

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

Part II

**Synopsis of the Ichneumonini: Genera *Orgichneumon*,
Cratichneumon, *Homotherus*, *Aculichneumon*,
*Spilichneumon***

by

GERD H. HEINRICH

Dryden, Maine

Research Associate, Entomology Research Institute, Research Branch,
Canada Department of Agriculture, Ottawa

THE CANADIAN ENTOMOLOGIST

Supplement 18

Accompanies Volume XCII

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II. Tribe Ichneumonini

Morphological characters

Flagellum.—Female flagellum displaying all conceivable modifications between filiform, very short and blunt at the apex, and bristleshaped, very long and strongly attenuated at the apex; sometimes extremely widened beyond the middle; sometimes very slender and not at all widened. Male flagellum normal, sometimes nodose with transversal ridges on the segments; tyloides of various shapes, sizes and numbers.

Head.—Shape of cheeks and temples varying from strongly narrowed to strongly inflated; clypeus normal, not distinctly convex, in a few males of the genus *Cratichneumon* strongly concave; apical border of clypeus in the great majority of species straight, rarely emarginate or bisinuate; mandibles usually normal, sometimes widened with blunted teeth, or shovel-shaped without teeth, sometimes unidentate.

Thorax.—Scutellum usually flat; sometimes distinctly raised above the post-scutellum; exceptionally, strongly convex. Propodeum not sloping down in a rounded curve as in the Protichneumonini, but of the "broken" type, the carina dentipara exterior diverging apically from the carina metapleuralis and often terminated by a sharply prominent corner or sometimes even by distinct hypophyses; areolation of the propodeum in the *Melanichneumon* group very distinct and complete, approaching the pattern characteristic of the Protichneumonini, the area superomedia being narrowed anteriorly and horseshoe-shaped, semi-oval, or hexagonal. In the genera of the *Ichneumon* group the area superomedia rectangular, square or transverse-rectangular, the costulae usually obsolete.

Legs.—Varying from very stout to very slender; coxae III of females in the genera *Ichneumon*, *Stenichneumon*, *Aoplus*, and *Cratichneumon* sometimes with a more or less distinct scopa which is never found in the genera *Pseudamblyteles*, *Eutanyacra* and *Spilichneumon*. In the genera *Patroclus* and *Pseudoamblyteles* claws more or less distinctly pectinate; in *Eupalamus* tarsi I and II of females usually widened.

Abdomen.—Female abdomen oxygygous or amblypygous; postpetiolus in *Ichneumon* and the closely allied genera with regularly striate median field, in the *Melanichneumon* group usually punctate, in *Cratichneumon* smooth or alutaceous;

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

gastrocoeli varying from entirely obsolete to deep and very large, with well developed thyridia, as in *Ichneumon* and *Thyrateles*, or without distinct thyridia as in *Pseudamblyteles* and *Ctenichneumon*; general shape of female abdomen usually oval-oblong, sometimes elongated and very slender as in *Neamblymorpha*, *Ectopimorpha* and *Limerodops*; male abdomen more uniform with some variation in the shape of the hypopygium only, which is sometimes distinguished by a more or less elongated median process, as in *Spilichneumon* and *Eutanyacra* or by a shorter, strongly convex process as in *Tricholabus*.

Color

Female abdomen usually black or red in various shades, or red and black combined, exceptionally metallic blue; in some species with white anal spots, rarely also with yellow or white lateral marks or apical bands on the anterior tergites; male abdomen often black and yellow banded, especially in the genera *Ichneumon* and *Pseudamblyteles* and in a few species of *Cratichneumon* and *Aoplus*; female thorax and head often variously ferruginous.

Sexual dimorphism

Very pronounced; two general rules of chromatic dimorphism are evident: 1. replacement of basic red color of the female abdomen by black in the male (found mainly in the genera *Ctenichneumon*, *Probolus*, *Tricholabus* and few species of *Aoplus*), 2. replacement of basic red color of the female abdomen by a bright yellow color in the male, usually interrupted by black crossbands (found in most of the species of *Ichneumon*, *Pseudamblyteles*, *Spilichneumon* and *Eutanyacra* and in a few *Cratichneumon* species). As a general rule white pattern of head, thorax and legs is more extensive in the males than in the females.

Biological characters

Hosts.—The great majority of Ichneumonini are parasites of Heterocera, mainly Noctuidae. The genus *Thyrateles* and a group of species of the genus *Ichneumon* have specialized on Rhopalocera, particularly Nymphalidae and Satyridae. *Trogomorpha*, a genus included here, although perhaps more closely related to the Listrodromini, was found to feed on Hesperiidæ. A few species of the genus *Ichneumon*, the Palaearctic genus *Hepiopelmus*, the Nearctic genus *Protopelmus* Heinrich and a few species of *Cratichneumon* attack Arctiidae. Much too little is known about the hosts of one of the most strikingly differentiated groups of the Nearctic Ichneumoninae, the genus *Cratichneumon*. Some of the biggest *Cratichneumon* species are parasites of Arctiidae, Noctuidae, Lymantriidae and related Heterocera. For the great number of small species amazingly few hosts have been recorded, all Geometridae.

Hibernation.—The tribe can be divided into two groups of genera, of which one hibernates in the adult instar whereas the other does not. All species of *Ichneumon*, *Thyrateles*, *Chasmias*, *Eutanyacra*, *Spilichneumon*, *Stenichneumon*, *Aoplus*, *Exephanes*, *Ectopimorpha* and probably some of the *Pseudamblyteles* species hibernate as adults. In the other group which does not hibernate, *Cratichneumon* joins with *Melanichneumon*, *Ctenichneumon*, *Tricholabus* and *Amblyteles*. The hibernated females leave their hiding places in the early spring, but some of them, recognizable by their worn wings, can still be found roaming around until the middle of July, simultaneously with the newly emerged males of the next generation. Hibernating species produce only one generation per year, whereas many, but seemingly not all, of the non-hibernating species appear in two summer generations.

Food of the adult.—Most of the adults of the Ichneumonini, especially the genus *Ichneumon* itself and the closely allied genera are regular visitors of umbelliferous flowers, but do not reject aphid honey dew. The species of the *Cratichneumon-Melanichneumon* group, however, are rarely found on flowers and decidedly prefer to feed on honey dew.

Distribution

The hibernating group of genera with *Ichneumon* at its center, and also some of the non-hibernating genera, like *Ctenichneumon*, are confined to regions with moderate climate, including the higher and highest elevations of the mountains in the tropical belt. Some species of this group represent the most northern outposts of the whole family in the arctic region, but none of them are found in the tropical lowlands. In clear contrast herewith, the *Cratichneumon-Melanichneumon* group is not restricted to moderate climates but is also well represented in the tropical belt, even in low altitudes.

Remarks

Our knowledge of the North American forms of this tribe is still very defective, and especially in the western, probably richest, part of the continent is so poor that a comprehensive synopsis of the whole North American fauna seems to be premature. The following treatments and keys therefore are confined to eastern North America, except for a few small genera.

Among all the genera of this tribe, *Cratichneumon* presents the greatest taxonomic difficulty. Here a differentiation of species has taken place and evidently is still in the process of further development, which seems to be unique. Morphological monotony combined in many cases with individual and geographical chromatic variability and with a confusing degree of sexual dimorphism are working together to form a taxonomic puzzle which is still far from satisfactory solution.

5. Genus *Orgichneumon* Heinrich

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

Type-species.—*Ichneumon calcatorius* Thunberg.

The type-species of this genus has the general appearance and color pattern of a *Coelichneumon* but must doubtlessly be placed in the tribe Ichneumonini, because of the morphology of the propodeum and the fact that the adult female hibernates. Within the tribe Ichneumonini the genus seems to be most closely related to *Stenichneumon* Thomson, agreeing with it in the deep, transverse gastrocoeli with narrowed interval and pronounced thyridia, but differing in the areolation of the propodeum which approaches that of *Protichneumonini*. Area superomedia close to horseshoe-shaped but strongly widened and unusually large. Apex of clypeus not truncate or slightly bisinuate as in the *Protichneumonini* but gradually a little rounded. Biologically distinguished by parasitizing the genus *Orgyia* (Liparidae). *Orgichneumon* is similar to the Oriental genus *Intermedichneumon* Heinrich but differs in the larger gastrocoeli and especially in the peculiar type of areolation.

1. *Orgichneumon calcatorius* (Thunberg)

Ichneumon calcatorius Thunberg, 1822, Bull. Acad. Sc. St. Petersburg, 8:254, ♀.

Ichneumon otiosus Say, 1829, Contrib. Maclur. Lyc. Philad., 1:69, ♀.

Ichneumon infidelis Cresson, 1867, Amer. Ent. Soc. Trans., 1:296, ♂.

Ichneumon burkei Viereck, 1910, U. S. Nat. Mus. Proc., 38:383, ♂.

Coelichneumon calcatorius Heinrich, 1953, Journ. Washingt. Ac. Sc., 43:148, ♂ ♀.

Intermedichneumon calcatorius Heinrich, 1956, Canad. Entom., 88:647/48, ♀ ♂.

Intermedichneumon calcatorius Heinrich, 1959, Entom. News, 70:211, ♂.

Types

Holotypes.—*Ichneumon calcatorius* Thunberg, ♀, Sweden, University of Upsala, Sweden. *Ichneumon otiosus* Say, lost. *Ichneumon burkei* Viereck, ♂, Wisconsin, U.S.N.M. *Ichneumon infidelis* Cressen, ♂, Connecticut, A.N.S.

Hosts

Orgyia antiqua Linnaeus (Quebec) and *Orgyia leucostigma* A. & S. (Nova Scotia and New Brunswick). C.N.C.

Distribution

Holarctic. In North America according to H. Townes, 1951 (*I. otiosus*): "Quebec to North Carolina, west to Illinois" and (*I. burkei*): "Wisconsin". New records: Prince Edward Island, Nova Scotia, New Brunswick, South Carolina, British Columbia (C.N.C.); Ontario (C.G.H.).

Female

Black; pronotal ridge and scutellum white; all tibiae with white annulus or semi-annulus; tarsi III usually white marked; postpetiolus in the overwhelming majority of specimens with white apical band or mark; coxae III dorsally and metapleura sometimes white marked; flagellum strongly attenuated, little widened; no scopa; length 11-17 mm.

Flagellum.—Bristleshaped, scarcely or little widened beyond the middle, strongly attenuated at the apex, with 38-42 segments, the first about three times as long as wide, the twelfth square. Black, with white annulus on segments 7-12 or 13.

Head.—Temple profile distinctly narrowed with curved outline; cheek profile rather strongly narrowed, nearly straight; malar space little shorter than the width of mandible base; median field of face rather prominent, face and base of clypeus strongly and densely punctured; mandibles normal with relatively small teeth; apical margin of clypeus not truncate as normally, but slightly rounded. Black; the following white: frontal orbits always broadly (usually extending downward a little beyond the level of the antennal base), facial orbits sometimes, outer orbits in varying degree (usually the temple region only, sometimes their whole length, in the latter case mostly with an interruption below the middle), sometimes base of mandibles. Marks of vertex never present.

Thorax.—Mesoscutum densely punctured, alutaceous and opaque between punctures in the anterior part; scutellum laterally carinate at the very base, raised considerably above the postscutellum, slanting gradually down to the latter; propodeum short with complete areolation; the area superomedia large, usually strongly transverse, approximately half-moon-shaped. Black with very variable white pattern. Pronotal ridge, subalarum and scutellum (entirely or at least in the apical half) always white; collare and postscutellum usually white; two short median stripes on the mesoscutum and a mark on the metapleura sometimes white; rarely a small mark on the mesopleura or the prepectus.

Legs.—Femora rather slender, distinctly and densely punctured; coxae III without scopa, strongly and densely punctured. Black; all tibiae beyond the base with white annulus or semiannulus; usually segments 1-3 or 1-2 of tarsi III, rarely also segment 1 or segments 1 and 2 of tarsi II, exceptionally the basal segment of tarsi I medially white; sometimes tarsi not at all white-marked; coxae III usually with white dorsal mark, coxae II or I and II sometimes white marked.

Abdomen.—Oxypygous; postpetiole with clearly defined, longitudinally striate median field; gastrocoeli very large and deep, triangular, their interval much

narrower than one of them, thyridia very large; middle of the second tergite and base of the third medially longitudinally striate or rugose; ovipositor projecting little. Black, the postpetiole with white apical band, often reduced to a median mark.

Male

Flagellum usually without, sometimes with white annulus; tyloides rather short-oval, on segments 9-18 or 19; white pattern as in the female, but in average more extensive; face and clypeus broadly white laterally, sometimes nearly entirely; length 13-16 mm.

The following are white: frontal orbits, sides of clypeus and face, usually extensively, sometimes face and clypeus almost entirely; outer orbits narrowly, widened below; often a mark on the mandible base; collare, pronotal ridge broadly, subalarum, sometimes two short median stripes on mesoscutum, scutellum (at least apical half), postscutellum in the majority of specimens, often a mark on prepectus and metapleura, sometimes also a mark on the lower half of mesopleura, apex of postpetiolus (at least medially), usually marks on coxae I and II and a dorsal mark on coxae III, annulus or semiannulus on all tibiae, segments 1-3 of tarsi III except base and apex, segment 1, or 1-2 or 1-3 of tarsi II medially, segment 1 or sometimes segments 1 and 2 of tarsi I medially.

Variability

Two females from South Carolina are more extensively white-marked than Canadian specimens: sides of face broadly white, mesoscutum with white middle stripes, prepectus, mesopleura and metapleura white marked (as in northern males); in one specimen femora III with white dorsal stripe.

TABLE I
Distribution of white in *Orgichneumon calcatorius* (Thunberg)

31 ♀ ♀		12 ♂ ♂	
31	frontal orbits broadly	2	flagellum with annulus
11	facial orbits entirely	3	flagellum with white spot
10	facial orbits on the upper fourth or third	7	flagellum entirely black
10	facial orbits without white	12	frontal orbits broadly
29	collare	12	outer orbits
31	scutellum entirely or in part	9	sides of face and clypeus
22	postscutellum	3	face and clypeus almost entirely
9	median stripes on mesoscutum	12	apical mark or band on postpetiolus
31	subalarum	12	scutellum entirely or in part
31	pronotal ridge broadly	11	postscutellum
28	apical band or mark on postpetiolus	12	pronotal ridge
26	dorsal mark on coxae III	12	subalarum
10	mark on coxae II	10	mark on prepectus
8	mark on coxae I	5	mark on mesopleura
5	mark on prepectus	9	mark on metapleura
3	mark on mesopleura	12	mark on coxae I
10	mark on metapleura	10	mark on coxae II
1	segment 1 of tarsi III	8	dorsal mark on coxae III
19	segments 1-2 of tarsi III	6	median stripes on mesoscutum
3	segments 1-3 of tarsi III	1	segments 1-2 of tarsi III
8	no white on tarsi III	11	segments 1-3 of tarsi III
1	segment 1 of tarsi II	9	segments 1-2 of tarsi II
2	segments 1-2 of tarsi II	3	segments 1-3 of tarsi II
1	segment 1 of tarsi I	9	segment 1 of tarsi I
17	outer orbits entirely	3	segments 1-2 of tarsi I
13	outer orbits in part	12	annulus or semiannulus of tibiae 1-III
1	no white on outer orbits		

One female from British Columbia shows reduced white pattern; mesoscutum, postscutellum, pleura and coxae not white-marked, apical band of postpetiolus reduced to a very small median spot.

The high degree of variability of white pattern in 31 females and 12 males from Canada and New York is demonstrated in the above table.

6. Genus *Cratichneumon* Thomson

Cratichneumon Thomson, 1893, Opusc. Ent. fasc. 18, p. 1945.

Type-species.—*Ichneumon luteiventris* Gravenhorst, designated by Ashmead, 1900.

Among the Holarctic genera of the tribe two main groups are contrasted: the one formed by *Cratichneumon*, *Melanichneumon* and some other closely related generic units, the second represented by *Ichneumon*, *Spilichneumon* and several allied genera. The two groups are relatively little different in morphology but biologically are well differentiated and probably are not very closely related. The females of the *Ichneumon* group hibernate, those of the *Cratichneumon*-and-*Melanichneumon* group do not, with the exception of very few species of *Melanichneumon* (*sensu lato*), which have been recorded as hibernating (at least some of them probably erroneously). The two groups can be distinguished by sculpture and type of areolation. In the *Ichneumon* group the median field of the postpetiole is striate and the area superomedia tends to have a square or rectangular outline with obsolete costulae, whereas in the *Cratichneumon*-*Melanichneumon* group the postpetiole is punctate or alutaceous and the area superomedia tends to be narrowed anteriorly in hexagonal or semi-oval shape usually with strong costulae.

More difficult than the separation of the two main groups is the distinction between *Cratichneumon* and *Melanichneumon* (*sensu lato*). As a general rule in *Cratichneumon* the sculpture of mesoscutum and abdomen is more smooth and shiny and less densely punctured than in *Melanichneumon*. This becomes especially evident on the postpetiolus and second tergite, which are usually smooth or alutaceous, sometimes sparsely punctured, in *Cratichneumon*, but densely and more strongly punctured in *Melanichneumon*. In the latter genus the gastrocoeli are usually more distinct than in the former, where they are shallow and often obsolete. There is also an important chromatic difference between the two genera: white anal marks are characteristic of most of the Palaearctic and many Nearctic species of *Melanichneumon* but are exceptional in *Cratichneumon* and are reduced when present.

Flagellum.—Female flagellum usually stout, short, and filiform, rarely lanceolate, exceptionally bristleshaped; tyloides of male flagellum in a few species unusually widened, in the majority of species short-oval.

Head.—Strong; temples and cheeks of females often inflated, sometimes distinctly but never strongly narrowed; malar space usually short; mandibles normal; clypeus sometimes depressed or face receding; clypeus of males normal, sometimes with median depression, exceptionally concave.

Thorax.—Mesoscutum and scutellum usually flat, the latter in the female rarely a little raised above the postscutellum; horizontal part of propodeum in the *nigritarius* group of species flat and a little longer than the apical part—in other species more or less, sometimes strongly, abbreviated, in the male always considerably shorter than in the female; area superomedia usually hexagonal, often without distinct anterior border and confluent with the area basalis; costulae present or obsolete.

Legs.—Usually stout and short, femora usually thick; coxae III often with a loose scopa, sometimes with a large, dense scopa.

Abdomen.—Relatively short, shiny, sometimes the postpetiole and the first tergite alutaceous or with few, scattered punctures, sometimes the postpetiole smooth, more often finely rugose; gastrocoeli shallow and small, sometimes obsolete, the thyridia however usually visible.

Color.—In the *nigritarius* group black, the tibiae marked with white; in the majority of species abdomen uniformly red or reddish-brown, sometimes dark banded, exceptionally with one light anal mark; tibiae in the *w-album* group yellow banded or marked beyond the base.

Sexual dimorphism.—In contrast to that of the rarely banded female, the male abdomen often dark-banded; head, thorax and legs of males more extensively white marked; in a few species the abdomen of the female red, of the male yellow-and-black banded as in the genus *Ichneumon*.

Geographical variability.—In eastern North America many species of this genus show a parallel chromatic geographical variability: the melanistic pattern of head, thorax and legs which is dominant in the Canadian Zone decreases gradually toward the South, being more and more replaced by red or rufous color, while simultaneously the white and yellow areas tend to increase. This rule applies to females as well as to males (see *paratus*, *w-album*, *variegatus*, *duplicatus*, *annulatus*, *rubricops*).

Remarks

In the following keys and descriptions, the term "white" may include yellow.

If the mesolcus is interrupted by a row of small cross-ridges, it is "crenulated".

Key to the Species of *Cratichneumon* Thomson and *Homotherus* Foerster of Eastern North America

Females

1. Abdomen uniformly black. _____ 2
- Abdomen red or ferruginous with or without dark bands. _____ 8
2. Tibiae III black or red without white pattern. _____ 3
- Tibiae III black with white pattern. _____ 4
3. Wings uniformly and strongly infuscated; legs black. (Flagellum rather slender and attenuated; apices of areae dentiparae prominent; area superomedia often transverse; no white pattern; length 12-17 mm.) _____ 1. *unifasciatus* (Say)
- Wings not infuscated; legs usually red. (Flagellum short, exactly filiform; apices of areae dentiparae not prominent; length 11 mm.) _____ 9. *ashmeadi* (Schulz)
4. Coxae III without scopa. _____ 5
- Coxae III with distinct scopa. _____ 6
5. Femora III slender, about four times as long as medially wide; flagellum slender, the seventh segment square; horizontal part of propodeum medially shorter than the declivity. (Scutellum black or apically white; length 14 mm.) _____
- _____ 2. *pilosulus* (Provancher)
- Femora III short and stout, about three times as long as wide; flagellum filiform, the fifth segment square; horizontal part of propodeum medially as long as, or longer than, the declivity. (Scutellum black or apically white; length 9-12 mm.) _____
- _____ 3. *sublatus* (Cresson)
6. Scutellum entirely black. (No white pattern on head and thorax; small scopa; length 8-12 mm.) _____ 8. *nigritarius acerbus* (Cresson)
- Scutellum entirely or partly white. _____ 7
7. Coxae III ventrally densely punctured with unusually large scopa; also coxae II with distinct scopa; basal segments of flagellum relatively long, the seventh square; tibiae III with white dorsal mark beyond base. (Orbits of temples white; length 13-14 mm.) _____ 4. *proximus* (Cresson)

Legs.—Usually stout and short, femora usually thick; coxae III often with a loose scopa, sometimes with a large, dense scopa.

Abdomen.—Relatively short, shiny, sometimes the postpetiole and the first tergite alutaceous or with few, scattered punctures, sometimes the postpetiole smooth, more often finely rugose; gastrocoeli shallow and small, sometimes obsolete, the thyridia however usually visible.

Color.—In the *nigritarius* group black, the tibiae marked with white; in the majority of species abdomen uniformly red or reddish-brown, sometimes dark banded, exceptionally with one light anal mark; tibiae in the *w-album* group yellow banded or marked beyond the base.

Sexual dimorphism.—In contrast to that of the rarely banded female, the male abdomen often dark-banded; head, thorax and legs of males more extensively white marked; in a few species the abdomen of the female red, of the male yellow-and-black banded as in the genus *Ichneumon*.

Geographical variability.—In eastern North America many species of this genus show a parallel chromatic geographical variability: the melanistic pattern of head, thorax and legs which is dominant in the Canadian Zone decreases gradually toward the South, being more and more replaced by red or rufous color, while simultaneously the white and yellow areas tend to increase. This rule applies to females as well as to males (see *paratus*, *w-album*, *variegatus*, *duplicatus*, *annulatifipes*, *rubricops*).

Remarks

In the following keys and descriptions, the term "white" may include yellow.

If the mesolcus is interrupted by a row of small cross-ridges, it is "crenulated".

Key to the Species of *Cratichneumon* Thomson and *Homotherus* Foerster of Eastern North America

Females

1. Abdomen uniformly black. 2
- Abdomen red or ferruginous with or without dark bands. 8
2. Tibiae III black or red without white pattern. 3
- Tibiae III black with white pattern. 4
3. Wings uniformly and strongly infuscated; legs black. (Flagellum rather slender and attenuated; apices of areae dentiparae prominent; area superomedia often transverse; no white pattern; length 12-17 mm.) 1. *unifasciatorius* (Say)
- Wings not infuscated; legs usually red. (Flagellum short, exactly filiform; apices of areae dentiparae not prominent; length 11 mm.) 9. *ashmeadi* (Schulz)
4. Coxae III without scopa. 5
- Coxae III with distinct scopa. 6
5. Femora III slender, about four times as long as medially wide; flagellum slender, the seventh segment square; horizontal part of propodeum medially shorter than the declivity. (Scutellum black or apically white; length 14 mm.) 2. *pilosulus* (Provancher)
- Femora III short and stout, about three times as long as wide; flagellum filiform, the fifth segment square; horizontal part of propodeum medially as long as, or longer than, the declivity. (Scutellum black or apically white; length 9-12 mm.) 3. *sublatus* (Cresson)
6. Scutellum entirely black. (No white pattern on head and thorax; small scopa; length 8-12 mm.) 8. *nigritarius acerbus* (Cresson)
- Scutellum entirely or partly white. 7
7. Coxae III ventrally densely punctured with unusually large scopa; also coxae II with distinct scopa; basal segments of flagellum relatively long, the seventh square; tibiae III with white dorsal mark beyond base. (Orbits of temples white; length 13-14 mm.) 4. *proximus* (Cresson)

- Coxae III ventrally sparsely punctured, with small scopa; coxae II without scopa; basal segments of flagellum abbreviated, the fourth square; tibiae III with white annulus. (Head without white pattern; length 12 mm.) 5. *promptus* (Cresson)
8. Frons concave, with strong wrinkles converging from the ocelli downward to the middle of the supraantennal cavity (Fig. 38). 9
Frons without such wrinkles. 10
9. Flagellum ferruginous without annulus; sterna marked with black; apex of tibiae III and the tarsi III not infuscated; femora III stout; second tergite considerably wider than long (length 12 mm.) 43. *brevipennis* (Cresson)
- Flagellum brown with prominent white annulus and black apex; thorax uniformly ferruginous; apex of tibiae III and the tarsi III infuscated; femora III more slender; second tergite a little longer than apically wide (length 13 mm.) 44. *howdeni*, new species
10. Tibiae III beyond base with yellow or white mark or annulus (base and apex usually infuscated or black). 11
Tibiae III without yellow or white mark or annulus beyond base, entirely rufous, brown or black, rarely yellowish at the base, often infuscated or black at the apex but only exceptionally simultaneously black or blackish at the base. 31
11. Coxae III without scopa. 12
Coxae III with distinct scopa. 17
12. Flagellum stout, exactly filiform, with 22-27 segments. 13
Flagellum more slender, subfiliform or bristleshaped, with 30-38 segments. 14
13. Head in front view almost square; clypeus extremely wide, almost five times as wide as long (Fig. 8); tibiae III blackish with distinct yellow annulus. (Femora III very stout and short; length 8-10 mm.) 24. *rius*, new species
Cheek profile distinctly narrowed; clypeus normal; tibiae III black at the apex with rather indistinct basal infuscation, the white annulus thus usually hardly prominent. (Length 5-9 mm.) 25. *annulipes* (Provancher)
14. Flagellum subfiliform, little attenuated at the apex; cheek profile scarcely narrowed, head in front view almost square (Fig. 7); handsome species, 12-15 mm. long. (Legs stout; mesoscutum with or without median mark; tibiae III rufous with or without small yellow mark beyond base; scopa slightly indicated.) 10. *anisotae*, new species
Flagellum bristleshaped, considerably attenuated at the apex; cheek profile distinctly narrowed, head in front view not almost square; smaller species of 12 mm. length and less. 15
15. Coxae III, femora III and mesoscutum entirely black. (Tibiae III black with or without white mark; length 12 mm.) 27. *duplicatus* (Say)
Coxae III red-brown or black with white mark; femora III rufous; mesoscutum medially red-brown or white. 16
16. Mesoscutum black with white median mark; propodeum black with white marks; temples slightly narrowed; flagellum with 35-39 segments. (Length 9-11 mm.) 26. *gracilior*, new species
Mesoscutum mainly or medially red-brown, without white median mark; propodeum mainly red-brown; temples scarcely narrowed; flagellum with 31 segments. (Length 9-10 mm.) 28. *insulae*, new species
17. Cheek profile not or scarcely narrowed, head in front view almost square (Fig. 8); scopa indistinct; big species, 12-15 mm. long. (Flagellum subfiliform; mesoscutum with or without median white mark.) 10. *anisotae*, new species
Head in front view not almost square; smaller species, 12 mm. long or less. 18
18. Second tergite alutaceous, not punctured (Fig. 41). (Scutellum yellow; flagellum exactly filiform with 28-32 segments; coxae III ventrally rather densely punctured.) 19
Second tergite with distinct punctation. 22
19. Coxae III dorsally extensively marked with yellow; legs III in direct comparison a little slenderer than in the alternative species; flagellum with 30-32 segments. (Sculpture of mesopleura very coarse and dense; mesopleura medially and sometimes mesoscutum red-brown; pronotal ridge always yellow; femora rufous; tarsi III not infuscated; length 12 mm.) 20. *vinulus* (Cresson)
Coxae III dorsally not yellow marked; legs III stouter; flagellum with 28-30 segments. 20
20. Basic color of head, thorax, femora III and coxae III black. 19a. *paratus paratus* (Say)
At least femora III rufous. 21

21. Femora III or all legs including coxae rufous, pleura and propodeum partially black. _____ 19b. *paratus pusillus* (Cresson)
 Entirely rufous, almost lacking black pattern. (Metatarsus III not infuscated; usually pronotal ridge yellow.) _____ 19c. *paratus pseudovinnulus*, new subspecies
22. Mesoscutum rufous or red-brown. _____ 23
 Mesoscutum basically black, the middle often red or yellow marked. _____ 26
23. Flagellum exactly filiform, not at all attenuated apically. _____ 24
 Flagellum apically distinctly attenuated. _____ 25
24. All coxae clear red; flagellum with 27-29 segments; cheek profile distinctly narrowed with almost straight outline; cheeks not inflated. (Femora red; scutellum white; pronotal ridge not white; length 9-13 mm.) _____ 21. *annulatus* (Provancher)
 At least coxae III mainly black; flagellum with 32-33 segments; cheek profile little narrowed, with somewhat curved outline; cheeks a little inflated. (Femora black or red; scutellum always, pronotal ridge sometimes, white; length 11-13 mm.) _____ 14. *w-album* (Cresson)
 (mutant with mainly red-brown mesoscutum)
25. Flagellum lanceolate with 37-38 segments, strongly widened, the widest segment 2.5 times as wide as long; cheek and temple profile a little narrowed; cheeks not inflated. (Legs uniformly rufous including coxae, all tibiae with small yellow mark; length 14 mm.) _____ 12. *ferrugops*, new species
 Flagellum slightly widened, with 32 segments, the widest twice as wide as long; cheek and temple profile scarcely narrowed; cheeks distinctly inflated. (Legs uniformly rufous including coxae, all tibiae with somewhat indistinct yellowish mark; tibiae III dorsally infuscated at base and apex; length 10 mm.) _____ 23. *erythroscuta*, new species
26. Mesoscutum with yellow median mark. _____ 27
 Mesoscutum without yellow median mark. _____ 28
27. Flagellum subfiliform, little widened beyond middle, slightly attenuated at the apex, the widest segment usually less than twice as wide as long; femora and tibiae III rufous, the latter dorsally somewhat infuscated with small yellow mark beyond base. (Flagellum with 33-36 segments; length 11-14 mm.) _____ 16. *subfilatus*, new species
 Flagellum rather strongly widened beyond the middle and distinctly attenuated at the apex, the widest segment more than twice as wide as long; femora and tibiae III blackish, the latter with a long, white dorsal stripe beyond base. (Flagellum with 35-37 segments; length 14 mm.) _____ 13. *acronictae*, new species
28. Coxae III ventrally and mesoscutum densely punctured; temple profile distinctly narrowed; flagellum with 33-35 segments, the basal segments relatively longer than in the alternative species, the first about twice as long as wide; femora III distinctly narrower; tarsi III always uniformly pale yellowish. (Length 9-12 mm.) _____ 18. *puncticoxae*, new species
 Coxae III ventrally and mesoscutum sparsely punctured; temple profile scarcely narrowed; flagellum with 32-33 segments, the first 1.5 times as long as wide; femora III stouter and wider; tarsi III often more or less infuscated. _____ 29
29. Femora III, tarsi and tibiae III deep black, the latter with a small white dorsal mark beyond base; cheek profile a little more narrowed than in the alternative species. (Scutellum and collar white, no other white marks on head and thorax; length 11-12 mm.) _____ 15. *picipes*, new species
 Femora III varying from rufous to black, tibiae III basally and apically black or blackish-brown with large white annulus or semiannulus beyond base; cheek profile wider than in the alternative species. (Length 12-15 mm.) _____ 30
30. Legs including coxae mainly rufous; pronotal ridge usually white. _____ 14a. *w-album w-album* (Cresson)
 Femora and coxae III black; pronotal ridge usually black or reddish. _____ 14b. *w-album lobatus* (Provancher)
31. Tibiae III entirely black. (Flagellum bristleshaped; no scopa; length 12 mm.) _____ 27. *duplicatus* (Say)
 Tibiae III not entirely black. _____ 32
32. Tibiae III uniformly rufous or brown, apically not infuscated or black. _____ 33
 Tibiae III apically black or infuscated. _____ 39

33. Cheek profile not narrowed; outline of head in front view almost square (Fig. 8); flagellum subfiliform; big species, 12-15 mm. long. (Mesoscutum with or without white median mark.) 10. *anisotae*, new species
(mutant without yellow mark on tibiae III) 34
- Cheek profile distinctly narrowed, or flagellum not subfiliform, or size smaller..... 34
34. Mesoscutum black with white median mark; handsome species, 12-15 mm. long. (Femora, tibiae and tarsi rufous without black or white pattern.) 35
- Mesoscutum black or red-brown without white median mark; smaller species 7-9 mm. long. 36
35. Flagellum lanceolate, strongly widened beyond the middle, the widest segment almost three times as wide as long; propodeum with pronounced white W-pattern including area superomedia and usually the whole areae spiraculiferae; mesopleura usually with white band or mark. (Mesoscutum smooth, glossy, with a few scattered punctures; distinct scopa; length 14-15 mm.) ... 11. *variegatus* (Provancher)
- Flagellum subfiliform, not widened beyond the middle; white W-pattern of propodeum less complete not including area superomedia and the whole areae spiraculiferae; mesopleura not white marked. (Distinct scopa; length 12-15 mm.) 17. *pseudanisotae*, new species
36. Flagellum exactly filiform. 37
- Flagellum, slender, bristlehaped. 38
37. Thyridia small, not transverse; scutellum and coxae I and II pale yellow; flagellar annulus distinct, clear white. (Apex of tibiae III slightly infuscated; no scopa; length 8-9 mm.) 35. *facetus* (Cresson)
- Thyridia transverse (very superficial) (Fig. 40); scutellum and coxae I and II not yellow; flagellar annulus indistinct, not clear white. (Ventral flat of flagellum scarcely indicated; no scopa; length 7-8 mm.) ... *Homotherus porcelariae*, new species
38. Flagellum somewhat widened beyond middle, the first segment a little less than twice as long as wide, the widest not quite twice as wide as long. (Red-brown, thorax with or without some black pattern; apex of scutellum laterally yellowish; no scopa; area superomedia about as long as wide; length 8 mm.) 41. *boreoalpinus*, new species
- Flagellum not at all widened beyond middle, first segment a little more than twice as long as wide, no segment wider than long. (Red-brown, thorax with some black pattern; scutellum yellowish; no scopa; declivity of propodeum nearly twice as long as the horizontal part, area superomedia transverse; length 8 mm.) 42. *pertenuis*, new species
39. Coxae III with scopa. 40
- Coxae III without scopa. 41
40. Flagellum slender, bristleshaped, not widened; carination of propodeum sharp and complete. (Head and abdomen predominantly red-brown, thorax and legs predominantly black; tibiae III medially red-brown; length 10 mm.) 34. *vockerothi*, new species
- Flagellum exactly filiform, widened beyond middle; carination weak and incomplete. (Red-brown with variable black and without yellow pattern, th ridia transverse; length 7-9 mm.) 29. *vescus* (Provancher)
41. Tergites 1-5 basally infuscated; carination of propodeum subobsolete (Fig. 16); very small species, 4-6 mm. long. (Red-brown variegated with black; flagellum exactly filiform; horizontal part of propodeum distinctly shorter than declivity. 30. *alternans* (Provancher)
- Without the above characters in combination; size 6 mm. or more. 42
42. Second tergite alutaceous, not at all or very sparsely and extremely finely punctured. (Flagellum filiform.) 43
- Second tergite always distinctly and rather densely punctured. 45
43. Gastrocoeli transverse, their interval narrower than one of them; declivity of propodeum 1.4 times as long as the horizontal part medially; scutellum not yellow. (Red-brown, head and thorax variegated with black; femora III usually black; length 7-8 mm.) *Homotherus townesi*, new species
- Gastrocoeli small, their interval wider than one of them; declivity of propodeum scarcely longer than the horizontal part medially; scutellum pale yellow. (Apex of areae dentiparae projecting a little.) 44
44. Malar space considerably longer than the width of base of mandible; mesoscutum always red-brown; metatarsus III and base of anterior tergites not infuscated. (Length 9-10 mm.) 36. *pteridis* Townes

- Malar space little longer than the width of base of mandible; mesoscutum black, medially usually brown; metatarsus III and usually base of anterior tergites infuscated. (Length 6-7 mm.) 37. *flavipectus* (Provancher)
45. Flagellum slender, bristleshaped. 46
Flagellum stout, exactly filiform or lanceolate. 47
46. Gastrocoeli transverse, their interval narrower than one of them. (Scutella, pronotal ridge, orbits, all trochanters and usually coxae I and II partially white; femora III black or rufous; length 9-10 mm) *Homotherus semiaoplus*, new species
Gastrocoeli small, their interval wider than one of them. 38
47. Propodeum not abbreviated, the declivity not considerably longer than the horizontal part; area superomedia usually longer than wide. (Flagellum exactly filiform.) 48
Propodeum more or less abbreviated, the declivity considerably longer than the horizontal part; area superomedia as wide as long or transverse. (Flagellum lanceolate or filiform.) 52
48. Area superomedia finely and densely transversely striated (Fig. 12); tibiae I and II with fairly distinct whitish dorsal mark in the middle; tibiae III apically black, usually slightly infuscated at the base, with faint indication of a whitish mark beyond base. (Scutellum white; length 5-9 mm.) 49
Area superomedia not transversely striated; tibiae I and II without indication of a whitish dorsal mark; tibiae III basally not at all infuscated. (Scutellum white or not white; length 7-9 mm.) 51
49. Thorax black, propodeum usually partially red-brown; femora and coxae III black. 25a. *annulatus annulatus* (Provancher)
Thorax more extensively, coxae and femora entirely red-brown. 50
50. Thorax red-brown with extensive black pattern. 25b. *annulatus quintilis* (Viereck)
Thorax probably entirely or almost entirely red-brown.
..... 25c. *annulatus facetops*, new subspecies (unknown)
51. Scutellum, frontal and vertical orbits white; tibiae III rufous-brown, slightly infuscated at the apex. (Length 8-9 mm.) 35. *facetus* (Cresson)
Scutellum and orbits not white; tibiae III yellowish or brownish, apically distinctly black. (Length 7-8 mm.) 31. *scitulus* (Cresson)
52. Flagellum filiform, not widened beyond middle; temple profile not narrowed. (Ovipositor distinctly projecting; declivity of propodeum about twice as long as the horizontal part medially; abdomen short-oval, wide; predominantly red-brown; length 7 mm.) 40. *rubricops*, new species
Flagellum lanceolate, strongly widened beyond middle and apically distinctly attenuated; temple profile somewhat narrowed. 53
53. Declivity of propodeum twice as long as the horizontal part medially, area superomedia transverse; projecting part of ovipositor longer than the last tergite; scutellum usually not yellowish. (Predominantly red-brown; last tergites often infuscated; length 8-9 mm.) 38. *rubricus* (Provancher)
Declivity of propodeum considerably less than twice as long as the horizontal part medially, area superomedia not transverse; projecting part of ovipositor shorter than the last tergite; scutellum yellow. (Predominantly rufous; last tergites not infuscated; length 7-9 mm.) 39. *rubricoides*, new species

Males

1. Abdomen uniformly black (in some cases white apical pattern on the postpetiolus). 2
Abdomen entirely or partially red, ferruginous or yellow. 13
2. Flagellum with white annulus. 3
Flagellum without annulus. 10
3. Head, thorax, abdomen and hind legs uniformly black, except sometimes the facial orbits. (Length 11-14 mm.) 8. *nigritarius acerbus* (Cresson)
Some other white marks on body or hind legs. 4
4. Median field of face but slightly convex, the lateral longitudinal impressions scarcely indicated; postpetiolus rather strongly and densely rugose, only slightly shiny; apices of areae dentiparae usually prominent. (Mesoscutum and trochanters always uniformly black; postpetiolus usually with white apical band; apex of femora III and tibiae III usually dorsally white; length 13-20 mm)
..... 1. *unifasciatus* (Say)

- Median field of face very prominent, the lateral longitudinal impressions distinct; postpetiolus weakly or indistinctly rugose, shiny; apices of areae dentiparae not prominent. 5
5. Tyloides on segments 8-14 of flagellum unusually enlarged and covering the full length of these segments. (Clypeus medially strongly concave; coxae III dorsally white marked; length 15-17 mm.) 6. *tyloidifer*, new species
- Tyloides of normal, small size and length. 6
6. Clypeus distinctly concave in the middle; coxae and trochanters not white-marked. (Cheeks narrow; areae superomedia distinctly transverse; median field of face prominent, the lateral longitudinal impressions distinct and diverging above towards antennae; length 15-16 mm.) 2. *pilosulus* (Provancher)
- Clypeus not concave (coxae or trochanters sometimes white-marked.) 7
7. Cheeks distinctly inflated. (Coxae III dorsally white-marked; mesoscutum sometimes with median mark; lateral longitudinal impressions of face not very strong and not diverging above toward antennae; length 16-17 mm.) 4. *proximus* (Cresson)
- Cheeks not inflated, narrow. 8
8. Mesoscutum with white median mark; trochantelli III white; metatarsus III with narrow white annulus at base. (Tibiae III with white basal annulus connected with a more or less extended white stripe on their outer side; length 14-17 mm.) 3. *sublatus* (Cresson), variety
- Mesoscutum without white median mark; trochantelli III black; metatarsus III sometimes dorsally white, but not with narrow, white basal annulus. 9
9. Coxae III entirely black; temple profile scarcely narrowed, with strongly curved outline; femora III rather stout. (Tibiae III usually with white annulus beyond base; fourth tergite finely punctured; length 13 mm.) 5. *promptus* (Cresson)
- Coxae III dorsally white marked; temple profile distinctly narrowed with slightly curved outline; femora III more slender. (Tibiae III with longitudinal white dorsal stripe beyond base; length 14-15 mm.) 7. *takomae*, new species
10. No white pattern on head, body and legs; legs usually red, sometimes black. (Length 11-14 mm.) 9. *ashmeadi* (Schulz)
- White pattern on head or body or legs or sometimes on all these parts; legs never red. 11
11. Median field of face strongly prominent, the lateral longitudinal impressions distinct; mesoscutum with white median mark; trochantelli III white. (Propodeum white marked; length 14-17 mm.) 3. *sublatus* (Cresson)
- Median field of face only slightly convex, the lateral longitudinal impressions weakly indicated; mesoscutum not white-marked, trochantelli III not white. 12
12. Tergites 2-4 alutaceous between punctures, almost opaque; oval tyloides on segments 6 or 7 to 17 or 18; tibiae III often dorsally entirely or extensively white. (Length 13-20 mm.) 1. *unifasciatus* (Say)
- Tergites 2-4 not alutaceous between punctures, shiny; longish tyloides on segments 4-22; tibiae III with a small, white dorsal spot on the extreme base. (Area superomedia large, anteriorly rounded, transverse; length 14 mm.) see *Anisopygus*
13. Frons with distinct longitudinal wrinkles below the ocellar region, converging downward to the middle of the supraantennal cavity; ocellar region slightly raised above the level of vertex. (Abdomen ferruginous, tergites 1-5 with black basal bands; length 12-14 mm.) 43. *brevipennis* (Cresson)
- Frons without longitudinal wrinkles. 14
14. Clypeus strongly concave as a whole, "dish-shaped" (Fig. 1). (Median field of face strongly prominent; eyes bulging (Fig. 2); handsome species, 16-18 mm. long.) 15
- Clypeus sometimes with median apical depression or localized concavity, but not concave as a whole. 16
15. Tyloides unusually widened (Fig. 36); tibiae III uniformly fulvous-red without yellow mark and black pattern; mesolcus representing a clear cut without crenulation. (Mesoscutum with white median mark; head and thorax with unusually rich white pattern.) 11. *variegatus* (Provancher)
- Tyloides moderately widened, but still somewhat wider than usual (Fig. 35); tibiae III with large yellow annulus, dorsally strongly infuscated at base and apex; mesolcus crenulated. (Mesoscutum with white median mark; head and thorax with rich white pattern; femora III stouter than in the alternative species, interior-laterally blackish.) 13. *acronictae*, new species

16. Tyloides enormous, almost as wide as long, covering the whole length and nearly the width of the flagellar segments (Fig. 37). (Clypeus with restricted concave median area; tibiae III basally narrowly black with a yellowish area beyond this dark basal annulus; mesoscutum with white median mark; head and thorax with unusually rich white pattern; handsome species of 15-18 mm. length.) _____
 Tyloides normal, narrowly oval or bacilliform. _____ 10. *anisotae*, new species 17
17. Flagellum without annulus. (Smaller species, 8-13 mm. long; all trochanters yellow.) _____ 18
 Flagellum with white annulus. _____ 19
18. Abdomen red-brown; tarsi III reddish-yellow; mesoscutum medially red-brown; thyridia transverse, their interval narrower than one of them; length 8-9 mm. _____
 Abdomen black, tergites 1-3 with broad, yellow apical bands; tarsi III basally infuscated; mesoscutum black, exceptionally with yellow median mark; thyridia not transverse; length 9-13 mm. _____ 29. *vescus* (Provancher) 19
19. Tibiae III beyond base with white (or yellow) annulus or dorsal mark, usually infuscated or black simultaneously at the base and apex, or else simultaneously rufous at the base and apex. _____ 20
 Tibiae III without white (or yellow) median mark or annulus, either uniformly rufous or black, or infuscated or black at the apex only, never simultaneously at base and apex. _____ 33
20. Tergites 2-5, at least the second, variegated with black (marks or bands); sometimes tricolored: red-brown with black base and yellow apex; mesolcus usually not or minutely crenulated. (Mesosternum white or white-marked.) _____ 21
 Tergites 2-7 uniformly red-brown or rufous without black or yellow bands or marks; mesolcus distinctly crenulated. _____ 25
21. Temple profile not narrowed; mesolcus rather strongly crenulated; abscissula obsolete; second tergite sparsely punctured, rather smooth and shiny; tergites 2-7 pale orange-yellow, the second usually with bipartite black median mark. (Clypeus wide, mandibles robust; femora III stout, black, ventrally pale yellow at the base; mesoscutum with median mark; length 11-14 mm.) _____ 24. *ritus*, new species
 Temple profile distinctly narrowed; mesolcus not or minutely crenulated; abscissula not entirely obsolete; second tergite more densely punctured, less shiny; abdomen otherwise colored. _____ 22
22. Metatarsus III blackish. (Second and third tergite yellow, sometimes partially rufous, the former not basally infuscated, but usually with a black, bipartite median mark; the third tergite with black basal band; following tergites predominantly black; mesoscutum with white median mark; length 10-13 mm.) _____ 23
 Tarsi III uniformly whitish including metatarsus. _____ 24
23. Femora III and coxae III dorsally black; basic color of anterior tergites yellow. _____
 Femora III and coxae III dorsally rufous; basic color of anterior tergites tending to turn partially reddish. _____ 19a. *paratus paratus* (Say)
 _____ 19b. *paratus pusillus* (Cresson)
24. Row of tyloides beginning on the fifth flagellar segment; metapleura white except areae coxales; blackish pattern of second tergite usually not covering its base but forming a bipartite median band beyond the thyridia; coxae III without conspicuous black pattern. _____ 19c. *paratus pseudovinnulus*, new subspecies
 Row of tyloides beginning on the seventh or eighth flagellar segment; metapleura black; black pattern of second tergite covering its base; coxae III black laterally and dorsally at apex. (Length 12-15 mm.) _____ 20. *vinnulus* (Cresson)
25. Mesoscutum entirely or medially red-brown. (Legs predominantly rufous including coxae, the latter usually laterally black; length 10-13 mm.) _____ 22. *vaccinii*, new species
 Mesoscutum black, sometimes medially white marked. _____ 26
26. All coxae uniformly red. _____ 27
 Coxae black or white or both, rarely coxae III partially red. _____ 28
27. Temple profile hardly narrowed, broadly rounded; pronotal ridge and sometimes median mark of mesoscutum white. (Second tergite very densely punctured; abdomen not infuscated toward apex; tarsi III not blackish; face and clypeus white; length 12 mm.) _____ 26. *gracilior*, new species

- Temple profile distinctly narrowed; pronotal ridge and middle of mesoscutum not white. (Abdomen usually somewhat infuscated toward the apex; tarsi III usually blackish; face and clypeus usually reddish-tinted medially or sometimes entirely; length 9-13 mm.) 21. *annulatus* (Provancher)
28. Temple profile not narrowed; occipital carina in vertical view very strongly, almost angularly curved toward ocelli in the middle (Fig. 5); median field of face simply convex, but not strongly prominent, the lateral longitudinal impressions shallow; handsome species, 14-18 mm. long. (Mesoscutum with or without white median mark; mesopleura often with white crossband; mesosternum usually black; color of legs III extremely variable, changing from rufous to entirely black, with or without yellow base or median mark or annulus of tibiae III.) 27. *duplicatus* (Say)
- Temple profile distinctly narrowed; occipital carina in vertical view curved evenly and moderately toward the ocelli (Fig. 6); median field of face rather strongly prominent, the lateral longitudinal impressions more pronounced; smaller species, 11-14 mm. long. 29
29. Legs III deep black including tarsi; tibiae III with small white mark dorsally beyond base. (Tyloides abbreviated-oval (Fig. 34), restricted to eight segments of flagellum; length 13-14 mm.) 15. *piceipes*, new species
- Legs III not entirely deep black; tibiae III with fairly wide annulus or rufous with yellowish area beyond base. 30
30. Tibiae III pale rufous with indistinctly defined yellow area dorsally beyond base, sometimes dorsally infuscated; mesosternum entirely or predominantly white; mesoscutum with white median mark. (Propodeum with complete, white W-pattern; legs predominantly rufous; length 11-14 mm.) 16. *subfilatus*, new species
- Tibiae III black at base and apex with clearly defined yellow annulus; mesosternum black or marked with white in the region of sternauli; mesoscutum rarely with white median mark. 31
31. Flagellum with short, narrow tyloides on seven to eight segments, beginning on the sixth or seventh; mesoscutum, especially the lateral lobes, considerably more densely punctured than in the alternative species, less shiny; tarsi III always entirely pale yellowish. (Femora III more slender and more densely punctured than in the following species, usually black with red base; length 12-13 mm.) 18. *puncticoxa*, new species
- Flagellum with long oval, narrow tyloides on 10-11 segments beginning on the fifth or sixth; mesoscutum sparsely punctured, shiny; tarsi III varying from yellowish brown to dark brown. (Length 12-15 mm.) 32
32. Femora III entirely or predominantly red; mesopleura and exterior part of mesosternum usually white marked; propodeum with more or less extensive white W-pattern; coxae I and II predominantly white. 14a. *w-album w-album* (Cresson)
- Femora III black; mesopleura and mesosternum not white marked; white pattern of propodeum reduced; coxae I and II usually black except apex. 14b. *w-album lobatus* (Provancher)
33. Tibiae III uniformly colored, either entirely black or entirely rufous. 34
- Tibiae III brown, rufous or yellowish with black or infuscated apex. 36
34. Tibiae III entirely black. 28
- Tibiae III entirely rufous. (Sterna entirely or partially, scutellum and pronotal ridge white; length 8-9 mm.) 35
35. Temple profile distinctly narrowed; row of tyloides beginning on the third, fourth or fifth flagellar segment; abdomen narrow, the third tergite distinctly less than twice as wide as long; femora III fairly slender; prescutellar carinae and mesopleura extensively white. 35. *facetus* (Cresson)
- Temple profile scarcely narrowed; row of tyloides beginning on the second flagellar segment; abdomen short-oval, the third tergite fully twice as wide as long; femora III distinctly stouter; prescutellar carinae and mesopleura red-brown. 39. *rubricoides*, new species
36. Gastrocoeli transverse and somewhat oblique, their interval narrower than one of them. (All trochanters and coxae I and II yellow.) 37
- Gastrocoeli small, their interval wider than one of them. 38
37. Frons below lower ocellus with a vertical, narrow groove; coxae III and femora III red, apically black; tarsi III infuscated. (Length 8-10 mm.) *Homotherus semiaopius*, new species
- Frons below lower ocellus without groove; coxae III and femora III black; tarsi III yellowish-red. (Length 8-9 mm.) *Homotherus townesi*, new species

38. Second tergite finely alutaceous, without distinct punctation, or very sparsely and extremely finely punctured. (Base of anterior tergites usually dark banded; mesosternum and mesopleura more or less extensively yellow.) 39
 Second tergite with distinct and rather dense punctation. 40
39. Mesoscutum red-brown, without white median mark; tarsi III yellowish brown, basally slightly infuscated; femora III black; mesopleura usually tricolored: white below, black above, red-brown in the middle. (Scutellum yellow; length 10-12 mm.) 36. *pteridis* Townes
 Mesoscutum black, with white median mark; metatarsus III blackish, the apical segments of tarsi III whitish; femora III rufous with black apex; mesopleura and a usually separate spot on speculum white, area below subalarum black. (Scutellum yellow; length 6-9 mm.) 37. *flavipectus* (Provancher)
40. Propodeum strikingly abbreviated, the area superomedia unusually narrowed, often four times wider than long (Fig. 24). (Mesosternum usually white marked on each side of the mesolcus; all trochanters and coxae I and II white; abdomen from predominantly black to predominantly red-brown; length 9-10 mm.) 38. *rubricus* (Provancher)
 Propodeum not or moderately abbreviated. 41
41. Row of tyloides beginning on the second, sometimes the third flagellar segment; sternauli on the mesosternum rather strongly impressed. (Scutellum white; tibiae III cream white, always apically broadly blackish; tarsi III never infuscated; mesoscutum never with white median mark; color of abdomen varying geographically from strongly dark-banded and predominantly black to uniformly yellowish rufous; length 9-13 mm.) 42
 Row of tyloides beginning beyond the third flagellar segment; sternauli less distinct. 44
42. Femora and coxae III and thorax predominantly black. 25a. *annulatifpes annulatifpes* (Provancher)
 Femora and coxae III and thorax not predominantly black. 43
43. Mesoscutum black; femora and coxae III, pleura and propodeum extensively red-brown. 25b. *annulatifpes quintilis* (Viereck)
 Mesoscutum vivid red-brown with pale yellow pattern; sterna, pleura and propodeum almost entirely pale yellow; femora yellowish-rufous. 25c. *annulatifpes facetops*, new subspecies
44. Sterna and pleura entirely black. 45
 At least mesosternum partially or entirely white. 46
45. Abdomen black, tergites 1-2 or 1-3 apically yellow banded; tarsi III uniformly whitish; length 10-11 mm. 32. *suadus* (Cresson)
 Abdomen brown, all tergites, except the last, with black basal bands; tarsi III red-brown, sometimes basally infuscated; length 8 mm. 40. *rubricops*, new species (tentative)
46. Mesoscutum red-brown without white median mark. (Abdomen red-brown, the anterior tergites usually with black basal bands; all trochanters and coxae I and II white; mesosternum more or less extensively and sometimes lower part of mesopleura yellowish-white; length 7-10 mm.) 31. *scitulus* (Cresson)
 Mesoscutum black with white median mark. 47
47. Coxae III dorsally extensively white marked; black basal band of second tergite extending from its very base to beyond the thyridia; mesoscutum medially coarsely, but not densely, punctured; carination of propodeum strong and complete; frons at and below the level of the lower ocellus slightly concave. (Abdomen pale reddish-brown, the anterior tergites apically more or less distinctly yellowish tinted, basally black banded; mesosternum and lower part of mesopleura white; length 12-15 mm.) 20. *vinnulus* (Cresson)
 (mutant with base of tibiae III white)
 Coxae III dorsally entirely black; second tergite with irregular black median, the third with black basal band; mesoscutum and mesopleura much more finely and densely punctured, the former scarcely shiny; anterior part of carination of horizontal part of propodeum obsolete; frons at and below the level of lower ocellus slightly convex. (Tergites 2-7 reddish-brown, the first and second tergite often indistinctly yellowish tinted at the apex, the second and third with black bands; length 10-11 mm.) 33. *remanens*, new species

1. *Cratichneumon unifasciatorius* (Say)

Figs. 17, 18.

Distribution

According to H. Townes, 1951: "Transcontinental in Transition, Upper Austral and Lower Austral Zones".

Female

Uniformly black; wings strongly infuscated; no scopa; flagellum bristleshaped, moderately attenuated; notaulices strongly impressed in the anterior third; postpetiolus longitudinally striate or irregularly rugose; apex of areae dentiparae distinctly prominent; area superomedia usually transverse and indistinctly separated from the area basalis; length 12-17 mm.

Flagellum.—Bristleshaped, moderately attenuated at the apex, not widened beyond the middle, with 38-42 segments, the first little more than twice as long as wide, the eighth square. Black with white annulus on segments 8-16, 17 or sometimes 18.

Head.—Temple profile wide, not narrowed, with almost straight outline; cheek profile distinctly narrowed, with almost straight outline; cheeks long, not inflated; malar space almost as long as the width of mandible base; clypeus with somewhat oblique sides and straight apical border, smooth, with scattered, gross punctures; face densely and grossly punctured, temples strongly and densely rugosely punctate; mandibles normal. Black.

Thorax.—Mesoscutum little convex, densely and strongly punctured, anterior third of notaulices strongly impressed; scutellum distinctly convex and more or less raised above the postscutellum, strongly punctured; all pleura grossly and densely rugose-punctured; propodeum short, area superomedia as wide as long, or more often transverse, often confluent with the area basalis; costulae obsolete or more or less distinct; areae dentiparae somewhat projecting at the apex. Black.

Legs.—Relatively long and fairly slender; coxae III densely and strongly punctured, without scopa. Black.

Abdomen.—Postpetiolus with distinct, flat median field with varying sculpture, sometimes longitudinally striate, usually irregularly rugose or reticulate; gastrococli shallow, thyridia distinct; whole surface of second tergite strongly and densely punctured; third tergite finely and sparsely punctured, alutaceous between punctures, the following tergites smooth. Black.

Male

Wings less infuscated than in the female, usually clear; black with white pattern of varying extent; flagellum with or without annulus; postpetiolus with or without apical white band; tibiae III dorsally more or less extensively white striped, sometimes entirely black; scutellum white, rarely black; face and clypeus from almost entirely white to almost entirely black; narrow, oval tyloides on segments 6 or 7 to 17 or 18; length 13-20 mm.

The following may be white or not: face and clypeus (often the face extensively, the clypeus not), base of mandibles, stripe or mark on frontal orbits, scape ventrally, mark on collare, pronotal ridge, subalarum, tegulae, apex of pronotal base, scutellum, postscutellum, mark on propodeum, apical band on postpetiolus, marks on coxae I and II, apex of femora dorsally, all tibiae dorsally, metatarsus I or I and II dorsally.

Two specimens from North Carolina have all the parts mentioned above white, and in addition: scape below, small mark on vertical orbits, cheeks extensively and apical marks on the second tergite laterally.

1a. *Cratichneumon unifasciatorius unifasciatorius* (Say)

Ichneumon unifasciatorius Say, 1825, Amer. Ent. 2:48, ♂.

Ichneumon malacus Say, 1829, Contrib. Maclur. Lyc. Phila., 1:72, ♀.

Ichneumon niger Brullé, 1864, Hist. Nat. Ins. Hym., 4:302, ♂ ♀.

Ichneumon afer Cresson, 1864, Ent. Soc. Phila. Proc., 3:138, ♀.

Ichneumon scriptifrons Cresson, 1877, Amer. Ent. Soc. Trans., 6:144, ♂.

Ichneumon atterimus Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., p. 30, ♀.

Types

Holotypes.—*Ichneumon unifasciatorius* Say, ♂, in Harris collection, M.C.Z. *Ichneumon malacus* Say, lost. *Ichneumon niger* Brullé, ♀, Musée National d'Histoire, Paris. *Ichneumon afer* Cresson, ♀, Illinois, A.N.S. *Ichneumon scriptifrons* Cresson, ♂, Canada A.N.S. *Ichneumon atterimus* Provancher, not found.

Hosts

According to H. Townes, 1951: *Orgyia leucostigma* (A. & S.), *Orgyia antiqua* (L.) (Liparidae), *Arctia* sp., *Diacrisia virginica* (F.), *Halisidota caryae* (Harr.), *Halisidota tessellaris* (A. & S.) (Arctiidae), *Acronycta oblinita* (A. & S.) (Noctuidae).

The above list reveals that tree-feeding Arctiidae are the most favored hosts of this species; the various other Heterocera recorded as hosts do not show a very close taxonomic relationship but they have in common that their caterpillars are hairy and almost all tree-feeders.

Distribution

Eastern North America in Transition, Upper Austral and Lower Austral Zones. Western limits of distribution still unexplored.

Male

In the overwhelming majority of specimens extensively white marked, particularly, (with rare exceptions) flagellum with white annulus, tibiae III white striped dorsally, postpetiolus white marked apically and face entirely white or white marked on the sides and in the middle.

Female

Not differentiated geographically.

1b. *Cratichneumon unifasciatorius vancouveriensis* (Provancher)

Ichneumon Vancouveriensis Provancher, 1885, Canad. Ent., 17:114, ♂.

Types

Holotype.—♂, Vancouver Island, C.N.C. No. 2376.

Host

One male bred in Victoria, British Columbia, from Arctiidae, probably *Halisidota argentata*, (Pack.) (C.N.C.).

Distribution

British Columbia (Vancouver Island, Victoria, Cultus Lake, Mission City, Agassiz) (C.N.C.).

Male

Considerably less white-marked than *unifasciatorius unifasciatorius*. Flagellum without annulus; clypeus and face entirely black or the latter with two small marks on the upper end of the median field; postpetiolus without white apical band; tibiae III with restricted white pattern, more often entirely black than white-striped; white on pronotal ridge and tegulae usually restricted or absent; length 14-18 mm.

Female

Seems to agree with *unifasciatorius unifasciatorius*.

2. *Cratichneumon pilosulus* (Provancher)

Ichneumon pilosulus Provancher, 1875, Nat. Canad., 7:25, ♀.

Types

Holotype.—♀, Quebec, Provincial Museum Quebec, No. 656.

Neallotype.—♂, Maine, Dryden, 1.VI.1951. C.G.H.

Distribution

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

Female

Black; tibiae dorsally with oblong white mark beyond the base; scutellum black, sometimes narrowly white at the apex; coxae III rather densely punctured without trace of scopa; flagellum rather slender, approximately bristleshaped; femora more slender than in all similar species, about four times as long as medially wide; mesonotum densely punctured; propodeum relatively short with hexagonal, often transverse area superomedia; length 14 mm.

Flagellum.—Slender, somewhat widened beyond the middle, distinctly attenuated toward the apex, with 35-37 segments, the first twice as long as wide, the seventh square, the widest about 1.5 times as wide as long. Black with white annulus on segments 8-16.

Head.—Temple and cheek profiles rather strongly narrowed with nearly straight outlines; malar space somewhat shorter than the width of mandible base; frons and temples strongly and densely punctured. Black; frontal orbits narrowly whitish or reddish.

Thorax.—Mesoscutum densely punctured, little shiny; notaulices anteriorly distinct; scutellum a little raised above the postscutellum, laterally carinated at the base; carination of propodeum strong and complete; area superomedia with sharp anterior carina, hexagonal, as wide as long or more often transverse. Black, apex of scutellum sometimes narrowly white.

Legs.—Rather slender, particularly femora III more slender and elongate than in all similar species, about four times as long as medially wide and densely punctured externally; coxae III without scopa, densely punctured. Black; all tibiae dorsally with oblong white mark beyond base.

Abdomen.—Postpetiolus finely and irregularly rugose or with scattered punctures or both; second tergite very densely and rather finely, the base of the third tergite very finely punctured; gastrocoeli, subobsolete, thyridia distinct. Black.

Male

Black; flagellum with white annulus on segments 14 or 15 to 21 or 22 and with oval tyloides on segments 7-16; cheeks narrow; area superomedia more or less strongly transverse; scutellum distinctly raised above postscutellum, laterally carinated at the base; sternauli on mesosternum distinct; tibiae III with white, longitudinal dorsal mark beyond base, sometimes also tarsi III dorsally white striped; mesoscutum, apical part of cheeks and coxae never white marked; length 15-16 mm.

Median part of the clypeus distinctly concave toward the apical border, the latter very little projecting in the middle; upper part of facial median field rather

strongly prominent, the lateral impressions distinct and wide, diverging toward the antennal base.

The following are white: mandible base, clypeus, face, frontal orbits, whole length of outer orbits confluent with the vertical mark (sometimes interrupted at or below the temples), scape below, pronotal ridge, subalarum, posterior half or two thirds of scutellum, postscutellum, mark of areae posteroexternae, tibiae I and II above and segment 1, or 1 and 2 or 1-3 of tarsi I and II dorsally, apex of femora I and II ventrally, a longitudinal mark of tibiae III dorsally beyond the base, sometimes segment 1 or 1 and 2 of tarsi III dorsally, sometimes a small mark of the carinal triangle.

3. *Cratichneumon sublatus* (Cresson)

Figs. 19, 20.

Ischnus sublatus Cresson, 1864, Ent. Soc. Phila. Proc., 3:186, ♂.

Ichneumon pravus Cresson, 1877, Amer. Ent. Soc., Trans., 6:151, ♀.

Types

Holotypes.—*Ischnus sublatus* Cresson, ♂, Illinois. A.N.S.; *Ichneumon pravus* Cresson, ♀, Canada. A.N.S.

Host

According to H. Townes, 1951: "*Heterocampa guttivitta* (Wlkr.)". This seems to be the typical host of the species. It was confirmed by two further rearings, one in Maine, the other (a series of four specimens) in the U.S.N.M. Also reared in Maine from *Heterocampa biundata* (Wlkr.).

Distribution

According to H. Townes, 1951: "Atlantic to 100° W. in Transition and Upper Austral Zones". New records: Ontario, Quebec (C.N.C.); New Hampshire, Maine (C.G.H.).

Female

In color, flagellar proportions and propodeal features related to nigrarius, but bigger, coxae III without scopa and head and thorax with some white pattern; face distinctly receding; length 9-15 mm.

Flagellum.—Filiform, hardly widened beyond the middle, not attenuated at the apex, with 32-34 segments, the first about 1.3 times as long as wide, the fifth square, the widest hardly wider than long. Black with white annulus on segments 8-14 or 15.

Head.—Temple profile hardly, cheek profile a little, narrowed, the outlines slightly curved; cheeks wide between orbits and carina genalis, moderately inflated; malar space about two thirds the length of mandible base; face and clypeus forming a strongly receding plane. Black; frontal orbits narrowly white; exceptionally (in southern specimens) also white marks on the vertical orbits; clypeus sometimes reddish.

Thorax.—Mesoscutum and scutellum flat and smooth with scattered, fine punctures; no notaulices; horizontal part of propodeum medially longer than the declivity; costulae obsolete; area superomedia usually but not always longer than wide and confluent with area basalis. Black with somewhat varying, restricted white pattern; collare, apex of pronotal ridge and subalarum usually white, rarely the entire pronotal ridge and apex of scutellum white.

Legs.—Very stout; femora III less than three times as long as wide medially; coxae III ventrally smooth and shiny with scattered punctures and no scopa.

Black; all tibiae with oblong white dorsal mark beyond base; basic color of tarsi and tibiae I and II brownish.

Abdomen.—Postpetiolus finely rugose or alutaceous; second tergite distinctly and densely, the third sparsely and very finely punctured; gastrocoeli and thyridia subobsolete. Black.

Male

Black; with rich white pattern; flagellum (except rare mutants) without annulus, with narrow bacilliform tyloides on segments 5 or 6 to 17 or 18; mesoscutum with white median mark; tibiae III with narrow white annulus at the base connected with a white stripe of varying extent on the outer side of the tibiae; metatarsus III narrowly white at base; clypeus without concavity, median field of face prominent; length 14-17 mm.

The following are white: mandibles except teeth, clypeus, face, frontal orbits, outer orbits (upward to the temple region, gradually widening downward and covering a great part of the cheeks including their apex and the malar space), scape below, collare, pronotal ridge, apex of pronotal base, tegulae, median mark on mesoscutum, scutellum except base, postscutellum, marks on propodeum (covering the areae posteroexternae and the narrow apex of areae dentiparae), coxae I and II except base, sometimes apical mark on the ventral side of coxae III, all trochanters I and II, trochantelli III, femora and tibiae I and II laterally, tarsi I and II (except apex of last segment), basal annulus on tibiae III connected with a stripe of varying extent on their outer side (usually covering about two thirds of the length of the tibia), narrow base of metatarsus III, rarely bases of all segments of tarsi III.

Variability

The following table shows the degree of variability in the distribution of white color pattern of a series of 18 females all from the same locality (and date) near Dryden, Maine.

TABLE II
Distribution of white in 18 females of *Cratichneumon sublatus* (Cresson)
from Ontario

18	annulus of flagellum on segments 8-14 or 15
17	frontal orbits distinctly
1	frontal orbits indistinctly
17	collare more or less extensively
1	collare indistinctly
2	pronotal ridge entirely
15	apex of pronotal ridge
1	pronotal ridge entirely black
-	apex of scutellum
18	scutellum entirely black
16	subalarum more or less extensively
2	subalarum entirely black

4. *Cratichneumon proximus* (Cresson)

Ischnus proximus Cresson, 1864, Ent. Soc. Phila. Proc., 3:187, ♂.

Ichneumon sagus Cresson, 1867, Amer. Ent. Soc., Trans., 1:194, ♀.

Types

Holotypes.—*Ischnus proximus* Cresson, ♂, Pennsylvania, A.N.S.; *Ichneumon sagus* Cresson, ♀, Illinois. A.N.S.

Distribution

According to H. Townes, 1951: "Atlantic to Illinois in Transition and Upper Austral Zones".

Female

Black; scutellum white except base; tibiae with oblong white mark dorsally beyond base; frontal and vertical orbits obscure red, orbits of temples white. Especially distinguished from all similar species by the very large scopa of coxae III and the presence of a small scopa also on coxae II; cheeks inflated; flagellum relatively long and fairly slender, little widened and apically little attenuated; length 13-14 mm.

Flagellum.—Of medium length, fairly slender, slightly widened beyond the middle and a little attenuated toward the apex, with 36 segments, the first nearly twice as long as wide, the ninth square, the widest about 1.5 times as wide as long. Black, segments 8-16 with white annulus.

Head.—Temple profile slightly rounded, hardly narrowed; cheek profile little narrowed with distinctly curved outline; cheeks wide between orbits and carina genalis, distinctly inflated, shiny with few, scattered, shallow punctures; malar space considerably shorter than the width of mandible base. Black; frontal and vertical orbits narrowly obscure red, orbits of temples white.

Thorax.—Mesoscutum shiny, rather sparsely punctured; carination of propodeum complete, except that the areae superomedia and basalis are confluent; sternauli on the mesosternum weak. Black; collare, scutellum (except base), and postscutellum white.

Legs.—Stout; femora III little more than three times as long as medially wide; coxae III with very large scopa, covering almost the whole length of their inner side, the rest of their ventral surface densely punctured; coxae II with small scopa at the apex. Black; all tibiae with oblong white dorsal mark beyond base.

Abdomen.—Postpetiolus finely sculptured, almost smooth, with very few scattered punctures near the apex; second tergite finely and fairly densely punctured except the apical third; rest of tergites without punctation; gastrocoeli subobsolete, thyridia distinct. Black.

Male

Black; flagellum with white annulus on segments 15 or 17 to 21 or 22 and with small, narrow, lanceolate, tyloides on segments 7-18 or 20; cheeks wide, distinctly inflated; area superomedia rarely a little transverse, usually confluent with the area basalis; scutellum distinctly raised above postscutellum; sternauli on mesosternum subobsolete; tibiae III with longitudinal white dorsal stripe beyond the base, sometimes also tarsi III dorsally white striped; mesoscutum sometimes with white median mark; coxae III with large white dorsal mark, coxae I and II mainly white; length 16-17 mm.

Clypeus normal, not concave and without median deepening, the anterior border very little projecting in the middle; median field of face distinctly but not strongly raised, with distinct but narrow bordering impressions laterally and at the apex.

The following are white: mandible base, clypeus, face, frontal orbits (considerably widened below the lower ocellus), outer orbits including the temple region, widened below over a great part of the cheeks (but not covering the apex of the cheeks, their hind part and the malar space), scape below, collare, pronotal ridge, subalarum, tegulae, scutellum, postscutellum, often median mark

on mesoscutum, areae posteroexternae, coxae I and II and trochanters I and II ventrally, large dorsal mark of coxae III, apex of femora I and II ventrally, tibiae I and II dorsally, dorsal stripe of tibiae III (not extending to the apex), basal segments of tarsi I and II and sometimes also of tarsi III dorsally.

5. *Cratichneumon promptus* (Cresson)

Ichneumon promptus Cresson, 1877, Amer. Ent. Soc. Trans., 6:152, ♀ ♂.

Types

Holotype.—♀, New Hampshire, A.N.S.

Host

According to H. Townes, 1951: "*Protoboarmia porcelaria* (Grote)". Host confirmed by a rearing in Manitoba (C.N.C.).

Distribution

According to H. Townes, 1951: "Atlantic to Continental Divide in Canadian Zone".

Female

Black; tibiae III with full white annulus; scutellum white; scopa distinct but not large; flagellum short and stout, widened beyond the middle, moderately attenuated at the apex; femora short and stout; cheeks slightly inflated; area supero-media hexagonal, about as wide as long; length 12 mm.

Flagellum.—Short, stout, distinctly widened beyond the middle and attenuated toward the apex, with 35 segments, the first less than 1.5 times as long as wide, the fourth square, the widest fully twice as wide as long. Black with white annulus on segments 7-14.

Head.—Temple and cheek profiles a little narrowed, with slightly curved outlines; cheeks rather wide between outer orbits and carina genalis, slightly inflated, shiny with few punctures; malar space somewhat shorter than the width of mandible base; carina genalis and carina oralis meeting at hind corner of mandible base. Black without white pattern; frontal orbits and vertical orbits obscurely red.

Thorax.—Median lobe of mesoscutum fairly densely, lateral lobes very sparsely punctured; carination of propodeum complete; area supero-media hexagonal, about as wide as long, narrowed anteriorly and clearly separated from the area basalis. Black, scutellum white; tegulae brownish.

Legs.—Stout; femora about three times as long as medially wide; coxae III ventrally smooth and scarcely punctured, with distinct scopa. Black; tibiae III or II and III with full white annulus, tibiae I with dorsal white mark beyond base.

Abdomen.—Postpetiolus with fairly distinct median field, finely coriaceous and more or less densely punctured; second and third tergites with very fine alutaceous basic sculpture, the second tergite finely and densely punctured except at apex, the third with some scattered, extremely fine punctures on the basal part; gastrocoeli subobsolete thyridia distinct. Black.

Male

Black; flagellum with white annulus on segments 15-20 and with small, short-oval tyloides on segments 6-14; scutellum strongly raised above postscutellum; tibiae III usually with broad, white annulus, sometimes with semi-annulus; all coxae and trochanters black; mesoscutum without median mark; length 13 mm.

Median field of face rather strongly prominent, the lateral longitudinal impressions distinct; anterior border of clypeus with very small median projection.

The following are white: usually mark on mandible base, clypeus, face, orbits around eye (interrupted at the level of lower ocellus and at the malar space), scape below, collare, pronotal ridge, subalarum, scutellum, annulus or semiannulus on tibiae III, tibiae I and II in the greater part, sometimes marks on propodeum below the apex of the areae dentiparae, rarely lateral apical marks on postpetiolus.

6. *Cratichneumon tyloidifer*, new species

Types

Holotype.—♂, Michigan, Ann Arbor, 6.VI.1959. C.G.H.

Paratypes.—2 ♂♂, New York, Bemus Pt., 15.VIII.1937 and 2 ♂♂, North Carolina, Crabtree Meadow. C.H.T.; 1 ♂, Ontario, Jordan. C.N.C.; 1 ♂, Maryland, Bowie. U.S.N.M.; 1 ♂, Maine, Mt. Blue. C.G.H.

Distribution

Ontario, Michigan, New York, Pennsylvania (C.H.T.), Maryland, North Carolina, Maine.

Male

Only known male of black color with extraordinarily enlarged tyloides, shaped as in variegatus; features of face and clypeus also similar to this species; black, flagellar annulus, scutellum dorsal stripe on tibiae III, dorsal mark on coxae III and apical lateral marks on postpetiolus white; length 15-17 mm.

Flagellum.—With white annulus on segments 14 or 15 to 21 or 22 with tyloides on segments 6-16 which are on the eighth to fourteenth segments widened and enlarged, covering the whole length of these segments.

Head.—Clypeus medially rather strongly concave, its apical border medially a little prominent; median field of face prominent, also the facial orbits in their lower part; the lateral longitudinal impressions pronounced, diverging above toward the antennal base; eyes bulging; cheeks narrowed, not inflated; carina oralis distinctly raised; malar space one-third as long as width of mandible base. Black; the following white: mandible base, clypeus, face, scape below, orbits around eyes (narrowly interrupted at vertex and malar space).

Thorax.—Notauli in the anterior part and sternauli on the mesosternum distinct; mesolcus crenulated; scutellum strongly elevated above postscutellum, with steep apical slope; carination of propodeum complete; area superomedia usually distinctly transverse. Black; the following white: collare, pronotal ridge, subalarum, tegulae entirely or in part, scutellum, postscutellum, marks of the propodeum covering the apex of areae dentiparae and part of areae posteroexternae (in rare cases extending over parts of the areae superomedia, postero-media and spiraculiferae, forming a W-pattern), sometimes a mark on carinal triangle, rarely median marks on mesoscutum.

Legs.—Femora III slender. Black; the following white: apices of femora I and II ventrally (rest of ventral side of femora I brownish), dorsal side of tibiae I and II and of the basal segments of tarsi I and II, a dorsal stripe on tibiae III beyond their base (sometimes extending to the very base of tibia, usually covering two thirds of its length), more or less extended apical marks on coxae I and II, dorsal mark on coxae III, sometimes metatarsus III dorsally.

Abdomen.—Postpetiolus nearly smooth, with white apical lateral marks. Black.

7. *Cratichneumon takomae*, new species

Types

Holotype.—♂, Maryland, Takoma Park, 24.V.1942, H. and M. Townes, C.H.T.

Paratype.—1 ♂, Maryland, Takoma Park, 24.V.1942, H. and M. Townes, C.H.T.

Male

Black; flagellum with annulus; mesoscutum without white median mark; coxae III dorsally white marked; tibiae III with white dorsal stripe from base to beyond the middle (type) or beyond the base (paratype); clypeus medially not concave; median field of face prominent; length 14-15 mm.

Flagellum.—Black with white annulus on segments 16-20 and with longish-oval tyloides on segments 5 or 6 to 15.

Head.—Temple profile narrowed with slightly curved outline; cheeks narrow, not inflated; carina oralis distinctly raised; malar space less than half as long as width of mandible base; clypeus without distinct median concavity, apically somewhat projecting in the middle; median field of face prominent. Black; the following white: mandibles except teeth, clypeus except anterior margin including the median projection, face, orbits around eyes (interrupted at the vertex and broadly at the malar space).

Thorax.—Mesoscutum shiny, fairly densely punctured; scutellum raised above postscutellum, convex; carination of propodeum sharp and complete; area superomedia about as wide as long. Black; the following are white: collare, subalarum, pronotal ridge, sometimes apex of pronotal base, tegulae, scutellum, postscutellum, two marks on the propodeum (covering the areae posteroexternae, apices of areae dentiparae and a small part of the areae spiraculiferae), pronotal triangle.

Legs.—Femora III comparatively slender. Black; the following are white: more or less extensive marks on coxae and sometimes on trochanters I and II, large dorsal mark on coxae III, tibiae and sometimes metatarsi I and II dorsally, femora I and II ventrally at the apex, sometimes metatarsus III dorsally, tibiae III dorsally from the base or from beyond the base to beyond the middle.

Abdomen.—Postpetiolus smooth and shiny; second tergite distinctly and fairly densely, the third finely and densely, punctured; gastrocoeli subobsolete; thyridia distinct. Black; postpetiolus with white apical band or marks; narrow apical border of second and third tergites pale.

Remarks

Distinctly different by characters of the head from *pilosulus*, *proximus*, *promptus* and *sublatus*; more closely related to *arizonensis* Viereck (western) but differing from the latter by the white pattern of tibiae III, the raised carina oralis and the medially more projecting clypeus.

8. *Cratichneumon nigrarius* (Gravenhorst)

Figs. 21, 22.

Distribution

Holarctic; in North America according to H. Townes, 1951: "Atlantic to Continental Divide in Canadian and Transition Zones"; also Hudsonian Zone.

Female

Head, thorax and abdomen black, without white pattern; tibiae with white dorsal mark beyond base; flagellum exactly filiform, neither widened nor attenuated; coxae III densely punctured with small scopa; length 8-12 mm.

Flagellum.—Exactly filiform, not widened beyond the middle, with 26-30 segments, the first about 1.5 times as long as wide, the fifth square. Black with white annulus on segments 6 or 7 to 12 or 13.

Head.—Temple profile scarcely, cheek profile distinctly, narrowed, both with almost straight outline; malar space almost as long as width of mandible base. Black.

Thorax.—Mesoscutum flat, rather densely punctured; scutellum flat; area superomedia somewhat longer than wide and confluent with the area basalis; costulae obsolete. Black.

Legs.—Stout; coxae III densely punctured with small scopa. All tibiae with white dorsal mark beyond base; basic color varying between black and red, usually partially brownish, in the Nearctic Zone deep black.

Abdomen.—Postpetiolus usually very finely longitudinally striate, sometimes smooth; gastrocoeli shallow and very small; second tergite distinctly and rather densely, the third very finely, punctured. Black, in the European subspecies sometimes the intersections of anterior tergites brownish.

Male

Black, facial orbits with or without white stripe; flagellum with narrow tyloides on segments 4 to 13 or 14 and with white annulus on segments 11 or 12 to 16 or 17; inner side of tibiae and femora I and II more or less extensively yellowish or brownish; length 11 to 14 mm.

8a. *Cratichneumon nigrarius nigrarius* (Gravenhorst)

Ichneumon nigrarius Gravenhorst, 1820, Mem. Acad. Sci. Torino, p. 281, ♀, ♂.

Types

Holotype.—In the Zoological Museum of the University of Wroclaw (=Breslau), Poland.

Host

Typical host, the European pine looper, *Bupalus piniarius* Linnaeus. A number of various other hosts have also been recorded, Geometridae as well as Noctuidae (see Schmiedeknecht, *Opuscula Ichneumonologica*, suppl., F. VI, p. 384).

Distribution

Palearctic Zone in Europe and Asia.

Female

Femora I and II, basic color of tibiae III and intersections of the anterior tergites show a distinct tendency to change to lighter color shades of brownish or obscure reddish; the white dorsal mark beyond base of tibiae III occupies about half the length of the tibia.

Male

Black with white annulus of flagellum and white facial orbits, the latter rarely absent.

8b. *Cratichneumon nigrarius acerbus* (Cresson)

Ichneumon acerbus Cresson, 1867, Amer. Ent. Soc. Trans., 1:293, ♂.

Ichneumon corvinus Cresson, 1877, Amer. Ent. Soc. Trans., 6:145, ♀.

Cratichneumon nigrarius acerbus Heinrich, 1953, Journ. Wash. Acad. Sci., 43:149/50, ♀ ♂.

Types

Holotypes.—*Ichneumon acerbus* Cresson, ♂, Illinois, A.N.S. *Ichneumon corvinus* Cresson, ♀, New Hampshire, White Mountains, A.N.S.

Hosts

According to H. Townes, 1951: "*Protoboarmia porcelaria* (Grote)". New record: *Semiothisa sexmaculata* Packard (C.N.C.).

Distribution

According to H. Townes, 1951: "Atlantic to Continental Divide in Canadian and Transition Zones". New records: Hudsonian Zone, Quebec (Great Whale River) and Labrador (C.N.C.).

Female

Basic color of tibiae, femora and abdomen uniformly deep black without tendency to change to lighter shades; white mark on tibiae III usually narrower than in *nigrarius nigrarius*.

Male

Identical with *nigrarius nigrarius* except that the white stripes of facial orbits are more often lacking.

9. *Cratichneumon ashmeadi* (Schulz)

Ichneumon imitator Ashmead, 1902, Wash. Acad. Sci. Proc., 4:151, ♂ (preocc.)

Ichneumon ashmeadi Schulz, 1906, Spolia Hym., p. 128 (new name).

Types

Holotype.—♂, Alaska, Juneau. U.S.N.M.

Neallotype.—♀, Washington, Nahcotta, 26.VIII.1952. U.S.N.M.

Distribution

According to H. Townes, 1951: "Alaska, Washington, Oregon. Transition Zone". New records: New Hampshire (Mt. Washington), Quebec (Mt. Albert). (C.N.C.); Colorado (C.H.T.).

Male

Distinguished by the total lack of white pattern; entirely black, including head and flagellum; legs varying from entirely black to entirely red (including coxae); area superomedia approximately square; mesolcus not crenulated; length 11-14 mm.

Flagellum.—Entirely black; tyloides narrow, lanceolated, not extending to the apices of the segments, on segments 4-13.

Head.—Temple profile slightly narrowed with rounded outline; cheek profile distinctly narrowed with straight outline; malar space as long as width of mandible base; lateral longitudinal impressions of face distinct; clypeus and mandibles normal. Black.

Thorax.—Shiny; mesoscutum rather densely punctured; notauli basally distinct, sternaui subobsolete; mesolcus not crenulate; scutellum slightly elevated above the postscutellum; carination of propodeum strong, the costulae often indistinct in the outer part; area superomedia as wide as long, almost square. Black.

Legs.—Fairly stout. Usually light red including coxae; tarsi III blackish. The few specimens I have seen from Quebec and New Hampshire and also some from Colorado and Washington have mainly black legs.

Abdomen.—Postpetiolus and base of second tergite irregularly or longitudinally rugose; rest of second tergite densely and strongly punctured; gastrocoeli and thyridia distinct. Black.

Female

Black without white pattern; legs including coxae uniformly red; flagellum filiform, short, with white annulus; coxae III with small scopa; length 11 mm.

Flagellum.—Exactly filiform, a little tapering toward the base, with 28 segments, the first not quite 1.5 times as long as wide, the fifth square. Black with white annulus on segments 8-12; scape ventrally red.

Head.—Temple profile and cheek profile a little narrowed with slightly curved outlines; malar space nearly as long as width of mandible base; cheeks wide between eyes and carina genalis; median field of face convex. Black.

Thorax.—Mesoscutum shiny, sparsely punctured; horizontal part of propodeum a little shorter than the declivity; carination complete, costulae and anterior border of area superomedia weak, the area superomedia hexagonal, not quite as wide as long. Black, tegulae red.

Legs.—Stout and short; coxae III with inconspicuous scopa. Uniformly red; tarsi III slightly infuscated.

Abdomen.—Postpetiolus irregularly and finely rugose with distinct median field; second tergite finely and rather densely, the third tergite less densely and more finely punctured; gastrocoeli subobsolete, thyridia distinct. Black; apical borders of anterior tergites narrowly brownish.

10. *Cratichneumon anisotae*, new species

Figs. 3, 4, 7, 37.

Types

Holotype.—♀, Sandfield, Ontario, ex *Anisota rubicunda* (Fabricius). C.N.C. No. 7014.

Allotype.—♂, Manitoulin Island, Ontario, ex *Anisota rubicunda*. C.N.C.

Paratypes.—6 ♀♀, and 1 ♂, Manitoulin Island, Ontario, ex *Anisota rubicunda*; 4 ♀♀, and 3 ♂♂, St. Josef Island, Ontario, ex *Anisota rubicunda*; 1 ♀, Echo Bay, Ontario, ex *Anisota rubicunda*; 1 ♂, Sandfield, Ontario, ex *Anisota rubicunda*; 1 ♂, Lonely Lake, Ontario, ex *Anisota rubicunda*; 1 ♀, Quebec, Hemmingford. C.N.C. 2 ♀♀, Maine, Dryden; 2 ♂♂, Maine, Dryden; 1 ♀, Ontario, Echo Bay, ex *Anisota rubicunda*; 1 ♀, Ontario, St. Josef Island, ex *Anisota rubicunda*; 1 ♂, Michigan, Grosse Ile. C.G.H.

Host

Anisota rubicunda (Fabricius).

Distribution

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

Female

In general appearance, conspicuous size and color pattern similar to variegatus; differing by the considerably wider cheeks (Fig. 7), the subfiliform, very

little widened flagellum, by the absent or indistinct scopa and by the incompleteness of the white, W-shaped pattern of the propodeum; area superomedia and areae spiraculiferae always black; usually tibiae III narrowly blackish at the base; a small yellow mark beyond the base of tibiae III may be present; length 12-15 mm.

Flagellum.—Subfiliform, slightly widened beyond the middle and a little attenuated at the apex, with 36-38 segments, the first about 1.5 times as long as wide, the fifth or sixth square, the widest 1.5 to 2 times as wide as long. Black with white annulus on segments 10-16 or 17, the basal segments usually obscure reddish ventrally and at the apex dorsally, scape red ventrally.

Head.—Temple profile hardly narrowed, slightly curved; eyes not bulging, their outline in vertical view forming together with the outline of the temples a continuous slight curve; cheek profile not narrowed, the outline of the head in front view almost square; cheeks very wide between outer orbits and carina genalis, slightly inflated; median field of face and the lower part of its lateral fields convex and distinctly raised above the clypeus, which is entirely flat, slightly depressed, distinctly prominent in the middle of the apical border and smooth with few scattered punctures; malar space little more than half as long as width of mandible base; mandibles normal, wide and long. Black; the following white: frontal orbits broadly, upper part of facial orbits, a band on orbits of vertex and temples (separated from the frontal orbits); clypeus, outer orbits and cheeks more or less extensively and usually middle of the face reddish.

Thorax.—Mesoscutum smooth, glossy, with few, scattered punctures; scutellum flat; propleura with strong, transverse wrinkles in the lower part, mesopleura very strongly punctured, punctures in the lower part running into irregular transverse striae; metapleura strongly and uniformly rugosely punctate; carination of propodeum strong and complete; area superomedia hexagonal, usually a little longer than wide and distinctly separated from the area basalis, narrowed from the insertion of the costulae (anterior to its middle). Black; the white pattern less extensive than in *variegatus*; the following white: collare, pronotal ridge, subalarum, scutellum, postscutellum, in more than 50 percent of specimens examined a median mark on mesoscutum, carinal triangle and areae posteroexternae more or less extensively; tegulae reddish.

Legs.—Stout, femora thick; coxae III shiny below with scattered punctures; apically on the inner side with fairly dense hairs not forming a distinct scopa; tibiae I and II spinose on the outer side. Fulvous-red, narrow base of tibiae III blackish; in about 50 percent of specimens tibiae II and III with a small yellow mark dorsally beyond the base; coxae II and III usually basally and externally blackish, dorsally marked with yellow; tarsi III or II and III infuscated.

Abdomen.—Postpetiolus almost smooth, usually with very few scattered punctures near apex; second tergite densely and finely punctured except toward apex, alutaceous between punctures, the following tergites without punctation; gastrocoeli almost obsolete, thyridia visible. Reddish-brown, the petiolus blackish; postpetiolus never white marked.

Variability

The following table illustrates the chromatic variability of 16 females from Ontario:

TABLE III
Chromatic variability of 16 females of *Cratichneumon anisotae*, new species, from
Dryden, Maine

9	mesoscutum with distinct median mark	White
4	mesoscutum with indistinct median mark	
3	mesoscutum without mark	
9	areae posteroexternae only	
5	area posteroexternae and upper part of areae posteromedia	
2	white pattern of areae posteroexternae strongly reduced	
5	tibiae III with small mark dorsally beyond base	Red
11	tibiae III without mark	
16	scape below and clypeus more or less extensively	
7	also cheeks more or less extensively	Black
16	tegulae	
16	tibiae III narrowly at base	
14	first segment basally or in part	Black
14	coxae II and III basally or externally	

Male

In its striking size and in color pattern similar to variegatus male but easily distinguishable by the following four characters: 1. tyloides extremely large and wide, even wider than in variegatus; 2. mesolcus strongly crenulated; 3. clypeus not "dish-shaped" i.e. not strongly concave on its whole surface but with a restricted concave median area only; 4. tibiae III narrowly blackish at the base with a yellowish area behind the dark basal band. Head and thorax black with extremely rich white pattern; mesoscutum with large, white median mark; mesosternum usually partially black; legs and abdomen fulvous, anterior tergites usually with more or less extensive infuscation; length 15-18 mm.

Flagellum.—Tyloides extremely large and wide (Fig. 37) on segments 5 or 6 to 15; black dorsally with white annulus on segments 16-22 or 24, fulvous ventrally; scape white below.

Head.—Temple profile rounded, a little inflated, eyes not bulging; clypeus with distinct, restricted median concavity, but not dish-shaped as in *variegatus*, rather strongly and densely punctured; median field of face strongly prominent but not quite so much as in *variegatus*, the lateral longitudinal depressions of the face pronounced but not quite as strongly deepened as in *variegatus*; ridge of lower part of inner orbits less prominent; malar space short. White except the following: broad middle of frons including the deepening of the antennae, ocellar region, occipital region, malar space and apical border of cheeks at mandible base.

The following parts, in addition, are white: collare, pronotal ridge, pronotal base, subalarum, tegulae, large median mark of mesoscutum, scutellum, post-scutellum, prosternum except base, mesosternum to a varying extent (sometimes only in middle and in the region of sternauli, sometimes only in the anterior part, rarely almost entirely), mesopleura (except approximately the upper third), area superomedia, area posteromedia (except lower part), usually area basalis (at least the apical part), areae posteroexternae, areae spiraculiferae, apical upper part of areae metapleurales, carinal triangle, coxae and trochanters I and II, coxae III ventrally and dorsally, trochanters III ventrally in part, first segment laterally and at the apex dorsally.

Abdomen fulvous; basic color of first segment dorsally and ventrally black; usually anterior tergites, sometimes tergites 2-6, with an irregular infuscated patch on each side; rarely tergites 2-7 clear fulvous without any infuscations.

Tibiae III sometimes infuscated toward the apex; tarsi III usually strongly infuscated, sometimes fulvous.

11. *Cratichneumon variegatus* (Provancher)

Figs. 1, 2, 9, 32, 36.

Ischnus variegatus Provancher, 1875, Nat. Canad., 7:250, ♂.

Cratichneumon w-album Townes, 1951, Synoptic Catalog, p. 289, ♂.

Cratichneumon variegatus Heinrich, 1959, Entom. News, 70:190, ♂.

Cratichneumon variegatus Heinrich, 1959, Entom. News, 70:214, ♂.

Types

Holotype.—♂, Quebec, Provincial Museum Quebec, No. 710.

Neallotype.—♀, Maine, Wellington, ex *Acronicta* sp. C.G.H.

Hosts

In Ontario a few males of this species were reared from *Anisota rubicunda* (Fabricius), together with a long series of both sexes of *Cratichneumon anisotae* (C.N.C.); 1 ♀, in Maine from *Acronicta* sp. on beech (C.G.H.); 1 ♀, from *Heterocampa guttivitta* Walk. (U.S.N.M.).

Distribution

According to H. Townes, 1951 (*Cratichneumon w-album*): "Atlantic to 100° W. in Transition and Upper Austral Zones".

Male

Unmistakably distinguished by the considerable size in combination with the following 4 characters: 1. *tibiae and tarsi III uniformly fulvous without any yellow or black pattern*; 2. *clypeus almost smooth, dish-shaped, strongly concave* (Fig. 1); 3. *tyloides unusually wide, although not quite as wide as in anisotae*; 4. *mesolcus shaped like a straight, narrow cut, without crenulation*. Head and thorax black with extremely rich, white pattern; mesoscutum with large, white median mark, mesosternum white; legs and abdomen fulvous, anterior tergites often partially infuscated; length 16-18 mm.

Flagellum.—With unusually widened tyloides on segments 6 or 7 to 16 or 17, the first and last very small. Black dorsally, with white annulus on segments 15 or 16 to 23 or 24, ventrally pale fulvous or yellowish; scape white below.

Head.—Temple profile rounded, distinctly narrowed; eyes strongly bulging; frons concave; clypeus strongly concave as a whole, dish-shaped, the anterior border medially a little prominent; median field of face very prominent, sloping down on both sides into a deep, longitudinal depression of the lateral field, which again rises on the outer side toward the orbits, forming an elevated orbital ridge; malar space short. White except broad middle of frons (including the deepening above the antennae), ocellar region and occipital region.

The following additional parts white: collare, pronotal ridge, pronotal base, subalarum, tegulae, large median mark on mesoscutum, scutellum, postscutellum, prosternum except base, mesosternum entirely, mesopleura except approximately the upper third, area superomedia (often without the narrow, anterior part), upper part of area posteromedia, areae posteroexternae, areae spiraculiferae, apical upper part of areae metapleurales, carinal triangle, coxae and trochanters I and II, coxae III ventrally (dorsally in the basal part and partially on the inner side), first segment laterally and dorsally at the apex.

Legs and abdomen fulvous, usually with infuscations of varying extent on the latter; basic color of first segment dorsally and ventrally black; infuscations

of the following tergites may extend over the greater part of tergites 2 to 3 or 4, or may be entirely lacking; in the majority of specimens tergites 2-3 or 4, sometimes tergites 2-6 more or less infuscated, the dark coloration forming irregular crossbands or separated lateral patches; tibiae III exceptionally with a very narrow, indistinct basal infuscation.

Female

Head and thorax black with rich white pattern; mesoscutum with white median mark; propodeum with pronounced white W-shaped pattern; abdomen and legs fulvous, femora and tibiae without dark or yellow marks; flagellum lanceolate, strongly widened and ventrally flattened, distinctly attenuated toward the apex; distinct scopa; mesoscutum smooth and glossy with few scattered punctures; carination strong and complete; length 14-15 mm.

Flagellum.—Stout, close to bristleshaped, strongly widened beyond the middle, distinctly attenuated at the apex, with 37-39 segments, the first about 1.5 times as long as wide, the fifth square, the widest almost three times as wide as long. Black with white annulus on segments 8-16 or 18, scape reddish.

Head.—Temple profile rounded, a little narrowed; cheeks very wide between outer orbits and carina genalis, cheek profile in front view, however, slightly narrowed with nearly straight outline; malar space little more than half as long as the width of mandible base; median field of face and the lower parts of its lateral fields rather strongly convex and raised above the level of the clypeus, the latter slightly depressed and entirely flat and smooth with a few scattered punctures; mandibles normal, robust. Black; the following white: upper part of frontal orbits broadly, upper part of facial orbits and of the facial median field, large mark on vertical orbits, base of mandibles more or less extensively, clypeus laterally more or less distinctly (the whitish color gradually turning into fulvous towards the middle of clypeus), sometimes a mark of varying size on lower part of outer orbits (occasionally extending over a great part of the cheeks).

Thorax.—Mesoscutum smooth and glossy with very few scattered punctures; scutellum flat, hardly raised above the postscutellum; propleura with strong, transverse wrinkles in the lower part; mesopleura very strongly punctured, the punctures partially running into irregular, transverse striae; metapleura uniformly and strongly rugosely punctate; carination of propodeum strong and complete; costulae strong, inserted anterior to the middle of the area superomedia, the latter hexagonal, usually a little longer than wide and narrowed from the costulae toward the area basalis, usually with a distinct anterior carina; posterior half of the horizontal part of the propodeum grossly reticulate-punctate, the anterior part strongly and more sparsely punctured. Black; the following are white: collare, pronotal ridge, apex of pronotal base, subalarum, tegulae, median mark on mesoscutum, apex of prosternum, crossband on lower half of mesopleura (often interrupted in the middle, sometimes reduced to a small or even indistinct mark), a W-shaped pattern on the propodeum (including area superomedia, upper part of area posteromedia, areae posteroexterna, areae spiraculiferae (except a median interruption) and a mark on apex of areae metapleurales adjacent to areae spiraculiferae) and the carinal triangle.

Legs.—Stout; femora III about three times longer than wide in the middle; coxae III with rather strong, fulvous scopa. Fulvous; femora, tibiae and tarsi without dark or white pattern; coxae I and II white marked, coxae III extensively white dorsally, marked with black dorsally at the apex and sometimes also on the outer side.

Abdomen.—Postpetiolus almost smooth, usually with some very fine rugose sculpture and with very few scattered punctures near apex; second tergite densely and finely punctured (except toward apex), alutaceous between punctures; gastrocoeli almost obsolete, thyridia rather distinct; the following tergites without punctation. Fulvous; postpetiolus with a whitish medio-apical band; petiolus usually infuscated.

Variability

Females from southern localities (Virginia, Carolina) are more extensively white colored on head and thorax, than northern specimens: face and clypeus almost entirely white and the crossband of mesopleura widened.

Remarks

There is no doubt about the conspecificity of the holotype of *I. variegatus* Prov. and the lectotype of *Ichneumon w-album* Cresson in the A.N.S. I have, however, explained (*loc. cit.*) that the latter type certainly represents another species from that originally described by Cresson under this name.

12. *Cratichneumon ferrugops*, new species

Types

Holotype.—♀, Quebec, Norway Bay, 2.VII.1940, E. G. Lester, C.N.C. No. 7061.

Paratypes.—1 ♀, Michigan, Cheboygan Co., R. R. Dreisbach, C.H.T.; 1 ♀, Ontario, Constance Bay, 18.VII.1935, G. S. Walley, C.G.H.

Distribution

Quebec, Ontario, Michigan.

Female

A handsome species with red head, mesoscutum, abdomen and legs; no white median mark on mesoscutum; scutellum yellow; tibiae without dark pattern but with a small yellow mark dorsally beyond base; flagellum lanceolate, strongly widened and ventrally flattened; coxae III sparsely punctured ventrally with scopa; length 14 mm.

Flagellum.—Stout, nearly bristleshaped, strongly widened beyond the middle, distinctly attenuated at the apex, with 37-38 segments, the first about 1.3 times as long as wide, the fifth square, the widest about 2.5 times as wide as long. Black with white annulus on segment 8-15 or 16; scape ventrally ferruginous.

Head.—Shaped as in *variegatus*. Ferruginous; depression above antennal base, ocellar region and occipital region black; in the specimen from Michigan temple orbits narrowly yellowish.

Thorax.—Mesoscutum smooth with rather densely set coarse punctures; sculpture of pleura and propodeum and carination of the latter as in *variegatus*. Black; mesoscutum and tegulae ferruginous; collare, scutellum and postscutellum yellow; pronotal ridge and subalarum ferruginous or yellowish; propodeum with more or less incomplete ferruginous W-pattern, the areae posteroexternae sometimes yellowish tinted; carinal triangle ferruginous or yellowish.

Legs.—Stout, coxae III ventrally smooth and shiny with scattered punctures and distinct scopa. Uniformly red including coxae and trochanters, without dark pattern; all tibiae with small yellow mark dorsally beyond base; in the specimen from Michigan coxae and trochanters dorsally yellow marked.

Abdomen.—Postpetiolus almost smooth, sometimes with few scattered punctures; second tergite finely punctured except toward apex, alutaceous between punctures; gastrocoeli subobsolete. Uniformly red.

Remarks

In morphology, particularly in flagellar proportions, and in sculpture very close to *variegatus*, but nevertheless probably a distinct species, differing strikingly in color pattern and also by the stronger and denser puncturation of the mesoscutum.

13. *Cratichneumon acronictae*, new species

Fig. 35.

Types

Holotype.—♀, Quebec, Parke Reserve, 22.VII.1936, ex *Acronicta* sp., A. R. Gobeil, C.N.C. No. 7073.

Allotype.—♂, Maine, Dryden, 5.VII.1959. C.G.H.

Paratypes.—1 ♂, Quebec, Knowlton, 2.VII.1936, G. S. Walley. C.N.C.; 1 ♀, North Carolina, Mt. Mitchell, 2.VIII.1950, H. M. and D. Townes. C.H.T.; 1 ♂, Maine, Kellyland, 23.VII. C.G.H.

Host

Acronicta sp.

Distribution

Quebec, Maine, New York, North Carolina.

Female

Head and thorax black with rich white pattern; mesoscutum with white median mark, propodeum with more or less incomplete W-pattern; abdomen pale red; all tibiae with large, white, dorsal mark; usually femora III dark; in size and appearance similar to variegatus, in flagellar proportions intermediate between variegatus and subfilatus, but closer to the former, the flagellum being distinctly more widened and somewhat more attenuated than in the latter. Differing in color from both species by a long, whitish, dorsal mark beyond the base of tibiae III, which is about half as long as the tibia; coxae III with distinct scopa; carina oralis not slightly raised as in subfilatus; length 14 mm.

Flagellum.—Subfiliform, rather strongly widened beyond the middle and fairly distinctly attenuated toward the apex, with 35-37 segments, the first 1.5 times as long as wide, the sixth square, the widest more than twice as wide as long. Black with white annulus on segments 7 or 8 to 16 or 18; scape ventrally and basal segments apically obscurely reddish.

Head.—Temple profile slightly, cheek profile rather distinctly, narrowed; malar space a little shorter than width of mandible base; carina oralis not raised. Black; the following white: frontal orbits broadly, confluent with the vertical and temple orbits, upper part of facial orbits, a mark on median field of face, sides of clypeus indistinctly, indistinct stripe on outer orbits and mandible base. Middle of clypeus reddish.

Thorax.—Mesoscutum shiny, medially much more densely punctured than in *variegatus* and *subfilatus*; sculpture of pleura as in the latter species; carination of propodeum strong and complete, the area superomedia hexagonal, about as wide as long and usually clearly separated from the area basalis. Black; the following white: collare, pronotal ridge, mark on apex of pronotal base, subalarum, scutellum, postscutellum, large median mark on mesoscutum, areae posteroex-

ternae, apex of area superomedia narrowly, extreme apex of areae spiraculiferae and carinal triangle. Tegulae reddish.

Legs.—Femora somewhat stouter and wider than in *subfilatus*; coxae III shiny, rather sparsely punctured, with distinct, medium sized scopa. All tibiae with large, whitish semi-annulus, dorsally blackish or brownish at base and apex; femora and coxae I and II of blackish basic color; all tarsi pale yellowish; all coxae and trochanters extensively marked with yellow dorsally. In the paratype from North Carolina basic color of femora and tibiae ferruginous as are coxae I and II ventrally.

Abdomen.—Postpetiolus with a few scattered punctures, second tergite rather densely and finely punctured; gastrocoeli subobsolete. Uniformly pale red; in the specimen from North Carolina petiolus infuscated.

Male

Closely related to and agreeing with variegatus male in the concave clypeus, pronounced longitudinal impressions on each side of the facial median field and the bulging eyes, well distinguished however by not extremely, but just moderately widened, oval, tyloides on segments 6-16 and by the large yellow annulus of tibiae III, which are basally and apically infuscated on the dorsal side; head and thorax black with extremely rich, white pattern; mesoscutum with large, white median mark, mesosternum almost entirely white; femora III in all three known specimens internally blackish; externally red; length 16-17 mm.

Features of the head almost as in *variegatus*; tyloides considerably smaller than in *variegatus* and *anisotae*, but distinctly wider than in almost all of the other species, oval shaped, the longest ones not covering the whole length of the antennal segments; mesolcus distinctly, though not strongly crenulated; femora considerably thicker than in *variegatus*.

The following white: head (except broad middle of frons including deepening above antennal base, ocellar region, occipital region and stripe on malar space), scape below, antennal annulus, collare, pronotal ridge, pronotal base, median mark of mesoscutum, subalarum, tegulae, scutellum, postscutellum, prosternum (except base), mesosternum (except narrow apical border), lower half of mesopleura (except mark in front of coxae III), carinal triangle, extensive W-pattern of propodeum (including areae posteroexternae and spiraculiferae, upper part of area posteromedia and apical part of area superomedia), coxae and trochanters I and II, coxae III extensively (ventral side entirely, dorsal side on the basal part and partially the inner side), trochanters III ventrally, apex of first segment apically somewhat indistinctly.

Abdomen pale red without infuscations, only the first segment of black, basic color, the postpetiolus reddish laterally, yellowish apically. Femora, especially femora III or II and III blackish on the inner side; tibiae III dorsally at base and apex infuscated with yellowish annulus between; tibiae I and II yellowish above; all tarsi pale.

14. *Cratichneumon w-album* (Cresson)

Figs. 6, 33, 42.

Preamble

Cresson described this species twice: originally in 1864 and for the second time in 1877. Both descriptions differ in deciding characters of specific value, in other words, referring to different species. The specimen in the A.N.S., designated as type of *Ischnus w-album* Cresson, matches the redescription of this

species (Cresson, 1877, Amer. Ent. Soc., 6:179/80) but represents with certainty a different species from that originally described in 1864. I therefore consider the true type of *Ischnus w-album* lost (see Heinrich, 1959, Entom. News 70: 190). Depending, in these circumstances, upon the original description alone for the interpretation of this species, I stated that the latter matches well, in every regard, southern specimens of the male considered to be associated with the later described *Ichneumon signatipes* Cresson female, one of the commoner and rather well-known species of eastern North America. I therefore have synonymised *signatipes* with *w-album*.

Distribution

According to H. Townes, 1951: "Atlantic to 100° West in Transition and Upper Austral Zones". New records (for ssp. *lobatus* Provancher) Ontario, Quebec, Maine.

Male. Extract from the original description (using my terminology)

Black, abdomen pale fulvous; mesoscutum with quadrate yellowish-white median mark; mesopleura beneath with large mark of the same color; propodeum with more or less distinct W-pattern; postpetiolus black, white at tip and sides; coxae whitish except a large black spot on the outside of coxae III; tibiae III whitish beyond base, their base and apical half blackish exteriorly; antennae black above, pale brown beneath; thorax shiny, feebly punctured; area superomedia small and transverse; length (6 lines) 13 mm.

New diagnosis of the only eastern species matching the above original description: *black, abdomen fulvous; tibiae III with at least dorsally clearly defined, conspicuous, white annulus between the narrow basal, and wide apical, black sections; femora III varying individually and geographically between entirely red and entirely black, the black becoming prevalent toward the northern part of the range (ssp. lobatus); mesoscutum with or without white median mark; white mark on mesopleura more or less expanded in southern populations, sometimes covering even the mesosternum, usually lacking in the northern subspecies; anterior coxae varying from white to black, but never red; clypeus very slightly depressed medially toward the apex; lateral lobes of mesoscutum shiny with scattered punctures; tyloides on flagellar segments 5 or 6 to 14 or 15, narrow, long-oval, the longest reaching almost to the base but not quite to the apex of the segments; length 12-15 mm.*

Flagellum.—Dorsally black, pale brownish ventrally, with white annulus on segments 14 or 15 to 21 or 22.

Head.—Temple profile slightly narrowed, the outline a little curved; malar space hardly more than one-fourth as long as the mandible base; clypeus very little depressed medially toward the apex; median field of face distinctly prominent, the lateral longitudinal impressions distinct but not pronounced; carina oralis a little raised toward the apex. The following yellow: mandibles except teeth, clypeus, face, orbits broadly around eyes, interrupted only narrowly at the vertex and malar space (in northern populations often also in the middle of the outer orbits).

Thorax.—Mesoscutum shiny, the lateral lobes sparsely punctured (the median lobe more densely); notauli anteriorly distinct; scutellum rather strongly raised above postscutellum, with rounded apical slope; areolation of propodeum complete, the area superomedia transverse. The following white: collare, pronotal ridge, apex of pronotal base, subalarum, tegulae, sometimes median mark on mesoscutum, scutellum, postscutellum, sometimes mark on anterior lower part

of mesopleura (mark may extend toward sternauli or be entirely lacking), carinal triangle and W-pattern of propodeum (more or less expanded, in northern specimens usually reduced to separated marks or lacking).

Legs.—Coxae I and II varying from entirely white (in some southern specimens) to mainly black (in some northern specimens), coxae III from white with black base and outside, to entirely black; trochanters I and II varying from white or dorsally black to entirely black, femora I and II from fulvous to brown with infuscated dorsal sides, femora III from entirely red to entirely black, tarsi III from pale to brownish; tibiae III with clearly defined white annulus or semi-annulus between the narrow black basal and wide black apical section.

Abdomen.—Fulvous red, the first segment black, usually white-marked at apex; postpetiolus smooth and shiny.

Remarks

The species *w-album* Cresson is part of a complex of at least four, hitherto confused, species which are rather well distinguished in the female sex. The corresponding males, however, are almost identical in morphology and, on the other hand, extraordinarily variable in color, individually as well as geographically. Therefore I have not yet been able to achieve their separation in a fully satisfactory way which would render possible the identification of every chromatic mutant. Also the association of sexes needs confirmation. The male of *w-album* as described above is very closely related and similar to the new species *subfilatus*, *puncticoxa* and *piceipes*. The differences are given in the key and will be further explained under the discussions of these species.

Female (signatipes Cresson)

Head and thorax black with obscure red and in southern species with some white pattern; mesoscutum without white median mark; flagellum stout, filiform, with 32, exceptionally 33, segments, the sixth or seventh square; coxae in the ventral apical part smooth and shiny with scattered punctures and distinct scopa; cheeks wide between eyes and carina genalis and somewhat inflated; legs including coxae varying between red and black; tibiae III always infuscated or black (dorsally or all around) with conspicuous, clear white mark beyond base; length 11-13 mm.

Flagellum.—Filiform, with 32, rarely 33 segments, the first 1.5 times as long as wide, the sixth or seventh square, the widest 1.5 times as wide as long. Black with white annulus on segments 8 or 9 to 15 or 16, scape red.

Head.—Temple profile scarcely, cheek profile a little, narrowed, with slightly curved outlines; cheeks wide between eyes and carina genalis, slightly inflated; malar space distinctly shorter than width of mandible base; carina oralis scarcely raised. Black; the following obscurely red: clypeus, median field of face, frontal and vertical orbits, the red color sometimes occupying the whole face and orbits; in southern specimens temples sometimes with a white mark; exceptionally (North Carolina) frontal orbits also whitish.

Thorax.—Mesoscutum smooth and shiny with scattered punctures; carination of propodeum complete, area superomedia hexagonal, often a little transverse, narrowed anteriorly and usually confluent with the area basalis. Black; mesoscutum usually obscurely reddish in the middle; scutellum white, postscutellum white or reddish; collare varying from white to reddish or black; tegulae and subalarum white or reddish; pronotal ridge white in southern specimens, varying to red or black toward the North; propodeum with yellowish or reddish mark below the areae dentiparae or entirely black.

Legs.—Femora very stout, not much more than three times as long as medially wide; coxae III ventrally smooth with scattered punctures; scopa distinct. Red, including coxae but varying to entirely black in northern populations; tibiae III with clearly defined white mark or annulus beyond base, the base and apical third blackish-brown or black; tarsi III usually more or less infuscated.

Abdomen.—Postpetiolus very finely rugose, usually with some punctures on the median field; second tergite finely and not densely punctured in the anterior part, the apical part and the following tergites impunctate; gastrocoeli subobsolete. Red, petiolus black.

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

Ischnus w-album Cresson, 1864, Ent. Soc. Phila. Proc., 3:191, ♂.

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

Ichneumon oryxicornis Viereck, 1905, Kansas Acad. Sci. Trans., 19:324, ♂.

Amblyteles duplicatiformis Viereck, 1917, Conn. State Geol. and Nat. Hist. Survey Bull., 22:354, 360, ♂.

Types

Holotypes.—*Ischnus w-album* Cresson, ♂, Pennsylvania, lost. *Ichneumon signatipes* Cresson, ♀, Pennsylvania, A.N.S. *Ichneumon oryxicornis* Viereck, ♂, Kansas, Kansas University, Lawrence. *Amblyteles duplicatiformis* Viereck, ♂, Connecticut, A.N.S.

Hosts

Several hosts have been reported (see H. Townes, 1951, p. 289). As *signatipes* Cresson was a complex of several different species not separated until now, the former host records given under this name are not reliable and are therefore omitted here.

Distribution

Upper Austral Zone north to southern New England and Michigan.

Female

Legs including coxae (except tibiae and tarsi III) mainly red; pronotal ridge white; frontal orbits and propodeum below areae dentiparae sometimes marked with white.

Male

Femora III entirely or mainly red; mesopleura and exterior part of mesosternum often white marked; coxae I and II mainly white; propodeum with more or less extensive white W-pattern.

14b. *Cratichneumon w-album lobatus* (Provancher)

Fig. 42.

Ichneumon lobatus Provancher, 1875, Nat. Canad., 7:23, 77, ♂.

Types

Holotype.—♂, Quebec, Provincial Museum Quebec, No. 646.

Distribution

Quebec, Ontario, Northern Michigan, New England.

Female

Femora III black; pronotal ridge, collare and subalarum black or reddish; coxae III black or blackish.

Male

White pattern of coxae reduced, usually coxae I and II black, apically white, coxae III entirely black; mesopleura not white marked, mesoscutum sometimes; white pattern of propodeum reduced; femora III black; tarsi III usually more or less infuscated.

15. *Cratichneumon piceipes*, new species

Fig. 34.

Types

Holotype.—♀, Maine, Mt. Blue, 9.IX.1956, C.G.H.

Allotype.—♂, Maine, Mt. Blue, 2.IX.1956, C.G.H.

Paratypes.—6 ♂♂, Maine, Mt. Blue, 2–9.IX.1956, 1 ♂, Maine, Dryden, 15.VI.1959, 2 ♀♀, Maine, Dryden, 14.IX.1951 and 1.VIII.1951, 1 ♀, Quebec, Gatineau, 19.VI.1959, all in C.G.H.

Distribution

Maine, Quebec.

Preamble

No other form has caused me so much doubt, checking, and rechecking. Does it represent a genetic mutant of *w-album*, or a sibling species? I am still not entirely sure, but I am inclined to assume a sibling species, recommending the problem for further observation and investigation.

My association of the two sexes is not based on the corresponding color of hind legs alone, but also confirmed by collecting a series of males and one female simultaneously in a restricted locality in the Mt. Blue State Park. Most important reason for the assumption of specific status is the fact that in the male the chromatic character of hind legs differing from *w-album lobatus*, seems always to correspond with a certain difference in the shape of tyloides. It still has to be investigated whether the shape of tyloides represents a dependable specific character.

Female

In morphology and sculpture almost identical to w-album lobatus, except in direct comparison tarsi III apparently a little more slender and the cheek profile appearing slightly more narrowed; chromatically different by the pitch-black color of tibiae and tarsi III and the reduction of the white annulus of tibiae III to a short mark dorso-laterally beyond base; femora III pitch black in the type, basally dark red in two of the paratypes; in the type scutellum and collare white, no other white or red pattern on head and thorax; length 11-12 mm.

Flagellum.—Filiform, with 33 segments, the proportions as in *w-album*. Black with white annulus on segments 8-14.

Head.—As in *w-album* except the slightly narrower cheek profile. Entirely black in the type, with obscure reddish frontal, vertical and temple orbits or only frontal orbits in the paratypes.

Thorax.—As in *w-album*. Scutellum white; collare white or reddish.

Legs.—Black, except the white mark on all tibiae behind the base.

Abdomen.—Red, petiolus black.

Male

General appearance and white color pattern as in w-album lobatus; differing in the pitch-black basic color of tibiae and tarsi III and in having the white an-

nulus of tibiae III reduced to a short mark externally beyond the base; tyloides restricted to eight segments of flagellum (usually on segments 7-14), short-oval, the longest covering about the median half of the segment; femora III sometimes dark red basally; length 13-14 mm.

16. *Cratichneumon subfilatus*, new species

Types

Holotype.—♀, Quebec, Wakefield, 7.IX.1959. C.G.H.

Allotype.—♂, Michigan, Grosse Isle, 30.V.1959. C.G.H.

Paratypes.—1 ♀, Michigan, Ann Arbor, 22.V.1959; 1 ♀, New York, Ithaca, 10.VIII.1947; 1 ♀, Michigan, Ann Arbor, 12.IX.1957; V. K. Gupta; C.G.H. 2 ♀♀, New Jersey, Moorestown, July and August, 1939. C.H.T. 1 ♀, New York, Ithaca, 6.VIII.1947; 1 ♀, Quebec, Aylmer, 11.VIII.1926. C.N.C.

Distribution

Eastern North America from Quebec south to North Carolina, west to Michigan.

Female

One of the similarly colored species of the w-album group; in antennal structure strongly differentiated from *variegatus* and closely related to *anisotae*, but differing from both by the distinctly narrowed cheek profile and by smaller size (intermediate between *anisotae* and w-album, but closer to the latter); most similar to w-album, distinguishable mainly by the longer, a little more attenuated ("subfiliform") flagellum and chromatically by a large yellow median mark on the mesoscutum (usually surrounded by obscure reddish), a smaller, less distinct yellow mark of tibiae III and the broadly yellow marked orbits of frons and temples; coxae III with distinct scopa, sparsely punctured; length 11-14 mm.

Flagellum.—Subfiliform, a little widened beyond the middle, slightly attenuated toward the apex, with 33-36 segments, the seventh or eighth square, the widest 1.5 to 2 times as wide as long. Black with white annulus on segments 8 or 9 to 15 or 16, scape and basal part of flagellum usually brown or reddish ventrally.

Head.—Temple profile slightly, cheek profile rather considerably, narrowed; malar space almost as long as width of mandible base; carina oralis distinctly, though not strongly, raised (in contrast to that of *variegatus*). Black, red and white or yellow. The following white: frontal orbits broadly, a band on orbits of temples (sometimes confluent with frontal orbits), usually uppermost part of the facial orbits. Broad middle of frons, ocellar region and occipital region black, the rest varying between red and black; but usually red in varying extent.

Thorax.—Mesoscutum smooth and shiny with few scattered punctures; propleura with some irregular punctures and wrinkles, sometimes with transverse wrinkles; mesopleura grossly, metapleura more regularly and densely but a little less grossly, punctured; carination strong and complete, the area superomedia hexagonal and usually confluent with the area basalis. Black; the following white: collare, pronotal ridge, subalarum, scutellum, postscutellum, a large median mark on mesoscutum (usually surrounded by an obscurely reddish belt), carinal triangle, a patch below apex of areae dentiparae (sometimes extending over the whole surface of the areae posteroexternae) and areas narrowly surrounding the spiracles; apex of pronotal base usually reddish or yellowish; tegulae reddish; mesopleura never white marked.

Legs.—Stout but a little more slender and longer than in *w-album*; coxae III shiny, rather sparsely punctured, with medium sized scopa. Red, trochanters fulvous- or yellowish-tinted, coxae II and III dorsally yellow-marked, coxae III usually externally with an infuscated mark; extreme apex of femora III and usually the tibiae III dorsally (especially at base and apex) more or less infuscated; tibiae II and III with a small (sometimes rather indistinct) yellow mark dorsally beyond the base; tarsi fulvous red.

Abdomen.—Postpetiolus almost smooth or finely rugose; gastrocoeli sub-obsolete, thyridia distinct; second tergite very finely and densely punctured except toward the apex, the following tergites impunctate. Red, petiolus usually infuscated; postpetiolus not yellow-banded.

Male (tentative)

Head and thorax black with very rich white pattern; mesoscutum with white median mark; mesosternum (except in rare mutants) entirely, and lower part of mesopleura, white; propodeum with full, white W-pattern; abdomen orange-red except first segment; legs fulvous, tibiae III dorsally a little darker toward base and apex with an indistinct and not clearly defined yellowish area beyond the base; clypeus with slight median depression; length 11-14 mm.

Flagellum.—Dorsally black, ventrally yellowish brown, with longish oval, rather narrow tyloides on segments 7-14 or 15, the longest reaching almost the base but not quite the apex of the segment, and with white annulus on segments 15 or 16 to 21 or 22; scape ventrally yellow.

Head.—Clypeus with slight, sometimes rather indistinct, median apical depression median field of face prominent, the lateral longitudinal depressions distinct, diverging toward antennae; carina oralis somewhat raised at the apex; eyes bulging. Black; the following white: mandibles except teeth, clypeus, face, orbits broadly around eyes without interruption, widening on the outer side over the cheeks including the malar space and apex.

Thorax.—Mesoscutum shiny, sparsely punctured; notaulices distinct in the anterior part; scutellum somewhat raised above the postscutellum; areolation complete, area superomedia transverse. Black; the following white: collare, pronotal ridge and base, subalarum, tegulae, median mark of mesoscutum, scutellum, postscutellum, complete W-pattern of propodeum (including the whole areae spiraculiferae, areae posteroexternae, the upper part of area posteromedia and the apical part or whole of area superomedia), mesosternum (rarely only in part), lower part (sometimes more than half) of the mesopleura except usually a black mark before coxae II and the carinal triangle.

Legs.—Orange-red; tibiae I and II pale yellow dorsally, tibiae III with a restricted yellowish-tinted area dorsally beyond the base, gradually changing into the basic color on both ends; base and apex of tibiae III dorsally usually a little infuscated; coxae white, coxae III externally marked with reddish or black, usually both; trochanters yellow; tarsi pale orange or yellow.

Abdomen.—Orange-red; the first segment laterally and dorsally at the apex whitish; petiolus dorsally and ventrally black.

Variability

Six specimens from North Carolina (Raleigh) have the white color of the mesopleura extended over the lower two-thirds; two specimens from Maine have the white color of the mesosternum reduced to a patch around sternauli; one specimen from Michigan has almost the whole dorsal side of tibiae III infuscated except a small yellow dot beyond base. Total of examined male specimens, 28.

17. *Cratichneumon pseudanisotae*, new species*Types*

Holotype.—♀, New York, Farmingdale, 23.VIII.1938. C.H.T.

Paratypes.—1 ♀, Maryland, Takoma Park, 11.IX.1943; 2 ♀♀, New Jersey, Moorestown, 8. and 14.VIII.1939. C.H.T.

Distribution

New York, New Jersey, Maryland.

Preamble

I am in doubt whether this "form" represents a mere mutant of *subfilatus* or a very closely allied but distinct species. As I can not find a single structural difference from *subfilatus* I am inclined to deny specific distinction. But the correctness of one or the other version can only be proven by rearing or perhaps by continued field observation. For this purpose it seemed preferable to draw attention to the problem by description of the form rather than to ignore its existence.

Female

Differing from *subfilatus* only chromatically: tibiae III uniformly clear rufous without indication of a yellow mark or area beyond base; rufous color of face, clypeus, cheeks and first segment replaced by predominantly black; post-petiolus with a yellowish apical band; averaging a little bigger than *subfilatus*; length 12-16 mm.

18. *Cratichneumon puncticoxa*, new species*Types*

Holotype.—♀, Maine, Dryden, 10.VII.1959, C.G.H.

Allotype.—♂, Quebec, Limbour, 26.VI.1959, C.G.H.

Paratypes.—7 ♀♀, Maine, Dryden, 4 ♀♀, Quebec, Limbour, C.G.H. 2 ♀♀, New York, Ithaca and Bemus Point, C.H.T. 1 ♀, Quebec, St. Sauveur, C.N.C.

Distribution

Massachusetts (M.C.Z.), Maine, Quebec (C.G.H.), New York (C.H.T.).

Female

Another species of the w-album complex; well distinguished by the densely punctured coxae III and mesoscutum, the distinctly more slender femora III and relatively longer basal segments of the flagellum; averaging somewhat smaller than w-album; head and thorax black, scutellum white, no other white pattern on head and thorax; tibiae III with clearly defined white annulus beyond base, black at base and beyond annulus; tarsi III uniformly pale orange-yellow; length 9-12 mm.

Flagellum.—Subfiliform, scarcely widened beyond middle, a little attenuated at apex, with 33-35 segments, the first almost twice as long as wide, the seventh square. Black with white annulus on segments 7 or 8 to 14 or 15.

Head.—Temple and cheek profiles distinctly narrowed with very slightly curved outlines; malar space a little shorter than width of mandible base; cheeks of normal width between eyes and carina genalis, not inflated. Black; frontal, vertical and temple orbits obscurely reddish, sometimes also clypeus.

Thorax.—Mesoscutum somewhat shiny, relatively densely punctured; scutellum a little raised above postscutellum; areolation of propodeum complete, area

superomedia hexagonal, narrowed anteriorly, often a little wider than long, usually separated from area basalis. Black; the following usually obscurely reddish: collare, apex of pronotal ridge, subalarum, tegulae, small marks on propodeum below apex of areae dentiparae and rarely a median mark on hind part of mesoscutum; scutellum and often the postscutellum white.

Legs.—Somewhat more slender than in the related species; femora III nearly four times as long as medially wide; segments of tarsi III relatively a little longer than those of *w-album*; coxae III rather densely punctured ventrally; scopa distinct. Black; tibiae III with narrow, clearly defined white annulus beyond base; trochanters, at least the trochantelli reddish; sometimes an irregular dorsal mark on coxae III and base of femora III obscure reddish; tibiae I and II pale orange-yellow with white annulus, all tarsi uniformly pale orange-yellow; femora I and II reddish brown.

Abdomen.—Postpetiolus finely rugose, sometimes with a few punctures; second tergite in the basal part finely punctured, its rest and the following tergites impunctate; gastrocoeli subobsolete. Red, petiolus black.

Male

The male evidently to be associated with the puncticoxa female is extremely similar to the w-album lobatus male. The combination of the following three characters renders identification possible: 1. mesoscutum, especially the lateral lobes less shiny and more densely punctured; 2. tyloides present on seven to eight segments only (in w-album lobatus on ten to eleven segments), short and narrow; 3. tarsi III uniformly pale orange-yellow, the metatarsus never even a little infuscated. Head and thorax black with yellow pattern; tibiae III with clearly defined white annulus between black sections; femora III usually partially black, sometimes entirely; length 12-13 mm.

Flagellum.—Black above, yellowish brown below, with small, narrow tyloides on segments 7 (sometimes 6) to 13 and with white annulus on segments 12 or 13 or 14 to 19 or 20 or 21; scape ventrally yellow.

Head.—Clypeus with slight but fairly distinct median depression; facial median field prominent, the lateral longitudinal impressions diverging towards antennae. Black; the following white: mandibles except teeth, clypeus, face, orbits around eyes (usually interrupted at vertex and more broadly at malar space, sometimes also in middle of outer side).

Thorax.—Black; the following white: collare, pronotal ridge, subalarum, scutellum, postscutellum, two marks on propodeum (covering the areae postero-externae, sometimes extending over upper part of the area posteromedia as well as apical part of areae spiraculiferae thus forming an incomplete W-pattern), sometimes a mark on carinal triangle, exceptionally a median mark on mesoscutum; tegulae reddish.

Legs.—Femora III in direct comparison of specimens a little more slender than in *w-album lobatus* and more densely punctured, the segments of tarsi III relatively a little longer. Coxae, except apices of coxae I and II, black; femora I and II light reddish brown, femora III usually basally red in varying extent, sometimes entirely black, sometimes mainly red; tibiae I and II pale yellow dorsally, infuscated ventrally; tibiae III with conspicuous white annulus beyond base, black before and beyond annulus; all tarsi uniformly pale orange-yellow; trochanters I and II usually dark above, yellowish ventrally, trochanters III reddish, sometimes ventrally yellowish.

Abdomen.—Orange-red; petiolus black; postpetiolus exceptionally with whitish apical mark.

superomedia hexagonal, narrowed anteriorly, often a little wider than long, usually separated from area basalis. Black; the following usually obscurely reddish: collare, apex of pronotal ridge, subalarum, tegulae, small marks on propodeum below apex of areae dentiparae and rarely a median mark on hind part of mesoscutum; scutellum and often the postscutellum white.

Legs.—Somewhat more slender than in the related species; femora III nearly four times as long as medially wide; segments of tarsi III relatively a little longer than those of *w-album*; coxae III rather densely punctured ventrally; scopa distinct. Black; tibiae III with narrow, clearly defined white annulus beyond base; trochanters, at least the trochantelli reddish; sometimes an irregular dorsal mark on coxae III and base of femora III obscure reddish; tibiae I and II pale orange-yellow with white annulus, all tarsi uniformly pale orange-yellow; femora I and II reddish brown.

Abdomen.—Postpetiolus finely rugose, sometimes with a few punctures; second tergite in the basal part finely punctured, its rest and the following tergites impunctate; gastrocoeli subobsolete. Red, petiolus black.

Male

The male evidently to be associated with the puncticoxa female is extremely similar to the w-album lobatus male. The combination of the following three characters renders identification possible: 1. mesoscutum, especially the lateral lobes less shiny and more densely punctured; 2. tyloides present on seven to eight segments only (in w-album lobatus on ten to eleven segments), short and narrow; 3. tarsi III uniformly pale orange-yellow, the metatarsus never even a little infuscated. Head and thorax black with yellow pattern; tibiae III with clearly defined white annulus between black sections; femora III usually partially black, sometimes entirely; length 12-13 mm.

Flagellum.—Black above, yellowish brown below, with small, narrow tyloides on segments 7 (sometimes 6) to 13 and with white annulus on segments 12 or 13 or 14 to 19 or 20 or 21; scape ventrally yellow.

Head.—Clypeus with slight but fairly distinct median depression; facial median field prominent, the lateral longitudinal impressions diverging towards antennae. Black; the following white: mandibles except teeth, clypeus, face, orbits around eyes (usually interrupted at vertex and more broadly at malar space, sometimes also in middle of outer side).

Thorax.—Black; the following white: collare, pronotal ridge, subalarum, scutellum, postscutellum, two marks on propodeum (covering the areae posteroexternae, sometimes extending over upper part of the area posteromedia as well as apical part of areae spiraculiferae thus forming an incomplete W-pattern), sometimes a mark on carinal triangle, exceptionally a median mark on mesoscutum; tegulae reddish.

Legs.—Femora III in direct comparison of specimens a little more slender than in *w-album lobatus* and more densely punctured, the segments of tarsi III relatively a little longer. Coxae, except apices of coxae I and II, black; femora I and II light reddish brown, femora III usually basally red in varying extent, sometimes entirely black, sometimes mainly red; tibiae I and II pale yellow dorsally, infuscated ventrally; tibiae III with conspicuous white annulus beyond base, black before and beyond annulus; all tarsi uniformly pale orange-yellow; trochanters I and II usually dark above, yellowish ventrally, trochanters III reddish, sometimes ventrally yellowish.

Abdomen.—Orange-red; petiolus black; postpetiolus exceptionally with whitish apical mark.

19. *Cratichneumon paratus* (Say)

Figs. 26, 41.

Distribution

According to H. Townes, 1951: "Atlantic to 100° W. in Transition and Upper Austral Zones". New records: Quebec, Northern Maine, Florida.

Male

Flagellum with annulus, tyloides on segments 5 (or 4) to 15 (or 13); mesoscutum black with white median mark; second and third tergites yellow (or partially rufous in southern populations), the former not infuscated at the base but usually with irregular black, bipartite median mark, the latter with black basal band; following tergites black, turning dark red-brown toward apex of abdomen (or rufous, in southern populations); tibiae III white, their base and apex always black; metatarsus III blackish, except in the most southern subspecies; femora III black (rufous in southern populations); mesosternum and part of mesopleura white (in southern populations white color sometimes extending over the whole mesopleura and metapleura); length 10-13 mm.

Flagellum.—Black, ventrally pale brownish, with narrow, bacilliform tyloides on segments 5 (or 4) to 15 (or 13) and with white annulus on segments 14 or 15 to 19 or 20; scape ventrally yellow.

Head.—Clypeus without median impression; median field of face slightly prominent; malar space very short, almost obsolete; carina genalis not at all raised. White; the following black: supraantennal cavity, frons broadly, ocellar and occipital region.

Thorax.—Notauli anteriorly distinct; mesoscutum shiny, distinctly and not densely punctured; scutellum somewhat raised above the postscutellum; mesolcus not crenulate. The following white: collare, pronotal ridge and base, subalarum, tegulae, median mark of mesoscutum, scutellum, postscutellum, carinal triangle, almost the whole declivity of propodeum, prosternum except base, the whole mesosternum and in geographically varying extent the mesopleura, in the most southern subspecies also the metapleura.

Legs.—Pale yellow; base and apex of tibiae III always black; color of femora III and dorsal side of femora I and II and of coxae III varying geographically from black to rufous; metatarsus III black, only in the most southern subspecies not infuscated.

Abdomen.—Postpetiolus smooth; second tergite distinctly and not densely, the third finely, punctured. Basic color of tergites 1-3 yellow (rufous in southern populations); the second tergite basally not infuscated, with an irregular, bipartite black median mark instead, the third tergite usually with black basal band; first tergite usually dorsally black except apex and sometimes base; sometimes tergites 1-3 (or in southern specimens 1-7) not black marked; in northern specimens the fourth usually blackish with narrow, yellow apical band, the following tergites entirely blackish, turning dark red-brown toward the apex of abdomen.

Female

Rather similar to *w-album* and very similar to the female supposed to belong to *vinnulus*. Distinguished from the former by the alutaceous, impunctate sculpture of the second tergite, the more densely punctured ventral side of coxae III and the shorter flagellum composed of 28-30 segments only. Differing very little from *vinnulus*: tarsi III and basal segments of flagellum a little stouter, flagellum a little shorter, coxae III dorsally not white marked.

Basic color of head and thorax varying from black in the North to rufous in the South; scutellum always white, pronotal ridge sometimes; tibiae III with clearly defined white annulus, their base and apex blackish in the North, rufous in the South; first, or first and second, segments of tarsi III blackish in northern specimens, not infuscated in the most southern; femora varying from black to red; abdomen red-brown or rufous. Femora very short and stout; distinct scopa; carination of propodeum sometimes weak, costulae sometimes obsolete; length 8-10 mm.

Flagellum.—Filiform, stout, slightly widened beyond middle, with 28-30 segments, the first 1.3 times as long as wide, the sixth square, the widest 1.5 times as wide as long. Black with white annulus on segments 8 or 9 to 14 or 15; scape ventrally red.

Head.—Shaped as *w-album*. Usually red-brown except the black supraantennal cavity and occipital region; sometimes more extensively black or entirely red-brown.

Thorax.—Mesoscutum shiny, sparsely punctured; carination of propodeum sometimes weak, the costulae obsolete, sometimes distinct; areae superomedia and basalis confluent. Varying from mainly black in the North to almost entirely rufous in the far South; all trochanters pale with a more or less distinct yellow tint; pronotal ridge white.

Legs.—Femora III very stout and short; coxae III ventrally densely punctured with distinct scopa. Coxae and femora III varying from black in the North to rufous in the South; all trochanters pale with a more or less distinct yellow tint; tibiae III with clear, white annulus beyond base, their base and apex blackish in the North, varying to rufous in the South; tarsi red brown or rufous, the first, sometimes also the second segment of tarsi III blackish except in the most southern populations.

Abdomen.—Postpetiolus finely irregularly rugose; second tergite alutaceous, impunctate, except sometimes a few extremely fine punctures in the median area of the base; gastrocoeli subobsolete. Red-brown; in northern specimens petiolus black.

Mutant

Three females from Maine and Quebec (C.G.H.) have the face black, the clypeus, pronotal ridge, and apex of postpetiolus, yellow. Otherwise they agree exactly with typical *paratus*.

19a. *Cratichneumon paratus, paratus* (Say)

Ichneumon parata Say, 1829, Contrib. Maclur. Lyc. Phila., 1:68, ♂.

Ichneumon annulipes Cresson, 1864, Ent. Soc. Phila. Proc. 3:170, ♀.

Types

Holotype.—*Ichneumon parata* Say, ♂, lost. *Ichneumon annulipes* Cresson, ♀, perhaps also lost (found neither in A.N.S. nor in U.S.N.M.).

Distribution

According to H. Townes, 1951: "Atlantic to 100° W. in Transition and Upper Austral Zones". The Upper Austral Zone should probably be eliminated from the range of this subspecies and transferred to that of the following. New records: Quebec, Northern Maine.

Male

Head and thorax black with yellow pattern; mesoscutum with white median mark; basal tergites yellow with black pattern: the first dorsally black except apex and usually base, the second with bipartite, irregular median mark, the third with black basal band; the following tergites black, the fourth usually with narrow, yellow apical band; the apical tergites gradually turning dark red-brown; femora III, coxae III except ventral side, base and apex of tibiae III and first, or first and second, segment of tarsi III black; apical segments of tarsi III whitish; mesosternum yellow; in mutants second and third tergite without or almost without black pattern.

Female

Head and thorax black with obscure red-brown, but usually without yellow, pattern, except the yellow scutellum; exceptionally pronotal ridge yellow; femora III and coxae III black; tibiae III with clearly defined white annulus, blackish at base and apex; tarsi red brown, first, or first and second, segment of tarsi III blackish.

19b. *Cratichneumon paratus pusillus* (Cresson)

Ichneumon pusillus Cresson, 1864, Ent. Soc. Phila. Proc., 3:171, ♀.

Cratichneumon pusillus Heinrich, 1959, Ent. News, 70:213, ♀.

Type

Holotype.— ♀, Delaware, A.N.S.

Distribution

Delaware (type), Virginia (U.S.N.M. and M.C.Z.).

Preamble

When I saw the type for the first time I could not believe it belonged to the species *paratus* Say. A second thorough examination has convinced me that H. Townes' interpretation was correct. I think, however, that the name should be maintained with subspecific status. Subspecies *pusillus* evidently links the northern subspecies *paratus* with the southern *pseudovinnulus*.

Female

At least femora III, sometimes (as in the type) all legs including coxae uniformly rufous (except the white annulus of tibiae); mesoscutum, head, and abdomen, uniformly rufous; pleura, sterna, and propodeum, mainly dark or red-brown.

Male

Femora III and coxae III in part, or entirely, rufous; basic color of abdomen extensively rufous; metatarsus III blackish.

19c. *Cratichneumon paratus pseudovinnulus*, new subspecies*Types*

Holotype.— ♀, North Carolina, Raleigh, 10.VI.1951, C.G.H.

Allotype.— ♂, North Carolina, Raleigh, 10.VI.1951, C.G.H.

Paratypes.— 5 ♀ ♀ and 4 ♂ ♂ from the same locality and date as the holotype. C.G.H.; 5 ♂ ♂ North Carolina, Southern Pines. C.N.C.

Distribution

North Carolina (C.G.H.); Florida (M.C.Z.). Perhaps ranging somewhat further north; the northern limits still need investigation.

Preamble

Both sexes of this form were included in the species *vinnulus* until now. Certain constant differences in the scheme of color pattern, however, have convinced me, that these are two distinctly different species and that *pseudovinnulus* replaces *paratus* geographically. Whether it may be assumed to have reached specific degree of differentiation or only subspecific seems to be a matter of opinion. I preferred to assume the subspecific status, as *pusillus* seems to link *pseudovinnulus* with *paratus*. The association of sexes as given below can be regarded as secure since they match perfectly and were collected in long series at the same time and restricted locality.

Female

Entirely rufous and almost lacking black pattern (except some sutures and marks on the mesosternum); the following yellow: annulus of tibiae, scutellum, postscutellum, subalarum and sometimes pronotal ridge; metatarsus III not infuscated; flagellum with 26-29 segments, black, ventrally brownish at the base, with white annulus on segments 7 or 8 to 14; scape rufous; costulae always distinct.

Male

White color of mesopleura (sometimes turning pale rufous toward the upper margin) covering nearly their whole surface except a narrow black band beneath the subalarum; metapleura entirely white except areae coxales; coxae III usually without conspicuous black pattern; blackish pattern of second tergite usually forming a bipartite median band rarely reaching base of tergite; sometimes abdomen pale rufous without black pattern.

Differs from subspecies *paratus* and *pusillus* by the metatarsus III not being infuscated and by the white pleura. Differs from *vinnulus* by the row of tyloides beginning on the fifth flagellar segment, by the extensive white color on the mesopleura and metapleura, by the second tergite rarely being black at the base and by the coxae III not being dorsally black and white.

20. *Cratichneumon vinnulus* (Cresson)

Ischnus vinnulus Cresson, 1864, Ent. Soc. Phila. Proc., 3:189, ♂.

Types

Holotype.—♂, Pennsylvania, A.N.S.

Neallotype.—♀, Maryland, Takoma Park, 9.IX.1945, H. & M. Townes, C.H.T.

Distribution

According to H. Townes, 1951: "Vermont to South Carolina, West to Ohio. Transition, Upper Austral and Lower Austral Zones".

Since I am going to split the species *vinnulus* Townes into two different forms, the distribution as given above will have to be revised. The species *vinnulus* Cresson in the interpretation of this paper occupies the more northern part of the range with its southern limits still to be investigated. New records for it (males): Ontario, Quebec, Maine (C.G.H.); (female): Kentucky (C.N.C.).

Preamble

The color of the male sex, on which the species was based, is so peculiar, that a misidentification seems to be hardly possible. In reality, however, we are dealing here again with a complex of similar-looking but different forms.

Preamble

Both sexes of this form were included in the species *vinnulus* until now. Certain constant differences in the scheme of color pattern, however, have convinced me, that these are two distinctly different species and that *pseudovinnulus* replaces *paratus* geographically. Whether it may be assumed to have reached specific degree of differentiation or only subspecific seems to be a matter of opinion. I preferred to assume the subspecific status, as *pusillus* seems to link *pseudovinnulus* with *paratus*. The association of sexes as given below can be regarded as secure since they match perfectly and were collected in long series at the same time and restricted locality.

Female

Entirely rufous and almost lacking black pattern (except some sutures and marks on the mesosternum); the following yellow: annulus of tibiae, scutellum, postscutellum, subalarum and sometimes pronotal ridge; metatarsus III not infuscated; flagellum with 26-29 segments, black, ventrally brownish at the base, with white annulus on segments 7 or 8 to 14; scape rufous; costulae always distinct.

Male

White color of mesopleura (sometimes turning pale rufous toward the upper margin) covering nearly their whole surface except a narrow black band beneath the subalarum; metapleura entirely white except areae coxales; coxae III usually without conspicuous black pattern; blackish pattern of second tergite usually forming a bipartite median band rarely reaching base of tergite; sometimes abdomen pale rufous without black pattern.

Differs from subspecies *paratus* and *pusillus* by the metatarsus III not being infuscated and by the white pleura. Differs from *vinnulus* by the row of tyloides beginning on the fifth flagellar segment, by the extensive white color on the mesopleura and metapleura, by the second tergite rarely being black at the base and by the coxae III not being dorsally black and white.

20. *Cratichneumon vinnulus* (Cresson)

Ischnus vinnulus Cresson, 1864, Ent. Soc. Phila. Proc., 3:189, ♂.

Types

Holotype.— ♂, Pennsylvania, A.N.S.

Neallotype.— ♀, Maryland, Takoma Park, 9.IX.1945, H. & M. Townes, C.H.T.

Distribution

According to H. Townes, 1951: "Vermont to South Carolina, West to Ohio. Transition, Upper Austral and Lower Austral Zones".

Since I am going to split the species *vinnulus* Townes into two different forms, the distribution as given above will have to be revised. The species *vinnulus* Cresson in the interpretation of this paper occupies the more northern part of the range with its southern limits still to be investigated. New records for it (males): Ontario, Quebec, Maine (C.G.H.); (female): Kentucky (C.N.C.).

Preamble

The color of the male sex, on which the species was based, is so peculiar, that a misidentification seems to be hardly possible. In reality, however, we are dealing here again with a complex of similar-looking but different forms.

It can be separated into two categories: with or without base of tibiae II black. The type of *vinnulus* has a basal black annulus on tibiae II; so has a second form, which is described under the name *pseudovinnulus* as a subspecies of *paratus*. The other category (without black base of tibiae III) also contains two different forms: a smaller one, which will be treated below as *remanens*, new species, and a bigger one, which I am unable to distinguish from *vinnulus* except by lack of the above-mentioned black pattern. I assume that the latter form represents a mere chromatic mutant of *vinnulus*.

Male

Head and thorax black with rich white pattern; mesoscutum with median mark; mesosternum and lower part (usually half or less) of mesopleura white; abdomen pale reddish brown, the anterior tergites apically usually yellowish-tinted; the first segment, except yellow apical band, and the basal half of the second, usually also the base of the third, rarely of the following, black; femora III red, black at apex; tibiae III white, usually black at base, always at apex; tarsi III whitish including the metatarsus; coxae III dorsally white with black apex, laterally black; area metapleuralis not white; row of tyloides not starting before the 7th or 8th flagellar segment; length 12-15 mm.

Flagellum.—Dorsally black, ventrally brownish with longish-oval tyloides on segments 7 or 8 to 16 or 17 (the longest one sometimes reaching from base to apex of the segments) and with white annulus on segments 14 or 15 to 22 or 23; scape white below.

Head.—Clypeus without median impression; median field of face slightly prominent; face and clypeus rather strongly punctured; malar space short, hardly one-third as long as width of mandible base; carina genalis not raised. Black; the following white: mandibles except teeth, face, clypeus, orbits broadly around eyes (not interrupted at vertex), widening on outer side over whole surface of cheeks including malar space.

Thorax.—Notauli anteriorly distinct; scutellum somewhat raised above post-scutellum; carination of propodeum strong and complete, area superomedia wider than long. Black; the following white: collare, pronotal ridge, pronotal base, subalarum, tegulae, median mark of mesoscutum, scutellum, postscutellum, incomplete W-pattern on propodeum (covering apex of areae spiraculiferae, areae posteroexternae, upper end of area posteromedia and apex of areae dentiparae), carinal triangle, mesosternum (except apical margin), lower half of mesopleura (except the apical area in front of coxae II), outer part of prepectus and apical part of prosternum. Metapleura always black.

Legs.—Yellowish white; femora III red, their apex narrowly blackish; femora I and II fulvous; tibiae III narrowly black at base (except mutants), broadly black dorsally at apex; coxae III black dorsally at apex and laterally; trochanters III usually marked with black dorsally.

Abdomen.—Reddish brown, the first segment black with yellowish apical band; second tergite black on the basal half; the third tergite usually, sometimes also the following tergites, basally infuscated; apical margins of anterior tergites more or less distinctly tinted yellowish.

Female

In associating the female described below with the *vinnulus* male I am following H. Townes' interpretation.

A sibling of paratus, scarcely differing from the latter in structural and sculptural characters, except that in direct comparison the legs III, especially

tarsi III look a little longer and more slender; basal segments of flagellum a little more stretched. Alutaceous sculpture, *scopa* of *coxae III*, and flagellar proportions, as in *paratus*. Differing from the latter in color by the *metatarsus III* not being black, all *coxae* being extensively marked with yellowish white dorsally and by the *mesopleura* being more or less extensively marked with red in the middle; length 12 mm.

Flagellum.—Filiform with 30-32 segments, the basal segments a trifle more stretched than in *paratus*, the seventh square. Black with white annulus on segments 8-14 or 15; scape ventrally reddish.

Head.—As in *paratus*, perhaps the temple profile a very little more narrowed.

Thorax.—As in *paratus*; yellow and red pattern more extensive. The following yellow: collare, pronotal ridge, pronotal base, subalarum, scutellum, post-scutellum and less distinctly and not clearly defined a mark below apex of *areae dentiparae* (turning gradually in all directions into obscure reddish). Mesoscutum almost entirely and median part of *mesopleura* more or less extensively red.

Legs.—Fulvous red; femora *III* red, narrowly black at apex; tibiae *III* with yellow annulus beyond base, their narrow base and broad apex blackish; all trochanters and extensive marks on dorsal side of all *coxae* pale yellowish; *coxae III* sometimes laterally marked with black; tarsi fulvous.

Abdomen.—Rufous; petiolus black; postpetiolus apically yellowish.

21. *Cratichneumon annulatus* (Provancher)

Mesostenus annulatus Provancher, 1875, Nat. Canad., 7:265, 267, ♂.

Types

Holotype.—♂, Quebec, Provincial Museum, Quebec.

Neallotype.—♀, Maine, Dryden, 28.VII.1959, C.G.H.

Distribution

According to H. Townes, 1951: "Quebec, Ontario, New Hampshire, Massachusetts, Rhode Island, New York, Pennsylvania". New record: Maine.

Male

A chromatically very distinct species of the *w-album* group. Head and thorax black, face, clypeus and scutellum yellow; legs including *coxae* and trochanters uniformly red; apex of femora *III*, basic color of tibiae *III* and tarsi *III* black, tibiae *III* with yellow annulus beyond base; flagellum with annulus; abdomen red; clypeus medially depressed; length 9-13 mm.

Flagellum.—Dorsally black, ventrally pale brownish, with narrow, bacilliform tyloides on segments 5 (or 4) to 13 (or 14) and with white annulus on segments 12 or 14 to 17 or 18; scape ventrally or almost entirely red.

Head.—Temple profile distinctly narrowed with slightly curved outline; clypeus with distinct median depression; median field of face prominent, the lateral longitudinal depressions distinct, diverging above toward antennae. Black; face and clypeus yellow, usually with a reddish-tinted median area; orbits obscurely red.

Thorax.—Mesoscutum shiny, rather sparsely punctured; scutellum distinctly raised above postscutellum; area superomedia wider than long; mesolcus crenulate. Black; collare, tegulae, apex of pronotal ridge and postscutellum reddish, scutellum white.

Legs.—Uniformly red, including *coxae* and trochanters, without white pattern, except a narrow, often not very clearly colored, annulus on tibiae *III*

beyond base; apex of femora III, base and apex of tibiae III and tarsi III black or blackish.

Abdomen.—Red, usually slightly infuscated toward apex.

Female

Head almost entirely, *mesoscutum*, *abdomen* and *legs* including *coxae* and *trochanters* red; *legs* III with black pattern, *tibiae* with yellow annulus; *scutellum* yellow; *flagellum* filiform; *small scopa*; *length* 8-11 mm.

Flagellum.—Filiform, scarcely widened beyond middle, with 27-29 segments, the first 1.3 times as long as wide, the fourth square. Black with white annulus on segments 7 or 8 to 13 or 14, scape and the basal segments ventrally reddish.

Head.—Cheek profile and temple profile distinctly narrowed, outline of the latter slightly curved, of the former almost straight; cheeks wide between eye and carina genalis, not inflated; carina oralis not raised. Red; occiput and deepennings above antennal sockets black.

Thorax.—Mesoscutum smooth and shiny, sparsely punctured; area supero-media and basalis confluent, costulae usually distinct. Black; scutellum yellow; collare, apex of pronotal ridge, tegulae, subalarum and mesoscutum medially or usually entirely red; sometimes more or less extensive red marks on propodeum below areae dentiparae.

Legs.—Stout; coxae III ventrally smooth, sparsely punctured, with small scopa. Apex of femora III, base and apex of tibiae III and tarsi III black or blackish, the latter sometimes lighter; all tibiae with yellow annulus; the rest uniformly red including coxae and trochanters.

Abdomen.—Postpetiolus almost smooth, sometimes with a few punctures or fine rugosity; second tergite finely and not densely punctured except toward apex, following tergites impunctate; gastrocoeli obsolete. Red; sometimes petiolus infuscated.

22. *Cratichneumon vaccinii*, new species

Types

Holotype.—♂, Ontario, Stonecliffe, 16.VI.1956, C.G.H.

Paratypes.—5 ♂♂, Ontario, Stonecliffe, 16.VI.1956, 4 ♂♂, Ontario, Nipigon, July, 1956, 1 ♂, Quebec, St. Julienne, 23.VIII.1956, C.G.H., 5 ♂♂, Quebec, Kazabazua, C.N.C.

Distribution

Northern Ontario, Quebec. Flies in clearings covered by *Vaccinium*.

Male

Related to *annulatus*; *chromatically* differing by the *mesoscutum* being red (black in *annulatus*), while the *coxae* tend to develop melanistic pattern (always clear red in *annulatus*); *tyloides* not bacilliform but oval; *coxae* III smoother, more finely punctured; *abdomen* clear rufous, never infuscated toward the apex. *Propodeum* with red pattern of very variable extent, in the extreme cases *propodeum* mainly red or entirely black; *legs* red, *tibiae* III with narrow yellow annulus beyond base, dorsally black at the apex and usually at the base; *tarsi* III usually blackish; *length* 10-13 mm.

Flagellum.—Black, ventrally reddish brown, with oval, or longish oval, tyloides on segments 3 or 4 or (usually) 5 to 12, 13 or 14 and with white annulus on segments 13 or 14 to 17 or 18; scape ventrally reddish brown.

Head.—Temple profile narrowed with slightly curved outline; malar space about half as long as width of mandible base; clypeus with distinct median depression; median field of face prominent, the lateral longitudinal depressions distinct. Black; face and clypeus usually reddish brown, the facial orbits yellow; often face and clypeus entirely yellow, sometimes entirely red; orbits broadly reddish brown around eyes, except yellow facial orbits; malar space and usually apex of cheeks black.

Thorax.—Mesoscutum shiny, not densely punctured; scutellum distinctly raised above postscutellum; carination of propodeum sharp and complete; area superomedia usually as wide as long; mesolcus crenulate. Black; the following reddish brown: mesoscutum entirely or medially, pronotal ridge, subalarum, tegulae, sometimes postscutellum and a more or less extensive pattern on propodeum (rarely lacking, or sometimes reduced to two marks on areae posteroexternae, usually forming a W-pattern, exceptionally covering most of the propodeum); scutellum and sometimes postscutellum yellow.

Legs.—Coxae III shiny, finely and sparsely punctured. Mainly rufous including coxae; all coxae usually laterally black marked, sometimes uniformly rufous; tibiae and tarsi I and II fulvous; apex of femora III, the tarsi III and the tibiae III dorsally at base and apex usually blackish, the tibiae III with narrow, yellow annulus beyond the base; in rare mutants tibiae III at the base not infuscated and tarsi III pale instead of blackish.

Abdomen.—Postpetiolus polished; gastrocoeli and thyridia fairly distinct. Uniformly rufous; the petiolus usually blackish.

23. *Cratichneumon erythroscuta*, new species

Types

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

Female

Head, mesoscutum, abdomen and legs reddish brown; scutellum yellow; tibiae with whitish mark dorsally beyond base; tibiae III slightly infuscated at base and apex. Flagellum close to bristleshaped, a little widened beyond middle, distinctly attenuated at the apex; coxae III sparsely punctured, with scopae; temples wide, scarcely narrowed; cheeks inflated, head in front view nearly square; pleura grossly sculptured; length 10 mm.

Flagellum.—Rather slender, slightly widened beyond the middle and somewhat attenuated toward the apex, with 32 segments, the first about 1.5 times as long as wide, the seventh square, the widest not quite twice as wide as long. Dorsally black, ventrally reddish brown, with white annulus on segments 7-15, segments before annulus apically brownish on the dorsal side.

Head.—Strongly developed; temple profile and cheek profile scarcely narrowed, with curved outline; cheeks distinctly inflated, wide between eyes and carina genalis; malar space a little shorter than the width of mandible base. Uniformly reddish brown.

Thorax.—Mesoscutum shiny, coarsely and sparsely punctured; declivity of propodeum not much longer than horizontal part; carination sharp and complete, area superomedia confluent with area basalis, forming a long, anteriorly slightly narrowed, central area; pleura very coarsely and densely, irregularly, rugosely punctured. Reddish brown; the following black: sterna entirely, prepectus, propleura, lower and upper part of mesopleura, metapleura except upper part of areae metapleurales, horizontal part of propodeum except the whole central area. Scutellum yellow; no other yellow pattern.

Legs.—Moderately slender; coxae III shiny, sparsely punctured, with distinct scopa. Uniformly rufous, including coxae and tarsi; tibiae with somewhat indistinct yellowish mark dorsally beyond base, tibiae III dorsally infuscated at base and apex.

Abdomen.—Postpetiolus finely alutaceous, with a few scattered punctures; second tergite finely and densely punctured except toward the apex; third tergite basally still more finely punctured; gastrocoeli subobsolete, thyridia indicated. Uniformly rufous.

Remarks

In the red mesoscutum resembling *ferrugops* and *annulatus*. Distinctly differing from both by the stronger head and by the antennal structure, the flagellum being considerably less widened than in *ferrugops* and more attenuated than in *annulatus*. Perhaps the female of *vaccinii*.

24. *Cratichneumon ritus*, new species

Figs. 8, 27, 31.

Types

Holotype.—♀, Michigan, Ann Arbor, 2.VI.1959, C.G.H.

Allotype.—♂, Michigan, Ann Arbor, 2.VI.1959, C.G.H.

Paratypes.—1 ♀, Michigan, Ann Arbor, 1 ♂, Maine, Dryden, C.G.H.; 3 ♀♀, Ontario, St. Catharines, St. Davids and Niagara Glen; 1 ♀, Michigan, Wayne Co.; 1 ♀, Iowa, C.N.C.

Distribution

Michigan, Maine, Ontario, Indiana, North Carolina (C.G.H.); Iowa, (C.N.C.).

Female

A smaller, very distinct species of the w-album group; head in front view almost square, clypeus extremely wide, face receding; femora III very stout and short; flagellum short, filiform; no scopa; head entirely, mesoscutum extensively, red; scutellum yellow; tibiae III blackish with distinct yellow annulus; metatarsus III blackish; length 8-10 mm.

Flagellum.—Filiform, short and stout, slightly widened beyond middle, with 25-27 segments, the first about 1.25 times as long as wide, the fourth square. Black, with white annulus on segments 7 or 8 to 14; scape ventrally red.

Head.—In front view almost square; temple profile not narrowed; cheeks wide between eyes and carina genalis; malar space about half as long as width of mandible base; plane of face and clypeus distinctly receding; clypeus about five times as wide as long, its medially slightly projecting apical border bent a little upward; carina oralis and carina genalis meeting at hind corner of mandible base, therefore no abscissula present; mandible long and wide. Red; deepening above antennal sockets and occipital region black.

Thorax.—Somewhat depressed, dorsally flat; mesoscutum smooth with scattered punctures; propodeum with complete areolation and very strong sculpture (Fig. 31); area superomedia longer than wide, hexagonal or nearly parallel-sided. Black; mesoscutum extensively or entirely red; postscutellum and scutellum except its reddish base yellow; the following ferruginous: collare, pronotal ridge, tegulae, subalarum and two marks on propodeum below apex of areae dentiparae.

Legs.—Stout, femora III three times as long as wide medially; coxae III ventrally fairly densely punctured, shiny, without scopa. Red, tibiae with yellow

annulus beyond base; the following black: coxae III laterally and dorsally at the base, usually apex of femora III narrowly, sometimes the entire femora III, tibiae III at base and apex and metatarsus III.

Abdomen.—Postpetiolus finely and irregularly longitudinally striate; second tergite extremely finely punctured. Red, first segment black except a red apical band.

Male

Head and thorax black with rich white pattern; mesoscutum with white median mark, mesosternum usually entirely, propodeum in the apical half white; abdomen of a peculiar pale orange-yellowish color, the anterior tergites often more yellowish-tinted, the second tergite usually with irregular, bipartite black median mark; flagellum with annulus; tibiae III whitish, black at base and apex; tarsi whitish; abdomen shiny, second tergite sparsely and finely punctured; no abscissula of carina oralis; length 11-14 mm.

Flagellum.—Dorsally black, ventrally brownish, with narrow, bacilliform tyloides on segments 3 or 4 to 14 or 15 and with white annulus on segments 13-18; scape ventrally yellow.

Head.—Temple profile rounded, little narrowed; malar space almost obsolete; face and upper part of clypeus strongly and densely punctured; median field of face little prominent, the longitudinal lateral impressions little distinct; median deepening of clypeus scarcely indicated; apical border of clypeus a little bent upward. Yellowish white; middle of frons, ocellar region and occipital region black.

Thorax.—Mesoscutum shiny, sparsely punctured; carination of propodeum complete and very strong; area superomedia relatively small, sometimes about square, sometimes horseshoe-shaped. Black, the following yellowish white: collar, pronotal ridge, pronotal base, subalarum, tegulae, large median mark on mesoscutum, scutellum, postscutellum, lower half of mesopleura (except a black mark in front of coxae II), approximately apical half of propodeum (covering the apical half of areae spiraculiferae and areae dentiparae, the areae posteroexternae, and the area posteromedia except its apex).

Legs.—Whitish; femora III usually black, their base more or less extensively whitish on ventral side and less extensively pale orange on dorsal side; femora I and II fulvous; tibiae III narrowly black at base, broadly at apex; coxae III black dorsally at base and laterally.

Abdomen.—Unusually smooth and shiny; the second tergite sparsely and finely punctured, postpetiolus polished. Pale orange-yellow, usually more yellowish-tinted toward the base; second tergite usually with a bipartite black median mark; first segment black with whitish apex.

Variability

White coloration of mesosternum sometimes considerably reduced, especially in small specimens; in some specimens also the third and following tergites slightly infuscated in the middle.

Remarks

Holotype and allotype were caught in copula. The association of sexes is therefore beyond doubt in this case.

25. *Cratichneumon annulatipes* (Provancher)

Fig. 12.

Distribution

According to H. Townes, 1951 (*quintilis* Viereck): "Maine and Quebec to West Virginia; Transition Zone". New records: Michigan, Missouri, Indiana (C.G.H.).

Female

In northern populations femora, coxae and thorax mainly black, the propodeum partially red-brown; toward the South a gradual decrease of melanistic and increase of erythristic pattern takes place, specimens with red femora, coxae, mesoscutum and pleura becoming more frequent and prevalent. Scutellum always yellow; tibiae III in northern specimens black apically, somewhat infuscated but not really black toward the base, the white annulus thus being less prominent than in other species of the group. Flagellum filiform, blunt at apex, with 22-26 segments; no scopa; carination of propodeum weak and incomplete; area superomedia longer than wide, finely transversely striated; second tergite densely punctured; length 5-9 mm.

Flagellum.—Exactly filiform with blunt apex, somewhat tapering toward the base, with 22-26 segments, the first nearly 1.5 times as long as wide, the fifth square. Black with white annulus on segments 6 or 7 to 12 or 13; scape ventrally red-brown.

Head.—Temple profile and cheek profile distinctly narrowed, the former with slightly curved, the latter with straight outline; malar space as long as the width of mandible base; median field of face a little convex. Mainly red-brown.

Thorax.—Mesoscutum shiny, fairly densely punctured; horizontal part of propodeum not much shorter than the declivity, weakly carinated, finely sculptured; costulae obsolete; area superomedia longer than wide, narrowed anteriorly and usually densely and finely transversely striated. Basic color varying from black to red-brown. Scutellum always yellow.

Legs.—Stout; coxae III shiny, densely punctured, without scopa. Femora III, coxae III and apex of tibiae III black in northern populations, turning red-brown in southern populations; tibiae with narrow whitish mark dorsally beyond base; base of tibiae III in northern populations more or less infuscated, usually pale brownish, rarely blackish; tarsi yellowish brown.

Abdomen.—Postpetiolus shiny, very finely irregularly rugose; second tergite densely and finely punctured, the third more finely punctured in the basal half; gastrocoeli and thyridia subobsolete. Uniformly red-brown.

Male

Chromatically perhaps the most mutable of all North American species of this genus, varying individually as well as geographically so strongly that it seems impossible to give a general color description covering the whole conspecies. The following combination of characters, however, may make it possible to identify the species in every disguise:

Row of tyloides beginning on second or at the farthest on third segment of flagellum; sternauli rather strongly impressed; femora very stout; area superomedia about as wide as long, usually without anterior carina; clypeus without depression, median field of face little convex, lateral longitudinal impressions subobsolete. Tibiae III cream-white, always broadly blackish at the apex, basally but slightly (indistinctly brownish) or not at all, infuscated; tarsi III pale, never

infuscated; flagellum with annulus; mesoscutum without median mark; scutellum and pronotal ridge white; length 9-13 mm.

Variability

To demonstrate the individual and geographical variability of this polychromatic species four of the prevailing color phases (which are all linked by intergrades) are described below:

1. Thorax, including pleura and propodeum, black, the latter often with reduced red-brown pattern; coxae and femora III black; abdomen dark red-brown with black basal bands or marks on tergites 1-5 or 6. (Common in Ontario, Quebec and Northern Maine).

2. Thorax black; propodeum more or less extensively, sometimes entirely, red-brown or rufous; mesopleura more or less extensively marked with rufous or partially with yellowish, the latter color sometimes extending onto the mesosternum; femora III black, coxae III often partially or mainly rufous; abdomen red-brown or rufous without black band; in some mutants prescutellar carinae and mesoscutum apico-laterally with small yellowish or reddish marks. (Prevalent in Maine and Michigan).

3. Similar to 2, but femora III and mesopleura mainly rufous or red-brown. (Connecticut and probably further south.)

4. Mesoscutum rufous, prescutellar carinae and mesoscutum in front of them yellow marked; sterna, mesopleura and propodeum pale yellow; abdomen and femora III pale yellowish rufous. (Prevalent in Missouri.)

25a. *Cratichneumon annulatipes annulatipes* (Provancher)

Phaogenes annulatipes Provancher, 1886, Addit. Corr. Fauna Ent. Canada Hym., p. 43, ♀.

Types

Holotype.—♀, Ontario, Ottawa. C.N.C. No. 48.

Neallotype.—♂, Quebec, Orleans, 26.VI.1959. C.G.H.

Distribution

According to H. Townes, 1951: "Ontario". New records: (♀ ♀ and ♂ ♂) Quebec, Maine, Michigan (C.G.H.); (♂ ♂): New York, Ithaca (C.N.C.); Massachusetts (M.C.Z.).

Female

Thorax black, scutellum yellow; the following red-brown: propodeum more or less extensively (usually the declivity and the apex of the horizontal part, sometimes the whole horizontal part and the areae spiraculiferae), collare, pronotal ridge, subalarum and tegulae; femora III and coxae II black, the latter usually dorsally marked with brown; tibiae III with whitish mark beyond base, apically broadly black, basally usually but slightly or indistinctly infuscated, exceptionally blackish.

Male

See description of the conspecies, paragraph "variability", chromatic phases 1. and 2.

25b. *Cratichneumon annulatipes quintilis* (Viereck)

Amblyteles quintilis Viereck, 1917, Conn. State Geol. and Nat. Hist. Survey Bull., 22:354, 357, ♂.

Cratichneumon annulatipes Heinrich, 1959, Entom. News, 70:214, ♂.

Type

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

Distribution

Connecticut, south to North Carolina. The western limits toward subspecies *facetops* not known yet.

Male and female

Differing from subspecies *annulatipes* generally by increase of the red and decrease of the black pattern. In particular coxae and femora III entirely red, the mesopleura more extensively red colored.

25c. *Cratichneumon annulatipes facetops*, new subspecies*Types*

Holotype.—♂, Missouri, Hannibal, 15.IX.1952. C.G.H.

Paratypes.—2 ♂♂, Missouri, Hannibal, 15.IX.1952. C.G.H.

Distribution

Missouri.

Male

Extremely similar to *facetus* Cresson; differing by the whitish tibiae III with dark apex and by the row of tyloides beginning on the second or third segment of flagellum. Differing from subspecies *annulatipes* and subspecies *quintilis* as follows: *mesoscutum* red-brown; the following pale yellow: two anteriorly diverging median stripes of *mesoscutum*, *prescutellar carinae*, a short stripe in front of the latter on each side of the *mesoscutum*, *sterna*, *mesopleura* and *propodeum*, the latter partially tinged with rufous; femora and abdomen yellowish-rufous, apices of anterior tergites indistinctly yellowish.

Remarks

Clearly intermediate mutants between subspecies *facetops* and subspecies *annulatipes* are sporadically found within populations of the latter subspecies. Such mutants differ from *facetops* only in having the *mesoscutum* and femora III entirely, the *mesosternum* partially black.

26. *Cratichneumon gracilior*, new species

Figs. 10, 25.

Types

Holotype.—♀, Maine, Dryden, 12.IX.1951. C.G.H.

Allotype.—♂, Quebec, Gatineau, 17.X.1956. C.G.H.

Paratypes.—3 ♀♀, Maine, Dryden; 2 ♀♀, North Carolina, Crabtree Meadow, C.G.H.; 5 ♀♀, Quebec, Wakefield, Aylmer, Sutton and Sweetsburg; 1 ♀, Ontario, Ottawa; 1 ♀, New York, Ithaca. C.N.C.

Distribution (females)

Quebec, Ontario, New York (C.N.C.); Maine, North Carolina (C.G.H.); Virginia (M.C.Z.).

Preamble

This is a very distinct species, chromatically belonging to the *w-album* group, but morphologically rather far differentiated from the rest by the bristle-

shaped flagellum and by the head structure; closely related only to *duplicatus* Say. The association of sexes is not definite; H. Townes considers the male, which is treated in this paper as a mutant of *vinnulus* (without black basal annulus on tibiae III), as matching; I doubt this, mainly because this male has not been caught in Maine, Quebec and Ontario where females are not very rare. But also my own interpretation of the male as given below is merely hypothetical.

Female

Head and thorax black with yellow pattern; mesoscutum usually with median mark, propodeum with two yellow marks; abdomen red; legs red including coxae; tibiae III somewhat infuscated with a rather small, usually not quite clearly defined, yellow mark dorsally beyond base; flagellum long, bristleshaped; no scopa; propodeum relatively short, area superomedia about as wide as long and usually confluent with area basalis; length 9-11 mm.

Flagellum.—Slender, bristleshaped, scarcely widened beyond middle, distinctly attenuated at apex, with 35-36 segments, the first more than twice as long as wide, the seventh square. Black with white annulus on segments 7 or 8 to 14 or 15.

Head.—Temple profile slightly narrowed with rounded outline; cheek profile distinctly narrowed with almost straight outline; malar space nearly as long as width of mandible base; cheeks not wide between eyes and carina genalis, not inflated; clypeus not depressed medially but rather a little convex, rounded at the sides; median field of face convex. Black; orbits of temples and usually also frontal and upper part of outer orbits yellow; clypeus, median field of face (or almost the whole face), frons in part, and anterior part of cheeks, reddish.

Thorax.—Mesoscutum more densely and distinctly punctured than in other species of the *w-album* group; propodeum rather short, area superomedia about as wide as long or a little transverse, hexagonal, usually confluent with area basalis; lower part of mesopleura very grossly and densely reticulate-punctate. Black, the following yellow: collare, pronotal ridge, sometimes apex of pronotal base, subalarum, usually median mark on mesoscutum, scutellum, postscutellum, carinal triangle and two marks of the propodeum (covering the areae posteroexternae, the apices of areae dentiparae and of areae spiraculiferae).

Legs.—Femora comparatively slender; coxae III densely punctured; no scopa. Red, including coxae; all tibiae with small yellowish mark dorsally beyond base; tibiae III and usually the narrow apex of femora III somewhat infuscated; coxae III extensively white marked on the dorsal side, externally usually blackish; trochanters reddish yellow.

Abdomen.—Short-oval, the second tergite wider at the apex than medially long; postpetiolus with distinct median field, finely irregularly rugose; second tergite densely and finely punctured nearly to the apex; gastrocoeli fairly distinct; ovipositor somewhat projecting. Red; petiolus black, postpetiolus usually apically yellowish at least laterally.

Male (tentative)

Similar to annulatus in the uniformly red colored coxae I-III; differing distinctly by the rounded, much less narrowed, temples and by the very densely punctured, almost opaque sculpture of the second tergite; chromatically distinguished by the presence of a white median mark on the mesoscutum and white marks on the propodeum; length 12 mm.

Flagellum. — Dorsally black, ventrally pale reddish brown, with bacilliform tyloides on segments 7-12 and white annulus on segments 13-18; scape pale reddish ventrally.

Head. — Temples broadly rounded, scarcely narrowed; malar space about one-third as long as the width of mandible base; clypeus with slight median impression; median field of face slightly prominent. Black; the following yellow: face, clypeus, orbits broadly around eyes (narrowly interrupted at vertex, broadly at malar space). Mandibles reddish.

Thorax. — Mesoscutum rather strongly punctured; scutellum convex, somewhat raised above postscutellum; carination of propodeum strong and complete; area superomedia small, as long as wide. Black; the following yellow: collare, pronotal ridge, subalarum, tegulae, median mark on mesoscutum, scutellum, postscutellum and a mark on areae posteroexternae.

Legs. — Uniformly red, including coxae and trochanters; tibiae and tarsi I and II dorsally yellowish; tibiae III with pale-yellow annulus beyond base, their base narrowly, and apex broadly, blackish brown; narrowly apex of femora III and tarsi III infuscated.

Abdomen. — Postpetiolus smooth; second tergite and the basal part of third tergite finely and densely punctured, almost opaque. Red, petiolus blackish.

27. *Cratichneumon duplicatus* (Say)

Fig. 5.

Ichneumon duplicatus Say, 1836, Boston, Journ. Nat. Hist., 1:230, ♂.

Types

Holotype. — ♂, probably lost.

In 1941 H. Townes saw in the Harris Collection (M.C.Z.) a specimen, partially damaged by dermestids, labelled in Say's handwriting "*duplicatus* Say", and doubtless from Say's collection, which he considered the type of the species. I searched for this type in the Harris Collection first in April, 1959 and then returned to Cambridge a second time during September, 1959 with the sole purpose of finding the type of *duplicatus* Say. I failed both times to rediscover it.

Neallotype. — ♀, New York, Farmingdale, C.H.T.

Distribution

According to H. Townes, 1951: "New York, New Jersey, West Virginia, Maryland". Not yet found in Canada or New England.

Preamble

H. Townes has seen the type and made notes on it. I do not doubt that his interpretation of the species is correct. The following redescription was based on the material in his collection.

Male

Resembles in appearance an oversized specimen of w-album and is also similar to acronictae. Differs from both by the head, and particularly temple, structure; temple profile not narrowed, temples wide, rounded; in vertical view carina occipitalis very deeply, almost angularly, curved inward toward ocelli; median field of face simply convex, not considerably prominent; the lateral longitudinal impressions shallow; clypeus not concave, rather slightly convex. Head and thorax with rich white pattern; mesoscutum with or without white median mark; mesopleura with or without white crossband; propodeum with more or less

complete white W-pattern; abdomen red-brown; color of legs extremely variable; length 14-18 mm.

Flagellum.—Dorsally black, ventrally obscure brownish, with elongate-oval tyloides on segments 6 or 7 to 16 or 17, the longest on segments 9-12 covering the whole length of the segments; white annulus on segments 14 or 15 to 23 or 24; scape ventrally yellow.

Head.—Temple profile scarcely narrowed, with curved outline; malar space nearly half as long as width of mandible base; cheeks fairly wide between eyes and carina genalis; carina oralis distinctly raised toward apex; clypeus not concave and without distinct median impression, its lateral borders oblique, almost rounded, anterior border projecting a little medially; median field of face convex but not strongly prominent, lateral impressions not pronounced. Black; the following yellow: mandibles except teeth, clypeus, face, orbits broadly around eyes, interrupted at malar space and often also at vertex; apex of cheeks usually black; sometimes yellow orbits reduced to narrow, incoherent stripes on frons, temples and outer orbits.

Thorax.—Mesoscutum distinctly and rather densely punctured; scutellum raised above postscutellum; carination of propodeum complete, area superomedia as long as wide or transverse. Black; the following yellow: collare, pronotal ridge, sometimes pronotal base in part or entirely, subalarum, usually tegulae, usually median mark of mesoscutum, scutellum, postscutellum, usually a transverse band on lower part of mesopleura, more or less extensive W-pattern on propodeum, which usually includes area superomedia and all of areae spiraculiferae, but is sometimes considerably reduced.

Legs.—Slender; femora comparatively longer than in *w-album*. Coxae I and II usually apically or entirely, coxae III dorsally white, rarely all coxae black; in southern specimens coxae III also ventrally whitish or reddish; trochanters I and II varying from black to reddish or white, trochanters III from black to red; femora black or (in southern specimens) red; tibiae and tarsi I and II fulvous or yellowish; tibiae III in northern specimens black with indistinct white mark dorsally beyond the base, in southern specimens basally white, apically blackish dorsally, reddish ventrally, the narrow base with or without infuscation; tarsi III pale, sometimes infuscated.

Abdomen.—Gastrocoeli scarcely indicated as a shallow, longitudinal, lateral impression at base of second tergite; thyridia obsolete. Rufous; petiolus more or less extensively black; postpetiolus apically and sometimes laterally yellowish.

Female

Related to gracilior, but legs III considerably longer, more slender and of black basic color; thyridia obsolete; mesoscutum more grossly punctured; temples wider. Head and thorax black without white pattern except collare, scutellum and postscutellum (and sometimes pronotal ridge and subalarum); abdomen red; legs mainly black including coxae and tibiae III; flagellum long, bristleshaped; no scopa; length 12 mm.

Flagellum.—Slender, bristleshaped, scarcely widened beyond middle, distinctly attenuated at apex, with 38 segments, the first fully twice as long as wide, the ninth square. Black with white annulus on segments 9-16.

Head.—Temple profile not narrowed with curved outline; cheek profile distinctly narrowed with straight outline; malar space fully as long as width of mandible base; cheeks long; clypeus with slightly rounded angles; carina oralis

somewhat raised. Black; frontal, vertical and temple orbits obscure red, temple orbits interiorly whitish; sometimes frons and vertex entirely red.

Thorax. — Mesoscutum coarsely, and fairly densely, punctured; lower part of mesopleura grossly and irregularly rugose-punctate; declivity of propodeum somewhat longer than horizontal part; carination distinct and complete, area superomedia hexagonal; mesolcus crenulate; apical border of area dentiparae not raised as in *gracilior*. Black; collare, scutellum and postscutellum white, sometimes also pronotal ridge and subalarum.

Legs. — Slender; femora, tibiae and tarsi III unusually elongate; coxae III shiny, fairly densely punctured, without trace of scopa. Legs III including coxae and tarsi black, anterior legs blackish brown; sometimes tibiae III dorsally with small whitish mark beyond base; trochantelli III fulvous; in one specimen (West Virginia) coxae I and II yellow marked.

Abdomen. — Postpetiolus irregularly and very finely rugose with few scattered punctures; second tergite evenly and densely punctured; gastrocoeli and thyridia obsolete. Red; petiolus basally black.

28. *Cratichneumon insulae*, new species

Types

Holotype. — ♀, Rhode Island, Westerly, 8.IX.1937, H. and M. Townes, C.H.T.

Paratype. — ♀, New Jersey, Moorestown, 23.VI.1939, C.H.T.

Distribution

New Jersey, Rhode Island.

Female

Head, abdomen and mesoscutum (medially or entirely) reddish brown; scutellum, pronotal ridge and orbits partially yellow; legs, including coxae, fulvous and reddish, the tibiae III dorsally at base and apex infuscated with small whitish mark beyond the base. Flagellum slender, bristleshaped; coxae III ventrally shiny, sparsely punctured, without scopa; length 9-10 mm.

Flagellum. — Bristleshaped, scarcely widened beyond middle, distinctly attenuated at the apex, with 31 segments, the first not much less than twice as long as wide, the seventh square. Black, with white annulus on segments 8-14-15; scape ventrally ferruginous.

Head. — Temple profile scarcely, cheek profile somewhat narrowed, with curved outlines; malar space distinctly shorter than width of mandible base; cheeks slightly inflated. Reddish brown, the following blackish brown: deepening above antennal sockets, ocellar and occipital regions; frontal, vertical and temple orbits yellowish tinted.

Thorax. — Mesoscutum shiny, distinctly and moderately densely punctured; declivity of propodeum somewhat less than twice as long as horizontal part; carination distinct and complete, area superomedia and basalis confluent, parallel-sided, forming a square central area. Reddish brown; the following black: sterna (entirely or partially), prepectus, middle of propleura, anterior, lower and upper border of mesopleura, anterior part of metapleura, areae coxales, base of areae superoexternae and sometimes lateral lobes of mesoscutum. The following yellow: collare, pronotal ridge, subalarum, tegulae, scutellum, postscutellum; areae posteroexternae indistinctly yellowish tinted.

Legs. — Moderately slender; coxae III shiny, not densely punctured, without scopa. Fulvous; all tibiae with whitish dorsal mark beyond base; tibiae III dorsally infuscated at base and apex; coxae I and II and all trochanters slightly yellowish-tinted.

Abdomen. — Slender; postpetiolus very finely alutaceous with few scattered punctures; second tergite densely and finely punctured; gastrocoeli small, subobsolete, thyridia fairly distinct. Uniformly rufous.

29. *Cratichneumon vescus* (Provancher)

Fig. 13.

Ichneumon vescus Provancher, 1877, Nat. Canad., 9:9, ♂.

Types

Holotype. — ♂, Quebec, Provincial Museum, Quebec, No. 685.

Neallotype. — ♀, Maine, Dryden, C.G.H.

Host

Protoboarmia porcelaria Gn. (C.N.C.).

Distribution

According to H. Townes, 1951: "Atlantic to Continental Divide in Canadian and Transition Zones". New records: British Columbia, Robson and Likely, (C.N.C.).

Male

Flagellum without annulus; mesoscutum usually without median mark; tergites 1-3 with broad yellow apical bands, 2 and 3 sometimes mainly yellow; the following tergites black; tibiae III yellow, apically broadly black; segment 1 or 1 and 2 of tarsi III partially infuscated; sterna and pleura black; mesopleura exceptionally marked with yellow. Oval tyloides on flagellar segments 4 or 5 to 10 or 11; femora stout; length 9-13 mm.

Flagellum. — Dorsally black, ventrally yellowish brown, without annulus, with longish oval tyloides on segments 4 or 5 to 10 or 11, the longest covering the basal $\frac{3}{4}$ of the length of the segments.

Head. — Temple profile rather strongly narrowed with slightly curved outline; malar space scarcely one-third as long as width of mandible base; median field of face convex, clypeus flat with straight apical border. Yellow; the following black: frons broadly, including the supraantennal cavity, ocellar region and occipital region down almost to mandible base.

Thorax. — Notauli anteriorly distinct; scutellum raised above postscutellum; carination of propodeum strong and complete, costulae usually distinct; area superomedia as long as wide or transverse. Black; the following yellow: collare, pronotal ridge, pronotal base apically, subalarum, tegulae, scutellum, postscutellum, rarely a small median mark on mesoscutum or a mark on mesopleura, usually two marks on areae posteroexternae.

Legs. — Femora stout. Lemon-yellow including all trochanters; the following black: femora I and II dorsally, femora III entirely, apex of tibiae III broadly, coxae III and segments 1 or 1 and 2 of tarsi III except their base and narrow apex.

Abdomen. — Postpetiolus very finely, irregularly rugose, shiny, with distinct median field; second and third tergites finely and rather densely punctured; gastrocoeli subobsolete, thyridia distinct, slightly oblique and somewhat wider than their interval. Black; tergites 1-3 with broad, yellow apical bands, often second

tergite yellow also at base; second and third tergites sometimes almost entirely yellow; the following tergites black, usually with narrowly obscure reddish apical borders.

Female

The association of the female described below with *vescus* male has been confirmed by rearing of a broad series of both sexes from the same host in Manitoba.

Head and thorax reddish brown with black pattern of variable extent; scutellum reddish brown like the mesoscutum; no white or yellow pattern; abdomen reddish brown; tibiae III yellowish, broadly black at apex; coxae III with small scopa; flagellum filiform, distinctly widened and flattened ventrally beyond middle; carination of propodeum weak and incomplete; thyridia transverse; length 7-9 mm.

Flagellum.—Exactly filiform, distinctly widened beyond middle, tapering somewhat toward base but not at apex, with 24-27 segments, the first about 1.3 times as long as wide, the fifth square, the widest about 2 times as wide as long. Black with white annulus on segments 7-11 or 12; scape ventrally reddish brown.

Head.—Temple and cheek profile distinctly narrowed with slightly curved outlines; malar space a little shorter than width of mandible base. Reddish brown with black pattern of varying extent. The following usually red: frons, vertex, outer orbits, clypeus and face except a blackish area on sides of latter; supraantennal cavity, occipital region and posterior part of cheek black.

Thorax.—Dorsally flat; mesoscutum and scutellum shiny, the former finely and fairly densely punctured; propodeum alutaceous, with weak, incomplete carination; costulae and lateral carinae of area posteromedia and area basalis obsolete. Reddish brown with black pattern of varying extent. The following usually black: sterna, propleura, mesopleura except middle, areae coxales. The following usually red: mesoscutum, scutellum, horizontal part and declivity of propodeum. In extreme mutants the black color may extend over the whole pleura and propodeum or the red color may occupy almost the whole thorax.

Legs.—Femora stout; coxae III ventrally shiny, finely and densely punctured, with small, black scopa. Femora III black, very rarely reddish brown; femora I and II varying from black to partially, or entirely, reddish brown as do coxae I and II; coxae III black; trochanters dorsally blackish, ventrally and apically obscure yellowish brown; tibiae III obscure yellowish or fulvous, broadly black at apex; tibiae and tarsi I and II obscure yellowish, the tibiae II usually apically a little infuscated; tarsi III reddish brown, the basal two or sometimes three segments blackish except the base and usually the apex narrowly.

Abdomen.—Postpetiolus alutaceous with fairly distinct median field; second tergite densely and finely, third tergite basally very finely punctured; thyridia distinct, relatively wide transversely. Reddish brown, petiolus blackish.

30. *Cratichneumon alternans* (Provancher)

Fig. 16.

Phygadeuon alternans Provancher, 1882, Nat. Canad., 13:335, 358, ♀.

Types

Holotype.—♀, (thorax only), Quebec, Provincial Museum, Quebec.

Distribution

Quebec.

Preamble

A thorax (not entire) without extremities is all that is left of the type. But this small fragment reveals one peculiar character: the carination of the propodeum is obsolete; the original description adds another important character: the tergites are basally infuscated. This is a common chromatic character of different males of this genus, but as a rule does not occur in females. In connection with the unusually small size recorded in the description and evident in the type-torso, the two characters mentioned above seem to be sufficient to secure the interpretation of this heretofore problematic species. The complete description below is based on two specimens from Quebec, both in the C.N.C.

Female

Very small, reddish brown variegated with black; scutellum and pronotal ridge close to yellowish; flagellum very short, filiform, with 23-25 segments; carination of propodeum almost obsolete; coxae III densely punctured, without scopa; horizontal part of propodeum distinctly shorter than the declivity; tergites 1-5 basally infuscated; length 4-6 mm.

Flagellum.—Exactly filiform, not attenuated at apex, hardly widened beyond the middle, a little tapering toward base, with 23-25 segments, the first 1.3 times as long as wide, the fourth square. Black with white annulus on segments 8-11, ventrally brownish at base; scape ventrally pale reddish.

Head.—Temple profile and cheek profile distinctly narrowed with curved outlines; malar space about two-thirds as long as width of mandible base. Black; clypeus and median field of face pale yellowish brown; orbits obscure reddish brown.

Thorax.—Mesoscutum and scutellum shiny, the former evenly and finely, not densely punctured; horizontal part of propodeum alutaceous, somewhat shiny, without distinct carination; from certain directions apex of area superomedia and the base of oblique costulae faintly visible. Black; the following reddish brown: collare, pronotal ridge, pronotal base, subalarum, tegulae, mesoscutum, scutellum, postscutellum, horizontal part of propodeum, areae spiraculiferae and middle of mesopleura extensively.

Legs.—Coxae III densely and finely punctured, without scopa. Yellowish brown; the following black: coxae II dorsally except at base, coxae III entirely except dorsally at base, femora III, tibiae III broadly at the apex; trochanters paler than the rest; femora I and II slightly darker.

Abdomen.—Postpetiolus almost smooth; second tergite finely and evenly, third tergite still more finely, punctured; gastrocoeli subobsolete, thyridia distinct. Reddish brown; tergites 1-5 basally extensively infuscated.

31. *Cratichneumon scitulus* (Cresson)

Ischnus scitulus Cresson, 1864, Ent. Soc. Phila. Proc., 3:193, ♂.

Ichneumon nanus Cresson, 1877, Amer. Ent. Soc. Trans., 4:184, ♀, (preocc.).

Amblyteles nanodes Cushman, 1925, Wash. Acad. Sci. Jour., 15:388, ♀, (new name).

Types

Holotypes.—*Ischnus scitulus* Cresson, ♂, Illinois, A.N.S. *Ichneumon nanus* Cresson, ♀, New York, A.N.S.

Distribution

According to H. Townes, 1951: "Atlantic to Continental Divide in Transition Zone". New records: Quebec, Ontario, Prince Edward Island (C.N.C.), Northern Maine (C.G.H.).

Male

A small species, almost identical in color with pteridis from which it is easily distinguished by the stouter femora III and by the sculpture of mesoscutum and second tergite which are shiny and distinctly punctured (alutaceous and opaque in pteridis); propodeum shorter than in pteridis, area superomedia transverse; carination tending to become incomplete, anterior part of area superomedia and the apices of costulae sometimes being obsolete; mesolcus not crenulate. Flagellum with annulus; mesoscutum, mesopleura partially and horizontal part of propodeum reddish brown in typical specimens (black in rare mutants); mesosternum and sometimes lower part of mesopleura yellowish white (in melanistic mutants black); trochanters I-III bright yellowish white; femora III red, apically black; tibiae III white, apically black; abdomen reddish brown, the anterior tergites in typical specimens with black basal bands, sometimes without infuscations; length 7-10 mm.

Flagellum.—Dorsally black, ventrally yellowish brown, with bacilliform tyloides on segments 4 or 5 to 11 or 12 and white annulus on segments 13 or 14 to 17 or 18; scape ventrally yellowish white.

Head.—Temple profile distinctly narrowed with curved outline; malar space subobsolete; median field of face somewhat prominent. Yellowish white; the following black: deepening above antennal sockets, middle of frons, ocellar region and occipital region.

Thorax.—Mesoscutum shiny, distinctly and rather densely punctured; propodeum short, area superomedia transverse; carination of anterior part of area superomedia and external part of costulae often obsolete. Usually mesoscutum, mesopleura and horizontal part of propodeum mainly reddish brown, propleura and metapleura black; in melanistic mutants mesoscutum, mesopleura and horizontal part of propodeum also mainly or entirely black; mesosternum yellowish white to a varying extent, usually almost entirely, white color sometimes extending over lower part of mesopleura, rarely reduced to middle of mesosternum only, exceptionally absent; the following also yellowish white: collare, pronotal ridge and base, subalarum, tegulae, scutellum, postscutellum, apex of prosternum and two marks on propodeum below apex of areae dentiparae.

Legs.—Femora rather stout. The following pale yellowish-white: coxae I and II entirely, apex of coxae III ventrally or their whole ventral side, all trochanters, tibiae and tarsi I and II, tibiae III except apex, tarsi III, the metatarsus sometimes slightly infuscated; femora I and II fulvous, femora III reddish brown turning into black toward the apex, sometimes entirely black; coxae III dorsally and laterally black, usually marked with red dorsally at base, sometimes ventrally at base.

Abdomen.—Postpetiolus smooth; the second tergite distinctly and rather densely punctured, shiny, gastrocoeli subobsolete, thyridia distinct. Reddish brown; petiolus usually partially black, tergites 2 and 3 with black basal bands, the following tergites sometimes narrowly infuscated at the base; rarely abdomen uniformly red without infuscations; apex of postpetiolus often yellowish tinted.

Female

Reddish brown, pleura and sterna with black pattern; scutellum not yellow; femora III apically, or entirely, black; tibiae III fulvous or reddish, apically black. Flagellum filiform, scarcely widened; coxae III finely punctured, without scopa; propodeum moderately short, weakly carinated, costulae and area superomedia anteriorly usually obsolete; second tergite finely, but distinctly punctured; ab-

domen rather narrow, the third tergite scarcely twice as wide as medially long; length 7-8 mm.

Flagellum.—Exactly filiform, scarcely widened beyond middle, with 24-25 segments, the first about 1.3 times as long as wide, the fourth or fifth square. Black with white annulus on segments 7 or 8 to 12, the basal segments ventrally brownish; scape ventrally reddish brown.

Head.—Temple profile and cheek profile distinctly narrowed, the former with slightly curved, the latter with almost straight, outline; malar space not quite as long as width of mandible base. Reddish brown; deepening above antennal sockets, ocellar region, and occipital region, black.

Thorax.—Mesoscutum shiny, sparsely punctured; propodeum moderately short, declivity less than twice as long as horizontal part, the latter alutaceous with weak and incomplete carination, costulae, anterior border of area superomedia and area basalis usually obsolete; lateral carinae of area superomedia slightly converging anteriorly, indicating an area about as wide as long or slightly longer than wide. Reddish brown without white or yellow pattern; the following black: prosternum, middle of mesosternum, prepectus, propleura, band below subalarum, area of mesopleura in front of coxae II, metapleura including area metapleuralis and area coxalis, sometimes only the latter.

Legs.—Stout; coxae III shiny, rather densely punctured, without scopa. Reddish brown; the following black: femora III apically or sometimes entirely, tibiae III apically, coxae III more or less extensively, sometimes almost entirely, usually only laterally; all trochanters, anterior tibiae and tarsi and base of tibiae III fulvous or pale yellowish red.

Abdomen.—Postpetiolus alutaceous; second tergite finely and densely punctured; third tergite basally still more finely punctured; gastrocoeli subobsolete; thyridia fairly distinct, not wider than their interval. Uniformly reddish brown.

Remarks

There is no real proof of the association of sexes, which was assumed from corresponding pattern, characters and distribution.

32. *Cratichneumon suadus* (Cresson)

Ichneumon suadus Cresson, 1877, Amer. Ent. Soc. Trans., 6:160, ♂.

Types

Holotype.—♂, Canada, A.N.S.

Distribution

According to H. Townes, 1951: "Quebec, New York, Rhode Island, Connecticut, Pennsylvania, Transition Zone". New records: Ontario (C.N.C.); Maine (C.G.H.).

Male

Somewhat similar to *paratus* and *vescus*; differing from both by the tarsi III being not infuscated basally and the flagellum being black ventrally, as well as dorsally. Differing from *paratus* furthermore by the more strongly narrowed temple profile, the yellow base of tibiae III and the black mesosternum, and from *vescus* by the white annulus of the flagellum and considerably more slender femora III.

Flagellum with annulus; mesoscutum, sterna and pleura not yellow marked; tergites 1-3, sometimes only 1-2 with yellow apical bands, the following tergites

black, sometimes the last obscurely reddish brown; tibiae III yellow, broadly black apically, tarsi III uniformly whitish; length 10-11 mm.

Flagellum.—Ventrally black as well as dorsally, with white annulus on segments 15-19 and with longish-oval tyloides on segments 6-14; scape ventrally yellow.

Head.—Temple profile strongly narrowed; malar space scarcely one-third as long as width of mandible base; median field of face prominent in the upper part; sides of clypeus slightly oblique and rounded, its anterior border very slightly curved with an indistinct indication of a median apical depression. Yellow; the following black: supraantennal cavity, frons broadly, ocellar region, occipital region extensively and downward close to mandible base.

Thorax.—Mesoscutum fairly strongly and densely punctured; notauli in the anterior third and sternali strongly impressed; scutellum raised above the post-scutellum; carination of propodeum sharp and complete; area superomedia as wide as long or transverse, usually not distinctly bordered anteriorly; mesolcus crenulate. Black; the following yellow: collare, pronotal ridge, apex of pronotal base, subalarum, tegulae, scutellum, postscutellum, carinal triangle and two marks on propodeum tending to form an incomplete W-pattern.

Legs.—Femora III considerably more slender than in *vescus*; coxae III densely and rather strongly punctured. Yellow; the following black: coxae III, femora III (except the narrowly reddish base), trochanters III dorsally in part, tibiae III broadly at the apex, femora I and II dorsally, tibiae I and II ventrally; femora I and II ventrally fulvous red.

Abdomen.—Postpetiolus extremely finely, irregularly rugose, almost smooth, with distinct median field; second tergite distinctly and more or less densely, the third very finely and rather indistinctly, punctured; thyridia distinct. Black, tergites 1-2 (type) or more often 1-3 with yellow apical band. The following tergites black, sometimes their narrow apices and the last tergite mainly obscure reddish.

Remarks

Several females not associated with males are described in this paper. Among them will perhaps be the other sex of *suadus*. There is neither proof nor even a strong reason for selecting any particular one as the matching sex. I therefore prefer to leave the problem entirely open rather than propose an association.

33. *Cratichneumon remanens*, new species

Types

Holotype.—♂, Maine, Dryden, June, 1959. C.G.H.

Paratypes.—7 ♂♂, Maine, Dryden; 2 ♂♂, North Carolina, Raleigh. C.G.H.
1 ♂, New York, Ithaca; 1 ♂, Ontario, Normandale. C.N.C.

Distribution

Maine, Ontario, New York, North Carolina.

Preamble

A well-distinguished, widespread and fairly common male; I have not found proof or even a good reason to associate it with any of the known females. Similar to *ritus* and most similar to *vinnulus* (the mutant without black base of tibiae III). Distinctly different from both species by the more abbreviated propodeum with transverse area superomedia and obsolete anterior part of the carination, by the denser and much finer puncturation of mesoscutum and mesopleura

and by the dorsally always entirely black coxae III. From *ritus* different in addition by the narrow temple profile and more slender femora III. Somewhat smaller than *vinnulus*.

Male

Carination of the anterior part of the propodeum obsolete; head and thorax black with rich white pattern; mesoscutum with median mark; mesosternum, major part of mesopleura and declivity of propodeum white; tibiae III white, apically broadly black; tarsi white; abdomen reddish brown except first segment; second tergite with irregular black median band, third with black basal band; coxae III black except ventrally; length 10-11 mm.

Flagellum.—Black, ventrally scarcely lighter, with lanceolate-bacilliform tyloides on segments 6-13 and with white annulus on segments 13 or 14 to 22 or 23; scape ventrally white.

Head.—Temple profile distinctly narrowed with curved outline; malar space subobsolete; clypeus without depression; median field of face slightly prominent. White; the following black: supraantennal cavity, ocellar region and occipital region.

Thorax.—Mesoscutum rather densely and finely punctured, only a little shiny; anterior third of notauli distinct; scutellum distinctly raised above post-scutellum; bordering carinae of area basalis and usually of anterior part of area superomedia obsolete, the latter wider than long; costulae strongly oblique, usually becoming obsolete anteriorly; mesolcus not in the least crenulate. Black; the following white: collare, pronotal ridge and base, subalarum, tegulae, median mark on mesoscutum, scutellum, postscutellum, apex of prosternum, mesosternum, at least lower half (often more) of the mesopleura (except a black mark in front of coxae II), whole declivity of propodeum including apex, or the whole, of areae spiraculiferae and sometimes apices of areae metapleurales and area superomedia.

Legs.—Pale yellow; femora I and II pale rufous; femora III black, in southern specimens rufous turning into black toward apex; apex of tibiae III broadly black; coxae III dorsally and laterally always black, white only ventrally; femora I and II sometimes dorsally infuscated.

Abdomen.—Red-brown; petiolus dorsally or also ventrally black, pale yellow laterally and at apex; second tergite with irregular blackish band beyond thyridia, indistinctly yellowish-tinted at apex; third tergite with black basal band. Second tergite distinctly and rather densely, the third more finely punctured; thyridia distinct.

34. *Cratichneumon vockerothi*, new species

Types

Holotype.—♀, New Hampshire, Mt. Washington, summit (6100-6288 ft.), 14.VIII.1958, J. R. Vockeroth, C.N.C. No. 7065.

Female

Head and abdomen mainly reddish brown; thorax black, posterior part of median lobe of mesoscutum and scutellum reddish brown; legs III mainly black, tibiae III medially reddish brown; flagellum slender, bristleshaped, not widened; coxae III with distinct scopa; length 10 mm.

Flagellum.—Bristleshaped, slender, not widened beyond the middle, slightly attenuated at the apex, with 34 segments, the first nearly twice as long as wide, the eighth square. Black with white annulus on segments 8-15; apex of basal segments brownish.

Head.—Temple profile not narrowed with slightly curved outline; cheek profile distinctly narrowed; cheeks long; malar space almost as long as width of mandible base; median field of face distinctly convex. Reddish brown; the following black: supraantennal cavity, lateral fields of face, occipital region narrowly and region next to carina occipitalis and genalis more broadly downward close to mandible base.

Thorax.—Mesoscutum and scutellum shiny, coarsely and sparsely punctured; propodeum strongly and densely punctured; carination sharp and complete, areae superomedia and basalis confluent. Black; the following reddish brown: collare, pronotal ridge narrowly, subalarum, tegulae, apical third of median lobe of mesoscutum and notauli, scutellum and postscutellum.

Legs.—Moderately slender; coxae III ventrally shiny, sparsely punctured, with considerable blackish scopa. Coxae I-III black; trochanters blackish brown; legs I and II including trochantelli reddish brown, the tarsi II somewhat infuscated; femora, tibiae and tarsi III black except reddish middle of tibiae.

Abdomen.—Postpetiolus irregularly, finely rugose with a few scattered punctures; second tergite finely and rather densely punctured; gastrocoeli subobsolete, thyridia distinct. Reddish brown, the first segment black except apex.

35. *Cratichneumon facetus* (Cresson)

Ichneumon facetus Cresson, 1867, Amer. Ent. Soc. Trans., 1:311, ♂.

Types

Holotype.—♂, Virginia, A.N.S.

Neallotype.—♀, Rhode Island, Westerley, 16.IX.1937, C.H.T.

Distribution

According to H. Townes, 1951: "Rhode Island, New York, Maryland, West Virginia, Virginia, North Carolina, Upper Austral Zone". New record: Michigan (C.G.H.).

Male

Flagellum with annulus; abdomen, femora III and tibiae III uniformly pale rufous; mesopleura extensively and sterna entirely white; mesoscutum red-brown; scutella, prescutellar carinae and pronotal ridge white; length 8-9 mm.

Flagellum.—Dorsally black, ventrally very pale brownish, with white annulus on segments 13 or 14 to 18, 19, or 20 and with narrow tyloides on segments 3, or 4 or 5 to 13 or 14; scape ventrally white.

Head.—Temple profile strongly narrowed with curved outline; malar space short, hardly one third as long as width of mandible base; median field of face slightly convex; apical border of clypeus straight without depression. White; the following black: supraantennal cavity, middle of frons, ocellar and occipital regions.

Thorax.—Mesoscutum finely and rather densely punctured; notauli obsolete; scutellum somewhat raised above the postscutellum; carination of propodeum not very strong but complete; area superomedia about as wide as long. Mesoscutum red-brown, usually more or less extensively black at anterior border and in front of scutellum; the following white: collare, pronotal ridge and base broadly, subalarum, tegulae, prescutellar carinae, scutellum, postscutellum, prosternum, mesosternum, mesopleura nearly entirely (in the upper part often pale rufous tinted), declivity of propodeum indistinctly. Rest of propodeum pale rufous; the following black: base of prepectus, middle of propleura narrowly,

short band on mesopleura below subalarum, sides of scutella and (in northern specimens) usually areae coxales.

Legs.—Moderately stout. Pale rufous; coxae and trochanters I and II white; trochanters III and all tarsi cream white with a slight rufous tint.

Abdomen.—Postpetiolus smooth and shiny; second and third tergites finely and densely punctured; gastrocoeli obsolete, thyridia narrow, fairly distinct. Uniformly pale rufous.

Female

Rufous; scutella and coxae and trochanters I and II white; tibiae III without light annulus or mark, slightly infuscated dorsally toward the apex; mesosternum black; flagellum filiform; no scopa; length 8-9 mm.

Flagellum.—Exactly filiform, not widened beyond middle, slightly tapering toward base, with 25 segments, the first 1.5 times as long as wide, the sixth square. Black with white annulus on segments 7-12; scape ventrally red.

Head.—Temple profile and cheek profile distinctly narrowed with slightly curved outlines; malar space about as long as width of mandible base. Pale reddish-brown; frontal and vertical orbits yellow; ocellar region and supraantennal cavity blackish brown.

Thorax.—Mesoscutum and scutellum flat, the former rather densely punctured; notauli obsolete; sternauli distinct; mesopleura including speculum strongly, densely and evenly, punctured; propodeum densely rugose-punctate, horizontal part not much shorter than declivity; carination complete; area superomedia a little longer than wide, narrowed anteriorly, hexagonal. Mesoscutum red-brown; the anterior border and cavity in front of scutellum black; rest of thorax rufous variegated with yellow and black; the following yellow or yellowish: collare, pronotal ridge and base, subalarum, tegulae and scutella. The following black: middle of propleura, prosternum except apex, mesosternum, prepectus, short band on mesopleura below subalarum, areae coxales.

Legs.—Stout; coxae III ventrally densely punctured, without scopa. Rufous; coxae and trochanters I and II yellowish; trochanters III yellowish-rufous; tibiae III dorsally slightly infuscated toward apex.

Abdomen.—Postpetiolus finely rugose; second tergite finely and very densely punctured; basal half of third tergite more finely and less densely punctured; gastrocoeli subobsolete, thyridia fairly distinct. Uniformly rufous.

36. *Cratichneumon pteridis* Townes

Fig. 28.

Phygadeuon proximus Provancher, 1874, Nat. Canad., 6:283, ♀, (preocc.).

Cratichneumon pteridis Townes, 1944, Amer. Ent. Soc. Mem., 11:339 (new name).

Types

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

Neallotype.—♂, Maine, Dryden, June, 1951, C.G.H.

Hosts

Protoarmia porcelaria Gn. and *Semiothisa* sp. (Manitoba), (C.N.C.).

Distribution

According to H. Townes, 1951: "Quebec, Maine, New Hampshire, New York, Pennsylvania, Canadian and Transition Zones". New records: Manitoba (C.N.C.); Ontario (C.G.H.).

Female

Red-brown; scutella yellow; femora III black, tibiae III brownish, black toward apex; flagellum filiform; no scopa; malar space long; second tergite alutaceous, not distinctly punctured; abdomen narrow; apex of areae dentiparae a little projecting; length 9-10 mm.

Flagellum.—Exactly filiform, not widened beyond middle, with 26-27 segments, the first a little more than 1.5 times as long as wide, the fifth or sixth square. Black with white annulus on segments 7-13; scape ventrally red-brown.

Head.—Temple profile and cheek profile rather strongly narrowed, the former with curved, the latter with straight, outline; cheeks long; malar space distinctly longer than width of mandible base; abscissula long. Red-brown, the clypeus usually infuscated; supraantennal cavity black.

Thorax.—Mesoscutum densely punctured, nearly opaque; notauli anteriorly distinct; horizontal part of propodeum scarcely one third shorter than declivity, densely rugose-punctate, nearly opaque; costulae and lateral carinae of area posteromedia obsolete; area superomedia hexagonal, usually a little longer than wide; areae dentiparae long, terminated by a slightly projecting corner. Red-brown; scutellum and postscutellum yellow; the following black: propleura extensively, base of prosternum narrowly, prepectus, small band on mesopleura below subalarum, usually mark on mesopleura in front of coxae II, areae coxales, scutellar sutures.

Legs.—Moderately slender; coxae III ventrally finely, and fairly densely, punctured, without scopa. Brown; the following black: femora II dorsally, femora III entirely, apex of tibiae III, dorsal marks on anterior coxae and trochanters, coxae III dorsally and laterally more or less extensively (except base).

Abdomen.—Relatively long and slender, sharply pointed at apex; ovipositor a little projecting; postpetiolus finely and irregularly longitudinally rugose; second tergite alutaceous without distinct puncturation; gastrocoeli obsolete; thyridia fairly distinct. Brown.

Male

Thorax red-brown variegated with black and yellow; flagellum with annulus; mesosternum and usually lower part of mesopleura yellow; coxae III dorsally, femora III entirely and apex of tibiae III black; coxae I and II and all trochanters bright yellow; abdomen brown, segments 2-6 basally more or less intensively infuscated. Mesoscutum densely and finely punctured, almost opaque; second tergite alutaceous without distinct puncturation; thyridia small, narrow; length 10-12 mm.

Flagellum.—Dorsally black, ventrally pale brown, with white annulus on segments 13-17 or 18 and with very narrow, bacilliform tyloides on segments 5-11 or 12; scape ventrally yellow.

Head.—Temple profile strongly narrowed, with curved outline; malar space short, about one third as long as width of mandible base; median field of face scarcely convex; clypeus flat with straight sides and straight apical border. Yellow; the following black: supraantennal cavity, middle of frons, ocellar and occipital region.

Thorax.—Mesoscutum densely and finely punctured, almost opaque; notauli anteriorly distinct; sternauli obsolete; carination of propodeum usually distinct and complete, costulae sometimes obsolete. Red-brown; the following yellow: collare, pronotal ridge and base, subalarum, tegulae, scutellum, postscutellum, prosternum (but usually not its extreme base), mesosternum, border of prepectus,

usually lower part of mesopleura more or less extensively, two marks on propodeum covering areae posteroexternae and their close environment. The following black: pronotum (except ridge and base), borders of mesoscutum narrowly, base of prepectus, mesopleura below subalarum and in front of coxae II, areae coxales and often areae metapleurales in part or entirely.

Legs.—Moderately slender. The following black: coxae III dorsally (base usually yellowish) and laterally more or less extensively, femora III and apex of tibiae III; coxae I and II and all trochanters bright yellow; tibiae and tarsi I and II yellowish; tibiae III yellowish brown, turning gradually paler toward base; tarsi III yellowish brown; coxae III ventrally reddish brown at base, usually yellow toward apex.

Abdomen.—Postpetiolus finely rugose; second tergite alutaceous, almost opaque; thyridia small and narrow. Brown; tergites 2-6 basally more or less intensively, sometimes very little, sometimes strongly, infuscated; apex of anterior tergites sometimes indistinctly yellowish.

37. *Cratichneumon flavipectus* (Provancher)

Fig. 11.

Cryptus flavipectus Provancher, 1879, Nat. Canad., 11:134, "♀" = ♂.

Ichneumon pygmaeus Davis, 1898, Amer. Ent. Soc. Trans., 24:350, ♀ (preocc.).

Cratichneumon ericaeus Townes, 1944, Amer. Ent. Soc. Mem., 11:335 (new name).

Types

Holotype.—*Cryptus flavipectus* Provancher, ♂, Quebec, Provincial Museum Quebec; *Ichneumon pygmaeus* Davis, ♀, New Hampshire, Mt. Washington, A.N.S.

Distribution

According to H. Townes, 1951: "New Hampshire to North Carolina in Transition, Upper Austral and Lower Austral Zones. Dry and mesophytic woods." New records: Maine, Quebec (C.G.H.); Ontario (C.N.C.).

Male

Flagellum with annulus; mesoscutum black with yellow median mark; mesosternum and the greater part of mesopleura yellowish white; propodeum black, red-brown and yellow; all trochanters and coxae I and II yellow; apex of femora III, of tibiae III and segment 1 or 1 and 2 of tarsi III blackish; abdomen red-brown, usually the anterior tergites (sometimes to the sixth) basally in decreasing extent infuscated. Second tergite alutaceous without distinct punctation; length 6-9 mm.

Flagellum.—Dorsally black, ventrally pale yellowish brown, with white annulus on segments 13 or 14 to 17 and with bacilliform tyloides on segments 3 or 4 to 13; scape ventrally yellow.

Head.—Temple profile strongly narrowed, with slightly curved outline; malar space very short, nearly obsolete; median field of face slightly projecting; clypeus flat with straight apical border. Pale yellow; the following black: supraantennal cavity, middle of frons, ocellar and occipital region.

Thorax.—Mesoscutum shiny, fairly densely punctured; scutellum relatively little raised above postscutellum; carination of propodeum distinct and complete; area superomedia about as wide as long or a little wider; pleura finely and sparsely punctured, shiny. Black; the following pale yellow: collare, pronotal ridge and base, subalarum, tegulae, median mark of mesoscutum, scutellum, postscutellum, prosternum, mesosternum, mesopleura up to above lower half and including

speculum, carinal triangle, declivity of propodeum, apex of areae coxales, metapleurales and spiraculiferae; a red-brown zone of transition between black base and yellow apex of propodeum.

Legs.—Moderately slender. The following whitish: all trochanters, coxae I and II, tibiae and tarsi I and II and apex of tarsi III, femora I and II pale rufous; femora III rufous, black at apex; tibiae III pale at base, running into rufous and then black toward apex; metatarsus III or segments 1 and 2 of tarsi III blackish except their narrow base and apex; coxae III rufous dorsally and laterally, ventrally whitish, usually with a black dorsal mark covering the apical cavity.

Abdomen.—Slender; postpetiolus shiny, almost smooth; second tergite finely alutaceous, without punctation; gastrocoeli obsolete; thyridia visible, narrow. Red-brown; petiolus or sometimes almost whole first segment black, usually indistinctly yellow at apex; usually the anterior tergites or sometimes even tergites 1-6 with blackish, infuscated base, gradually decreasing in width from segment to segment toward apex of abdomen; rarely tergites 2-4 uniformly rufous or the second tergite only with a bipartite blackish median mark.

Variability

Color comparatively constant; specimens from North Carolina show indistinct or no infuscation of the apex of femora III and of bases of the anterior tergites, but are otherwise identical.

Female

Small and slender species. Mesoscutum black, medially usually marked with obscure red-brown; scutella yellow; pleura and propodeum extensively red-brown; apex of tibiae III and usually of femora III and the metatarsus III blackish; abdomen red-brown, usually the base of the anterior tergites infuscated. Flagellum filiform; no scopa; second tergite alutaceous, not distinctly punctured; length 6-7 mm.

Flagellum.—Exactly filiform, not at all widened beyond middle, with 22-24 segments, the first about 1.3 times as long as wide, the fifth or sixth square. Black with white annulus on segments 7 or 8 to 11 or 12; basal segments ventrally more or less extensively brownish; scape ventrally red-brown.

Head.—Temple profile and cheek profile distinctly narrowed, the former with curved, the latter with almost straight outline; malar space a little longer than width of mandible base; carinae genalis and oralis meeting just before mandible base; abscissula nearly obsolete. Red-brown; supraantennal cavity, ocellar and occipital region black.

Thorax.—Mesoscutum shiny, finely and rather sparsely punctured; notauli not indicated except at the very base; horizontal part of propodeum almost as long as declivity; carination weak but complete; area superomedia a little longer than wide and confluent with area basalis; areae dentiparae and superomedia finely, usually transversally, rugose, nearly opaque. Black, variegated with red-brown; scutellum, postscutellum, collare and tegulae yellowish; the following red-brown: middle of mesoscutum usually, sometimes sutures between median and lateral lobes, pronotal ridge and base, usually middle of mesopleura more or less extensively, metapleura except base and areae coxales, declivity of propodeum and apex of its horizontal part.

Legs.—Moderately slender; coxae III ventrally finely and densely punctured, without scopa. Rufous; the following blackish: apex of tibiae III, metatarsus III (except narrowly its base and apex) and usually apex of femora III; all trochanters and coxae I and II slightly yellowish tinted.

Abdomen.—Postpetiolus very finely rugose; second tergite alutaceous, without punctures, nearly opaque; gastrocoeli obsolete, thyridia visible. Light red-brown; petiolus (rarely almost the whole first tergite) blackish; usually basal half of second and, more narrowly, the base of third to fourth or fifth tergite more or less distinctly infuscated.

38. *Cratichneumon rubricus* (Provancher)

Figs. 23, 24.

Phygadeuon rubricus Provancher, 1882, Nat. Canad., 13:335, 358, ♀.

Types

Holotype.—♀, Quebec, Provincial Museum Quebec.

Neallotype.—♂, Maine, Dryden, C.G.H.

Distribution

According to H. Townes, 1951: "Quebec, New York". New records (♀♀ and ♂♂): Maine (C.G.H.); (♂): Prince Edward Island (C.N.C.); (♀): Michigan (C.H.T.).

Female

Mainly red-brown including scutellum; usually no yellow pattern; last two or three tergites often, apex of tibiae III, femora III partially and sometimes tarsi III blackish. Propodeum abbreviated, declivity about twice as long as horizontal part medially; carination weak and incomplete; flagellum lanceolate, strongly widened beyond middle; no scopa; ovipositor relatively strongly projecting; length 8-9 mm.

Flagellum.—Lanceolate, short and stout, strongly widened and ventrally flattened beyond middle, distinctly attenuated toward apex, with 28 segments, the first about 1.3 times as long as wide, the third square, the widest fully twice as wide as long. Black with white annulus on segments 7-12; scape ventrally red-brown.

Head.—Temple profile and cheek profile distinctly narrowed, the former with slightly curved, the latter with almost straight, outline; malar space approximately as long as width of mandible base. Red-brown; supraantennal cavity black.

Thorax.—Mesoscutum flat, shiny, moderately densely punctured; horizontal part of propodeum short, about half as long as the declivity; carination weak and incomplete; costulae and lateral carinae of area posteromedia obsolete; area superomedia wider than long, not bordered by carinae anteriorly. Red-brown; the following black: basal half of prosternum, middle of propleura, narrow stripe on mesopleura below subalarum, mark in front of coxae II, areae coxales and scutellar sutures; in mutants scutellum indistinctly yellowish.

Legs.—Stout; coxae III ventrally shiny, finely and moderately densely punctured, without scopa. Red-brown; the following black: a small mark in the dorsal apical cavity of all coxae, femora III dorsally toward the apex more or less extensively or entirely, apex of tibiae III, sometimes segments of tarsi III except narrowly their base and apex; femora I and II dorsally infuscated; in mutants coxae yellowish.

Abdomen.—Postpetiolus with distinct median field, very finely, usually transversely, rugose; second tergite finely and fairly densely punctured, except at the apex; gastrocoeli obsolete, thyridia distinct; ovipositor strongly projecting. Red-brown, tergites 5 or 6-7 usually blackish.

Male

Propodeum more strongly abbreviated than in female; area superomedia strongly transverse, two to four times as wide as long; flagellum with annulus; thorax black (rarely extensively marked with red-brown); mesosternum usually with a white mark on each side of mesolcus; scutellum white; abdomen blackish, tergites 1-3 apically more or less extensively brown; all trochanters and coxae I and II white; tibiae III white with black apex; usually segments 1 and 2 of tarsi III partially infuscated; length 9-10 mm.

Flagellum.—Dorsally black, ventrally reddish brown with short, bacilliform tyloides on segments 4 or 5 to 11 or 12 and with white annulus on segments 13-17 or 18 or 19; scape ventrally yellow.

Head.—Temple profile distinctly narrowed, with slightly curved outline; malar space very short, subobsolete; median field of face moderately prominent above; clypeus flat with apical border straight and lateral corners right angled. Black; the following white: mandibles except teeth, clypeus, face, orbits around eyes including malar space and apex of cheeks (sometimes narrowly interrupted at vertex).

Thorax.—Mesoscutum shiny, finely and fairly densely punctured; notauli basally indicated; scutellum transverse, somewhat raised above postscutellum; propodeum strongly abbreviated with strong and complete carination; area superomedia always distinctly, often very much, wider than long, forming a strongly narrowed, transverse, stripe. Black; the following white: collare, pronotal ridge, usually apex of pronotal base, subalarum, tegulae, scutellum, postscutellum, sometimes two small marks on propodeum at apex of areae dentiparae, usually a mark on mesosternum on each side of mesolcus. Mesoscutum, pleura and propodeum sometimes variegated with dark red-brown.

Legs.—Femora stout. Pale yellow including coxae I and II; the following black: femora III, coxae III except their apex ventrally, apex of tibiae III, usually segments 1 and 2 of tarsi III toward their apices; femora I and II dorsally black, ventrally rufous.

Abdomen.—Postpetiolus shiny, finely, irregularly rugose; second tergite distinctly and rather densely, third tergite more finely, punctured; gastrocoeli subobsolete, thyridia distinct. Blackish; tergites 1-3 with obscure brownish apical bands, usually also base of second tergite brownish.

Variability

Male.—Five specimens from Quebec (C.N.C.) agree exactly with specimens from Maine, the thorax and abdomen being predominantly black as described above. One specimen from Prince Edward Island differs by strong reduction of melanin, the mesoscutum, pleura and abdomen being mainly red-brown, variegated with black.

Female.—In rare mutants scutellum, apex of pronotal ridge, and trochanters may be yellowish; such specimens are extremely similar to *rubricoides* but can be distinguished by the shorter propodeum and longer ovipositor.

39. *Cratichneumon rubricoides*, new species*Types*

Holotype.—♀, New York, Bemus Point, 17.VII.1937, H. K. Townes, C.H.T.

Allotype.—♂, Michigan, Ann Arbor, 10.VI.1959, C.G.H.

Paratypes.—1 ♀, New York, Bemus Point, 1 ♀, North Carolina, Mt. Mitchell. C.H.T.; 1 ♀, Quebec, Knowlton. C.N.C.

Distribution

Quebec (C.N.C.), New York, North Carolina, Michigan (C.H.T.).

Female

Closely related to *rubricus*, particularly in morphology of flagellum and propodeum; differing in the distinctly shorter ovipositor, somewhat less abbreviated propodeum and in chromatic characters.

Pale rufous; scutellum, all trochanters and pronotal ridge at least apically yellow; apex of tibiae III and sometimes of femora III infuscated; propodeum somewhat abbreviated, the declivity about 1.3 times as long as horizontal part medially; carination somewhat weak and incomplete; flagellum lanceolate; no scopa; ovipositor moderately projecting; length 7-9 mm.

Flagellum.—Lanceolate, short and stout, strongly widened and ventrally flattened beyond middle, distinctly attenuated toward apex, with 27-28 segments (specimen from North Carolina with 31), the first about 1.3 times as long as wide, the fourth square, the widest twice as wide as long. Black with white annulus on segments 7 or 8 to 12 or 13; scape ventrally rufous; basal segments ventrally brownish.

Head.—Temple profile and cheek profile distinctly narrowed, the former with slightly curved, the latter with almost straight, outline; malar space a little shorter than width of mandible base. Rufous; supraantennal cavity black.

Thorax.—Mesoscutum shiny, median lobe finely and moderately densely, the lateral lobes sparsely, punctured; horizontal part of propodeum considerably shorter than the declivity, finely rugose and sparsely punctured, almost opaque; carination of anterior part of area superomedia and of area basalis, sometimes also costulae, obsolete; area superomedia not wider than long. Rufous; the following yellow: collare, apex of pronotal ridge (sometimes the whole pronotal ridge), subalarum, scutellum, postscutellum. The following black: base of prosternum, base of prepectus, middle of propleura, marks on mesopleura below subalarum and in front of coxae II, areae coxales and scutellar sutures.

Legs.—Stout; coxae III ventrally shiny, moderately densely punctured, without scopa. Rufous; all trochanters yellowish; apex of tibiae III more or less strongly, and sometimes apex of femora III, infuscated.

Abdomen.—Postpetiolus finely rugose; second tergite finely and densely, third tergite more finely and less densely, punctured, both alutaceous between punctures; gastrocoeli subobsolete, thyridia indistinct. Uniformly rufous.

Male

The male described below matches the female so well in morphology and also in color that the association seems to be reasonably secure. Similar in color to *facetus* but differing in appearance by the shorter-oval abdomen and stouter femora.

Flagellum with annulus; legs including femora and tibiae III uniformly rufous; thorax rufous with yellow and some black pattern; scutellum and pronotal ridge yellow, mesosternum variegated with yellow; abdomen uniformly rufous; all trochanters and coxae I and II white. Propodeum abbreviated; tyloides beginning on second flagellar segment; length 8 mm.

Flagellum.—Dorsally black, ventrally red-brown, with bacilliform tyloides on segments 2-12 and white annulus on segments 13-17; scape ventrally yellow.

Head.—Temple profile but little narrowed with strongly curved outline; malar space about one-third as long as width of mandible base; anterior border

of clypeus straight, its lateral borders somewhat oblique; median field of face moderately prominent above. White; occipital region downward close to mandible base rufous; supraantennal cavity and ocellar region black.

Thorax.—Median lobe of mesoscutum rather densely, lateral lobes more sparsely punctured and shiny; scutellum transverse, raised above postscutellum; horizontal part of propodeum scarcely half as long as declivity; carination of its anterior part, costulae and lateral carinae of area posteromedia obsolete; area superomedia transverse. Rufous; the following yellow: collare, pronotal ridge and base, subalarum, tegulae, scutellum, postscutellum and the mesosternum (more indistinctly and partially mixed with rufous).

Legs.—Femora stout. Uniformly rufous, tibiae III scarcely infuscated apically; the following white: coxae I and II, all trochanters, coxae III ventrally at the apex, tip of femora I and II ventrally.

Abdomen.—Relatively short-oval; postpetiolus smooth and shiny; tergites 2 and 3 densely and finely punctured; gastrocoeli subobsolete, thyridia fairly distinct, small. Uniformly rufous.

40. *Cratichneumon rubricops*, new species

Types

Holotype.—♀, Maine, Phillips, 15.VIII.1956. C.G.H.

Allotype.—♂, Maine, Dryden, 4.VII.1959. C.G.H.

Paratypes.—2 ♀♀, 1 ♂, Maine, Dryden. C.G.H.; 2 ♀♀, Ontario, Orillia and Quebec, Knowlton, C.N.C.

Distribution

Maine (C.G.H.), Quebec, Ontario (C.N.C.), New York (C.H.T.).

Female

Related to *rubricus*, particularly in the abbreviated propodeum and wide abdomen with rather strongly projecting ovipositor; clearly distinguished by the temple profile not being narrowed, the flagellum scarcely being widened beyond the middle and not attenuated at the apex.

Mainly red-brown, including scutellum; no yellow pattern; femora III black; tibiae III except base and basal segments of tarsi III partially blackish; flagellum filiform, not distinctly widened beyond middle; declivity of propodeum nearly twice as long as horizontal part; temple profile not narrowed; no scopa; length 7 mm. (See also paragraph *Variability* below).

Flagellum.—Filiform, scarcely widened beyond middle, not attenuated at apex, tapering toward base, with 25 or 26 segments, the first 1.3 times as long as wide, the fifth square. Black with white annulus on segments 7-12 or 13; scape ventrally red-brown.

Head.—Temple profile not narrowed, with curved outline; cheek profile little narrowed, with very slightly curved outline; malar space a little shorter than width of mandible base. Red-brown; supraantennal cavity black.

Thorax.—Mesoscutum finely and fairly densely punctured; declivity of propodeum about twice as long as horizontal part medially; carination rather weak, costulae, lateral carinae of area posteromedia and anterior border of areae superomedia subobsolete or obsolete. Red-brown; the following black: prosternum, mesosternum, propleura, marks of mesopleura below subalarum and in front of coxae II, areae coxales and sutures of scutella.

Legs.—Femora stout; coxae III ventrally shiny, densely punctured, without scopa. Red-brown; the following black: femora III, tibiae III except base, two basal segments of tarsi III, all coxae partially and femora I and II dorsally more or less distinctly.

Abdomen.—Postpetiolus very finely rugose-alutaceous; second tergite finely and densely, third tergite more finely and sparsely punctured; gastrocoeli subobsolete, thyridia fairly distinct; second tergite apically distinctly wider than medially long; third tergite at least three times as wide as long; ovipositor projecting. Uniformly red-brown.

Variability

One female from New York, Poughkeepsie, has yellowish scutellum, rufous femora III and in general reduced black pattern. The species thus seems to follow the general rule of geographical variability.

Male (tentative)

Flagellum with annulus; thorax black; scutellum and pronotal ridge white; abdomen red-brown, tergites with black basal bands; coxae and trochanters I and II white, III black; femora III black, tibiae III blackish, brownish at base; tarsi III red-brown or basally infuscated; propodeum abbreviated; malar space subobsolete; length 8 mm.

Flagellum.—Dorsally black, ventrally yellowish brown, with bacilliform tyloides on segments 5-12 and with white annulus on segments 11-15 or 16.

Head.—Temple profile not narrowed, with curved outline; malar space subobsolete; anterior border of clypeus straight. Black; the following white: mandibles except teeth, clypeus, face, orbits around eyes including apex of cheeks and malar space.

Thorax.—Mesoscutum rather densely punctured, median lobe opaque; scutellum transverse, somewhat raised above postscutellum; declivity of propodeum twice as long as horizontal part; carination distinct and complete; area superomedia moderately transverse, not quite twice as wide as long. Black; the following white: collare, pronotal ridge, apex of pronotal base, subalarum, tegulae, scutellum, postscutellum, sometimes two small marks on propodeum below apex of areae dentiparae.

Legs.—Femora stout. Coxae and trochanters I and II white (coxae II except base); coxae, trochanters and femora III black; tibiae and tarsi I and II pale rufous; femora I and II ventrally rufous, dorsally blackish or blackish brown; tarsi III pale brownish, the basal segments sometimes blackish except base and apex; tibiae III basally brownish, turning gradually blackish for the apical two-thirds of their length; trochantelli III yellowish.

Abdomen.—Postpetiolus almost smooth, irregularly and finely rugose; second tergite distinctly and very densely, the basal half of the third more finely but also densely and distinctly punctured; gastrocoeli subobsolete, thyridia distinct. Red-brown; all tergites, except the last, with black basal bands which cover more than half the first and second tergites and decrease in length gradually toward apex of abdomen.

41. *Cratichneumon boreoalpinus*, new species

Types

Holotype.—♀, Newfoundland, St. John's, Howard E. Evans, C.N.C. No. 7060.

Paratype.—♀, New Hampshire, Mt. Washington, Lakes of the Clouds, 29. VIII.1954, Becker, Munroe and Mason, C.N.C.

Distribution

Nearctic-boreoalpine: Mt. Washington, Newfoundland.

Female

Reddish brown; scutellum somewhat raised above postscutellum, dorsally flattened, its apex laterally and the pronotal ridge narrowly yellow; flagellum slender, bristleshaped; no scopa; mesoscutum, second and third tergite finely and densely punctured; legs rather slender, reddish brown including coxae; length 8 mm.

Flagellum.—Bristleshaped, slender, widened beyond middle and distinctly, though not strongly attenuated at apex, with 30-31 segments, the first a little less than twice as long as wide, the fifth square, the widest not quite as wide as long. Reddish brown with fairly indistinct annulus on segments 7-11 (type) or 9-11 (paratype).

Head.—Temple profile and cheek profile distinctly narrowed, with slightly curved outlines; malar space little shorter than width of mandible base; median field of face but slightly convex; face and clypeus finely punctured. Reddish brown; frontal and vertical orbits yellow; no dark pattern in the paratype; in the type, frons, ocellar region, temples and occipital region, blackish brown.

Thorax.—Mesoscutum relatively strongly convex, finely and densely punctured, a little shiny; notauli anteriorly distinct; scutellum somewhat raised above postscutellum, dorsally flattened, apically a little truncate; propodeum densely rugose-punctate, almost opaque; carination not strong, but complete; area super-omedia hexagonal, about as wide as long. Reddish brown; the following yellow: collare, pronotal ridge and base narrowly, subalarum, tegulae and the apex of scutellum laterally; no black pattern in the paratype; the following blackish in the type: propleura and prepectus partially, band of mesopleura below subalarum, sutures of scutellar region.

Legs.—Rather slender; coxae III finely and fairly densely punctured, shiny, without scopa. Uniformly reddish brown, anterior coxae lighter.

Abdomen.—Postpetiolus densely and finely rugose; second and third tergite densely and finely punctured; gastrocoeli subobsolete, thyridia fairly distinct; ovipositor a little projecting. Uniformly reddish brown.

42. *Cratichneumon pertenuis*, new species

Types

Holotype.—♀, New York, Ithaca, 23.VI.1935. C.H.T.

Female

Related to *boreoalpinus*; differing by the more abbreviated propodeum and more elongate flagellar segments.

Red-brown; thorax with some black pattern; scutellum yellowish; declivity of propodeum nearly twice as long as the horizontal part; no scopa; flagellum bristleshaped, slender, not at all widened beyond middle; length 8 mm.

Flagellum.—Bristleshaped, not widened beyond middle, distinctly attenuated at apex, with 30 segments, the first more than twice as long as wide, the eighth square. Black, with white annulus on segments 9-13; scape ventrally rufous.

Head.—Temple profile slightly, cheek profile distinctly, narrowed, the former with curved, the latter with almost straight, outline; malar space two-thirds as long as width of mandible base. Red-brown; supraantennal cavity black.

Thorax.—Mesoscutum finely and rather densely punctured; anterior third of notauli distinct; scutellum slightly raised above postscutellum; declivity of propodeum nearly twice as long as horizontal part medially; carination distinct; area superomedia wider than long, weakly bordered anteriorly. Red-brown; scutellum yellowish; the following black: base of prosternum, middle of propleura, prepectus, mesolcus, a mark on mesopleura below subalarum and one in front of coxae II, areae coxales and scutellar sutures.

Legs.—Fairly slender; coxae III ventrally densely punctured, without scopa. Uniformly rufous including coxae; tibiae III apically slightly infuscated.

Abdomen.—Postpetiolus very finely, irregularly rugose; second tergite finely and densely, the third basally indistinctly, punctured. Uniformly rufous.

43. *Cratichneumon brevipennis* (Cresson)

Fig. 38

Ichneumon brevipennis Cresson, 1864, Ent. Soc. Phila. Proc., 3:174, ♀.

Ischnus volens Cresson, 1864, Ent. Soc. Phila. Proc., 3:192, ♂.

Ichneumon brevipennis var. *obsoletus* Riley, 1877, Ins. Mo. Ann. Rpt., 9:55, ♀.

Cratichneumon brevipennis Heinrich, 1959, Ent. News, 70:214, ♀ ♂.

Types

Holotypes.—*Ichneumon brevipennis* Cresson, ♀, Colorado, A.N.S. *Ischnus volens* Cresson, ♂, Virginia, A.N.S. *Ichneumon brevipennis* var. *obsoletus* Riley, type lost.

Host

According to H. Townes, 1951 (*volens*): "*Protoleucania albilinea* (Hbn.)."

Distribution

According to H. Townes, 1951 (*brevipennis*): "Colorado"; (*volens*): "Atlantic to 100° W. in Upper Austral Zone. Grassy, overgrown fields". New records: (♂) Maine (C.G.H.); (♀) Ontario (C.N.C.); (♂) Rhode Island, Florida (C.H.T.).

Preamble

This species and the following have several unusual characters, such as the striking wrinkles of the frons and the sculpture of the anterior tergites, which indicate a far-advanced separation from the other species of the genus and could be considered sufficient for generic distinction. The males, however, in which these characters are developed in a considerably lesser degree, seem scarcely to be separable from the genus *Cratichneumon*.

Female

Ferruginous, with restricted black pattern; frons concave with very strong vertical wrinkles; second and third tergites opaque, the second extremely densely punctured, the third alutaceous between punctures; flagellum filiform; gastrocoeli subobsoletæ, thyridia distinct; large scopa; length 12 mm.

Flagellum.—Filiform, with 35 segments, the first about 1.3 times as long as wide, the sixth square, the widest 1.5 times as wide as long. Ferruginous without distinct annulus.

Head.—In front view nearly square; cheeks long; frons concave with several, irregular, strongly prominent wrinkles, the median pair running convergently from the ocellar region downward and meeting in the middle of the antennal cavity. Ferruginous.

Thorax.—Scutellum flat, shiny, scarcely punctured; carination of propodeum strong and complete; area superomedia hexagonal, sometimes without anterior

carina, scarcely wider than long. Ferruginous; the following black: prosternum basally or entirely, mesosternum medially or to region of sternauli, region of mesopleura in front of coxae II, prepectus partially, sometimes propleura medially and areae coxales.

Legs.—Coxae III with large scopa. Ferruginous.

Abdomen.—Gastrocoeli subobsolete, thyridia very distinct; postpetiolus punctate and longitudinally rugose (type) or punctate only; tergites 2 and 3 opaque, the second tergite very densely punctured, without intervals between punctures, the third less densely punctured, alutaceous between punctures. Ferruginous; tergites 2 or 3 to 4 with black basal bands.

Male

Ferruginous, thorax more or less extensively black, scutellum yellow; tergites 1-4 or 5 with black basal bands; apex of tibiae III and tarsi III usually blackish, tibiae III often with a slight yellow tint beyond base; flagellum reddish brown, usually with white annulus. Postpetiolus smooth and shiny, tergites 2-4 extremely densely punctured, opaque; frontal wrinkles much less strongly developed than in the female but still distinct; ocellar region slightly raised above level of vertex; length 12-14 mm.

Flagellum.—Reddish brown, ventrally somewhat lighter, with short-oval tyloides on segments 6-19 or 20 and with white annulus on segments 13 or 14 to 19 or 20 or even 22; specimens without annulus occur but their status remains uncertain.

Head.—Temple profile not narrowed, with curved outline; malar space less than half as long as width of mandible base; wrinkles on frons as in the female but considerably less strongly developed; median field of face slightly convex; carina oralis somewhat raised. Black, ferruginous and yellow; the following yellow: mandibles except teeth, clypeus, face and sometimes outer orbits partially and intergrading with reddish; the following black: deepening above antennal sockets, middle of frons, ocellar and occipital regions more or less extensively; the rest ferruginous.

Thorax.—Mesoscutum rather strongly and densely punctured; scutellum convex, smooth and shiny; carination of the propodeum distinct and complete except the anterior carina of area superomedia which is often lacking. Mesoscutum and propodeum partially or entirely ferruginous; sterna and pleura more or less extensively, sometimes entirely, black; the following yellow: collare, pronotal ridge, sometimes pronotal base, subalarum, tegulae, scutellum, postscutellum and often not clearly defined marks on areae posteroexternae.

Legs.—Slender. Ferruginous, tibiae and tarsi I and II fulvous, usually apex of tibiae III and tarsi III blackish (sometimes ferruginous like the rest); coxae and trochanters I and II yellow, coxae III ferruginous, sometimes ventrally and dorsally yellow marked; tibiae III usually yellowish-tinted beyond the base.

Abdomen.—Postpetiolus polished; tergites 2-5 finely and extremely densely punctured, opaque; thyridia distinct. Ferruginous; tergites 1-4 or 5 with black basal bands, decreasing gradually in width toward apex of abdomen.

Remarks

All males from New England I have seen have a white annulus on the flagellum (the type of *volens* has no flagella). Cresson mentions in the original description that the annulus may be present or absent. In C.H.T. is a series of males from Maryland without flagellar annulus. The status of this form needs further investigation.

44. *Cratichneumon howdeni*, new species

Types

Holotype.—♀, North Carolina, Southern Pines, H. & A. Howden, C.H.T.

Distribution

North Carolina.

Female

Closely related to *brevipennis* Cresson and agreeing with it in the wrinkled frons and dense, opaque sculpture of tergites 2 and 3. Differing in the more slender thorax, abdomen and femora III, the prominent white annulus of the flagellum, and sculpture of the postpetiolus.

Ferruginous, black pattern restricted to a basal band on the third tergite; apex of tibiae III and tarsi III infuscated; frons concave, with strong, vertical wrinkles; flagellum subfiliform with white annulus and black apex; scopa distinct; gastrocoeli subobsolete, thyridia distinct; length 13 mm.

Flagellum.—Subfiliform, distinctly widened beyond middle and somewhat attenuated toward apex, with 37 segments, the first about 1.5 times as long as wide, the 9th square, the widest about twice as wide as long. Brown, with clearly defined white annulus on segments 8-15, the following segments black.

Head.—In front view nearly square; cheeks long; frons concave with strongly prominent longitudinal wrinkles; longitudinal impression of malar space, usually separating face and cheeks, obsolete; mandibles robust with stout, blunt, upper tooth. Ferruginous.

Thorax.—Median longitudinal diameter of mesoscutum distinctly longer than the median transverse diameter; scutellum slightly convex, shiny, scarcely punctured, mesoscutum densely and coarsely punctured; carination of propodeum strong and complete; area superomedia hexagonal, narrowed anteriorly, in contrast to *brevipennis*, distinctly longer than wide; apices of areae dentiparae prominent; meso- and metapleura extremely strongly reticulate-rugose. Uniformly ferruginous.

Legs.—Comparatively slender; femora III fully three times as long as medially wide; coxae III with distinct scopa, ventrally shiny with scattered punctures. Ferruginous; apex of tibiae III and tarsi III infuscated.

Abdomen.—Narrower than in *brevipennis*; the second tergite medially a little longer than apically wide (in *brevipennis* apically considerably wider than medially long); postpetiolus irregularly, longitudinally striate; gastrocoeli subobsolete, thyridia distinct; second and third tergite opaque. Ferruginous, third tergite with black basal band.

45. (?) *Cratichneumon pectoralis* (Say)

Ichneumon pectoralis Say, 1829, Contrib. Maclur. Lyc. Phila., 1:72, ♂.

Type

Holotype.—♂, Indiana, lost.

Male

Extract from the original description (using my terminology).

Black, abdomen rufous with black basal bands ("incisures") of tergites; antennae blackish with white annulus on segments 13-16; the following are yellow: face, clypeus, orbits, pronotal ridge, subalarum, scutellum and legs; femora III and apex of tibiae III rufous tinted; "pleura black; pectus black with a large yellow spot between the intermediate and posterior feet"; length over (1/5 inch =) 5 mm.

The type of this species is lost. No specimen has ever been found matching the fragmentary original description. From the wording above it must be concluded that the yellow spot, after which the species evidently was named, was situated on the metapleura ("between intermediate and posterior feet"), and that the mesopleura and the mesosternum were entirely black. If this is so, and if the legs were really yellow I have never seen a *Cratichneumon* species even similar to the description and I doubt that the type belonged to this genus.

Because of lack of sufficient information it is impossible to insert this species in the key to *Cratichneumon* species. It is added here for completeness.

7. Genus *Homotherus* Foerster

Homotherus Foerster, 1868, Verh. Naturh. Ver. Preuss. Rheinland, 25:185.

Type-species.—*Ichneumon locutor* Thunberg (see key to genera footnote 5).

The type-species of this genus differs from the bulk of *Cratichneumon* species only in one diagnostic character: the shape of thyridia and gastrocoeli. These are strongly transverse, their interval being narrower than one of them. In this regard the group agrees with *Aoplus* Tischbein, linking the latter with *Cratichneumon*. As a matter of fact it is rather difficult to distinguish *Homotherus* from *Aoplus*, as the external differences are very subtle. But in spite of this similarity I am convinced that *Homotherus* is much more closely related to *Cratichneumon* than to *Aoplus*. Here again a biological character seems to be important. All *Aoplus* species hibernate, none of the species of *Cratichneumon* and *Homotherus* do. In cases where the taxonomic position of a particular species seems to be doubtful, this biological character may be regarded as deciding. Otherwise we depend for the recognition of this genus on the following characters:

Female

Mesoscutum shiny (usually opaque in *Aoplus*); gastrocoeli and thyridia running parallel with the anterior border of the second tergite (oblique, forming a considerable angle with the anterior border of the tergite in *Aoplus*), poorly defined, scarcely impressed, fading toward the center of the segment (clearly defined, well impressed and not fading medially in *Aoplus*); last tergite never with white mark; flagellum usually filiform.

Male

More difficult to distinguish from *Aoplus* than the female; thyridia more distinctly impressed and defined than in the latter (although not quite as distinct as in *Aoplus* male), somewhat removed from the anterior border of the second tergite and sometimes oblique. Differing from *Aoplus* mainly in sculpture, especially in the shining mesoscutum and propodeum and the more prominent carination including costulae.

Homotherus species are included in the key to the species of *Cratichneumon*.

1. *Homotherus semiaoplus*, new species

Types

Holotype.—♀, Maine, Dryden, 23.VII.1959. C.G.H.

Allotype.—♂, Maine, Dryden, 3.VIII.1959. C.G.H.

Paratypes.—3 ♀♀, 1 ♂, Maine, Dryden. C.G.H.; 2 ♂♂, Quebec, Wakefield and Cascapedia. C.N.C.; 4 ♂♂, Quebec, Stoneham. C.H.T.

Distribution

Maine (C.G.H.), Quebec (C.N.C. and C.H.T.), West Virginia (C.G.H.).

Preamble

This species comes very close to *Aoplus* in its general appearance as well as in the bristleshaped structure of the female flagellum. I prefer to consider it a *Homotherus* species, because the thyridia of the female are only weakly indicated and not oblique and because the mesoscutum of the male is shiny and the carination of its propodeum is sharp and complete. I suppose that the female will not be found hibernating; otherwise the generic position of this species should be changed.

Female

Rufous; scutellum and pronotal ridge white; orbits broadly, all trochanters and usually coxae I and II partially white; femora III varying from rufous to blackish; tibiae III apically infuscated. Flagellum bristleshaped, little widened beyond middle; no scopa; thyridia transverse, but rather indistinct and scarcely impressed; abdomen fairly slender and apically attenuated; length 9-10 mm.

Flagellum—Bristleshaped, a little widened beyond middle, distinctly attenuated at apex, with 31-33 segments, the first fully twice as long as wide, the seventh or eighth square, the widest nearly 1.5 times as wide as long. Black with white annulus on segments 8-13 or 14; scape ventrally rufous.

Head.—Temple profile and cheek profile distinctly narrowed with slightly curved outlines; malar space a little shorter than width of mandible base; median field of face distinctly convex. Rufous; orbits usually white except temple region and lower part of face, sometimes, however, broadly white all around the eye; supraantennal cavity and sometimes ocellar region black.

Thorax.—Anterior third of notauli distinct; median lobe of mesoscutum fairly densely, lateral lobes more sparsely, punctured and shiny; scutellum a little raised above postscutellum; declivity of propodeum about 1.5 times as long as horizontal part medially; carination not very sharp, costulae and anterior border of area supermedia subobsolete or obsolete. Red-brown; the following white: collare, pronotal ridge partially or entirely, sometimes apex of pronotal base, subalarum, tegulae partially, scutellum, postscutellum, sometimes two more or less distinct marks on areae posteroexternae; the following black: base of prosternum, prepectus entirely or basally, middle of propleura, marks on mesopleura below subalarum and in front of coxae II, areae coxales entirely or partially.

Legs.—Moderately slender; coxae III ventrally densely punctured, shiny, without scopa. Rufous; the following white or yellowish: all trochanters, coxae I, coxae II apically more or less extensively; tibiae III apically infuscated; femora III varying from clear rufous to blackish.

Abdomen.—Longish and slender, gradually attenuated toward apex; ovipositor a little projecting; postpetiolus finely alutaceous-rugose, almost opaque; second tergite very finely punctured, alutaceous between punctures; gastrocoeli obsolete; thyridia transverse, barely distinct and very superficial. Uniformly rufous.

Male

Flagellum with annulus; red-brown; scutella and pronotal ridge white; coxae I and II and all trochanters white; base of trochanters III and apex of coxae III black as are the apices of femora and tibiae III; tarsi III infuscated; pleura and sterna not white marked; length 8-10 mm.

Flagellum.—Dorsally black, ventrally obscure brownish, with bacilliform tyloides on segments 4 or 5 to 11 or 12 and with white annulus on segments 12 or 13 to 16 or 17; scape ventrally white.

Head.—Temple profile strongly narrowed, with curved outline; malar space short, about one-third as long as width of mandible base; median field of face

also frons and vertex more or less extensively red-brown; sometimes frontal orbits and marks on vertical orbits yellow.

Thorax.—Basal third of notauli distinct; mesoscutum shiny, fairly densely punctured; declivity of propodeum about 1.4 times as long as horizontal part; carination complete; area superomedia hexagonal, about as wide as long; costulae distinct. Red-brown; the following black: prosternum, prepectus, mesosternum, propleura, band below subalarum, mesopleura in front of coxae II, areae coxales, scutellar sutures, rarely lateral lobes and anterior part of mesoscutum.

Legs.—Moderately stout; coxae III ventrally densely and finely punctured, shiny, without scopa. Reddish brown; the following black: coxae II laterally, coxae III except ventrally and narrowly at the base dorsally, femora III, trochanters III except apex, apex of tibiae III; in melanistic mutants coxae II and III may be entirely black; femora I and II usually dorsally infuscated.

Abdomen.—Postpetiolus distinctly and densely irregularly rugose; second tergite finely alutaceous, without distinct punctures, following tergites smooth; thyridia transverse, very superficial and sometimes hardly recognizable. Uniformly red-brown, petiolus basally black.

Male

Flagellum with annulus; thorax black, variegated with vivid red-brown; scutellum and pronotal ridge yellow; abdomen red-brown, coxae I and II and all trochanters yellow; femora III entirely, tibiae III apically black; tarsi III and basic color of tibiae III yellowish red. Gastrocoeli distinct, transverse, oblique; malar space short; length 8-9 mm.

Flagellum.—Dorsally black, ventrally obscurely brownish with narrow bacilliform tyloides on segments 4 or 5 to 12 and with white annulus on segments 13 or 14 to 17 or 18; scape ventrally yellow.

Head.—Temple profile strongly narrowed with curved outline; malar space scarcely one-third as long as width of mandible base; median field of face moderately convex. Black; the following pale yellow: mandibles except teeth, clypeus, face, frontal and vertical orbits, cheeks including malar space upward to temple region.

Thorax.—Anterior third of notauli distinctly impressed; median lobe of mesoscutum densely, lateral lobes sparsely, punctured, shiny; scutellum raised above postscutellum; carination of propodeum sharp and complete; area superomedia transverse. Black, variegated with vivid red-brown, or red-brown variegated with black; the following pale yellow: collare, pronotal ridge and base, subalarum, tegulae, scutellum, postscutellum and more or less extensively the region below apex of areae dentiparae; the following red-brown: middle of mesoscutum, middle of mesopleura and propodeum except base and areae coxales. The red-brown color may be reduced on propodeum and mesopleura or spread over most of mesopleura and all the mesoscutum.

Legs.—Moderately slender. The following black: coxae III, femora III and apex of tibiae III. The following pale yellowish-white: all trochanters, coxae I and II, usually narrow apex of coxae III ventrally, tibiae and tarsi I and II, femora I and II ventrally and the narrow base of tibiae III indistinctly, the latter turning gradually pale reddish toward the black apex; femora III sometimes ventrally, or in part, red-brown.

Abdomen.—Postpetiolus shiny, indistinctly sparsely rugose; first tergite very finely and fairly densely punctured; thyridia transverse, very distinct, oblique. Red-brown; first segment basally black or all but apex of postpetiolus black.

3. *Homotherus porcelariae*, new species

Figs. 15, 40.

Types

Holotype.—♀, Manitoba, Treesbank, ex *Protoarmia porcelaria* Gn. 29.V.1939. C.N.C. No. 7062.

Allotype.—♂, Manitoba, Treesbank, ex *Semiothisa* sp. C.N.C. No. 7062.

Paratypes.—1 ♀, Ontario, Ottawa; Manitoba, Treesbank, 1 ♀ and 1 ♂, ex *Protoarmia porcelaria* Gn., 3 ♂♂, ex *Semiothisa* sp.; Manitoba, Sprucewoods, 2 ♀♀ and 4 ♂♂, ex *Eufidonia notatoria* Wlk., 3 ♀♀ and 1 ♂, ex *Semiothisa* sp. C.N.C. 1 ♀, Maine, Dryden; Manitoba, Treesbank, 1 ♀, ex *Protoarmia porcelaria* Gn., 1 ♂, ex *Semiothisa* sp. C.G.H.

Hosts

Protoarmia porcelaria Gn., *Eufidonia notatoria* Wlk., *Semiothisa* sp. (reared in Manitoba). (C.N.C.).

Distribution

Maine, Manitoba, New Brunswick, Labrador, Ontario.

Preamble

The diagnosis of this species and the association of sexes has been securely established by a series of 60 females and 35 males all reared from the same hosts. Without the evidence of this reared material it would hardly have been possible to associate the sexes. *H. porcelariae* is a sibling of *townesi*, difficult to distinguish from the latter in the female sex, more easily in the male by the lack of flagellar annulus.

Female

Almost identical in color and structure with *townesi*; differing as follows: second tergite finely and densely punctured; tibiae III uniformly red-brown, not apically black; annulus of flagellum indistinct, pale brownish instead of white; ventral flat beyond middle of flagellum subobsolete; basal flagellar segments relatively a little shorter.

Flagellum.—Short, exactly filiform, slender, not at all widened beyond middle and ventrally not distinctly flattened, with 25-26 segments, the first 1.3 times as long as wide, the fifth square. Obscure brownish or blackish brown with indistinct, not clearly defined, brownish-white annulus on about ninth to eleventh segments.

Head.—As in *townesi*; frontal orbits and mark on vertical orbits perhaps more often yellow (17 out of 60 specimens).

Thorax.—As in *townesi*; mesosternum usually not entirely black but partially or entirely red-brown.

Legs.—As in *townesi*, except that in the examined specimens tibiae III are uniformly red-brown.

Abdomen.—As in *townesi*, except that the second tergite is finely and densely punctured.

Male

Flagellum ventrally pale reddish brown, dorsally darker brown or blackish, always without annulus. Otherwise identical with *townesi*.

8. Genus *Aculichneumon* Heinrich

Cratichneumon, subgenus *Aculichneumon* Heinrich, 1938, Extrait Mém. L'Acad. Malgache, 25:98.

Type-species.—*Cratichneumon* (*Aculichneumon*) *longicauda* Heinrich (monobasic).

Aculichneumon was based on a Madagascar species of the *Cratichneumon* group, but with the general appearance of *Polytribax*, distinguished by a very long projecting ovipositor of the female, by a laterally carinated scutellum, obsolete gastrocoeli, complete carination of the abbreviated propodeum and almost smooth postpetiolus.

I am convinced today, that the different "*Cratichneumon* species" with long, aptesine-like ovipositor, which are distributed over a great part of the world, represent a natural unit, evolutionarily rather far differentiated from the genus *Cratichneumon*: in other words, a distinct genus.

The four European species and the North American species that belong to this genus are closely related to one another, but all differ by sculptural characters and the structure of the scutellum from the Ethiopian type-species of *Aculichneumon*. I therefore suggest joining all species of the Holarctic as one taxonomic unit to be separated with subgeneric status from the Madagascanian *Aculichneumon*, subgenus *Aculichneumon*.

Subgenus *Crypteffigies* Heinrich

Aculichneumon, subgenus *Crypteffigies* Heinrich, 1961, *Canad. Entom. Suppl.* 15:17.

Type-species.—*Cratichneumon confusus* Ashmead.

Agreeing with subgenus *Aculichneumon* in the long aptesine-like projecting ovipositor of the female and the more or less abbreviated propodeum, but differing in the scutellum not being laterally carinated. Sheaths of ovipositor hairless and polished. Postpetiolus in the type of the subgenus and in most of the Palearctic species distinctly and densely punctured.

In the European Palearctic this subgenus is represented by four species: *lanius* Gravenhorst, *albilarvatus* Gravenhorst, *temuicinctus* Schmiedeknecht and *pseudocryptus* Wesmael. From the Nearctic only the species treated below is known.

1. *Aculichneumon (Crypteffigies) confusus* (Ashmead)

Figs. 29, 30.

Distribution

Alaska and Ontario.

Female

Ferruginous, thoracic sutures black; flagellum apically infuscated with either faintly indicated (Alaska) or distinct (Ontario) white annulus before the dark apex. Abdomen short-oval; ovipositor not quite half as long as the abdomen; no scopa; postpetiolus rather strongly and densely punctured; spiracles of propodeum small, short-oval; carination of propodeum complete, area superomedia hexagonal; length 6-10 mm. (ovipositor not included).

Flagellum.—Short, exactly filiform, not at all attenuated toward apex, distinctly tapering toward base, with 23-24 segments, the first 1.3 times as long as wide, the fourth square.

Head.—Temple profile scarcely narrowed, with slightly curved outline; cheek profile distinctly narrowed, with straight outline; malar space a little longer than width of mandible base; face somewhat receding; median field of face scarcely convex. Ferruginous; supraantennal cavity usually black.

Thorax.—Horizontal part of propodeum shorter than declivity; carination complete, including costulae; area superomedia usually hexagonal, narrowed anteriorly, as wide as long or a little longer than wide. Ferruginous; the following

black: base of prosternum, prepectus basally or entirely, middle of propleura, mark on mesopleura below subalarum and in front of coxae II, areae coxales, scutellar and propodeal sutures.

Legs. — Moderately stout; coxae III ventrally finely punctured, shiny, without scopa. Uniformly ferruginous including coxae.

Abdomen. — Short-oval, second tergite at apex wider than medially long, the third about three times as wide as long; postpetiolus with fairly distinct median field, strongly and rather densely punctured; gastrocoeli small, subobsolete. Uniformly ferruginous; petiolus sometimes infuscated.

Male

Known only from Alaska (see *confusus confusus* Ashm.).

1 a. *Aculichneumon (Crypteffigies) confusus confusus* (Ashmead)

Cratichtneumon confusus Ashmead, 1902, Wash. Acad. Sci. Proc., 4:158, ♂.

Plectocryptus popofensis Ashmead, 1902, Wash. Acad. Sci. Proc., 4:183, ♀.

Plectocryptus yakutatensis Ashmead, 1902, Wash. Acad. Sci. Proc., 4:183, ♀.

Types

Holotypes. — *Cratichtneumon confusus*, ♂, Alaska, Yakutat. U.S.N.M. *Plectocryptus popofensis*, ♀, Alaska, Popof Island. U.S.N.M. *Plectocryptus yakutatensis*, ♀, Alaska, Yakutat. U.S.N.M.

Distribution

Alaska, Yakutat and Popof Island; new records: Alaska; Anchorage, Naknek, Nome, Unalaska Island, Umnak Island (C.N.C.).

Female

Scape and about the twelve basal flagellar segments ferruginous, the rest blackish; the last three to four segments before the blackish apex a shade lighter than the rest of the base; length 6-7 mm.

Male

Flagellum without annulus. Head black except face and clypeus; thorax black, variegated with red-brown; mesoscutum and scutellum red-brown; abdomen ferruginous, the anterior tergites basally black; legs uniformly ferruginous including coxae; length 7-8 mm.

Flagellum. — Dorsally black, ventrally pale yellowish brown, without annulus; bacilliform tyloides on segments 5-12.

Head. — Temple profile distinctly narrowed, with curved outline; malar space shorter than width of mandible base. Black; the following white: face, clypeus, malar space and apex of cheeks; no white pattern on orbits.

Thorax. — Mesoscutum shiny, finely and laterally sparsely punctured; scutellum not much raised above postscutellum; propodeum not more abbreviated than in female, with sharp carination, only costulae usually subobsolete; area supero-media not transverse; spiracles small, short-oval. Black; the following red-brown: collare partially, pronotal ridge and base partially, tegulae, mesoscutum, scutellum, postscutellum, middle of mesopleura and the mesosternum more or less extensively, lateral marks on propodeum covering the areae superoexternae, dentiparae, and partially, spiraculiferae.

Legs. — Moderately slender. Uniformly ferruginous.

Abdomen. — Postpetiolus with distinct median field, puncturation restricted to its base and lateral fields; second tergite and base of third distinctly and densely

punctured; gastrocoeli subobsolete, thyridia very small and narrow. Ferruginous; petiolus and basal bands of tergites 2-3 or 4 black, band of second tergite the broadest.

1 b. *Aculichneumon (Crypteffigies) confusus megalurus*, new subspecies

Types

Holotype.—♀, Ontario, Nipigon, 1.VI.1956. C.G.H.

Paratypes.—3 ♀♀, Ontario, Vineland, and Parry Sound, C.N.C.

Distribution

Ontario.

Female

Agreeing with confusus, but considerably bigger and having a distinct white annulus on the flagellum; length 7-10 mm.

9. Genus *Spilichneumon* Thomson

Spilichneumon Thomson, 1894, Opusc. Ent. fasc. 19, p. 2087.

Type-species.—*Ichneumon occisor* Fabricius, designated by Ashmead, 1900. *Spiloteles* Berthoumieu, 1904, in Wytsman, Gen. Ins., fasc. 18, p. 54.

Type-species.—*Ichneumon occisor* Fabricius, designated by Viereck, 1914.

This genus is, like many others of the subfamily, not distinguished by strong and striking characters. Its diagnosis is based on a combination of certain morphological characters derived from the female and others from the male, and on some biological features as well. All these must be considered together for achieving a concept of the group.

Female and male

Thyridia tending to be distinct. This is a feature of taxonomic importance as it indicates the separation of *Spilichneumon* from *Pseudamblyteles*. But unfortunately its practical usefulness for identification purposes is restricted by another tendency simultaneously effective in this genus, the tendency for obsolescence of gastrocoeli, especially in the females.

Female

Flagellum.—Always bristleshaped, never filiform as so often in the genus *Ichneumon*, usually stout with more or less abbreviated basal segments and not widened beyond middle.

Head.—More or less strengthened, temple profile and cheek profile never very strongly narrowed; mandible bidentate and strengthened in the type-species, with a tendency for the teeth to be blunted and abbreviated, forming in the extreme case a shovel-like apex, similar to that seen in the oriental oxygygous genus *Gyrodonta* Cameron.

Thorax.—Tending to be elongated and depressed rather than short and high; propodeum not abbreviated as in *Eutanyacra* Cameron, the horizontal part usually being longer or at least not considerably shorter than the declivity; area superomedia often considerably longer than wide, never much wider than long.

Legs.—Usually stout; coxae III without scopa.

Abdomen.—Amblypygous; tending to develop longish-oval, or even elongated, shapes, rarely short-oval; postpetiolus longitudinally striate; sculpture of second and third tergites comparatively fine, apical tergites in typical species smooth and more or less glossy; gastrocoeli rather small and shallow, not trans-

verse, sometimes subobsolete; thyridia distinct, except in species with subobsolete gastrocoeli; hypopygium without a bunch or fringe of long, stiff bristles on the middle of the apical half, as typical for *Eutanyacra*, but sometimes with scattered bristles.

Male

Resembles the males of the genus *Ichneumon* except that the hypopygium tapers apically into a more or less prolonged median process; area superomedia often longer than wide. The peculiar characters of the mandibles of the females and the smooth sculpture of the abdomen are not shared by the males.

Biological characters

The European species are, as far as the hosts are known, parasites of cryptophagous larvae of Noctuidae, either stem-boring (*Gortyna*, *Nonagria*) or root-feeding (*Jaspidea*). The typical shape of the female mandible evidently represents an adaptive character, enabling the parasite to open its way into the secluded abode of the host, which, lacking a long ovipositor, it cannot reach from the outside. As the American species treated below under this genus have similar mandibles in the females it may be presumed that they, too, are parasites of cryptophagous moths.

Females of all species of the genus hibernate.

Differential diagnosis

In the above concept the genus *Spilichneumon* is clearly separated from *Ichneumon* by the shape of the hypopygium in both sexes.

In the female it is distinguishable from *Eutanyacra* by the longer propodeum, the lesser growth of bristles at the apex of the hypopygium, and the stouter antennae; from *Pseudamblyteles* by the strengthened mandibles, the more or less distinct thyridia and the stouter legs and antennae; from *Triptognathus* Wesm. by the strengthened, either bidentate or strongly widened and shovel-shaped mandibles, the more prolonged propodeum and abdomen and the stouter antennae and legs.

In the male it can be separated from *Eutanyacra* by the longer area superomedia, which is always considerably wider than long in *Eutanyacra* but usually longer than wide in *Spilichneumon* (though sometimes a little wider than long) and by the differently shaped claspers, which are somewhat sinuated at the lower side, forming below at the apex a sharp angle, whereas in *Eutanyacra* they are broadly and evenly rounded at the apices and relatively larger; from *Pseudamblyteles* by the more or less prolonged middle of the hypopygium and the distinct thyridia (except in species where the gastrocoeli are extremely superficial); from *Triptognathus* (no species of this genus has yet been recorded from North America) only by the shape of mandibles, which in the latter genus have no subapical tooth. There exist, however, intermediate forms.

Species included

Of the species included here in the genus *Spilichneumon* only *taos*, *borealis* and *valdetypicus* can be regarded as morphologically closely allied to the European type of the genus; *bronteus*, *subrufus*, *nubivagus* and *citrinus* are closely enough related to be included without hesitation; *physcoteloides* occupies an intermediate position between *Spilichneumon* and *Pseudamblyteles* but seemed to be closer related to the former; *obscuricolor* and *superbus* cannot be considered as typical representatives of this taxonomic unit but seem, for the time being, to fit better in *Spilichneumon* than in any other described genus. Advancing

knowledge and understanding of this group may point to generic distinction of both of these species.

Remarks

The treatment of this genus is based mainly on the material of C.N.C. and C.G.H. The material of C.H.T. will be worked out by H. Townes himself and was therefore not included. Only the fauna of Eastern North America was considered.

Key to the Species of *Spilichneumon* Thomson of Eastern North America

Females

1. Last four tergites and mesoscutum black (apical teeth of mandible normally pointed). 2
Last four tergites ferruginous or red. Often the mesoscutum of the same color. 4
2. Second and third tergites of the same basic color as the rest of the abdomen; only base of second tergite with yellowish-red band. (Basic color of tibiae yellowish; length 10.5 mm.) 2. *borealis* (Provancher)
Second and third tergites red or reddish throughout. 3
3. Basic color of tibiae red; no white apical mark on abdomen. (Second and third tergites red; length 13 mm.) *taos* (Cresson)
Basic color of tibiae yellowish; tergite seven with a white spot. (Second and third tergites yellowish-red; length 10 mm.) 3. *valdetypicus*, new species
4. Mandible with a distinctly developed and pointed lower tooth, and a normally pointed upper one (Fig. 43). Tergites 2 to 7 uniformly rufous, never marked with black; mesoscutum rufous; femora black or rufous; length 14-17 mm.) 4. *bronteus* (Cresson)
Lower mandible tooth reduced to a little notch or obsolete; in one species well developed, but in this case broadly rounded and not pointed. 5
5. Mandible broad, but gradually tapering toward apex into one pointed tooth, the lower being subobsolete (Fig. 45). (Abdomen rufous, tergites 3 to 4 or 5 usually blackish or infuscated at the bases; mesoscutum and femora rufous; length 14-15 mm.) 7. *subrufus* (Cresson)
Mandibles broadly rounded at apex, which is divided into *two* shovel-shaped teeth or forms *one* broad shovel, the lower tooth in the latter case being subobsolete or obsolete. 6
6. The almost shovel-shaped apex of the mandible divided by a distinct incision into two blunt teeth (Fig. 49). (Abdomen rufous; second and third tergites with a black apical band; tibiae medially yellowish; length 13-15 mm.) 8. *physcoteloides*, new species
Mandibles shovel-shaped, the lower tooth being obsolete or indicated only by a minute notch. 7
7. Mandibles extremely wide (Fig. 47); wings strongly infuscated; tergites 2 to 7 clear red without black markings. (Flagellum with distinct white annulus; head and thorax black; length 16 mm.) 10. *obscuricolor*, new species
Mandibles somewhat narrower (Fig. 48); wings not infuscated; tergites 2 to 7 ferruginous, the third and fourth each with a narrow basal black band. (Head and thorax of ferruginous basic color; length 16-17 mm.; especially distinguished by the smooth and shiny sculpture of mesoscutum and abdomen.) 9. *superbus* (Provancher)

Males

1. Basic color of abdomen red, orange-red, or ferruginous. 2
Basic color of abdomen yellow, yellow and black, or black. 5
2. Ocellar region strongly elevated above level of vertex; ocelli strongly enlarged; abdomen ferruginous, tergites 2 to 5 with narrow black basal bands; basic color of thorax ferruginous. (Hypopygium projecting a little.) 9. *superbus* (Provancher)
Ocelli not or very little enlarged or elevated; abdomen red or orange-red; bases of tergites 2 to 5 not black; basic color of thorax not ferruginous. 3

3. Wings uniformly and strongly infuscated; hypopygium without middle process, its apical margin merely protruding in a broad angle; notaulices obsolete even at the very bases. (Tergites 2 to 7 clear red without black mark; lower mandible tooth reduced, the upper not prolonged and not very sharply pointed.) 10. *obscuricolor*, new species (δ tentative)
- Wings not strongly infuscated; middle process of hypopygium long; notaulices indicated at bases. 4
4. Lower mandible tooth normal, separated from the upper by a distinct gap (Fig. 44); tergites 2 to 7 usually brick red, rarely the second and third more or less yellowish at bases. 5. *nubivagus* (Cresson)
- Lower mandible tooth reduced, not separated from the upper by a distinct gap (Fig. 46); usually tergites 2 and 3 yellowish at bases, often also the sides of tergite 3 yellowish. 7. *subrufus* (Cresson) (mutant I)
5. At least tergites 2 and 3 yellow, without black marks. 6
- Tergites 2 and 3 yellow, with more or less extended black bands or marks, or sometimes entirely black. 8
6. Smaller species, 15.5 mm. long; hypopygial process narrow and sharply pointed (Fig. 53); area superomedia about twice as long as wide. (Tergites 2 and 3 yellow; basic color of thorax black.) 1. *taos* (Cresson)⁸
- Bigger species, 16-18 mm. long; hypopygial process less strongly narrowed, its apex blunter, often truncated; area superomedia not longer than wide. 7
7. Tergites 1 to 4 and prevailing color of thorax yellow. (Hypopygial process truncated in the type.) 6. *citrinus* (Provancher)
- Tergites 2 and 3, exceptionally also 4, yellow; basic color of thorax black. 4. *bronteus* (Cresson) (mutant)
8. Hypopygial process strongly narrowed and sharply pointed (Fig. 53); small, 14.5-15.5 mm. long. 9
- Hypopygial process less strongly narrowed, usually blunt, often broadly rounded or truncated at apex; bigger, 16-18 mm. long. 10
9. Malar space very short, hardly as long as one-third of the width of base of mandible; the second tergite with a black mark only at middle of apical part, the third entirely yellow; coxae I and II yellow except at bases. 1. *taos* (Cresson)⁸
- Malar space longer, almost as long as the width of mandible base; the second tergite with a broad black band in apical half, the third with a narrow one, sometimes being reduced to median apical spot; coxae I and II black, each sometimes with a yellow apical spot. 2. *borealis* (Provancher)⁸
10. Hypopygial process abbreviated (Fig. 54); thyridia subobsolete; coxae III yellow marked at apex dorsally. (Fourth tergite with an uninterrupted yellow basal crossband.) 8. *physcoteloides*, new species
- Hypopygial process rather long; thyridia distinct; coxae III dorsally not yellow marked. (Fourth tergite usually entirely black, or with a medially interrupted yellow basal crossband.) 11
11. Lower mandible tooth reduced and without a distinctly incised open gap between itself and base of the upper (Fig. 46); second and third tergites broadly yellow in basal halves, the fourth usually broadly yellow marked on both sides of base; hypopygial process usually normally narrowed and sharply pointed at apex (Fig. 51). 7. *subrufus* (Cresson)
- Lower mandible tooth normal, separated from base of the upper by a distinctly incised, open gap (Fig. 44); second and third tergites broadly yellow in basal halves, mutating sometimes to entirely yellow or entirely black; fourth tergite only exceptionally yellow-marked; hypopygial process usually blunt, or truncated at apex (Fig. 52). 4. *bronteus* (Cresson)

⁸The two species *borealis* and *taos* are similar in general appearance to *Exephanes terminalis* Cresson, which, however, can easily be recognized as an *Exephanes* species by the strong and usually complete areolation of the propodeum, with hexagonal, not elongated, area superomedia, and by the shorter and less strongly narrowed hypopygial process.

1. *Spilichneumon taos* (Cresson)

Amblyteles taos Cresson, 1877, Ann. Ent. Soc. Trans., 6:191, ♀.

Types

Holotype.—♀, New Mexico. A.N.S.

Neallotype.—♂, Maine, Dryden, 2.VIII.1952. C.G.H.

Distribution

According to H. Townes, 1951: "Alberta, New Mexico". New records: (♀ ♀ and ♂ ♂) Maine (C.G.H.); (♂) Quebec (C.N.C.); (♀ ♀) Massachusetts (M.C.F.).

Preamble

Among the American species of this genus *taos* is one of the most closely related to the Palaearctic type of the genus, *occisor*, in color pattern as well as in morphology. It lacks, however, the white anal spots or bands so characteristic of its European relatives.

Female

Black, tergites 2 and 3 red, scutellum white; legs black, the tibiae and tarsi red except apices of tibiae III and sometimes tarsi III. Cheeks inflated; mandibles very broad with abbreviated, blunt teeth; flagellum bristleshaped, stout; length 13-14 mm.

Flagellum.—Bristleshaped, short, strongly attenuated at the apex, not widened, or ventrally flattened, beyond middle, with 36-38 segments, the first about 1.5 times as long as wide, the fifth square. Black with white annulus on segments 6-13, the basal segments usually brownish, becoming gradually more reddish toward the annulus.

Head.—Temple profile a little, cheek profile scarcely narrowed, the former with hardly, the latter with distinctly curved outline; malar space about half as long as the width of mandible base; cheeks distinctly inflated; mandibles very broad, scarcely tapering toward apex, with two abbreviated and blunted apical teeth, the upper little longer than the lower. Black, mandibles and usually the frontal orbits narrowly red, rarely the middle of the face.

Thorax.—Elongated; mesoscutum flat, sparsely punctured and distinctly longer than wide; area superomedia considerably longer than wide and weakly bordered; no costulae. Black, scutellum white, tegulae red-brown; usually collare and apex of pronotal ridge obscurely red-brown.

Legs.—Stout. Black, tibiae and tarsi red; apex of tibiae III broadly black, the apices of segments of tarsi III usually more or less infuscated; all trochantelli and the apices of femora I and II ventrally reddish brown.

Abdomen.—Nearly parallel-sided and rather narrow; postpetiolus without distinct median field, medially very finely longitudinally striated; second and third tergites finely and rather densely, the fourth sparsely and very finely punctured; gastrocoeli very small and superficial, small thyridia visible. Black, tergites 2 and 3 red, exceptionally also the fourth tergite variegated with red.

Male

Similar in color pattern to most of the European males of the genus; black, scutellum white, the second and third tergites yellow, the second usually with an irregular black mark medially toward apex; coxae I and II predominantly yellow. Tyloides on flagellar segments three to 17; area superomedia much longer than wide; median process of hypopygium long, narrow and pointed (Fig. 53); malar

space scarcely one-third as long as width of mandible base; gastrocoeli very shallow, longer than wide, longitudinally striate; thyridia fairly distinct; length 16-17 mm.

Flagellum.—Dorsally and ventrally black with tyloides on segments 3 to 17, which on segments 8 to 11 extend almost from end to end.

The following are yellow: mandibles except teeth, clypeus, face, frontal orbits narrowly, scape below, collare, apex of pronotal ridge, subalarum, tegulae, scutellum, second and third tergites, coxae I and II except base, trochanters I and II, all trochantelli, femora I and II ventrally and also dorsally at the apex, all tibiae except apices of tibiae III and all tarsi, the tarsi III sometimes apically infuscated. Trochanters dorsally and the second tergite medially toward the apex usually black marked; second and sometimes the third tergite medially with a more or less distinct orange yellow tint.

2. *Spilichneumon borealis* (Provancher)

Amblyteles borealis (Provancher), 1882, Nat. Canad., 13:328, ♀.

Types

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

Neallotype. — ♂, Ontario, Mer Bleue, near Ottawa. C.N.C. No. 7138.

Distribution

Quebec, (♀ ♀ ♂) Ontario (C.N.C.).

Female

Black; base of second tergite obscure yellowish, scutellum white except base; legs black, tibiae II and III with pale yellow annulus beyond base, tibiae I without black pattern, tarsi not black. Cheeks not inflated; length 10.5 mm.

Flagellum.—Bristleshaped, short, distinctly attenuated at apex, not widened nor ventrally flattened beyond the middle, with 32 segments, the first 1.3 times as long as wide, the fourth square. Blackish with whitish annulus on segments 8 to 12, segments 1 to 7 broadly brownish at apices.

Head.—Temple- and cheek-profile distinctly narrowed with almost straight outlines; cheeks not inflated; malar space a little shorter than width of mandible base; mandibles fairly broad, with short apical teeth, upper little longer than lower. Black; lower part of frontal orbits narrowly, and mandibles, obscurely reddish.

Thorax.—Mesoscutum flat, finely and not densely punctured, shiny; area superomedia about twice as long as wide, weakly bordered; costulae obsolete. Black; scutellum white except base.

Legs.—Stout. Black, all tibiae pale yellowish beyond base, tibiae II and III narrowly black at base and broadly at apex, basic color of tibiae I pale rufous; tarsi reddish yellow, the apices of segments of tarsi III, or III and II, infuscated.

Abdomen.—Postpetiolus almost polished, with indistinct indication of some fine longitudinal striae; second tergite sparsely and very finely punctured, puncturation of the third tergite extremely fine, becoming obsolete toward its apex; following tergites smooth and shiny: gastrocoeli extremely small, almost obsolete. Black; base of second tergite obscurely yellowish.

Male

Similar to *taos* in the elongated area superomedia, in the shape of the narrow elongated, and strongly pointed median process of the hypopygium and in the

relatively small size. Differing in the distinctly less shortened malar space and the more pronounced melanism.

Black, scutellum white, the second and third tergites yellow, the former with a broad, the latter with a narrow, black apical band, reduced sometimes to a median spot; coxae I and II black, sometimes apically narrowly yellow; tyloides on flagellar segments 5-15 or 16; area superomedia considerably longer than wide; median process of hypopygium long, narrow and pointed; malar space almost half as long as width of mandible base; gastrocoeli very shallow; length 13-15 mm.

Flagellum.—Black with tyloides on segments 5-15 or 16, which on segments 3-12 extend almost from end to end.

The following yellow: mandibles except base, clypeus, face, scape ventrally, sometimes frontal orbits narrowly, collare, apex of pronotal ridge, subalarum, tegulae partially, scutellum, sometimes apical spot on coxae I and II, femora I ventrally entirely and dorsally at apex, apex of femora II, all tibiae except that the apex of tibiae III is broadly black, all tarsi except that the apical three segments of tarsi I and II are reddish brown.

3. *Spilichneumon valdetypicus*, new species

Type

Holotype.—♀, Manitoba, Riding Mountain National Park, 8.VI.1938, W. J. Brown. C.N.C. No. 6786.

Female

Closely related to *taos* and *borealis*. Differing from the latter in the inflated cheeks, making the head, in frontal view, nearly square; and from the former in the much less powerful-looking mandibles, the receding face, and the yellowish tibiae and anal spot.

Black, scutellum yellow, second and third tergites reddish, seventh with whitish anal spot; legs black, tibiae reddish yellow, tibiae III apically broadly black; length 9.5 mm.

Flagellum.—Bristleshaped, short, strongly attenuated at apex, not widened, nor ventrally flattened beyond middle; with 34 segments, the first 1.3 times as long as wide, the second almost square. Black, with white annulus on segments 6-11.

Head.—Plane of face considerably receding; cheeks distinctly inflated; head in frontal view nearly square; malar space half as long as width of mandible base; mandibles stout, with normal, rather short, apical teeth. Black.

Thorax.—Area superomedia about twice as long as wide, weakly bordered; costulae obsolete. Black; scutellum yellow; collare partially, and tegulae, reddish brown.

Legs.—Stout. Black; tibiae reddish yellow, tibiae III apically broadly black; tarsi reddish tinted, segments of tarsi III infuscated at apices.

Abdomen.—Black, second and third tergite reddish, the seventh with a whitish anal spot.

4. *Spilichneumon bronteus* (Cresson)

Ichneumon bronteus Cresson, 1864, Ent. Soc. Phila. Proc., 3:144, ♂.

Amblyteles bronteus Townes, 1951, Synoptic Catalog, p. 294, ♂.

Types

Holotype.—♂, Pennsylvania. A.N.S.

Neallotype.—♀, Maine, Dryden, 21.VII.1952. C.G.H.

Distribution

According to H. Townes, 1951: "Atlantic to Continental Divide in Transition and Upper Austral Zones". New records: British Columbia, Robson (C. G.H.); British Columbia, Victoria and Royal Oak; Quebec, Rupert House and Cascapedia; Ontario, Sudbury (C.N.C.).

Male

Black, scutellum yellow; yellow pattern of head and thorax rather constant, of abdomen mutating from almost entirely black (type) to predominantly yellow; in northern specimens usually tergites 2 and 3 yellow with black apical bands; wings in southern specimens (type) distinctly infuscated. Hypopygial process rather long, apically often blunted or truncated; mandibles with distinct subapical tooth, separated from the upper one by a normal gap; area superomedia somewhat wider than long; length 16-19 mm.

Flagellum.—Dorsally and ventrally black; segments 5-15 with tyloides, which on segments 6-13 extend almost from end to end; scape ventrally yellow.

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

Thorax.—Scutellum rather strongly convex; propodeum shorter than in typical species of the genus, with distinct and complete carination including costulae; area superomedia somewhat wider than long. Black; the following yellow: collare, apex of pronotal ridge, subalarum, tegulae, scutellum, post-scutellum.

Legs.—Black and yellow; the following yellow: coxae I and II at apices, or almost entirely, trochanters I and II ventrally or entirely, trochanters III ventrally at least at end, all trochantelli, femora I and II ventrally and apically above, or sometimes entirely, all tibiae and tarsi except apical third of tibiae III, sometimes femora III ventrally.

Abdomen.—Postpetiolus with clearly defined, longitudinally striate median field; gastrocoeli well developed, with distinct thyridia; hypopygial process rather long, usually blunted or truncate at the apex. Black; in the majority of specimens second and third tergites yellow with a black apical band, rarely both tergites entirely yellow or abdomen entirely black; sometimes also the third tergite basally yellow.

Female

In associating the female described below with *bronteus* male I am following and confirming H. Townes' interpretation.

Head, mesoscutum and abdomen rufous, scutellum yellow or yellowish, rest of thorax and coxae black; legs rufous or femora II and III more or less extensively, the latter often entirely black; tergites never black banded, the first segment sometimes basally or entirely black. Mandibles moderately wide with two normally pointed apical teeth; area superomedia usually longer than wide, finely and irregularly wrinkled; length 14-17 mm.

Flagellum.—Bristleshaped, short, strongly attenuated at apex, not widened nor ventrally flattened beyond the middle; with 40-41 segments, the first about 1.4 times as long as wide, the fourth or fifth square. Tricolored: rufous from segment one to five, passing into yellowish white from segment 6-16, the apex blackish; sometimes the whitish annulus indistinct.

Head.—Temple profile and cheek profile distinctly narrowed with almost straight outline; cheeks not inflated; malar space as long as width of mandible

base; mandibles moderately wide with two normally pointed apical teeth, upper somewhat longer than lower (Fig. 43). Rufous, sometimes variegated with black; the following sometimes black: a crossband on face at base of clypeus, projecting upwards on both sides above clypeal foveae into face, supraantennal cavity and hind part of cheeks to a variable extent; crossband of face sometimes separated into two marks.

Thorax.—Black; the following rufous: mesoscutum, pronotal ridge, subalarum, tegulae and often postscutellum; scutellum yellowish, sometimes tinted with rufous.

Legs.—Stout; entirely rufous except coxae; often femora II dorsally, femora III extensively or entirely and apex of tibiae III black.

Abdomen.—Postpetiolus rather wide, densely longitudinally striate; second tergite distinctly and rather densely, the third more finely and less densely, punctured; gastrocoeli and thyridia rather distinct. Uniformly rufous; petiolus or the whole first segment often black; the following tergites never black-banded.

5. *Spilichneumon nubivagus* (Cresson)

Ichneumon consimilis Cresson, 1864, Ent. Soc. Phila. Proc., 3:163, ♂. (Preocc.)

Ichneumon nubivagus Cresson, 1867, Amer. Ent. Soc. Trans., 1:291, ♂.
(New name)

Ichneumon aequalis Provancher, 1875, Nat. Canad., 7:23, 76, ♂.

Amblyteles fraternus Cresson, 1877, Amer. Ent. Soc. Trans., 6:175, ♂.

Amblyteles nubivagus Townes, 1951, Synoptic Catalog, p. 294. ♂.

Spilichneumon nubivagus Heinrich, 1959, Ent. News, 70:209, Nos. 14 and 15, ♂.

Types

Holotypes.—*Ichneumon consimilis* Cresson, ♂, Colorado. A.N.S. *Ichneumon aequalis* Provancher, ♂, Quebec, Provincial Museum Quebec. *Ichneumon fraternus* Cresson, ♂, Massachusetts, A.N.S.

Host

According to H. Townes, 1951: "Reported from *Cucullia intermedia* Speyer".

Distribution

According to H. Townes, 1951: "Transcontinental in Transition and Canadian Zones". New record: Labrador, Goose Bay (C.N.C.).

Preamble

This species (or possibly male mutant of *bronteus*?) represents to me a still unsolved problem. *Nubivagus* is rather strikingly chromatically different from *bronteus* male, but I am unable to find the slightest structural difference between the two. In both forms the shape of the hypopygial process varies from a rather pointed to a blunt or truncated apex. Distribution and habitat seem to be the same. In eastern Canada and New England I have observed both "species" often simultaneously. No female was ever found in such places other than *bronteus* as described above. It seems hardly possible that the female of a species as common as *nubivagus* should not have been collected. All this points strongly to the assumption that *nubivagus* represents an erythristic mutant of *bronteus*, analogous to the color mutant of *subrufus* males (see description). But yet I do not feel entirely convinced. Against the above hypothesis stand the lack of intergrades and the color pattern of coxae I and II, which in the melanistic form (*bronteus*) shows on the average much more yellow than in the erythristic (*nubivagus*),

where the coxae are sometimes even entirely black. So I have to leave this question open for the time being, recommending the problem for further observation.

Male

Abdomen red without any black pattern except the black first segment; exceptionally tergites two and three with a slight yellowish tint near base; coxae I and II normally with restricted yellow marks and sometimes even entirely black; scutellum yellow, exceptionally black; otherwise like bronteus male; length 16-19 mm.

6. *Spilichneumon citrinus* (Provancher)

Ichneumon citrinus Provancher, 1886, Addit. Corr. Faune Ent. Canada Hym., p. 31, ♂.

Pseudamblyteles citrinus Townes, 1951, Synoptic Catalog, p. 292, ♂.

Type

Holotype.—♂, Ontario, Ottawa. Harrington. C.N.C. No. 79.

Preamble

There are two strange facts to be recorded about the type specimen: first, morphologically it is identical with the male of *bronteus*, and, secondly, no other specimen colored like it has been collected in the 72 years since it was described. I therefore suspect that it represents an abnormal, extraordinarily light-colored, mutant of *bronteus*.

Male

Predominantly yellow with black pattern; flagellum with a yellowish semi-annulus; structural characters as in bronteus; length 17 mm.

The following black: frons except orbits, ocellar region, occipital region; three broad longitudinal bands on the three lobes of the mesoscutum, median one reaching back from anterior margin of mesoscutum only to middle of lobe, lateral two extending to posterior margin of mesoscutum and joining there into a black crossband; upper halves of mesopleura (except two yellowish patches), a mark in the upper basal part of the area metapleuralis, a mark on the mesosternum mesad of the place of the sternaui, irregular marks on the sides of coxae III and at the very bases of coxae I and II behind, the apical half of femora III dorsally, apex of tibiae III, tergites 5-7, including hypopygium and genitalia.

Flagellum black, segments 13-20 yellowish above, segments 1-13 dirty yellowish at their apices; scape dorsally infuscated.

7. *Spilichneumon subrufus* (Cresson)

Ichneumon subrufus Cresson, 1864, Ent. Soc. Phila. Proc., 3:168, ♀.

Ichneumon inconstans Cresson, 1864, Ent. Soc. Phila. Proc., 3:153, ♂.

Ichneumon comes var. *aleatorius* Cresson, 1867, Amer. Ent. Soc. Trans., 1:301, ♂.

Amblyteles aleatorius Townes, 1951, Synoptic Catalog, p. 294, ♂.

Amblyteles inconstans Townes, 1951, Synoptic Catalog, p. 294, ♂.

Amblyteles subrufus Townes, 1951, Synoptic Catalog, p. 295, ♀.

Spilichneumon subrufus Heinrich, 1959, Ent. News, 70:209, Nos. 16 and 17, ♂.

Types

Holotypes.—*Ichneumon subrufus* Cresson, ♀, Virginia, A.N.S. *Ichneumon inconstans* Cresson, ♂, Colorado. A.N.S. *Ichneumon comes* var. *aleatorius* Cresson, ♂, Canada, A.N.S.

Hosts

According to H. Townes, 1951: "Reported from *Chorizagrotis auxiliaris* Grote." New record: *Crymodes devastator* Brace in Saskatchewan (C.N.C.).

Distribution

According to H. Townes, 1951 (*aleatorius*, *inconstans* and *subrufus*): "Transcontinental in Transition and Upper Austral Zones". New records: Newfoundland, Northwest Territories (C.N.C.).

Female

Head, mesoscutum, scutellum and abdomen rufous; rest of thorax usually predominantly black, often marked with rufous, varying to almost entirely rufous; in the majority of specimens tergites 3-5 with narrow infuscated or blackish basal bands; legs rufous except coxae. Strikingly distinguished by unique shape of mandibles, these strongly widened with broadly downwardly curved lower margin, gradually tapering toward apex into one tooth, the subapical tooth being subobsolete (Fig. 45); length 14-15 mm.

Flagellum.—Bristleshaped, short, strongly attenuated at apex, not widened nor ventrally flattened beyond middle; with 38-41 segments, the first 1.5 times as long as wide, the third square. Rufous including scape, apex black; no distinct annulus.

Head.—Temple profile and cheek profile little narrowed, with scarcely curved outlines; malar space somewhat shorter than width of mandible base; mandibles broad, tapering gradually into one fairly blunt apical tooth, subapical tooth subobsolete or obsolete. Rufous; supraantennal cavities black.

Thorax.—Scutellum slightly raised above postscutellum; area superomedia usually longer than wide, weakly bordered, finely and irregularly longitudinally wrinkled; costulae obsolete. The following usually rufous: collare, pronotal ridge and base, subalarum, tegulae, mesoscutum, scutellum, postscutellum and horizontal part of propodeum partially; often marks on mesopleura and mesosternum, and prosternum often partially; sometimes sterna and pleura predominantly rufous.

Legs.—Stout. Rufous, coxae black.

Abdomen.—Postpetiolus rather wide, densely longitudinally striate; second and third tergite distinctly and rather densely, basal half of fourth tergite sparsely and very finely, punctured; gastrocoeli and thyridia rather distinct. Rufous, base of tergites 3-5 often narrowly infuscated or black.

Male

Very similar in color to the most common chromatic mutant of the males of *bronteus* (with yellow basal bands on second and third tergites), except that usually base of fourth tergite with a patch of yellow on each side. Easily distinguishable from *bronteus* by the different shape of the mandibles, the subapical tooth being reduced to a small projection situated rather far back from the sharp point of the long upper tooth (Fig. 46); median projection of hypopygium usually more sharply pointed at apex than in *bronteus* (Fig. 51); length 15-17 mm.

I have not seen melanistic mutants such as occur in *bronteus*. The erythristic mutant described below, however, is rather common.

Mutant I, male

Abdomen without black color, the latter being replaced entirely by orange-red; bases of second and third tergites, and usually patches at sides of fourth, yellowish.

The evidence for associating this mutant with the normal male of *subrufus* is as follows: in both forms the yellow pattern is identical (except that the black of the abdomen is replaced by red as described above), occasional intergrades are found, and the morphology is otherwise identical.

8. *Spilichneumon physcoteloides*, new species

Types

Holotype.—♀, Maine, Dryden, 22.IX.1951. C.G.H.

Allotype.—♂, Maine, Dryden, 29.X.1951. C.G.H.

Paratypes.—8 ♀♀, 9 ♂♂, Maine, Dryden; 2 ♀♀, Quebec, Poltimore (hibernating); 3 ♂♂, Maine, Hinckley. C.G.H. 1 ♀, Massachusetts, Cumming-ton, 2 ♀♀; Quebec, Rougement and Poltimore. C.N.C.

Distribution

Maine, Quebec, Massachusetts. Evidently ecologically restricted to moist clearings with a stock of the grass *Calamagrostis canadensis* (Nutt.).

Preamble

This species is on the borderline between *Spilichneumon* and *Pseudambly-tes*, since the propodeum is too short for typical species of the former genus, the thyridia are too indistinct and the hypopygium of the male projects only slightly. On the other hand the mandibles and flagellum of the female are shaped as in *Spilichneumon*. So there are almost equal reasons for placing the species in either one of the two genera.

Female

Red-brown; pleura, sterna, apical bands of second and third tergites, femora III and variable pattern of the head black; tibiae II and III medially yellowish; mandibles very broad, almost shovel-shaped, their apical margin, however, divided by a small incision into two blunt teeth (Fig. 49); gastrocoeli superficial; length 13-15 mm.

Flagellum.—Bristleshaped, short, strongly attenuated at the apex, not widened, or ventrally flattened, beyond middle, with 40 segments, the first 1.3 times as long as wide, the third square. Basal part red-brown, at least the first segment, sometimes the first to fifth or sixth basally blackish; segments 8 or 9 to 15 dorsally more or less distinctly yellowish; the following segments black.

Head.—Temple profile and cheek profile distinctly narrowed, the former with slightly curved, the latter with straight, outline; malar space about as long as width of mandible base. Red-brown with black in variable extent; the following usually black: mark on each side of face, supraantennal cavity, cheeks posteriorly, occipital region; sometimes clypeus, face and cheeks almost entirely black, sometimes entirely red-brown.

Thorax.—Mesoscutum and scutellum flat, the former moderately densely punctured, shiny; horizontal part of propodeum considerably shorter than declivity; area superomedia usually square, sometimes a little wider than long, rarely a little longer than wide, its posterior border and the costulae obsolete. Black; the following red-brown: mesoscutum usually entirely (exceptionally only medially), pronotal ridge partially or entirely, subalarum (sometimes yellowish), tegulae, collare, propodeum partially (except the narrow base and apex, the areae coxales and areae metapleurales).

Legs.—Stout; coxae black, I and II usually a little rufous or yellowish at the very ends, III sometimes dorsally rufous at apex; trochanters black, their apical margins and the trochantelli rufous; femora I and II rufous, ventrally black at bases; femora III black, usually rufous only dorsally toward apices; tibiae and tarsi yellowish-rufous, tibiae II and III medially distinctly yellow, turning gradually rufous toward the end of tibiae III, and blackish apically.

Abdomen.—Stouter than in typical *Spilichneumon* species, short, broad-oval; postpetiolus wide with rather distinct, longitudinally striate median field; second tergite distinctly and fairly densely, the third less densely and more finely punctured; following tergites smooth; gastrocoeli very small and superficial. Red-brown, second and third tergites always with black apical bands.

Male

The male associated here with the female described above was collected on several occasions at the same habitat and time as the female. The association seems to be highly probable, but still needs further confirmation.

Similar in color to the yellow-banded mutant males of bronteus and subrufus, but differing from both in the superficial gastrocoeli without distinct thyridia and the considerably shorter, triangular process of hypopygium (Fig. 54). Black; scutellum yellow; tergites 2-4 with broad yellow basal bands, the one on the fourth narrower than the two others; coxae III black, usually marked with yellow at apex dorsally and laterally, sometimes also ventrally; length 15-19 mm.

Flagellum.—With longish-oval tyloides on segments 4 or 5 to 19 or 20 which on none of the segments extend from end to end. Black dorsally and ventrally; scape ventrally yellow.

Head.—Shape of mandibles between those of *bronteus* and *subrufus*, the lower tooth being a little more strongly developed than in males of *subrufus*, the upper a little shorter. Black; the following yellow: mandibles, clypeus, face, frontal orbits up to level of lower ocellus.

Thorax.—Scutellum distinctly convex and raised above level of postscutellum; area superomedia about as long as wide, usually square or somewhat narrowed anteriorly; costulae obsolete or subobsolete. Black; the following yellow: collar, apex of pronotal ridge, subalarum, tegulae, scutellum (not postscutellum) and exceptionally a small mark on lower part of areae dentiparae.

Legs.—Black and yellow; the following yellow: coxae I and II except their bases, usually apex of coxae III dorsally and laterally, sometimes also ventrally (the exterior lateral mark usually more extensive than the interior, sometimes from apex to base of coxa), all trochanters and trochantelli, femora I and II ventrally entirely, dorsally at base and apex, extreme base and apical margin of femora III, all tibiae and tarsi except the broadly black apex of tibiae III.

Abdomen.—Postpetiolus with clearly defined, longitudinally striate median field; tergites 2-5 densely and strongly punctured, opaque, the second tergite striate between gastrocoeli; gastrocoeli superficial, thyridia subobsolete. Black; the following yellow: second and third tergites except a broad black apical band, base of third tergite more narrowly, the yellow band sometimes medially interrupted; seventh tergite usually partially or entirely obscure red-brown; exceptionally also the fifth tergite with a red-brown patch basally on each side.

9. (?) *Spilichneumon superbus* (Provancher)

Amblyteles superbus Provancher, 1886, Addit. Corr. Faun. Ent. Canada Hym., p. 35, ♀.

Ichneumon koebeleri Swezey, 1909, Report of Work of the Experiment Station of the Hawaiian Planter's Association, Bull. 7:30, 31, ♀ ♂.

Amblyteles superbus Townes, 1951, Synoptic Catalog, p. 295, ♀.

Pseudamblyteles koebeleri Townes, 1951, Synoptic Catalog, p. 293, ♀ ♂.

Ichneumon koebeleri Heinrich, 1959, Ent. News, 70:136, ♀.

Spilichneumon superbus Heinrich, 1959, Ent. News, 70:209, ♀ ♂.

Types

Holotypes.—*Amblyteles superbis* Provancher, ♀, British Columbia, Vancouver Island. C.N.C. No. 90. *Ichneumon koebelei* Swezey, ♀, Hawaii. U.S.N.M.

Hosts

Euxoa scandens Riley, *Euxoa flavicollis* Smith, *Euxoa messoria* Harris, *Feltia duceus* Wlk., in Saskatchewan; *Euxoa ochrogaster* Gn., in Manitoba; *Chorizagrotis auxiliaris* Grt., in Alberta. (C.N.C.).

In Hawaii, where the parasite was introduced, reared from *Pseudaletia unipuncta* (Haworth).

Distribution

According to H. Townes, 1951 (*superbis*): "British Columbia, Vancouver Island"; (*koebelei*): "California, Hawaii". New records: Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta, Northwest Territories, Colorado, Texas, Big Bend National Park (C.N.C.).

Preamble

The shovel-shaped mandibles represent the most peculiar character of the female, and the elevated ocellar region with enlarged ocelli of the male. Both sexes are frequently caught at night, attracted by lights, the enlargement of male ocelli perhaps being correlated with nocturnal life. On account of the above mentioned characters generic distinction could be considered for this species. On the other hand the well developed thyridia, structure of flagellum, glossy sculpture of female abdomen and the medially slightly projecting hypopygium of the male, seem to indicate rather close relationship to *Spilichneumon*.

Female

Uniformly ferruginous, third and fourth tergites each with a narrow basal black band; pleura and sterna sometimes with more or less extensive black pattern; mandibles shovel-shaped; sculpture of mesoscutum, scutellum, abdomen and ventral side of coxae unusually smooth and shiny; flagellum without annulus, usually infuscated at apex; length 16-17 mm.

Flagellum.—Bristleshaped, fairly short, strongly attenuated at apex, not widened or ventrally flattened beyond middle, with 40 (type) to 41 segments, the first 1.5 times as long as wide, the fifth square. Ferruginous, the apex usually infuscated or black.

Head.—Temple profile slightly, cheek profile distinctly narrowed, both with slightly curved outlines; malar space as long as the width of mandible base; mandibles shovel-shaped, somewhat narrower than in *obscuricolor*, without, or almost without, indication of a subapical tooth. Ferruginous; supraantennal cavities usually black.

Thorax.—Mesoscutum flat, finely and sparsely punctured, shiny; propodeum rugose-punctate, area superomedia usually square, sometimes a little wider than long, or longer than wide; no costulae; areae metapleurales and lower part of mesopleura punctate and strongly transversely striate. Ferruginous; in the type only the following black: base of prepectus, mesosulcus, apical margin of mesosternum. Black pattern of thorax individually, and probably geographically, varying; in the most melanistic specimens the following black: prepectus, prosternum and mesosternum entirely, areae coxales, basal and apical margin of propodeum, posterior and superior margin of mesopleura.

Legs.—Stout; coxae III ventrally shiny with few scattered punctures; uniformly ferruginous.

Abdomen.—Postpetiolus with fairly clearly defined, longitudinally striate, median field; second tergite fairly distinctly and sparsely, the third more sparsely, almost indistinctly punctured, the following tergites smooth and shiny. Ferruginous, third and fourth tergites each with a narrow basal black band.

Male

Ferruginous; tergites 2-5 with narrow, black basal bands; head and thorax with some black pattern; flagellum black. Ocellar region raised above level of vertex, ocelli enlarged; tyloides on flagellar segments 2-20, elongate, narrow; lower mandible tooth reduced; hypopygium with short, triangular process; length 16 mm.

Flagellum.—With elongate-oval, narrow tyloides on segments 2-20, reaching on the seventh to sixteenth segment almost from end to end. Black; scape ferruginous.

Head.—Ocelli strongly enlarged, ocellar region elevated above normal level of vertex so that the middle ocellus is directed to the front, the hind ocelli to the sides, the distance of the lower margin of one of the latter from the margin of the eye being hardly more than half of the diameter of the middle ocellus; temple profile strongly narrowed with straight outline; occiput sloping steeply down from the top of the elevated ocellar region; malar space subobsolete; lower mandible tooth strongly reduced and situated far back from the blunt tip of the prolonged upper tooth.

Thorax.—Mesoscutum rather strongly convex, sparsely punctured, shiny; scutellum considerably raised above postscutellum, convex, smooth and shiny; lower part of mesopleura and areae metapleurales transversely striate; area supermedia wider than long, costulae obsolete.

Abdomen.—Postpetiolus with striate median field; tergites 2-4 distinctly punctured with alutaceous sculpture between punctures, not shiny; hypopygium without prolonged median process, simply protruding backward in the shape of a sharply pointed triangle.

Variability

In eight specimens from Nova Scotia the following black: frons (except frontal orbits), elevated ocellar region, sometimes middle of occiput behind ocelli, apical margin of cheeks at mandible base, pronotum (except pronotal ridge and base), prosternum, prepectus, mesosternum, upper and hind margins of mesopleura, basal and apical margins of propodeum, areae coxales, base and apex of areae metapleurales, scutellar sutures, petiolus ventrally, bases of tergites 2-5 and sometimes bases of coxae III or II and III; clypeus, face, scutellum, pronotal ridge and subalarum are yellowish tinted.

Two specimens from Quebec show a reduction of melanistic pattern on the prosternum and pro-, meso- and metapleura.

In six specimens from Colorado this reduction tends to extend further, including also the mesosternum, frons, and ocellar region.

Remarks

In color-pattern this male is almost identical with certain species of the genus *Eutanyacra* as it is also in the shape of tyloides. The differentiating features are the development of ocelli, the very different shape of the temples, and the shape of the mandibles.

10. (?) *Spilichneumon obscuricolor*, new species*Types*

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

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

Paratypes.—4 ♀♀, Maine, Dryden; 1 ♀, 1 ♂, Ontario, Ottawa. C.G.H.

23 ♀♀, Ontario (Ottawa and Merivale); Quebec, (Old Chelsea, Aylmer, St. Jean, Lanoraie, Hemmingford, Danford); Saskatchewan (White Fox); Connecticut (Hartford); New York (Ithaca). C.N.C.

Distribution

Maine, Quebec, Ontario, Connecticut, New York, Saskatchewan. Series from British Columbia (C.N.C. and C.G.H.) differ in color of legs and flagellum. They probably represent a western subspecies rather than a distinct species.

Preamble

The generic position of this species is still doubtful. As explained before the diagnosis of this genus combines characters of both sexes, which are not correlated one to another. Consequently, except in obviously clear cases, both sexes should be known before the generic status of the species can be considered as definitely confirmed. The male described below was tentatively associated with the female and therefore can not be used as a base for generic placement. In case the association should prove to be correct, the generic position of this species should be altered.

Female

Black; abdomen red except first segment; wings uniformly and strongly infuscated; legs black; flagellum with white annulus; mandibles unusually widened, with shovel-shaped apex, the lower tooth scarcely indicated by minute notch; length 16 mm.

Flagellum.—Bristleshaped, strongly attenuated at the apex, slightly widened and ventrally flattened beyond middle, with 41 segments, the first hardly 1.5 times as long as wide, the sixth square. Black with white annulus on segments 5 or 6 to 14 or 15.

Head.—Temple and cheek profile scarcely narrowed with distinctly curved outlines; head in frontal view almost square; clypeus wide; mandibles broad, shovel-shaped, the obsolete lower tooth scarcely indicated by a little notch. Black; orbits beside antennae and at vertex usually obscurely reddish.

Thorax.—Mesoscutum slightly convex; notauli obsolete; scutellum somewhat raised above postscutellum; area superomedia usually square; costulae obsolete. Uniformly black.

Legs.—Stout. Black; tarsi red-brown, apices of segments of tarsi II and III often slightly infuscated.

Abdomen.—Postpetiolus with clearly defined, densely longitudinally striate median field; gastrocoeli and thyridia distinct. Red; petiolus or the entire first segment black.

Male (tentative)

Black; tergites 2-7 red; wings uniformly and strongly infuscated; scutellum usually partially or entirely yellow; rarely apex of postpetiolus yellow banded; tarsi and base of tibiae III ventrally yellowish; upper mandible tooth long, not slender and not sharply pointed, the lower reduced; basal segments of flagellum short, the first about 1.3 times as long as wide; hypopygium without long median projection; length 16 mm.

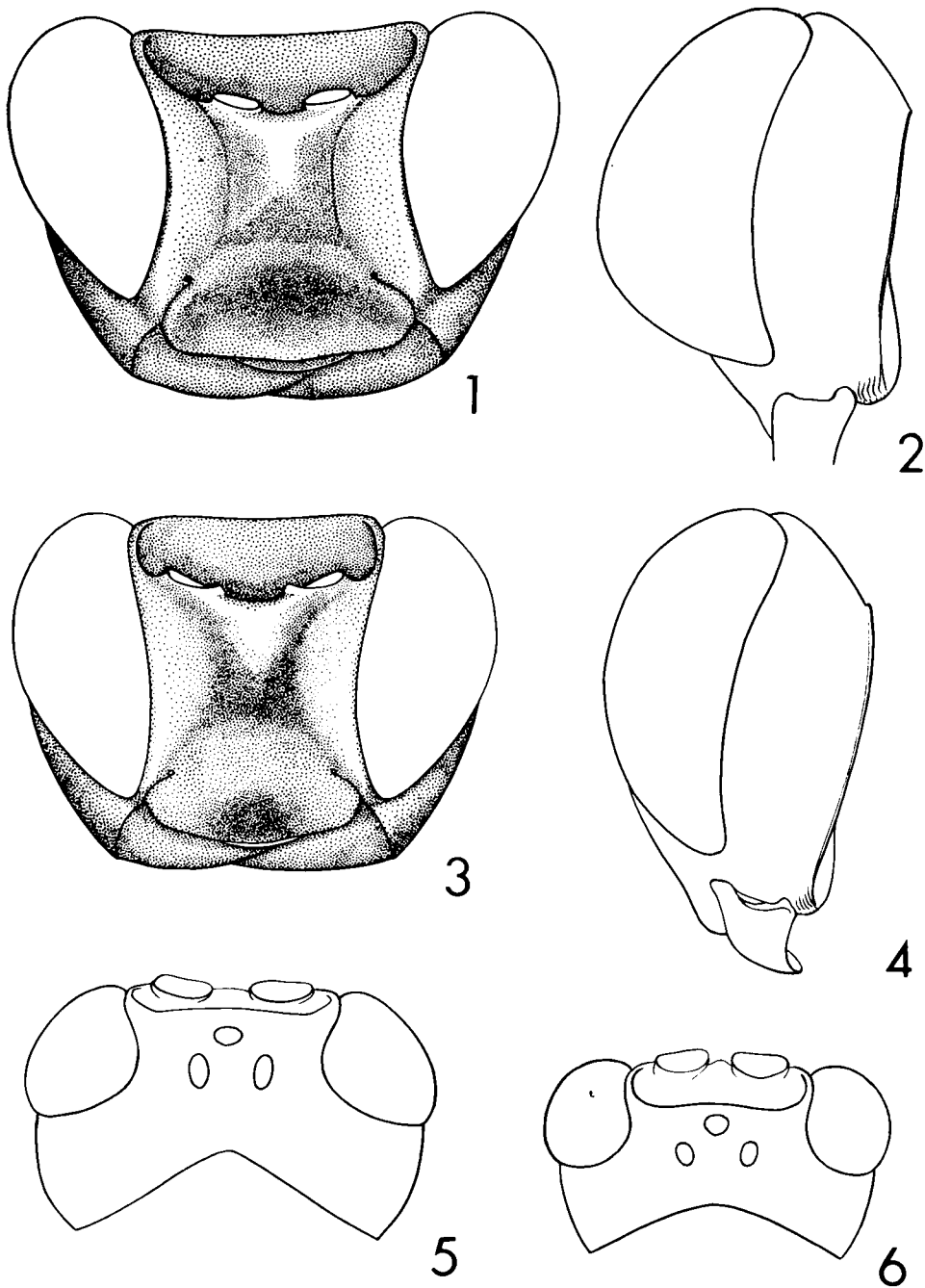
Flagellum.—With comparatively short basal segments, the first scarcely longer than the second and about 1.3 times as long as wide; tyloides elongate-oval, on segments 6-16 or 18, on the ninth to fourteenth segments reaching almost from end to end. Black; scape ventrally yellow.

Mandibles fairly robust, upper tooth somewhat prolonged and obtuse at apex, the lower reduced and situated far back from apex of upper.

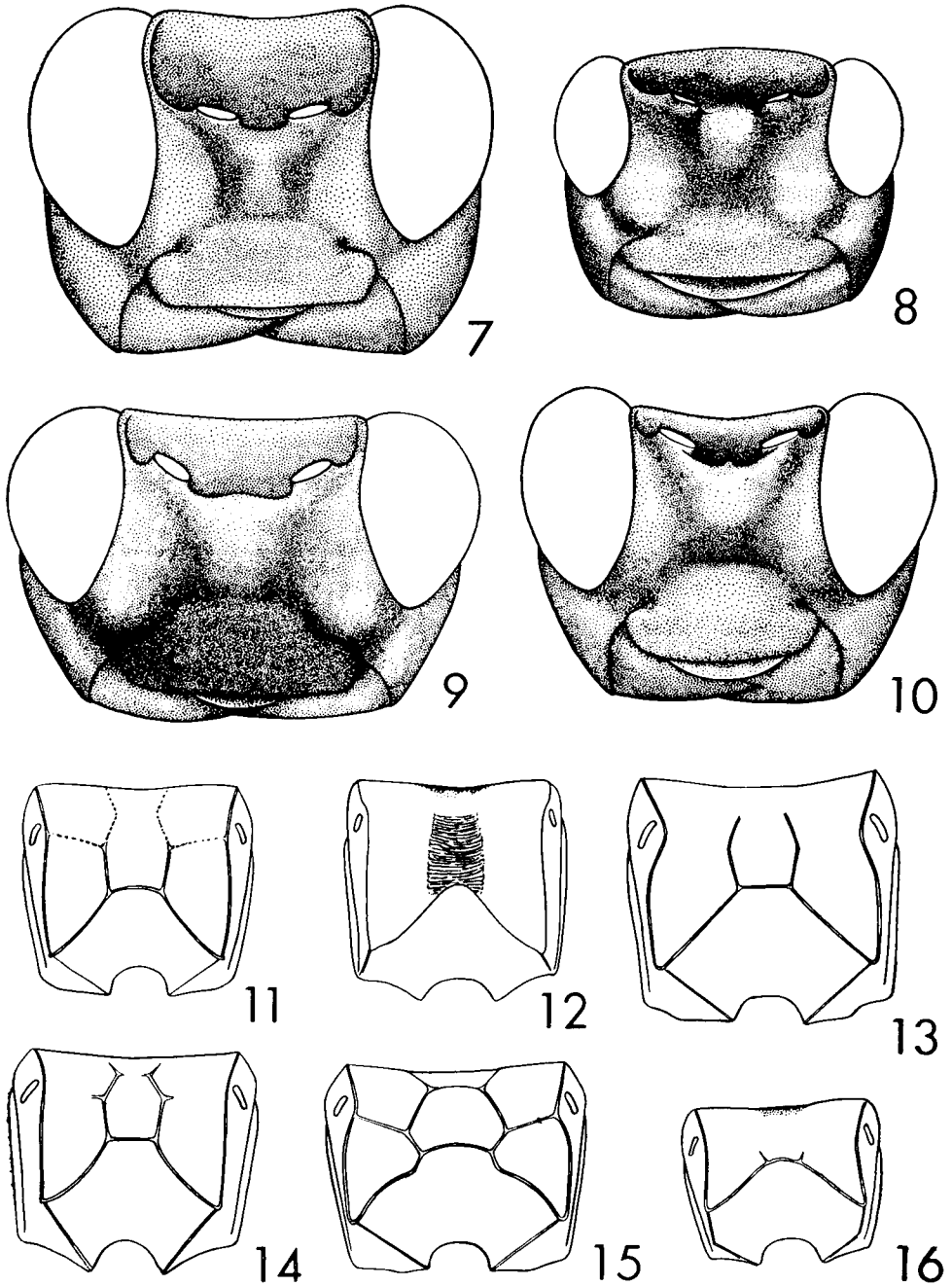
The following yellow: face (except some irregular, more or less extensive lining around the middle area), clypeus (except usually at apex), usually middle of mandibles, narrow apical margin on each of trochanters I and II, all tarsi, tibiae I and II (except a more or less pronounced ventral infuscation toward each apex), the bases of tibiae III ventrally more or less distinctly, usually the scutellum partially or almost entirely and sometimes the tegulae partially, subalarum and collare; rarely the postpetiolus apically.

Remarks

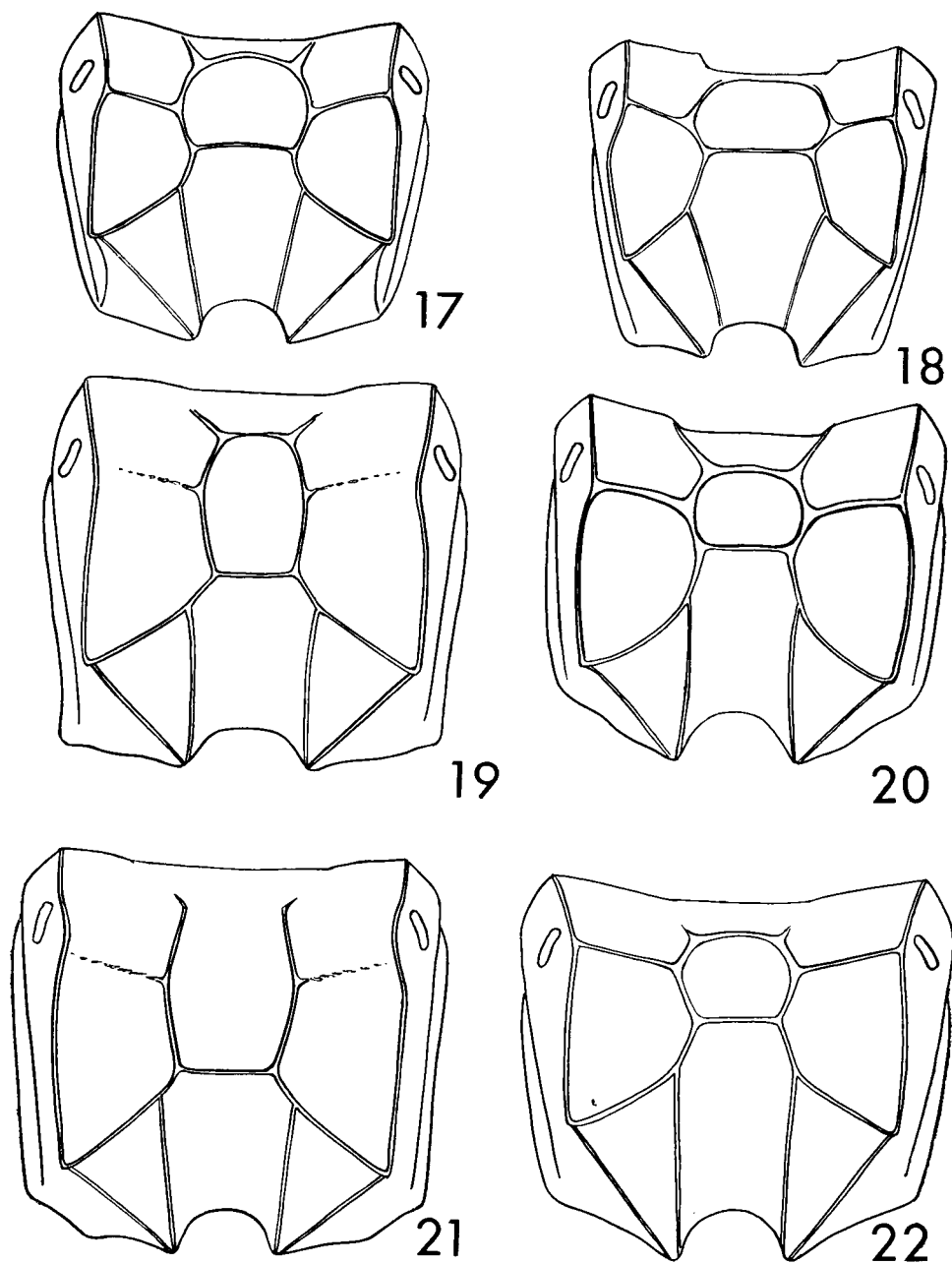
This male is extremely similar in color, strong infuscation of wings and general appearance to a species of the genus *Ichneumon* occurring in the same localities. The latter may be distinguished by the relatively longer first flagellar segment, the relatively shorter tyloides, the narrower and more sharply pointed upper tooth of mandibles and the dark tarsi III.



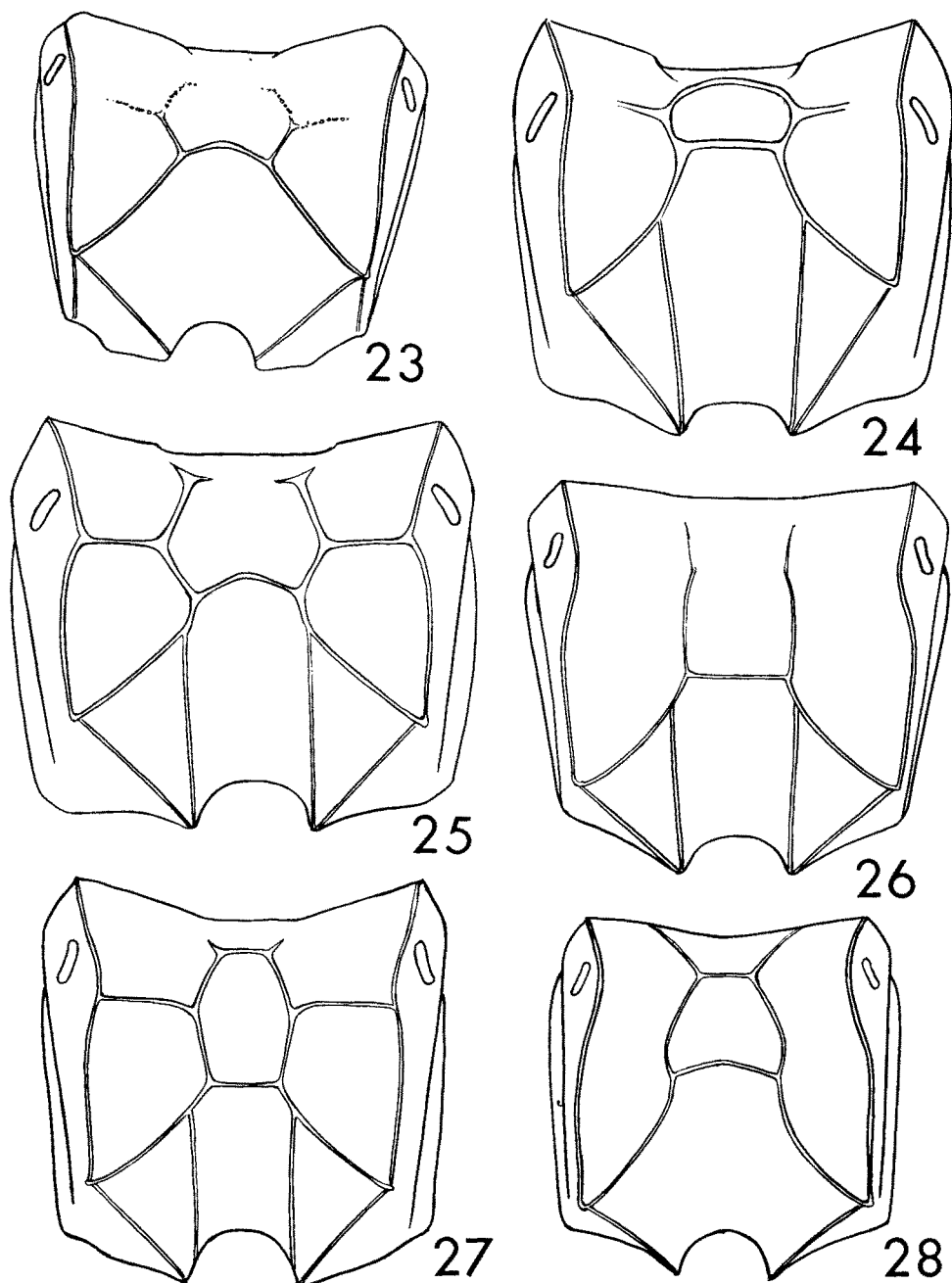
Figs. 1-6. Heads of *Cratichneumon*. 1, front view, 2, profile, *C. variegatus* (Provancher), ♂; 3, front view, 4, profile, *C. anisotae* n. sp., ♂; 5, *C. duplicatus* (Say), ♂, 6, *C. w-album* (Cresson), ♂, temple profiles.



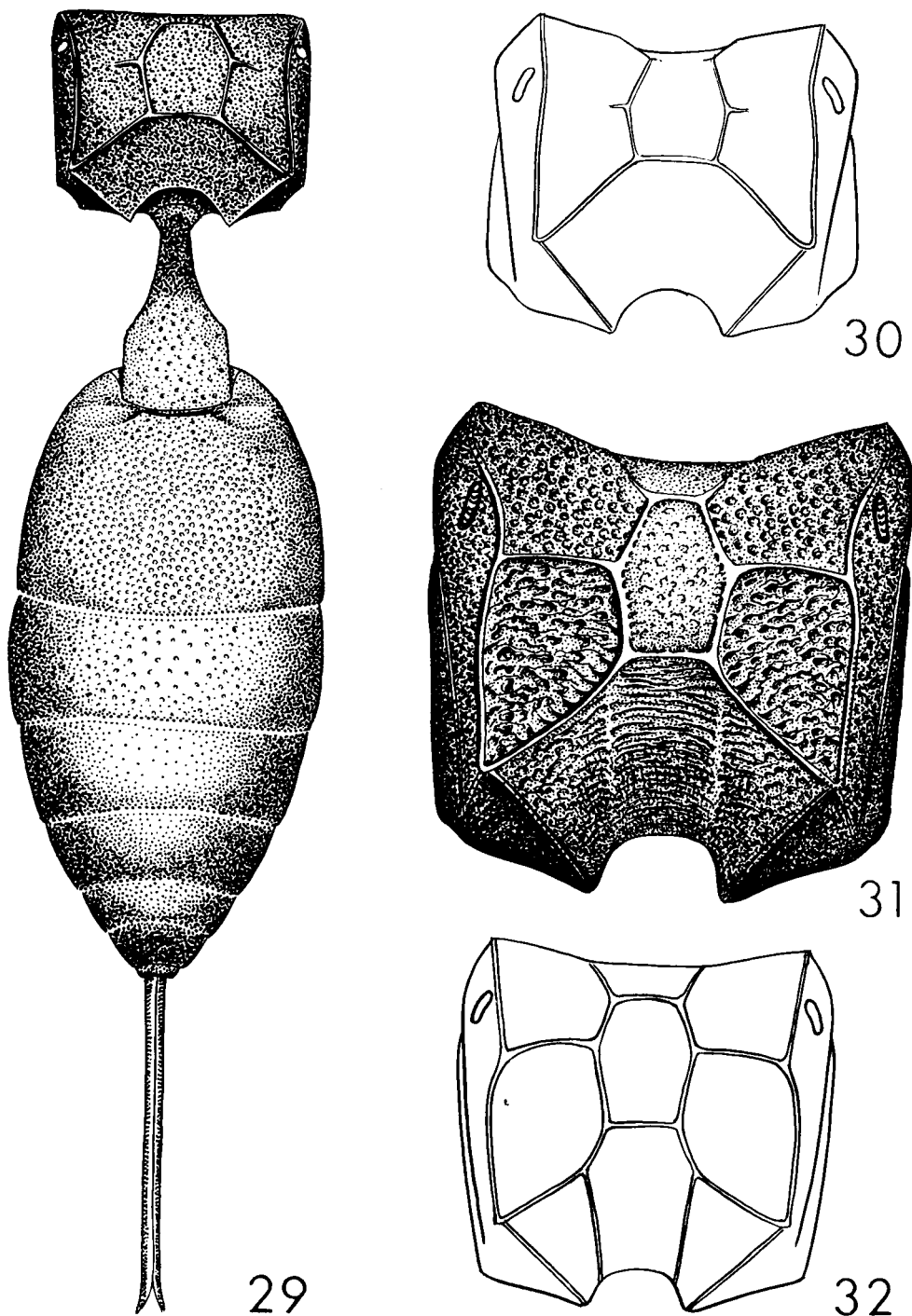
Figs. 7-10. Heads of *Craticheumon* in front view; Figs. 11-16. Carinations of propodea of *Craticheumon* and *Homotherus*. 7, *C. anisotae* n. sp., ♀; 8, *C. ritus* n. sp., ♀; 9, *C. variegatus* (Provancher), ♀; 10, *C. gracilior* n. sp., ♀; 11, *C. flavipectus* (Provancher), ♀; 12, *C. annulatifemur* (Provancher), ♀; 13, *C. vespertinus* (Provancher), ♀; 14, *H. townesi* n. sp., ♀; 15, *H. porcelariae* n. sp., ♀; 16, *C. alternans* (Provancher), ♀.



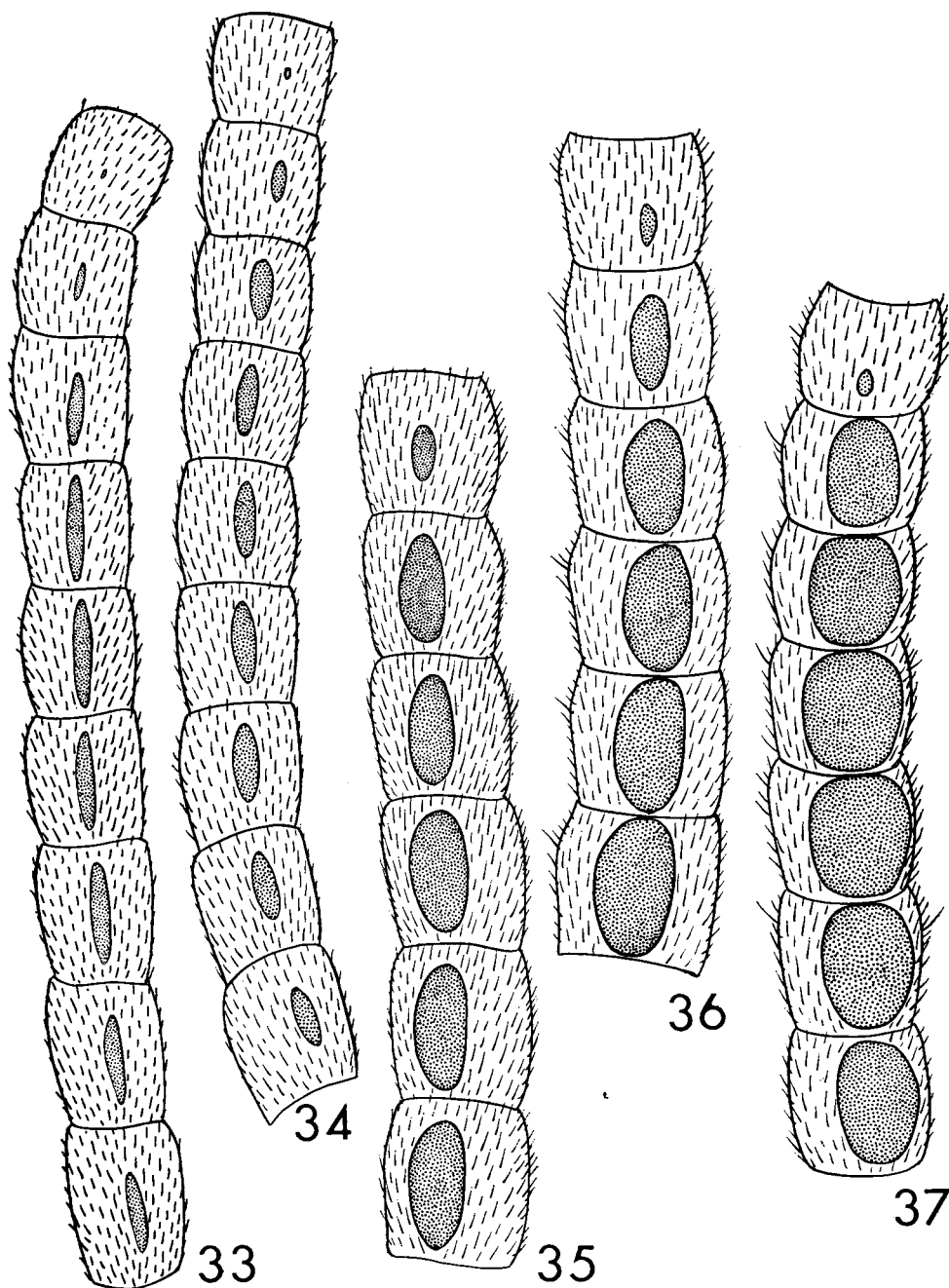
Figs. 17-22. Sexual dimorphism of propodeal carination in *Craticheumon*. 17, ♀, 18, ♂, *C. unifasciatus* (Say); 19, ♀, 20, ♂, *C. sublatus* (Cresson); 21, ♀, 22, ♂, *C. nigriventris* (Cresson).



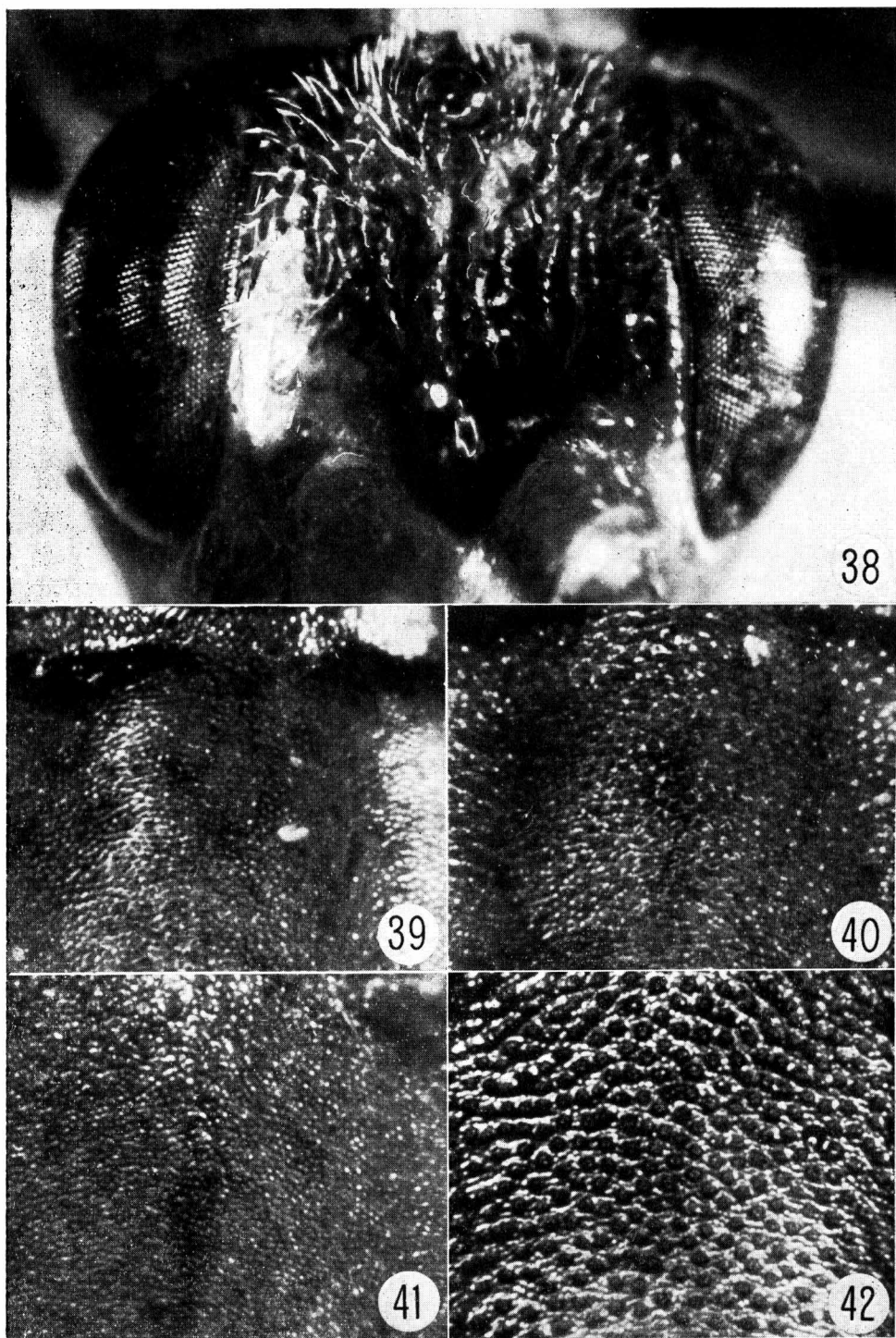
Figs. 23-28. Carinations of propodea of *Cratickneumon*. 23, ♀, 24, ♂, *C. rubricus* (Provancher); 25, *C. gracilior* n. sp., ♀; 26, *C. paratus* (Say), ♀; 27, *C. ritus* n. sp., ♀; 28, *C. pteridis* Townes, ♀.



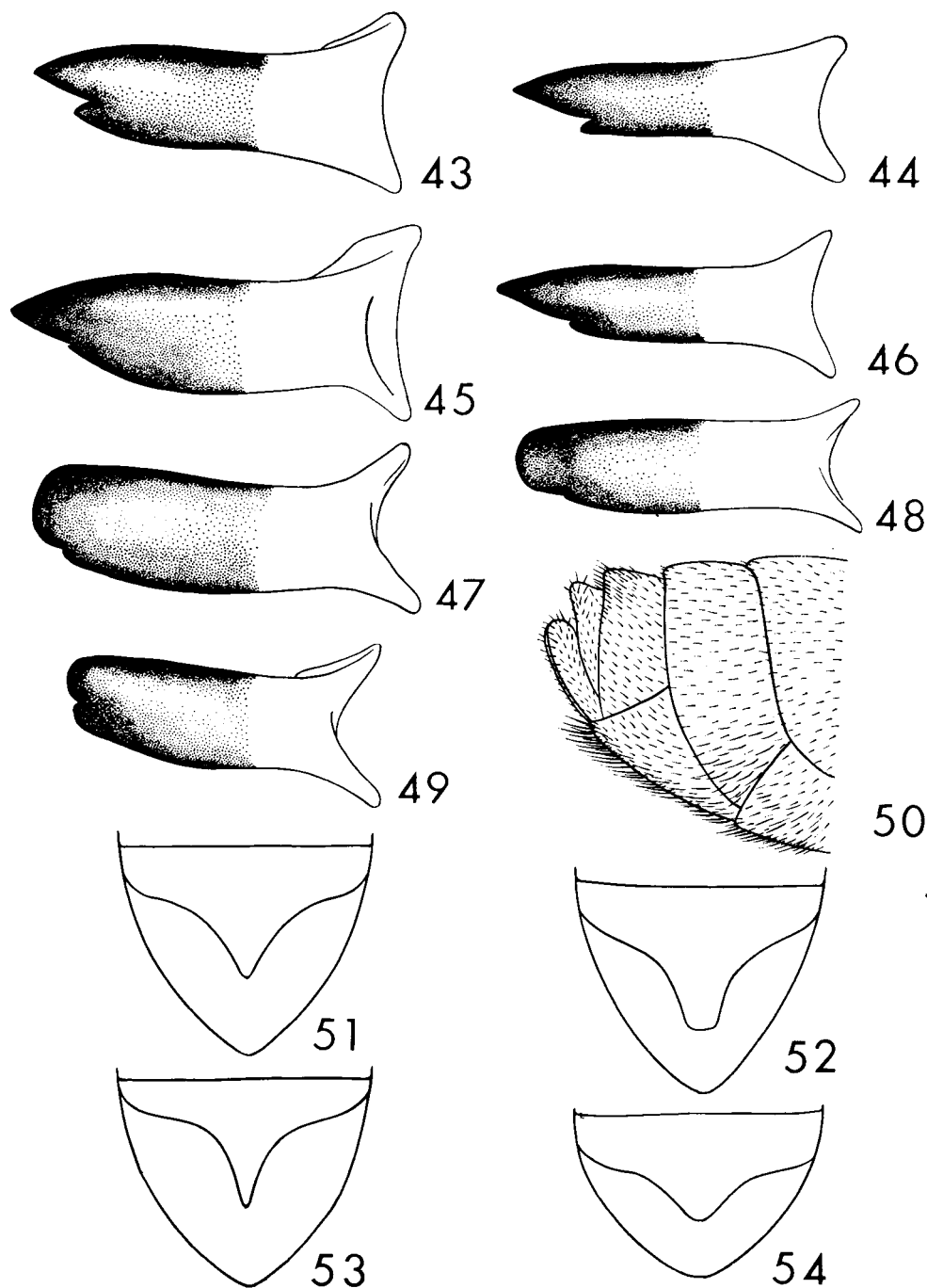
Figs. 29-32. 29, *Aculichneumon* (*Crypteffigies*) *confusus* (Ashmead), ♀, abdomen and propodeum; 30, same species, ♂, carination of propodeum; 31, *Cratichneumon ritus*, n. sp., ♀, propodeum; 32, *Cratichneumon variegatus* (Provancher), ♀, carination of propodeum.



Figs. 33-37. Tyloides of *Craticlneumon*. 33, *C. w-album* (Cresson), ♂; 34, *C. piceipes* n. sp., ♂; 35, *C. acronictae* n. sp., ♂; 36, *C. variegatus* (Provancher), ♂; 37, *C. anisotae* n. sp., ♂.



Figs. 38-42. 38, *Cratichneumon brevipennis* Cresson, ♀, wrink'ed frons. Figs. 39-42. Sculpture of second tergite of two *Homotherus* and two *Cratichneumon* species. 39, *H. townesi* n. sp., ♀; 40, *H. porcelariae* n. sp., ♀; 41, *C. paratus* (Say), ♀; 42, *C. w-album lobatus* (Provancher), ♀.



Figs. 43-49. Mandibles; Figs. 50-54. Hypopygia of *Spilichneumon*. 43, *S. bronteus* (Cresson), ♀; 44, same species, ♂; 45, *S. subrufus* (Cresson), ♀; 46, same species, ♂; 47, *S. obscuricolor* n. sp., ♀; 48, *S. superbus* (Provancher), ♀; 49, *S. physcoteloides* n. sp., ♀; 50, *S. bronteus* (Cresson), ♀; 51, *S. subrufus* (Cresson), ♂; 52, *S. bronteus* (Cresson), ♂; 53, *S. taos* (Cresson), ♂; 54, *S. physcoteloides* n. sp., ♂.

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