-15 mm.) ... 2. *expunctus* (Cresson)

1. *Probolus detritus* (Brullé)

Fig. 50

Ichneumon detritus Brullé, 1846, Hist. Nat. Ins. Hym., 4: 302, ♀.

Ichneumon illaetabilis Cresson, 1877, Amer. Ent. Soc. Trans., 6: 190, ♂.

Ichneumon detritus Townes, 1961, Proc. Ent. Soc. Wash., 63: 107.

Types

Holotypes.—*Ichneumon detritus* Brullé, ♀, "Caroline l'herminier", Musée National d'Histoire Naturelle, Paris. *Ichneumon illaetabilis* Cresson, ♂, Georgia. A.N.S.

Distribution

According to H. Townes 1951: (*illaetabilis*) "Massachusetts, New York, Georgia". New records, ♀ ♀: Rhode Island, Pennsylvania, North Carolina, South Carolina (C.H.T.); Ontario (C.N.C.). ♂ ♂: Maine (C.G.H.); Ontario, Quebec (C.N.C.).

Preamble

The identity of the type of *detritus* Brullé with the female treated below has been established by H. Townes who examined the type. The association of the sexes, as given below, is based (1) on the presumption that only two species of this genus occur in eastern North America, (2) on the conviction that the association of sexes of the other species, *expunctus* Cresson, is satisfactorily confirmed. The pattern of chromatic sexual dimorphism which involves abdomen and legs, but in an opposite way, seems to be startling: the abdomen is red in the female, black in the male, while the legs are red in the male, black in the female. The European type-species, however, shows an exact parallel. I think that both species are geographical vicariants, but perhaps far enough differentiated to be considered as distinct species.

Female

Black, usually including scutellum, which is sometimes white marked; abdomen beyond first segment red; flagellum more slender than in *expunctus*: first flagellar segment fully twice as long as wide, about the twelfth square, none

wider than long; femora III relatively a little longer than in *expunctus*; the second tergite more strongly punctured; length 12-15 mm.

Flagellum.—Bristleshaped, slender, with relatively long basal segments (Fig. 50), extremely attenuated and acutely pointed at apex, ventrally flattened beyond middle, but not at all widened, with 41-46 segments, the first fully twice as long as wide, about the twelfth square. Black with white annulus on segments 4 or 5 to 11, 12 or 13.

Head.—As described in the treatment of the genus. Black; vertical orbits usually with white dot.

Thorax.—As described in the treatment of the genus. Black, including scutellum, which is not seldom with a white or brownish mark.

Legs.—Fairly slender. Uniformly black, including entire tibiae I.

Abdomen.—First segment and gastrocoeli as described in the treatment of the genus; second tergite fairly strongly and comparatively densely punctured from base to about apex; third tergite somewhat less strongly, but also distinctly, punctured. First segment black, the rest red.

Male

Black, including abdomen, scutellum white; legs including coxae and trochanters rufous, tibiae III (sometimes except base) and the tarsi III black; length 14-16 mm.

Flagellum.—With 39 or 40 segments, the first about twice as long as wide, and with short-oval tyloides on segments 8 or 9 to 15 or 16. Black, including scape.

Head.—Black; white dot on vertical orbits and sometimes a short white line on about middle of outer orbits.

Thorax.—Black; the following are white: subalarum, tegulae partially, scutellum except base narrowly, postscutellum.

Legs.—Rufous; tarsi and tibiae III black, the latter sometimes gradually turning into obscure rufous toward base; sometimes also apex of femora III narrowly black.

Abdomen.—Sculpture of tergites 1-3 rather coarse, irregularly rugose-punctate, subopaque. Uniformly black.

2. *Probolus expunctus* (Cresson)

Fig. 49

Ichneumon obliteratus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 147, ♂. (Preocc.)

Ichneumon expunctus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 290. (New name.)

Ichneumon indistinctus Provancher, 1875, Nat. Canad., 7: 23, 75, ♀. New synonymy.

Types

Holotypes.—*Ichneumon obliteratus* Cresson, ♂, Colorado. A.N.S. *Ichneumon indistinctus* Provancher, ♀, Quebec.

Distribution

According to H. Townes 1951 (*expunctus*): "Quebec, Ontario, New York, Ohio, Colorado"; (*indistinctus*): "Quebec, New York". New records: Maine (C.G.H.); Manitoba, British Columbia (Robson), perhaps Alaska (see remark at the end) (C.N.C.).

Preamble

Females are rather similar to *detritus* (Brullé), differing mainly in flagellar proportions and slightly by a little stouter femora III and by finer sculpture of anterior tergites. Males are strongly different from *detritus* by color of legs.

The association of sexes was fairly well established by common collecting localities and data of males and females; besides, the short first flagellar segment of the male matches that of the female flagellum well.

Male

Black, including abdomen and basic color of legs; scutellum white; tibiae and tarsi I and II predominantly and usually tibiae III dorsally in part white; flagellum sometimes with white annulus; length 12-15 mm.

Flagellum.—With 41-43 segments (the first about 1.5 times as long as wide) and with oval tyloides on segments 7 or 8 to 14, 15 or 16. Black, sometimes (as in the type specimen) with extensive dorsal annulus covering about 8-11 segments.

Head.—Black; white dot on vertical orbits and usually a short, white line on about middle of outer orbits.

Thorax.—Black; the following are white: collare, subalarum, apex of pronotal ridge, regulae partially, scutellum and usually postscutellum.

Legs.—Black with extensive white pattern; the following are white: apices of femora I and II, tibiae I except ventral, longitudinal black line, tarsi I except segment 5 or 4 and 5, tibiae II dorsally, usually except narrowly at apex, basal segments of tarsi II dorsally, apical margin of femora III, tibiae II usually dorsally from base to beyond middle, sometimes at base only; more rarely tibiae III entirely black; rarely trochanters I apically white marked.

Abdomen.—Sculpture of tergites 1-3 fairly coarse, but on the average not quite as coarse and dense as in *detritus*. Uniformly black.

Female

Black, scutellum predominantly white; abdomen beyond first segment red; flagellum stouter than in detritus: first flagellar segment about 1.5 times as long as wide, the fifth or sixth square, the widest nearly 1.5 times as wide as long; femora III relatively a little shorter than in detritus; the second tergite less strongly punctured; length 12-13 mm.

Flagellum.—Bristleshaped, fairly stout, the basal segments rather short, extremely attenuated and acutely pointed at apex, ventrally flattened and slightly widened beyond middle, with 41-44 segments, the first about 1.5 times as long as wide, the fifth or sixth square (Fig. 49), the widest nearly 1.5 times as wide as long. Black, with white annulus on segments 3 or 4 to 10, 11 or 12.

Head.—As described in the treatment of the genus. Black; vertical orbits usually with white spot; sometimes short white line on about middle of exterior orbits.

Thorax.—Black; dorsal surface of scutellum entirely or predominantly white.

Legs.—Moderately slender; uniformly black including entire tibiae I.

Abdomen.—Second tergite fairly finely and sparsely, the third still more finely and sparsely, sometimes indistinctly, punctured. First segment black, the rest red.

Variety 1. ♀

One female from Alaska (King Salmon) in the C.N.C. has a uniformly black abdomen, but agrees in flagellar structure with *expunctus*, while the sculpture of the first tergite is coarser than normal for this species. I suppose it represents a mutant of *expunctus* rather than a new species.

27. Genus *Stenichneumon* Thomson

Figs. 4, 48

Stenichneumon Thomson, 1893, Opusc. Ent., fasc. 8, p. 1964.

Type-species.—(*Ichneumon pictorius* Gravenhorst) = *militarius* Thunberg.
Design. by Viereck, 1914.

Myermo Cameron, 1901, Ann. Mag. Nat. Hist., 7: 523.²

Type-species.—*Myermo rufipes* Cameron. (Monobasic.) *Aoplus* Townes.
1951, Syn. Cat., p. 290/91. (Partim.)

A group of large, comparatively long-bodied species which agree in most essential characters with *Ichneumon* Linnaeus, but differ by the very large, deep and strongly widened gastrocoeli with considerably narrowed interval and with very large, oblique thyridia. This structure of gastrocoeli approaches the *gracilicornis* group of *Ichneumon* which is not always easily distinguished from *Stenichneumon*, although I think that these two groups are not even closely related. In *Stenichneumon* the thyridia are more oblique than in the *gracilicornis* group of *Ichneumon*, and wider in transverse measurement, the abdomen of females tends to be more elongate and the color is different (see below).

Myermo Cameron is based on an oriental species which differs from the type of *Stenichneumon* Thomson morphologically only by a gibbosity on the elbow of the first segment and by a slightly more convex clypeus. A tendency for a more or less pronounced elevation of the base of the median field of postpetiolus is evident in several species of the genus *Stenichneumon*. It is well pronounced (though individually variable to a certain degree) in the American species *S. palidipennis* Viereck and *S. salvus* Cresson. We would have to classify these species as belonging to the genus *Myermo* Cameron if we considered the elevation on the elbow of the first segment as a distinctive generic character. I do not feel inclined to do so, and even less, as the degree of elevation varies not only specifically but even individually considerably.

H. Townes has synonymized *Stenichneumon* with *Aoplus* Tischbein. I think these are two distinct genera, well separated by sculpture of postpetiolus, depth of gastrocoeli and by biology.

Flagellum.—Of females always bristleshaped, considerably attenuated and acutely pointed at apex, ventrally sharply flattened beyond middle and sometimes slightly widened; of males, with a comparatively short row (of about 10) of bacilliform tyloides.

Head.—Cheeks and temples never very wide or inflated, usually considerably narrowed; puncturation rather strong and dense; mandibles normal; clypeus slightly convex.

Thorax.—Mesoscutum fairly strongly convex, longer than wide; notauli basally indicated; scutellum more or less considerably raised above postscutellum; area superomedia usually about square, often large, sometimes somewhat longer than wide, or wider than long; costulae obsolete or weak.

Legs.—Fairly slender; coxae of females sometimes with scopa, or scopuliferous gibbosity (Fig. 48).

Abdomen.—Never stout, rather longish and approaching a parallel-sided shape, the second tergite being longer than wide; apex strongly oxygygous, tip of ovipositor of females projecting; median field of postpetiolus usually well defined, with a tendency to project more or less sharply at elbow of the first segment, sometimes forming even a conical elevation at this point; gastrocoeli deep and very large, transverse, with strongly narrowed interval; thyridia very large,

²See also Townes, Townes and Gupta, 1961, A Catalogue and Reclassification of the Indo-Australian Ichneumonidae, p. 345. American Entomological Institute, 5950 Warren Road, Ann Arbor, Michigan, U.S.A.

oblique, with wide longitudinal diameter; median field of postpetiolus longitudinally striate (except in individual mutants in which the striation may be altered to irregular rugosity).

Color.—Abdomen uniformly black, red or yellowish, or combining two of these colors; without light anal marks. (In Oriental species sometimes tergites white banded). No, or restricted, sexual dimorphism.

Biology.—In contrast to the genus *Aoplus* which parasitizes mainly Geometridae, the genus *Stenichneumon* feeds on Noctuidae, particularly Plusiinae. Females hibernates as adults.

Key to the Species of *Stenichneumon* Thomson of America North of Mexico

Females

1. Coxae III ventrally with toothlike, hairy projection (Fig. 48). (Wings distinctly infuscated; head, thorax, abdomen and legs III uniformly black. Length 14-18 mm.) 2 *b. culpator cincticornis* (Cresson)
- Coxae III without toothlike projections. (Wings not infuscated; head, thorax, abdomen and legs III not uniformly black.) 2
2. Femora III black. (All tibiae with white annulus; scutellum white; elbow of first segment with or without a conical or pyramidal bump.) 3
- Femora III rufous. (Conical or pyramidal bump on elbow of first segment.) 5
3. Two irregular, white or ivory lateral marks on disk of second tergite. (Length 15-16 mm.) 3 *b. salvus bioculatus* (Cresson)
- Abdomen uniformly black. 4
4. Apical border of ventral side of coxae III internally somewhat produced and slightly elevated (Figs. 5, 8); conical or pyramidal bump on elbow of first segment; tarsi I and II and facial orbits never white marked. (Length 15-16 mm.) 3 *b. salvus bioculatus* (Cresson), variety
- Apical border of ventral side of coxae III simple (Figs. 7, 10); no conical or pyramidal bump on elbow of first segment, tarsi I and II and facial orbits sometimes white marked. (Length 15-18 mm.) 1 *b. militarius leucopus*, new subspecies
5. Scutellum black or ferruginous; second tergite varying from black to ferruginous, without yellow areas. Predominating color of head, thorax and abdomen varying from black to ferruginous; length 15-16 mm.) 4 *b. pallidipennis* (Viereck)
- Scutellum and disc of second tergite laterally or predominantly yellow. (Predominant color of head, thorax and abdomen black or ferruginous.) 6
6. Projecting lip on inner ventral side of apical border of coxae III more pronounced and elevated than in the alternative subspecies (Figs. 5, 8). Predominant color of thorax including mesoscutum, of tergite 1 and tergites 3-7 black. 3 *b. salvus bioculatus* (Cresson), western variety
- Projecting lip on ventral inner side of apical border of coxae III less pronounced and elevated (Figs. 6, 9). Basic color of thorax, including mesoscutum, of tergite 1 and usually of tergites 3-7 ferruginous. 3 *a. salvus salvus* (Cresson)

Males

1. Wings distinctly infuscated; legs III uniformly black; flagellum with white annulus. (Head, thorax and abdomen black; length 14-19 mm.) 2 *b. culpator cincticornis* (Cresson)
- Wings not infuscated; legs III not uniformly black; flagellum without annulus. 2
2. Second and third tergites with yellow pattern or predominantly yellow. 3
- Second and third tergites without yellow pattern. 4
3. Femora III black; second and third tergites basally, apically and sometimes laterally black and with a median, longitudinal, black or infuscated line dividing the yellow color into two patches. (Length 16-18 mm.) 3 *b. salvus bioculatus* (Cresson)
- Femora III rufous; second and third tergites yellow with narrow, black apical bands in typical specimens; usually fourth tergite and mesoscutum partially ferruginous; sometimes yellow pattern of second and third tergites as in the alternative subspecies. (Length 16-18 mm.) 3 *a. salvus salvus* (Cresson)

4. Femora III black; scutellum white. (Tibiae and tarsi with white pattern; length 15-20 mm.) 1b. *militarius leucopus*, new subspecies
 Femora III rufous; scutellum black or ferruginous. (Tibiae and tarsi without white pattern, usually rufous, sometimes tibiae medially yellowish; length 15-17 mm.) 4. *pallidipennis* (Viereck)

1. *Stenichneumon militarius* (Thunberg)

Distribution

Holarctic; in North America according to H. Townes 1951: "Transcontinental in Canadian Zone". New records: Maine (C.G.H.), New York (M.C.Z.).

Female

Head and thorax black, scutellum white; in nearctic populations pronotal ridge, or its apex, and often facial orbits and subalarum, white, or white marked; abdomen always uniformly black; legs black, all tibiae white banded; in nearctic populations often coxae I and II and tarsi I and II white marked; length 15-18 mm.

Flagellum.—Bristleshaped, moderately long, ventrally distinctly flattened beyond middle and somewhat widened, gradually attenuated toward apex and acutely pointed, with 39-42, usually 40 segments, the first about 2.5 times as long as wide, about the twelfth square, the widest 1.5 to 2 times as wide as long. Black, with white annulus on segments 6 or 7 or 8 to 12 or 13, or rarely, to 14.

Head.—Temple profile and cheek profile considerably narrowed, the former with slightly curved, the latter with straight outline; malar space not quite as long as width of base of mandible; clypeus slightly convex. Black; in American populations usually facial orbits white in upper part or entirely.

Thorax.—Mesoscutum convex, densely punctured, subopaque; anterior third of notauli fairly distinct; scutellum strongly raised above postscutellum, apically truncate, dorsally almost flat; area superomedia large, usually approximately square, with somewhat rounded anterior corners, sometimes somewhat wider than long; costulae obsolete or fairly distinct. Black, scutellum white; in American populations also pronotal ridge at least apically, collare and sometimes subalarum partially, white.

Legs.—Moderately slender; coxae III ventrally densely punctured, toward apex on inner side fairly densely haired, but without clearly defined scopae. Black; all tibiae white banded; in American populations sometimes first segment of tarsi I and II medially white.

Abdomen.—Median field of postpetiolus clearly defined, longitudinally striate, not very prominent at the elbow of first segment. Uniformly black.

Male

Head and thorax black, pronotal ridge apically or entirely and the scutellum, white; face and clypeus from almost entirely black to almost entirely white; abdomen always uniformly black; flagellum in European populations, with rare exceptions, with white annulus; in the American subspecies uniformly black; legs black, all tibiae white banded, in American populations usually tarsi, often also coxae I and II white marked; length 15-20 mm.

Flagellum.—With 40-41 segments and with bacilliform tyloides on segments 7, or 8 to 15, 16 or 17.

Distribution of white is described under the subspecies.

1a. *Stenichneumon militarius militarius* (Thunberg)*Ichneumon militarius* Thunberg, 1822, Mém. Acad. St. Petersb., 8: 254, ♀.*Ichneumon pistorius* Gravenhorst, 1829, Ichn. Eur., 1: 231, ♀ ♂.**Types***Holotypes*.—*Ichneumon militarius* Thunberg, ♀, Sweden, Prov. Westmanland (Västmanland), University of Upsala, Sweden. *Ichneumon pistorius* Gravenhorst, ♀, ? location.**Distribution**

Europe.

Female

Black, scutellum white; flagellum and all tibiae white banded; usually no other white markings on head, thorax or legs.

Male

Black, scutellum white; flagellum with white annulus on segments 14-17 or 18; all tibiae white banded; facial orbits, collare and apex of pronotal ridge white; tarsi and coxae not white marked.

1b. *Stenichneumon militarius leucopus*, new subspecies

Figs. 4, 7, 10

Aoplus militarius Townes, 1951, Syn. Cat., p. 290, ♀.*Stenichneumon militarius*, ssp. Heinrich, 1953, Journ. Wash. Acad. Sci., 43: 5, ♀ ♂.**Types***Holotype*.—♀, Maine, Dryden, 13.IX.1951, G. H. Heinrich. C.G.H.*Allotype*.—♂, Maine, Dryden, 14.VII.1952. C.G.H.*Paratypes*.—3 ♀ ♀, 6 ♂ ♂, Maine; 1 ♀, Quebec. C.G.H.; 2 ♀ ♀, Quebec, 1 ♂, Ontario, 3 ♀ ♀ British Columbia. C.N.C. No. 7292.**Host***Phusia* sp. in Maine (C.G.H.).**Distribution**

North America; according to H. Townes 1951: "Transcontinental in Canadian Zone". New records in northern part of Transition Zone: Maine (C.G.H.), Quebec, Cascapedia and Gaspé; New Brunswick (C.N.C.).

FemaleLike *militarius militarius*: Black, scutellum white; flagellum and all tibiae white banded; differing by more extensive white markings; additionally white: collare, pronotal ridge apically or almost entirely, usually upper part of facial orbits more or less extensively, often mark on subalarum and in about 50% of specimens dorsal median mark on segments I of tarsi I and II.**Male**Black, scutellum white; all tibiae, but not flagellum, white banded; face more extensively white than in *militarius militarius*, sometimes entirely white; clypeus laterally more or less extensively, pronotal ridge entirely white; tarsi partially white.*Head*.—The following are white: face except a longitudinal, black median line or band, rarely entirely, clypeus except middle or laterally more or less extensively, often marks on mandibles, sometimes ventral marks on scape, exceptionally marks on vertical orbits.

Thorax.—The following are white: scutellum, collare, pronotal ridge, tegulae in part (sometimes white marked only, sometimes entirely white), marks on subalarum or its entire surface.

Legs.—The following are white: femora I extensively on anterior side, apex of femora II anteriorly, tibiae I and II for their whole length on anterior side, except base and apex on posterior side, annulus on tibiae III, segments 1-2, or usually to 3 of all tarsi, except apices, and on tarsi III also except bases, often marks on coxae I and II, exceptionally trochanters I and II ventrally.

Remarks

Males of this subspecies are extremely similar to *Patrocloides perluctuosus* (Provancher); typical specimens of the latter can be easily distinguished by their white flagellar annulus; mutants, however, which lack this annulus are almost congruent with *Stenichneumon militarius leucopus* and can scarcely be distinguished. The abdomen of *Patrocloides perluctuosus* has usually a metallic-bluish hue not present in *Stenichneumon militarius*, and the temple profile of the latter is a little less narrowed.

2. *Stenichneumon culpator* (Schränk)

Fig. 48

Distribution

Holarctic; in the Old World from Europe to Sachalin; in America, transcontinental in Canadian, Transition and Upper Austral Zones.

Preamble

The species is distinguished by a unique character: a hairy, strongly projecting elevation on the coxae III of females (Fig. 48).

Female

Black, including scutellum; legs predominantly black; tergites 2 and 3 in palaearctic populations usually chestnut-red; in nearctic populations abdomen always uniformly black; flagellum with white annulus; coxae III with a hairy, tooth-like projection (Fig. 48); length 14-18 mm.

Flagellum.—Bristleshaped, considerably attenuated and acutely pointed at apex, ventrally distinctly flattened beyond middle but not widened, with 38-40 segments, the first more than 3 times as long as wide, about the eleventh approximately square. Black with white annulus on segments 7 or 8 to 12 or 14.

Head.—Temple and cheek profiles considerably narrowed, with almost straight outlines; cheeks somewhat constricted at carina genalis; malar space scarcely shorter than width of base of mandible; clypeus apico-laterally rounded, medially slightly convex in basal part and gradually depressed toward apical border, the lateral edges oblique and a little prominent; face, clypeus and cheeks fairly strongly and densely punctured. Uniformly black.

Thorax.—Mesoscutum convex, densely and strongly punctured; notauli basally distinct; scutellum strongly raised above postscutellum, dorsally convex, laterally in basal part more or less distinctly carinate; area superomedia square, a little wider than long or somewhat longer than wide, on the average wider in European than in American populations, usually with rounded anterior corners; costulae subobsolete or distinct. Uniformly black.

Legs.—Fairly slender; coxae III densely punctured with a toothlike, haired elevation. Black; apex of femora I and tibiae I yellowish on anterior side; basic color of tibiae varying geographically from predominantly reddish-brown (pale-

arctic subspecies) to predominantly black or blackish-brown (nearctic subspecies).

Abdomen.—On the average narrower in nearctic than in palaearctic populations; median field of postpetiolus longitudinally striate as a rule, but rather often irregularly rugose instead, more or less strongly prominent on the bend of first segment, but never forming a conical elevation. Uniformly black or (in palaearctic populations) with chestnut-red second and third tergites.

Male

Black, including scutellum and head; legs predominantly black; tergites 2 and 3 in palaearctic populations usually chestnut-red, in nearctic populations abdomen always uniformly black; flagellum in nearctic populations always with, in palaearctic specimens with or without, white annulus; length 14-19 mm.

2a. *Stenichneumon culpator culpator* (Schrank)

Stenichneumon culpator Schrank, 1802, Fauna Boica, 11, p. 277, ♀.

Amblyteles adsenator Tischbein, 1881, Stett. Ent. Z., p. 184, ♂.

Types

Holotype.—Not located.

Host

Plusia festucae (L.); different, further host records are compiled by Schmiedeknecht (Op. Ichn. Suppl.) which, however, I can not trust to be correct and suspect are erroneous, or else accidental, unless confirmed again.

Distribution

Palaearctic Zone, including Europe, Japan and Northern Asia to Sachalin.

Female

Wings not, or scarcely, infuscated; black, second and third tergites, sometimes only the second chestnut-red; exceptionally abdomen entirely black (variety *adsenator* Tischbein); tibiae predominantly reddish-brown; length 14-18 mm.

Male

As the female; white annulus on flagellum often absent.

2b. *Stenichneumon culpator cincticornis* (Cresson)

Fig. 48

Ichneumon cincticornis Cresson, 1864, Ent. Soc. Phila. Proc., 3: 139, ♀.

Ichneumon galenus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 292, ♂.

Ichneumon mathewi Cameron, 1907, Entom., 40: 277, ♂.

Aoplus cincticornis Townes, 1951, Syn. Cat., p. 290, ♀ ♂.

Stenichneumon culpator cincticornis Heinrich, 1953, Jour. Wash. Acad. Sci. 43: 149, ♀ ♂.

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

Types

Holotypes.—*Ichneumon cincticornis* Cresson, ♀, Pennsylvania. A.N.S. *Ichneumon galenus* Cresson, ♂, Virginia. A.N.S. *Ichneumon mathewi* Cameron, ♂, British Columbia. British Museum, London.²

Host

According to H. Townes 1951: "*Trichoplusia ni* Hbn."

²During his visit in London, September 1960, H. Townes examined the type of *Ichneumon mathewi* Cameron and compared it with males of *culpator* Schrank. He kindly informed me that he stated specific identity.

Distribution

According to H. Townes 1951: "Transcontinental in Transition and Upper Arctic Zones. New records: Transcontinental in Canadian Zone: Quebec, Rupert, Yukon, Dawson, Northwest Territories, Fort Simpson; Alaska, Anchorage (C.N.C.)."

Female

Wings strongly infuscated; uniformly black except for a white flagellar annulus on segments 7-14, 15 or 16; tibiae predominantly black or blackish-brown; length 14-17 mm.

Male

Uniformly black; always with ivory colored flagellar annulus on segments 7 or 8 to 19 or 20; length 14-19 mm.

3. *Stenichneumon salvus* (Cresson)

Figs. 5, 6, 8, 9

Townes (Syn. Cat. 1951) has associated *bioculatus* Cresson and *pallidipennis* Viereck as subspecies with *salsus* Cresson. The relationship of these three forms represents, however, a problem which does not seem to be satisfactorily solved yet. As evident in the material of the C.N.C., at least the ranges of *pallidipennis* and *bioculatus* overlap so widely that their subspecific association appears to be inconceivable, the more so, as there exists a considerable chromatic and a slight, but constant, structural difference in the apex of coxae III between the two forms. I do not doubt, therefore, that *pallidipennis* has to be considered as a distinct species different from *bioculatus*. More complicated is the case of *salsus* and *bioculatus*. The latter form, easily distinguishable by color and by the apical structure of coxae III from the former, is represented in the C.N.C. by specimens from Prince Edward Island in the east to British Columbia (Steelhead and Kamloops) in the west, where it meets *salsus*, which (according to specimens I have seen) is distributed in Vancouver Island and Oregon, and (according to H. Townes) also in Washington and California. This pattern of distribution would not exclude the possibility of subspecific association, but we can not presume that we already know the real borders of distribution of the two forms. The coxal structure of *salsus* (Figs. 6, 9) agrees better with *pallidipennis* than with *bioculatus* (Figs. 5, 8), and this makes me sceptical. Following H. Townes I am going to treat *salsus* and *bioculatus* as associated subspecies. Supposing, however, that further research should unveil an extension of the range of *bioculatus* to the south of British Columbia into Washington and Oregon, the subspecific hypothesis would have to be abandoned; otherwise it would probably have to be maintained.

Distribution

Transcontinental in Canadian Zone. The range is divided between two different subspecies, the eastern being transcontinental from Prince Edward Island to Western British Columbia, the western being distributed from Vancouver Island southward over Oregon, Washington and California.

Female

Second tergite usually partially, scutellum and annulus of tibiae always, yellow; basic color of head, thorax and abdomen ferruginous in subspecies *salsus* and black in subspecies *bioculatus*; apical ventral border of coxae III on inner

side distinctly produced and slightly elevated in subspecies *bioculatus*; first segment on elbow with conical bump; length 15-18 mm.

Flagellum.—Bristleshaped, moderately long, ventrally distinctly flattened beyond middle and somewhat widened, gradually attenuated toward apex and acutely pointed, with 39-41 segments, the first about 2.5 times as long as wide, about the eleventh square, the widest 1.3 to 1.5 times as wide as long. Black, or in extremely erythristic specimens from the west coast, ferruginous, with white annulus on segments 6 or 7 to 12 or 13, or rarely to 14.

Head.—Temple and cheek profiles considerably narrowed, with straight outlines; malar space not quite as long as width of base of mandible; clypeus slightly convex. Black, varying in extreme eastern populations to predominantly ferruginous.

Thorax.—As in *militarius* (Thunberg), except scutellum, which is on average not quite as strongly raised above postscutellum and apically not truncate. Black, varying in extreme western populations to predominantly ferruginous; scutellum and collare always, postscutellum and the extreme apex of pronotal ridge sometimes, white.

Legs.—Moderately slender; coxae III ventrally densely punctured, without clearly defined scopa; in subspecies *bioculatus*, apical ventral border of coxae III on the inner side distinctly produced and elevated. Black, in western populations rufous; all tibiae yellow banded.

Abdomen.—First segment at elbow with conical elevation; median field of postpetiolus clearly defined, longitudinally striate. Predominant color black in subspecies *bioculatus*, partially to entirely ferruginous in subspecies *salvus*; second tergite with two irregular, larger or smaller, yellow lateral marks which in western specimens tend to spread over almost its whole surface; in western specimens sometimes also the third tergite with irregular, slightly yellowish tinted, lateral areas; in extreme eastern populations (New Brunswick) specimens with an entirely black abdomen occur.

Male

Second and third tergites extensively to entirely, face, clypeus, pronotal ridge and scutellum entirely, yellow; flagellum without annulus; predominant color of legs varying geographically: rufous in the west, black in the east; elbow of first segment with conical bump; length 16-18 mm.

Flagellum.—With 38-40 segments and narrow, bacilliform tyloides on segments 7-15 or 16 which do not reach apices or bases of segments. Black, in western populations sometimes ferruginous; scape ventrally yellow.

Head.—Black; face and clypeus and middle of mandibles yellow.

Thorax.—Scutellum more considerably raised above postscutellum than in females, with steeper apical slope; area superomedia much wider than long, sometimes nearly half-moon-shaped. Black; in subspecies *salvus* mesoscutum often with ferruginous, longitudinal stripes, or predominantly ferruginous; the following are yellow: collare, pronotal ridge apically or entirely, scutellum (sometimes except base); sometimes yellow also: tegulae partially, subalarum partially, postscutellum.

Legs.—Basic color of all femora and apex of tibiae III black in eastern, rufous to yellow in western populations; tibiae I and II, tarsi I and II, and tibiae III except apex, always pale yellow; tarsi III pale yellow, in eastern specimens with blackish apices of segments; coxae black, in western specimens varying to ferruginous; coxae I, or I and II apically more or less extensively yellow marked, in western specimens sometimes predominantly yellow.

Thorax.—Scutellum slightly convex and slightly raised above postscutellum; area superomedia on the average shorter than in female, usually horseshoe-shaped, sometimes half-moon-shaped; costulae distinct, inserted in or before middle of area superomedia. Ferruginous; the following are yellow: collare, pronotal ridge, pronotal base, subalarum, tegulae, scutellum, postscutellum and indistinctly an area below apex of areae dentiparae; the following are black: base of prosternum, prepectus predominantly, mesolcus, middle of pronotum behind collare, sometimes middle of propleura, band below subalarum, areae coxales, scutellar and propodeal sutures.

Legs.—Ferruginous; all trochanters (not trochantelli), coxae I and II partially or entirely and sometimes apex of coxae III ventrally yellow.

Abdomen.—Sculpture of postpetiolus as in female. Uniformly ferruginous; sometimes apical border of postpetiolus, rarely the apical border of second tergite narrowly yellowish.

28. *Melanichneumon (Rictichneumon) virginicus* (Cresson)

Ichneumon virginicus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 181, ♀.

Ichneumon ornatipes Cresson, 1867, Amer. Ent. Soc. Trans., 1: 294, ♂.

Melanichneumon virginicus Townes, 1951, Syn. Cat., p. 286, ♀.

Melanichneumon ornatipes Townes, 1951, Syn. Cat., p. 286, ♂.

Melanichneumon virginicus Heinrich, 1959, Ent. News, 70: 212-13, ♀ ♂.

Types

Holotype.—*Ichneumon virginicus* Cresson, ♀, West Virginia. A.N.S.;
Ichneumon ornatipes Cresson, ♂, West Virginia. A.N.S.

Distribution

West Virginia.

Preamble

The species shares with *residuus* (Say) the enormously widened clypeus, the strong, wide and long mandibles with reduced lower tooth and the very stout and short femora. The association of sexes was made on account of corresponding structural characters and distribution, in spite of chromatical dimorphism. It needs further confirmation.

Female

Head and thorax black with very restricted, light pattern; yellowish are: small marks on facial orbits, level with antennal sockets, frontal orbits narrowly, marks on collare, on apex of pronotal ridge and on subalarum; abdomen red, excluding base of petiolus; legs predominantly black; length 13 mm.

Flagellum.—Stout and short, bristleshaped, ventrally flattened and rather strongly widened beyond middle, attenuated toward apex, with 44 (in type) segments, the first scarcely 1.3 times as long as wide, the third square, the widest not quite twice as wide as long. Black, with white annulus on segments 5-16, the basal segments apically brownish.

Head.—Strongly transverse; temple profile inflated, broadly curved; cheeks broad; malar space about one third as long as width of base of mandible; clypeus approximately 5 times as wide as long, strongly depressed and thus situated deeply below level of face; median field of face strongly raised, the lateral fields too somewhat convex; mandibles enormous, wide and long, the upper tooth very strong, the lower reduced. Black; yellow dot on inner orbits level with antennal sockets, frontal orbits narrowly yellowish; clypeus ferruginous.

Thorax.—Mesoscutum and scutellum flat; area superomedia elongate-horseshoe-shaped with costulae inserted beyond middle. Black; yellowish dot on apex of pronotal ridge and on subalarum.

Legs.—Femora III extraordinarily stout and short, in lateral view about 2.5 times as long as medially wide; coxae III ventrally densely punctured. Black; according to original description "tibiae and tarsi piceous".

Abdomen.—Postpetiolus with clearly defined, flat median field, strongly and densely punctured; gastrocoeli small and shallow. Red; base of petiolus black.

Male

The male repeats, within the normal limits of sexual dimorphism, the main structural characters of the female: the widened, depressed clypeus, the unusually long and strong mandibles, the unusually stout and short femora and the clearly defined, flat, median field of postpetiolus.

Black with rather extensive white patterns, especially on legs; face, clypeus, cheeks, scutella and other markings white; all coxae, femora and tibiae ventrally or laterally white marked; length 14 mm.

Flagellum.—With elongate-oval tyloides on segments 2-14, the longest on segments 4-11 leaving about $\frac{1}{2}$ of the segments at base, and apex as well, uncovered. Black, scape ventrally white.

Head.—Black; the following are white: face, clypeus, orbits broadly (widened on vertex, interrupted on temples, widening beyond temples over the whole surface of cheeks).

Thorax.—Area superomedia prolonged horseshoe-shaped a little. Black; the following are white: collare, pronotal ridge broadly, two short lines on pronotal base, tegulae, subalarum, scutellum, postscutellum, two small lateral marks on mesoscutum before prescutellar carinae.

Legs.—Black; the following are white: all coxae and trochanters ventrally, femora I and II ventrally, femora III on exterior side, tibiae I and II and tarsi I and II on interior side, tibiae III ventrally.

Abdomen.—Median field of postpetiolus punctured only toward apex. Black.

29. *Melanichneumon* (?subgenus) *peramoenus*, new species

Types

Holotype.—♂, Quebec, Gatineau, 17.X.1956, Gerd H. Heinrich. C.G.H.

Paratypes.—1 ♂, Quebec; 1 ♂, Washington, D.C. C.G.H. 1 ♂, Ontario, Bala. C.N.C. No. 7324.

Distribution

Quebec; Ontario; Maryland.

Preamble

A multicolored, striking, small species; its chromatic pattern, particularly on the mesoscutum suggests affinity to the subgenus *Melanichneumon*, but the small, distinctly impressed gastrocoeli and the type of carination would fit better into the subgenus *Vulgichneumon*. No final classification can be made until the female is found.

Male

Head and thorax black, with very rich yellow pattern; entire sterna, more than lower half of mesopleura, median and lateral lines on mesoscutum, scutella

and extensive propodeal marks, yellow; abdomen tricolored, tergites 1-6 basally extensively black, 1-4 yellowish apically and laterally, vivid red-brown between black base and yellowish apices and sides; predominant color of segments 5-7 vivid red-brown; femora III rufous, tibiae III pale yellow, apically black; flagellum with annulus; length 9-10 mm.

Flagellum.—With 31-33 segments and with short, bacilliform tyloides on segments 5 or 6 to 15 or 16. Black, with white annulus on segments 13 or 15 to 17; ventrally ferruginous; scape ventrally yellow.

Head.—Temple profile distinctly narrowed, with curved outline; malar space a little more than half as long as width of base of mandible; clypeus slightly convex. Yellow; the following are black: supraantennal cavity, middle of frons broadly, ocellar and occipital regions.

Thorax.—Mesoscutum slightly convex, strongly and fairly densely punctured, shiny; notauli basally indicated; scutellum somewhat raised above postscutellum, apically truncate, dorsally slightly convex, laterally carinated at the very base; carination of propodeum sharp and complete; area superomedia usually slightly longer than wide, receiving the costulae before the middle, slightly narrowed from costulae toward base, with hexagonal outline. Black; the following are yellow: collar, pronotal ridge, pronotal base, subalarum, usually base of tegulae, two longitudinal, median lines on mesoscutum, two short, lateral lines on mesoscutum near tegulae, scutella, prosternum except base, border of prepectus, mesosternum, more than lower two thirds of mesopleura, carinal triangle and two long, longitudinal marks on propodeum, covering almost the entire areae spiraculiferae, apical parts of areae dentiparae, the areae posteroexternae and sometimes a small, apical part of areae metapleurales.

Legs.—Tricolored; coxae I and II entirely, coxae III ventrally entirely, dorsally partially yellow; rest of coxae III black; trochanters and trochantelli yellow; trochanters III black; all femora rufous; femora III apically black; tibiae and tarsi yellowish, tibiae III apically broadly black; tarsi III more or less infuscated, their basal segments yellowish, except blackish apices.

Abdomen.—Postpetiolus neatly punctured, its median field not clearly defined; gastrocoeli small, but fairly deeply impressed; tergites 2-4 strongly and moderately densely punctured, shiny. First tergite usually black, except yellow apical band and lateral slopes; sometimes its base dorsally yellow too; tergites 2-6 basally black to a gradually diminishing extent from tergite to tergite, the second to fourth tergites apically and laterally pale yellowish tinted, red between the black base and yellowish apex, the fifth and sixth segments red-brown, except black basal band, the seventh entirely red-brown.

30. *Melanichneumon* (?subgenus) *texanus* (Cresson)

Ichneumon texanus Cresson, 1877, Amer. Ent. Soc. Trans., 6: 159, ♂.

Types

Holotype.—♂, Texas. A.N.S.

Distribution

According to H. Townes 1951: "Rhode Island, New York, Alberta, Texas." New records: Michigan (C.H.T.); Maine, Livermore (C.G.H.).

Male

Black, with rich yellow pattern; scutellum and pronotal ridge yellow; tergites 1-2 with yellow, apical bands, the third with latero-apical mark or (type) with

apical band, seventh tergite with anal mark; all trochanters and the coxae I and II predominantly yellowish-white; all tibiae and tarsi extensively yellowish-white; tibiae III at base narrowly, at apex broadly black; length 7-9 mm.

Flagellum.—With 30-32 segments and with oval tyloides on segments 5 or 6 to 14. Black, ventrally brownish; scape ventrally yellow.

Head.—Temple profile moderately narrowed, with slightly curved outline; malar space scarcely half as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal and vertical orbits (up to level of hind margin of upper ocelli), about lower half of outer orbits.

Thorax.—Mesoscutum moderately densely punctured, shiny; notauli basally indicated; scutellum rather strongly raised, with steeply rounded apical slope; carination of propodeum sharp and complete, area superomedia wider than long, receiving the costulae at about the middle. Black; the following are yellow: collar, pronotal ridge, subalarum, tegulae more or less extensively, scutellum, postscutellum and two marks of varying extent on propodeum, sometimes reduced to a small spot, sometimes occupying the apical half of areae dentiparae, entire areae posteroexternae and apex of areae spiraculiferae.

Legs.—Rather short. Black; the following are yellow: coxae I and II, sometimes ventro-apical mark on coxae III, all trochanters, anterior side and tip of femora I and sometimes also of femora II, tibiae I and II (except apices on posterior sides), tibiae III (except base narrowly and apex broadly, tarsi I and II predominantly, segments 1-2 or 3 of tarsi III (except black apices)).

Abdomen.—Median field of postpetiolus well defined, fairly densely punctured; gastrocoeli triangular, comparatively large and fairly deeply impressed, with very distinct thyridia; tergites 2-4 fairly strongly and densely punctured, shiny. Black; the following are yellow: apical band on postpetiolus and on second tergite, latero-apical marks or (in type) apical band on third tergite; seventh tergite with whitish anal mark.

Remarks

The subgeneric position of this small species can not be determined until the female is known; the chromatic patterns suggest *Melanichneumon*, while the gastrocoeli agree with *Vulgichneumon*. As in many parallel cases, the specimen from Maine differs from specimens from more southern localities by having less extensive light markings: trochanters III and the last tergite are entirely black; the propodeum is almost entirely black.

33. Genus *Stenobarichneumon* Heinrich

Figs. 31, 32

Stenobarichneumon Heinrich, 1961, Can. Ent. Suppl. 15: 16.

Type-species.—*Ichneumon citator* Thunberg.

This genus has about the same relationship to *Barichneumon* Thomson as *Homotherus* Foerster has to *Cratichneumon* Thomson. It shares with *Barichneumon* the neatly punctured sculpture of postpetiolus and anterior tergites and the general pattern of carination of propodeum, represented by the anteriorly narrowed, usually approximately hexagonal shape of area superomedia and the presence of distinct costulae (Fig. 32). Differing from *Barichneumon* and related forms considerably in structure of gastrocoeli which are large, comparatively deep, and transverse, with narrowed interval and well developed thyridia (Fig. 31).

On account of the flagellar structure of the females the genus can be divided into two groups: one represented by the type-species of the genus, distinguished by bristleshaped, slender, apically more or less considerably attenuated flagella; the other represented by a greater number of species, distinguished by rather stout and filiform flagella. All known Nearctic species have the head and thorax black, with very restricted white pattern, usually including white marks on vertical orbits, and a partially or entirely red abdomen.

The distribution of the genus is Holarctic.

Females do not hibernate. The hosts are probably Geometridae as suggested by the small size of all species.

Key to the Species of *Stenobarichneumon* Heinrich of Eastern North America

Females

1. Flagellum bristleshaped, slender, pointed at apex, the first segment 2.5 times as long as wide; in the type specimen, scutella and propodeum red. (Length 9 mm.).....
.....1. *pergracilis*, new species
Flagellum filiform, not pointed at apex, the first segment less than twice as long as wide; scutella and propodeum black..... 2
2. Abdomen uniformly red; femora slightly slenderer than in the alternative species; flagellum with 28 segments, imperceptibly attenuated at apex, the first segment 1.5 times as long as wide, the fifth square. (All coxae and femora black; length 7 mm.).....
.....5. *agitator*, new species
Apical tergites black; femora slightly stouter than in the alternative species; flagellum with 26 or 27 segments not at all tapering toward apex, slightly stouter than in the alternative species, the first segment 1.3 times as long as wide, the fourth square..... 3
3. Tergites 2 and 3 or 1-3 red; tergites 2 and 3 a little more finely punctured than in the alternative species. (Length 4-6 mm.).....
.....3. *pygmaeops*, new species
Tergites 1-4 red; tergites 2 and 3 a little more strongly punctured than in the alternative species. (Length 7 mm.).....
.....4. *duplicans*, new species

Males

1. Flagellum with white annulus; femora III stouter than in the alternative species. (Flagellum with 31-32 segments; length 8-9 mm.).....
.....2. *sandersi* (Cresson)
Flagellum without annulus; femora a little less stout..... 2
2. Scutellum predominantly, or at least its apical half and the frontal orbits, white; mesosternum and propodeum sometimes partially ferruginous. (Flagellum with 33-34 segments; length 9 mm.).....
.....1. *pergracilis*, new species
Scutellum black or inconspicuously white marked at the very apex only; frontal orbits black; mesosternum and propodeum always entirely black. (Flagellum with 26-31 segments; sides of clypeus and face, and vertical marks white.)..... 3
3. Tibiae I and II lemon yellow with black ventral stripe; abdomen uniformly red, sometimes tergites 6 and 7 black. (Flagellum with 31 segments; length 10 mm.).....
.....5. *agitator*, new species
Tibiae I and II rufous or ferruginous, without black ventral stripe; at least tergites 5-7 black..... 4
4. Tergites 1-4 red; sculpture of tergites 2 and 3 somewhat stronger than in the alternative species; flagellum with 30 segments. (Length 9 mm; femora III light red with clearly defined, deep black apex.).....
.....4. *duplicans*, new species
Tergites 1-3 (or only 2 and 3) red; sculpture of tergites 2 and 3 somewhat finer; flagellum with usually 28, rarely 29, segments. (Length 6-8 mm.; femora III black, varying to red with a not-clearly-defined, black apical part.).....
.....3. *pygmaeops*, new species

1. *Stenobarichneumon pergracilis*, new species*Types*

Holotype.—♀, Maine, Mt. Blue, 22.IX.1956, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Mt. Blue, 30.IX.1956. C.G.H.

Paratypes.—3 ♂♂, Maine, Mt. Blue and Dryden. C.G.H. 3 ♂♂, Ontario and Quebec. C.N.C.

Distribution

Maine, Ontario, Quebec.

Female

Flagellum slender, bristleshaped; head, pro- and mesosternum black, scutella and propodeum red; vertical orbits white marked; abdomen tricolored: tergites 1-4 red, 5-7 black, the sixth with small, the seventh with large, white mark; legs, including coxae and trochanters, ferruginous, femora and tibiae III apically black; length 9 mm.

Flagellum.—Slender, bristleshaped, ventrally flattened but not at all widened beyond middle, attenuated and pointed at apex, with 33 segments, the first fully 2.5 times as long as wide, all segments longer than wide. Black, with white annulus on segments 9-12; apices of basal segments and flattened part of flagellum brownish.

Head.—Temple and cheek profiles distinctly narrowed with almost straight outlines; malar space as long as width of base of mandible. Black, vertical orbits with white mark; clypeus apically ferruginous.

Thorax.—Mesoscutum slightly convex, fairly densely punctured, shiny; notauli scarcely indicated at base; scutellum laterally carinated at the very base, a little raised above postscutellum; areae superomedia longer than wide, hexagonal, considerably narrowed toward base. Black; scutellum, postscutellum and propodeum red; mesosternum predominantly and lower part of mesopleura reddish tinted; collar, narrow apex of pronotal ridge and mark on subalarum reddish-yellow.

Legs.—Moderately slender. Ferruginous; apex of femora III and of tibiae III black, tarsi III infuscated.

Abdomen.—Fairly slender; median field of postpetiolus not clearly defined; gastrocoeli triangular, transverse, with oblique thyridia and rather narrow interval; tergites 1-3 moderately densely punctured, shiny. Tergites 1-4 and the fifth laterally ferruginous, the rest black; tergite 6 with small, the seventh with large white anal mark.

Male

Basic color of head and thorax predominantly or entirely black with white pattern; scutellum, at least the apical half, white; lower part of mesopleura, the mesosternum and propodeum sometimes partially ferruginous; abdomen ferruginous except tergites 6 and 7 which are black; legs ferruginous; apex of femora III, of tibiae III and sometimes of coxae III, black; length 9 mm.

Flagellum.—With 33-34 segments and with short, bacilliform tyloides on segments 6-15. Black, without annulus; ventrally (including scape) brownish.

Head.—Malar space scarcely half as long as width of base of mandible. Black; the following are white: clypeus laterally, lateral fields of face, frontal and vertical orbits, stripe on lower half of outer orbits; middle of clypeus apically sometimes ferruginous.

Thorax.—Black; sometimes lower part of mesopleura, mesosternum and/or propodeum partially ferruginous; the following are white: collare, subalarum and scutellum (except base).

Legs.—Ferruginous; the following are black: apex of femora III and of tibiae III, sometimes also apex of coxae III; tarsi III usually infuscated, sometimes only apices of their segments blackish.

Abdomen.—Ferruginous; tergites 6 and 7 and usually the fifth tergite medio-apically black.

2. *Stenobarichneumon saundersi* (Cresson), new combination

Ichneumon saundersi Cresson, 1877, Amer. Ent. Soc. Trans., 6: 141, 177, ♂.

Melanichneumon saundersii Townes, 1951, Syn. Cat., p. 286, ♂.

Melanichneumon saundersi Walkley, 1958, Syn. Cat. Suppl., p. 49, ♂.

Types

Holotype.—♂, Canada. A.N.S.

Distribution

According to H. Townes 1951: "Alberta, New York". New records: Maine, Dryden (C.G.H.). Quebec, Aylmer (C.N.C.).

Male

Head and thorax black with restricted white pattern; apex of scutellum sometimes white marked or with transverse, white apical band; white marks on vertical orbits; flagellum with white annulus; abdomen uniformly red, except black petiolus; femora, coxae and trochanters predominantly black; scutellum laterally carinated to about middle; length 8-9 mm.

Flagellum.—With 31-32 segments with long-oval tyloides on segments 4-11 extending from bases to apices of segments. Black, with white annulus on segments 10 or 11 to 15 or 16, ventrally brownish except very base and apex; scape black, usually with a white mark ventrally near apex.

Head.—Temple profile distinctly narrowed with slightly curved outline; malar space half as long as width of base of mandible. Black; the following are white: mark on base of mandible, clypeus except middle, sides of face (the white band broadest below, at bases of clypeus, then gradually narrowing and extending to about middle of frons), two small marks near upper border of face, marks on vertical orbits, usually a short line on lower part of outer orbits; in the type specimen frontal orbits confluent with vertical orbits.

Thorax.—Mesoscutum distinctly convex, fairly densely punctured, shiny; notauli basally fairly distinct; scutellum rather strongly raised above post-scutellum, dorsally slightly convex, laterally carinated to about middle; area superomedia about as long as wide, approximately horseshoe-shaped. Black; the following are white: apex of pronotal ridge narrowly, mark on tegulae, mark on subalarum, often two small marks or a narrow crossband on apex of scutellum.

Legs.—Moderately stout. Predominantly black; tibiae and tarsi I and II predominantly pale yellow, the former with black or infuscated ventral stripe, the latter apically infuscated; anterior side of femora I and apex narrowly of femora II internally yellowish; femora I dorso-medially red-brown; coxae I and usually coxae II apically yellow marked; tibiae III brown, apically extensively, sometimes predominantly, black; basal segments of tarsi III usually narrowly red-brown.

Abdomen.—Median field of postpetiolus fairly distinct. Uniformly red, except black petiolus.

11. Flagellum dorsally uniformly black, without annulus. (Length 10-11 mm.) 9. *monotomus*, new species (Western)
- Flagellum with white annulus. (Scutella, pronotal ridge, coxae I and II and trochanters I and II white.) 12
12. Apices of femora III and of tibiae III, and the tarsi III black; trochanters III white except base; mesoscutum shiny; carination of propodeum complete and sharp, costulae distinct. (Length 8-10 mm.) see Part II: *Homotherus semiaoplius* Heinrich
- Apices of femora and tibiae III and the tarsi III not infuscated; trochanters III not partially white; mesoscutum opaque; carination of propodeum weaker, costulae usually obsolete. (Length 9-10 mm.) 13. *pseudoveloxy*, new species

1. *Aoplius confirmatus* (Cresson)

Fig. 3

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

Phygadeuon jocosus Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., pp. 47, 53, ♀.

Types

Holotypes.—*Ichneumon confirmatus* Cresson, ♀, New York. A.N.S.
Phygadeuon jocosus Provancher, ♀, Quebec. Provincial Museum, Quebec.

Neallotype.—♂, Maine, Dryden, 26.IX.1958. C.G.H.

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition and Canadian Zones."

Preamble

A handsome species and one of the largest of the genus. Females prettily colored and chromatically rather variable.

Female

Light ferruginous, scutellum and pronotal ridge white; thorax and head tri-colored: ferruginous, white, (yellow), and black, head sometimes predominantly white; mesoscutum varying from entirely ferruginous to almost entirely black, in the latter case usually with short, ferruginous, longitudinal median stripes; legs and abdomen usually uniformly light ferruginous, rarely tip of femora III black or apices of tergites 1-2 whitish; length 13 mm.

Flagellum.—Bristleshaped, gradually considerably attenuated toward apex, ventrally flattened beyond middle and somewhat widened, with usually 35 segments, the first fully 3 times as long as wide, the thirteenth square, the widest 1.3 to 1.75 times as wide as long. Black, with white annulus on segments 7 to 8 to 13 or 14; scape ventrally ferruginous.

Head.—Temple and cheek profiles strongly narrowed, with straight outlines; occiput steeply and abruptly sloping down from hind margin of ocelli and eyes; malar space approximately as long as width of base of mandible. The following are black: supraantennal cavities, middle of frons, ocellar region and more or less extensively occipital region, the black color of the latter sometimes extending far down onto hind part of cheeks; clypeus, broad middle of face and apex of cheeks in northern specimens usually ferruginous; sometimes head white, except the black pattern mentioned above.

Thorax.—Mesoscutum convex, longer than wide, densely punctured, alutaceous between punctures, opaque; notauli basally distinct; scutellum distinctly raised above postscutellum, apically a little truncate and obliquely sloping toward postscutellum, laterally slightly carinate at the very base; area superomedia ap-

proximately square; costulae obsolete. Ferruginous; the following are black: base of prosternum, middle of pronotum more or less extensively, usually band below subalarum; mesoscutum entirely ferruginous or predominantly black, in the latter case usually with two short, ferruginous median stripes, sometimes also with such stripes laterally; more rarely propleura and prepectus entirely black; the following are yellow: collare, pronotal ridge broadly, usually pronotal base more narrowly or sometimes incompletely, subalarum, scutellum, postscutellum; tegulae varying from white to pale ferruginous; propodeum always uniformly ferruginous.

Legs.—Moderately slender; coxae III ventrally finely and rather densely punctured, on inner side toward apex fairly densely haired, but without distinct scopae. Uniformly ferruginous; rarely tip of femora III black; usually coxae I and II pale yellow marked, sometimes predominantly white.

Abdomen.—Uniformly ferruginous.

Male

Description based on 5 specimens from Maine.

Black, pronotal ridge and scutellum yellow; tergites 1-3 with yellow, apical bands (the band on the third tergite sometimes medially interrupted and ferruginous tinted); flagellum without annulus; legs, including femora III predominantly lemon yellow; coxae and trochanters III black; length 13-15 mm.

Flagellum.—With 35 segments and with elongate, bacilliform tyloides on segments 7-15. Black; scape ventrally yellow.

Head.—Malar space about half as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits broadly up to upper ocelli, dots on vertical orbits, outer orbits broadly below temple region; apex of cheeks and malar space black.

Thorax.—Black; the following are yellow: collare, pronotal ridge broadly, pronotal base narrowly, at least toward apex, tegulae, subalarum, scutellum, postscutellum, prosternum except base, a longitudinal mark on mesosternum along sternauli, rarely a small mark on apex of areae dentiparae or on lower part of mesopleura.

Legs.—Lemon yellow; coxae III, trochanters and trochanterli III and base of coxae I and II black; segments 1-2 or to 3 of tarsi III usually blackish, their apical segments yellowish-brown; sometimes femora I and II or even III with longitudinal, blackish or brownish ventral band.

Abdomen.—Second tergite densely and rather strongly rugose-punctate, subopaque; third tergite of similar, but less dense and strong sculpture, being more smooth and shiny toward apex; middle part of hypopygium broadly projecting. Black; tergites 1-3 with broad, yellow, apical bands; the band of the third tergite sometimes ferruginous tinted and incomplete (medially interrupted).

Variety 1, ♂.

7 ♂♂, Ontario, Quebec and New York (C.N.C.); 1 ♂, Maine (C.G.H.).

Mesosternum and more than half of mesopleura yellow; the following are also yellow: areae spiraculiferae and dentiparae, cheeks entirely up to temple region, vertical orbits broadly, long, median mark on mesoscutum, prescutellar carinae, pronotal base broadly.

Variety 2, ♀.

1 ♀, Maryland (C.N.C.).

Lower half of mesopleura and part of mesoscutum pale yellow; head predominantly yellow; cheeks, clypeus and middle of face not being ferruginous but pale yellow; apices of first and second tergites broadly pale yellowish; mesoscutum black with ferruginous median and lateral lines.

Remarks

It seems to be possible that *Variety 1*, above, represents a distinct species, but so far I have found no convincing reason to support such a hypothesis.

2. *Aoplus permutabilis*, new species

Distribution

Transition and Canadian Zones; from northern Ontario (Smoky Falls) south to Maryland. Most western records so far from Indiana and Missouri.

Preamble

A small, unusually mutable species of the *confirmatus* group. Among the 22 females I have seen I did not find two specimens which were entirely congruent. Although individual and geographical variability evidently accounts for this diversity in the first place, it is also possible that we are dealing with a complex, composed of two mutable sibling species. I found, however, no convincing evidence yet, either for or against such a hypothesis.

The association of sexes as given below is tentative. It is supported mainly by corresponding frequency and distribution of males and females and also by the fact that no further unassociated species are known so far in eastern North America (except *torpidus* females which are ecologically restricted to higher elevations and *thujarum* females, which differ in size).

Female

Ferruginous; scutellum, pronotal ridge, collare and subalarum pale yellow in type and in majority of specimens; in the southern subspecies also pronotal base and orbits extensively white; in some specimens, probably belonging here, some or all of mentioned parts ferruginous like the rest of the body; last two or three tergites almost always infuscated; more or less restricted black markings on head, pronotum and prosternum; apex of femora III usually black; flagellum bristleshaped, in type tricolored, with ferruginous base and white annulus, sometimes black with white annulus; coxae III without scopa; length 8-11 mm.

Flagellum.—Bristleshaped, fairly slender, gradually attenuated and pointed at apex, ventrally flattened beyond middle but not widened, with usually (as in type) 31, sometimes 33, segments, the first about 3.5 times as long as wide, the first square segment between about the twelfth and fifteenth segments. Black, the basal 5 or 6 segments often ferruginous with white annulus on segments 7 (apex) to 12.

Head.—Temple and cheek profiles considerably narrowed, the former with almost straight, the latter with slightly curved outlines; malar space somewhat longer than width of base of mandible. Ferruginous; supraantennal cavities and usually ocellar region black; northern specimens tend to be more melanistic, the black color sometimes even covering face and clypeus entirely and also middle of frons and occiput; in some northern specimens frontal orbits narrowly, in southern populations all orbits more extensively pale yellow.

Thorax.—Mesoscutum convex, finely and densely punctured, alutaceous between punctures, subopaque; notauli basally distinct; scutellum distinctly raised

above postscutellum; declivity of propodeum nearly twice as long as horizontal part medially; carination fairly weak; area superomedia usually about as long as wide, slightly narrowed toward base, not distinctly bordered toward area basalis; costulae obsolete. Ferruginous; the following are usually pale yellow: collare, pronotal ridge, tegulae, subalarum, scutellum, postscutellum; all mentioned parts can sometimes be partially, or entirely, ferruginous instead; in southern populations yellow pattern extensive, including pronotal base and sometimes marks on mesopleura.

Legs.—Ferruginous, including coxae and trochanters; usually tip or apex of femora III more or less extensively blackish; more rarely in northern specimens also coxae apically, or even predominantly, infuscated.

Abdomen.—Postpetiolus finely alutaceous, fairly shiny, second tergite finely and in basal part rather densely punctured, finely alutaceous between punctures, but nevertheless somewhat shiny; gastrocoeli distinct and fairly deep, with rather narrow interval; thyridia large and oblique. Ferruginous, tergites 5-7 or 6 and 7 usually infuscated.

Male

Black, scutella and pronotal ridge yellow; propodeum yellow or ferruginous marked; tergites 1 and 2 with broad, yellow apical bands, rarely the third apically or laterally ferruginous; flagellum without annulus; legs, including coxae and trochanters pale yellow, the femora usually pale rufous tinted; coxae III black, rarely basally, exceptionally predominantly, obscure ferruginous; tarsi II basally infuscated; length 8-11 mm.

Flagellum.—With 30-33 segments and with narrow, bacilliform tyloides on segments 8 or 9 to 15 or 16. Black, ventrally brownish; scape ventrally yellow.

Head.—Malar space about one third as long as width of base of mandible; median field of face rather strongly prominent. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits broadly, triangular, vertical marks of varying size (sometimes confluent with frontal orbits), cheeks up to vertical region except at least a narrow apical border at base of mandibles, usually except a broader, apical band.

Thorax.—Mesoscutum densely and finely punctured, alutaceous between punctures, subopaque; scutellum rather strongly raised above postscutellum, convex; area superomedia somewhat wider than long. Black; the following are yellow: collare, pronotal ridge broadly, pronotal base, tegulae, subalarum, scutellum, postscutellum, rarely median mark on mesoscutum, prosternum (except base), anterior, lower part of mesopleura (the yellow color extending onto mesosternum at least to position of sternauli), mesosternum in part or sometimes entirely, usually areae dentiparae (the latter sometimes obscure ferruginous instead of yellow or showing both colors combined); sometimes also apical part of areae spiraculiferae yellowish or ferruginous, exceptionally also areae metapleurales.

Legs.—Fairly stout. Predominantly pale yellow, the femora usually more rufous tinted; coxae III black, sometimes basally, exceptionally predominantly, obscure ferruginous; metatarsus III more or less strongly infuscated, varying from brownish to blackish, the following segments becoming gradually paler.

Abdomen.—Postpetiolus with irregular fine sculpture, shiny; second tergite finely and on basal half rather densely punctured, alutaceous between punctures, but nevertheless fairly shiny. Black; first and second tergites with broad yellow apical bands; sometimes the third tergite laterally or apically obscure ferruginous.

2a. *Aoplus permutabilis permutabilis*, new subspecies

Types

Holotype.—♀, Maine, Dryden, 3.VI.1952, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Dryden, 14.VIII.1959. C.G.H.

Paratypes.—6 ♀♀, 7 ♂♂, Maine; 19 ♀♀, Maine, Dryden, hibernating; 3 ♀♀, Massachusetts, Quebec, Indiana. C.G.H. 3 ♀♀, Ontario; 1 ♀, 2 ♂♂, Quebec; 2 ♀♀, Maine, Dryden, hibernating. C.N.C. No. 7295.

Distribution

Northern part of the range of the conspecies: Maine, Ontario, Quebec, Massachusetts, Indiana.

Female

No yellow pattern on head, except sometimes narrowly yellow frontal orbits; coxae and trochanters I and II not yellow marked; on the thorax, at the most, the following are yellow: collare, pronotal ridge narrowly, subalarum, tegulae, scutellum and postscutellum; sometimes some or all of mentioned parts ferruginous tinted; length 9-11 mm.

TABLE I

Variability of distribution of yellow and black on 21 *Aoplus permutabilis permutabilis* females found gregariously hibernating in one rotten stump near Dryden, Maine.

A. Yellow

- 18 Subalarum more or less extensively
- 5 Frontal orbits up to lower ocellus very narrowly
- 16 Frontal orbits up to lower ocellus more extensively
- 16 Collare more or less extensively
- 10 Apex narrowly of pronotal ridge
- 9 Pronotal ridge extensively or entirely
- 14 Scutellum predominantly or entirely
- 4 Scutellum apically and sometimes also laterally
- 1 Mark on middle of outer orbits

B. Black

- 18 Supraantennal cavities
- 13 Ocellar region
- 13 Temple region
- 10 Occipital region medially to predominantly
- 12 Face laterally more or less intensively and extensively
- 5 Face medially too
- 12 Clypeus apically to predominantly more or less intensively
- 3 Head almost entirely
- 14 Propleura medially more or less extensively
- 17 Band on mesopleura below subalarum
- 14 Prosternum basally more or less extensively
- 4 Prepectus extensively
- 8 Marks on apices of coxae III
- 6 Marks on apices of coxae II
- 1 Marks on apices of coxae I
- 18 Apices of femora III more or less extensively, but less than half
- 3 About apical half of femora III
- 1 Tergite 7
- 7 Tergites 6 and 7
- 9 Tergites 5 to 7
- 21 Scape and pedicellus dorsally or predominantly
- 7 Flagellar segments 1-7 predominantly

2b. *Aoplus permutabilis leucorbis*, new subspecies*Types*

Holotype.—♀, Missouri, Hannibal, 15.IX.1952, Gerd H. Heinrich. C.G.H.

Paratypes.—1 ♀, Maryland, Silverspring, hibernating 1959, Gerd H. Heinrich. C.G.H.

Distribution

Maryland, Missouri.

Female

Head extensively yellowish-white; white are: facial, frontal, vertical and outer orbits broadly; coxae and trochanters I and II dorsally yellow; maximal yellow pattern of *permutabilis permutabilis* new subspecies, on thorax, and in addition entire pronotal base, in specimen from Maryland also marks on lower part of mesopleura; length 8 mm.

Male

Unknown.

3. *Aoplus limbatae*, new species*Types*

Holotype.—♀, British Columbia, Trout Lake, 9.IX.1937, ex *Nematocampa limbata* Haw., G. R. Hopping. C.N.C. No. 7299.

Allotype.—♂, (abdomen missing), British Columbia, Trout Lake, 3.IX.1937, ex *Nematocampa limbata* Haw. C.N.C.

Paratype.—1 ♀, (flagella missing), same locality and host. C.N.C.

Host

Nematocampa limbata Haw.

Distribution

British Columbia.

Preamble

The female of this species is extremely similar to *permutabilis*, new species, and could scarcely be considered more than a subspecies of it, if the male did not differ from *permutabilis* by distinctly slenderer femora III. The abdomen of the male type is missing, but several years ago, when I examined the specimen for the first time, it still had the abdomen and I made short notes which cover at least the chromatic characters of the abdomen. The female is rather similar to *monotonus*, new species, too, but differs by the not-at-all widened and more considerably attenuated flagellum. Differs from *permutabilis* by presence of a weak scopa and slightly more abbreviated propodeum.

Female

Ferruginous, including scutellum; subalarum and apex of pronotal ridge yellowish; last tergites faintly infuscated; apices of femora III narrowly infuscated; restricted blackish markings on head and thorax; flagellum black with white annulus; coxae III with weak scopa; area superomedia transverse; length 9-10 mm.

Flagellum.—Bristleshaped, slender, gradually attenuated and pointed at apex, ventrally flattened beyond middle, but not widened, with 32 segments, the first about 3 times as long as wide, the fourteenth or fifteenth approximately square. Blackish with white annulus on segments 8-11; scape ventrally ferruginous.

Head.—Structure as in *permutabilis*. Ferruginous; supraantennal cavities and face laterally, in paratype also ocellar and occipital regions, slightly infuscated.

Thorax.—Structure as in *permutabilis*; area superomedia, however, distinctly transverse and bordered anteriorly. Ferruginous, including scutellum; collar, subalarum and apex of pronotal ridge indistinctly yellowish; the following are slightly infuscated: prosternum, prepectus and pronotum partially, band below subalarum, scutellar and anterior propodeal sutures.

Legs.—Coxae III with scopae. Ferruginous, including coxae and trochanters; apices of femora III slightly infuscated.

Abdomen.—Structure as in *permutabilis*; a little less shiny. Uniformly ferruginous.

Male

Black, scutella and pronotal ridge yellow; propodeum uniformly black; first segment with yellow apical band; flagellum without annulus; legs yellowish, femora slightly rufous tinted, coxae and trochanters III black, tarsi III basally infuscated; femora considerably slenderer than in *permutabilis*.

Flagellum.—With bacilliform tyloides on segments 8-16. Black, ventrally brownish; scape ventrally yellow.

Head.—Structure as in *permutabilis*. Black; the following are yellow: mandibles except teeth, clypeus, face, frontal orbits broadly (no vertical marks), oblong mark on lower part of outer orbits.

Thorax.—Structure as in *permutabilis*. Black; the following are yellow: collar, pronotal ridge broadly, pronotal base narrowly, regulae, subalarum, apex of prosternum and scutella.

Legs.—Slender. Yellowish; all femora and tibiae III rufous tinted; coxae and trochanters III black; tarsi III infuscated except apices.

Abdomen.—(Missing); according to my previous notes black with yellow apical band on first tergite.

4. *Aoplus thujarum*, new species

Types

Holotype.—♀, Ontario, Ottawa, hibernating in rotten cedar stump, 3.XI.1953, E. C. Becker. C.N.C. No. 7296.

Paratypes.—11 ♀♀, same locality and data. C.N.C. 2 ♀♀, same locality and data; 1 ♀, Quebec, Aylmer, hibernating, 1956, Gerd H. Heinrich. C.G.H.

Distribution

Ontario, Quebec.

Preamble

Another species of the *confirmatus* group. Except for the more conspicuous size, extremely similar to *permutabilis*, new species. If I had seen one or two specimens only, I would perhaps have considered them as mere mutants of the latter species. The series, however, of 14 females, all collected simultaneously in gregarious hibernation, originates convincingly the concept of a distinct species with constant characters.

The differences from *permutabilis* are — each considered alone for itself — very slight, but sum up to a total which in most cases will allow the correct identification: (1) size rather constantly 12 mm., that is far beyond average and

slightly beyond the maximum of *permutabilis*; (2) apex of abdomen and of femora III never infuscated; (3) coxae III ventro-apically on inner side much more densely haired than in *permutabilis*, forming a weak scopa; (4) yellow pattern on orbits constant and more extensive than in *permutabilis permutabilis*, new subspecies, including also the lower part of outer orbits; (5) median field of face a little less convex; (6) flagellum with usually 34 or 35, rarely 33, segments, instead of the 31 or 32, rarely 33 in *permutabilis*.

Female

Pale ferruginous; scutellum, pronotal ridge, collare and subalarum constantly pale yellow; apex of abdomen and of femora III never infuscated; head not black marked, except sometimes supraantennal cavities restrictedly; rarely restricted black markings on pronotum and prosternum; flagellum bristleshaped, black with white annulus, base never ferruginous; coxae III with weak scopa; general appearance elongate and slender; length 12 mm.

Flagellum.—Bristleshaped, slender, gradually attenuated and pointed at apex, ventrally flattened beyond middle, but not widened, with usually 34 or 35, rarely 33 segments, the first about 3.5 times as long as wide, the thirteenth or fourteenth approximately, but none exactly, square. Black with white annulus on segments 7 or (usually) 8 to 12 or 13; apices of basal segments usually narrowly, obscure brownish; scape ventrally, or predominantly, ferruginous.

Head.—Temple and cheek profiles considerably narrowed, the former with straight, the latter with slightly curved, outline; malar space scarcely longer than width of base of mandible; median field slightly less distinctly raised than in *permutabilis*. Pale ferruginous; the following are pale yellow: frontal orbits more or less broadly, lower part of outer orbits, usually uppermost part of facial orbits and base of mandibles; no black markings except sometimes supraantennal cavities restrictedly and exceptionally (one specimen) ocellar and occipital regions.

Thorax.—As in *permutabilis*, except that the propodeum seems a trifle less abbreviated, the area superomedia being often somewhat longer than wide. Pale ferruginous; the following are pale yellow: collare, pronotal ridge, subalarum, scutellum, postscutellum; tegulae pale ferruginous; black markings absent or restricted; the following are black: sometimes base of prosternum, often middle of pronotum behind collare, more rarely propleura, usually, more or less restricted band below subalarum, sometimes the very base of median lobe of mesoscutum.

Legs.—Rather long and slender; coxae III ventrally on inner side covered by dense, pale hair which forms a weak scopa (easily overlooked on account of its pale color blending with color of coxae). Uniformly pale ferruginous, the coxae I and II sometimes pale yellow marked.

Abdomen.—Long and slender, ovipositor distinctly projecting; median field of postpetiolus finely alutaceous, shiny; second tergite finely and fairly densely punctured, finely alutaceous between punctures, nevertheless, somewhat shiny. Uniformly pale ferruginous; apical tergites never infuscated.

5. *Aoplus moiiletti*, new species

Types

Holotype.—♀, Alberta, Coleman, ex *Enypia moiiletti* Blkmre., E. M. Hills, 17.VIII.1955. C.N.C. No. 7301.

Paratype.—1 ♀, same locality and host, 15.VIII.1955. C.N.C.

Host

Enypia moiiletti Blkmre.

Distribution

Alberta.

Preamble

A medium sized species of the *confirmatus* group, similar to *thujarum*, new species, but considerably less slender, temple profile not quite as strongly narrowed, femora somewhat less slender, scutellum not yellow; chromatically, by the almost uniformly ferruginous basic color, similar to *monotonus*, new species, but flagellum not widened beyond middle and more considerably attenuated.

Female

Ferruginous, including scutellum; frontal orbits, subalarum and pronotal ridge narrowly pale yellow; flagellum black, with white annulus, not widened beyond middle; scopa distinct; length 10-11.5 mm.

Flagellum.—Bristleshaped, slender, gradually considerably attenuated and pointed at apex, ventrally flattened beyond middle, but not widened, with 35-36 segments, the first about 2.5 times as long as wide, about the sixteenth square. Black with white annulus on segments 8-12; scape ventrally ferruginous.

Head.—Temple and cheek profiles considerably narrowed, the former not quite as strongly as in *thujarum*, and with straight, the latter with slightly curved, outline; malar space scarcely longer than width of base of mandible. Ferruginous; the following are pale yellow: frontal orbits from level of antennal sockets up to lower ocellus, outer orbits partially and fairly indistinctly; no black markings.

Thorax.—Mesoscutum convex, finely and densely punctured, somewhat shiny; notauli basally indicated; scutellum rather strongly raised above postscutellum; area superomedia slightly wider than long; costulae distinct in type specimen, subobsolete in paratype. Ferruginous; the following are pale yellow: pronotal ridge narrowly and subalarum.

Legs.—Moderately slender; coxae III with scopa. Uniformly ferruginous.

Abdomen.—Less slender than in *thujarum*; second tergite medially about as long as apically wide, the third considerably wider than long; postpetiolus with fairly distinct median field, finely coriaceous. Uniformly ferruginous.

6. *Aoplus torpidus* (Wesmael)

Ichneumon torpidus Wesmael, 1857, Oria, p. 32, ♀.

Types

Holotype.—♀, Piemont. ? Musée d'Histoire Naturelle de Belgique, Bruxelles.

Distribution

Holarctic. In Europe all records are alpine and near-alpine: Piemont, Niederdonau (Heinrich, 1944), Allgaeu, Berchtesgaden, Steiermark. In America recorded so far from Quebec, Laniel and Mt. Lyall; Alberta, Edmonton. (C.N.C.). Ontario, Nipigon; Maine, Jackmann. (C.G.H.).

Preamble

A black species of smaller size. It is strange that neither in Europe nor in America has the male been discovered. Here and there a black male occurs which marches *torpidus* well enough in size and color (in America described as *vagus* by Provancher). This male, however, belongs, as sufficiently proven by rearings and observations, to the red-bodied, also holarctic, species *Aoplus ruficeps*

(Gravenhorst). The male of *torpidus* is presumably either similar to *ruficeps* male, or extremely dimorphic, and has escaped recognition by one or the other reason. American populations of the species are almost congruent with European. The frontal orbits of the latter are more ferruginous tinted and connected with the likewise-colored vertical orbits. Such subtle differences do not seem to justify a subspecific naming.

Female

Black, scutellum usually obscure ferruginous; upper part of facial orbits, and frontal orbits narrowly whitish; flagellum bristleshaped, but moderately attenuated toward apex; coxae III with small scopa; tibiae predominantly brownish; length 9-12 mm.

Flagellum.—Bristleshaped, moderately attenuated and moderately pointed at apex, ventrally flattened beyond middle and slightly widened, with 32-35 segments, the first about 2.5 times as long as wide, about the thirteenth square, the widest nearly 1.5 times as wide as long. Black, with white annulus on segments 6 or 7 to 11 or 12; scape usually ventrally ferruginous.

Head.—Temple and cheek profile rather strongly narrowed with almost straight outlines; malar space fully as long as width of base of mandible. Black; in American specimens the uppermost part of facial orbits (level with antennal sockets) and the frontal orbits, whitish, in European specimens these parts ferruginous, as are the vertical orbits too.

Thorax.—Mesoscutum densely and finely punctured, alutaceous between punctures, opaque; notauli basally distinct; area superomedia usually about square, sometimes slightly wider than long, its anterior bordering carina sometimes subobsolete; costulae obsolete or indicated. Black; collare, scutellum and post-scutellum usually ferruginous or obscure yellowish; usually apex of pronotal ridge, more rarely its whole length, of the same color.

Legs.—Moderately slender; coxae III densely punctured, with fairly distinct scopa. Black; trochantelli I and II, extreme base of femora and the tibiae and tarsi brownish; tibiae III apically or entirely infuscated.

Abdomen.—Slender, sharply pointed toward apex; ovipositor distinctly projecting. Black; first and second tergites sometimes obscurely brownish tinted toward apex.

7. *Aoplus rarior*, new species

Types

Holotype.—♀, Ontario, Constance Bay, 20.VII.1933, G. S. Walley. C.N.C. No. 7293.

Paratype.—1 ♀, Quebec, Gatineau. C.G.H.

Distribution

Ontario; Quebec.

Preamble

In general appearance somewhat similar to *velox* (Cresson), but very different in structure of flagellum, which is bristleshaped and somewhat widened beyond middle.

Female

Head predominantly, mesoscutum, scutella, propodeum predominantly and abdomen except base of petiolus, red-brown; all coxae and trochanters, femora III predominantly and apex of tibiae III black; flagellum bristleshaped with white annulus; coxae III with scopa; length 12 mm.

Flagellum.—Bristleshaped, gradually attenuated and pointed at apex, ventrally distinctly flattened beyond middle and somewhat widened, with 33-34 segments, the first fully 2.5 times as long as wide, the eleventh or twelfth approximately square, the widest about 1.5 to 1.75 times as wide as long. Black, with white annulus on segments 7-12; scape ventrally at base ferruginous.

Head.—Temple and cheek profiles rather strongly narrowed, the former with straight, the latter with almost straight outline; malar space approximately as long as width of base of mandible. Ferruginous; the following are black: lateral fields of face, clypeus laterally or more extensively, supraantennal cavities partially.

Thorax.—Mesoscutum moderately convex, densely punctured, alutaceous between punctures, opaque; notauli basally distinct; scutellum slightly raised above postscutellum; area superomedia about as long as wide, weakly bordered anteriorly; costulae obsolete. Red-brown; the following are black: propleura (including pronotal base) up to beyond middle, prosternum, prepectus, band below subalarum, longitudinal band on lower part of mesopleura (or regions above sternauli and in front of coxae II), areae coxales, propodeal and scutellar sutures.

Legs.—Moderately slender; coxae III ventrally very densely punctured, with scopa. All coxae, trochanters and trochantelli, and the femora III except base, black or blackish; the rest red-brown; apex of tibiae III narrowly black; femora II, in type also femora I, blackish infuscated dorsally.

Abdomen.—Fairly slender; ovipositor distinctly projecting; median field of postpetiolus distinct, finely coriaceous; thyridia oblique, distinctly diverging from apical border of postpetiolus. Except base of petiolus, uniformly red-brown.

8. *Aoplus melanisticus*, new species

Types

Holotype.—♀, Ontario, Upsala, 22.VI.1956, Gerd H. Heinrich. C.G.H.

Paratypes.—2 ♀♀, Yukon Territory, Rampart House, 14 and 15.VII.1951, C. C. Loan. C.N.C. No. 7300.

Distribution

Canadian Zone: Northern Ontario, Yukon Territory.

Preamble

Very similar to *ravior*, new species, but considerably smaller and slenderer, the flagellum scarcely widened, mesosternum and last three tergites black. It seems not impossible that this form represents a melanistic, boreal subspecies of *permutabilis*, new species.

Female

Ferruginous, including scutellum, without yellow pattern; head and thorax with fairly extensive black markings; tergites 5-7 entirely or predominantly black; all coxae, trochanters and femora III or II and III black; flagellum black with white annulus; fairly distinct scopa; length 9 mm.

Flagellum.—Bristleshaped, gradually attenuated and pointed at apex, ventrally flattened but scarcely widened beyond middle, with 31 or (type) 32 segments, the first fully 3 times as long as wide, about the twelfth or thirteenth approximately square. Black, with white annulus on segments 7 or 8 to 11.

Head.—Structure as in *permutabilis*. Ferruginous with varying black pattern: at least supraantennal cavities partially, ocellar region and occipital

region black (one specimen from Yukon Territory), sometimes also middle of frons broadly black (second specimen from Yukon Territory), sometimes also face, except median field, and clypeus (specimen from North Ontario).

Thorax.—Structure as in *permutabilis*. Ferruginous; the following are black: propleura partially or entirely (except pronotal ridge and base), sterna, prepectus, band below subalarum, areae coxales, sometimes declivity of propodeum, scutellar and propodeal sutures, lateral lobes of mesoscutum entirely or predominantly, base of median lobe at pronotum.

Legs.—Moderately slender; coxae III ventrally densely punctured, moderately shiny, with fairly distinct scopa. The following are black: all coxae and trochanters, femora III and (in type specimen) also II, apex of tibiae III more or less distinctly; rest ferruginous or pale brownish; in specimens from Yukon Territory femora I and II ferruginous, sometimes dorsally infuscated.

Abdomen.—Structure as in *permutabilis*. Ferruginous; tergites 5-7 entirely or predominantly black; in type specimen also bases of tergites 1-4 narrowly black.

9. *Aoplus monotonus*, new species

Types

Holotype.—♀, Washington, Elbe, 15.VII.1940, H. and M. Townes. C.H.T.

Allotype.—♂, Washington, Ashford, 18.VII.1940, H. and M. Townes. C.H.T.

Paratypes.—4 ♀ ♀, Washington, Elbe and Ashford and Mt. Rainier (2900 ft.); 2 ♀ ♀, Oregon, Meacham; 2 ♀ ♀, Colorado, Phantom Valley; 1 ♀, Alberta, Banff. C.H.T. 2 ♀ ♀, British Columbia, Robson. C.G.H. 5 ♀ ♀, British Columbia, Robson, C.N.C.

Distribution

Seemingly confined to the West: Washington, Oregon, Colorado, British Columbia, Alberta.

Preamble

A smaller, uniformly ferruginous species of the *confirmatus* group; sometimes with restricted black pattern on sterna and pleura, but, in the female, without yellow markings; distinguished by its color, flagellar structure and weak scopa.

Female

Usually uniformly ferruginous, always without yellow pattern, sometimes with restricted black pattern on pleura and sterna; flagellum tricolored, with white annulus and ferruginous base; coxae III with weak scopa; length 10-11 mm.

Flagellum.—Bristleshaped, fairly slender, moderately attenuated and pointed at apex, ventrally flattened beyond middle and slightly widened, with 30-34 segments, the first about 2.5 times as long as wide, the twelfth approximately square, the widest about 1.5 times as wide as long. Tricolored, with white annulus on segments 7 or (usually) 8 to 11 or (usually) 12, the basal segments (sometimes up to white annulus) ferruginous; scape ferruginous.

Head.—Temple and cheek profiles considerably narrowed, the former with straight, the latter with slightly curved outline; malar space scarcely longer than width of base of mandible. Uniformly ferruginous.

Thorax.—Mesoscutum convex, finely and densely punctured, alutaceous between punctures, a little shiny; notauli basally distinct; scutellum distinctly

raised above postscutellum, dorsally punctured and shiny, laterally carinate at very base; area superomedia about as wide as long; costulae obsolete. Usually uniformly ferruginous, only the very base of prepectus and sometimes base of prosternum infuscated; in few melanistic specimens the following are black: prosternum, prepectus, middle of pronotum behind collare and propleura.

Legs.—Moderately stout; coxae III with weak scopa. Uniformly ferruginous; rarely apex of coxae III black.

Abdomen.—Median field of postpetiolus densely, irregularly rugose; second tergite fairly densely punctured, alutaceous between punctures, its basal part densely somewhat coarsely and rugose punctate; gastrocoeli well impressed, with large, oblique thyridia. Uniformly ferruginous.

Male

Pale ferruginous; scutella, pronotal ridge and sterna pale yellow; head and thorax with restricted, black pattern; flagellum usually uniformly black; legs without black markings; length 10-11 mm.

Flagellum.—With 32-33 segments and with bacilliform tyloides on segments 8-16. Black, ventrally obscure brownish; scape ventrally yellow.

Head.—Malar space half as long as width of base of mandible. The following are yellow: mandibles except teeth, clypeus, face, frontal orbits, cheeks (except upper part and hind border); the following are black: middle of frons, ocellar and occipital regions; zone between yellow and black, ferruginous.

Thorax.—Ferruginous; the following are yellow: collare, pronotal ridge, pronotal base, subalarum, tegulae, scutella, prosternum, mesosternum, about lower half of mesopleura; the following are black: band below subalarum and mesoscutal sutures; sometimes black pattern more extended, including middle of propleura, propodeal sutures, area coxales and even most of declivity of propodeum.

Legs.—Pale rufous; coxae and trochanters I and II pale yellow.

Abdomen.—Uniformly pale ferruginous.

10. *Aoplus velox* (Cresson)

Distribution

According to H. Townes 1951: "Transcontinental in Canadian Zone and cooler parts of Transition Zone".

Preamble

This species is well distinguished by the filiform flagellum of females and the pattern of chromatic sexual dimorphism. Females from British Columbia are chromatically somewhat differentiated from eastern populations, therefore in the following treatment an eastern and a western subspecies has been separated. The species varies unusually in size.

Female

Head partially, mesoscutum, scutellum and abdomen entirely or predominantly red-brown; in the western subspecies usually the whole thorax of the same color; seventh tergite with yellowish anal mark; legs red-brown, coxae I and II usually partially, femora III predominantly black; flagellum filiform, with white annulus; coxae III with scopa; length 9-13 mm.

Flagellum.—Filiform, not attenuated, with blunted apex, ventrally flattened beyond middle and scarcely widened, slightly attenuated toward base, with 29 to 35 segments, the first 2.3 times as long as wide, the sixth square. Black, with white annulus on segments 7-12 or 13; scape ventrally usually ferruginous.

Head.—Temple and cheek profiles distinctly narrowed, both with scarcely curved outlines; malar space scarcely longer than width of base of mandible. Varying from predominantly red-brown (usually with black clypeus, supra-antennal cavities and temple region) to predominantly black (with only frontal and vertical orbits ferruginous).

Thorax.—Mesoscutum but slightly convex, fairly densely punctured, alutaceous between punctures, subopaque; anterior third of notauli rather distinct; scutellum slightly raised above postscutellum, fairly strongly punctured and shiny; propodeum finely rugose-coriaceous, opaque; area superomedia approximately square, often a little narrowed toward apex; costulae obsolete; apices of areae dentiparae a little prominent. Black; the following are usually red-brown: collare, pronotal ridge partially, tegulae, subalarum, mesoscutum, scutellum postscutellum, sometimes basic lateral areas on horizontal part of propodeum; rarely mesoscutum partially infuscated; in great majority of western specimens thorax, including pleura, predominantly red-brown.

Legs.—Moderately stout, coxae III with distinct scopa. Red-brown including coxae and trochanters; coxae I and II, trochanters I and II and femora I and II usually partially infuscated, sometimes predominantly blackish-brown; femora III except base and the apex of tibiae III black or blackish.

Abdomen.—Postpetiolus densely, irregularly rugose; second tergite finely coriaceous-alutaceous, subopaque; thyridia less oblique than in the *confirmatus* group, nearly parallel with apical border of postpetiolus; ovipositor projecting little. Uniformly red-brown, the seventh tergite with more or less distinct yellowish anal mark.

Male

Black; scutellum usually apically, sometimes predominantly yellowish or pale ferruginous; legs rufous, apex of femora III and the tibiae and tarsi III black (the tibiae III often medially brownish); coxae and trochanters I and II sometimes pale yellowish or whitish; flagellum black, without annulus; length 11-15 mm.

Flagellum.—Unusually variable in number of segments (32-40), with narrow, bacilliform tyloides on segments 5 or 6 to 12 or 13, or 14. Black, ventrally pale yellowish-brown, except at tip; scape ventrally white.

Head.—Malar space scarcely half as long as width of base of mandible. Black; the following are white: mandibles except teeth, face and clypeus; face usually with a black mark or dot in the middle of its upper part; often middle of clypeus and face broadly infuscated.

Thorax.—Scutellum more considerably raised above postscutellum than in female, dorsally rather flat, laterally carinate at base; notauli strongly developed; area superomedia often wider than long. Black; scutellum usually apically, sometimes entirely, ferruginous, sometimes entirely black; tegulae and sometimes subalarum ferruginous or yellowish; collare always black.

Legs.—Vivid rufous; apex of femora III, the tibiae and tarsi III black, tibiae III sometimes medially lighter, rufous or brownish; coxae and trochanters I and II sometimes yellowish-white, rarely also coxae III ventrally.

Abdomen.—Uniformly black; sometimes apex of first, or first and second, tergite indistinctly ferruginous.

10a. *Aoplus velox velox* (Cresson)

Ichneumon velox Cresson, 1864, Ent. Soc. Phila. Proc., 3: 185, ♀.
Ichneumon puerilis Cresson, 1867, Amer. Ent. Soc. Trans., 1: 296, ♂.
Ichneumon mellicoxus Provancher, 1875, Nat. Canad., 7: 21, 48, ♂.
Phygadeuon apicatus Provancher, 1875, Nat. Canad., 7: 180, 183, ♀.
Phygadeuon cressoni Provancher, 1876, Nat. Canad., 8: 318, ♀.

Types

Holotypes.—*Ichneumon velox* Cresson, ♀, Illinois. A.N.S. *Ichneumon puerilis* Cresson, ♂, Canada. A.N.S. *Ichneumon mellicoxus* Provancher, ♂, Quebec, Provincial Museum, Quebec, No. 650. *Phygadeuon apicatus* Provancher, ♀, Quebec. Type not located. *Phygadeuon cressoni* Provancher, ♀, Quebec. Provincial Museum, Quebec (not numbered yet).

Hosts

According to H. Townes 1951: "*Lambdina fiscellaria fiscellaria* (Guen.) and *Nepytia canosaria*". Both records confirmed by rearings in Canada, the former in Newfoundland, the latter in New Brunswick (C.N.C.). New record: *Ellopia athasaria* (Guen.) in Connecticut (U.S.N.M.).

Distribution

Eastern part of the range of the conspecies, to the north including Newfoundland, westward probably to Continental Divide.

Female

Pleura and sterna entirely or predominantly black.

10b. *Aoplus velox occidentalis* (Harrington), new status

Ichneumon occidentalis Harrington, 1876, Nat. Canad., 26: 210, ♀.

Types

Holotype.—♀, Vancouver Island, Victoria. C.N.C.

Host

Lambdina fiscellaria lugubrosa (Hulst) (C.N.C.).

Distribution

Vancouver Island.

Female

Thorax, including pleura and sterna, entirely or predominantly red-brown.

Male

Agrees with *velox velox* (Cresson).

11 *Aoplus ruficeps* (Gravenhorst)

Distribution

Holarctic; recorded from middle and northern Europe in the Old World; transcontinental in Canadian and cooler part of Transition Zones in America; mainly in coniferous woods.

Preamble

A species related to *velox* (Cresson) by structure of flagellum, color pattern of female and principle of chromatic sexual dimorphism. Females are on the average smaller than *velox* but sometimes rather similar in color to *velox*.

occidentalis (Harrington). They can be always easily distinguished by difference in relative length of first segment of flagellum which is only 1.75 times as long as wide in *ruficeps*, but 2.30 times as long as wide in *velox*. Besides, the temple outline of *ruficeps* is more rounded and somewhat less narrowed than in *velox*.

Female

Head, thorax, abdomen and legs predominantly ferruginous, mesosternum usually and sometimes prepectus black; in the European subspecies often pleura entirely or predominantly blackish too; scutellum usually with yellowish apical band; seventh tergite with yellowish anal mark; flagellum filiform, black with white annulus, scape predominantly or entirely ferruginous; coxae III with scopa; length 8-11 mm.

Flagellum.—Filiform, short, not attenuated, with blunted apex, ventrally flattened beyond middle and scarcely widened, slightly attenuated toward base, with usually 26-28, exceptionally 30, segments, the first 1.75 times as long as wide, the fifth or sixth square. Black, with white annulus on segments 7 or 8 to 11 or 12, rarely to 13; scape usually entirely or predominantly ferruginous.

Head.—Temple profile slightly less narrowed, its outline a little more curved than in *velox*; malar space scarcely longer than width of base of mandible. Predominantly or entirely ferruginous; supraantennal cavities and usually temple region toward carina occipitalis infuscated or black.

Thorax.—As in *velox*, but apices of areae dentiparae not at all prominent. Ferruginous; in American specimens usually mesosternum, often also prepectus, sometimes prosternum and propleura black or blackish; in European populations infuscation of thorax tends to be more extensive, often including all pleura, sometimes even propodeum.

Legs.—Fairly stout; coxae III with distinct scopa. Ferruginous; in American populations often all trochanters and the coxae I and II partially, more rarely all femora laterally infuscated.

Abdomen.—As in *velox*. Uniformly ferruginous; the seventh tergite with yellowish anal mark, often the apical border of the sixth tergite medially, narrowly yellowish.

Male

Black, scutellum, except base, and pronotal ridge white; flagellum except in specimen from Alaska with white annulus; coxae and trochanters I and II extensively white; femora III rufous in Europe, black or blackish-brown in America; tibiae III usually pale yellowish, or whitish toward base, tarsi III sometimes whitish, dorsally usually variegated with whitish; length 9-13 mm.

Flagellum.—With 31-35 segments and bacilliform tyloides on segments 5-11. Black, ventrally brownish, with white annulus on segments 15 or 16 or 17 to 17, 18 or 19; scape ventrally white.

Head.—Malar space scarcely one third as long as width of base of mandible. Black; the following are white: mandibles except teeth, clypeus, face, frontal orbits up to lower ocellus, outer orbits except temple region, including malar space and usually apex of cheeks along base of mandibles.

Thorax.—Black; the following are white: collare, apex of pronotal base, pronotal ridge, apex of prosternum, tegulae, subalarum, scutellum except base and postscutellum.

Legs.—Coxae and trochanters I and II extensively, usually predominantly, white; coxae III black, often ventrally with white mark at apex; femora and tibiae rufous in European subspecies; in nearctic specimens femora III entirely, femora I and II partially, black or blackish; tibiae I and II predominantly white, tibiae III more or less extensively whitish toward base, blackish at apex; anterior tarsi pale, tarsi III infuscated, partially pale.

Abdomen.—Black; incisions between anterior tergites, or narrow, lateral borders of the latter sometimes obscure ferruginous, especially in European specimens.

11a. *Aoplus ruficeps ruficeps* (Gravenhorst)

Ichneumon ruficeps Gravenhorst, 1829, Ichn. Eur. I, p. 633, ♀.

Aoplus ruficeps Heinrich, 1949, Muench. Ent. Ges., 35-39: 6, ♂.

Types

Holotype.—Lost during World War II (according to H. Townes).

Distribution

Middle and northern Europe.

Hosts

Bupalia piniaria (L.) and *Selenia lunaria* Fab. (according to Schmiedeknecht, Op. Ichn. Suppl., p. 423).

Female

On the average ferruginous color on thorax more restricted than in *ruficeps vagans*; usually sterna and all pleura predominantly or entirely, sometimes even propodeum, black or strongly infuscated.

Male

All femora rufous; tibiae and tarsi fulvous; tibiae III usually apically infuscated, pale toward base, especially on ventral side; tarsi III partially infuscated, bases and apices of their two basal segments, sometimes ventral side of all segments, and the third and fourth segment usually entirely pale.

11b. *Aoplus ruficeps vagans* (Provancher)

Ichneumon vagans Provancher, 1875, Nat. Canad., 7: 22, 51, ♂.

Aoplus ruficeps Heinrich, 1956, Can. Ent. 88: 648/49, ♀.

Aoplus vagans vagans Townes, 1951, Syn. Cat., p. 290, ♂.

Aoplus ruficeps vagans Heinrich, 1959, Can. Ent., 91: 807, ♂.

Types

Holotype.—♂, Quebec, Provincial Museum, Quebec, No. 683.

Host

(♀ ♂) *Macaria* sp. New Brunswick and Nova Scotia (C.N.C.).

Distribution

According to H. Townes 1951: "Transcontinental in Canadian Zone." New records: Cooler parts of Transition Zone; Maine, Dryden (C.G.H.).

Preamble

The association of sexes was confirmed by rearings of males and females from the same host in New Brunswick and in Nova Scotia.

Female

Thorax on the average more extensively ferruginous than in *ruficeps ruficeps* (Gravenhorst); pleura predominantly or entirely, propodeum entirely, ferruginous.

Male

Femora III entirely black or blackish; femora I and II black on exterior side only, interiorly and dorsally whitish; tibiae and tarsi I and II whitish, the tibiae with blackish ventral stripe toward apex; tibiae III apically blackish, basally more or less extensively whitish, particularly extensively on ventral side; tarsi III infuscated, bases and apices of their segments, sometimes their entire ventral side, sometimes the fourth segment entirely whitish.

11c. *Aoplus ruficeps sitkensis* (Ashmead)

Ichneumon sitkensis Ashmed, 1902, Wash. Acad. Sci. Proc., 4: 152, ♂.

?*Ichneumon simulator* Ashmead, 1902, Wash. Acad. Sci. Proc., 4: 153, ♂.

Aoplus vagans sitkensis Townes, 1951, Syn. Cat. p. 290, ♂.

Aoplus ruficeps sitkensis Heinrich, 1959, Ent. News, 70: 211, ♂.

Types

Holotype.—♂, Alaska, Sitka. U.S.N.M. *Ichneumon simulator* Ashmead, ♂, Alaska, Kukak Bay. U.S.N.M.

Distribution

According to H. Townes 1951: "Alberta, Alaska".

Male

The type differs from *ruficeps vagans* (Provancher) by lack of a white annulus on flagellum.

Remarks

I am in doubt whether *simulator* Ashmead is indeed specifically identical with *sitkensis*. It differs from it by having a very narrow (2 segments) white annulus on flagellum and by the obsolescence of the white color on anterior coxae and trochanters. It also seems that the sculpture on lower half of mesopleura and on mesoscutum is a little more shiny. More material and further investigation are necessary in order to secure a clear concept of the variability and of the diagnosis of this subspecies.

12. *Aoplus ochropis* (Gmelin)*Distribution*

Holarctic; recorded from Europe and Japan in the Old World, in America from Alaska, Alberta, Colorado and (one male) Quebec (Mt. Lyall). The most common species of the genus in Europe, where deciduous woods with rank ground vegetation represent its habitat.

Preamble

A species of the *velox* group, with white anal mark and subfiliform, rather slender flagellum. While the few specimens I have seen from Alaska and Alberta (including the type specimen of *seldoviae* Ashmead) show no distinct subspecific differences from European populations, a large series from Colorado in C.H.T. represents a distinct subspecies.

Female

Black, in European populations usually anterior tergites more or less extensively obscure ferruginous; scutellum more or less extensively ferruginous; seventh tergite with large white anal mark, sixth medially with white apical border; flagellum subfiliform, slender and fairly long; femora, tibiae and tarsi predominantly rufous, in Colorado predominantly black; coxae III with scopa; length 8-12 mm.

Flagellum.—Subfiliform, fairly long and slender, very slightly attenuated toward apex, ventrally flattened beyond middle and scarcely widened, with usually 31-32 segments, the first almost 3 times as long as wide, the ninth, tenth or eleventh square. Black, with white annulus on segments 6 or 7 to 12; scape ventrally and apices of basal segments more or less extensively ferruginous.

Head.—Temple profile distinctly narrowed, with slightly curved outline, cheek profile considerably narrowed, with straight outline; malar space a little longer than width of base of mandible. Black; frontal orbits and usually middle of face obscure ferruginous.

Thorax.—Mesoscutum moderately convex, finely and very densely punctured, subopaque; anterior third of notauli distinct; scutellum somewhat raised above postscutellum, dorsally flat and moderately densely punctured, shiny, laterally carinate at base; area superomedia longer than wide, costulae obsolete, often their base at junction with area superomedia recognizable. Black; narrow apex of pronotal ridge, scutellum more or less extensively, postscutellum, tegulae, usually subalarum and sometimes collare obscure ferruginous.

Legs.—Moderately slender; coxae III ventrally finely and very densely punctured, shiny, with scopa. In the European subspecies rufous, coxae usually more or less infuscated, in specimens from Colorado legs predominantly black.

Abdomen.—Postpetiolus densely and finely, irregularly rugose, with fairly indistinct median field; gastrocœli strongly transverse with very narrow interval, thyridia wide and moderately oblique. Black, seventh tergite with large white anal mark, the sixth medially with white apical border; anterior tergites in European specimens usually more or less extensively obscure ferruginous.

Male

Black; face, clypeus and about apical half of scutellum white; flagellum with white, annulus, ventrally pale; legs, including femora III, in European specimens predominantly rufous, in populations from Colorado predominantly black; length 10-13 mm.

Flagellum.—With 31-34 segments and with narrow, bacilliform tyloides on segments 6 or 7 to 11 or 12. Black, with white annulus on segments 12 or 13 to 16 or 17; ventrally pale ferruginous; scape ventrally white.

Head.—Malar space about one third as long as width of base of mandible. Black; mandibles except teeth, clypeus and face white.

Thorax.—Black; about apical half of scutellum and in European populations, usually, postscutellum and partially subalarum whitish; tegulae and extreme apex of pronotal ridge pale ferruginous.

Legs.—In European populations predominantly rufous; coxae, particularly coxae III, usually partially infuscated, the latter often predominantly black; in populations from Colorado legs predominantly black; legs I and II more brownish, their tibiae and tarsi lighter than the femora.

Abdomen.—Black; insections between anterior segments often obscure ferruginous.

12a. *Aoplus ochropis ochropis* (Gmelin)

Ichneumon ochropis Gmelin, 1790, in Linnaeus, System Nat., Ed. 13, p. 2679.

Melanichneumon seldoviae Ashmead, 1902, Wash. Acad. Sci. Proc., 4: 155, ♂.

Types

Holotypes.—*Ichneumon ochropis* Gmelin, destroyed. *Melanichneumon seldoviae* Ashmead, ♂, Alaska, Seldovia. U.S.N.M.

Hosts

Abraxas grossulariata (L.) (according to Schmiedeknecht, Opusc. Ichn. Suppl., p. 422).

Distribution

Palearctic; widely spread and very common in Europe; recorded also from Japan; the type specimen of *Melanichneumon seldoviae* from Alaska is not distinguishable from palearctic specimens. Whether or not the range of the European subspecies really includes Alaska (and Alberta) can not be decided before broad series from the mentioned area have been collected and examined.

Female

Legs predominantly rufous (coxae usually partially infuscated); anterior tergites usually more or less extensively (at least their apical borders) obscure ferruginous.

Male

Legs predominantly rufous; coxae III, tibiae III toward apex and tarsi III usually infuscated, femora III, however, always rufous.

12b. *Aoplus ochropis coloradensis*, new subspecies

Types

Holotype.—♀, Colorado, Phantom Valley, 9400 ft., 9.VIII.1948, H. M. D. and J. Townes. C.H.T.

Allotype.—♂, from the same locality and date. C.H.T.

Paratypes.—11 ♀ ♀, 4 ♂ ♂ from the same locality and date. C.H.T.

Distribution

Colorado (and probably Quebec, Mt. Lyall).

Female

Legs black; legs I and II not quite as dark as legs III, their femora blackish-brown, their tibiae and tarsi brown; abdomen uniformly black, except anal marks.

Male

Femora, tibiae and tarsi I and II still paler than in female, the femora pale brown, the tibiae almost yellowish; legs III, however, including femora and tibiae uniformly black.

Remarks

The single known specimen from the east, a male from Quebec, (Mt. Lyall, 1500 ft.) in C.N.C. agrees with specimens from Colorado.

13. *Aoplus pseudovelox*, new species

Types

Holotype.—♀, Quebec, St. Sauveur, 22.VIII.1959, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Dryden, 30.VIII.1951. C.G.H.

Paratypes.—2 ♂♂, Maine, Dryden. C.G.H.; 2 ♀♀, 4 ♂♂, Ontario, Ottawa. C.N.C.; 1 ♀, Michigan, Manistee; 2 ♀♀, Pennsylvania; 1 ♀, 3 ♂♂, New York. C.H.T.

Distribution

Quebec, Ontario, Maine, Michigan, New York, Pennsylvania (types); New Hampshire, Alberta (C.H.T.).

Preamble

A small species of the *velox* group, related and somewhat similar to *velox* (Cresson), differing as follows: considerably smaller; thorax predominantly, rest uniformly, or almost uniformly, ferruginous; flagellum slenderer, its last segment not quite as short and blunt as in *velox*, but slightly attenuated; scopa of coxae III indistinct; frons more convex.

Female

Thorax predominantly, rest uniformly, or almost uniformly, ferruginous; seventh tergite with whitish anal mark; flagellum filiform, black, with white annulus; coxae III with indistinct scopa; length 7 mm.

Flagellum.—Filiform, not attenuated, the apex, however, not quite as blunt as in *velox*, as the apical segment is slightly attenuated, as a whole slenderer than in *velox*, ventrally flattened beyond middle, but not at all widened, with 28 segments, the first more than three times as long as wide, about the tenth square. Black with white annulus on segments 8-12; scape black, ventrally ferruginous.

Head.—Temple and cheek profiles rather strongly narrowed, the former with slightly curved, the latter with straight, outline; malar space a little longer than width of base of mandible; frons below and at level of lower ocellus slightly convex, with a very slight median depression below lower ocellus. Ferruginous; usually supraantennal cavities and sometimes malar space black.

Thorax.—Mesoscutum moderately convex, finely and densely punctured, subopaque; notauli basally distinct; scutellum but slightly raised above post-scutellum, dorsally flat, moderately densely punctured and shiny, laterally carinate at the very base; carination of propodeum weak, costulae obsolete, area superomedia slightly narrowed toward base, scarcely as long as apically wide, or somewhat wider than long. Ferruginous; the following are black: prosternum except apex, prepectus, mesolcus, middle of propleura, band below subalarum, anterior border of mesopleura adjacent to prepectus, mark on mesopleura in front of coxae II, areae coxales, sometimes lower part of areae metapleurales, or even entire areae metapleurales, usually mesoscutal, scutellar and propodeal sutures.

Legs.—Moderately slender; coxae III ventrally finely and fairly densely punctured, shiny, with small and weak scopa. Uniformly ferruginous, rarely trochanters blackish; coxae sometimes partially somewhat infuscated, particularly coxae I and II.

Abdomen.—Postpetiolus without distinct median field, finely coriaceous; second and third tergites very finely coriaceous-alutaceous, without distinct puncturation; gastrocœli shallow, thyridia moderately oblique. Ferruginous, the seventh tergite with not clearly defined, yellowish anal mark.

Male

Very similar to *Homotherus semiaoplus* Heinrich, but chromatically constantly different by the tarsi III and apices of femora and tibiae III not being infuscated.

Rufous, head and thorax with restricted black markings, scutella and pronotal ridge and base white, coxae I and II and trochanters I and II white; legs III including coxae and trochanters rufous; sometimes coxae apically (dorsally, or also ventrally), and sometimes trochanters III dorsally partially black, but never apices of femora and tibiae III; tarsi III not infuscated; flagellum black with white annulus; length 9-10 mm.

Flagellum.—With 29 to (usually) 30 segments and with narrow, bacilliform tyloides on segments 6-12. Black, with white annulus on segments 11, 12 or 13 to 17 or 18, ventrally usually indistinctly brownish tinted; scape ventrally white, dorsally usually ferruginous at base.

Head.—Malar space half as long as width of base of mandible. The following are white: mandibles except teeth, clypeus, face, frontal orbits, malar space and apex of cheeks; the following are black: supraantennal cavities, frons, vertex and occiput; upper part of cheeks up to temple region ferruginous; sometimes also vertex and occiput partially ferruginous.

Thorax.—Mesoscutum convex, densely and finely punctured, subopaque; basal third of notauli distinct; scutellum distinctly raised above postscutellum; propodeum short, declivity about twice as long as horizontal part medially; area superomedia somewhat wider than long, costulae usually obsolete. Rufous; the following are white: collare, pronotal ridge and base narrowly, subalarum, tegulae, scutellum and postscutellum; the following are black: base of prosternum, middle of pronotum (behind collare), prepectus, band below subalarum, mark on mesopleura in front of coxae II, areae coxales, propodeal, scutellar and mesoscutal sutures, sometimes propleura and metapleura partially.

Legs.—Rufous; coxae I and II, trochanters and trochantelli I and II white; tarsi III and apices of femora III and tibiae III never infuscated, often coxae III dorsally near apex black marked, or trochanters III dorsally partially black, more rarely coxae III ventrally black at apex.

Abdomen.—Petiolus gradually widening into postpetiolus; median field of postpetiolus very finely alutaceous, somewhat shiny; second tergite very finely alutaceous, with scattered, extremely fine punctures; gastrocoeli rather shallow, but distinct. Uniformly rufous.

Remarks

The association of sexes as given above was concluded from chromatic, and particularly sculptural, analogies. Also both sexes have been collected at the same time in a restricted locality in Ontario.

14. *Aoplus cestus* (Cresson)

Ichneumon cestus Cresson, 1877, Amer. Ent. Soc. Trans., 6: 182, ♀.

Platylabus opacitas Davis, 1898, Amer. Ent. Soc. Trans., 24: 353, ♂.

Aoplus cestus Heinrich, 1959, Entom. News, 70: 211, ♀ ♂.

Types

Holotype.—*Ichneumon cestus* Cresson, ♀, Vancouver Island. *Platylabus opacitas* Davis, ♂, Idaho, Moscow. U.S.N.M.

Hosts

According to H. Townes 1951: "*Lambdina fiscellaria somnaria* (Hlst.)."

Distribution

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

Preamble

The strongly projecting apices of areae dentiparae and the laterally (to about the middle) carinate scutellum distinguish this species from the type-species and from all other known European and North American species.

Female

Pale ferruginous; third tergite with broad black basal band; flagellum without annulus, infuscated toward apex; thorax with restricted black pattern; coxae III with weak scopa; length 10-11 mm.

Flagellum.—Bristleshaped, moderately attenuated, and moderately pointed at apex, ventrally slightly flattened beyond middle and scarcely widened, with 38-40 segments, the first about 2.5 times as long as wide, about the eighteenth square. Ferruginous, infuscated toward apex.

Head.—Temple and cheek profiles considerably narrowed, with almost straight outlines; malar space distinctly longer than width of base of mandible. Uniformly ferruginous.

Thorax.—Mesoscutum moderately convex, finely and densely punctured, slightly shiny; notauli basally indicated; scutellum somewhat raised above post-scutellum, dorsally sparsely punctured and shiny, laterally carinate to about middle; area superomedia usually approximately parallel-sided, somewhat longer than wide and with obsolete anterior carina; costulae obsolete; apices of areae dentiparae distinctly projecting. Ferruginous; the following are black: base of prepectus and basal sutures of scutellum and propodeum.

Legs.—Moderately stout; coxae III ventrally finely and fairly densely punctured, with scopa. Uniformly pale ferruginous; apices of tibiae III and usually femora III infuscated.

Abdomen.—Postpetiolus finely, irregularly coriaceous-rugose; second tergite finely and fairly densely punctured, alutaceous between punctures, subopaque. Ferruginous, third tergite with broad black basal band.

Male

Pale ferruginous; third tergite with broad black basal band; flagellum without annulus, infuscated toward apex; apices of femora III and of tibiae III blackish, face and clypeus predominantly pale yellowish; length 10-11 mm.

Flagellum.—With 38-40 segments and with bacilliform tyloides on segments 8 to 18 or 19. Ferruginous, including scape; dorsally infuscated toward apex.

Head.—Malar space more than half as long as width of base of mandible. Ferruginous, face and clypeus, except middle, pale yellow, supraantennal cavities black.

Thorax.—Ferruginous; the following are usually yellowish tinted: collare, pronotal ridge partially, pronotal base, subalarum, regulae, scutella; the following are usually black: base of prepectus, line on pronotum behind collare, short band below subalarum, extreme base of median lobe of mesoscutum, basal sutures of scutellum and propodeum.

Legs.—Pale ferruginous; apices of femora III and of tibiae III, and usually base of coxae III or III and II narrowly, blackish; coxae I and II almost yellowish.

Abdomen.—Pale ferruginous; third tergite with broad black basal band.

29. Genus *Limonethe* Townes

Figs. 1, 2

Limonethe Townes, 1946, Bol. Ent. Venezolana, 5: 56.*Type-species*.—*Joppa maurator* Brullé.

A distinct neotropical genus, closely related to the *Melanichneumon* group, advanced with just one species into America north of Mexico. Especially distinguished by the shape of the areolet in the forewing, the gross punctation of thorax and abdomen, and structure of mandibles.

Flagellum.—Of female bristleshaped, considerably widened and ventrally flattened beyond middle, moderately attenuated at apex; of male with long row of short-oval tyloides, segments, except the basal ones, with transverse ridges of short bristles on ventral side.

Head.—Normal, with narrowed temple and cheek profiles; mandibles with strong and long pointed upper tooth and reduced, subobsolete lower tooth, situated far back from the apex.

Thorax.—Unusually strongly and densely punctured all over; mesoscutum scarcely convex, without notauli; scutellum longer than wide, triangular, in females scarcely raised above postscutellum, dorsally flat and strongly punctured, laterally not carinate; carination of propodeum complete and distinct, of the general pattern of the *Melanichneumon* group; area superomedia hexagonal with insertion of costulae distinctly before middle in females, considerably before middle in males (Fig. 1).

Wings.—Arolet in the fore wing unusually wide at the top, sometimes nearly square, receiving the nervus recurrens far beyond middle.

Legs.—Moderately slender, coxae III without scopa.

Abdomen.—Of females narrow, approximately parallel-sided, with elongate anterior tergites; apex oxygygous, hypopygium, however, fairly long; postpetiolus with weakly indicated median field, strongly and rather densely punctured; gastrocoeli small, quadrangular, shallow; thyridia obsolete (Fig. 2); tergites 2-3 of females, 2-4 of males, densely and very strongly punctured.

Color.—The single North American species is black with vivid red abdomen and femora III, white banded flagellum in both sexes and strongly infuscated wings.

1. *Limonethe maurator* (Brullé)

Figs. 1, 2

Joppa maurator Brullé, 1846, Hist. Nat. Ins. Hym., v. 4, p. 287, ♀ ♂.*Ichneumon insolens* Cresson, 1867, Amer. Ent. Soc. Trans., 1: 302, ♀ ♂.*Joppa canadensis* Provancher, 1874, Nat. Canad., 6: 336, ♀.*Types*

Holotypes.—*Joppa maurator* Brullé. Musée National d'Histoire Naturelle, Paris; *Ichneumon insolens* Cresson, ♀, Louisiana. A.N.S.; *Joppa canadensis* Provancher, ♀, Quebec (according to N. M. Comeau referring to Provancher's notes: Cap Rouge). Provincial Museum, Quebec.

Distribution

According to H. Townes 1951: "Atlantic to 100° W. in Upper Austral and Lower Austral Zones. Overgrown, grassy fields. Rarely in Transition Zone".

Female

Black; abdomen and femora III vivid red, first segment sometimes partially infuscated; wings strongly infuscated; apex of femora I and the tibiae I internally

ivory; flagellum with white annulus; vertical orbits sometimes with yellowish spot; length 13-15 mm.

Flagellum.—Bristleshaped, moderately long, ventrally flattened and considerably widened beyond middle, gradually attenuated toward apex, with about 39-40 segments, the first twice as long as wide, the seventh square, the widest fully twice as wide as long. Black, with white annulus on segments 7 or 8 to 14 or 15.

Head.—Temple profile moderately narrowed with somewhat curved outline, cheek profile considerably narrowed, with straight outline; malar space shorter than width of base of mandible. Uniformly black; sometimes vertical orbits with yellowish spot.

For the rest see description of genus.

Male

Black; abdomen and femora III vivid red, first segment usually partially or predominantly infuscated; wings strongly infuscated; apex of femora I and the tibiae I internally ivory; flagellum with white annulus; facial orbits broadly, spot on vertical orbits and collare yellow; length 15-18 mm.

Flagellum.—With 40-42 segments and with fairly indistinct, short-oval tyloides on about segments 6-21. Black with white annulus on segments 12 or 13 or 14 to 19 or 20 or 21.

30. Genus *Hybophorellus*, Schulz

Hybophorus Tischbein, 1875, Stett. Ent. Zeit., 26: 281. (Preocc.)

Hybophorellus Schulz, 1911 (1909), Zool. Ann., 4: 38. (New name.)

Hybophorellus Heinrich, 1949, Mitt. Muench. Ent. Ges., 35-39, p. 49.

Hybophorellus Heinrich, 1956, Can. Entom., 88: 649.

Type-species.—*Ichneumon aulicus* Gravenhorst.

In some respects, as in the convex clypeus, the projecting apices of areae dentiparae, the elevated scutellum and the structure of the slender mandibles, this genus seems to approach *Hoplismenus* Gravenhorst. Whether these similarities indicate a true relationship, or represent mere convergencies, is uncertain.

Flagellum.—Of females moderately long, bristleshaped, ventrally flattened beyond middle and sometimes widened, considerably attenuated toward apex; of male slightly nodulose toward apex, with a long row of short-oval tyloides.

Head.—Temple and cheek profiles but slightly or moderately narrowed, the former with curved outline; lower part of cheeks constricted at carina genalis; median field of face and the clypeus rather strongly convex; mandibles slender, with very small apical teeth, the upper little longer than the lower.

Thorax.—Mesoscutum and scutellum rather strongly convex, the latter considerably raised above postscutellum, with steep apical declivity, laterally not carinate; notauli obsolete; propodeum fairly short, the area superomedia horseshoe-shaped or approximately square, usually in males, sometimes in females, wider than long; upper bordering carinae of areae coxales always, costulae usually, absent; apices of areae dentiparae more or less, sometimes inconspicuously projecting; carina bordering area spiraculifera at its apex, strongly curved in the upper part, usually laminately elevated in the lower.

Legs.—Moderately stout, coxae III ventrally without scopa.

Abdomen.—Fairly stout; apex of female abdomen amblypygous, the hypopygium without apical fringe of bristles; in both sexes median field of postpetiolus

distinct at elbow, flattened and often becoming indistinct toward apex, irregularly, sometimes indistinctly reticulated-coriaceous; gastrocoeli small and shallow, thyridia usually obsolete (Fig. 34).

Color.—Black and brown or ferruginous or yellowish in combination, or uniformly ferruginous. No yellow pattern on head and thorax. Sexual dimorphism inconspicuous.

Biology.—It is unknown whether or not females hibernate as adults; in Europe both sexes are found from July to September. Hosts are unknown. Schmiedeknecht mentions (Op. Ich. Suppl., p. 84) that, according to his observations, *Agrotis segetum* (Schiff.) seems to be the host of *Hybophorellus injucundus* (Wesmael).

Distribution.—Holarctic; in America in Canadian, Hudsonian and Arctic Zones.

Key to the Species of *Hybophorellus* Schulz of America North of Mexico

Females and Males

1. Checks distinctly, obliquely striated. (Flagellum of females considerably widened beyond middle; abdomen ferruginous and black; length 9-12 mm.) 2. *injucundus nearcticus* Heinrich, ♀ ♂
- Checks not or indistinctly striated. 2
2. Abdomen and mesoscutum ferruginous. (Flagellum of female not at all widened beyond middle; length 10-12 mm.) 1. *townesi* Heinrich, ♀ ♂
- Abdomen uniformly black. (Head and thorax, including flagella, uniformly black; legs vivid rufous; tyloides white; length 13 mm.) 3. *baffinensis*, new species, ♂ (♀ unknown)

1. *Hybophorellus townesi* Heinrich

Hybophorellus townesi Heinrich, 1956, Can. Entom., 88: 649, ♀ ♂.

Types

Holotype.—♀, Saskatchewan, Secretan, 15.VII.1944, I. G. Rempel. C.H.T.

Allotype.—♂, Saskatchewan, Swift Current, 21.VI.1937, R. H. Sparrow. C.H.T.

Paratype.—1 ♀, locality and data as holotype. C.G.H.

Distribution

Saskatchewan.

Preamble

Differs from *injucundus* (Wesmael) by the not striate and narrower cheeks, the less pronounced, only inconspicuously projecting apices of areae dentiparae and by the considerably slenderer flagellum of the female. By the latter two characters also distinguished from the European type-species of the genus.

Female

Almost uniformly ferruginous, only lower margin of metapleura and mesolcus black; flagellum without annulus, infuscated toward apex; length 10 mm.

Flagellum.—Bristleshaped, slender, considerably attenuated and acutely pointed at apex, ventrally flattened beyond middle, but not at all widened, with 42 segments, the first 2.35 times as long as wide, about the tenth square. Ferruginous, somewhat infuscated at apex.

Head.—Temple profile scarcely, cheek profile distinctly narrowed, the former with slightly curved, the latter with almost straight outline; malar space about as

long as width of base of mandible; cheeks sparsely and finely punctured, not striate. Uniformly ferruginous.

Thorax.—Mesoscutum finely and moderately densely punctured, shiny; carination of propodeum fairly weak; area superomedia transverse; costulae obsolete; apices of areae dentiparae but little projecting. Almost uniformly ferruginous, only lower border of metapleura and mesolcus black.

Legs.—Coxae III ventrally finely and moderately densely punctured, shiny. Uniformly ferruginous.

Abdomen.—In dorsal view more tapering toward apex than in the other species; median field of postpetiolus not clearly defined, finely and irregularly rugose, smoother toward apex; gastrocoeli rather shallow, narrow thyridia distinguishable.

Male

Ferruginous with black markings more extended than in female; the followings are black; propodeum entirely, pleura, sterna, coxae predominantly, trochanters, face except median field, clypeus, frons except orbits, ocellar region, cheeks, base of mandibles, flagellum basally on dorsal side; length 12 mm.

2. *Hybophorellus injucundus* (Wesmael)

Figs. 34, 36, 38

Distribution

Holarctic; in Europe boreo-alpine and sporadically also in middle Europe; in North America subarctic.

Preamble

The species is distinguished by a unique sculptural character: in both sexes the cheeks are densely and very finely, longitudinally, in their lower part more strongly and obliquely, striate (Fig. 38). The flagellum of the female considerably stouter and more widened beyond middle than in *townesi* Heinrich, less stout than in *aulicus* Gravenhorst (European). In contrast to *aulicus* as well as *townesi* the tarsi are usually infuscated.

Female

Abdomen black, tergites 1-3 and the fourth tergite laterally dark ferruginous; head and thorax varying geographically from entirely black (nominate subspecies) to predominantly dark ferruginous (nearctic subspecies); flagellum black with white annulus, widened beyond middle; legs, except black coxae and trochanters, reddish-brown, femora III or III and II sometimes predominantly or entirely black, tarsi usually partially infuscated; length 9-11 mm.

Flagellum.—Bristleshaped, rather stout, ventrally distinctly flattened and somewhat widened beyond middle, considerably attenuated and acutely pointed at apex, with 34-35 segments, the first fully twice as long as wide, about the fifth square, the widest 1.33-1.8 times wider than long. Black with white annulus on segments, 4, 5 or 6 to 10.

Head.—Temple profile long, scarcely narrowed, with slightly curved outline, cheeks densely, in the upper part very finely, longitudinally, in the lower part more strongly and obliquely striate (Fig. 38). Black, in the type of nearctic subspecies occiput as well as facial and frontal orbits ferruginous.

Thorax.—Mesoscutum convex, rather strongly and densely punctured, shiny; notauli subobsolete; upper bordering carinae of areae coxales absent; costulae

distinct or obsolete; area superomedia varying in shape, horseshoe-shaped, semi-circular, or semioval, mostly wider than long, sometimes longer than wide (Fig. 36). Black; sometimes horizontal part of propodeum ferruginous marked, in alpine populations with obscure ferruginous pattern on mesoscutum and scutellum, in nearctic subspecies much more extensively ferruginous.

Legs.—Moderately stout; coxae III ventrally fairly densely punctured and shiny. Coxae, trochanters and trochantelli always black; femora I always red-brown, femora II and III varying geographically and in some populations also individually from predominantly or entirely black to entirely red-brown; tibiae and tarsi red-brown; apex of tibiae III and the tarsi usually more or less infuscated.

Abdomen.—Median field of postpetiolus flat, but fairly clearly defined, finely and densely rugose; gastrocoeli shallow and small, thyridia obsolete (Fig. 34); second and third tergites rather densely punctured, somewhat alutaceous between punctures, slightly shiny. Tergites 1-3, and sides of fourth tergite ferruginous, the rest black; base of petiolus usually infuscated.

Male

Head black, exceptionally lateral fields of face with small yellow mark; thorax black in European populations; mesoscutum and scutellum ferruginous in allotype of nearctic subspecies; tergites 1-3 and often sides of fourth tergite dark ferruginous, rest of abdomen black; often petiolus, sometimes first tergite predominantly black too; flagellum with white annulus; legs as in female; length 11-12 mm.

Flagellum.—With 33-36 segments and with short-oval tyloides on basal half of segments 2 or 3 to 21. Black with white annulus of varying extent between segments 8 and 15.

Mesoscutum more convex, scutellum more elevated above postscutellum than in female; carination of propodeum and lateral carinae of median field of postpetiolus more prominent, sculpture of second tergite coarser. Otherwise like female.

2a. *Hybophorellus injucundus injucundus* (Wesmael)

Amblyteles injucundus Wesmael, 1854, Bull. Acad. Sc. Belgique, Annexe, p. 119 (Ambl. p. 45), ♀.

Amblyteles duplicator Roman, 1923, Entom. Monthly Mag., 9: 30, ♀.

Hybophorellus duplicator Heinrich, 1949, Mitt. Muench. Ent. Ges. 35-39, p. 49, ♀ (nec ♂).

Hybophorellus injucundus Perkins, 1953, Bull. Brit. Mus. (Nat. Hist.), III, No. 4, p. 118.

Types

Holotypes.—*Amblyteles injucundus* Wesmael, ♀, Sweden, ? Musée d'Histoire Naturelle de Belgique, Brussels; *Amblyteles duplicator* Roman, ♀, England, Nottingham Museum, Nottingham.

Host

According to Schmiedeknecht (Op. Ichn. Suppl., genus *Amblyteles* p. 84), *Agrotis segetum* (Schiff.) "seems to be" the host.

Distribution

Sweden, England, Middle Germany.

Female and Male

Head and thorax including scutellum black; femora II predominantly, femora III entirely, black; flagellum with white annulus.

2b. *Hybophorellus injucundus montecapitis* Heinrich

Hybophorellus montecapitis Heinrich, 1949, Mít. Muench. Ent. Ges., 35-39, p. 50, ♀.

Hybophorellus duplicator Heinrich, 1949 (*loc. cit.*), p. 50, ♂ (nec ♀).

Hybophorellus duplicator montecapitis Heinrich, 1952, Am. Mag. Nat. Hist., 5: 1052, ♀ ♂.

Types

Holotype.—♀, Bavaria, Berchtesgaden, Jenner-Massiv, 1700 m., 22.VII.1947. C.G.H.

Distribution

High mountain region of European Alps (Jenner-Massiv near Berchtesgaden and Allgau).

Female

Head black, rarely upper part of facial orbits at level with antennal sockets ferruginous; thorax black, mesoscutum with two long, longitudinal, obscure ferruginous bands; sometimes scutellum partially ferruginous; femora II usually partially, femora III entirely, black, sometimes all femora, tibiae and tarsi ferruginous; widest segment of flagellum 1.55 times as wide as long.

Male

As *injucundus injucundus* (Wesmael): head and thorax black; femora II predominantly, femora III entirely, black; apex of tibiae III and the tarsi III usually infuscated; flagellum with white annulus between segments 8 and 15.

2c. *Hybophorellus injucundus nearcticus* Heinrich

Figs. 34, 36, 38

Hybophorellus injucundus nearcticus Heinrich, 1956, Can. Ent., 88: 650, 651, ♀ ♂.

Types

Holotype.—♀, Northwest Territories, Bernard Harbour, Canad. Arct. Exped., 12.VII.1915. C.N.C. No. 6409.

Allotype.—♂, Northwest Territories, Chesterfield, J. R. Vockeroth, 1.VIII.1950. C.N.C.

Distribution

Northwest Territories.

Female

Ferruginous color on head and thorax much more extended than in *injucundus montecapitis* Heinrich, covering in the type specimen the entire mesoscutum, scutellum, surface of propodeum, mesopleura, mesosternum, coxae I and II, upper and lower third of pronotum, occiput, facial and frontal orbits; flagellum a little more widened beyond middle than in *injucundus montecapitis*, the widest segment being 1.8 times wider than long; area superomedia wider and larger.

Male

(Allotype). Head black, thorax black with ferruginous mesoscutum and scutella; femora, tibiae and tarsi ferruginous except black basal half of femora III; flagellum black.

3. *Hybophorellus baffinensis*, new species**Types**

Holotype.—♂, Baffin Island, Frobisher Bay, 5.VII.1948, F. G. Dilabio. C.N.C. No. 7297.

Distribution

Baffin Island.

Preamble

This extremely melanistic form may perhaps represent another subspecies of *injucundus* (Wesmael) instead of a distinct species. No conclusion can be made in one or the other direction unless the female is discovered. The male differs from *injucundus nearcticus* Heinrich by indistinct striation of cheeks and by another color pattern, the thorax and abdomen being uniformly black, the femora III, however, uniformly rufous.

Male

Uniformly black, including flagella; legs uniformly vivid rufous except all coxae, trochanters and trochantelli which are black; tyloides white; length 13 mm.

Flagellum.—With 34 segments and with short-oval tyloides on segments 2-24 (rather small and indistinct on segments 2, 23 and 24); black, tyloides white.

Head.—As in *injucundus*; the striation of cheeks, however, indistinct and partially obsolete.

31. Genus *Rubicundiella* Heinrich

Rubicundiella Heinrich, 1961, Can. Ent. Suppl. 15: 15.

Type-species.—*Ichneumon mucronatus* Provancher.

Melanichneumon rubicundus Townes (Syn. Cat. 1951, p. 286) turns out to be a complexity of several (at least three and probably more) species, in other words, a phylogenetic unit, distinguished by a series of common characters. Whether to call this unit a subgenus (of *Melanichneumon* Thomson) or a distinct genus is largely a matter of opinion. To me this group seems rather clearly defined and well enough separated from the bulk of the *Melanichneumon* group to be considered as a genus, particularly on account of the male flagellar structure.

Rubicundiella is distinguished from all other species of the *Melanichneumon* group by the following characters: (1) Male flagellum not "nodulose", lacking on ventral side the little transverse ridges or elevations topped by very short bristles which are typical for *Melanichneumon sensu lato*; (2) apices of areae dentiparae more or less prominent, forming pointed, small apophyses in males, less pronounced or obsolete in females (Figs. 11, 12, 13, 15) (this type of sexual dimorphism is in contrast to that of other genera of the subfamily, particularly the genus *Acanihojoppa* Cameron, where apophyses are much more pronounced in females than in males); (3) seventh tergite of males somewhat reduced and partially or mostly hidden under the wide sixth, thus giving the abdomen usually a slightly club-shaped appearance.

Flagellum.—Of females short, filiform, ventrally flattened beyond middle but not widened; of males without transverse, bristle-topped ridges on ventral side of segments of apical part, but with a row of about 10 short-oval or short-bacilliform tyloides.

Head.—Temple and cheek profiles but slightly or moderately narrowed; median field of face in both sexes (particularly males) somewhat more protuberant than in *Melanichneumon*; mandibles normal.

Thorax.—Mesoscutum rather flat, in females usually with obsolete notauli; sternauli on mesosternum always distinct; in males notauli often basally indicated; scutellum flat in females, slightly convex in males, laterally carinate at base or, in the type-species, to beyond middle; carination of propodeum sharp and complete;

area superomedia hexagonal, about as long as wide, sometimes distinctly longer than wide, arcae dentiparae with small but distinct apophyses in males, less prominent as a rule in females than in males, or in some species obsolete.

Legs.—Moderately stout; coxae III of females with scopa.

Abdomen.—Median field of postpetiolus well defined, irregularly longitudinally striate in females, in males usually nearly smooth or with vestiges of fine striation; gastrocoeli very small and shallow or subobsolete, with subobsolete thyridia; tergites strongly and densely, sometimes very densely, punctured, fairly strongly sclerotized and clearly separated, in males the last tergite somewhat reduced and partially hidden under the sixth, the abdomen thus appearing slightly club-shaped; in females the sixth and seventh tergites strongly narrowed and somewhat reduced, ovipositor slightly projecting.

Color.—In all known species basic color ferruginous with varying, usually restricted, black pattern; chromatic sexual dimorphism inconspicuous.

Biology.—One specimen has been received by H. Townes (Ent. News, 49: 219) as hibernating under a stone. A single discovery of this kind can not always be regarded as a final proof for hibernation being the rule, as sometimes specimens of non-hibernating species hide at the beginning of the winter in sheltered places where they die, however, before spring. If the fact of hibernation is confirmed as a rule, this would add an important biological character to the diagnosis of this genus. Several Noctuids have been recorded as hosts.

Remarks

Rubicundiella seems to be related to the oriental genus *Algathia* Cameron, sharing with the latter the small, pointed apophyses of the propodeum. It differs from *Algathia* by: (1) the structure of male flagellum which is apically nodulose in *Algathia*; (2) the structure of gastrocoeli which form a short, superficial, longitudinal impression laterally at the base of the second tergite in *Algathia*; (3) by the longitudinally striate median field of female postpetiolus.

The diagnostic separation of the different species of this genus represent an extremely difficult problem which is still far from final solution. The sexual dimorphism in the degree of development of the propodeal apophyses, combined with a certain individual mutability of this character and others represents a particular difficulty.

Key to the Species of *Rubicundiella* Heinrich of America North of Mexico

Females

1. Apex of arcae dentiparae without projecting little teeth (to be seen in profile of propodeum); area superomedia usually as long as wide, sometimes even wider than long. (Arcae dentiparae relatively shorter and wider than in the alternative group.) 2
- Apex of arcae dentiparae with distinctly projecting little teeth; area superomedia usually a little longer than wide. (Arcae dentiparae relatively longer and narrower than in the alternative group; seventh tergite with indistinct, white anal mark.) 3
2. Tergites 3-7 with black apical bands gradually increasing in extent toward apex of abdomen; all femora dorsally extensively or entirely black; first flagellar segment 1.5 times as long as wide. (Flagellum predominantly black with white annulus; length 9 mm.) 3. *blanchardi* (Davis)
- Abdomen uniformly, legs almost uniformly, ferruginous; first flagellar segment 1.3 times as long as wide. (Flagellum in type specimen ferruginous with black apex and without annulus; length 8 mm.) 5. *simplicior*, new species

3. Flagellum short, with 25 segments, tapering toward base, first segment fully twice as long as wide, even the shortest segments seemingly still a little longer than wide; apophyses moderately long. (Ferruginous; tergites 6 and 7, the tibiae III and tarsi III infuscated; length 6.5 mm.) 2. *annulicornis* (Ashmead)
- Flagellum not quite as short, and not perceptibly tapering toward base, with 25-29 segments, the first 1.5 times as long as wide, the fifth square; apophyses small. (Ferruginous; in northern specimens last tergites somewhat infuscated; apices of femora III and of tibiae III, and the tarsi III infuscated; length 6-8 mm.) 6. *perturbatrix*, new name for *rubicundus* Cresson

Males

1. Flagellum with annulus. (Scutellum laterally carinated to middle or beyond; apophyses of propodeum pronounced; areae superomedia longer than wide.) 2
- Flagellum without annulus. (Scutellum carinated at base only; apophyses moderate, sometimes obsolete; area superomedia, in majority of specimens, not longer than wide.) 3
2. Face, clypeus, anterior coxae and scutellum white; bigger than alternative species, 10-11 mm. long. 1. *mucronata* (Provancher)
- Face, clypeus, anterior coxae and scutellum ferruginous, as is the rest; smaller species 7-9 mm. long. 2. *annulicornis* (Ashmead)
3. Mesosternum and bands on tergites, and the sixth tergite usually predominantly or entirely, deep black. 4
- Mesosternum ferruginous, abdomen not black banded, at the most last two tergites somewhat infuscated and apical borders of segments darker ferruginous than the rest of the surface. 5
4. Tergites 2-6, rarely 3-6 with black apical bands, the seventh ferruginous, the band on the sixth tergite sometimes broadened; apical half to two thirds of femora III black; head ferruginous; bigger species, 10-11 mm. long. 3. *blanchardi* (Davis)
- Tergites 6 and 7 totally, 5 predominantly or totally, black, the second tergite usually without black apical band; femora III dorsally entirely, or almost entirely, black; usually cheeks, sometimes face partially or entirely, black; smaller species, 6-9 mm. long. 4. *deuteromelas*, new species
5. Apices of areae dentiparae with distinct little teeth. Area superomedia longer than wide; flagellum with 28-31 segments; length 7-10 mm.) 6. *perturbatrix*, new name for *rubicundus* Cresson
- Apices of areae dentiparae without pointed projections. (Area superomedia about as long as wide; flagellum with 31-33 segments; length 10-11 mm.) 5. *simplicior*, new species

1. *Rubicundiella mucronata* (Provancher)

Fig. 11

Ichneumon mucronatus Provancher, 1875, Nat. Cana., 7: 24, 81, "♀" = ♂.

Ichneumon mucronatus Provancher, 1883, Petite Faune Entom. du Canada, 2: 290, ♂.

Types

Holotype.—♂, Quebec. Provincial Museum, Quebec. No. 651.

Distribution

Quebec. New records: Kansas (C.G.H.), Maryland (C.N.C.).

Preamble

The species was originally described as a female; as mentioned in the original description both flagella of the type specimen were missing already at the time of description. In a later re-description, however, (*loc. cit.* 1883) the author refers to the type as a male and even mentions its white flagellar annulus, evidently referring to a second specimen secured in the meantime.

The male of the species is well distinguished by its white flagellar annulus, yellow scutellum and pronounced propodeal apophyses which are considerably longer than in *blanchardi* (Davis) and *perturbatrix*, new name, males (Fig. 11);

horizontal part of propodeum comparatively longer, area superomedia longer than wide, the distance from tips of apophyses to spiracles longer than their distance to hind border of propodeum at insertion of coxae III.

It may be supposed that in this species too the apophyses of the female are shorter than in the male, which makes the association of sexes difficult; so far I have not seen any females which I would associate with *mucronata* male; it does not seem impossible, however, that *annulicornis* Ashmead from Louisiana represents a southern subspecies of this species.

Male

Ferruginous; flagellum dorsally black, with white annulus; scutellum yellow; apophyses conspicuous; area superomedia longer than wide with costulae far before middle; length 10-11 mm.

Flagellum.—(Specimen from Kansas.) With 33 segments, and with short, bacilliform tyloides on segments 6-17. Black with white annulus on segments 12-16, ventrally pale brown; basal segments also dorsally brownish; scape ferruginous, ventrally paler.

Head.—Temple profile slightly narrowed, with slightly curved outline; malar space less than half as long as width of base of mandible. Ferruginous; according to description by Cresson, and also in specimen from Kansas, face and clypeus yellow; also mandibles except teeth yellow; these yellow patterns were not recognizable on the type specimen.

Thorax.—Notauli basally indicated; scutellum slightly raised above post-scutellum, laterally carinate to beyond middle in specimens from Kansas; area superomedia longer than wide, hexagonal, with costulae far before middle, narrowed from their insertion toward base and toward apex; apophyses rather long and pointed; distance from their tip to spiracles in type specimen equal too, in Kansas specimens considerably longer than, distance from their tip to apex of propodeum at coxae III. Ferruginous; pale yellow are: collare, tegulae, scutellum; the following are black: base of prosternum, middle of prepectus, mesolcus (the line widened at apex), scutellar and propodeal sutures.

Legs.—Rather slender; pale ferruginous; according to Cresson's description and in specimens from Kansas, coxae and trochanters I and II pale yellow (not visible in type specimen); apex of tibiae III, of tarsi II and the tarsi III predominantly blackish; according to Cresson's description, also posterior trochanters and tips of their femora black.

Abdomen.—Tergites 1-4 narrower and more elongate than in *blanchardi*; gastrocoeli rather indistinct; median field of postpetiolus smooth; tergites 2-4 and base of fifth moderately strongly and densely punctured. Ferruginous, without black bands; apical part of sixth, and the seventh tergite in part, infuscated (in specimen from Kansas).

2. *Rubicundiella annulicornis* (Ashmead), new combination

Colpognathus annulicornis Ashmead, 1890, U.S.N. Mus. Proc., 12: 396, ♀.

Types

Holotype.—♀, Louisiana. U.S.N.M.

Distribution

Louisiana; Georgia.

Preamble

I have not seen any other material than the type, another female (from Georgia) and a series of males (from Louisiana), all in the U.S.N.M. The species is distinguished by the comparatively pronounced apophyses of the female and by its long area superomedia; males have a white annulus on flagellum, as *mucronata* (Provancher), but no yellow colored face, scutellum and coxae. This form is certainly closely related to *mucronata*, but smaller, and males differ, as described above, somewhat chromatically. It seems, however, not impossible that it represents a southern subspecies of the latter. With regard to the great similarity of all species of this genus, extreme reluctance in subspecific associations seems to be advisable and much more evidence and material is needed before a well founded judgment will be possible.

Female

(Description based on type specimen.)

Ferruginous; tergites 6 and 7 infuscated, the seventh with indistinct, white anal mark; apex of femora III and (in specimen from Georgia—the type has no tibiae III) the tibiae and tarsi III blackish; flagellum with 25 segments, basally brownish, apically blackish, with white annulus; areae dentiparae with moderately long, pointed apophyses; median field of postpetiolus finely striate; gastrocoeli obsolete; length 6.5 mm.

Flagellum.—Filiform, slender, ventrally flattened beyond middle but not widened, distinctly tapering toward base, with 25 segments, the first fully twice as long as wide, seemingly even the shortest segments still a little longer than wide. Basally brownish, apically blackish, with white annulus on segments 7-11.

Head.—Temple profile somewhat, cheek profile considerably narrowed. Ferruginous.

Thorax.—Scutellum laterally carinate to beyond middle, somewhat raised above postscutellum, fairly strongly, longitudinally, rugose-punctate; area superomedia hexagonal, considerably longer than wide, narrowed toward base and less strongly toward apex; areae dentiparae terminated by relatively long and pointed teeth. Ferruginous.

Legs.—Coxae III with small scopa. Ferruginous; apex of femora III and the tibiae and tarsi III blackish.

Abdomen.—Median field of postpetiolus well defined, longitudinally striate; gastrocoeli obsolete. Ferruginous; tergites 6 and 7 infuscated, the seventh with small whitish anal mark.

Male

Uniformly pale ferruginous with apex of tibiae III and the tarsi III slightly infuscated; flagellum basally and ventrally ferruginous, dorsally blackish except base, with white or whitish annulus; scutellum, coxae, face and clypeus not white as in mucronata but ferruginous, as is the rest; apophyses conspicuous; area superomedia not quite as elongate as in mucronatus, with costulae before middle; length 7-9 mm.

Flagellum.—With 29-31 segments and with short, bacilliform tyloides on segments 5-14 or 15. Ferruginous, dorsally blackish except base.

In all other characters like *mucronata*.

3. *Rubicundiella blanchardi* (Davis), new combination

Figs. 12, 46

Ichneumon blanchardi Davis, 1898, Amer. Ent. Soc. Trans., 24: 350, ♀.

Melanimichneumon blanchardi Heinrich, 1959, Ent. News, 70: 211, ♀.

Types

Holotype.—♀, New Hampshire, Mt. Lafayette. A.N.S.

Neallotype.—♂, Maine, Mt. Blue. C.G.H.

Distribution

New Hampshire; Maine. Further records: Massachusetts, Forest Mills (M.C.Z.); Quebec (C.N.C.).

Female

Ferruginous, third tergite with narrow, fourth with broad, black apical band, the following tergites almost entirely black; all trochanters and femora dorsally and the tibiae and tarsi III almost entirely black; prepectus medially and mesolcus apically black; flagellum with 30-31 segments, predominantly black, with white annulus; areae dentiparae without distinct projections; median field of postpetiolus distinctly striate; gastrocoeli very small, but relatively distinct; length 9 mm.

Flagellum.—Filiform, ventrally flattened beyond middle but not widened, with 30-31 segments, the first about 1.5 times as long as wide, the sixth square. Black, the basal segments apically brownish, segments 7 to 12, 13 or 14 white; scape ventrally ferruginous.

Head.—Temple profile scarcely narrowed, with slightly curved outline; cheek profile somewhat narrowed, with slightly curved outline; malar space as long as width of base of mandible; cheeks fairly wide between eyes and carina genalis, apically distinctly constricted at the latter; face slightly receding, its middle convex; fairly densely punctured except lower part of cheek which is smooth, with few scattered punctures. Uniformly ferruginous.

Thorax.—Mesoscutum moderately densely punctured, shiny; scutellum almost smooth with a few punctures at the apex, laterally carinate at the base; area superomedia hexagonal usually about as long as wide, sometimes a little longer, distinctly narrowed from costulae toward base; areae dentiparae shorter than in *mucronata* (Provancher) and *perturbatrix*, new name, their apices without distinct teeth, usually not even pointed. Ferruginous; the following are black: base of prosternum narrowly, middle of prepectus broadly, mesolcus (the black line widened toward its apex), sometimes apical border of mesosternum, scutellar sutures partially and usually lower border of areae coxales.

Legs.—Moderately stout; coxae III ventrally fairly densely punctured, shiny, with distinct scopa. Ferruginous; all trochanters and femora dorsally predominantly or entirely black; tibiae and tarsi III black, the former toward base, particularly on ventral side, obscure ferruginous; tibiae and tarsi II infuscated.

Abdomen.—Postpetiolus rather wide with distinct, longitudinally striate median field, the lateral fields punctate; gastrocoeli small, but slightly impressed and fairly distinct, a little wider than long; second, third and basal part of fourth tergites strongly and densely, the second tergite very densely, punctured. Ferruginous; the following are black: narrow apical band on third, a broad one on the fourth and almost entire surface of the fifth, sixth and seventh tergites.

Male

During July 1960 I caught in an insect trap, on the same spot in a mountain meadow on Mt. Blue, Maine, three identical females of this species and 18 males which match the females well in size and in the sculpture of abdomen. I do not doubt that the association of these two sexes is correct. The males are constant in size and rather constant in color too.

Ferruginous, scutellum rarely yellow; sterna and prepectus always black, propleura usually on the lower part; tergites 2 to 6 with regular, black apical bands, rarely the apical border of second tergite not infuscated; the bands of tergites 2-4 always narrow, of the fifth sometimes broader than the preceding, the sixth tergite often half, or predominantly, black, the seventh without black pattern; femora and tibiae III apico-dorsally more or less extensively, sometimes predominantly, black, tarsi III always black; flagellum without annulus, dorsally black; propodeum with distinct, small apophyses, comparatively short; area superomedia, with rare exceptions, a little wider than long, or as long as wide (Fig. 12); anterior tergites moderately densely punctured, polished and shiny between punctures (Fig. 46); length 10-11 mm.

Flagellum.—With 31 to 34, usually 33 segments and with oval tyloides on segments 6 to 15 or (usually) 16. Dorsally black or dark brown, including scape, ventrally pale brown.

Head.—Temple profile but slightly narrowed, with slightly curved outline; malar space about half as long as width of base of mandible. Usually uniformly ferruginous except more or less extensively black marked supraantennal cavities; band along hind border of cheeks exceptionally black.

Thorax.—Mesoscutum strongly and moderately densely punctured, shiny; notauli usually basally distinct, sternaui on mesosternum always sharply impressed; scutellum slightly raised above postscutellum, shiny; propodeum relatively short, area superomedia horseshoe-shaped or hexagonal, narrowed toward base and slightly toward apex, usually somewhat wider than long or as wide as long (Fig. 12), but exceptionally longer than wide; areae dentiparae with distinct, small teeth; distance from tip of teeth to lower edge of spiracles not much longer than distance from tip of teeth to apex of propodeum, measured along exterior carina of areae posteroexternae. Ferruginous; collare always, scutellum rarely, yellowish, scutellar and propodeal sutures, usually lower part of propleura more or less extensively and areae coxales entirely or partially.

Legs.—Ferruginous; the following are black: very base of coxae III ventrally, all trochanters dorsally, sometimes predominantly, tarsi III entirely, apex of femora III dorsally to a varying extent (at least apical third, often apical half, sometimes predominantly, except base), apex of tibiae III, dorsally usually more extensively than ventrally, sometimes tibiae III predominantly or entirely; tarsi II infuscated.

Abdomen.—Median field of postpetiolus shiny, almost smooth or with vestiges of striation, apically with a few scattered punctures; tergites strongly and moderately densely punctured, polished and shiny between punctures. Ferruginous; usually all tergites except first and seventh with black apical bands which are narrow on segments 2-4, usually somewhat broader on the fifth and the broadest on the sixth tergite, the latter being often predominantly black; rarely second tergite apically not infuscated.

TABLE II

Variability of distribution of black and yellow on 18 *Rubicundiella blanchardi* males from Mt. Blue, Maine.

A. Black

- 18 Prosternum, mesosternum and prepectus
- 18 Scutellar and propodeal sutures
- 1 Propleura predominantly
- 11 Approximately lower half of propleura
- 4 Restricted area along lower border of propleura
- 2 Propleura entirely ferruginous
- 11 Areae coxales entirely
- 4 Areae coxales partially (half or predominantly)
- 3 Lower border of areae coxales
- 18 Extreme base of coxae III ventrally
- 18 Trochanters dorsally or entirely
- 18 Tarsi III
- 18 Tarsi II infuscated
- 13 About apical half or apical third of tibiae III
- 5 Tibiae III predominantly or entirely
- 9 About apical third to apical half of femora III dorsally
- 9 About apical two thirds of femora III dorsally
- 15 Apical border of second tergite narrowly
- 18 Apical border of third and fourth tergite narrowly
- 17 Apical border of fifth tergite narrowly
- 1 Apical border of fifth tergite broadly
- 3 Apical border of sixth tergite narrowly
- 11 About apical half of sixth tergite
- 4 Sixth tergite predominantly
- 18 Petiolus ventrally

B. Yellow

- 18 Collare
- 5 Scutellum

4. *Rubicundiella deuteromelas*, new species

Fig. 47

Types

Holotype.—♂, Maine, Mt. Blue, 16.VII.1960, G. H. Heinrich. C.G.H.

Paratypes.—18 ♂♂, Maine, Mt. Blue. C.G.H.; 1 ♂, Yukon Territory, Dawson. C.N.C. No. 7302.

Distribution

Maine (Mt. Blue); Yukon Territory.

Preamble

Between the end of June and the beginning of August, 1960, 19 *Rubicundiella* males were caught in an insect trap at the same spot with a series of males of *blanchardi* (Davis). These males share with the latter the black color of sterna and prepectus but differ distinctly in size, being considerably smaller, in sculpture of anterior tergites, which are more densely and finely punctured and usually subopaque (Fig. 47), and especially in principle of melanism of the abdomen and also of the head. While in the bigger and more shiny *blanchardi* (see Table I) the second tergite, in the great majority of specimens, bears a narrow, black apical band, in *deuteromelas* the great majority of specimens have the second tergite, and a number of specimens even the third tergite, uniformly

ferruginous. In contrast, herewith, in *deuteromelas* the following tergites are very extensively melanistic, the fifth being predominantly, the sixth and seventh always, entirely black, while in the bigger males considered as *blanchardi* the seventh tergite is never black, the fifth and sixth apically black banded only. Furthermore *deuteromelas* displays, in contrast to *blanchardi*, a melanistic tendency on the head, the cheeks being often, face and clypeus sometimes, black. Taking all these differences, evident on large series, under consideration, one must come to the conclusion that *blanchardi* and *deuteromelas* are distinct species rather than mutants of the same species (*blanchardi*), unless we assume that we are dealing with ecological subspecies feeding on different hosts.

Male

Ferruginous (a darker shade than in *blanchardi*), with extensive black pattern; *sterna* and *prepectus* always black; lower part of *propleura* more seldom black than in *blanchardi*; cheeks, however, fairly often black and sometimes even face and clypeus partially or entirely; tergite 2 usually, 3 sometimes, without black apical band; fourth tergite with broad black apical band or predominantly black, the fifth always predominantly, the sixth and seventh entirely black; tibiae and tarsi III and the femora III dorsally entirely black; usually also femora I and II dorsally black and the tibiae and tarsi II infuscated; flagellum without annulus, dorsally black; length 6-9 mm., usually 7-8 mm.

Flagellum.—With 27-31 segments and with bacilliform-oval tyloides on segments 5 or 6 to 14 or 15. Dorsally black including scape, ventrally pale brown.

Head.—As in *blanchardi*. Ferruginous; ocellar region but exceptionally black, usually, however, cheeks apically predominantly or entirely black, sometimes also clypeus and face partially or entirely.

Thorax.—As in *blanchardi*, except for spiracles of propodeum which look relatively shorter and smaller, and for the areae dentiparae which seem to be on the average a trifle longer and more declivous. Ferruginous; *sterna*, *prepectus* and propodeal and scutellar sutures always black, areae coxales usually, lower part of *propleura* sometimes black.

Legs.—More extensively melanistic than in *blanchardi*; the following are black: trochanters dorsally or predominantly, legs III (except trochantelli, extreme base and the ventral side of femora III, base of tibiae III ventrally and sometimes narrowly on dorsal side also, sometimes trochanters ventrally), femora II dorsally; apex of tibiae III and tarsi III, sometimes also tarsi I more or less strongly infuscated.

Abdomen.—As in *blanchardi*: tergites on the average, however, more finely and densely punctured, subopaque (Fig. 47). Anterior tergites tending to reduction of melanistic pattern, posterior tergites, on the contrary, to extensive increase of black compared with *blanchardi*; second tergite rarely with black apical band, the third usually apically black banded, sometimes half, rarely predominantly, black; the fourth tergite always apically black banded, sometimes predominantly, rarely entirely, black; fifth tergite predominantly or entirely, the sixth and seventh always entirely, black.

Variability of males

See table III.

TABLE III

Variability of distribution of black on 19 *Rubicundiella deuteromelas* males from Mt. Blue, Maine.

19	Prosternum, mesosternum and prepectus
19	Scutellar and propodeal sutures
1	Propleura predominantly
6	Lower third to lower half of propleura
13	Propleura entirely ferruginous
16	Areae coxales entirely
1	Areae coxales partially
19	Trochanters dorsally or entirely
19	Tarsi III
19	Tarsi II infuscated
19	Tibiae III entirely or predominantly
19	Femora III dorsally entirely or almost entirely
4	Apical border of second tergite
15	Second tergite uniformly ferruginous
11	Apical border of third tergite
3	Apical half of third tergite
1	Third tergite predominantly
4	Third tergite uniformly ferruginous
13	Apical band on fourth tergite
5	Fourth tergite predominantly or entirely
1	Fourth tergite uniformly ferruginous
3	Apical band on fifth tergite
16	Fifth tergite predominantly or entirely
17	Sixth tergite entirely
17	Seventh tergite entirely
16	Supraantennal cavities
2	Ocellar region
15	Cheeks apically, predominantly or entirely
4	Face partially or entirely

5. *Rubicundiella simplicior*, new species

Types

Holotype.—♀, British Columbia, Victoria, ex *Ramosia bibioniformis* (Belv.), 1.VIII.1954, W. T. Cram. C.N.C. No. 7303.

Allotype.—♂, Saskatchewan, Tyner, ex *Fishia discors* Grt.

Paratypes.—♀, (no flagella, abdomen separated), Saskatchewan, ex *Fishia discors* Grt.; 2 ♂, Saskatchewan, probably ex *Heliothis ononis* Schiff.

Hosts

Ramosia bibioniformis (Belv.) (Aegeriidae); *Fishia discors* Grt. *Heliothis ononis* Schiff (Heliothiinae).

Distribution

Saskatchewan; British Columbia.

Preamble

On account of the structure of male flagellum (see treatment of genus), and the evidently very close relationship to *blanchardi* (Davis), I am placing this species in the genus *Rubicundiella* in spite of the fact that the areae dentiparae in both sexes have no toothlike projections. The latter feature and the structure of propodeum which is (similar to *blanchardi*) comparatively short, with relatively

short areae dentiparae and area superomedia, represent the main distinctive characters of the species.

Female.

Uniformly ferruginous; base of prosternum and middle of prepectus basally, as well as the apex of mesolcus, but not the apex of abdomen, and not apices of femora III, infuscated; flagellum short, with very short basal segments, ferruginous, apically black, in type specimen without distinguishable white annulus; length 8 mm.

Flagellum.—(Type specimen.) Short, filiform, ventrally flattened beyond middle but not widened, with 27 segments, the first about 1.3 times as long as wide, about the fourth square. Scape and segments 1-12 pale ferruginous, the rest black; no white annulus visible.

Head.—Temples and cheeks rather wide, their outlines scarcely narrowed and very slightly curved; malar space slightly longer than width of base of mandible. Uniformly ferruginous.

Thorax.—Mesoscutum moderately densely punctured, shiny; area superomedia about as wide as long in type specimen, considerably wider than long in paratype; areae dentiparae without projections. Ferruginous; the following are black: base of prosternum, base of prepectus medially, apex of mesolcus.

Legs.—Fairly stout. Ferruginous; in type specimen only trochanters I and II dorsally infuscated, in paratype also apex narrowly of femora III, apex of tibiae III and the tarsi III toward apex.

Abdomen.—Postpetiolus relatively wide, the median field distinct, finely, longitudinally striate with a few scattered punctures, the lateral fields punctate; gastrocoeli very small and shallow; second and third tergites and base of the fourth rather densely and moderately strongly punctured. Uniformly ferruginous.

Male

In general appearance and size similar to *blanchardi*, but propodeum without apophyses; mesosternum, femora III and abdomen pale ferruginous without melanistic pattern, except sometimes a slight infuscation at the very end of femora III.

Light ferruginous, in the two reared specimens from Heliothis ononis prosternum and prepectus black, trochanters dorsally infuscated; in the specimen ex Fishia discors all these parts light ferruginous like the rest; apex of tibiae III and tarsi III, except base, sometimes also apex narrowly of femora III infuscated; apical borders of tergites a shade darker ferruginous than the rest of abdomen; flagellum dorsally brownish, ventrally pale brownish; length 10-11 mm.

Flagellum.—With 31-33 segments and with bacilliform tyloides on segments 5 or 6 to 15 or 16. Dorsally brownish, ventrally pale brown.

Head.—Temple and cheek profiles a little less narrowed than in *blanchardi*; malar space nearly as long as width of base of mandible. Uniformly ferruginous.

Thorax.—Notauli basally indicated, sternaui distinct on the mesosternum; propodeum nearly as in *blanchardi* but differing in the total absence of apophyses. Uniformly ferruginous.

Legs.—Ferruginous; apex of tibiae III and the tarsi III, except base, moderately infuscated; in two specimens ex *Heliothis ononis* trochanters dorsally blackish, in one specimen also apices of femora III narrowly infuscated.

Abdomen.—Uniformly light ferruginous, the apical borders of tergites a shade darker.

Remarks

Distinctly more closely related to *blanchardi* than to *perturbatrix*, new name, and possibly a geographical vicariant of the former; the slight difference in structure of head and apices of areae dentiparae suggest, however, a species rather than a subspecies.

6. *Rubicundiella perturbatrix*, new name

Figs. 13, 14, 15

Ichneumon rubicundus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 176, ♀. (Preocc.)

Melanichneumon rubicundus Townes, 1951, Syn. Cat., p. 286, ♀.

Melanichneumon mucronatus Walkley, 1958, Syn. Cat. Suppl., p. 49, ♀.

Types

Holotype.—♀, Illinois. A.N.S.

Distribution

According to H. Townes 1951: "Atlantic to 100° West in Transition, Upper Austral and Lower Austral Zones; California, Hawaii". Although *rubicundus* Townes (*loc. cit.*) was composed of several different species, the distribution as given above seems to apply also to the particular form treated here under the name *perturbatrix*, as I have seen specimens, which I would refer to the latter, from Texas, Florida, North Carolina, Maine and Ontario.

Preamble

This is one of the most problematic species of the subfamily and I have to admit that I do not consider all problems connected with it as being solved yet. Particularly, I do not feel absolutely sure whether all specimens considered here as specifically identical with the type specimen really represent one and the same species, although my repeated attempts to distinguish several different forms were in vain. Females of the species *perturbatrix*, as treated below, differ distinctly from *blanchardi* (Davis) by: (1) the apices of areae dentiparae projecting into little pointed teeth, best visible in lateral view of propodeum; (2) the propodeum and especially the areae dentiparae being comparatively a little longer, the distance from tip of teeth to lower edge of spiracles being distinctly longer than from tip of teeth to apex of declivity, measured along external carina of areae posteroexternae; (3) gastrocoeli being subobsolete; (4) by the second and third tergites being still denser sculptured and opaque; (5) by less melanistic pattern on abdomen and hind legs; (6) by the on-the-average smaller size. The males, confirmed as associated by rearings of both sexes in the Parasite Laboratory in Belleville, Ontario, differ, beyond doubt, specifically from *mucronata* Provancher, but I do not know the female of the latter, which may be very similar to *perturbatrix*.

Female

Pale ferruginous; apex of fifth, sixth and the seventh tergites infuscated, the latter apically pale; apex of tibiae III, apex of femora III dorsally and the tarsi III infuscated (not evident in type specimen, but in all other examined specimens); prepectus medially and mesolcus apically, black; flagellum basally brownish or ferruginous, apically black, with white annulus; areae dentiparae with small but distinct (seen in profile of propodeum), pointed teeth; median field of postpetiolus distinctly striate; gastrocoeli subobsolete; length 6-8 mm.

Flagellum.—Filiform, ventrally flattened beyond middle, but not widened, with 25-29, usually 27, segments, the first about 1.5 times as long as wide, the fifth square. Basal segments ferruginous or brownish turning gradually darker toward annulus, with white annulus on segments 6 or 7 to 12 or 13; the apex blackish.

Head.—As in *blanchardi*. Uniformly ferruginous.

Thorax.—Mesoscutum strongly and fairly densely punctured, shiny; scutellum predominantly smooth, at the apex, however, usually densely punctured, the punctures often running into irregular striae, laterally carinate at the base; area superomedia hexagonal, on the average comparatively longer and narrower than in *blanchardi*; also areae dentiparae somewhat longer and narrower than in that species and terminated by a small, pointed tooth (Fig. 13). Ferruginous; the following are black: base of prepectus medially and apex of mesolcus; in southern specimens thorax uniformly ferruginous.

Legs.—Moderately stout; coxae III ventrally fairly densely punctured, shiny, with distinct scopae. Ferruginous; apices of femora III and of tibiae III and the tarsi III infuscated; in northern specimens usually also trochanters and the femora I and II dorsally slightly infuscated.

Abdomen.—Postpetiolus with distinct, longitudinally striate median field, the lateral fields punctate (Fig. 14); gastrocoeli extremely small and shallow, subobsolete; second and third tergites extremely densely punctured and subopaque, also the base narrowly of fourth tergite fairly densely punctured. Ferruginous; the apex of fifth and the sixth and seventh tergites infuscated, the latter apically whitish.

Male

Differs from *blanchardi* by, on the average, a relatively longer horizontal part of propodeum, with the area superomedia and areae dentiparae being comparatively longer and narrower, the former being usually longer than wide; apophyses a little more pronounced, distance from tip of apophyses to lower edge of spiracles considerably longer than from their tip to apex of propodeum (Fig. 15). Melanistic pattern much more reduced.

Ferruginous; the following are black or infuscated: base of prosternum, base of prepectus medially, apex of mesolcus, apex of femora III dorsally, apex of tibiae III, the tarsi III, sixth and seventh tergites usually in northern specimens, sometimes also apex of fifth tergite; length 7-10 mm.

Flagellum.—With 28-31 segments and with longish-oval tyloides on segments 5-15. Dorsally blackish, ventrally pale brownish; scape ventrally ferruginous.

32. Genus *Melanichneumon* Thomson

The genus *Melanichneumon*, in the interpretation of H. Townes, 1951, includes a vast number of related, but not at all homogenous, species which are joined mainly by two common characters: (1) the neatly punctured sculpture of anterior tergites, often including the postpetiolus; (2) the generalized type of sharp and complete carination of the propodeum with distinct costulae and with an areae superomedia which is narrowed toward the base, with hexagonal, semi-oval or horseshoe-shaped outline. In order to complete the diagnosis, it may be added that the apex of female abdomen is oxypygous and that the segments of male flagellum bear ventro-laterally transverse ridges, topped by short bristles,

rendering the appearance of flagellum slightly nodose, in a gradually increasing degree, from beyond base toward apex. The neatly punctured sculpture of anterior tergites represents the strongest distinctive feature in comparison with the genus *Cratichneumon* Thomson, and the borderline between these two large genera is not always very clearly defined.

The multitude of species covered by the above diagnosis appears to be naturally divided into a number of groups, differing mainly by the structure of female flagellum, by the structure of gastrocoeli and by the sculpture of median field of postpetiolus. Most of these groups are linked, however, by intermediate forms and by various combinations of characters, not only in one, but sometimes in several directions. From a practical point of view it seems desirable to arrange the multitude of forms taxonomically according to their structural groups, but how this can be achieved best under the mentioned circumstances presents a complicated problem. I have eliminated two groups which can be separated from the rest in *both* sexes without great difficulty under the status of full genera: *Rubicundiella* Heinrich and *Stenobarichneumon* Heinrich. Other groups, as *Melanichneumon* and *Barichneumon* which are linked with another by a continuous "cline" of forms and the males of which are practically indistinguishable, I have treated as subgenera. The holarctic *brevicinctor* group, represented by many species in the Old, and by several species also in the New, World, is named as a third subgenus *Vulgichneumon* Heinrich; this group comes close to the genus *Alagthia* Cameron, described from the Oriental Region, but seems to be different enough to be taxonomically separated.

Color

In a parallel to the genus *Ichneumon* Linnaeus and in contrast to the genus *Cratichneumon* Thomson, females of *Melanichneumon* (*sensu lato*) tend to display white anal marks. Unlike *Ichneumon*, this pattern is fairly often shared by their males. White or yellow lateroapical marks on anterior tergites are typical for the subgenus *Melanichneumon*. In contrast to the genus *Ichneumon*, and paralleling the genus *Cratichneumon*, a white flagellar annulus is a common feature of males, particularly in the subgenus *Melanichneumon*. As a rule, chromatic sexual dimorphism is not considerable.

Distribution

Almost worldwide with numerous species in the temperate Zones of the Old and New Worlds; but, in contrast to *Ichneumon*, well represented also in the tropics. Few species — if any — enter the subarctic zone; none evidently have adapted to the Arctic.

Biology

The majority of known host records refer to Geometridae; some of the bigger forms parasitize Noctuidae, evidently without narrowly limited host specialization (see host records of *brevicinctor* Say). As a rule, females do not hibernate. There are, however, some records in the literature concerning hibernating *Barichneumon* females; some of these records may have resulted through misidentifications, others may refer to "attempted hibernations". But it may be possible that a few species have indeed adapted to hibernation as a biological character. This remains to be investigated.

**Key to the Subgenera of *Melanichneumon* Thomson
and some closely related genera
of America North of Mexico**

1. Gastrocoeli transverse, their interval narrower than one of them. (Postpetiolus neatly punctured; abdomen red and black, females sometimes with anal mark.) (Fig. 31) 33. *Stenobarichneumon* Heinrich, genus 2
Gastrocoeli not transverse, or the interval wider than one of them.
2. Clypeus extremely short and wide, 5 or 6 times as wide as long (Fig. 22); mandibles long and comparatively wide, with subobsolete subapical tooth and blade-like inferior edge (Fig. 23). (Femora III extremely short and thick; gastrocoeli obsolete or very small; postpetiolus punctured.) 32D. *Ricticbneumon* Heinrich, subgenus 3
Clypeus and mandibles normal.
3. Flagellum of female short, lanceolate, very strongly widened and ventrally strongly flattened beyond middle, considerably attenuated and pointed at apex. (Male flagellum with distinct, bristle-topped, transverse ridges and usually with white annulus; in both sexes postpetiolus neatly punctured, area superomedia large, often shaped like a gothic arch or semi-oval (Figs. 18, 19), sometimes hexagonal; usually anterior tergites with white or yellow apico-lateral marks, last tergites often with anal marks.) 32A. *Melanichneumon* Thomson, subgenus 4
Flagellum of females filiform to bristleshaped, in the latter case not short and but moderately if at all widened beyond middle.
4. Areae dentiparae usually terminated by short, toothlike projections, particularly pronounced in males (Figs. 11, 12, 15); gastrocoeli and thyridia subobsolete in females, indistinct in males; flagellar segments of males without transverse ridges. (Median field of postpetiolus in females irregularly, longitudinally striate; flagellum of females exactly filiform; head, thorax and usually abdomen predominantly ferruginous; small species, 6-11 mm. long.) 31. *Rubicundiella* Heinrich, genus 5
Areae dentiparae in both sexes not terminated by toothlike projections; gastrocoeli and thyridia distinct in both sexes; flagellar segments of males with more or less distinct, transverse ridges (except in a few species of the subgenus *Vulgichneumon*.)
5. Postpetiolus including median field neatly punctured, the latter often ill-defined; flagellum of females short and stout, exactly filiform. (Femora short and thick; gastrocoeli small but distinctly impressed, with distinct thyridia; small species, 6-12 mm. long.) 32C. *Barichneumon* Thomson, subgenus
Median field of postpetiolus usually clearly defined, aciculated or at least with vestiges of longitudinal striation, or with fine, longitudinal rugosity (Figs. 27, 29), sometimes almost smooth, usually with some scattered punctures (Fig. 16); flagellum of female rather long and slender, filiform or bristleshaped. (Femora moderately slender; gastrocoeli more or less impressed, with distinct thyridia; on the average, bigger species.) 32B. *Vulgichneumon* Heinrich, subgenus

**Key to the Species of the Genus *Melanichneumon* Thomson
of Eastern America North of Mexico**

Females

See under subgenera.

Males

1. Tergites 1-4 or 6 yellow, 1-5 or 6 with black basal bands. (Medium sized species, 12-13 mm. long, resembling in appearance males of the *laetus* group of *Ichnneumon*; flagellum without annulus.) 2
Abdomen colored otherwise. 3
2. No yellow mark on mesoscutum and mesopleura; seventh tergite and apices of fifth and sixth ferruginous tinted, without anal marks; femora III black, usually narrowly yellow (or ferruginous?) at tip and base. 19. (*Vulgichneumon*) *nimicus* (Cresson)

- Mesoscutum with large, yellow, median mark, mesopleura extensively yellow; tergites 6 and 7 black, with yellow anal marks; femora III not entirely black (in the neallotype varied black, red and ferruginous, with a narrow yellowish basal annulus; sometimes black, lemon yellow at the base and toward the apex.)..... 20. (*Vulgichneumon*) *zebratus* (Cresson)
3. Basic color of entire abdomen black..... 4
- Basic color of entire abdomen or at least of two entire tergites red or ferruginous..... 16
4. Several anterior tergites with white or yellow apical bands or latero-apical marks. (Propodeum white marked.)..... 5
- Anterior tergites uniformly black..... 8
5. Flagellum without annulus..... 6
- Flagellum with annulus..... 7
6. Bigger species, 13-15 mm. long; tergites 1-5 with white apical bands; mesoscutum with white median mark. (Tergites 6 and 7 with anal mark; all tibiae extensively white.)..... 17. (*Vulgichneumon*) *albomarginatus* (Cresson)
- Small species, 7-9 mm. long; tergites 1-2 or 3 with yellow apical bands; mesoscutum without median mark. (Tergite 7 with anal mark; all tibiae extensively white.)..... 30. (?subgenus) *texasus* (Cresson)
7. Large species, 18 mm. long; tergites 1-4 with large, triangular, apico-lateral marks; no anal marks..... 1. (*Melanichneumon*) *dreisbachi*, new species
- Smaller species, 11 mm. long; tergites 1-4 with medially interrupted and laterally abbreviated, narrow, white apical bands; seventh tergite with anal mark..... 2. (*Melanichneumon*) *foxleei*, new species
8. Seventh or sixth and seventh tergites with anal mark; flagellum with annulus..... 9
- No anal marks, or flagellum without annulus..... 10
9. Sixth and seventh tergites with anal marks; facial orbits and mark on vertical orbits white..... 12. (*Melanichneumon*) *nigripes* (Provancher)
- Only seventh tergite with anal mark; head uniformly black..... 14. (*Vulgichneumon*) *brevicinctor* (Say)
10. Clypeus unusually wide and depressed; mandibles unusually long and strong; face, clypeus and cheeks entirely white. (All coxae, femora and tibiae ventrally or laterally white marked; length 14 mm.)..... 28. (*Rictichneumon*) *virginicus* (Cresson)
- Clypeus and mandibles normal; face and clypeus medially black; cheeks usually not white..... 11
11. Abdomen with dark, metallic-blue hue; tibiae III usually with white, dorsal stripe..... 16. (*Vulgichneumon*) *subcyaneus* (Cresson)
- Abdomen without metallic-blue hue; tibiae III never white striped..... 14
12. Tarsi and tibiae III uniformly black..... 16c. (*Vulgichneumon*) *subcyaneus neutralis* (Cresson)
- Tarsi III partially, tibiae III dorsally, white, except apex..... 13
13. Scutellum always entirely white; lower 2/3 to 3/4 of outer orbits and pronotal ridge white..... 16a. (*Vulgichneumon*) *subcyaneus subcyaneus* (Cresson)
- Scutellum usually partially or entirely black; white markings on outer orbits and pronotal ridge more restricted..... 16b. (*Vulgichneumon*) *subcyaneus cordatus* (Cresson)
14. Legs red; flagellum without annulus. (Length 7-9 mm.)..... 22. (*Barichneumon*) *anator* (Fabricius)
- Legs black; flagellum with annulus..... 15
15. Large species, 13-14 mm. long; median field of postpetiolus very finely, longitudinally striate, with a few scattered punctures, or almost smooth; flagellum with 37-38 segments, white annulus beginning on the tenth or eleventh; pronotal ridge entirely white. (Scutellum usually predominantly white.)..... 15. (*Vulgichneumon*) *saevus* (Cresson)
- Small species, 9-11 mm. long; median field of postpetiolus nearly and rather densely punctured; flagellum with 33-35 segments, white annulus beginning on the 13th or 14th segment; pronotal ridge only apically white..... 13. (*Melanichneumon*) *absconditus* (Provancher)
16. Flagellum without annulus. (Small species.)..... 17
- Flagellum with annulus..... 20

17. Clypeus unusually wide and short, extremely strongly and densely punctured, mandible wide and long with subobsolete, subapical ventral tooth; gastrocoeli obsolete. (Ferruginous; scutella, pronotal ridge and anterior coxae white; length 7-10 mm.) 27. (*Ricticbneumon*) *residuus* (Say)
Clypeus of normal shape and sculpture; mandibles normal; gastrocoeli small but more or less distinct. (Scutellum yellow, propodeum white marked.) 18
18. Mesoscutum black, with two short, white median lines; lower half of mesopleura white; femora III uniformly light ferruginous, apically not black marked. (Sterna white; length 6-7 mm.) 25. (*Baricbneumon*) *libens* (Cresson)
Mesoscutum black or ferruginous, without white median lines; lower half of mesopleura not white; femora III apically black. 19
19. Mesoscutum predominantly dark ferruginous; mesosternum predominantly whitish; coxae III ventrally toward apex white; gastrocoeli still smaller than in the alternative species. (Length 7 mm.) 24. (*Baricbneumon*) *sorex*, new species
Mesoscutum and mesosternum black; coxae III without white mark; gastrocoeli small but distinct. (Length 8 mm.)
..... 23. (*Baricbneumon*) *soror bimaculalis* (Dalla Torre)
20. Postpetiolus finely, longitudinally striate or rugose, or almost smooth, in any case not neatly and densely punctured. 21
Postpetiolus neatly and fairly or rather densely punctured. 23
21. Scutellum laterally carinate; mesoscutum with yellow median lines; all tergites with white apical bands; scutellum black, laterally and apically white; length 11 mm. 18. (*Vulgicbneumon*) *blandii* (Cresson)
Scutellum not carinate; mesoscutum without median lines; sixth and seventh or fifth to seventh tergites with white anal marks, anterior tergites without apical bands; scutellum uniformly white; length 8-10 mm. (Clypeus white.) 22
..... (*Vulgicbneumon*) *terminalis* (Cresson)
22. Fourth tergite, propodeum and mesopleura predominantly or entirely ferruginous; at least entire lateral fields of face, usually entire face, white. 21a. (*Vulgicbneumon*) *terminalis terminalis* (Cresson)
Fourth tergite, propodeum and mesopleura predominantly or entirely black; face either entirely black or only facial orbits white. 21b. (*Vulgicbneumon*) *terminalis apicalis* (Provancher)
23. Several tergites between the second and sixth with black basal bands. 24
No tergites with black basal bands except sometimes the first. 26
24. Thorax ferruginous, mesoscutum without yellow, longitudinal median lines. (length 9-10 mm.) 5. (*Melanicbneumon*) *lissorufus*, new species
At least mesoscutum predominantly black; mesoscutum with white or yellow longitudinal median bands. 25
25. Tergites 6 and 7 with white anal marks, anterior tergites with clearly defined, white apical and vivid red-brown median, transverse bands; mesosternum and mesopleura predominantly vivid red-brown, the latter white marked; coxae III red-brown and white. (Length 10 mm.) 9. (*Melanicbneumon*) *beiligraditii* (Cresson)
Tergites 6 and 7 immaculate, anterior tergites medially ferruginous, apically yellow, these two colors not clearly separated one from another; mesosternum and more than lower two thirds of mesopleura yellow, without brown or ferruginous markings, coxae III yellow and black. (Length 9-10 mm.) 29. (?subgenus) *peramoetus*, new species
26. Thorax including mesoscutum predominantly ferruginous; mesoscutum without longitudinal, yellow median lines. (Abdomen ferruginous, anterior tergites usually with yellow apical bands, the seventh sometimes with anal mark; length 8-10 mm.) 5. (*Melanicbneumon*) *lissorufus*, new species
Basic color of mesoscutum, sometimes of entire thorax black; mesoscutum often with longitudinal, median, yellow lines. 27
27. Mesosternum uniformly black. 28
Mesosternum partially or entirely yellow or ferruginous. (Mesoscutum always with longitudinal, yellow lines; basic color of tergites 1 or 2 to 7 ferruginous.) 29
28. Mesoscutum uniformly black, without longitudinal yellow lines; gastrocoeli rather distinctly impressed; seventh and usually part of the sixth tergite black; no anal marks. (First tergite black, with white latero-apical marks or apical band; length 10-11 mm.) 10. (*Melanicbneumon*) *leviculus* (Cresson)
Mesoscutum with yellow, longitudinal, median stripes; gastrocoeli scarcely impressed; abdomen uniformly dark ferruginous, except black petiolus and yellow markings; sixth and seventh tergites with anal marks, first and second with latero-apical marks. (Length 12 mm.) 4. (*Melanicbneumon*) *indecoratus*, new species

29. First tergite black with yellow apical band. (Mesosternum yellow, thorax without ferruginous pattern; prescutellar carinae yellow; tergites 2-4 with yellow, laterally considerably widened apical bands, sixth and seventh tergites with anal marks; length 12 mm.) 8. (*Melanichneumon*) *townesi*, new species
- First tergite ferruginous. 30
30. Prescutellar carinae not yellow; scutellum laterally not carinate at base; flagellum with 31-33 segments; mesopleura and propodeum usually extensively ferruginous. (Mesosternum varying from ferruginous to yellow, tergites 1-3 with triangular, yellow, latero-apical marks, the seventh with anal mark; length 9-10 mm.) 3. (*Melanichneumon*) *disparilis* (Cresson)
- Prescutellar carinae yellow; scutellum laterally carinate to beyond base; flagellum with 35-37 segments; mesopleura and propodeum without or with restricted ferruginous markings. 31
31. Lower two thirds of mesopleura and metapleura extensively yellowish white; femora III rufous, apically not infuscated. (Length 12 mm.) 6. (*Melanichneumon*) *bonestus* (Cresson)
- Pleura predominantly black, usually ferruginous and yellow marked; femora III apically black. (Length 11-12 mm.) 7. (*Melanichneumon*) *flavocarina*, new species

32A. Subgenus *Melanichneumon* Thomson

Melanichneumon Thomson, 1895, Opusc. Ent. fasc. 18, p. 1954.

Type-species.—*Ichneumon spectabilis* Holmgren, designated by Ashmead 1900.

The type-species of the subgenus is distinguished by: (1) the short, lanceolate flagellum of the female; (2) the scarcely impressed gastrocoeli with obsolete thyridia; (3) the large, half-oval or gothic-arch-shaped area superomedia; (4) the punctate postpetiolus; (5) the chromatic pattern, with white, latero-apical marks on anterior tergites and usually also white anal marks on last tergites. It is one of the largest species of the genus, in general appearance resembling a *Coelichneumon*, with the abdomen of the female gradually tapering toward the end and apically pointed; the areolet in the fore-wing is pentagonal, its intercubiti not being confluent anteriorly.

The European fauna contains two further species sharing with the type-species of the genus all the essential above-mentioned characters: *Ichneumon fortis* Wesmæl and *Ichneumon melanarius* Wesmæl. A third European species, *Ichneumon albipictus* Gravenhorst, is also closely allied with the type-species of the subgenus. In the nearctic region only one species has been found so far, which agrees with *spectabilis* Holmgren entirely in size, morphology and general chromatic characters: it is *Melanichneumon dreisbachi*, new species. Besides, there exists, however, in North America a group of considerably smaller species, represented by *disparilis* Cresson which, except in size and certain chromatic particulars, agree perfectly with the type of the subgenus *Melanichneumon* and therefore are considered as consubgeneric. The structure of gastrocoeli is not entirely homogenous in this group, and some species with more distinctly impressed gastrocoeli and with more distinct thyridia seem to link it with the subgenus *Barichneumon*. In order to achieve the clearest possible separation of the two subgenera I have, for practical reasons, considered the short, lanceolate, strongly widened structure of the female flagellum as the deciding feature of the subgenus in cases where the shape of gastrocoeli, size and color pattern may perhaps suggest the subgenus *Barichneumon* as well. This refers particularly to *absconditus* Provancher.

No species of the subgenus *Melanichneumon* has been found hibernating; my field observations suggest that there is only one generation per year; the hosts of the large forms, including the type-species of the subgenus, are unknown. One of the species of the *disparilis* group has been reared from a Geometrid.

**Key to the Species of *Melanichneumon*,
subgenus *Melanichneumon* Thomson
of America North of Mexico**

Females

1. Abdomen uniformly or predominantly black..... 2
- Abdomen uniformly or predominantly ferruginous or red..... 5
2. Several anterior tergites with white latero-apical marks, or with white apical bands.... 3
- Anterior tergites without white pattern. (Sixth and seventh tergites with white anal marks; small species, 7-10 mm. long.)..... 4
3. Large species, 15 mm. long; flagellum with more than 40 segments; mesoscutum and apical tergites without white pattern. (White, latero-apical marks on tergites 1-2.)..... 1. *dreisbachi*, new species
- Small species, about 10 mm. long; flagellum with less than 40 segments; mesoscutum probably with white lateral lines near tegulae; apical tergite probably white marked..... 2. *foxleei*, new species (female not yet known)
4. Mesoscutum very densely punctured, opaque; scutellum white; no scopa; gastrocoeli obsolete; second tergite sometimes partially obscure ferruginous tinted. (Length 9-10 mm.)..... 12. *nigripes* (Provancher)
- Mesoscutum sparsely punctured, shiny; scutellum black or only apex white; small scopa; gastrocoeli rather small but distinctly impressed; second tergite distinctly black. (Length 7-8 mm.)..... 13. *absconditus* (Provancher)
5. Entire thorax, including mesoscutum, pleura and propodeum, uniformly black. (Femora III black; seventh tergite with anal mark.)..... 6
- Thorax partially (at least the mesoscutum) ferruginous..... 7
6. Coxae III with distinct scopa, ventrally not densely punctured; basal flagellar segments rather stout, the first scarcely 1.3 times as long as wide, the fourth square. (Apex of scutellum and usually apex of pronotal ridge white; length 8-10 mm.)..... 10. *levicululus* (Cresson)
- Coxae III without trace of scopa, ventrally polished, still more sparsely punctured; basal flagellar segments extremely abbreviated, the first scarcely longer than wide, the second square. (Apex of scutellum white; length 9 mm.)..... 11. *leviculops*, new species
7. Mesoscutum and prescutellar carinae not yellow marked..... 8
- Mesoscutum and/or prescutellar carinae yellow marked. (No distinct anal marks.)..... 11
8. Scutella yellow..... 9
- Scutella ferruginous like the mesoscutum. (Anterior tergites without apico-lateral yellow marks.)..... 10
9. Usually one or several of anterior tergites with yellow apico-lateral marks; femora III in lateral view not quite as wide as in alternative species; flagellum not quite as stout, the first segment about 1.5 times as long as wide, the sixth square. (Sixth and seventh tergites with yellow anal marks; femora III apically or predominantly black; length 8-10 mm.)..... 3. *disparilis* (Cresson)
- Anterior tergites without latero-apical marks; femora III in lateral view stouter; flagellar segments a little shorter than in alternative species, the first segment 1.3 times as long as wide, the fourth square. (Seventh or sixth and seventh tergites with yellow anal marks.)..... 4. *indecoratus*, new species (variation)
10. Femora III stouter, the head in dorsal view and cheek profile wider than in alternative species; flagellum with 37-38 segments; mesoscutum somewhat alutaceous between punctures, sub-opaque; basic color darker ferruginous, black pattern on thorax more extensive than in alternative species; length 10-11 mm. (Seventh or sixth and seventh tergites with yellow anal marks; femora III apically black.)..... 4. *indecoratus*, new species
- Femora III less stout, head in dorsal view and cheek profile somewhat narrower than in alternative species; flagellum with 35-37 segments; mesoscutum not alutaceous between punctures, distinctly shiny; basic color lighter ferruginous, black pattern on thorax more restricted; length 8-9 mm. (No distinct anal marks; apices of femora III black; sometimes bases of tergites 2-4 or to 5 black.)..... 5. *lissorufus*, new species

11. Lower part of carina genalis with slight but distinct double curve; scutellum laterally carinate at base only; petiolus black; sixth and seventh tergites with distinct, anal marks. (Tergites 1-3 with yellow, laterally widened, apical bands; prescutellar carinae and median lines on mesoscutum yellow; length 12 mm.) 8. *townesi*, new species
- Carina genalis straight, scutellum carinate to beyond middle; petiolus ferruginous; no distinct anal marks. 12
12. Scutellum, band on mesopleura and marks on propodeum yellowish white. (Usually lateral lobes, or more, of mesoscutum more extensively black; tergites 1-3 with yellow, apico-lateral marks; femora III apically not black; length 9-11 mm.) 6. *bonestus* (Cresson)
- Scutellum narrowly yellow at apex only; pleura and propodeum not yellow marked. (Mesoscutum entirely ferruginous; several anterior tergites with yellow, latero-apical marks; femora III apically broadly black; length 10-11 mm.) 7. *flavicarina*, new species

1. *Melanichneumon (Melanichneumon) dreisbachi*, new species

Types

Holotype.—♀, Michigan, Midland Co., 22.VII.1944, R. R. Dreisbach. C.H.T.

Allotype.—♂, Michigan, Bay Co., 25.VI.1939, R. R. Dreisbach. C.H.T.

Paratype.—♀, Maine, Dryden. C.G.H.

Distribution

Michigan, Maine.

Preamble

This is the single nearctic form known so far which is closely related and very similar in appearance, structure and color to the European type-species *spectabilis* Holmgren, and perhaps merely represents a subspecies of the latter. The female differs from *spectabilis* by lacking the two white anal marks, a chromatic peculiarity which, however, occasionally also occurs in the European species. The male is much more extensively white marked than the male of *spectabilis*, but also lacks the two white anal spots characteristic for the latter.

Female

Black; the following are white; mark on vertical orbits, subalarum and latero-apical marks on segments 1-2; frontal orbits pale ferruginous; length 15 mm.

Flagellum.—Lanceolate, fairly stout, strongly widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with 45 segments, the first 1.5 times as long as wide, the sixth square, the widest about 4 times as wide as long. Black with white annulus on segments 6-15.

Head.—Temple profile but slightly, cheek profile more distinctly, narrowed, the former with curved outline; malar space fully half as long as width of base of mandible; apical border of clypeus with small, median projection. Black; frontal orbits pale ferruginous, turning white on vertical orbits.

Thorax.—Mesoscutum but slightly convex, fairly densely punctured; notauli basally weakly indicated; scutellum dorsally flat, scarcely raised above post-scutellum; carination of propodeum complete and more prominent than in *spectabilis*; costulae distinct, area superomedia a little longer than wide, narrowed toward base, forming almost a gothic arch. Black; the following are white: mark on collar, subalarum, scutellum (except infuscated middle).

Legs.—Stout, femora III rather short and stout; coxae III ventrally strongly and moderately densely punctured, shiny. Black; femora I anteriorly brownish; tibiae I and II anteriorly yellowish.

Abdomen.—Postpetiolus, second and third tergites densely punctured, median field of postpetiolus comparatively well-defined; gastrocoeli scarcely impressed, indicated by irregular, longitudinal rugosity. Black; tergites 1 and 2 with white latero-apical marks.

Remarks

The paratype agrees exactly with the holotype, except for the frontal orbits, collare and subalarum, which are entirely black.

Male

Black; flagellum with white annulus; pronotal ridge and base, scutella, large marks on propodeum, latero-apical marks on tergites 1-4 and other markings white; length 18 mm.

Flagellum.—With 42 segments and with rather small, short-oval tyloides on segments 5-15. Black, with white annulus on segments 11-18; scape ventrally white.

Head.—Malar space about one third as long as width of base of mandible. Black; the following are white: Clypeus (except apical border), face (except longitudinal, black, median mark), frontal and vertical orbits, cheeks (except apex narrowly and hind part along carina genalis).

Thorax.—As in female, notauli basally more distinct, scutellum slightly more raised. Black with rich white pattern; the following are white: collare, pronotal ridge, pronotal base, subalarum, regulae, small lateral, longitudinal marks on mesoscutum near regulae, marks on prescutellar carinae, scutellum, postscutellum, two large marks on propodeum covering the entire areae dentiparae, areae posteroexternae and apices of areae spiraculiferae.

Legs.—Black; the following are white: dorsal mark on coxae II and III, ventral marks on coxae I and II, ventral marks on trochanters I, femora I narrowly at apex and ventrally except base, tibiae I and metatarsus I on anterior side, apex of femora II ventrally.

Abdomen.—Black, tergites 1-4 with large, triangular, apico-lateral marks.

2. *Melanichneumon (Melanichneumon) foxleei*, new species

Types

Holotype.—♂, British Columbia, Robson, 23.VI.1956, A. R. Foxlee. C.G.H.

Distribution

British Columbia.

Male

Black; scutella, pronotal ridge, two short, lateral lines (no median lines) on mesoscutum and marks on propodeum white; pleura and sterna immaculate; tergites 1-4 with medially interrupted, white apical bands, the seventh tergite with anal mark; flagellum with annulus; legs III uniformly black; length 11 mm.

Flagellum.—With 37 segments and with short-oval, whitish tyloides on segments 8-17. Black, with white annulus on segments 11-17; scape ventrally white.

Head.—Temple profile strongly narrowed with slightly curved outline; occiput steeply sloping down from hind border of eyes and upper ocelli; malar

space fully half as long as width of base of mandible. Black; the following are white: clypeus (except large blackish-brown median patch), face (except narrow, longitudinal, median line and basal sutures of clypeus), orbits around eyes (narrowed at temples, interrupted at malar space).

Thorax.—Mesoscutum convex, strongly and moderately densely punctured, shiny; notauli basally fairly distinct; scutellum distinctly raised above post-scutellum, laterally not carinate, apically truncate; carination sharp and complete, area superomedia horseshoe-shaped. Black; the following are white: collar, pronotal ridge and base, subalarum, dot on tegulae, two short lateral lines on mesoscutum near tegulae, scutella, areae posteroexternae.

Legs.—Black; the following are white: ventral mark on coxae I, ventral and dorsal mark on coxae II, dorsal mark on coxae III, femora I and II apically on anterior side, anterior side of tibiae I; basic color of legs I and II brownish-black.

Abdomen.—Postpetiolus without clearly defined median field, neatly punctured; gastrocoeli small and shallow, thyridia small but distinct; second and third tergites strongly and moderately densely punctured, shiny. Black; tergites 1-4 with medially interrupted and laterally somewhat abbreviated, narrow, white apical bands, the seventh tergite with anal mark; the fifth tergite with two very inconspicuous, white apical lines as rudiments of an apical band.

3. *Melanichneumon (Melanichneumon) disparilis* (Cresson)

Figs. 18, 19, 25

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

Types

Holotype.—♀, Connecticut. A.N.S.

Neallotype.—♂, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Maine and Ontario to South Carolina and Tennessee. Transition and Upper Austral Zones". New record: Quebec (C.N.C.).

Female

Ferruginous, scutella and usually a dot on the very apex of pronotal ridge yellow; mesoscutum and prescutellar carinae never yellow marked; tergites 6 and 7 with anal marks, often second tergite, or first and second, sometimes (as in the type specimen) tergites 1-3, with yellow latero-apical marks; femora III from apically to predominantly and apex of tibiae III, black; vertical orbits broadly yellow; head and thorax with restricted black markings; length 8-10 mm.

Flagellum.—Lanceolate, rather short, strongly widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with usually 33, sometimes up to 35, segments, the first scarcely 1.5 times as long as wide, the sixth square, the widest about 3.5 times as wide as long. Black, with white annulus on segments 6 or 7 to 13 or 14; scape ventrally ferruginous; basal segments usually apically brownish.

Head.—Temple and cheek profiles rather strongly narrowed, with nearly straight outlines; occiput and temples declivous from hind border of ocelli and eyes; malar space slightly longer than width of base of mandible. Ferruginous; vertical orbits always broadly yellow, sometimes also frontal orbits yellow tinted; supraantennal cavities always and often also marks on temple region black;

often ocellar region, entire occipital and temple region black, especially in northern specimens; rarely also middle of frons infuscated.

Thorax.—Mesoscutum fairly flat, strongly and moderately densely punctured; notauli basally indicated; scutellum slightly convex, a little raised above postscutellum; carination of propodeum distinct and complete, including costulae; area superomedia broadly horseshoe-shaped to semi-oval (Fig. 18). Ferruginous; the following are yellow: collare, usually the very apex of pronotal ridge, subalarum, always scutella; the following are black: prosternum basally or entirely, prepectus basally to entirely, middle of pronotum behind collare, often also propleura extensively, mesolcus, band below subalarum, often mark on mesopleura in front of coxae II, scutellar and propodeal sutures, often areae coxales, and the apex of area posteromedia, usually lateral sutures of mesoscutum.

Legs.—Femora rather stout; coxae III ventrally moderately densely punctured, shiny. Ferruginous; the following are black: coxae II and III dorsally, at least at apex, often predominantly, sometimes entirely (ventrally always ferruginous), femora III at least apically, often predominantly, tibiae III apically; coxae I and II sometimes dorsally at base pale yellow; sometimes also trochanters ventrally yellow.

Abdomen.—Petiolus gradually widening into postpetiolus, the latter without clearly defined median field, neatly (sometimes medially sparsely) punctured; gastrocoeli superficial, thyridia subobsolete (Fig. 25); second, third and base of fourth tergites fairly strongly and densely punctured; ovipositor projecting somewhat. Ferruginous; sixth and seventh tergites always with yellow anal marks; often the second or first and second, sometimes first, second and third tergites with yellow apico-lateral marks; often anterior tergites uniformly ferruginous.

Male

Thorax black with rich yellow and also ferruginous pattern; mesoscutum with two median longitudinal yellow lines and usually with short, yellow lateral lines; prescutellar carinae, however, not yellow marked; scutella yellow; meta- and mesopleura extensively ferruginous, the latter sometimes extensively yellow instead; mesosternum varying from ferruginous to yellow; abdomen ferruginous, tergites 1-3 with triangular yellow apico-lateral marks, the seventh tergite with yellow anal mark; trochanters and the coxae I and II yellow; coxae III ventrally not yellow but ferruginous, apically black, particularly dorsally black; femora III and tibiae III ferruginous, apically black; length 9-10 mm.

Flagellum.—With 31-33 segments and with bacilliform tyloides on segments 7-14 or 15. Black, ventrally pale brownish, with white annulus on segments 10 or 11 to 18 or 19; scape ventrally yellow.

Head.—Malar space less than half as long as width of base of mandible. Pale yellow; the following are black: supraantennal cavities, middle of frons, ocellar, occipital and temple regions; yellow orbits at temples strongly narrowed or interrupted.

Thorax.—Scutellum more convex than in female; area superomedia comparatively shorter (Fig. 19). Black; propodeum, meso- and metapleura and mesosternum extensively ferruginous, on mesosternum and mesopleura predominant ferruginous color tends to turn partially or predominantly into yellow; the following are yellow: collare, pronotal ridge, pronotal base, subalarum, tegulae partially, two median lines on mesoscutum, usually two shorter lateral lines on mesoscutum near tegulae, scutellum, postscutellum, areae postero-

externae, often mesopleura and mesosternum partially to predominantly, sometimes exterior part of prepectus, apex of prosternum, or prosternum predominantly, upper part of carinal triangle; prescutellar carinae never yellow marked; the following are black: predominant color of mesoscutum (the latter sometimes medially ferruginous), propleura, upper part of mesopleura, mark on mesopleura and mesosternum in front of coxae II, prepectus, base of prosternum, areae coxales, sometimes lower part of areae metapleurales, area posteromedia base of propodeum.

Legs.—Femora III somewhat slenderer than in *indecoratus*, new species, and in *flavicarina*, new species. Ferruginous; the following are yellowish-white: all trochanters (trochantelli pale ferruginous), coxae I and II, sometimes dorsal mark on coxae III; coxae III ventrally never white marked; the following are black: apex of femora III and of tibiae III, apex of coxae III (more extensively on dorsal side than ventrally), base of coxae III and usually their inner side more or less extensively; tarsi pale ferruginous.

Abdomen.—Ferruginous; the following are yellow: triangular latero-apical marks on tergites 1-3 which are gradually narrowed toward middle of tergites where they are usually confluent, anal mark on seventh tergite.

4. *Melanichneumon (Melanichneumon) indecoratus*, new species

Types

Holotype.—♀, Ontario, Cobalt, 12.VII.1956, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Mt. Blue, 25.VI.1960. C.G.H.

Paratypes.—2 ♀♀, Quebec (Low and Limbour). C.G.H.; 1 ♀, Quebec, Nominigüe. C.N.C. No. 7304.

Distribution

Ontario, Maine, Quebec, Prince Edward Island.

Preamble

Closely related to *disparilis* (Cresson) but chromatically rather different. In the female basic color darker ferruginous (nearly red-brown), and head, thorax and anterior tergites without yellow patterns. In the (tentative) male, sterna, pleura and coxae almost entirely black. Temple profile of female slightly less narrowed than in *disparilis*; flagellum still a little more widened; femora III in both sexes in lateral view somewhat wider.

Female

Dark ferruginous, including scutella and pronotal ridge; head and thorax without yellow patterns; sterna and coxae partially infuscated, sometimes predominantly black; femora III and tibiae III apically black; seventh, or sixth and seventh, tergites with yellow anal marks; length 10-11 mm.

Flagellum.—Lanceolate, rather short, extremely widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with 37-38 segments, the first 1.3 times as long as wide, the fourth square, the widest about 4 times as wide as long. Black with white annulus on segments 7-14; scape ventrally ferruginous.

Head.—Nearly as in *disparilis*, but temple profile not quite as strongly narrowed and malar space scarcely as long as width of base of mandible; frons and face slightly more strongly and densely punctured. Dark ferruginous without yellow pattern; the following are black: supraantennal cavities, usually narrow line on apex of cheeks at base of mandibles, malar space, sometimes ocellar region and hind border of occipital region.

Thorax.—Mesoscutum flat, strongly and a little more densely punctured than in *disparilis*, alutaceous between punctures and scarcely shiny; notauli basally indicated; scutellum a trifle more raised above postscutellum than in *disparilis*; carination of propodeum distinct and complete including costulae; area superomedia shaped like a gothic arch. Dark ferruginous, without yellow pattern; the following are black: base and apex of prosternum, prepectus entirely, middle of propleura extensively, broad band on mesopleura below subalarum, mark on mesopleura in front of coxae II, middle and apex of mesosternum more or less extensively, areae coxales, apex of area posteromedia, scutellar and propodeal sutures.

Legs.—Femora III in lateral view wider than in *disparilis*. Ferruginous; the following are black: apices of femora III and of tibiae III, all trochanters extensively (not trochantelli); all coxae partially infuscated to predominantly black.

Abdomen.—As in *disparilis*. Dark ferruginous; base of petiolus black; seventh or sixth and seventh tergites yellow marked.

Male

Thorax black with yellow, but almost without ferruginous, patterns; mesoscutum with two longitudinal yellow median lines; prescutellar carinae not yellow marked; scutella, marks on propodeum and pronotal ridge yellow; pleura and sterna black, middle of mesopleura with indistinct, obscure, ferruginous patch; abdomen dark ferruginous, tergites 1 and 2 with yellow apico-lateral marks, 6 and 7 with anal marks; legs dark ferruginous, all coxae and trochanters (not trochantelli) and apices of femora III and of tibiae III black; length 12 mm.

Flagellum.—With 37 segments and with small, short-oval tyloides on segments 7-17. Black, ventrally brownish, with white annulus on segments 10-20; scape ventrally yellow.

Head.—Malar space about one third as long as width of base of mandible. Pale yellow; the following are black: supraantennal cavities, frons (except yellow frontal orbits), ocellar region, occipital region (including temples and hind part of cheeks), apex of cheeks narrowly at base of mandibles, malar space.

Thorax.—Black; the following are yellow: collare, pronotal ridge, apex of pronotal base, subalarum, two long, longitudinal, median lines on mesoscutum, scutellum, postscutellum, areae posteroexternae.

Legs.—Femora III stouter than in *disparilis*. Dark ferruginous; coxae, trochanters (not trochantelli), apex of femora III and of tibiae III black.

Abdomen.—Postpetiolus more densely and evenly punctured than in *disparilis*. Dark ferruginous; postpetiolus black; the following are yellow: latero-apical marks on first and second tergites, small anal mark on sixth, larger one on seventh, tergite.

Variability

One male from Pinkam Notch, New York (C.H.T.), seems to be specifically identical with the allotype, but differs by somewhat more extensive yellow markings. The yellow, latero-apical marks on anterior tergites are medially confluent, forming yellow apical bands not only on the first and second tergites, but also on the third; coxae I and II are marked with yellow.

In females, restricted yellow pattern on the thorax may sometimes occur. In one paratype (C.N.C.) the subalarum is yellow, in another specimen from Prince Edward Island (C.N.C.), which also seems to belong to this species, the following are yellow: apex of pronotal ridge, subalarum, scutellum except base,

postscutellum, vertical orbits narrowly and indistinctly. The latter specimen is chromatically very similar to *disparilis* but differs by the stouter basal flagellar segments, the stouter femora III and the shorter malar space.

5. *Melanichneumon (Melanichneumon) lissorufus*, new species

Types

Holotype.—♀, Quebec, Kazubazua, 27.VI.1933, G. S. Walley. C.N.C. No. 7316.

Allotype.—♂, Ontario, Constance Bay. C.N.C.

Paratypes.—4 ♀♀, 1 ♂, Ontario; 2 ♀♀, 2 ♂♂, Quebec. C.N.C.; 1 ♀, 1 ♂, Ontario, 1 ♀, Michigan, 1 ♀, New York. C.H.T.; 1 ♀, Maine, 2 ♀♀, Quebec. C.G.H.

Distribution

Maine, New York, Ontario, Quebec, Michigan, Labrador (C.N.C.).

Preamble

A smaller species differing from all others of the *disparilis* group by the nearly uniform ferruginous color of the entire body (with absent, or very restricted, yellow and black pattern) and its smoother and more shiny sculpture, especially on pleura.

Female

Almost entirely ferruginous, including scutella and base of flagellum; apices of femora III and tibiae III and sometimes bases of tergites 2-4 or to 5 black; length 8-9 mm.

Flagellum.—Lanceolate, rather short, extremely widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with 35-37 segments, the first scarcely 1.5 times as long as wide, the fifth square, the widest nearly 4 times as wide as long. Ferruginous, with white or whitish annulus on segments 7 or 8 to 12 or 13; apex beyond annulus black, basal segments before annulus sometimes dorsally infuscated.

Head.—Temple and cheek profiles (as in *disparilis* (Cresson)) rather strongly narrowed, with nearly straight outlines; malar space scarcely longer than width of base of mandible. Ferruginous; sometimes vertical orbits narrowly yellow.

Thorax.—Mesoscutum rather flat, fairly densely punctured, shiny; notauli basally indicated, scutellum slightly convex and slightly raised above postscutellum, laterally carinated at the very base only; carination of propodeum sharp and complete, including costulae; area superomedia approximately half-oval or horse-shoe-shaped; pleura less densely punctured and more shiny than in *disparilis*. Ferruginous; the following are black: base of prosternum and base of prepectus more or less extensively, small mark below subalarum, scutellar and anterior propodeal sutures; subalarum sometimes yellowish; sometimes middle of pronotum narrowly blackish.

Legs.—Moderately stout. Ferruginous, apex of femora III and of tibiae III usually black; sometimes also narrowly base of tibiae III blackish.

Abdomen.—Tergites 1-3 rather densely punctured, shiny. Ferruginous; sometimes sixth and seventh tergites dorsally indistinctly yellowish; sometimes tergites 3-5 with black basal bands.

Variability

One female from Cartwright, Labrador (C.N.C.), is more melanistic than all other specimens. Additional black markings: apex of cheeks, prosternum and prepectus entirely, areae coxales, narrow apices and bases of coxae, apices of femora III and tibiae III more extensively.

Male

Thorax ferruginous, with a restricted yellow and a more or less extensive black pattern; scutella and usually pronotal ridge yellow; mesoscutum without longitudinal yellow stripes; abdomen ferruginous, in majority of specimens with yellow apical bands on tergites 1-3 or 2 and 3; tergites 3-6 often with black, basal bands; seventh tergite sometimes with anal mark; all coxae ferruginous, coxae III sometimes dorsally entirely black; apex of femora III and of tibiae III black; length 9-10 mm.

Flagellum.—With 32-36 segments and with bacilliform tyloides on segments 6 or 7 to 14 or 15. Black, with white annulus usually on segments 10-17, sometimes to 21; ventrally pale brownish; scape ventrally yellowish or ferruginous.

Head.—Ferruginous; mandibles except teeth, face, clypeus, orbits and apex of cheeks usually yellowish; supraantennal cavities, middle of frons, ocellar and occipital regions black.

Thorax.—Ferruginous; the following are usually yellow: collare, pronotal ridge and base, subalarum, scutellum, postscutellum, areae posteroexternae, apex of areae metapleurales narrowly; the following are black: prosternum basally to entirely, prepectus, middle of propleura, band below subalarum, mesolcus (sometimes mesosternum extensively), scutellar and propodeal sutures, lateral sutures of mesoscutum.

Legs.—Moderately stout. Ferruginous; the following are black: apex of femora III and of tibiae III, sometimes coxae III dorsally at apex, or predominantly.

Abdomen.—Ferruginous; the following are yellow: usually apico-lateral marks or apical band on first tergite, apical bands on second and third tergites, and sometimes apical mark on seventh tergite; tergites 3-5 or to 6 often with black basal bands.

6. *Melanichneumon (Melanichneumon) honestus* (Cresson)

Ichneumon honestus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 310, ♂.

Types

Holotype.—♂, West Virginia. A.N.S.

Neallotype.—♀, South Carolina. C.G.H.

Distribution

West Virginia (type), Maryland and North Carolina (C.H.T.).

Preamble

The male of this species (holotype) is distinguished by the scutellum, which is carinated laterally in the basal part, the white prescutellar carinae and the predominantly white mesopleura and mesosternum. The female which doubtlessly has to be associated with it displays in principle the same chromatic pattern as *flavicarina*, new species, but is much less melanistic, the scutellum being entirely yellow, the pleura and propodeum predominantly ferruginous and yellow, the femora III and tibiae III apically not black.

Male

Thorax black with very rich yellowish-white pattern; mesoscutum with two median longitudinal, and short lateral, white lines; prescutellar carinae and scutella, mesopleura, mesosternum and the declivity of propodeum predominantly, white; abdomen ferruginous, tergites 1-4 with medially narrowed, yellow apical bands, the seventh with anal mark; all trochanters and coxae I and II, ventral side and dorsal patch on coxae III white; femora and tibiae uniformly ferruginous; tarsi pale yellowish; length 12 mm.

Flagellum.—With about 36 segments and with bacilliform tyloides on segments 7-16. Black, with white annulus on segments 11-21 or (type) 24, ventrally pale brownish; scape ventrally yellow.

Head.—Malar space less than half as long as width of base of mandible. White; the following are black: supraantennal cavities, frons (except white frontal orbits), ocellar and occipital regions.

Thorax.—Scutellum laterally carinated to beyond middle. Black with extremely rich, yellowish-white pattern; the following are yellowish-white: collare, pronotal ridge and base broadly, subalarum, tegulae partially, two median longitudinal lines and two short lateral lines on mesoscutum, prescutellar carinae, scutellum, postscutellum, prosternum (except base), exterior band on prepectus, mesopleura (except black band below subalarum and mark in front of coxae II), mesosternum (except mesolcus), declivity of propodeum (except part of area posteromedial), apex of area superomedial and of areae dentiparae, apical part of metapleura, carinal triangle.

Legs.—Ferruginous; the following are white: coxae I and II, all trochanters and trochantelli, ventral side and inner half of dorsal side of coxae III; coxae III laterally black in the upper, ferruginous in the lower part.

Abdomen.—Ferruginous; tergites 1-4 with medially narrowed, yellow, apical bands; seventh tergite with anal mark.

Female

Ferruginous; prescutellar carinae, entire scutellum, the postscutellum and pronotal ridge broadly yellowish-white; tergites 1-3 with yellow, latero-apical marks, no anal marks; femora and tibiae uniformly ferruginous; middle of mesopleura extensively, and usually apex of propodeum laterally, yellowish-white; mesoscutum usually laterally, sometimes its entire color black; length 9-11 mm.

Flagellum.—Lanceolate, rather short, considerably widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with 35-38 segments, the first 1.3 times as long as wide, the fifth square, the widest about 3.5 times as wide as long. Black, with white annulus on segments 6-14 or 15; scape ventrally ferruginous; basal segments brownish at apex.

Head.—As in *indecoratus*, new species, ferruginous; mark below ocelli and occipital region usually black; orbits around eyes broadly yellowish-white, except at malar space; base of mandibles, sometimes face medially, and clypeus laterally, whitish.

Thorax.—As in *indecoratus*; scutellum, however, rather flat and laterally carinated to beyond middle. Pale ferruginous with rich yellowish-white pattern; the following are yellowish-white: collare, pronotal ridge and pronotal base broadly, subalarum, sometimes tegulae partially, longitudinal, median stripes on mesoscutum, prescutellar carinae, scutellum, postscutellum, irregular mark below apex of areae dentiparae and sometimes apex of metapleura, broad, indistinctly defined, diagonal crossband of mesopleura, carinal triangle, tip of

prosternum, sometimes mesosternum partially and indistinctly; the following are black: middle of pronotum, narrowly base of prosternum, band below subalarum, base of prepectus, scutellar and propodeal sutures, lateral lobes of mesoscutum, sometimes basic color of the latter entirely.

Legs.—Pale ferruginous; all trochanters and trochantelli and the coxae I and II predominantly whitish; coxae III dorsally on interior side white, on exterior side with black patch; all tarsi pale yellowish.

Abdomen.—Pale ferruginous; the following are yellowish-white: triangular latero-apical marks on tergites 1-3 which on the second and third tergites are sometimes confluent, forming a continuous apical band.

7. *Melanichneumon (Melanichneumon) flavicarina*, new species

Types

Holotype.—♀, Maine, Dryden, 8.VIII.1952, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Dryden, June 1959. C.G.H.

Paratypes.—1 ♀, 2 ♂♂, Maine, Dryden. C.G.H.; 1 ♀, Quebec; 1 ♀ Manitoba, Treesbank. C.N.C. No. 7305; 1 ♀, Ontario, Thunder Bay. C.H.T.

Host

Protopoarmia porcelaria Gn. in Manitoba (C.N.C.).

Distribution

Maine, Ontario, Quebec, Manitoba.

Preamble

This species agrees with *indecoratus*, new species, in the structure of head, femora III and female flagellum, and differs in all these characters from *disparilis* (Cresson). It is distinguished from *indecoratus* by a considerably different color pattern, particularly by the yellow marked prescutellar carinae, a yellow, apical band on scutellum and the absence of anal marks on the last tergites, while in contrast to *indecoratus*, tergites 1 or 2 to 3 bear yellow apico-lateral marks. Besides, in contrast to both mentioned species, about the basal half of scutellum is laterally carinated. This is perhaps the northeastern subspecies of *honestus* (Cresson) (see remark at the end).

Female

Ferruginous; prescutellar carinae, apex of scutellum, postscutellum and pronotal ridge apically, or predominantly, yellow; tergites 2, or 2 and 3, sometimes 1-3 with yellow latero-apical marks; no anal marks; femora and tibiae III apically black; vertical orbits yellow; head and thorax with restricted black markings; length 10-11 mm.

Flagellum.—Lanceolate, rather short, extremely widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with 36 or (usually) 37 segments, the first 1.3 times as long as wide, the fourth square, the widest about four times as wide as long. Black, with white annulus on segments 6 or 7 to 14 or 15; scape ventrally ferruginous.

Head.—As in *indecoratus*. Ferruginous; vertical orbits broadly, temple orbits narrowly, yellow; the following are black: supraantennal cavities and at least marks on temple region, sometimes middle of frons and ocellar and occipital regions.

Thorax.—Scutellum laterally carinated in about basal half; otherwise as in *indecoratus*. Ferruginous; the following are yellow: collare, pronotal ridge apically or predominantly, subalarum, prescutellar carinae, narrow apical band on scutellum, postscutellum, sometimes a small mark below apex of areae dentiparae; the following are black: prosternum except apex, prepectus, propleura extensively, band below subalarum, mark on mesopleura in front of coxae II, areae coxales, apex of area posteromedia, scutellar and propodeal sutures, lateral sutures of mesoscutum.

Legs.—Femora III as stout as in *indecoratus*. Ferruginous; coxae II dorsally extensively yellow, sometimes also coxae III with yellow, dorsal mark; the following are black: coxae III dorsally except base, apex of femora III broadly, tibiae III apically; in specimen from Manitoba trochanters predominantly pale yellow.

Abdomen.—Ferruginous; tergites 1 and 2 or 2 and 3 or 1-3 with yellow apico-lateral marks; no anal marks.

Male

Similar to *disparilis* but distinguished by the greater number of flagellar segments, the laterally more extensively carinated scutellum, and chromatically mainly by the yellow prescutellar carinae, yellow apical bands on anterior tergites including the 4th, and ventrally yellow coxae III (at least at apex).

Thorax black with rich yellow and very restricted ferruginous pattern; prescutellar carinae, scutella, two longitudinal median stripes on mesoscutum, and sometimes two short lateral lines near tegulae, yellow; mesopleura usually medially ferruginous, in front of the ferruginous patch usually pale yellow; metapleura sometimes partially ferruginous, usually predominantly black; mesosternum partially, often predominantly or entirely, pale yellow; coxae III ventrally pale yellow, at least at apex, their base sometimes ferruginous, their dorsal side black with yellow mark and usually ferruginous base; femora III and tibiae III apically black; length 11-12 mm.

Flagellum.—With 35-37 segments and with bacilliform tyloides on segments 7-15 or 16. Black, ventrally brownish; scape ventrally yellow.

Head.—Malar space nearly half as long as width of base of mandible. Pale yellow; the following are black: supraantennal cavities, frons (except yellow frontal orbits), ocellar region and occipital region (including hind part of cheeks).

Thorax.—Black; the following are yellow: apex of prosternum, collare, pronotal ridge and base broadly, subalarum, prescutellar carinae, two long, longitudinal, median stripes on mesoscutum, sometimes short lateral lines near tegulae, scutellum, postscutellum, areae posteroexternae (confluent with yellow upper part of area posteromedia), sometimes apex of areae spiraculiferae and metapleurae, often a mark on lower apical part and another patch on lower anterior part of mesopleura, mesosternum entirely or partially; the following are usually ferruginous: middle of mesopleura, areae spiraculiferae predominantly, apex of areae dentiparae and of area superomedia.

Legs.—Femora III as in *indecoratus*. Ferruginous; the following are yellowish-white: coxae I and II predominantly or entirely, coxae III ventrally (at least at apex), all trochanters and trochantelli, usually dorsal mark on coxae III; the following are black: coxae III laterally and dorsally (usually except base), apex of femora III and usually of tibiae III; all tarsi pale yellowish.

Abdomen.—Ferruginous; tergites 1-4 with yellow, apical bands which gradually widen toward lateral borders of segments; seventh tergite with yellow apical mark.

Variability

In one female (C.N.C.) from Manitoba the lateral lobes of mesoscutum are predominantly black, all trochanters yellowish.

Remarks

This form agrees with *honestus* (Cresson) in the laterally carinated scutellum, in other structural characters and in the principal of chromatic pattern, although the black color is much more extended and the yellow considerably reduced in both sexes. It seems to replace *honestus* geographically in northeastern America. Both facts suggest a subspecific association. Nevertheless, this hypothesis seems to need further confirmation.

8. *Melanichneumon (Melanichneumon) townesi*, new species

Types

Holotype.—♀, New York, Poughkeepsie, 25.VII.1936, H. K. Townes. C.H.T.

Allotype.—♂, New York, Poughkeepsie, 18.VII.1936, H. K. Townes. C.H.T.

Distribution

New York, Rhode Island (C.H.T.).

Preamble

The holotype resembles chromatically *disparilis* (Cresson), but has yellow prescutellar carinae and considerably stouter femora III. In both regards it agrees with *honestus* (Cresson). It is distinguished from the latter as follows: (1) carina genalis in the lower part slightly but distinctly curved, at first away from the level of cheeks, than again upward toward base of mandibles; (2) scutellum laterally carinated narrowly at the base only; (3) meso- and metapleura and also first tergites more sparsely punctured and polished between punctures; (4) petiolus black, last tergites with anal marks. There is also a slight bump on the elbow of first segment, but this may perhaps be accidental. The male associated here with the holotype is extremely similar to *flavicarina*, new species. It differs by the black basic color of first segment.

Female

Ferruginous, head and thorax extensively black and yellow marked; prescutellar carinae, entire scutellum, the postscutellum and pronotal ridge broadly yellowish-white; petiolus black, tergites 1-3 with yellow, laterally widened apical bands, the sixth and seventh with anal marks; femora and tibiae uniformly ferruginous, carina genalis not straight but slightly sinuous in its lower part; length 12 mm.

Flagellum.—Lanceolate, rather short, extremely widened and ventrally flattened beyond middle, considerably attenuated and pointed at apex, with 40 segments, the first 1.3 times as long as wide, the fourth segment square, the widest about 4 times as wide as long. Black, with white annulus on segments 7-15; scape ventrally ferruginous; basal segments apically brownish.

Head.—As in *indecoratus*, new species, ferruginous; the following are black: supraantennal cavities, middle of frons, ocellar region and occipital region including hind part of cheeks; the following are yellowish-white: orbits around eyes (except on malar space), clypeus laterally and apex of cheeks.

Thorax.—Mesoscutum flat, fairly densely punctured; notauli basally indicated; scutellum slightly convex, laterally carinated at the very base; area superomedia approximately horseshoe-shaped; area posteromedia longer than the horizontal part medially; mesopleura and metapleura medially sparsely punctured, polished between punctures. Ferruginous; the following are yellowish-white: collare, scutellum, postscutellum, pronotal ridge and base broadly, subalarum, prescutellar carinae, two fairly indistinct median lines on mesoscutum, areae posteroexternae, mark on lower apical part of mesopleura and on apical part of metapleura; the following are black: prosternum (except apex), propleura entirely, prepectus, broad band below subalarum, mark on mesopleura in front of coxae II, mesosternum extensively, propodeum (except the mentioned yellow parts and an anteriorly adjacent, restricted ferruginous area at each of them).

Legs.—Femora III rather stout and wide in lateral view. Ferruginous; the following are yellow: all trochanters (not trochantelli) predominantly, coxae I and II except pale ferruginous base, apex of coxae III ventrally and internally; coxae III externally black.

Abdomen.—First segment at elbow somewhat elevated; postpetiolus medially shiny and rather sparsely punctured; second and third tergites fairly densely punctured, shiny. Ferruginous; petiolus black; tergites 1-3 with laterally widened, yellow apical bands, sixth and seventh with anal mark.

Male

Head and thorax black with very rich, yellowish-white pattern, but without ferruginous; abdomen ferruginous, first tergite black with yellow apical band, tergites 2-4 with yellow, apical bands which are considerably widened laterally; sixth and seventh tergites with anal marks; prescutellar carinae, two longitudinal stripes on mesoscutum and scutella, white; coxae I entirely, II and III apically, white; femora and tibiae uniformly ferruginous; length 12 mm.

Flagellum.—With 37 segments and with short-oval tyloides on segments 7-17. Black, with white annulus on segments 11-21, ventrally brownish; scape ventrally white.

Head.—Black; the following are white: mandibles except teeth, clypeus, face, cheeks (except hind border), broad orbits around eyes (narrowed at temple region).

Thorax.—Black; the following are white: collare, pronotal ridge and base broadly, subalarum, two longitudinal stripes on mesoscutum, prescutellar carinae, scutellum, postscutellum, declivity of propodeum (except apex of area posteromedia), apex of areae dentiparae, superomedia, spiraculiferae and metapleurae, apical mark on lower part of mesopleura, lower anterior part of mesopleura, border of prepectus, mesosternum predominantly, apex of prosternum.

Legs.—Ferruginous; coxae I white, coxae II white with black base, coxae III black, apically white on ventral side; tarsi yellowish.

Abdomen.—Ferruginous; first segment black; tergites 1-4 with yellow apical bands which are laterally considerably widened; sixth tergite with small, seventh with large, apical mark.

9. *Melanichneumon (Melanichneumon) heiligbrodtii* (Cresson)

Ichneumon heiligbrodtii Cresson, 1877, Amer. Ent. Soc. Trans., 6: 168, ♂.

Types

Holotype.—♂, Texas, Bastrop. A.N.S.

Distribution

Texas. New record: Mexico, Nuevo Leon (C.G.H.).

Preamble

A pretty, tricolored species. According to color patterns it probably belongs to the subgenus *Melanichneumon*.

Male

Mesoscutum and horizontal part of propodeum extensively or entirely black, with white pattern; mesoscutum with longitudinal white median, and short white lateral, lines; scutella white; pleura and sterna vivid red-brown with white and black markings; abdomen tricolored, with vivid red-brown basic color, anterior tergites with black basal, white apical and red-brown median, bands; sixth and seventh tergites with anal marks; legs red-brown, anterior coxae partially white; flagellum with white annulus; length 10 mm.

Flagellum.—With 34 segments (specimen from Mexico) and with very short-oval tyloides on segments 7 or 8 to 15 or 16. Black, with white annulus on segments 9 or 10 to 16 or 17; scape ventrally white.

Head.—Malar space half as long as width of base of mandible; temple profile strongly narrowed with slightly curved outline. White; the following are black: supraantennal cavity, middle of frons broadly, ocellar and occipital regions, malar space.

Thorax.—Mesoscutum slightly convex, fairly densely punctured; notauli obsolete; scutellum distinctly raised above postscutellum, dorsally slightly convex, apically truncate; carination of propodeum sharp and complete; area superomedial wider than long, widened-horseshoe-shaped or half-moon-shaped. Basic color of mesoscutum and horizontal part of propodeum extensively or entirely black, of pleura and sterna vivid red-brown; the following are white: collare, pronotal ridge, pronotal base, subalarum, tegulae partially, two long, longitudinal, median stripes and two short lateral lines on mesoscutum, scutellum, postscutellum, lateral border of prepectus, sometimes adjacent mark on mesopleura, mark on lower, apical part of mesopleura, apical mark on metapleura, declivity of propodeum predominantly; the following are black: base of prosternum, middle of propleura, prepectus, band below subalarum, mark on mesopleura in front of coxae II, areae coxales, horizontal part of propodeum basally or entirely, area posteromedial partially; rest vivid red-brown.

Legs.—Moderately stout. Legs III red-brown, in specimen from Mexico, their coxae and trochanters ventrally white at apex, the coxae dorsally white marked too; basic color of legs I and II rufous, the coxae extensively white.

Abdomen.—Median field of postpetiolus poorly defined, neatly punctured; gastrocoeli small, slightly impressed, with fairly distinct thyridia; tergites 2-4 strongly and densely punctured, moderately shiny. Vivid red-brown; tergites 1-3 (type) or 1-4 (specimen from Mexico) with broad, black basal bands; tergites 1-4 with white apical bands (in type the band of the fourth tergite reduced to apico-lateral marks), the sixth and seventh tergites with anal marks; in specimen from Mexico also the fifth tergite with narrow, laterally abbreviated, apico-median band.

10. *Melanichneumon* (*Melanichneumon*) *leviculus* (Cresson)*Ichneumon leviculus* Cresson, 1877, Amer. Ent. Soc. Trans., 6: 170, ♂.*Types**Holotype*.—♂, New York. A.N.S.*Neallotype*.—♀, Maine, Dryden. C.G.H.*Distribution*

According to H. Townes 1951: "Maine to North Carolina". New records: Quebec (C.G.H.); Ontario (C.N.C.).

Preamble

This and the following species, *leviculops*, new species, link subgenus *Melanichneumon* with subgenus *Barichneumon*, as they combine the lanceolate flagellum of the females of the former with the small but distinctly impressed gastrocoeli of the latter. On account of the lanceolate female flagellum they are placed in *Melanichneumon* here. *M. leviculus* is the single Nearctic species of the latter group known to me which has a distinct scopa on coxae III.

Male

Head and thorax black, with white, but without ferruginous, pattern; pronotal ridge, scutellum (usually except base) and marks on propodeum, white; abdomen red, the first tergite predominantly, the seventh, and usually the sixth partially, black; apex of first segment red with white apical band or latero-apical marks; femora III entirely, tibiae III apically, black; coxae I and II, sometimes also coxae III, extensively white marked; length 10-11 mm.

Flagellum.—With 34-37 segments and with longish-oval tyloides on segments 4 or 5 to 14 or 15. Black with white annulus on segments 13 or 14 to 21 or 22 or even 24; scape ventrally white.

Head.—Malar space subobsolete, one fourth as long as width of base of mandible; temple profile scarcely narrowed, with curved outline. Black; the following are white: mandibles except teeth, clypeus and face, both except a longitudinal black median band, frontal and vertical orbits, lower part of outer orbits broadly.

Thorax.—Mesoscutum slightly convex, fairly densely punctured, shiny; notauli basally fairly distinct; scutellum somewhat raised above postscutellum, apically truncate, laterally carinated at the base; carination of propodeum sharp and complete; area superomedia as wide as, or wider than, long. Black; the following are white: collare, pronotal ridge broadly, sometimes line on apex of pronotal base, subalarum, mark on regulae, scutellum (except base), postscutellum, two marks of varying size (sometimes rather small) on propodeum, rarely mark on mesopleura.

Legs.—Femora stout. Coxae I and II apically more or less extensively, often predominantly, white; coxae III black, sometimes ventrally at apex and dorsally white marked; trochanters black, trochanters I and II usually ventrally white; femora III black, femora I and II rufous on interior side, exteriorly more or less infuscated; tibiae and tarsi I and II yellowish on interior side, exteriorly somewhat infuscated; tibiae and tarsi III pale brownish, apically infuscated.

Abdomen.—Median field of postpetiolus fairly distinct, punctured; gastrocoeli small, but distinct. Red, first and last tergites black, the first usually apically red and with white apical band, or white latero-apical marks; often sixth tergite partially infuscated.

Female

Coxae III with distinct scopa; head and thorax black with restricted white pattern; apex of scutellum, usually apex of pronotal ridge and vertical marks white; abdomen red; sixth and seventh tergites with white anal marks, their predominant color (at least of the seventh tergite) black; coxae, trochanters and femora black, in rare mutants red; length 8-10 mm.

Flagellum.—Lanceolate, moderately short, strongly widened and ventrally flattened beyond middle, distinctly attenuated toward apex, with 31-35 segments, the first scarcely 1.3 times as long as wide, the fourth square, the widest scarcely 2.5 times as wide as long. Black, with white annulus on segments 7-13 or to 15.

Head.—Temple profile slightly, cheek profile more distinctly, narrowed, the former with slightly curved, the latter with almost straight outline; malar space shorter than width of base of mandible. Black; the following are white: marks on vertical orbits, usually frontal orbits narrowly (if present, confluent with vertical marks), lateral marks on clypeus, usually a small mark on upper facial orbits (level with antennal sockets), sometimes a short stripe on lower outer orbits and a small mark on lower outer corners of face; clypeus between whitish, lateral patches usually obscure ferruginous.

Thorax.—Mesoscutum flat, moderately densely punctured, shiny; notauli indicated at the very base; scutellum slightly convex, laterally carinated at the base; area superomedia hexagonal, as long as wide, or a little longer, slightly narrowed toward base. Black; the following are white: collar, usually apex of pronotal ridge (rarely pronotal ridge entirely black, or almost entirely white), apex of scutellum, postscutellum, subalarum.

Legs.—Femora stout; coxae III ventrally finely and not densely punctured, shiny, with distinct scopa. Black; basic color of all tibiae and tarsi and anterior side of femora I and II brownish; apex of tibiae III black; apices of segments of all tarsi and slightly also apices of tibiae I and II infuscated.

Abdomen.—Median field of postpetiolus not clearly defined, densely punctured; gastrocoeli small, but distinctly impressed; second and third tergites fairly strongly and moderately densely punctured, shiny. Red; sixth and seventh tergites with white anal marks; predominant color of sixth and seventh, sometimes only of the latter, black; petiolus sometimes partially infuscated.

Variability

In one out of 12 specimens from Maine predominant color of legs including coxae and trochanters, red; coxae I and II white marked, coxae III dorsally black marked; apices of tibiae and femora III black, tarsi III infuscated.

11. *Melanichneumon (Melanichneumon) leviculops*, new species*Types*

Holotype.—♀, Quebec, Lac Gagnon, ex Geometrid. C.N.C. No. 7321.

Paratype.—♀, Ontario, Sudbury. C.N.C.; 1 ♀, Maine, Dryden. C.G.H.

Distribution

Quebec, Ontario, Maine.

Preamble

Very similar and closely allied to *leviculus* (Cresson) female, but at once distinguishable as a different species by the ventral side of coxae III which is

smooth and shiny, with a few scattered punctures only, and without any trace of a scopa; besides, basal segments of flagellum distinctly shorter.

Female

Coxae III ventrally smooth, with scattered punctures and without scopa; head and thorax black, with very restricted white pattern; only parts white: vertical marks, apex of scutellum and subalarum; abdomen red, tergites 5-7 (type) or 6-7 (paratype) black or infuscated, the sixth and seventh with white anal marks; coxae, trochanters and femora black in type specimen; length 9 mm.

Flagellum.—Lanceolate, short, strongly widened and ventrally flattened beyond middle, distinctly attenuated toward apex, with 33 segments, the basal segments extremely short, the first being scarcely longer than wide, the second square, the widest more than twice as wide as long. Black, with white annulus on segments 6 or 7 to 12.

Head.—As in *leviculus*. Black; marks on vertical orbits white; clypeus apically ferruginous.

Thorax.—As in *leviculus*. Black; subalarum and apex of scutellum white.

Legs.—Coxae III ventrally smooth, with few scattered punctures and without trace of scopa. Otherwise in color and structure as in *leviculus*.

Abdomen.—Median field of postpetiolus not clearly defined, fairly densely punctured; gastrocoeli smaller and shallower than in *leviculus*; second and third tergites a trifle less strongly punctured. Red; basic color of tergites 5-7 (in paratype 6-7) black, sixth and seventh tergites with white anal marks.

Variability

In the type specimen all femora are black or blackish-brown; in the specimen from Sudbury, Ontario, red with apices of femora III infuscated. The specimen from Maine is only 8 mm. long, has 32 flagellar segments, a small white mark on the collare, and the femora black turning obscure red toward the base and on the interior side; otherwise it agrees exactly with the holotype.

12. *Melanichneumon (Melanichneumon) nigripes* (Provancher)

Ichneumon nigripes Provancher, 1882, Nat. Canad., 13: 310, 324, ♂.

Cratichneumon pluto Viereck, 1903, Amer. Ent. Soc. Trans., 29: 78, ♂.

Amblyteles ohioensis De Gant, 1933, U. S. Nat. Mus. Proc., 82: 1, ♀ ♂.

Melanichneumon gestuosus Townes (nec Cresson), 1951, Syn. Cat., p. 285, partim, ♂.

Melanichneumon nigripes Heinrich, 1959, Ent. News, 70: 212, ♂.

Types

Holotypes.—*Ichneumon nigripes* Provancher, ♂, Ontario, Toronto. Provincial Museum, Quebec. No. 654; *Cratichneumon pluto* Viereck, ♂, New Mexico. A.N.S.; *Amblyteles ohioensis* De Gant, ♀, Ohio, Bedford. U.S.N.M.

Distribution

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

Preamble

This form approaches *M. (Barichneumon)* Thomson, by color pattern, but is considered as a *Melanichneumon* sensu stricto on account of the lanceolate flagellum and obsolete gastrocoeli and thyridia of the female. The type of *Ichneumon gestuosus* Cresson does not belong here but represents a true *Ichneumon* species.

Distribution

According to H. Townes 1951: "Ontario, Colorado." New records (δ δ): New Hampshire, Washington, Alberta, (?) North Carolina (C.H.T.); (\varnothing): Maine (C.G.H.).

Preamble

The type specimen is a badly faded specimen with obscure ferruginous discolored abdomen and legs. It also lacks both tarsi III and parts of both flagella. A good series of eight specimens in the Townes collection gave me the opportunity to complete the description. I have no doubt concerning the association of the female described below, as it matches the males as well as possible, particularly also in the shape of the small, triangular, distinctly impressed gastrocoeli and in sculpture. On account of the short, lanceolate flagellum of this female, the species has been included in the subgenus *Melanichneumon*, although otherwise it seems closely related to subgenus *Barichneumon*, linking both subgenera.

Male

Black, apex of pronotal ridge and usually apex of scutellum white; white in addition: sides of clypeus and face broadly, frontal and vertical orbits narrowly, sometimes a line on lower part of outer orbits, collare, subalarum, sometimes restricted marks on apex of coxae I and II; flagellum with white annulus; no anal marks; femora short and thick; length 9-11 mm.

Flagellum.—With 33-35 segments and with bacilliform tyloides on segments 5 or 6 to 13 or 14. Black, ventrally usually brownish, with white annulus on segments 13 or 14 to 18 or 19 or 20.

Head.—Malar space short, about one third as long as width of base of mandible. Black; the following are white: face and clypeus (except a longitudinal, median band), frontal orbits (sometimes subobsolete), vertical orbits and often a short stripe on lower part of outer orbits.

Thorax.—Mesoscutum slightly convex, sparsely punctured, shiny; notauli basally indicated; scutellum laterally carinate at base; carination sharp and complete; area superomedia as wide as, or a little wider than, long, hexagonal. Black; the following are white: collare, apex of pronotal ridge more or less extensively, subalarum, usually apical, transverse band on scutellum (sometimes medially interrupted).

Legs.—Fairly stout, femora thick. Black; anterior side of tibiae I and II ivoryish, of femora I and of apex of femora II pale brownish.

Abdomen.—Median field of postpetiolus moderately clearly defined; gastrocoeli rather small, triangular, distinctly impressed; tergites 2 and 3 moderately densely punctured, shiny. Uniformly black.

Remarks

One male from North Carolina (C.H.T.) has 38 flagellar segments, which is 4 more than the maximal number of the rest, and more oval shaped tyloides. The record was therefore added to the distribution with a question mark.

Female

Very similar to *nigripes* (Provancher) in appearance and size and agreeing with it in the short, lanceolate flagellum of the female and in color pattern. Differing distinctly as a species in the shiny, sparsely punctured sculpture of mesoscutum and anterior tergites, in the very small, but distinctly impressed, gastrocoeli and in the presence of a weak scopa.

Coxae III with weak scopa; mesoscutum sparsely punctured, shiny; black; vertical orbits with small, white mark, sixth and seventh tergites with white anal marks; sometimes apex of scutellum white; median field of postpetiolus not clearly defined, neatly punctured; length 7-8 mm.

Flagellum.—Lanceolate, rather short, considerably widened and ventrally flattened beyond middle, distinctly attenuated toward apex, with 32 segments, the first 1.5 times as long as wide, the fifth square, the widest about 2.5 times as wide as long. Black, with white annulus on segments 7-12.

Head.—Temple and cheek profiles fairly strongly narrowed, with nearly straight outlines; malar space not quite as long as width of base of mandible. Black; vertical orbits with small white marks; clypeus apically obscure ferruginous, the lateral angles indistinctly yellowish.

Thorax.—Mesoscutum flat, sparsely punctured, shiny; notauli subobsolete; scutellum laterally carinate at base; carination of propodeum sharp and complete; area superomedia slightly longer than wide, hexagonal, more or less narrowed toward base. Uniformly black; sometimes apex of scutellum narrowly white; tegulae ferruginous.

Legs.—Fairly stout. Black; tibiae and tarsi I and II brownish; anterior side of tibiae I ivory; tibiae III red-brown, apically black.

Abdomen.—Median field of postpetiolus not clearly defined; gastrocoeli rather small, triangular, distinctly impressed; tergites 1-3 moderately densely punctured, shiny. Black; sixth and seventh tergites with white anal marks.

32B. Subgenus *Vulgichneumon* Heinrich

Figs. 27, 28, 29, 30

Melanichneumon (*Vulgichneumon*) Heinrich, 1961, Can. Ent. Suppl. 15: 17.

Type-species.—*Ichneumon brevicinctor* Say.

The type of the subgenus is distinguished by: (1) the elongate, filiform flagellum of the female; (2) the scarcely impressed gastrocoeli with distinct thyridia, approaching the structure of gastrocoeli of the genus *Ichneumon* (Figs. 27, 28); (3) distinctly hexagonal area superomedia (Figs. 28, 30); (4) distinct median field of postpetiolus which is not neatly and regularly punctured but almost smooth, or weakly, longitudinally striate with only a few scattered punctures; (5) the chromatic pattern, represented by white anal marks on the last, and lack of white apico-lateral marks on anterior, tergites. In all these five characteristics subgenus *Vulgichneumon* differs from subgenus *Melanichneumon*, but only in characters (1) and (4) however, from the subgenus *Barichneumon*, with which it is linked by intermediate forms.

Here again, I would like to stress the structure of female flagellum for subgeneric distinction and to use the sculpture of postpetiolus as supplementary character, ignoring small, interspecific differences and intersubgeneric congruences in depth and size of gastrocoeli. Consequently I am including in the subgenus *Vulgichneumon* all species of the *Melanichneumon* group with slender and fairly long, filiform, subfiliform or bristleshaped flagellum of females and with well-defined, not regularly and neatly punctured, but striate, substriate or almost smooth, median field of postpetiolus. In the type-species the gastrocoeli are shallow, with distinct thyridia, in other species included in the subgenus the gastrocoeli are fairly deeply impressed. The two species *mimicus* and *zebratus*, also included below in the subgenus, approach chromatically, and especially by

the subobsolete, transverse ridge on male flagellum, the genus *Ichneumon* L.; they represent perhaps a Central American group which may include still other, at present unknown, species, and which in such a case would probably better be considered as generically, or at least subgenerically, distinct.

The subgenus *Vulgichneumon* is widely distributed over the temperate zones of the Old and New Worlds. It is represented in Europe by *Ichneumon saturatorius* Fabricius and by a considerable number of other species. From our continent so far only two fully typical species are recorded: *brevicinctor* Say and *saevus* Cresson, but some other species are closely enough related to be included.

Females do not hibernate. Collecting records indicate there are, in all probability, two summer generations. Numerous Noctuids have been recorded as hosts.

**Key to the Species of *Melanichneumon*,
subgenus *Vulgichneumon* Heinrich
of Eastern North America**

(including also the western subspecies *subcyaneus cordatus* (Cresson))

Females

1. Legs predominantly or entirely black..... 2
 Legs predominantly red or ferruginous..... 6
2. Abdomen bluish-black without white pattern; length 10-14 mm.....
 (16. *subcyaneus* Cresson)..... 3
 Abdomen black without bluish hue, with white anal marks or white bands..... 4
3. Scutellum entirely white; white flagellar annulus on segments 7 or 8 to 16 or 17.....
 16a. *subcyaneus subcyaneus* (Cresson)
 Eastern North America
 Scutellum partially or entirely black; white flagellar annulus less extensive.....
 16b. *subcyaneus cordatus* (Cresson)
 Western North America
4. Tergites 1-4 with white apical bands, 5-7 with anal marks; propodeum and tibiae white marked. (Flagellum bristleshaped, slender; coxae III with weak scopa; length 12-13 mm.)..... 17. *albomarginatus* (Cresson)
 Abdomen black; only tergites 6 and 7 with white anal mark; propodeum and tibiae not white marked..... 5
5. Trochanters III and scutellum white; flagellum filiform with 29-31 segments. (Coxae III with scopa; length 10-12 mm.)..... 14. *brevicinctor* (Say)
 Trochanters III uniformly, scutellum basally, black; flagellum subbristleshaped, with 38-39 segments. (Coxae III with indistinct scopa; length 13-14 mm.).....
 15. *saevus* (Cresson)
6. Abdomen black; tergites 1-5 with yellow apical bands, 6 and 7 with anal marks. (Mesoscutum with yellow median mark; flagellum bristleshaped, slender; coxae III with distinct scopa; length 12 mm.)..... 20. *zebratus* (Cresson)
 Abdomen partially or entirely ferruginous..... 7
7. Last tergites without anal marks; coxae III with distinct scopa; flagellum without annulus. (Predominant color of entire body ferruginous, anterior tergites with black basal bands; length 10-12 mm.)..... 19. *minimus* (Cresson)
 Last tergites with anal marks; coxae III without scopa; flagellum with annulus..... 8
8. Larger species, 10-11 mm. long; flagellum long, bristleshaped, with 37-38 segments; tergites 1-5 with white apical bands; gastrocoeli distinct. (Tergites 4 or 5 to 7 black, sixth and seventh with anal mark; scutellum laterally carinate.).....
 18. *blandii* (Cresson)
 Small species, 7-8 mm. long; flagellum filiform with 23-25 segments; tergites 1-5 without white pattern; gastrocoeli obsolete..... (8. *terminalis* (Cresson))..... 9
9. Fourth tergite, propodeum and mesopleura entirely or predominantly black; femora III predominantly black..... 21b. *terminalis apicalis* (Provancher)
 Fourth tergite, propodeum and mesopleura entirely or predominantly, femora III predominantly, ferruginous..... 10

10. Thorax uniformly ferruginous, except white scutellum; white anal mark on sixth tergite reduced to a narrow apical band.

21c. *terminalis carolinensis*, new subspecies

Thorax with black markings; sixth and seventh tergites with white anal marks.

21a. *terminalis terminalis* (Cresson)

14. *Melanichneumon (Vulgichneumon) brevicinctor* Say

Figs. 27, 28, 29, 30

Ichneumon brevicinctor Say, 1825, Amer. Ent., 2: 49, ♂.

Ichneumon extrematis Cresson, 1844, Ent. Soc. Phila. Proc., 3: 149, ♀.

Phygadeuon niger Provancher, 1874, Nat. Canad., 6: 280, ♀.

Types

Holotypes.—*Ichneumon brevicinctor* Say, ♂, lost. *Ichneumon extrematis* Cresson, ♀, Illinois. A.N.S. *Phygadeuon niger* Provancher, ♀, Canada. Provincial Museum, Quebec (not numbered yet).

Hosts

According to H. Townes 1951: "*Pyrausta nubilalis* (Hnb.), *Itame sulphurea* (Pack.), *Achatodes zeae* (Harr.), *Bleptina* sp., *Callopietria floridensis* (Guen.), *Cirphis unipuncta* (Haw.), *Lascoria ambigua* (Wlkr.), *Macronoctua onusta* Grote, *Hyphantria cunea* (Drury).

Distribution

According to H. Townes 1951: "Transcontinental in Transition and Upper Austral Zones."

Preamble

One of the most common species of the subfamily in the Nearctic Zone. Chromatically well distinguished in both sexes; the female by the constantly white trochanters III; the male by the one large, white anal mark, the white scutellum and no other white pattern on head, thorax or abdomen.

Female

Black; only the following are white: scutellum, anal marks on sixth and seventh tergites, trochanters (not trochantelli) III and flagellar annulus; coxae III with scopae; length 10-12 mm.

Flagellum.—Filiform, fairly long and slender, ventrally flattened beyond middle but not widened, with 29-31 segments, the first nearly 2.5 times as long as wide, the sixth square. Black, with white annulus on segments 5 or 7 to 11 or 12.

Head.—Temple profile slightly, cheek profile distinctly, narrowed, the former with curved, the latter with almost straight outline; malar space not quite as long as width of base of mandible. Uniformly black.

Thorax.—Mesoscutum slightly convex, finely and densely punctured, opaque; notauli basally indicated; scutellum scarcely raised above postscutellum; carination of propodeum sharp and complete; area superomedia usually as wide as, or wider than, long and little narrowed toward base, hexagonal or almost horseshoe-shaped (Fig. 30). Uniformly black except white scutellum.

Legs.—Moderately slender; coxae III ventrally finely and densely punctured, with weak scopae. Black; trochanters III white.

Abdomen.—Median field of postpetiolus clearly defined, rather smooth, with vestiges of longitudinal striation, apically with a few scattered punctures, lateral

fields punctured; gastrocoeli fairly small and shallow, but distinct, with distinct thyridia (Fig. 29); second and third tergites densely punctured, subopaque. Black; sixth and seventh tergites with white anal marks.

Male

Black, scutellum and anal mark on seventh tergite white; no other white marks; flagellum with white annulus; length 9-13 mm.

Flagellum.—Black, with white annulus on segments 13 or 14 to 17 or 18 and with bacilliform tyloides on segments 5 or 6 to 13, 14 or 15; bristle-topped, transverse ridges on segments very distinct and visible almost to the basal segment.

Head.—Malar space scarcely half as long as width of base of mandible. Uniformly black.

Thorax.—Mesoscutum more convex than in female, densely punctured, subopaque; scutellum distinctly raised above postscutellum. Black, scutellum white.

Legs.—Uniformly black; apex of femora I and the tibiae I ventrally ivoryish, the latter dorsally brownish.

Abdomen.—Gastrocoeli prolonged, longer than wide, shallow; thyridia distinct, more removed from the base of second tergite than in female (Fig. 27). Black, seventh tergite with white anal mark.

15. *Melanichneumon (Vulgichneumon) saevus* (Cresson)

Ichneumon saevus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 296, ♀.

Types

Holotype.—♀, Illinois. A.N.S.

Distribution

According to H. Townes 1951, "Rhode Island, Illinois". New record: Maine (♀ ♂).

Preamble

A rather rare and local species, with all typical characters of the subgenus. I think there is no doubt about the association of sexes as given below, on account of the series of specimens collected in Maine in the area of Dryden.

Female

Flagellum slightly but distinctly attenuated toward apex; black, the following are white: frontal orbits, collar partially, apex of scutellum, apex of pronotal ridge, subalarum and marks on tergites 6 and 7; coxae III with indistinct scopa; length 11-13 mm.

Flagellum.—Subbristle-shaped, moderately long and slender, ventrally flattened and slightly widened beyond middle, moderately attenuated toward apex, with 38 (type) to 39 segments, the first fully twice as long as wide, the seventh square, the widest about 1.5 times as wide as long. Black with white annulus on segments 6-14 (type) or 15.

Head.—Temple profile slightly, cheek profile distinctly narrowed, the former with curved, the latter with almost straight outline; malar space not quite as long as width of base of mandible. Black, frontal orbits narrowly white up to level of anterior border of upper ocelli.

Thorax.—Mesoscutum slightly convex, fairly strongly and moderately densely punctured, shiny; notauli basally distinct; scutellum a little raised above postscutellum, laterally carinate at the very base; carination of propodeum sharp and

complete; area superomedia large, as wide as, or wider than, long and moderately narrowed toward base, hexagonal or approximately horseshoe-shaped. Uniformly black, scutellum with a white apical band.

Legs.—Moderately slender; coxae III ventrally fairly strongly and densely punctured, with indistinct scopa. Uniformly black.

Abdomen.—Median field of postpetiolus fairly clearly defined, more or less distinctly longitudinally striate, apically with a few scattered punctures; gastrocoeli fairly small and shallow, but distinct, with distinct thyridia; second and third tergites rather strongly and densely, the fourth on basal part more finely and sparsely, punctured. Black, sixth and seventh tergites with white anal marks.

Male

Black, scutellum apically white to a varying extent; also white: sides of clypeus and face, frontal orbits, outer orbits partially, collare, pronotal ridge, subalarum and flagellar annulus; no anal marks, length 13-14 mm.

Flagellum.—With 37-38 segments and with longish-oval tyloides on segments 5 or 6 to 12. Black, with white annulus on segments 10 or 11 to 18 or 19 or 20.

Head.—Malar space less than half as long as width of base of mandible. Black; the following are white: usually base of mandibles, clypeus and face (both except a longitudinal, black, median band), two small spots on upper border of face below antennal cavities, frontal orbits narrowly up to level of anterior border of upper ocelli, stripe on lower part of outer orbits ($\frac{1}{2}$ the length of outer orbits or less).

Thorax.—Mesoscutum more convex, scutellum more raised, area superomedia wider, otherwise as in female. Black; the following are white: collare, pronotal ridge, subalarum, two short lateral lines at apex of scutellum, in majority of specimens the apex of scutellum more extensively, with the black color at base of scutellum, however, always projecting medially wedge-shaped into apical white part.

Legs.—Uniformly black; apex of femora I and II and anterior side of tibiae I and II ivory.

Abdomen.—Uniformly black, without anal marks.

16. *Melanichneumon (Vulgichneumon) subcyaneus* (Cresson)

Figs. 16, 17

Hosts

According to H. Townes 1951: "*Diacrisia virginica* (F.); *Hyphantria cunea* (Drury)".

Distribution

According to H. Townes 1951: "Atlantic to Rocky Mountains in Transition and Upper Austral Zones".

Preamble

Very variable in size, but on the average one of the biggest among the nearctic species of the genus. Sculpture of median field of postpetiolus rather mutable, sometimes fairly distinctly longitudinally striate, more often nearly smooth with vestiges of rugosity and always with scattered punctures (Fig. 16); sometimes puncturation of postpetiolus fairly dense and regular. Chromatically and in sculpture, including carination of propodeum, a somewhat isolated species, but nevertheless, one to be placed into the subgenus *Vulgichneumon* without too much reservation.

Female

Black; scutellum white, in western populations usually black; frontal orbits narrowly ferruginous, yellowish at upper end (level with ocellus); abdomen with distinct, dark metallic-blue hue; flagellum fairly slender, subbristleshaped; area superomedia wider than long, hexagonal; coxae III ventrally strongly punctured, shiny; length 10-14 mm.

Flagellum.—Fairly long and slender, subbristleshaped, ventrally flattened beyond middle but not widened, slightly attenuated at the very apex, with 39-44 segments, the first fully twice as long as wide, the sixth or seventh square. Black, with a white annulus of a geographically varying extent.

Head.—Temple profile scarcely, cheek profile more distinctly narrowed, both with slightly curved outlines; malar space a little longer than width of base of mandible. Black; frontal orbits usually narrowly lined with ferruginous, this line ending above at level of lower ocellus in a yellowish dot.

Thorax.—Mesoscutum and scutellum rather flat, the former strongly and moderately densely punctured, shiny; notauli scarcely indicated at the very base; carination sharp and complete; area superomedia large, usually wider than long, receiving costulae beyond middle, slightly narrowed toward base, with hexagonal outline, broadly truncate at base (Fig. 19). Black; scutellum in eastern populations white, in western specimens usually predominantly or entirely black.

Legs.—Moderately stout; coxae III ventrally polished, fairly strongly and moderately densely punctured. Uniformly black; apex of femora I and the tibiae I ivory on anterior side.

Abdomen.—Stout, broad-oval; median field of postpetiolus clearly defined, usually very finely and irregularly, longitudinally striate, with scattered punctures, often almost smooth, sometimes fairly densely punctured; gastrocœli triangular, moderately impressed, with distinct thyridia; second and third tergites moderately strongly and fairly densely punctured. Uniformly black, with dark, metallic-blue hue.

Male

Black; scutellum in eastern subspecies white, in western specimens often predominantly black; face and clypeus white, medially black; flagellum without annulus; abdomen black with metallic blue hue; legs black, tibiae and tarsi dorsally more or less extensively white; in specimens from California tibiae III (always ?) uniformly black; length 12-16 mm.

Flagellum.—With 39-43 segments, and with long bacilliform tyloides on segments 4 or 5 to 22 or 23. Black; scape ventrally white.

Head.—Malar space about one third as long as width of base of mandible. Black; the following are white: base of mandibles, clypeus and face (except a black, longitudinal, median band), sometimes clypeus more extensively or with restricted white lateral marks, frontal orbits up to vertex, lower $\frac{3}{4}$ to $\frac{3}{4}$ of outer orbits.

Thorax.—Mesoscutum and scutellum more convex than in female; notauli basally more distinct, area superomedia distinctly shorter and wider. Black; the following are white: collare, pronotal ridge, subalarum, tegulae partially or entirely, scutellum, postscutellum; in western populations white on pronotal ridge and scutellum usually more restricted.

Legs.—Black; the following are white: usually an apical mark on coxae I and a little dot on anterior apical edge of coxae II, apices of femora I and II anteriorly, all tibiae dorsally, tibiae III except apices, an individually varying number of basal segments of all tarsi dorsally except apices.

Abdomen.—Sculpture and color as in female.

16a. *Melanichneumon (Vulgichneumon) subcyaneus subcyaneus* (Cresson)

Figs. 16, 17

Ichneumon pullatus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 146, ♂.

Ichneumon subcyaneus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 148, ♀.

Types

Holotypes.—*Ichneumon subcyaneus* Cresson, ♀, Massachusetts. A.N.S.; *Ichneumon pullatus* Cresson, ♂, Illinois. A.N.S.

Host

Hyphantria cunea (Drury) (C.N.C.).

Distribution

Eastern North America.

Female

Scutellum always entirely white; white flagellar annulus on segments 7 or 8 to 16 or 17.

Male

Scutellum always entirely white; tibiae III dorsally white except apex; pronotal ridge entirely white.

16b. *Melanichneumon (Vulgichneumon) subcyaneus cordatus* (Cresson)

Ichneumon cordatus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 146, ♂.

Ichneumon solitus Cresson, 1877, Amer. Ent. Soc. Trans., 6: 144, ♀.

Melanichneumon subcyaneus cordatus Heinrich, 1959, Ent. News, 70: 212, ♀ ♂.

Types

Holotypes.—*Ichneumon cordatus* Cresson, ♂, Colorado. A.N.S.; *Ichneumon solitus* Cresson, ♀, Colorado. A.N.S.

Distribution

According to H. Townes 1951 (*cordatus*): "Colorado"; (*solitus*): "British Columbia, Washington, Arizona, New Mexico". Arizona probably has to be transferred to the range of *subcyaneus neutralis*; the subspecific status of populations from Mexico needs further investigation.

Female

Scutellum not entirely white, often entirely black; flagellar annulus less extensive than in *subcyaneus subcyaneus*.

16c. *Melanichneumon (Vulgichneumon) subcyaneus neutralis* (Cresson)

Ichneumon neutralis Cresson, 1877, Amer. Ent. Soc. Trans., 6: 149, ♂.

Ichneumon odiosus Cresson, 1877, Amer. Ent. Soc. Trans., 6: 145, ♂.

Pterocormus neutralis Townes, 1951, Syn. Cat. pp. 299-300, ♂.

Melanichneumon subcyaneus neutralis Heinrich, 1959, Ent. News, 70: 212, ♂.

Types

Holotypes.—*Ichneumon neutralis* Cresson, ♂, California. A.N.S.; *Ichneumon odiosus* Cresson, ♂, California. A.N.S.

Distribution

California; Arizona (U.S.N.M.).

Male

White on head and thorax more or less restricted, as in *subcyaneus cordatus*, from which it differs by the often uniformly black tibiae and tarsi III.

Remarks

A series of both sexes from Arizona (U.S.N.M.) shows the following variability: scutellum of females usually black, of males usually white; tibiae III of females usually black, of males usually white; tibiae III of males sometimes uniformly black as in type of subspecies *neutralis*, sometimes dorsally white striped; Arizona is therefore better included in the range of this subspecies than of *subcyaneus cordatus*. Whether these two subspecies can be satisfactorily separated at all needs to be investigated.

17. *Melanichneumon (Vulgichneumon) albomarginatus* (Cresson)

Ichneumon albomarginatus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 297, ♂.

Types

Holotype.—♂, Mississippi. A.N.S.

Neallotype.—♀, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Quebec, Ontario, New Hampshire, Vermont, Ohio, Indiana, Mississippi". New records: Maine (C.G.H.); New Jersey (M.C.Z.).

Male

Black with rich white pattern on head, thorax, abdomen and legs; flagellum without annulus; scutella, median mark on mesoscutum and marks on propodeum white; tergites 1-5 with white apical bands, 6 and 7 with anal marks; all tibiae with white pattern; length 13-15 mm.

Flagellum.—(Specimens from Maine.) Black, with 40-42 segments and with longish-oval tyloides on segments 6 or 7 to 16 or 17; scape ventrally white.

Head.—Temple profile distinctly narrowed, with curved outline; malar space fully half as long as width of base of mandible. White; the following are black: supraantennal cavities, middle of frons broadly, ocellar and occipital regions, malar space and hind part of cheeks along carina genalis.

Thorax.—Mesoscutum moderately convex, densely punctured, somewhat shiny; basal third of notauli distinct; scutellum distinctly raised above post-scutellum, laterally carinated at the very base; carination of propodeum complete and sharp, area superomedia approximately horseshoe-shaped. Black; the following are white: collar, pronotal ridge, pronotal base, subalarum, scutellum, postscutellum, median mark on mesoscutum, two marks on propodeum (including apical part of areae dentiparae and of areae spiraculiferae, and adjacent part of areae posteroexternae), mark on carinal triangle, usually a band on mesopleura along prepectus and another band on mesosternum along sternauli.

Legs.—Black; the following are white: apex of coxae I extensively, apex on ventral side of coxae II less extensively, all trochantelli, trochanters I and II ventrally, femora I anteriorly, apex of femora II anteriorly, tibiae I and II (except extensive, wedge-shaped, black, ventral stripe), dorsal stripe on tibiae III from

beyond base nearly to middle (sometimes medially interrupted by an irregular, longitudinal, black band).

Abdomen.—Median field of postpetiolus indistinctly defined, usually with vestiges of fine, longitudinal rugosity, or rather smooth; gastrocoeli triangular, rather deeply impressed, with distinct thyridia; tergites 2-4 rather strongly and densely punctured; seventh tergite narrowed; hypopygium gradually narrowed toward apex; sternites 2-5 membranous, whitish, with longitudinal, sclerotized, longish-oval, black lateral bands. Black; tergites 1-5 with white apical bands, which on tergites 3-5 are gradually widened toward the middle and laterally abbreviated; sixth and seventh tergites with white anal mark.

Female

(Description based on 3 females from Maine.)

Black, with rich, white pattern on head, thorax and abdomen; scutellum apically or more extensively white; propodeum with white marks; tergites 1-4 with white apical bands, 5-7 with anal marks; tibiae white marked; flagellum slender, bristleshaped; coxae III with weak scopa; length 12-13 mm.

Flagellum.—Fairly long, slender, bristleshaped, ventrally flattened and slightly widened beyond middle, considerably attenuated toward apex and pointed, with 41 segments, the first nearly 2.5 times as long as wide, the seventh square, the widest little wider than long. Black, with white annulus on segments 8-14.

Head.—Cheek and temple profiles distinctly narrowed, the latter with slightly curved outline. Frontal, vertical and temple orbits white; clypeus apically obscure ferruginous; the rest black.

Thorax.—Mesoscutum slightly convex, densely punctured, subopaque; basal third of notauli distinct; scutellum smooth, laterally carinate at the base; area superomedia about as wide as long or a little longer, but slightly narrowed toward base, approximately horseshoe-shaped or hexagonal. Black; the following are white: collare, pronotal ridge, subalarum, scutellum except base or except triangular, lateral, black marks at the base, postscutellum predominantly, marks on apices of areae dentiparae.

Legs.—Moderately slender; coxae III ventrally fairly densely punctured, shiny, with weak scopa. Black; the following are white: apical border of trochanters, all trochantelli predominantly, interior side of tibiae I, annulus beyond base of tibiae II, longitudinal mark on exterior side of tibiae III beyond base.

Abdomen.—Median field of postpetiolus with vestiges of longitudinal striation, or rather smooth, with some scattered punctures; gastrocoeli triangular, rather deep; second and third tergites strongly and fairly densely, the fourth weakly and sparsely punctured; sternites as in male. Black; the following are white: regular, full, apical bands on tergites 1-3, abbreviated bands on the middle of apex of tergite 4, half-moon-shaped, apical mark on the fifth, and regular anal marks on the sixth and seventh tergites.

18. *Melanichneumon (Vulgichneumon) blandii* (Cresson)

Ichneumon blandii Cresson, 1864, Ent. Soc. Phila. Proc., 3: 188, ♂.

Types

Holotype.—♂, Pennsylvania. A.N.S.

Neallotype.—♀, North Carolina. C.G.H.

Distribution

According to H. Townes 1951: "New York to North Carolina in Transition and Upper Austral Zones. Moist woods." New record: Ontario, Simcoe (C.N.C.).

Preamble

This species and *albomarginatus* Cresson differ from the type-species of the subgenus *Vulgichneumon* by the more deeply impressed gastrocoeli, by the color pattern and by the slenderer flagella and legs. They represent a slightly differentiated group which could be considered as another subgenus.

Male

Thorax black and ferruginous with rich, white pattern; abdomen black, all tergites with white apical bands, the seventh predominantly white; legs pale rufous, apex of femora III and the tibiae III blackish, tarsi III white, the base of metatarsus black; mesoscutum black with whitish median and lateral stripes, scutellum black, laterally and apically white; propodeum and mesopleura predominantly ferruginous; flagellum with white annulus; length 11 mm.

Head.—White; the following are black: supraantennal cavity, middle of frons broadly, ocellar and occipital regions.

Thorax.—Scutellum laterally carinate. Basic color of pronotum and mesoscutum and a band on mesopleura below subalarum black; the following are white: collare, pronotal ridge, pronotal base, subalarum, tegulae, two short median lines on mesoscutum, prescutellar carinae, sides and apex of scutellum, postscutellum, border of prepectus, carinal triangle and the sterna.

Legs.—Rather slender. Pale rufous; coxae I and II partially and the tarsi III white; the following are black: apex of femora III, tibiae III predominantly, base of metatarsus III.

Abdomen.—Black; all segments with white apical bands, the seventh almost entirely white.

Female

Predominant color of head, prothorax, mesoscutum, scutellum and tergites 4 or 5 to 7 black with rich white pattern; the rest pale ferruginous with white pattern; prescutellar carinae, two median stripes on mesoscutum and sides and apex of scutellum white; tergites 1-5 with white apical bands, sixth and seventh tergites with white anal mark; scutellum laterally carinate; flagellum bristle-shaped; no scopa; length 10-11 mm.

Flagellum.—Fairly long, bristleshaped, ventrally flattened and widened beyond middle, considerable attenuated and pointed at apex, with 37-38 segments, the first fully 3 times as long as wide, the ninth approximately square, the widest about twice as wide as long. Black, with white annulus on segments 7-15, scape ventrally fulvous, the basal segments apically brownish.

Head.—Temple and cheek profiles considerably narrowed, with nearly straight outlines; occiput steeply declivous from hind margin of eyes and ocelli; malar space somewhat shorter than width of base of mandible. White; the following are black: supraantennal cavity, middle of frons broadly, ocellar and occipital regions.

Thorax.—Mesoscutum slightly convex, finely and densely punctured, alutaceous between punctures, subopaque; notauli basally distinct; scutellum slightly raised above postscutellum, dorsally flat and gradually sloping down to the

latter, laterally carinated; carination of propodeum sharp and complete; area superomedia semi-oval or semi-elliptic, receiving the costulae beyond middle. Basic color of propodeum, mesoscutum and scutellum black; mesosternum, mesopleura, metapleura and propodeum predominantly pale ferruginous; the following are white: collar, pronotal ridge, pronotal base, subalarum, tegulae, two short median lines on mesoscutum, prescutellar carinae, sides and apex of scutellum, postscutellum, carinal triangle, apex of prosternum, exterior bordering band on prepectus and adjacent area on mesopleura, mark on lower posterior part of mesopleura.

Legs.—Fairly long and slender; coxae III ventrally densely punctured, without scopa. Pale ferruginous; apex of femora III, base and apex of tibiae III all narrowly infuscated, base of metatarsus III black; anterior coxae extensively whitish tinted.

Abdomen.—Fairly slender, tapering considerably toward apex; ovipositor projecting somewhat; median field of postpetiolus fairly well defined, finely, longitudinally striate; gastrocoeli moderately deep with distinct thyridia; second and third tergites densely punctured. Tergites 1-3 or to 4 pale ferruginous, the following tergites black; tergites 1-5 with white apical bands, sixth and seventh tergites with white apical marks.

19. *Melanichneumon (Vulgichneumon) mimicus* (Cresson)

Ichneumon mimicus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 300, ♂.

Types

Holotype.—♂, Massachusetts. A.N.S.

Neallotype.—♀, Maine, Dryden. C.G.H.

Distribution

According to H. Townes: "Atlantic to Illinois in Transition Zones". New record (♂): Newfoundland, Harmon Field (C.N.C.).

Preamble

The pattern of chromatic sexual dimorphism of this species and the chromatic characters of both sexes correspond entirely with those of the *laetus* group of the genus *Ichneumon* L. On account of sculpture and type of carination of propodeum, however, it has to be classified as a member of the *Melanichneumon* group, where it seems to be closer related to *Vulgichneumon* than to any other of the subgenera. The subobsolescence of the bristle-shaped, transverse ridges of the male flagellum in *mimicus* as well as in the closely allied species *zebratus* suggest a rather strong differentiation of this group from the type-species of the subgenus, *brevicinctor* Say.

Male

Basic color of head and thorax black; scutella yellow, propodeum extensively yellow marked; no yellow mark on mesoscutum and mesopleura; abdomen yellow, with black basal bands on tergites 1-6, the seventh tergite and the apices of the fifth and sixth ferruginous tinted; femora III black; flagellum without annulus; length 12-13 mm.

Flagellum.—With 40-43 segments and with short, bacilliform tyloides on segments 6 or 7 to 17. Dorsally black or blackish, ventrally ferruginous; scape ventrally yellow; rarely flagellum entirely ferruginous.

Head.—Temple profile not narrowed, with curved outline; cheek profile distinctly narrowed, with slightly curved outline; malar space half as long as width of base of mandible. Black; the following are yellow: mandibles except teeth, clypeus, face, orbits around eyes (always interrupted at malar space, narrowed or sometimes interrupted at temple region).

Thorax.—Mesoscutum slightly convex, strongly and moderately densely punctured, shiny; notauli basally indicated; scutellum distinctly raised above postscutellum, dorsally fairly flat; carination of propodeum sharp and complete; area superomedia large, almost as wide as long, receiving the costulae in the middle, slightly narrowed toward base, horseshoe-shaped or hexagonal. Black; the following are yellow: collar, pronotal ridge (sometimes apically only), usually pronotal base, subalarum, tegulae, scutellum, postscutellum, marks of varying size on propodeum (covering often the entire areae dentiparae, most of the areae spiraculiferae, areae posteroexternae and area posteromedia except apex) and marks on apex of areae metapleurales; rarely border of prepectus yellow marked.

Legs.—Moderately stout. Yellow; the following are black: coxae III, femora III, apex of tibiae III and sometimes femora II dorsally in part; predominant color of femora I and II dorsally rufous tinted; sometimes base of coxae I and II narrowly black; sometimes coxae III with yellow, dorsal mark.

Abdomen.—Median field of postpetiolus moderately clearly defined, with vestiges of longitudinal striation, or rather smooth, always with a few scattered punctures toward apex; gastrocoeli triangular, fairly deeply impressed with distinct thyridia. Yellow; basic color of last three tergites ferruginous; tergites 1-6 with broad, black, basal bands which on the fifth tergite, and sometimes on the fifth and sixth, tend to occupy most of the surface.

Female

Ferruginous, without yellow or white markings; head and thorax with black pattern; tibiae III apically black; tergites 1-4 with black basal bands; flagellum slender, bristleshaped, without white annulus; coxae III with scopa; length 10-12 mm.

Flagellum.—Bristleshaped, rather slender, ventrally flattened beyond middle but not widened, considerably attenuated and pointed at apex, with 40-43 segments, the first not quite 2.5 times as long as wide, the tenth approximately square. Ferruginous, infuscated toward apex.

Head.—Temple profile not narrowed, with curved outline; cheek profile distinctly narrowed, with slightly curved outline; malar space about as long as width of base of mandible; cheeks wide between eyes and carina genalis. Ferruginous; supraantennal cavities and sometimes ocellar region black.

Thorax.—Mesoscutum scarcely convex, fairly strongly and moderately densely punctured, shiny; notauli basally distinct; scutellum slightly raised above postscutellum, dorsally flat; carination as in male. Ferruginous; the following are black; prosternum, propleura predominantly or entirely, prepectus, middle and apex of mesosternum or mesosternum entirely, band on mesopleura below subalarum and mark in front of coxae II (rarely mesopleura predominantly), areae coxales and scutellar and propodeal sutures broadly.

Legs.—Moderately stout; coxae III ventrally polished, with scattered punctures and with distinct scopa. Ferruginous including coxae and trochanters; coxae III sometimes dorsally black marked, rarely predominantly black; apex of tibiae III black; rarely the very apex of femora III slightly infuscated.

Abdomen.—Postpetiolus and gastrocoeli as in male; tergites 2, 3 and basal part of 4 rather strongly and densely punctured, somewhat shiny. Ferruginous; tergites 1-3 or to 4 with black basal bands.

20. *Melanichneumon (Vulgichneumon) zebratus* (Cresson)

Ichneumon zebratus Cresson, 1867, Amer. Ent. Soc. Trans., 1: 299, ♀.

Types

Holotype.—♀, Illinois. A.N.S.

Neallotype.—♂, Maryland, Bowie. C.N.C. No. 7323.

Host

According to H. Townes, 1951: "*Prochoerodes forficaria* (Guen.)".

Distribution

According to H. Townes 1951: "Transcontinental in Upper Austral and Lower Austral Zones". New records: Transition Zone (Michigan, Ann Arbor; British Columbia, Robson. (C.G.H.).

Preamble

Morphologically closely related and in the male sex similar to *mimicus*, but with considerably less developed chromatic sexual dimorphism.

Female

Black, scutella and large median mark on mesoscutum yellow; propodeum and pleura extensively yellow marked; tergites 1-5 with yellow apical bands, 6 and 7 with anal marks; femora, tibiae and tarsi predominantly rufous; flagellum bristleshaped, slender, with white annulus; coxae III with distinct scopa; length 12 mm.

Flagellum.—Bristleshaped, rather slender, ventrally flattened and slightly widened beyond middle, considerably attenuated and pointed at apex, with 41 segments, the first not quite three times as long as wide, the fourteenth approximately square, the widest little wider than long. Black, with white annulus on segments 7-14 or 15; scape ventrally yellow.

Head.—Temple and cheek profiles distinctly narrowed, both with slightly curved outlines; malar space more than half as long as width of base of mandible. Yellow; the following are black: supraantennal cavities; middle of frons, ocellar and occipital regions.

Thorax.—As in *mimicus* (Cresson). Black; the following are yellow: collar, pronotal ridge, pronotal base, subalarum, tegulae, large median mark on mesoscutum, scutellum, postscutellum, carinal triangle, mesopleura predominantly, propodeum extensively, its yellow markings covering about apical two thirds of areae metapleurales and of areae spiraculiferae, the areae dentiparae and the areae posteroexternae.

Legs.—Moderately stout; coxae III ventrally densely and strongly punctured, with distinct scopa. All trochanters and coxae I and II yellow; coxae III basally black, dorsally at apex yellow, ventrally toward apex rufous; rest of legs rufous; the tibiae I and II on anterior side and apices of femora I and II on anterior side yellowish, tibiae III with yellowish mark beyond base.

Abdomen.—As in *mimicus*. Black; tergites 1-4 with regular, broad, yellow apical bands extending from side to side; fifth tergite with laterally abbreviated, medio-apical, yellow band, sixth and seventh tergites with anal marks.

Male

In color pattern almost identical with the female, except for the partially black femora, the black apex of tibiae III and the black (except yellow apices) coxae III.

Black, scutella and large, median mark on mesoscutum yellow; propodeum and pleura extensively yellow marked; tergites 1-5 with yellow, apical bands, sixth and seventh with anal marks; legs predominantly yellow, femora III extensively, femora I and II dorsally in part, black; apices of tibiae III black; flagellum without annulus; length 12 mm.

Flagellum.—With 39-41 segments and with bacilliform tyloides on segments 7-14. Dorsally black, ventrally brownish; scape ventrally yellow.

Head.—As in female.

Thorax.—As in female.

Legs.—All trochanters and coxae I and II yellow; coxae III black, their apex dorsally and ventrally yellow; femora I and II yellow, dorsally partially black; tarsi I and tibiae I and II yellow, the tibiae II ventrally with black, longitudinal stripe; tibiae III yellow, apically broadly black; femora III rufous, black toward apex and laterally; tarsi II and III infuscated.

Abdomen.—As in female.

Remarks

The femora III of the male from British Columbia are black and broadly lemon-yellow at apex. This may indicate a subspecific differentiation.

21. *Melanichneumon (Vulgichneumon) terminalis* (Cresson)

Distribution

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

Preamble

This species really does not belong in the genus *Melanichneumon*, differing from it considerably in one of the two fundamental characters: in the sculpture of anterior tergites, the postpetiolus (lateral fields as well as median fields) being almost smooth, or very finely, longitudinally striate, without any puncturation, and the second and third tergites being very finely punctate and alutaceous between punctures, similar to *Cratichneumon* rather than to *Melanichneumon*. Also the obsolescence of gastrocœli does not fit into the latter genus. On the other hand, the scheme of carination of propodeum and the color patterns do agree with the *Melanichneumon* group. If one or several other species with corresponding characters are found, it would probably be best to name the group as a genus. In the meantime, I am following H. Townes, leaving the species in the genus *Melanichneumon*, where it agrees somewhat better with the subgenus *Vulgichneumon* than with the subgenera *Melanichneumon* and *Barichneumon*.

Individually variable and also varying geographically in the usual way, northern populations being more melanistic, southern more erythristic.

Female

Head always black; *thorax* varying from entirely black to entirely ferruginous except the white scutellum; *abdomen* tricolored, tergites 1-3 or 1-4 fer-

ruginous, the following tergites black, sixth and seventh, or 5-7 with white, anal mark; legs ferruginous including coxae, femora III in northern populations black, in southern black tipped; anterior coxae and trochanters sometimes whitish; length 7-8 mm.

Flagellum.—Exactly filiform, somewhat tapering toward base, ventrally not distinctly flattened beyond middle, with 23-25 segments, the first a little more than twice as long as wide, the seventh square. Black, with white annulus on segments 6 or 7 to 11 or 12; segments 1-3 or to 4 often ferruginous or brownish.

Head.—Temple and cheek profiles distinctly narrowed, the former with slightly curved, the latter with straight outline; malar space somewhat longer than width of base of mandible; mandibles slender. Black; in southern populations clypeus ferruginous.

Thorax.—Mesoscutum slightly convex, finely and densely punctured, subopaque; basal third of notauli fairly distinct; scutellum slightly convex; carination of propodeum sharp and complete; area superomedia strongly narrowed toward the base, almost pointed and pentagonal, receiving the costulae beyond middle; spiracles of propodeum very small, short-oval. Black; in northern populations propodeum and pleura sometimes partially ferruginous; predominant color varying southward to entirely ferruginous; scutellum always white.

Legs.—Rather slender. Pale ferruginous; femora III apically or (in northern populations) entirely black; tibiae III apically and tarsi III infuscated; anterior coxae in southern populations sometimes whitish.

Abdomen.—Median field of postpetiolus moderately distinct, extremely finely, longitudinally striate or rugose, sometimes rather smooth, without punctures; gastrocoeli subobsolete; second and third tergites finely and densely punctured and finely alutaceous between punctures, slightly shiny. Tergites 1-3 or to 4 red, the following tergites black, the sixth and seventh with large, sometimes the fifth with small, white anal marks.

Male

Head black, always the clypeus, often facial orbits, in southern populations usually face predominantly or entirely, white; thorax black, pleura and propodeum varying to entirely ferruginous; scutella white; abdomen and legs as in female; flagellum with annulus; length 8-10 mm.

Flagellum.—With 28-29 segments and with bacilliform tyloides on segments 5-13. Black, with white annulus on segments 13 or 14 to 17 or 18; scape and basal segments in southern populations varying to predominantly ferruginous.

Head.—Malar space fully half as long as width of base of mandible. Black; at least the clypeus, often also facial orbits, white; in southern populations face extensively or entirely white.

Thorax.—Black; at least collare and scutellum, sometimes subalarum and apex of pronotal ridge white; propodeum and mesopleura varying to entirely ferruginous in southern specimens.

Legs.—Ferruginous, including coxae; apices of femora III, of tibiae III and the tarsi III black; tarsi II sometimes infuscated; sometimes trochanters and coxae I and II ventrally whitish.

Abdomen.—Gastrocoeli forming a longitudinal, superficial impression laterally at the base of second tergite, the thyridia being somewhat removed from the base. Tergites 1-3 or to 4 red, the following black; sixth and seventh tergites with anal mark, sometimes also the fifth tergite with a small apical mark or a narrow apical band.

21a. *Melanichneumon (Vulgichneumon) terminalis terminalis* (Cresson)*Ichneumon terminalis* Cresson, 1864, Ent. Soc. Phila. Proc., 3: 184, ♀.*Ichneumon finitimus* Cresson, 1867, Amer. Ent. Soc. Trans., 1: 302, "♀" = ♂.**Types***Holotypes*.—*Ichneumon terminalis* Cresson, ♀, Delaware. A.N.S.; *Ichneumon finitimus* Cresson, ♂, Illinois. A.N.S.**Distribution**

Delaware; Illinois; Missouri (C.G.H.); Maryland; Iowa; Southern Ontario (C.N.C.).

Female

Fourth tergite, propodeum and mesopleura predominantly or entirely ferruginous; femora III predominantly red, with black apex; clypeus ferruginous.

Male

Fourth tergite, propodeum and mesopleura predominantly or entirely ferruginous; at least lateral fields of face, usually entire face, white.

21b. *Melanichneumon (Vulgichneumon) terminalis apicalis* (Provancher)*Mesostenus apicalis* Provancher, 1875, Nat. Canad., 7: 266, 267, ♂.*Phygadeuon brevicaudus* Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., p. 54, ♀.**Types***Holotypes*.—*Mesostenus apicalis* Provancher, ♂, Canada. Provincial Museum, Quebec. (Not numbered yet.); *Phygadeuon brevicaudus* Provancher, ♀, Canada. Provincial Museum, Quebec. (Not numbered yet.)**Distribution**

Quebec; Northern Ontario; Maine (C.G.H.).

Male

Fourth tergite, propodeum and mesopleura predominantly or entirely black, the latter and the propodeum often obscure ferruginous marked; face either entirely black, or only facial orbits narrowly white.

Female

Fourth tergite, propodeum and mesopleura black, rarely the latter, or the propodeum, with restricted, obscure ferruginous mark; femora III predominantly black; clypeus black.

**21c. *Melanichneumon (Vulgichneumon) terminalis carolinensis*,
new subspecies****Types***Holotype*.—♀, North Carolina, Raleigh, 10.VI.1951. C.G.H.**Distribution**

North Carolina.

FemaleThorax, including sterna, mesoscutum and pronotum uniformly ferruginous (except white scutellum), tergites 1-4 ferruginous; white mark on sixth tergite reduced to a narrow apical band; otherwise like *terminalis terminalis* (Cresson).

32C. Subgenus *Barichneumon* Thomson

Figs. 20, 21

Barichneumon Thomson, 1893, Opusc. Ent. fasc., 18, p. 1959.*Type-species*.—*Ichneumon anator* Gravenhorst, designated by Ashmead, 1900.

The type-species of this subgenus is a small, rather isolated and aberrant, holarctic species. It is distinguished by the extremely short, exactly filiform flagellum of female, by the extremely stout and wide femora, the small but distinctly impressed gastrocoeli, the ill-defined, neatly punctured median field of postpetiolus, and a short propodeum with short, hexagonal area superomedia (Fig. 21).

I suggest confining the use of this subgeneric name to the small, stout forms with likewise short and filiform, or subfiliform, flagella of females, stout legs, small, distinctly impressed gastrocoeli and with neatly and regularly punctured postpetiolus.

As mentioned in the treatment of the subgenus *Vulgichneumon*, no sharp borderline between this and the latter subgenus can be drawn.

**Key to the Species of *Melanichneumon*,
subgenus *Barichneumon* Thomson
of Eastern North America**

Females

1. Abdomen black. (Scutellum apically white; tergites 6 and 7 with white anal marks; femora III and flagellum extremely short, the latter with 24 segments; legs predominantly red; length 7-9 mm.) 22. *anator* (Fabricius)
- Abdomen predominantly ferruginous. 2
2. Flagellum bristleshaped, with 30-32 segments, the first 2.5 times as long as wide; length 8-10 mm. (Scutellum yellow, sometimes basally ferruginous; no distinct anal marks; basic color of head, thorax and legs ferruginous.) 26. *excelsior*, new species
- Flagellum filiform, with 25-30 segments, the first 1.3 to 1.5 times as long as wide; length 6-9 mm. 3
3. Coxae III with weak scopa; tergites 6-7 blackish. Ferruginous with restricted black, head and thorax without yellow, pattern; seventh tergite with anal mark; flagellum fairly slender, not at all widened, first segment 1.5 times as long as wide; length 6 mm.) 25. *libens* (Cresson)
- Coxae III without trace of scopa; basic color of entire abdomen ferruginous. (Sometimes seventh tergite with anal mark.) 4
4. Flagellum not widened beyond middle, with 25-27 segments, the first 1.5 times as long as wide; gastrocoeli subobsolete; coxae II finely punctured; cheek profile somewhat more narrowed than in alternative species; no anal mark. (Ferruginous with restricted black pattern; scutellum without yellow tint; pronotal ridge usually yellow; length 7-9 mm.) 24. *sorex*, new species
- Flagellum distinctly widened beyond middle, with 28-30 segments, the first scarcely 1.3 times as long as wide; gastrocoeli moderately small, distinct; apical part of ventral side of coxae II almost smooth, with very few punctures; cheek profile somewhat less narrowed than in alternative species; seventh tergite with anal mark. (Ferruginous with restricted black pattern; scutellum reddish-yellow; pronotal ridge not yellow; length 6.5-9 mm.) (sorex (Cresson)) 5
5. The following are black: prosternum and propleura extensively, mesosternum partially, prepectus entirely, areae coxales, area posteromedia partially, apex of femora III and of tibiae III, the tarsi III, coxae often partially 23b. *sorex bimaculatus* (Dalla Torre)
- Almost uniformly ferruginous; only the following are black: base of prosternum narrowly, base of prepectus, mesolcus, lower border of areae coxales, apex of femora II and of tibiae III slightly infuscated. 23a. *sorex sorex* (Cresson)

22. *Melanichneumon (Barichneumon) anator* (Fabricius)

Figs. 20, 21

Ichneumon anator Fabricius, 1793, Ent. Syst., p. 169.*Ichneumon dealbator* Thunberg, 1822, Mém. Acad. Sc. St. Petersburg, p. 272.*Ichneumon belvipes* Cresson, 1867, Trans. Amer. Ent. Soc. 1: 297, ♂ ♀.*Phygadeuon niger* Provancher, 1876, Nat. Canad., 8: 317, ♀.*Phygadeuon electus* Provancher, 1886, Addit. Corr. Fauna Ent. Canada Hym., p. 51, ♂.*Barichneumon anator* Thomson, 1893, Opusc. Entom., 18, p. 1960, ♀ ♂.*Melanichneumon belvipes* Townes, 1951, Syn. Cat., p. 285, ♀ ♂.*Barichneumon anator* Heinrich, 1953, Journ. Wash. Ac. Sci., 43: 149, ♀.*Melanichneumon belvipes* Walkley, 1958, Syn. Cat. Suppl., p. 49.*Barichneumon anator* Walkley, 1958, Syn. Cat. Suppl., p. 49.*Melanichneumon anator* Heinrich, 1959, Ent. News, 70: 211, ♀.*Barichneumon anator* Heinrich, 1959, Can. Ent. 91: 806, ♀ ♂.

Types

Holotypes.—*Ichneumon anator* Fabricius, not located; *Ichneumon dealbator* Thunberg, ?sex, probably University of Upsala, Sweden; *Ichneumon belvipes* Cresson, ♀, Illinois. A.N.S.; *Phygadeuon niger* Provancher (1876), ♀, Quebec. Provincial Museum, Quebec. (Not numbered yet.); *Phygadeuon electus* Provancher, "♀" = ♂, Quebec. Provincial Museum, Quebec. (Not numbered yet.)

Distribution

According to H. Townes 1951 (*Melanichneumon belvipes*): "Atlantic to 100° West in Transition Zone." Holarctic.

Preamble

This small species is very widely distributed over the Palaearctic and Nearctic Zones, evidently without any geographical variations. It is morphologically rather different from the great majority of forms of the *Melanichneumon* group by the extremely short, filiform flagellum of female, by the extraordinarily short and thick femora and by the shape of head, with the temple and vertical region bulging slightly above the level of upper eye-rim.

Female

Black; scutellum apically white; tergites 6 and 7 with white anal marks; legs predominantly red, except coxae and trochanters; flagellum filiform, extremely short; femora III extremely short and thick; length 7-9 mm.

Flagellum.—Extremely short, exactly filiform, not widened and not distinctly flattened beyond middle, with 24 segments, the first scarcely 1.3 times as long as wide, the third square. Black, with white annulus on segments 6 or 7 to 10, ventrally obscure ferruginous, the basal segments dorso-apically of the same color.

Head.—Temple profile not narrowed, with evenly curved outline; temple and vertical region slightly bulging above level of border of upper eye (Fig. 20); cheek profile distinctly narrowed, with curved outline; malar space half as long as width of base of mandible; median field of face considerably raised and convex. Black; upper part of frontal orbits up to level of upper ocelli narrowly white.

Thorax.—Mesoscutum flat, moderately densely and finely punctured, shiny; notauli fairly distinct in basal part; scutellum flat, apically truncate; propodeum short, area superomedia hexagonal, on the average about as long as wide, sometimes even wider than long (Fig. 21). Black; the following are white: collar, apex of pronotal ridge subalarum and two latero-apical marks on scutellum which often are confluent, forming a medially narrowed, apical band.

Legs.—Extremely short and stout; femora III in lateral view scarcely 2.5 times as long as medially wide; coxae III ventrally moderately densely punctured, shiny. Red; all coxae and trochanters (not trochantelli), apex of tibiae III and the tarsi III black or blackish.

Abdomen.—Short; median field of postpetiolus fairly distinct, densely punctured; second tergite finely and moderately densely, the third still more finely punctured, both shiny; gastrocoeli small, distinctly though not deeply impressed, with fairly distinct thyridia. Black; tergites 6 and 7 with white, anal mark; apical border of anterior tergites usually narrowly obscure ferruginous.

Male

Flagellum without annulus, dorsally black, ventrally ferruginous; inner orbits white; tegulae often white marked; otherwise like the female.

23. *Melnichneumon (Barichneumon) soror* (Cresson)

Distribution

According to H. Townes: "Ontario, New York, Delaware, New Jersey". New records: Maine (C.G.H.); Quebec, British Columbia (δ), (C.N.C.).

Preamble

A small, predominantly ferruginous species which is in size and morphology rather closely allied to *anator* (Fabricius). In New England and Canada, side by side with *soror*, another ferruginous, very similar, but doubtlessly distinct species has been found. It is *sorex*, new species, males and females. The type specimen of *soror* from Delaware, a female, differs chromatically from northern populations of females by considerably less developed melanism. The species is therefore divided here into two subspecies, the male of the northern subspecies already bearing a name: *bimacularis* Dalla Torre. The differences, however, between the males of the two subspecies of *soror* can not be stated accurately at the present time. I suspect that the two species *soror* and *sorex* may display a parallel geographical, chromatic variability; comprehensive material will have to be gathered and studied in order to find the distinctive chromatic characters. In the following treatment the description of males refers to northern populations only.

Female

Ferruginous, with more or less restricted black pattern on head, thorax and legs; collare pale yellow, scutellum reddish yellow; apices of femora III and tibiae III infuscated; flagellum stout, filiform, distinctly widened beyond middle, slightly tapering toward apex and also toward base, with 28-30 segments; femora III stout; coxae II polished with very few scattered punctures; length 6.5-9 mm.

Flagellum.—Filiform, stout, distinctly widened beyond middle and ventrally flattened, tapering slightly toward apex and distinctly toward base, with 28-30 segments, the first scarcely 1.3 times as long as wide, the fourth square, the widest nearly 1.5 times as wide as long. Black, with white annulus on segments 7-13 or to 14; scape ventrally ferruginous; basal segments sometimes apically brownish.

Head.—Wide, strongly transverse; temple and cheek profiles scarcely narrowed, with curved outlines; malar space about half as long as width of base of mandible. Uniformly ferruginous in type of the species; in northern populations supraantennal cavities, ocellar region and hind part of occipital region black.

Thorax.—Mesoscutum and scutellum flat, the former fairly finely and moderately densely punctured, shiny; scutellum laterally carinated at the base; car-

ination complete and sharp, area superomedia hexagonal, narrowed toward base, about as long as wide. Ferruginous; in southern subspecies with very restricted, in northern with more extensive, black markings; the following are yellow: collare, subalarum and scutellum, the latter usually ferruginous tinted.

Legs.—Stout, femora thick; coxae II ventrally polished, with few scattered punctures. Ferruginous; apices of femora III and of tibiae III and the tarsi III more or less infuscated or blackish; in northern specimens often the coxae also partially infuscated.

Abdomen.—Short; second tergite wider than medially long, postpetiolus, second and third tergites moderately strongly and moderately densely punctured, shiny; gastrocoeli moderately small, triangular, distinctly though not deeply impressed, with fairly distinct thyridia; median field of postpetiolus not clearly defined. Ferruginous, seventh tergite with yellow anal mark.

Male

(Northern population.)

Head predominantly yellow, *abdomen* ferruginous; *thorax* black with yellow pattern, *scutella* yellow; *legs* ferruginous, *apices of femora III and of tibiae III* broadly, and the *tarsi III*, black; *coxae I and II* yellow, *coxae III* black; *flagellum* without annulus, *dorsally* black, *ventrally* ferruginous, length 8 mm.

Flagellum.—With 30-31 segments and with elongate-oval tyloides on segments 4 or 5 to 13 or 14. Black, ventrally ferruginous; scape ventrally yellow.

Head.—Malar space very short, less than one third as long as width of base of mandible. The following are yellow: mandibles except teeth, clypeus, face, orbits broadly around eyes (interrupted at temples); the following are black: supraantennal cavities, middle of frons broadly, ocellar and occipital region, apex of cheeks.

Thorax.—Scutellum convex, somewhat raised above postscutellum and apically truncate; area superomedia sometimes a little wider than long. Black; the following are yellow: apex of prosternum, collare, pronotal ridge and base, subalarum, mark on tegulae, scutellum, postscutellum, marks on propodeum; pleura sometimes medially obscure ferruginous.

Legs.—Ferruginous; coxae and trochanters I and II pale yellow; the following are black: coxae III, apices of femora III and of tibiae III extensively, and tarsi III.

Abdomen.—Ferruginous; petiolus black.

23a. *Melanichneumon (Barichneumon) soror soror* (Cresson)

Ichneumon soror Cresson, 1864, Ent. Soc. Phila. Proc., 3: 135, ♀.

Melanichneumon soror Townes, 1951, Syn. Cat., p. 286.

Types

Holotype.—*Ichneumon soror* Cresson, ♀, Delaware. A.N.S.

Distribution

Delaware.

Female

(Description based on the type specimen.)

Almost uniformly ferruginous; black markings considerably less extensive than in *soror bimacularis*; only the following are black: base of prosternum narrowly, base of prepectus, small mark below subalarum, mesolcus, lower border of areae coxales; apex of femora III and of tibiae III slightly infuscated.

**23b. *Melanichneumon (Barichneumon) soror bimacularis* (Dalla Torre),
new status**

Ichneumon bimaculatus Provancher, 1888, Addit. Corr. Faune Ent. Canada Hym., p. 357, ♂ (preocc.).

Ichneumon bimacularis Dalla Torre, 1902, Cat. Hym., v. 3, p. 863 (new name).

Types

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

Neallotype.—♀, Maine, Dryden. C.G.H.

Distribution

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

Male

See description of conspecies.

Female

More melanistic than *soror soror* (Cresson); the following are usually black: prosternum and propleura extensively, mesosternum partially, prepectus entirely, areae coxales, scutellar and propodeal sutures broadly, area posteromedia partially (sometimes all median areae of propodeum), coxae often partially, apex of femora III and of tibiae III, the tarsi III.

24. *Melanichneumon (Barichneumon) sorex*, new species

Types

Holotype.—♀, Maine, Mt. Blue, 18.VI.1960, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Mt. Blue, 31.VII.1960. C.G.H.

Paratypes.—1 ♀, Maine, Mt. Blue. C.G.H.; 4 ♀♀, Ontario and Quebec. C.N.C. No. 7320.

Distribution

Maine, Quebec, Ontario; Virginia (M.C.Z.).

Preamble

A small, predominantly ferruginous species, very similar to *soror* (Cresson). Females differ from the latter by the (in vertical view) narrower head, by the flagellum which is not at all widened beyond middle, by the more narrowed cheek profile, with slightly longer malar space, by the subobsolete gastrocoeli and distinctly, though finely, punctured coxae II. In the male mesoscutum, pleura and propodeum are ferruginous, the mesosternum yellowish in the type, but probably not always.

Female

Ferruginous, with restricted black pattern on head, thorax and legs; no anal mark; collare and usually pronotal ridge pale yellowish; scutellum ferruginous, without yellow tint; apices of femora III and of tibiae III infuscated; flagellum exactly filiform, not widened beyond middle, with 25-27 segments; femora III stout, coxae II ventrally with fine puncturation; length 7-9 mm.

Flagellum.—Exactly filiform, ventrally flattened beyond middle but not widened, with 25-27 segments, the first about 1.5 times as long as wide, the fourth square. Black, with white annulus on segments 8-12; scape and basal segments ventrally, the latter also dorsally at apex, brownish.

Head.—Somewhat narrower than in *soror*; temple and cheek profiles moderately narrowed, with slightly curved outlines; malar space about as long as width of base of mandible. Ferruginous; base of supraantennal cavities and ocellar region usually black; frontal orbits yellow, sometimes also vertical (both specimens from Mt. Blue) orbits yellow.

Thorax.—Mesoscutum and scutellum flat, the former moderately densely punctured, shiny; notauli indicated at the very base; scutellum laterally carinate at the very base; carination complete and sharp; area superomedia hexagonal, narrowed toward base, a little longer than wide. Ferruginous; collare, subalarum and usually pronotal ridge yellowish; the following are black: middle of pronotum behind collare (sometimes also middle of propleura), base of prosternum, prepectus, band below subalarum, sometimes areae coxales, scutellar and propodeal sutures, sometimes apex of area posteromedia.

Legs.—Femora stout; coxae II and III ventrally finely and fairly densely punctured. Uniformly ferruginous; apices of femora III and of tibiae III usually infuscated.

Abdomen.—Somewhat slenderer than in *soror*; the second tergite medially as long as or a little longer than apically wide; median field of postpetiolus basally fairly well, apically ill-defined, densely punctured; gastrocoeli extremely small and shallow, subobsolete; second tergite and the third (except apex) fairly densely punctured, shiny. Uniformly ferruginous.

Male

Head predominantly yellow, *abdomen* ferruginous; *thorax* ferruginous with yellow and black pattern; *scutella*, and in allotype *mesosternum*, yellow; *legs* ferruginous, apices of femora III and of tibiae III and the tarsi III black; coxae I and II yellow; *flagellum* without annulus, dorsally black, ventrally ferruginous; length 7 mm.

Flagellum.—With 28 segments and with elongate-oval tyloides on segments 5-14. Black, ventrally ferruginous, scape ventrally yellow.

Head.—Malar space scarcely one third as long as width of base of mandible. The following are yellow: Mandibles except teeth, clypeus, face, orbits broadly around eyes (interrupted at temples), cheeks; the following are black: supraantennal cavities, middle of face broadly, ocellar and occipital regions, malar space.

Thorax.—Ferruginous with yellow and black pattern; the following are yellow: apex of prosternum, collare, pronotal ridge and base, subalarum, mark on regulae, scutellum, postscutellum, marks on propodeum, the mesosternum (the yellowish color extending along the prepectus upward onto the mesopleura); the following are black: base of prosternum, prepectus, mesolcus, pronotum (except ridge and base), band below subalarum, areae coxales, area posteromedia, scutellar, pronotal and mesoscutal sutures; mesoscutum, mesopleura, metapleura and horizontal part of propodeum predominantly ferruginous.

Legs.—Ferruginous; coxae and trochanters I and II and coxae III apically on ventral side pale yellow; coxae III dorsally with black mark; apices of femora III and of tibiae III and the tarsi III black.

Abdomen.—Gastrocoeli very small. Uniformly ferruginous including petiolus; postpetiolus with latero-apical yellow marks.

Remarks

The description of the male above was based on a single specimen, the allotype. Another male from Quebec (C.N.C.) has the mesosternum and the

coxae III uniformly ferruginous, without yellow pattern, but agrees otherwise. Whether it represents the same species or not is uncertain.

25. *Melanichneumon (Barichneumon) libens* (Cresson)

Ichneumon libens Cresson, 1877, Amer. Ent. Soc. Trans., 6: 181, ♂.

Types

Holotype.—♂, Illinois. A.N.S.

Neallotype.—♀, Maine, Dryden. C.G.H.

Distribution

According to H. Townes 1951: "Rhode Island, Connecticut, New York, New Jersey, Maryland, Illinois." New records: North Carolina, Maine (C.G.H.).

Preamble

One of the smallest species. The female described below was associated on account of the fact that it represents the single eastern species known to me which fits *libens* male in smallness. The association needs further confirmation.

Male

Head predominantly yellow; abdomen uniformly pale ferruginous; thorax black, ferruginous and pale yellow; pronotal ridge, scutella, two short, median lines on mesoscutum, entire mesosternum, more than lower half of mesopleura and marks on propodeum yellow; mesoscutum black; legs pale ferruginous, apices of femora III and of tibiae III infuscated, coxae and trochanters I and II and ventral side of coxae III pale yellow; flagellum without annulus, dorsally black, ventrally ferruginous; length 6-7 mm.

Flagellum.—With usually 28, rarely 27, segments, and with bacilliform tyloides on segments 5 or 6 to 12 or 13. Dorsally black, ventrally ferruginous; scape ventrally yellow.

Head.—Malar space very short, less than one third as long as width of base of mandible. Pale yellow; the following are black: supraantennal cavities, frons broadly, ocellar and occipital regions; yellow orbits at temples not interrupted, but considerably narrowed.

Thorax.—Mesoscutum somewhat convex, moderately densely punctured, shiny; notauli basally indicated; scutellum slightly raised above postscutellum, dorsally rather flat, laterally carinated to about middle; area superomedia about as long as wide, hexagonal or horseshoe-shaped. Black, ferruginous and pale yellow; the following are yellow; collare, pronotal ridge and pronotal base, subalarum, two short median lines on mesoscutum, scutellum, postscutellum, two marks on propodeum (covering areae posteroexternae and apices of areae dentiparae and spiraculiferae), prepectus except base, prosternum, mesosternum and more than lower half of mesopleura; the following are black: pronotum (except ridge and base), usually about upper third of mesopleura (sometimes less), mesoscutum (except median lines), base of prepectus, areae coxales, area posteromedia, rarely areae metapleurales, scutellar sutures, sometimes metapleura; the rest of the propodeum ferruginous; sometimes ferruginous zone on metapleura between the black part below subalarum and the yellow lower part.

Legs.—Fairly stout. Pale ferruginous; coxae and trochanters I and II and the ventral side of coxae III pale yellow; apices of femora III and of tibiae III usually slightly infuscated.

Abdomen.—Slender; median field of postpetiolus not clearly defined. Uniformly pale ferruginous.

Female

Ferruginous, with restricted black pattern; last two tergites blackish, the seventh with white anal mark; no yellow pattern on head and thorax; apices of femora III and of tibiae III infuscated; flagellum exactly filiform, fairly slender, with 26 segments; femora III fairly stout; coxae III with weak scopula; length 6 mm.

Flagellum.—Exactly filiform, fairly slender, not at all widened beyond middle, with 26 segments, the first fully 1.5 times as long as wide, the sixth approximately square. Black, with white annulus on segments 7-12; basal segments ventrally and dorsally at apices ferruginous; scape ventrally ferruginous.

Head.—Temple profile and cheek profile distinctly narrowed, with slightly curved outlines; malar space as long as width of base of mandible. Ferruginous; the following are black: supraantennal cavities, ocellar region and occipital region.

Thorax.—Mesoscutum and scutellum flat, the former finely and moderately densely punctured, shiny, the latter laterally carinated to beyond base; carination of propodeum sharp and complete; area superomedia hexagonal, strongly narrowed toward base. Ferruginous; the following are black: middle of pronotum, base of prosternum, prepectus, mesolcus, area coxales, mesoscutal and scutellar sutures.

Legs.—Femora III fairly stout; coxae III ventrally very finely punctured, shiny, with small, weak scopula. Ferruginous, except infuscated apices of femora III and tibiae III; tarsi III slightly infuscated.

Abdomen.—Median field of postpetiolus not clearly defined, finely punctured; second and third tergites finely and moderately densely punctured, shiny; gastrocoeli extremely small and shallow, subobsolete. Ferruginous; tergites 6 and 7 blackish, the sixth with white apical margin, the seventh with white mark.

26. *Melanichneumon (Barichneumon) excelsior*, new species

Types

Holotype.—♀, Maine, Mt. Blue, 18.VI.1960, Gerd H. Heinrich. C.G.H.

Paratypes.—4 ♀♀, Maine and Quebec. C.G.H. 3 ♀♀, Ontario, Quebec. C.N.C. No. 7322.

Distribution

Maine, Quebec, Ontario.

Preamble

A medium sized species, distinguished by the fairly slender, bristleshaped structure of female flagellum.

Female

Flagellum fairly long and slender, bristleshaped; ferruginous, the thorax extensively black; scutellum yellow, sometimes basally ferruginous; no distinct anal marks; legs predominantly ferruginous, including coxae; apices of femora and tibiae III black; length 8-10 mm.

Flagellum.—Bristleshaped, fairly long, with elongate basal segments, ventrally flattened and slightly widened beyond middle, distinctly attenuated toward apex, with 30-32 segments, the first nearly 2.5 times as long as wide, the seventh square. Black, with white annulus on segments 5 or 6 to 12 or 13; scape ventrally ferruginous.

Head.—Temple and cheek profiles distinctly narrowed, with almost straight outlines; malar space about as long as width of base of mandible. Ferruginous; the following are black: supraantennal cavities, temple regions and sometimes ocellar region; vertical orbits often more or less distinctly yellowish.

Thorax.—Mesoscutum slightly convex, very finely and moderately densely punctured, shiny; notauli basally indicated; scutellum slightly convex; carination sharp and complete; area superomedia about as long as wide, hexagonal, more or less strongly narrowed toward base. Ferruginous; the following are yellow: collare, subalarum, often the apex of pronotal ridge and the scutellum entirely or apically (in the latter case the base ferruginous); the following are black: prosternum, mesosternum, prepectus, band below subalarum, areae coxales, scutellar and propodeal sutures and the propodeum to a varying extent (sometimes predominantly red or predominantly black), often only its apical slope and parts of areae metapleurales and spiraculiferae.

Legs.—Stout; coxae III ventrally finely and rather densely punctured. Ferruginous, including coxae; apices of femora and tibiae III black, tarsi III blackish.

Abdomen.—Postpetiolus wide, with fairly well defined median field; tergites 1-3 moderately finely and densely punctured; gastrocoeli not very small, distinctly impressed, with distinct thyridia. Ferruginous, petiolus usually blackish, last tergite dorsally indistinctly yellowish.

32D. Subgenus *Rictichneumon* Heinrich

Figs. 22, 23, 24

Melanichneumon (*Rictichneumon*) Heinrich, 1961, Can. Ent. Suppl. 15: 17.

Type-species.—*Ichneumon residuus* Say.

The two nearctic species included in this subgenus are distinguished from all others of the *Melanichneumon* group by two peculiar, probably functionally connected, characters: the extremely widened clypeus (Fig. 22) and the long and strong mandibles with reduced subapical tooth (Fig. 23). Additional distinctive characters are presented by the extremely stout and thick femora, subobsolete or very small gastrocoeli and the punctured postpetiolus (Fig. 24).

No other species agreeing in structure with the type-species of this subgenus are known to me from other parts of the world, nor have I seen so far forms linking it with the other subgenera of *Melanichneumon*. The group perhaps deserves generic status.

27. *Melanichneumon* (*Rictichneumon*) *residuus* (Say)

Figs. 22, 23, 24

Ichneumon residuus Say, 1829, Contrib. Maclur. Lyc. Phila., 1: 73, ♀.

Ichneumon utilis Cresson, 1867, Amer. Ent. Soc. Trans., 1: 311, ♂.

Platylabus onniferruginous Viereck, 1905, Kansas Acad. Sci. Trans., 19: 322, ♀.

Melanichneumon residuus Townes, 1951, Syn. Cat., p. 286.

Types

Holotypes.—*Ichneumon residuus* Say, ♀. Lost; *Ichneumon utilis* Cresson, ♂, Massachusetts. A.N.S.; *Platylabus onniferruginous* Viereck, ♀, Kansas, Snow Entomological Museum, University of Kansas, Laurence, Kansas.

Host

According to H. Townes 1951: "*Alsophila pometaria* Harr."

Distribution

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

Female

Almost uniformly ferruginous; thorax with very restricted black and yellowish pattern; flagellum with white annulus; length 6-9 mm.

Flagellum.—Stout, subfiliform, ventrally flattened and somewhat widened beyond middle, gradually slightly tapering toward apex, with 30-31 segments, the first scarcely 1.5 times as long as wide, the third square, the widest about twice as wide as long. Dark ferruginous with white annulus on segments 6 or 7 to 13 or 14, the apex blackish; scape ferruginous.

Head.—Temple profile scarcely narrowed, with curved outline; head in front view transverse, almost rectangular; clypeus extremely wide and short, more than 6 times as wide as long (Fig. 22); malar space less than half as long as width of base of mandible; carina oralis and carina genalis meet at lower corner of mandible base, abscissula obsolete; mandibles rather long and strong, gradually tapering toward apex, the subapical tooth reduced, its position indicated by a small notch (Fig. 23); lower edge of mandibles in ventral view forming a slightly curved blade; face and base of clypeus coarsely and extremely densely punctured. Ferruginous; frontal and vertical orbits usually indistinctly yellowish tinted.

Thorax.—Mesoscutum rather flat, of equal, longitudinal and transverse diameter, moderately densely punctured; notauli basally indicated; scutellum flat; area superomedia semi-oval, somewhat longer than wide; costulae obsolete. Ferruginous; the following are black: base of prosternum, base of prepectus, apex of mesolcus, scutellar sutures partially; the following are yellowish: collare, apex of scutellum, postscutellum, subalarum.

Legs.—Extremely short and stout; femora III in lateral view about 2.5 times as long as wide; tibiae short, distinctly widened and thickened toward apex, the apical border of tibiae III slightly raised and topped by stiff bristles; coxae III without scopa, fairly sparsely punctured. Uniformly ferruginous.

Abdomen.—Median field of postpetiolus not defined, basally densely, apically sparsely punctured, medially usually smooth; lateral fields densely punctured (Fig. 24); gastrocoeli and thyridia obsolete; second and third tergites finely and fairly densely punctured; ovipositor slightly projecting. Uniformly ferruginous.

Male

Ferruginous; head yellow, with middle of frons, ocellar and occipital regions black; thorax with yellow and restricted black pattern, scutella yellow; coxae and trochanters partially yellow; abdomen uniformly ferruginous; flagellum ferruginous, without annulus, dorsally infuscated; length 7-10 mm.

Flagellum.—With 30-33 segments and with small short-oval tyloides on segments 5 to 13 or 14 which reach neither the bases nor the apices of segments; segments from the fourth to apex with transverse ridges. Ferruginous, dorsally more or less infuscated, sometimes blackish including scape, the latter ventrally yellow.

Head.—Malar space subobsolete; face and clypeus very densely and strongly punctured, punctures tending to run into longitudinal, irregular striae on the clypeus. Black; the following are yellow: mandibles except teeth, clypeus, face, cheeks, orbits around eyes broadly (narrowed at temples); the rest black.

3. *Stenobarichneumon pygmaeops*, new species*Types*

Holotype.—♀, Maine, Dryden, 18.VIII.1951, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Dryden, 8.VI.1960. C.G.H.

Paratypes.—2♀♀, 4♂♂, Maine. C.G.H.; 1♀, 3♂♂, Quebec, Ontario. C.N.C. No. 7318.

Distribution

Maine, Quebec, Ontario.

Female

Flagellum short, filiform; head and thorax including scutellum uniformly black, except usually small white marks on vertical orbits; tergites 1-3 or (in type) 2-3 ferruginous, 4-7 black; coxae varying from predominantly ferruginous to black (in type), femora III ferruginous, apically black or entirely black; length 4-6 mm.

Flagellum.—Short, exactly filiform, ventrally flattened beyond middle but not widened, with 26 segments, the first 1.3 times as long as wide, the fourth square. Black, with white annulus on segments 7-11 or 12.

Head.—Temple and cheek profiles distinctly narrowed, with curved outlines; face slightly receding; malar space a little longer than width of base of mandible. Black; usually small white marks on vertical orbits; apical part of clypeus ferruginous.

Thorax.—Mesoscutum flat, finely and not densely punctured, shiny; notauli basally indicated; scutellum somewhat raised above postscutellum, laterally carinated to about middle; area superomedia not, or little longer than wide, hexagonal; costulae sometimes indistinct. Black; tegulae ferruginous.

Legs.—Rather stout; coxae III ventrally finely and moderately densely punctured, shiny. Color of coxae and femora varying individually from predominantly ferruginous to black; at least apices of femora III, of tibiae III and the coxae III dorsally black; tarsi III infuscated.

Abdomen.—Short; median field of postpetiolus fairly distinct, punctured; second and third tergites finely and moderately densely punctured, shiny; gastrocoeli transverse, each wider than their interval, thyridia distinct, but slightly oblique. Black; second and third tergites, sometimes also the first, ferruginous.

Male

Head and thorax black, the former with restricted, the latter without, white pattern; flagellum without annulus, black, ventrally ferruginous; white marks on vertical orbits; abdomen red and black to an individually somewhat varying extent; tergites 2 and 3 always red, often also the postpetiolus or entire first segment; color of coxae and femora varying from entirely black to predominantly ferruginous; at least coxae I, usually I and II with small apical white mark; length 6-8 mm.

Flagellum.—Usually with 28, sometimes with 27 or 29 segments and with elongate-oval tyloides on segments 4-11, the longest almost reaching from bases to apices of segments. Black, ventrally ferruginous; scape black.

Head.—Malar space about half as long as width of base of mandible; supra-antennal cavities comparatively large and strongly concave. Black; the following are white: sides of clypeus, or clypeus predominantly, sides of face, usually marks on vertical orbits and on base of mandibles.

Thorax.—Mesoscutum and scutellum more convex than in female, the latter laterally carinated to about middle. Uniformly black, without white pattern; tegulae ferruginous.

Legs.—Coxae, trochanters and the femora III varying from predominantly ferruginous to entirely black; femora III usually, tibiae III always, ferruginous and with broadly black apex, tarsi III blackish; at least coxae I, usually coxae I and II with small, white apical mark.

Abdomen.—Usually tergites 2 and 3 and the apex of postpetiolus, sometimes tergites 1-3 red, the rest black.

4. *Stenobarichneumon duplicans*, new species

Types

Holotype.—♀, Maine, Dryden, 27.VII.1959, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Mt. Blue, 15.VIII.1960. C.G.H.

Distribution

Maine.

Preamble

Extremely similar to *pygmaeops*, new species, but probably a distinct species rather than only a phase of the latter. In both sexes postpetiolus and tergites 2-4 bright red (instead of only 2-3 as in *pygmaeops*); femora III in lateral view a trifle wider, light red with clearly limited black apex, puncturation of tergites 2 and 3 somewhat stronger. Female flagellum a trifle widened beyond middle and almost imperceptibly attenuated toward apex.

Female

Flagellum short, filiform; head and thorax including scutellum uniformly black, except small, white marks on vertical orbits; tergites 1-4 light red (except petiolus), 5-7 black; legs predominantly light red, including coxae and trochanters; femora II and III apically on dorsal side with a clearly defined, black mark; length 7 mm.

Flagellum.—Short, filiform, ventrally flattened beyond middle and a trifle widened, almost imperceptibly tapering toward apex, with 27 segments, the first 1.3 times as long as wide, the fourth square. Black, with white annulus on segments 6-12.

Legs.—Light red including coxae and trochanters; the following are black: coxae II and III dorsally in part, dorsal mark on apex of femora II, apex of femora III dorsally, tibiae III apically; tarsi III blackish except base; apex of tibiae III slightly infuscated.

Otherwise like *pygmaeops*.

Male

Head and thorax black, sides of clypeus and face and marks on vertical orbits white; flagellum without annulus, black, ventrally ferruginous; abdomen light red, except petiolus and tergites 5-7 which are black; femora, tibiae and tarsi as in female, coxae, however, almost entirely black; length 9 mm.

Flagellum.—With 30 segments and with elongate-oval tyloides on segments 4-11. Black, ventrally ferruginous; scape black.

Legs.—Coxae almost entirely black, coxae I partially ferruginous, whitish at the very apex, coxae II with obscure ferruginous ventral and dorsal marks, coxae

III ventrally with a small ferruginous patch; trochanters partially black; trochantelli, femora and tibiae red, tarsi III black, femora II with dorso-apical, black mark, apex of femora and tibiae III black.

Otherwise like *pygmaeops*.

5. *Stenobarichneumon agitator*, new species

Types

Holotype.—♀, Ontario, Marmora, 5.VIII.1952, C. Boyle. C.N.C. No. 7319.

Allotype.—♂, Gatineau, Quebec, 17.X.1956. C.G.H.

Distribution

Ontario; Quebec; Maine (C.G.H.).

Preamble

The female is closely related to *pygmaeops*, new species, but has a little slenderer femora III, a longer apically slightly tapering flagellum, and a uniformly red abdomen. It does not seem to be impossible that it represents the other sex of *saundersi* (Cresson), but for the time being we have no convincing evidence to support such a hypothesis.

Female

Flagellum moderately short, filiform; head and thorax including scutellum uniformly black, except small white marks on vertical orbits; abdomen uniformly light red, in type last tergite with indication of a yellowish anal mark; legs predominantly black, including femora, coxae and trochanters; tibiae and tarsi predominantly reddish-brown; length 7 mm.

Flagellum.—Moderately short, filiform, ventrally flattened beyond middle but not widened, tapering a very little toward apex, with 28 segments, the first 1.5 times as long as wide, the fifth square. Black, with white annulus on segments 7-12.

Head.—As in *pygmaeops*.

Thorax.—As in *pygmaeops*.

Legs.—Femora a little longer and slenderer than in *pygmaeops*. Coxae, trochanters and femora black; trochantelli, tibiae and tarsi pale brownish; apices of tibiae II and of tibiae and tarsi III blackish.

Abdomen.—As in *pygmaeops*. Uniformly light red; seventh tergite with indication of yellowish anal mark.

Male

In size and appearance similar to *saundersi* (Cresson) but femora III distinctly more slender and flagellum without annulus. Very similar to *pygmaeops* but a little bigger, tibiae I and II lemon yellow with dark ventral stripe, abdomen entirely or almost entirely red.

Head and thorax black, sides of clypeus and of face and marks on vertical orbits white; flagellum without annulus, black, ventrally ferruginous; abdomen uniformly light red, except petiolus, sometimes the two apical tergites black; all coxae, trochanters and trochantelli and the femora II and III black; tibiae I and II lemon yellow with black ventral stripe; length 10 mm.

Flagellum.—With 31 segments and with long-oval tyloides on segments 5-11. Black, ventrally ferruginous; scape black.

Head.—Black; the following are white: sides of clypeus and face up to above level of antennal sockets.

Thorax.—As in *pygmaeops*. In the allotype subalarum and regulae inconspicuously white marked.

Legs.—Femora more slender than in *sandersi*. Black; apices of femora I and II, dorsal side of tibiae I and II and of metatarsus I lemon-yellow; tibiae I and II with black, ventral stripe; femora I pale rufous on interior side, dorsally rufous with a black, longitudinal stripe on each side of the rufous middle; tibiae III reddish-brown with black apex, tarsi III black with red base; tarsi I and II pale; rest black.

Abdomen.—Light red; petiolus, and in one specimen tergites 6 and 7, black.

34. Genus *Platylabops* Heinrich

Platylabops Heinrich, 1950, Mittell. Sammelst. Schmarotzerbest., 27: 4, 5.

Type-species.—*Platylabops hinzi* Heinrich, monobasic.

A distinct genus which combines certain characters of the *Platylabini* with others of the genus *Aoplus* Tischbein.

Flagellum.—Of females bristleshaped, slender, not, or moderately widened beyond middle, varying considerably in length among the species. Of males with a short row of bacilliform tyloides, with less distinct, transverse ridges on segments than in *Aoplus*.

Head.—Temple and cheek profile moderately narrowed, usually with slightly curved outlines; clypeus with straight apical border, slightly convex (Fig. 44). The latter character, although not striking, is fundamental for the diagnosis and recognition of the genus and separates it clearly from *Aoplus*. Mandibles normal.

Thorax.—Mesoscutum moderately convex, usually moderately densely punctured and more or less shiny; notauli basally distinct; scutellum in both sexes more or less raised above postscutellum, laterally carinate to a varying extent among the species, at base only or to beyond middle; propodeum fairly short, the declivity considerably longer than the horizontal part medially, sometimes twice as long; spiracles of propodeum small, oval; carination moderately sharp, but complete, including costulae; area superomedia receiving costulae usually beyond middle, on the average as wide as long, approximately hexagonal or horseshoe-shaped.

Legs.—From moderately stout to rather slender.

Abdomen.—Of females longish-oval, oxypygous, slightly blunted apically; median field of postpetiolus usually ill-defined, finely or indistinctly irregularly, longitudinally striate or rugose, sometimes coriaceous or nearly smooth; gastrocoeli in type-species rather shallow and each about as wide as their interval. Shape and depth of gastrocoeli varying specifically from the structure represented by the type-species to distinctly deepened and transverse forms with narrowed intervals. Such forms resemble *Aoplus* and *Platylabus* Wesmael. They are to be distinguished from the former by their convex clypeus, from the latter by the normal, not-flattened petiolus and by the different shape of female abdomen, especially apical structure.

Color.—Chromatically characteristic for a number of palaearctic and nearctic species of this genus in the peculiar scheme of the white pattern on the head of the males which includes the clypeus, facial orbits, a mark in the middle of the upper part of the face and dots on vertical orbits. The abdomen is red or black,

or basally red and apically black, always without anal marks, usually without light bands; the chromatic sexual dimorphism is inconsiderable.

Distribution.—Temperate Zones of the New and Old Worlds.

Biology.—Females do not hibernate, an important biological character, confirming the generic difference between *Platylabops* and *Aophus*. Geometrids (*Eupithecia* species) have been recorded as hosts of several of the American species.

Key to the Species of *Platylabops* Heinrich of America North of Mexico

Females

1. Ovipositor projecting considerably, as long as the postpetiolus; flagellum short, sub-filiform, with 26 segments; abdomen black, apices of all segments narrowly whitish. (Basic color of thorax ferruginous; head extensively white; length 7 mm.) 4. *leucopsis* (Ashmead)
(California, Washington, Oregon)
- Ovipositor not, or scarcely, projecting; flagellum bristleshaped, with 29-40 segments; abdomen colored otherwise 2
2. Flagellum with 38-40 segments, very long and slender, extremely attenuated toward apex; scutellum distinctly laterally carinated to far beyond middle; thorax black without white pattern. (Gastrocoeli shallow, thyridia transverse; legs long and slender; abdomen black, or partially reddish-brown; length 9-10 mm.) 5b. *apricus nearcticus*, new subspecies
- Flagellum with 29-33 segments, rather short, moderately attenuated toward apex; scutellum carinated laterally only at the base, or at the most to the middle; thorax with restricted white pattern. (Abdomen uniformly ferruginous or red.) 3
3. Basic color of head, thorax and abdomen pale ferruginous. (Length 7 mm.) 3. *holerythrus*, new species
(British Columbia)
- Basic color of head and thorax black, abdomen rufous or red. (Legs predominantly rufous.) 4
4. Coxae uniformly light rufous; tarsi III scarcely infuscated; only apex of pronotal ridge white; flagellum scarcely widened beyond middle, with white annulus. (Length 6.5 mm.) 2. *fraterculus*, new species
- Coxae rufous, partially blackish infuscated, or entirely black; tarsi III black; pronotal ridge white for its whole length; flagellum distinctly widened beyond middle, the widest segment nearly twice as wide as long; white annulus obsolete or subobsolete. (Gastrocoeli shallow, somewhat wider than their interval.) 5
5. Coxae and trochanters rufous, partially infuscated; eleventh flagellar segment dorsally and facial orbits narrowly white; abdomen uniformly rufous. 1a. *pecki pecki*, new species and new subspecies
(Saskatchewan)
- Coxae and trochanters black; flagellum and facial orbits entirely black, first abdominal segment infuscated. 1b. *pecki novaescotiae*, new species and new subspecies

Males

1. Abdomen predominantly black. 2
- Abdomen predominantly ferruginous or rufous. (Basic color of head and thorax black.) 3
2. Thorax black; scutellum carinated to beyond middle; flagellum with 37-40 segments; clypeus, facial orbits and median mark on upper border of face white; length 10-12 mm. 5b. *apricus nearcticus*, new subspecies
- Thorax ferruginous with white and restricted black pattern; scutellum laterally carinated at base only; flagellum with 28 segments; face and clypeus entirely white; length 8 mm. (Apical borders of all tergites narrowly whitish.) 4. *leucopsis* (Ashmead)

3. Clypeus except apex, facial orbits and mark in the middle of upper end of face white. (Legs rufous, coxae and trochanters extensively blackish, tarsi III black, coxae I and II white marked; abdomen rufous; length 8 mm.)
 1a. *pecki pecki*, new species and new subspecies 4
 Clypeus and face uniformly white.
4. Legs, including all coxae and trochanters clearly rufous; apex of pronotal ridge white; scutellum basally ferruginous, apically white. (Length 7 mm.)
 2. *fraterculus*, new species
 Femora and tibiae I and II dorsally blackish-brown, ventrally white; femora and tibiae III red; coxae and trochanters III black, coxae and trochanters I and II ventrally white; pronotal ridge white for its whole length; scutellum black with two apico-lateral white marks which are sometimes confluent. (Length 7-8 mm.)
 6. *eupitheciarum*, new species (Western)

1. *Platylabops pecki*, new species

Distribution

Saskatchewan, Nova Scotia.

Preamble

A small species, chromatically and in structure fairly closely related to the type-species.

Female

Head and thorax black, with restricted white pattern; pronotal ridge entirely, scutellum apically, white; frontal and sometimes facial orbits, vertical dots and, in type specimen of western subspecies, also basal part of clypeus, white; legs rufous, coxae and trochanters partially infuscated, in eastern specimens black; tarsi III black; abdomen rufous; flagellum black with subobsolete or obsolete white annulus; length 7 mm.

Flagellum.—Subbristleshaped, slender, rather short, ventrally flattened and moderately widened beyond middle, slightly attenuated toward apex, with 30 segments, the first fully twice as long as wide, the twelfth square, the widest not quite twice as wide as long. Black, the eleventh segment in western specimens dorsally white.

Head.—Temple profile moderately narrowed, with curved cheek profile more distinctly narrowed, with nearly straight outlines; malar space about as long as width of base of mandible. Black; the following are white: base of mandibles, frontal and sometimes facial orbits narrowly, marks on vertical orbits, in type of *pecki pecki* also basal part of clypeus.

Thorax.—Mesoscutum convex, finely and moderately densely punctured, rather shiny; basal third of notauli distinct; scutellum distinctly raised above post-scutellum, laterally carinate at the base; area superomedia wider than long, somewhat narrowed toward base, hexagonal. Black; the following are white: pronotal ridge, sometimes short line on apex of pronotal base, regulae, apical half or two thirds of scutellum, postscutellum, indistinctly subalarum.

Legs.—Moderately slender; coxae III ventrally finely and densely punctured, shiny. Rufous; tarsi III black; tarsi II slightly, all coxae and trochanters partially, blackish infuscated; in eastern specimens coxae and trochanters black.

Abdomen.—Narrow, longish-oval; median field of postpetiolus fairly clearly defined, very finely coriaceous-rugose, somewhat shiny; gastrocœli shallow, wider than their interval; second and third tergites finely and rather densely punctured, very finely alutaceous between punctures, slightly shiny; fourth and fifth tergites still more finely punctured. Uniformly rufous.

Male

(Western specimens.)

Head and thorax black with restricted white pattern; pronotal ridge entirely, scutellum apically, white; facial and lower third of frontal orbits, mark on vertical orbits, clypeus except apex and mark in the middle of upper end of face, white; legs rufous, tarsi III black, tarsi I and II infuscated; coxae and trochanters partially black, anterior coxae white marked; tibiae I and II ivory on anterior side; abdomen uniformly rufous; flagellum without annulus; length 8 mm.

Flagellum.—With 30 segments and with bacilliform tyloides on segments 7-12. Black; scape ventrally white.

Head.—Malar space more than half as long as width of base of mandible. Black; the following are white: mandibles except teeth, clypeus except apex, facial orbits broadly, lower part of frontal orbits, marks on vertical orbits, median mark on upper end of face.

Thorax.—As in female.

Legs.—Rufous; tarsi I and II infuscated, tarsi III blackish; coxae, trochanters and trochantelli extensively black or blackish, coxae I or I and II white marked.

Abdomen.—Uniformly rufous.

1a. *Platylabops pecki pecki*, new subspecies*Types*

Holotype.—♀, Saskatchewan, White Fox, 18.VII.1944, O. Peck. C.N.C. No. 7325.

Allotype.—♂, Saskatchewan, White Fox, 18.VII.1944. C.N.C.

Paratypes.—1 ♀, 1 ♂, Saskatchewan, White Fox. C.G.H.

Distribution

Saskatchewan.

Female

Coxae and trochanters rufous, partially infuscated; eleventh segment of flagellum dorsally and facial orbits narrowly, sometimes also basal part of clypeus, white; abdomen uniformly rufous.

Male

See description of conspecies.

1b. *Platylabops pecki novaescotiae*, new subspecies*Types*

Holotype.—♀, Nova Scotia, White Pt. Beach, 27.VIII.1936, J. McDunnough. C.N.C. No. 7327.

Distribution

Nova Scotia.

Female

Coxae and trochanters uniformly black; flagellum uniformly black; facial orbits and clypeus without white pattern; first segment infuscated.

Male

Unknown.

2. *Platylabops fraterculus*, new species

Types

Holotype.—♀, New York, Mt. Marcey, 30.VII.1929. C.G.H.

Allotype.—♂, Vermont, Rutland. U.S.N.M.

Paratypes.—1 ♀, Maine, S. W. Harbor. U.S.N.M.; 2 ♂♂ Maine, Eastport. M.C.Z.

Distribution

Maine, Vermont, New York.

Preamble

Very similar and closely allied to *pecki*, new species, but probably a distinct species rather than a subspecies, as the flagellum of the female is less widened beyond middle and its first segment relatively a little longer; besides, the white pattern of the head of the male is considerably different.

Female

Head and thorax black, with restricted white pattern; apex of pronotal ridge and apex of scutellum white, the latter basally ferruginous; frontal orbits and marks on vertical orbits white, clypeus pale ferruginous; legs including all coxae and trochanters clearly rufous, tarsi III scarcely darker than the rest; abdomen uniformly rufous; flagellum black with distinct white annulus; length 6.5 mm.

Flagellum.—Bristleshaped, slender, ventrally flattened beyond middle and scarcely widened, but slightly attenuated toward apex, with 30 segments, the first segment about 3 times as long as wide, the fifteenth approximately square. Black, with white annulus on segments 10-12 or 13.

Head.—As in *pecki*. Black; frontal orbits and vertical marks white; clypeus and in type also face, extensively light ferruginous.

Thorax.—As in *pecki*; scutellum laterally carinated nearly to the middle. Black; the following are white: collare, apex of pronotal ridge and of pronotal base, subalarum, apex of scutellum; scutellum between black base and white apex, tegulae and postscutellum pale ferruginous.

Legs.—As in *pecki* but uniformly clear rufous, including coxae and trochanters; tarsi III scarcely infuscated a little.

Abdomen.—As in *pecki*, gastrocoeli seemingly a little wider and deeper. Uniformly rufous.

Male

Head and thorax black with white pattern; apex of pronotal ridge and of pronotal base, collare and apex of scutellum white, scutellum basally ferruginous; face and clypeus, frontal orbits, vertical marks and apex of cheeks white; legs, including coxae, and the abdomen uniformly rufous; flagellum without annulus; length 7 mm.

Flagellum.—With 32 segments and with bacilliform tyloides on segments 7-15. Black, ventrally brownish; scape ventrally white.

Head.—As in *pecki* but chromatically differing by much more extensive white coloration; the following are white: mandibles except teeth, clypeus, face, frontal orbits nearly up to lower ocellus, vertical marks, anterior part of apex of cheeks.

Thorax, legs and abdomen, including color, as in female.

3. *Platylabops holerythrus*, new species

Types

Holotype.—♀, British Columbia, Quesnel, ex *Eupithecia transcanadata* MacK. C.N.C. No. 7329.

Paratypes.—3 ♀♀, British Columbia, Parkville and Holden. C.N.C.

Distribution

British Columbia.

Preamble

Another species of the *binzi* group, in structure close to *pecki*, new species, and *fraterculus*, new species, but very different in color.

Female

Almost uniformly pale ferruginous; frontal orbits, vertical orbits, subalarum and apex of pronotal ridge indistinctly pale yellowish; in the type specimen (not in paratypes) coxae I, propleura, prosternum and propodeal sutures broadly blackish; length 7 mm.

Flagellum.—Bristleshaped, slender, fairly short, ventrally flattened, but not at all widened beyond middle, moderately attenuated toward apex, with 31-33 segments, the first about 2.5 times as long as wide, about the twelfth approximately square. Black, with white annulus on segments 9 or 10 to 12 (in one specimen subobsolete); scape ferruginous.

Head.—Temple profile moderately narrowed, with curved, cheek profile more distinctly narrowed, with nearly straight, outline; malar space a little longer than width of base of mandible. Pale ferruginous; frontal and vertical orbits indistinctly yellowish.

Thorax.—Mesoscutum convex, finely and fairly densely punctured, rather shiny; notauli basally distinct; scutellum somewhat raised above postscutellum, laterally carinate at the very base only; area superomedia wider than long. Pale ferruginous; apex of pronotal ridge and subalarum yellowish; base of prepectus and propodeal sutures, in type specimen additionally coxae I, prepectus entirely, propleura extensively and base of propodeum, blackish.

Legs.—Moderately slender. Uniformly pale ferruginous, including coxae and trochanters.

Abdomen.—Median field of postpetiolus not clearly defined, finely alutaceous; gastrocœli rather deeply impressed, transverse, with narrowed interval; second and third tergites finely and rather densely punctured, alutaceous between punctures, slightly shiny. Uniformly pale ferruginous.

4. *Platylabops leucopsis* (Ashmead), new combination

Ichneumon leucopsis Ashmead, 1890, U. S. Nat. Mus. Proc., 12: 391, ♂.

Aoplus leucopsis Townes, 1951, Syn. Cat., p. 290, ♂.

Types

Holotype.—♂, California, Alameda County. U.S.N.M.

Neallotype.—♀, Oregon, Canon Beach, 9.VIII.1940, H. & M. Townes. C.H.T.

Preamble

An aberrant, small, multicolored species, distinguished by the considerably projecting ovipositor of the female. I think that this form can not be included

in the genus *Aoplus*, as the structure of head and clypeus, of the male flagellum and of gastrocoeli do not agree with the latter genus, and as also the sculpture and the chromatic pattern are considerably different. The gastrocoeli, although transverse with narrowed interval as in *Aoplus*, do not have the oblique thyridia so typical for that genus. Instead the thyridia run nearly parallel with the apical border of postpetiolus, as in *Platylabops*. Also the structure of clypeus, head and male flagellum agree well with *Platylabops* where at least the species seems to be better placed than in *Aoplus* — unless we would prefer considering the projecting ovipositor as a character important enough for erection of a new genus or subgenus.

Male

Head black, with extensive white pattern; thorax ferruginous, with white and black pattern; pronotal ridge and scutellum apically or predominantly white; abdomen black, with narrowly whitish apical borders of segments; legs ferruginous, anterior coxae and trochanters white; tip of femora III, apex of tibiae III and the tarsi III infuscated; length 8 mm.

Flagellum.—With 28 segments and with short-oval tyloides on segments 7 or 8 to 13 or 14. Black; scape ventrally white.

Head.—Temple profile slightly narrowed, with curved outline; malar space short, about one third as long as width of base of mandible; vertex a little convex; head in front view nearly circular; apical border of clypeus slightly curved. Black; the following are white: mandibles except teeth, clypeus, face, frontal orbits narrowly up to level of lower ocellus, triangular marks on vertical orbits, about lower two-thirds of outer orbits, widening below over the entire surface of the apex of cheeks.

Thorax.—Convex, distinctly and fairly densely punctured, shiny; basal third of notauli very distinct; scutellum raised above postscutellum, laterally carinated at base; area superomedia about as wide as long, sometimes anteriorly confluent with area basalis. Vivid ferruginous; the following are white: collare, pronotal ridge, pronotal base, subalarum, tegulae, sides and apex of scutellum, postscutellum; the following are black: base of prosternum, middle of propleura, base of prepectus, band below subalarum, declivity of propodeum more or less extensively, mesoscutal sutures including notauli, scutellar and propodeal sutures.

Legs.—Femora fairly stout. Ferruginous; coxae and trochanters I and II white; the following are blackish: tip of femora III, tibiae III extensively toward apex and the tarsi III; in type specimen coxae III white marked.

Female

Color almost exactly as in male, but white lines on frontal and vertical orbits confluent one with another; flagellum short, subfiliform, very slightly attenuated toward apex; ovipositor considerably projecting, about as long as postpetiolus; length 7 mm.

Flagellum.—Short, subfiliform, ventrally flattened but not widened beyond middle, inconsiderably attenuated toward apex, with 26 segments, the first fully twice as long as wide, the twelfth approximately square. Black, with white annulus on segments 10 and 11; scape ventrally ferruginous.

Head.—Malar space half as long as width of base of mandible. Face, except facial orbits and hind part of cheeks, light ferruginous; white on frontal orbits confluent with vertical orbits.

The rest as in male.

5. *Platylabops apricus* (Gravenhorst)*Distribution*

Holarctic. Recorded in Europe from England, Belgium, Germany, Northern Italy and Rumania; new records from North America: Maine (C.G.H.) and New York (C.N.C.). American populations differ a very little from European by a slightly more pronounced melanism.

Preamble

This species differs rather considerably in structure from the type-species; by the much longer, slenderer and extremely attenuated flagellum of the female, the longer and slenderer legs, and the scutellum, which is laterally carinated far beyond middle. The peculiar white facial pattern of the male, however, is exactly the same as in most other species of the genus.

Female

Black, frontal orbits sometimes very narrowly whitish; tergites 1-3 varying individually from entirely reddish-brown to nearly entirely black, with geographical predominance of one or the other mutant; legs black, tibiae and tarsi brownish; flagellum with white annulus; gastrocoeli very shallow, thyridia, however, distinct and wider than interval; length 9-10 mm.

Flagellum.—Bristleshaped, long, very slender, ventrally flattened beyond middle, but not at all widened, extremely attenuated and pointed at apex, with 38-40 segments, the first about 4 times as long as wide, all longer than wide. Black, with white annulus on segments 9-12.

Head.—Temple and cheek profiles distinctly narrowed, with very slightly curved outlines; malar space about as long as width of base of mandible. Black; in European populations frontal orbits sometimes narrowly white, vertical orbits usually with tiny white dot.

Thorax.—Mesoscutum densely and finely punctured, subopaque; notauli basally indicated; scutellum considerably raised above postscutellum, with steep, rounded, apical slope, laterally strongly carinated to far beyond middle; costulae weak, sometimes obsolete; area superomedia on the average as long as wide, its outline varying from half-oval (Fig. 43) to almost quadrangular, its anterior bordering carina sometimes weak or obsolete. Uniformly black.

Legs.—Long and slender; coxae III ventrally finely and very densely punctured. Black; tibiae and tarsi brownish, the tarsi and apices of tibiae more or less infuscated; anterior side of tibiae I and apices of femora I ivoryish.

Abdomen.—Longish-oval; median field of postpetiolus not clearly defined, coriaceous-rugose; gastrocoeli scarcely impressed, thyridia, however, large and distinct, wider than their interval (Fig. 45); second and third tergites densely and finely punctured, alutaceous between punctures, subopaque. Black, tergites 1-3 or 2 and 3 in European populations usually reddish-brown, in American specimens predominantly blackish, the apex of first tergite, the second and the lateral and apical borders of the third sometimes reddish-brown.

Male

Usually uniformly black with the following white markings: base of mandibles, clypeus except apex, facial orbits, mark in the middle of upper border of face, small dots on vertical orbits, subalarium, mark on apex of pronotal ridge; apices of femora I and II and the tibiae I and II ivory on anterior side; second or second and third tergite usually reddish-brown in palaearctic, blackish in nearctic, specimens; length 10-12 mm.

Flagellum.—With 37-40 segments and with bacilliform tyloides on segments 8 or 9 to 14. Uniformly black, including scape.

5a. *Platylabops apricus apricus* (Gravenhorst)

Ichneumon apricus Gravenhorst 1820, Mem. Accad. Sc. Torino, p. 390, ♀

Types

Holotype.—♂, without data, Breslau (Wroclaw), Silesia.

Distribution

England, Germany, Belgium, Northern Italy, Rumania.

Female

Tergites 1-3 or 2-3 usually reddish-brown; frontal orbits usually narrowly white, vertical orbits with small, white dot.

Male

Entire second tergite, and sometimes the third partially or entirely, reddish-brown.

5b. *Platylabops apricus nearcticus*, new subspecies

Figs. 43, 44, 45

Types

Holotype.—♀, Maine, Mt. Blue, 20.IX.1958, Gerd H. Heinrich. C.G.H.

Allotype.—♂, Maine, Dryden, 15.VII.1955. C.G.H.

Paratypes.—1 ♀, 3 ♂♂, Maine, Dryden. C.G.H.; 1 ♂, New York, Ithaca. C.N.C. No. 7326.

Distribution

Maine, New York.

Female

Reddish-brown color on abdomen more restricted than in *apricus apricus* (Gravenhorst); second and third tergites black with only lateral and apical borders brownish (type specimen) or sometimes the second tergite alone obscure reddish-brown; white pattern of frontal and vertical orbits obsolete.

Male

Entire abdomen black, except brownish apical borders of tergites 1-3.

6. *Platylabops eupitheciarum*, new species

Types

Holotype.—♂, Alberta, Grande Prairie, ex *Eupithecia* sp. C.N.C. No. 7328.

Paratypes.—6 ♂♂, British Columbia and Alberta, ex different *Eupithecia* spp. C.N.C.

Hosts

Eupithecia placidata Taylor, British Columbia (Nanaimo, Gabriola, Caisson) (C.N.C.); *Eupithecia unicolor* (Hlst.), British Columbia, Mt. Maxwell (C.N.C.); *Eupithecia ornata* (Hulst), Alberta, Jasper (C.N.C.).

Distribution

Alberta, British Columbia.

Preamble

The color of this male corresponds well with that of *pecki novaescotiae*, new subspecies, ♀ from Nova Scotia, but the rather deeply impressed gastrocoeli exclude the association.

Male

Head and thorax black with white pattern; face and clypeus, pronotal ridge and base and two latero-apical marks on scutellum white; apex of postpetiolus, tergites 2-7 and legs III (except black coxae and trochanters) vivid red; anterior coxae extensively white; flagellum black; length 7-8 mm.

Flagellum.—With 31-32 segments and with bacilliform tyloides on segments 7-14. Black; scape ventrally white.

Head.—Malar space a little more than half as long as width of base of mandible. Black; the following are white: mandibles except teeth, clypeus, face, frontal orbits up to level of lower ocellus, triangular mark on vertical orbits, lower two thirds of outer orbits, widening below over the whole width of apex of cheeks.

Thorax.—Mesoscutum convex, finely and rather densely punctured, moderately shiny; basal third of notauli distinct; scutellum fairly strongly raised above postscutellum, laterally carinated at base only, with steeply rounded apical slope; area superomedia strongly transverse, usually more than twice as wide as long. Black; the following are white: collare, pronotal ridge, pronotal base (usually narrowly interrupted beyond collare), subalarum, tegulae, two latero-apical marks on scutellum (sometimes confluent), usually postscutellum, often apex of prosternum.

Legs.—Coxae and trochanters black, coxae and trochanters I and II ventrally white; femora and tibiae I and II dorsally blackish-brown, ventrally yellowish-white; tarsi I and II whitish, dorsally infuscated; femora and tibiae III red, tarsi III infuscated.

Abdomen.—Median field of postpetiolus fairly indistinct, finely coriaceous-rugose; gastrocoeli transverse with narrowed interval, rather deeply impressed; anterior tergites finely punctured, alutaceous between punctures. Red, first segment black except apex.

35. *Genus Hoplismenus Gravenhorst*

Figs. 33, 35, 37, 39

Hoplismenus Gravenhorst, 1829, *Ichn. Europ.*, v. 2, p. 409.

Type-species.—(*Hoplismenus maestus* Gravenhorst) = *Ichneumon armatorius* Panzer. Designated by Westwood, 1839.

Rhyaspis Tischbein, 1874, *Stett. Ent. Ztg.*, 35: 139.

Type-species.—*Rhyaspis rugosus* Tischbein. Monobasic.

Peritaenus Clement, 1927, *Konowia*, 6: 74. New synonymy.

Type-species.—*Peritaenus bavaricus* Clement. Monobasic.

The genus *Hoplismenus* represents within the holarctic fauna one of the most strikingly distinguished and most clearly defined genera of the subfamily, supposing we do not attempt to break this well-knit unit into splinters, as Clement did in 1927. First of all there exist no practical reasons for a taxonomic subdivision of this genus, as its restricted number of species is easy to survey. Furthermore the characters used by Clement in order to maintain Tischbein's

genus *Rhyaspis* and to erect the new genus *Paritaenius* do not seem to indicate a considerable (that means, a generic) phylogenetic differentiation but are rather to be evaluated as specific. In the genus *Peritaenius* the existence or obsolescence of a transverse carina bordering the apex of the horizontal part of the scutellum was used for generic distinction. Here Clement did evidently not realize—although all the five new *Peritaenius* species he described were based on males only—that this feature is generally confined to the male. As a general rule luxuriant² groups like *Hoplismenus* and many tropical genera, which are distinguished by projecting appendices, as apophyses of the propodeum, high elevated carinae on the scutellum, horns on the frons or vertex and the like, tend to display a considerable individual and geographical variability and also sexual dimorphism in the degree of the development of such projections. Characters of this kind should, therefore, in these genera be evaluated somewhat differently from a taxonomic point of view than in other plainly structured and more conservative groups, where sometimes even minor differences may indicate a distinct generic status.

The following are the four fundamental characters of the genus *Hoplismenus*:

- (1) Clypeus distinctly convex, in longitudinal direction as well as transversally (Fig. 39);
- (2) propodeum with considerably projecting apophyses (Fig. 35);
- (3) scutellum very strongly raised above postscutellum, laterally more or less extensively carinated, in females usually apically sloping down in a steep curve (Fig. 37), in males tending to form a transverse, sharp edge (in some species elevated into a projecting, transverse carina) on the borderline between the horizontal part and the steep apical declivity;
- (4) gastrocoeli not deeply but distinctly impressed, medium sized, approximately basally as wide as externally long, with distinct thyridia.

Flagellum.—Of females always long, slender, bristleshaped, ventrally flattened beyond middle, not, or moderately, widened, extremely attenuated and pointed at apex; of males with a short row of tyloides, somewhat nodose from beyond middle to apex.

Head.—Of peculiar, very characteristic shape; temple and cheek profiles strongly narrowed with straight outline; occiput more or less steeply declivous from hind border of eyes and ocelli; malar space unusually long, distinctly to considerably longer than width of base of mandible in both sexes; clypeus convex in longitudinal and transverse directions; mandibles rather abruptly narrowed from beyond base, delicate, with small teeth, the lower not much shorter than the upper and not quite level with the latter; lower part of carina genalis often with specifically varying curve.

Thorax.—Mesoscutum distinctly longer than wide, convex, with more or less distinct, fairly long notauli, densely sculptured; scutellum highly elevated above postscutellum, laterally more or less extensively carinate, in females usually with rounded, apical slope, in males tending to form on the borderline between the ascending "horizontal part" and the steep apical declivity a sharp, transverse edge which in some species is elevated into a more or less projecting, transverse carina; apices of areae dentiparae drawn out into strongly projecting apophyses; area superomedia usually as wide as, or somewhat wider than, long, with approximately hexagonal outline, narrowed anteriorly; costulae distinct to obsolete.

Legs.—Long and very slender.

²Luxuriant.—This term is applied here to groups displaying an exuberant growth of appendices of different kinds (as, for example, in the Ichneumoninae, long apophyses of the propodeum, frontal horns, apical spines or highly elevated lateral laminae of the scutellum). The term implies also that such appendices or protuberances represent a "luxury", in other words, that they do not seem to serve the primary needs and necessities of life.

Abdomen.—Of females oxygygous, broadly oval, narrowed toward apex and pointed, with distinctly projecting ovipositor; postpetiolus with distinct median field, irregularly rugose or punctured; gastrocoeli distinctly but not deeply impressed, of medium size, with distinct thyridia (Fig. 33).

Color.—Basic color ferruginous or black or ferruginous and black; in the nearctic fauna no species with a white abdominal pattern has been found; head and thorax usually with restricted white or yellow pattern; partially white or pale tarsi III with partially black metatarsus III represent in many species a characteristic chromatic pattern of the genus; sexual dimorphism from moderate to inconsiderable.

Distribution.—Temperate Zones of the New and Old Worlds. Many genera of the tropics similarly have developed forms with long apophyses on the propodeum, but very few of them would I consider as being closely related.

Biology.—Females hibernate as adults. All species feed exclusively on Rhopalocera, particularly Nymphalidae, but also Satyridae.

Remarks

The North American species of this genus have been already treated before by Hewson H. Swift (1946, Ann. Ent. Soc. Amer., 39:397-410) in an excellent monograph to which I do not have many additions to offer. Many parts of the following descriptions are quoted from Swift.

Two species *teres* Swift and *propitius* Cresson originally included by Swift in *Hoplismenus* I prefer to eliminate because they lack the convex structure of clypeus which I consider as the most fundamental character of the genus.

As in other highly specialized and morphologically well distinguished genera, so also in *Hoplismenus* the structural differentiation of the species is inconsiderable, and their distinction therefore often difficult.

Key to the Species of *Hoplismenus* Gravenhorst of America North of Mexico

Females

1. Wings strongly infuscated; head, thorax and abdomen black; large species, 11-18 mm. long. 2
- Wings not or scarcely infuscated; not simultaneously head, thorax and abdomen black; smaller species, 8-14 mm. long. 4
2. All coxae, trochanters and femora red; tibiae III black or blackish, except red base; tarsi III yellowish, their metatarsus brown or black except apex.
- 1b. *morulus pacificus* (Cresson) All coxae, trochanters and femora predominantly black, tibiae III colored otherwise. 3
3. All tibiae and tarsi and usually tips of femora yellow. 1a. *morulus morulus* (Cresson)
- Tibiae III black, metatarsus III sometimes infuscated. 1c. *morulus flavitarsis* (Cresson)
4. Basic color of head and thorax black. 5
- Basic color of head and thorax ferruginous. 6
5. Scutellum with sharp edge between horizontal part and apical declivity, laterally carinate from its base to the latter, strongly punctured; entire thorax very densely and coarsely sculptured, mesoscutum opaque; length 13 mm. 4. *arizonensis* Swift
- Scutellum without sharp edge between horizontal part and apical declivity, laterally carinate at the base only, not punctured, smooth; thorax not so densely and not coarsely punctured, mesoscutum subopaque; length 11 mm.
- 2c. *rutilus borealis*, new subspecies
6. Flagellum between scape and annulus black; mesopleura including speculum and area in front of it very densely punctured, the punctures nowhere separated by their own width; postpetiolus more densely punctured than in alternative species; outer orbits with white stripe; metatarsus III not infuscated; scutellum laterally carinated to beyond middle. (Length 9-11 mm.) 3. *praeeruptus* Swift

- Flagellum basally more or less extensively ferruginous; mesopleura on the average less densely punctured; on speculum and on area in front of it, punctures usually separated by at least their own width; postpetiolus usually with a few scattered punctures (median field usually with fewer than 30); outer orbits without white stripe; metatarsus III usually infuscated; scutellum laterally carinated at base only. 7
7. Frontal orbits, often upper part of facial orbits and the scutellum white; clypeus and apex of cheeks usually partially or entirely black; mesosternum often extensively, pronotum usually partially, black; length 10-12 mm. 2a. *rutilus rutilus* (Cresson)
- White and black marks reduced; white on inner orbits, reduced to a small spot above level of antennae, scutellum ferruginous or with small, light, median mark; clypeus, cheeks, pronotum and mesosternum not black marked; length 7-10 mm. 2b. *rutilus transversus* Davis

Males

1. Wings strongly infuscated; abdomen black; large species, 11-18 mm. long. 2
Wings not strongly infuscated; entire abdomen or at least several entire tergites ferruginous; smaller species, 8-14 mm. long (basic color of head and thorax black.) 4
2. Coxae and trochanters yellowish or reddish, often marked with piceous. 3
Coxae and trochanters black, coxae and trochanters I and II sometimes yellow marked. 3
1b. *morulus pacificus* (Cresson)
3. All tibiae and tarsi yellow. 1a. *morulus morulus* (Cresson)
Tibiae III black or brown, metatarsus sometimes infuscated. 1c. *morulus flavitarsis* (Cresson)
4. Coxae, trochanters, femora and tibiae III uniformly deep black; legs I and II posteriorly black, anteriorly white; large white mark on lower edge of mesopleura, coxae III with white ventro-apical mark; abdomen red, first segment and base of second black. (Face and clypeus white; flagellum black, without annulus; length 9 mm.) 5. *polyleucos*, new species
Coxae III and trochanters III black or partially ferruginous, femora III red with black apex, tibiae III predominantly black with ferruginous base; no white mark on mesopleura and coxae III; abdomen entirely ferruginous or apically black, never basally black. (Flagellum ventrally yellowish-brown, with or without annulus.) 5
5. Only facial and frontal orbits white; tergites 4-7 black. (Basic color of thorax uniformly black including mesoscutum; flagellar annulus obsolete or subobsolete; length 11 mm.) 2c. *rutilus borealis*, new subspecies
Face and clypeus white; abdomen uniformly ferruginous, or tergites 5-7 black. 6
6. Flagellum with white annulus of varying extent between ninth and fifteenth segments; mesoscutum black. (Length 10-12 mm.) 2a. *rutilus rutilus* (Cresson)
Flagellar annulus obsolete; mesoscutum predominantly ferruginous. 2b. *rutilus transversus* (Cresson)

1. *Hoplismenus morulus* (Say)

Distribution

Transcontinental in Transition and Upper Austral Zones.

Preamble

The largest nearctic species, chromatically distinguished by the entirely black abdomen. It may well be possible that this species replaces the palaearctic *Hoplismenus terrificus* Wesmael geographically in the nearctic, as Swift supposed. But the general impression in comparing series of both forms suggests that their differentiation has already reached a specific status.

Female

Black; wings strongly infuscated; flagellum with annulus; facial orbits sometimes yellow or ferruginous; color of legs including coxae varying subspecifically; length 11-18 mm.

Male

Black; wings strongly infuscated; flagellum without annulus; face and clypeus entirely or predominantly yellow; sometimes scutellum marked with yellow; flagellum with bacilliform tyloides on segments 7, 8 or 9 to 19, 20 or 21.

1a. *Hoplismenus morulus morulus* (Say)

Figs. 33, 35, 37, 39

Ichneumon morulus Say, 1829, Contrib. Maclur. Lyc. Phila., 1: 73, ♀.

Ichneumon calcaratus Provancher, 1875, Nat. Canad., 7: 21, 49, ♂.

Hoplismenus morulus morulus Swift, 1946, Ann. Ent. Soc. Amer., 39: 400, 401, ♀ ♂.

Types

Holotype.—*Ichneumon morulus* Say, ♀. Lost; *Ichneumon calcaratus* Provancher, ♂, Canada. Provincial Museum, Quebec.

Hosts

According to H. Townes 1951: "*Nymphalis antiopa* (L.), *Polygonia interrogationis* (Fabricius), *Vanessa* sp. (probably *V. cardui* (L.))"; according to L. Walkley (1958, Syn. Cat. Suppl., p. 48): *Polygonia comma* (Harr.).

Distribution

According to H. Townes 1951: "Atlantic to Continental Divide in Transition and Upper Austral Zones." New records: Canadian Zone, Northwest Territories, Fort Simpson and Fort Smith (C.N.C.). Habitat according to Swift: "... mesic woods, particularly along wooded streams and river margins where there is a leafy urticaceous undergrowth.

Female

Coxae and trochanters black; all tibiae and tarsi yellow, femora II and III black, usually with yellowish apices, often also femora I predominantly black.

Male

Coxae and trochanters black; coxae I, sometimes coxae I and II yellow marked, trochanters I and II usually extensively yellow; all tibiae and tarsi yellow; femora III except apex, femora II predominantly, black.

2b. *Hoplismenus morulus pacificus* Cresson

Hoplismenus pacificus Cresson, 1877, Amer. Ent. Soc. Trans., 6: 186, ♂ ♀.

Hoplismenus morulus pacificus Swift, 1946, Ann. Ent. Soc. Amer., 39: 402, ♂ ♀.

Types

Holotype.—♀, Vancouver Island. A.N.S.

Host

Nymphalis californica (Bdv.).

Distribution

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

Female

Legs red, including all coxae and trochanters; tibiae III black or blackish except red base; tarsi III pale yellowish, their metatarsus infuscated except reddish-brown to black apex.

Male

Legs including coxae and trochanters reddish to yellowish, coxae and trochanters often marked with piceous; apex of tibiae III often infuscated.

2c. *Hoplismenus morulus flavitarsis* (Cresson)

Trogus flavitarsis Cresson, 1865, Proc. Ent. Soc. Phila., 4: 265, ♂.

Hoplismenus morulus flavitarsis Swift, 1946, Ann. Ent. Soc. Amer., 39: 402, ♀ ♂.

Types

Holotype.—♂, Colorado. A.N.S.

Distribution

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

Female

All coxae, trochanters, femora and the tibiae III black to dark reddish-brown; tibiae I and II, all tarsi and occasionally a stripe on ventral side of tibiae III yellowish; metatarsus III sometimes infuscated.

Male

All coxae, trochanters and femora black, tibiae III brown; tibiae I yellowish, tibiae II pale rufous; all tarsi light yellow; tibiae III with yellowish, ventral stripe.

2. *Hoplismenus rutilus* (Cresson)*Distribution*

Our records concerning the distribution of this rather rare species are certainly not complete. I suppose that it inhabits in ecologically suitable localities the entire Canadian and Transition Zones. In the following, three subspecies are distinguished; one occupying northeastern North America from Ontario, Quebec and Prince Edward Island south to Virginia; the other the western United States, Colorado, Idaho, Wyoming and Oregon; the third western Canada Northwest Territories, Saskatchewan and Manitoba. This is not more than a first rough conception, subject to further detailed research, covering particularly the areas among the three at present supposed subspecific ranges and beyond them.

The 6 females from my collection were all collected on dry mountain meadows in Maine (Mt. Blue), evidence for a distinct ecological difference between this species and *praeruptus* Swift.

Preamble

I have assumed that *Ichneumon scutellatus* Provancher is the male of this species. There are several reasons to support this hypothesis: (1) the transverse ridge or carina on the apex of the horizontal part of the scutellum, which was generally believed to have been a distinctive specific character for both sexes, and which particularly distinguishes *scutellatus* as a species, is really a secondary sexual character of males of several species of this genus, obsolete in the females; I have observed this before in the European fauna; (2) the chromatic main difference between *scutellatus* male and *rutilus* female (thorax black in the former, ferruginous in the latter) agrees with the common nearctic pattern of chromatic sexual dimorphism, as represented in numerous species of the subfamily; (3) in structure, sculpture and other chromatic patterns both "species" agree very well; (4) in the 96 years which have passed since the description of

rutilus female, no male to be associated with it has been found; vice versa, during the 85 years since the description of *scutellatus* male no female matching it has been recorded, except the one which Provancher included in the original description. Neither Swift nor I saw this specimen; it may have been indeed a melanistic individual or geographical variety of *rutilus* ♀ (as for example *borealis* ♀ described below) or even another male misidentified as female, a mistake not at all rare in the past time of primitive magnifying glasses.

Female

Predominantly ferruginous, with restricted white pattern on head and thorax and with black pattern of geographically and individually varying extent on head, thorax, abdomen and legs; a line on frontal orbits (never on outer orbits), collare, subalarum, mark on apex of pronotal ridge, and scutellum, white; flagellum basally ferruginous, apically black, with white annulus; abdomen ferruginous or tergites 4 or 5 to 7 black; apex of femora and tibiae III black; metatarsus III usually partially infuscated; length 7-12 mm.

Flagellum.—With 37-39 segments very slightly widened beyond middle. Black; basal 5 segments ferruginous, variously marked with black dorsally at apex; white annulus on segments 6 or 7 or 8 to 10 or 11; scape ferruginous, sometimes dorsally black.

Head.—Malar space fully 1.5 times as long as width of base of mandible; lower part of carina genalis straight. Ferruginous; frontal orbits up to lower ocellus, or more restrictedly, and sometimes upper part of facial orbits, yellowish-white; often apex of clypeus or entire clypeus and apex of cheeks blackish, sometimes entire cheeks, frons, ocellar region and occiput, in one northwestern Canadian specimen, even, predominant color of head, black.

Thorax.—Mesoscutum moderately densely punctured, alutaceous between punctures, subopaque; scutellum laterally carinate at base only, apically with steep, but rounded slope, dorsally strongly convex; shiny; carination of propodeum complete, only costulae sometimes subobsolete; mesopleura densely punctured; on the speculum and in the area before it, intervals of punctures usually as wide as punctures. The following are white: collare, apex of pronotal ridge narrowly, subalarum partially or sometimes entirely, and in eastern populations scutellum; predominant color varying individually and geographically; in eastern populations predominantly ferruginous, with black pattern, in the western subspecies almost entirely ferruginous, in specimen from Northwest Territories black with inconspicuous ferruginous areas on mesoscutum.

Legs.—Predominantly ferruginous, including coxae and trochanters, the latter black in specimens from the Northwest Territories; apex of tibiae III and of femora III always black, metatarsus III usually infuscated.

Abdomen.—Postpetiolus gradually widened toward apex with double-curved lateral outlines; median field irregularly, finely rugose, usually with fewer than 30, often only with a few scattered punctures, rarely rather densely punctured; second and third tergites moderately densely punctured, finely alutaceous between punctures, semiopaque. Uniformly ferruginous or tergites 5-7 or 4-7 black.

Male

Basic color of head and thorax black; face, clypeus and scutellum partially or entirely white; thorax sometimes partially ferruginous; abdomen ferruginous, often tergites 5-7, or 4-7 black; legs ferruginous, coxae and trochanters often infuscated to blackish, anterior coxae usually white marked, apices of femora III,

the tibiae III extensively and metatarsus III black, following segments of tarsi III white; flagellum with or without annulus; horizontal part of scutellum with a transverse apical carina, often with an apical, median deepening; length 10-12 mm.

Flagellum.—With 35-38 segments and with longish-oval tyloides on segments 7-16 or 17. Black, ventrally pale yellowish-brown, in eastern populations usually with white annulus of varying extent between the ninth and fifteenth segments; scape ventrally white.

2a. *Hoplismenus rutilus rutilus* (Cresson)

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

Ichneumon scutellatus Provancher, 1875, Nat. Canad., 7: 24, 78, ♂. New synonymy and new status.

Hoplismenus scutellatus Swift, 1946, Ann. Ent. Soc. Amer., 39: 404, ♂.

Hoplismenus rutilus rutilus Swift, 1946, Ann. Ent. Soc. Amer., 39: 406, ♀.

Types

Holotypes.—*Ichneumon rutilus* Cresson, ♀, Virginia. A.N.S.; *Ichneumon scutellatus* Provancher, ♂, Canada. Provincial Museum Quebec.

Distribution

According to H. Townes 1951 (*rutilus*): "Massachusetts, Rhode Island, Pennsylvania, Virginia." New records (♀ ♀): Maine (C.G.H.); Ontario and Quebec (C.N.C.); (♂ ♂): Prince Edward Island, Quebec (C.N.C.).

Female

Ferruginous, scutellum and line on frontal orbits white; no white line on outer orbits; restricted black markings on head and thorax, usually including at least part of the clypeus, sometimes most of mesosternum; flagellum tricolored, with ferruginous base and white annulus, usually on segments 6 or 7 to 11; abdomen usually uniformly ferruginous, sometimes tergites 5-7 black; apex of femora III, and apex of tibiae III broadly black; metatarsus III usually more or less infuscated, the following segments pale; length 10-12 mm.

Male

Apex of horizontal part of scutellum with transverse, elevated ridge or carina; basic color of head and thorax including mesoscutum black; abdomen uniformly ferruginous, often tergites 5-7 black; face, clypeus, frontal orbits, stripe on outer orbits, scutellum partially, collare, mark on subalarum and apex of pronotal ridge, white; propodeum usually irregularly ferruginous marked; legs ferruginous, coxae and trochanters extensively blackish infuscated; flagellum black, ventrally yellowish-brown with white annulus of varying extent between ninth and fifteenth segments; apices of femora III, tibiae III (except base) and metatarsus III black; following segments white; length 10-12 mm.

2b. *Hoplismenus rutilus transversus* Davis

Hoplismenus transversus Davis, 1898, Trans. Amer. Ent. Soc., 24: 351, ♂.

Hoplismenus rutilus tenuis Swift, 1946, Ann. Ent. Soc. Amer., 39: 407, ♀. New synonymy.

Hoplismenus scutellatus transversus Heinrich, 1959, Ent. News, 70: 217, ♂.

Types

Holotypes.—*Hoplismenus transversus* Davis, ♂, Idaho, Moscow. A.N.S.; *Hoplismenus rutilus tenuis* Swift, ♀, Colorado, Twin Sisters. U.S.N.M.

Distribution

Idaho, Colorado, Oregon, Wyoming.

Preamble

Both sexes less melanistic than *rutilus rutilus* (Cresson); white annulus of flagellum in both sexes more restricted or obsolete.

Male

Differs from *rutilus rutilus* by the ferruginous mesoscutum and the lack of annulus on flagellum; the abdomen is entirely ferruginous, as also in mutants of *rutilus rutilus*.

Female

Somewhat smaller than *rutilus rutilus*; white pattern, and black pattern as well, more reduced; scutellum ferruginous or with white center mark only; white annulus on flagellar segments 8-10 usually incomplete; clypeus and pronotum uniformly ferruginous; length 7-10 mm.

2c. *Hoplismenus rutilus borealis*, new subspecies

Types

Holotype.—♀, Northwest Territories, Norman Wells, 3.VII.1940, W. R. M. Mason. C.N.C. No. 7331.

Allotype.—♂, Saskatchewan, Saskatoon, 18.VII.1923, Kenneth M. King. C.N.C.

Paratypes.—1 ♂, Manitoba, Beulah, 13.VII.1927. C.N.C.

Distribution

Northwest Territories, Saskatchewan, Manitoba.

Preamble

The structural congruence of this form with *rutilus rutilus* (Cresson) seems to be perfect. Nevertheless I do not feel fully sure about the subspecific association, as the chromatic differentiation is rather striking.

Female

Head and thorax black; short stripe on frontal orbits and on scutellum white; flagellum tricolored, as in *rutilus rutilus*; mesoscutum with a restricted indistinct, obscure ferruginous pattern on median and lateral lobes; abdomen ferruginous, tergites 4-7 black; all coxae and trochanters, femora III (except base narrowly and ventral side), apical half of tibiae III and the metatarsi III black; femora, tibiae and tarsi I and II, and basal half of tibiae III ferruginous; segments 2-4 of tarsi III pale; length 11 mm.

Male

Head and thorax including entire mesoscutum black; white pattern on head more restricted than in *rutilus rutilus* and in *rutilus transversus*, only the facial orbits, frontal orbits, and in the allotype a line on outer orbits being white; flagellar annulus obsolete or subobsolete as in *rutilus transversus* Davis; coxae and trochanters black, coxae I and II in allotype (not in paratype) white marked; otherwise legs as in *rutilus rutilus*; abdomen ferruginous, tergites 4-7 black; length 11 mm.

3. *Hoplismenus praeruptus* Swift

Hoplismenus praeruptus Swift, 1946, Ann. Ent. Soc. Amer., 39: 407, ♀.

Types

Holotype.—♀, New York, Ithaca, Six Mile Creek, 16.X.1939. P. P. Baiby, U.S.N.M.

Paratypes.—1 ♀, New York, Ithaca. C.H.T.; 1 ♀, Washington, Olympia. U.S.N.M.; 1 ♀, W. H. Harrington Coll., probably Ontario. C.N.C.; 1 ♀, P. Atkinson. A.N.S.; 1 ♀, Connecticut. Collection Swift.

Distribution

New York, Connecticut, Washington. According to Swift (*loc. cit.*) the two specimens from New York were collected in "a moist, wooded, stream bed area, similar to the habitat preferred by *morulus morulus*".

Preamble

Similar to *rutilus* (Cresson); differs by the structure of scutellum, which is laterally carinated to beyond the middle (in *rutilus* at the base only), and which is apically more steeply sloping, by the denser puncturation of postpetiolus and chromatically by the black base of flagellum and more extensive white pattern on head and thorax.

Female

Ferruginous, including the entire clypeus and tarsi III; outer orbits and scutellum partially white; coxae I ventrally white, coxae II with white spot, flagellar segments from base to annulus black; length 9-11 mm.

Flagellum.—(Type specimen.) Black, with white annulus on segments 6-12.

Head.—Eye 1.5 to 1.6 times as wide as cheek; malar space 1.2 to 1.4 times as long as width of base of mandible. Ferruginous; the following are white: frontal orbits broadly up to vertex and long, narrow stripe on outer orbits.

Thorax.—Mesopleura including speculum closely punctate, opaque, the punctures nowhere separated by their own width; scutellum strongly elevated, laterally carinated to beyond middle, apically steeply declivous; metapleural carina poorly defined, incomplete. Ferruginous; the following are white (type): collare, pronotal base, apex of pronotal ridge, scutellum partially.

Legs.—Ferruginous; coxae I white in front, coxae II with small white dot; apex of tibiae III black; metatarsus III not infuscated.

Abdomen.—Postpetiolus very densely punctured, as much so as the second tergite. Ferruginous.

4. *Hoplismenus arizonensis* Swift

Hoplismenus arizonensis Swift, 1946, Ann. Ent. Soc. Amer., 39: 404, ♀.

Types

Holotype.—♀, Arizona, Santa Catalinas Mts., VI.1930, M. Cazier. U.S.N.M.

Distribution

Arizona, Santa Catalinas.

Preamble

A medium sized species, well distinguished by the very dense, coarse sculpture of the entire thorax with fully opaque mesoscutum, furthermore by scutellar structure and color.

Female

Head and thorax black with restricted white pattern; abdomen and legs including coxae red; apex of scutellum white; segments 3-5 of tarsi III yellowish; length 13 mm.

Flagellum.—Slightly widened beyond middle. Black with pale annulus on segments 8-14.

Head.—Temples in lateral view only half as wide as eyes; lower part of carina genalis slightly curved; clypeus strongly convex; subopaque; face and clypeus strongly punctured. Black; the following are white: inner orbits from middle of face up to level of lower ocellus.

Thorax.—Scutellum laterally and apically nearly vertically declivous, with sharp edge between horizontal part and apical declivity, laterally carinate from its base to the latter, strongly punctured, shiny; propodeum rugose; apophyses long and narrow. Black; the following are white: collare, mark on subalarum, apex of scutellum.

Legs.—Red, including coxae; coxae and trochanters I and II infuscated; segments 3-5 of tarsi III yellowish; tibiae I ivory on anterior side.

Abdomen.—Median field of postpetiolus rugose-punctate; gastrocoeli 0.3 times the width of the abdomen; second and third tergites densely and strongly punctured, opaque. Vivid red, base of petiolus infuscated.

5. *Hoplismenus polyleucos*, new species

Types

Holotype.—♂, Ontario, Simcoe, 23.VI.1936, G. S. Walley. C.N.C. No. 7330.

Distribution

Ontario.

Preamble

This is the single nearctic species known so far which comes close in structure, smaller size, and chromatic pattern to the palaearctic *armatorius* group. It may well be the American representative of one of the European species belonging to the latter. As this European group is not revised yet, and as its species are not satisfactorily separated and diagnosed, a subspecific association can not be made. The type of *polyleucos* differs chromatically from all known European forms of the *armatorius* group by its rich white pattern.

Male

Head and thorax black with rich white pattern; abdomen red except the first segment and base of the second which are black; orbits around eyes predominantly, face and clypeus entirely, white; large, longitudinal white mark on border of mesopleura and mesosternum; scutellum apically, pronotal base entirely, white; legs III black, segments 2-5 of tarsi III white, coxae III white marked; coxae I and II almost entirely white; legs I and II white on anterior side, dorsally predominantly black; length 9 mm.

Flagellum.—With 38 segments and with longish-oval tyloides on segments 6-20. Black; scape ventrally white.

Head.—Carina genalis straight, without curve in lower part; malar space slightly longer than width of base of mandible. Black; the following are white: mandibles except teeth, face and clypeus (except an infuscated band between both), orbits around eyes (interrupted broadly at temple region and narrowly at malar space).

Thorax.—Mesoscutum densely punctured, alutaceous between punctures, subopaque; scutellum with sharp edge between horizontal part and steep apical declivity (but without elevated transverse carina), laterally carinate almost to apex of horizontal part; mesopleura and metapleura very densely punctured. Black; the following are white: collare, entire pronotal base, apex of pronotal ridge, tegulae, scutellum except base, lateral marks on prosternum, large, longish mark on anterior lower part of mesopleura (continuing somewhat onto mesosternum); mesosternum predominantly brownish.

Legs.—Black; the following are white: coxae and trochanters I and II ventrally, apical mark on ventral side of coxae III, femora and tibiae I and II on anterior side, all tarsi predominantly; metatarsus III black except apically; metatarsi I and II slightly infuscated on posterior side.

Abdomen.—Postpetiolus very densely punctured. Red, first segment black; second tergite blackish infuscated toward base.

36. Genus *Hemihoplis* Heinrich

Hemihoplis Heinrich, 1961, Can. Ent. Suppl. 15: 15.

Type-species.—*Hoplismenus teres* Swift.

The type-species, *teres* Swift, differs fundamentally from the diagnosis of *Hoplismenus* Gravenhorst in the flat structure of the clypeus; there are also several additional differences, as in the structure of gastrocoeli, of mandibles, and of male flagellum. I think that it just can not be pressed into the frame of the genus *Hoplismenus*.

The combination of a normally flattened clypeus, elevated scutellum and strong apophyses of the propodeum agrees with the genus *Togea* Uchida, from which *Hemihoplis* is well distinguished by the triangular, rather deeply impressed gastrocoeli.

Flagellum.—Of females bristleshaped, slender; of males with basal segments overlapping one another unusually far on outer side and with row of bacilliform, very narrow and indistinct tyloides.

Head.—General structure similar to *Hoplismenus* with strongly narrowed, straight outlines of temple and cheek profiles and with long malar space; clypeus, however, not convex but flat; mandibles not so delicate and not narrowed as in *Hoplismenus*, the lower tooth situated comparatively much further back from the tip of the upper, not quite level with it.

Thorax.—Mesoscutum as in *Hoplismenus*, notauli less distinct; scutellum convex, less considerably elevated above postscutellum, laterally not carinate; apophyses of propodeum but moderately long, wide; carination of propodeum complete.

Legs.—Slender.

Abdomen.—Median field of postpetiolus clearly defined, longitudinally striate-rugose; gastrocoeli quadrangular, rather deeply impressed, with distinct thyridia.

Color.—Predominantly ferruginous; sexual dimorphism inconsiderable.

Distribution.—Carolinian and Lower Austral Zones. I suspect that the genus is of neotropical origin and that other species may occur in central America.

Biology.—Host of the type-species of the genus: *Precis coenia* (Hbn.).

1. *Hemihoplis teres* (Swift)

Hoplismenus teres Swift, 1946, Ann. Ent. Soc. Amer., 39: 409-10, ♀ ♂.

Types

Holotype.—♀, Virginia, Great Falls, 10.X.1945, H. and M. Townes. C.H.T.

Allotype.—♂, same locality and date. C.H.T.

Host

According to H. Swift 1946: "*Precis coenia* (Hbn.)" (Maryland).

Distribution

According to H. Townes 1951: "Ohio, Maryland, Virginia, North Carolina, Georgia, Florida, Louisiana".

Preamble

This species is rather similar to *Ichneumon propitius* Cresson. The apophyses are, however, more strongly developed, the mandibles slenderer, more curved, with the lower tooth set further back from the tip and a little out of the level of upper; furthermore the cheek and temple profiles are more narrowed and have in both sexes a straight outline, and the sides of the clypeus are convergent. The sum of these characters indicates a relationship to *Hoplismenus* which is not evident in *propitius*.

Female

Ferruginous with restricted yellow and almost without black patterns; flagellum ventrally ferruginous, dorsally infuscated, with pale annulus; apices of tibiae III and the tarsi III usually more or less infuscated; scutellum and mark on subalarum yellow; length 8-13 mm.

Male

Ferruginous, with more extensive yellow pattern, flagellum ventrally yellowish, dorsally infuscated, with pale annulus; the following are yellow or yellowish: face, clypeus, frontal orbits, scape ventrally, collare, pronotal base, apex of pronotal ridge, subalarum, tegulae, scutellum, coxae and trochanters I and II, tibiae and tarsi extensively, tip of tibiae III somewhat infuscated; length 8-12 mm.

37. Genus *Trogomorpha* Ashmead

Figs. 40, 41, 42

Trogomorpha Ashmead, 1900, U. S. Nat. Mus. Proc., 23: 15.

Type-species.—*Ichneumon trogiformis* Cresson.

The taxonomic position of this genus is not clear. It combines features of three different tribes. Depending on which of these characters we consider as the most important, and which as mere convergencies, we have the choice of including it in the Ichneumonini, Listrodromini or Ischnojoppini. Running down the key for the tribes as given by Heinrich in 1934 (Mitt. Zool. Mus. Berlin, 20: 65), we arrive at the Ischnojoppini, where Townes placed the genus in 1951. The latter tribe contains so far a single, aberrant genus (*Ischnojoppa*), distributed over the grasslands of the Oriental and Ethiopian Zones, the extremely slender-bodied species of which are inhabitants of stands of tropical grasses and are evidently parasites of some stem-boring Noctuidae or Microlepidoptera. I do not think that *Trogomorpha*, feeding on Rhopalocera (Hesperiidae) as recently recorded, has any closer relationship to the *Ischnojoppa* group, in spite of the evident similarity in structure of head and mandibles. I am rather inclined

to ignore the head and mandible characters in this particular case, assuming that they represent a mere convergency. Under this hypothesis, *Trogomorpha* would, in every other regard, fit clearly in the tribe Ichneumonini where I have placed it.

Flagellum.—Of females bristleshaped, rather short, ventrally flattened and widened beyond middle, moderately attenuated and pointed at apex; of males with strongly developed, transverse, bristle-topped ridges, and with a moderate number of bacilliform tyloides.

Head.—Temple profile not narrowed, with broadly curved outline, cheek profile slightly narrowed, with slightly curved outline; malar space longer than width of base of mandible; face, clypeus and malar space with subobsolete, plastic features, forming almost one smooth plane as in *Anisobas* Wesmæl; labrum nearly hidden; mandibles as in *Anisobas*: short, wide, curved, with strong, almost equal teeth, separated by a wide gap (Fig. 42).

Thorax.—Coarsely rugose-punctate; notauli basally indicated; scutellum distinctly raised above postscutellum, laterally carinate at base only; horizontal part of propodeum fairly long, medially not much shorter than declivity; areae denticiparæ not curved downward; carination complete but rendered partially somewhat indistinct by coarse sculpture.

Legs.—Slender; coxæ III of females with strong scopa.

Abdomen.—Oxyptygous; tergites 1-4 very strongly sclerotized, very strongly and densely punctured, separated one from another by pronounced incisions; gastrocoeli triangular, fairly small, distinctly impressed, thyridia fairly distinct (Fig. 41).

Color.—Wings strongly infuscated, with or without light bands; dark ferruginous without white or yellow pattern; flagellum with white annulus in both sexes. Chromatical sexual dimorphism inconsiderable.

1. *Trogomorpha arrogans* (Cresson)

Ichneumon arrogans Cresson, 1873, Acad. Nat. Sci. Phila. Proc., 25: 115, ♀ ♂.

Ichneumon panamensis Cameron, 1885, Biol. Centr. Amer. Hym., v. 1, p. 158, ♂.

Types

Holotypes.—*Ichneumon arrogans* Cresson, ♀, Mexico. A.N.S.; *Ichneumon panamensis* Cameron, ♂, Panama, Volcan de Chiriqui, 4000-6000 ft., London, British Museum.

Distribution

According to H. Townes 1951: "Texas (Brownsville and Gillespie Co.) south to Columbia. Perhaps a subspecies of *T. trogiformis*."

Preamble

This form differs from *trogiformis* (Cresson) strikingly in the color of wings, but not at all in structure; my careful examination of flagellar characters of both forms in both sexes, (number and proportions of segments and number and shape of tyloides) failed to reveal the slightest difference. I do not doubt that they are vicariants, replacing one another geographically, but I would like to delay the decision to call them associated subspecies until some research has been done concerning the areas where both forms meet, as the striking difference in wing color may indicate that the differentiation has reached a specific status excluding interbreeding.

Female

Wings strongly infuscated, with broad, light crossband beyond the basal vein, usually also with narrow, light base; dark ferruginous; bases of tergites 2-4, apex of femora III, tibiae III except base and basal segments of tarsi III usually infuscated or blackish; flagellum tricolored; length 11-14 mm.

Flagellum.—Bristleshaped, rather short, ventrally flattened and widened beyond middle, moderately attenuated and pointed at apex, with 36 to (usually) 39 segments, the first fully twice as long as wide, the sixth square, the widest more than twice as wide as long. Tricolored; scape and segments 1-5 or 6 ferruginous, 6 or 7 to 15 with pale yellowish annulus, the apex black.

Male

Coxae and trochanters II and III more or less extensively infuscated; femora III usually entirely black; sometimes sterna, lower part of propleura, areae coxales and petiolus black; segments 2-5 of tarsi III whitish; otherwise like female; length 13-14 mm.

Flagellum.—With 38-39 segments and with small, short, bacilliform tyloides on segments 9 or 10 to 24 or 25. Black, ventrally ferruginous except apex, with white annulus on segments 11 or 12 to 18 or 19; scape and basal 3-5 segments also dorsally partially or entirely ferruginous.

2. *Trogomorpha trogiformis* (Cresson)

Figs. 40, 41, 42

Ichneumon ferrugator Fabricius, 1793, Ent. System., v. 2, p. 194. (Preocc.)

Ichneumon trogiformis Cresson, 1864, Ent. Soc. Phila. Proc., 3: 175, ♂.

Trogomorpha trogiformis Walkley, 1958, Syn. Cat. Suppl., p. 48.

Types

Holotype.—♂, New Jersey. A.N.S.

Host

According to Walkley 1958: "*Ephyriades brumnea floridensis* Bell & Comst." (Hesperiidae).

Distribution

According to H. Townes 1951: "Gulf and Atlantic States north to New York in Upper Austral and Lower Austral Zones. Overgrown fields".

Female

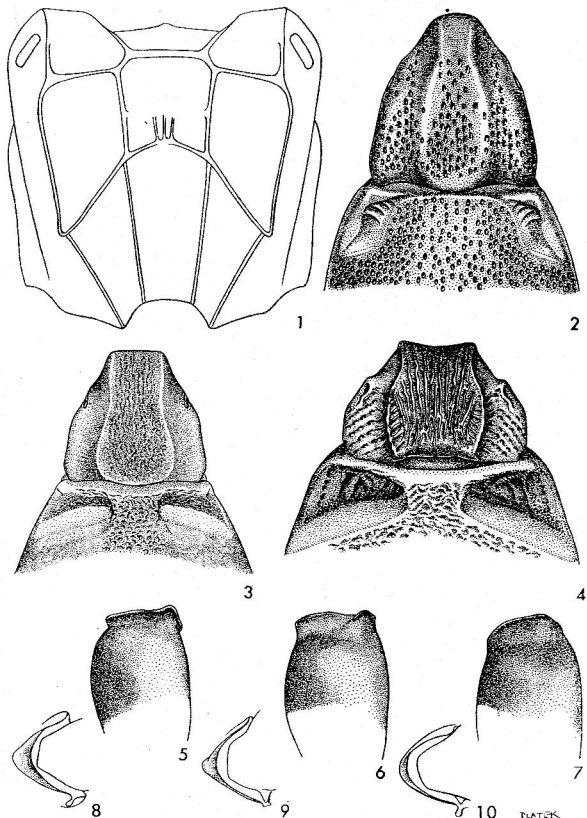
Wings uniformly and strongly infuscated, without light bands; uniformly dark ferruginous, flagellum tricolored; length 13-15 mm.

Flagellum.—As in *arrogans* (Cresson); segments 7 or 8 to 13 or 14 with annulus (series from Florida).

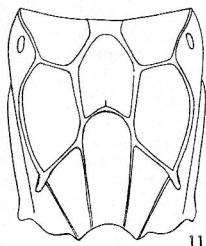
Male

Coxae and trochanters II and III more or less extensively infuscated or black, femora III usually entirely black; sometimes sterna and lower part of metapleura infuscated; in contrast to *arrogans*, however, tibiae and metatarsus III not infuscated; tarsi III whitish; length 14-16 mm.

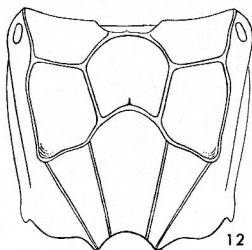
Flagellum.—As in *arrogans*; sometimes ferruginous with white annulus, and infuscated at apex only.



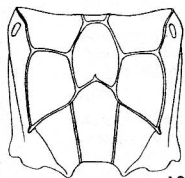
Figs. 1-10. Fig. 1, carination of propodeum, *Limonetbe maura* (Brullé), ♂. Figs. 2-4, Gastrocoeli and postpetioli of females. 2, *Limonetbe maura*; 3, *Aoplus confirmatus* (Cresson); 4, *Stenichneumon militarius* (Thunberg). Figs. 5-10. Ventral sides of coxae III with apical lip, and outlines of apical lips of coxae III in posterior view, all of females. 5, 8, *Stenichneumon salix bioculatus* (Cresson); 6, 9, *Stenichneumon salix salix* (Cresson); 7, 10, *Stenichneumon militarius leucopus* n. ssp.



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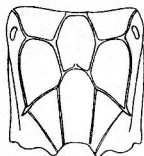
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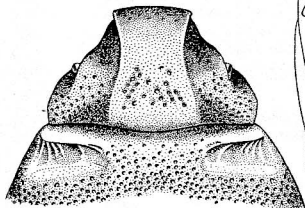
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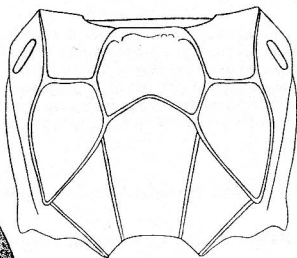
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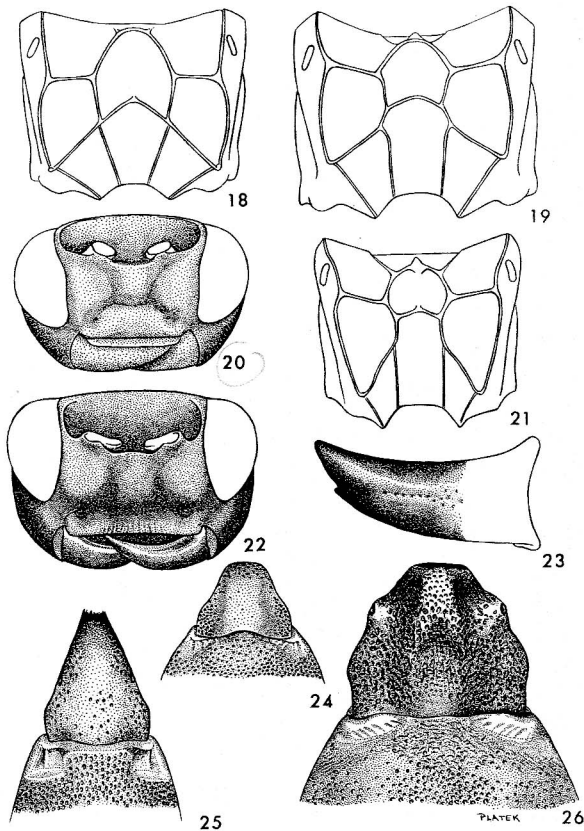
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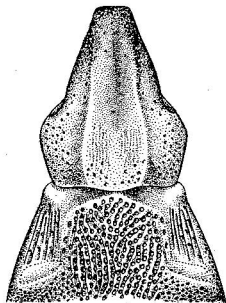
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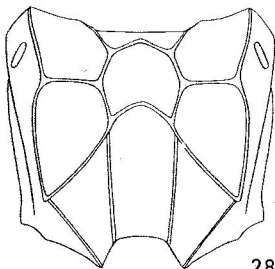
Figs. 11-17. Figs. 11-13, 15, 17. Carination of propodea. 11, *Rubicundiella mucronata* (Provancher), ♂; 12, *Rubicundiella blanchardi* (Davis), ♂; 13, *Rubicundiella perturbatrix*, new name, ♀; 15, same species, ♂; 17, *Melanichneumon* (*Vulgichneumon*) *subcyaneus* (Cresson), ♀. Figs. 14, 16. Postpetioli and gastrocoeli. 14, *Rubicundiella perturbatrix*, ♀; 16, *Melanichneumon* (*Vulgichneumon*) *subcyaneus*, ♀.



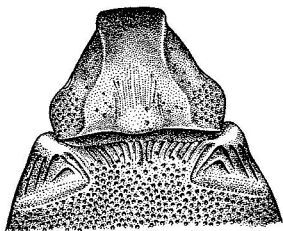
Figs. 18-26. Figs. 18, 19, 21. Carination of propodea. 18, *Melanichneumon (Melanichneumon) disparilis* (Cresson), ♀; 19, same species, ♂; 21, *Melanichneumon (Barichneumon) anator* (Fabricius), ♀. Figs. 24-26. Postpetioli and gastrocoeli. 24, *Melanichneumon (Rictichneumon) residuus* (Say), ♀; 25, *Melanichneumon (Melanichneumon) disparilis* (Cresson), ♀; 26, *Probolus detritus* (Brullé), ♀. Figs. 20, 22. Heads of females in front view. 20, *Melanichneumon (Barichneumon) anator*; 22, *Melanichneumon (Rictichneumon) residuus*. Fig. 23. Mandible of *Melanichneumon (Rictichneumon) residuus*, ♀.



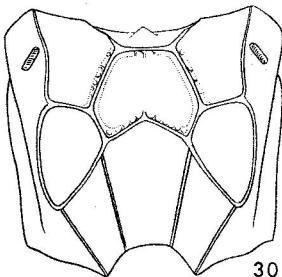
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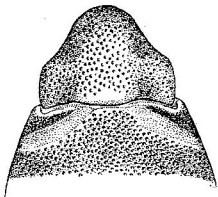
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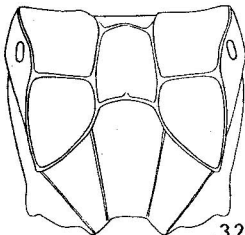
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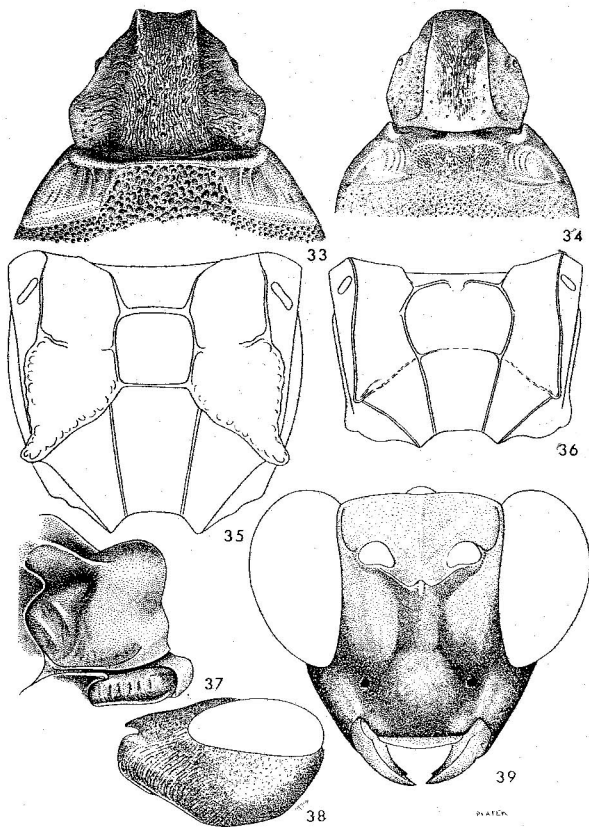
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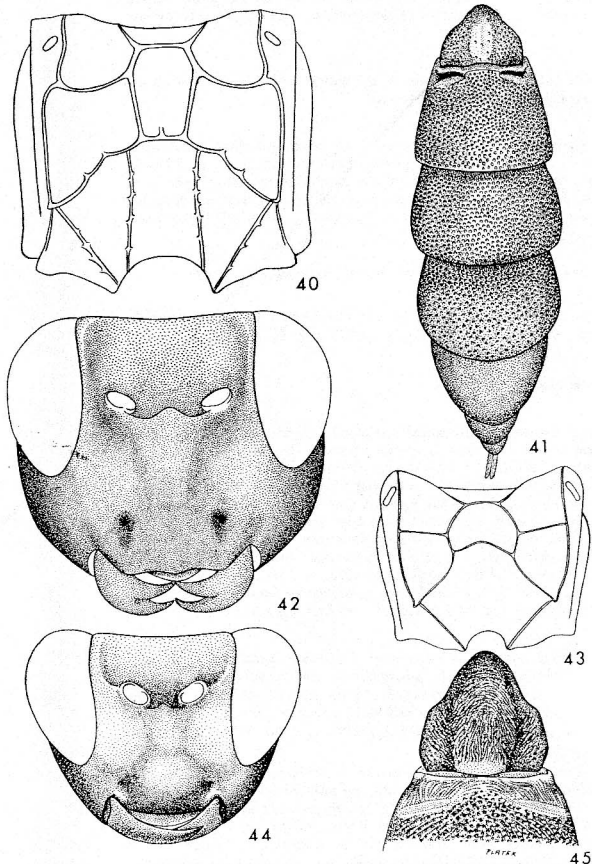
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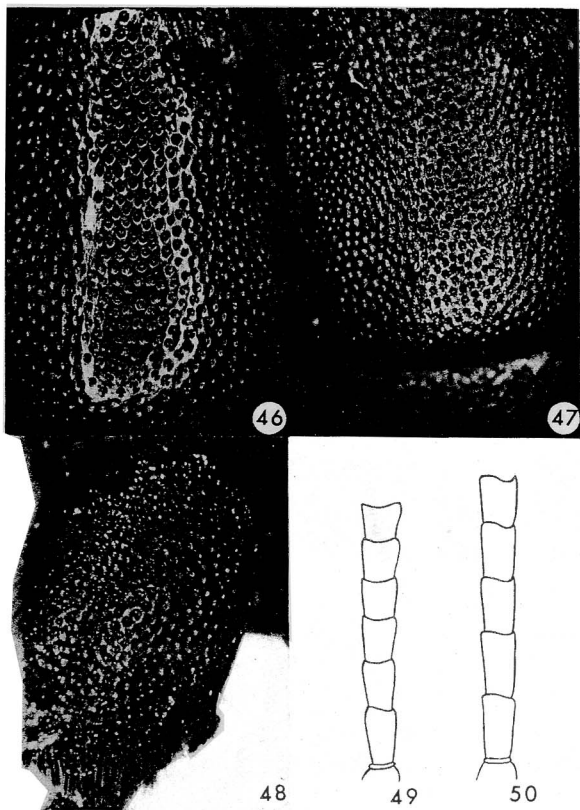
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