

A REVISION OF THE PARASITIC WASPS OF THE GENUS MICROBRACON OCCURRING IN AMERICA NORTH OF MEXICO

By C. F. W. MUESEBECK

Of the Bureau of Entomology, United States Department of Agriculture

INTRODUCTION

Ashmead¹ published the name *Microbracon* with the following description: "I propose this new genus for the reception of those species in the genus *Bracon* having the recurrent vein joining the first submarginal cell between its middle and its apex, restricting the genus *Bracon* to those species having the recurrent vein interstitial with the first transverse cubital. The majority of species belonging in this new genus known to me are all small and resemble certain Rhyssalids." Subsequently Ashmead² greatly restricted the genus *Bracon*, separating it from *Microbracon* by a group of characters which are certainly not of generic or even of subgeneric value. Since that date Viereck³ has shown that the name *Bracon* Fabricius must be used for *Cremnops* Foerster, a genus in the Agathidinae, and⁴ that *Microbracon* Ashmead becomes the valid name for *Bracon* of Authors not Fabricius.

The subfamily formerly known as the Braconinae, for which Gahan⁵ proposed the name Vipiinae upon the transfer of *Bracon* Fabricius to another subfamily, has been largely neglected from the standpoint of generic revision and is at present very unsatisfactorily classified. Many of the genera are poorly defined, and doubtless a considerable number must eventually be placed in synonymy. It is not, however, the purpose of this paper to present a revision of the subfamily Vipiinae, and accordingly the merits of the various generic names, apart from those which are here regarded as synonyms of *Microbracon*, will not be discussed. Merely to show the relation of *Microbracon* to the remainder of the subfamily an attempt will be made to point out the more important characters distinguishing this genus from other genera or groups of genera in our fauna.

¹ Bull. No. 1, Colo. Biol. Assoc., 1890, p. 15.

² Proc. U. S. Nat. Mus., vol. 23, 1900, p. 138.

³ Bull. 83, U. S. Nat. Mus., 1914, pp. 23 and 37.

⁴ Idem, p. 94.

⁵ Proc. U. S. Nat. Mus., vol. 53, 1917, p. 196.

A study of the genus *Microbracon*, with the purpose of revising the group, has been induced by the abundant rearing of species of this genus in the United States Bureau of Entomology in the course of work upon various insect pests, and by the difficulty of satisfactorily identifying these species. In the prosecution of this study the chief repositories of the types, which are the United States National Museum, the Philadelphia Academy of Sciences, the Connecticut Agricultural Experiment Station, and the Museum of Public Instruction in Quebec, have been visited and the types examined. Only the types of the following have not been seen: Those of Say's four species, which are no longer in existence, so far as known; *kansensis* Viereck and *piceiceps* Viereck, which are in the collection of the University of Kansas; *diversicolor* Viereck which is on deposit at the California Academy of Sciences; and *rufomarginatus* Ashmead which could not be located.

This paper is a contribution from the office of Gipsy Moth and Brown-tail Moth Investigations, of the Bureau of Entomology, United States Department of Agriculture. Grateful acknowledgment is accorded A. F. Burgess, in charge of this branch of the Bureau of Entomology, for encouragement in the work and for permission to visit the various institutions in whose collections the types are contained. Expression of thanks are also due, and cordially given, S. A. Rohwer, A. B. Gahan, and R. A. Cushman, of the Bureau of Entomology, for helpful suggestions and for the use of notes; and Dr. W. E. Britton, of the Connecticut Agricultural Experiment Station, Dr. Henry Skinner of the Philadelphia Academy of Sciences, and F. N. Correveau, Assistant Curator of the Museum of Public Instruction at Quebec, for many kindnesses and for permission to examine the types in their custody.

CLASSIFICATION

Superfamily ICHNEUMONOIDEA

Family BRACONIDAE

Subfamily VIPIINAE

Braconoidae FOERSTER, Verh. d. naturh. Ver. pr. Rheinl., vol. 19, 1862, pp. 227 and 234.

Braconides MARSHALL, Trans. Ent. Soc. Lond., 1885, p. 1.

Braconinae CRESSON, Syn. Hym. North America, 1887, pp. 54 and 56.

Braconidae Tribe I MARSHALL, in Andre, Hymen. Eur. et Alg., vol. 4, 1888, p. 68.

Braconinae ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 136.—SZEPLIGETI, Genera Insectorum, fasc. 22, 1904, p. 10.

Vipiinae GAHAN, Proc. U. S. Nat. Mus., vol. 53, 1917, p. 196.

Head varying from transverse to cubical; mandibles normal, touching or crossing at tips and forming with the emarginate and

anteriorly somewhat elevated clypeus, a more or less circular opening; occiput entirely immargined; anterior wing⁶ with three cubital cells; first discoidal cell always separated from the first cubital; subdiscoideus never interstitial with the first abscissa of discoideus; second abscissa of discoideus always much longer than third; submediellan cell very short, never more than one-fourth the mediellan cell; cubitella originating at the end of mediella; postnervellus absent.

Genus MICROBRACON Ashmead

- Bracon* NEES (part), Hymen. Icheum. affil. Monogr., vol. 1, 1834, p. 46.—FOERSTER, Verh. naturh. Ver. pr. Rheinfl., vol. 19, 1862, p. 235.—MARSHALL, Trans. Ent. Soc. London, 1885, p. 11.—CRESSON, Synopsis Hymen. N. Am., 1887, p. 56.
- Microbracon* ASHMEAD, Bull. Colorado Biol. Assoc. 1, 1890, p. 15.
Genotype.—*Microbracon sulcifrons* Ashmead (Monobasic).
- Habrobracon* (Ashmead) JOHNSON, Ent. News, vol. 6, 1895, p. 324.
Genotype.—*Bracon gelechiae* Ashmead (By designation of Viereck, Bull. S3, U. S. Nat. Mus., 1914, p. 65).
- Macrodactium* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 138.
Genotype.—*Bracon euurae* Ashmead (Monobasic).
- Bracon* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 139.
- Habrobracon* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 139.
- Tropidobracon* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 139. *Genotype*.—*Bracon gastroideae* Ashmead (Monobasic).
- Liobracon* (Ashmead) NASON, not Szepliget, Ent. News, vol. 16, 1905, p. 298.
Genotype.—*Bracon nuperus* Cresson (Monobasic).
- Bracon* SZEPLIGETI, Genera Insectorum, fasc. 22, 1904, p. 27.
- Amyosoma* VIERECK, Proc. U. S. Nat. Mus., vol. 44, 1918, p. 640.
Genotype.—*Amyosoma chilonis* Viereck (Monobasic).
- Habrobracon* CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 99.
- Habrobracon* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), pp. 182 and 209.
- Microbracon* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1917 (1916), pp. 182 and 204.

Head transverse to subquadrate, never rostriform, always wider than long antero-posteriorly; malar space variable but always much less than half the eye height; eyes oval, rather broad, bare or indistinctly very sparsely hairy; frons not or scarcely impressed; scape short, not or hardly longer than first flagellar segment, broadening evenly from base to apex, not excavated, and not prominently rimmed at apex; first segment of flagellum always much longer than pedicel, as long as or longer than the second, and never excavated below nor with a prominent rim at apex; antennal segments varying in number from thirteen to forty or more; parapsidal grooves usually well indicated, with the mesonotal lobes distinct; sometimes

⁶ The wing venation terminology employed in this paper is that proposed by Rohwer and Gahan, Proc. Ent. Soc. Wash., vol. 18, 1916, pp. 20-76.

the parapsidal grooves defined only by lines of pubescence, the mesoscutum being rather flat; mesonotum, pleura and propodeum usually smooth and polished, although sometimes very finely sculptured; suture between mesoscutum and scutellum finely foveolate; propodeum rarely with a median longitudinal carina, but frequently with a stub of a median ridge at apex; wings varying from clear hyaline to strongly infumated; usually dusky on the basal two-thirds; nervulus interstitial with basal vein; recurrent vein entering first cubital cell; second cubital cell varying greatly in length, the second abscissa of radius being sometimes no longer than the first abscissa, sometimes much more than twice as long; radius usually attaining wing margin near the apex of wing, rarely much before; spurs of posterior tibiae rather short, never distinctly half the metatarsus; abdomen elliptical or ovate, conspicuously angled at the junction of first and second segments; the first abdominal tergite with lateral membranous margins, the chitinized plate of this tergite with two oblique grooves converging anteriorly; second abdominal tergite without lateral oblique diverging impressions; suturiform articulation frequently broad and foveolate; none of the following sutures deep or foveolate; third tergite without transverse or oblique impressions setting off the anterior lateral corners of the tergite; abdomen varying from entirely smooth and polished to entirely rugulose or granular; ovipositor sheaths varying from less than one-fourth the length of the abdomen to longer than the entire body. This genus includes the smallest of the Vipiinae; very rarely does the body attain a length of 5 mm.

Microbracon is probably more closely related to *Iphiaulax* Foerster and its allies than to any other group of the Vipiinae, although its species are much smaller than most species of *Iphiaulax* and differ considerably in general appearance. The species of *Microbracon*, however, always lack the deep and often foveolate abdominal sutures usually found in *Iphiaulax* and lack also the oblique lateral furrows on the second tergite, and the anterior corners of the third tergite are never set off by transverse impressions. *Coeloides* of Authors, which includes Viereck's *Habrobraconidea*, differs from *Microbracon* especially in the more cubical head, the excavated frons, and the short first and second flagellar segments of the antennae which are scarcely longer than the pedicel, somewhat hollowed out beneath and flaring a little at the apex. The group typified by *Atanycolus* Foerster is readily distinguished by the cubical head and impressed frons, and the scape, which is large, cylindrical, conspicuously excavated at base and apex, with prominent basal and apical margins, and supported by a cylindrical stalk. From *Compsobracon* Ash-

mead *Microbracon* is at once distinguished by the propodeal spiracles which are small and round while in the former they are large and linear; the unusually long scape further distinguishes *Compsobracon*. *Zavipio* Viereck is readily separated by its rostriform head, with the accompanying very long malar space, and by the usually very short radial cell.

Habrobracon (Ashmead) Johnson, *Macrodyctium* Ashmead, *Tropidobracon* Ashmead, *Liobracon* (Ashmead) Nason, not Szepliget, and *Amyosoma* Viereck can not be held distinct from *Microbracon*. These groups intergrade completely, so that it is entirely impossible to determine where one ends and another begins. The characters upon which they have been separated are by no means sufficiently distinct or constant to serve to distinguish genera. The genotypes of all must, I believe, be regarded as congeneric even by those disposed toward a large increase in the number of genera, if a thorough study is made of the group.

In few groups of the Braconidae is there found so wide a range of variation within species as in *Microbracon*. Practically all characters, many of them excellent characters in other groups, vary greatly in this genus. Because of this it is always extremely desirable to have before one a good series of specimens when attempting identifications. The males are particularly difficult, exhibiting still wider variations than the females, and single specimens of this sex can sometimes be only doubtfully named. Host records are often of much value, for although few, if any, of the species are restricted to single hosts, and frequently the same species attacks both lepidopterous and coleopterous larvae, still one species usually parasitizes hosts of the same general habit or found in the same food plants. In a consideration of specific characters in *Microbracon* one is impressed by the lack of constancy in color or even color pattern, although sometimes there is a degree of uniformity which is of a little help and permits the employment of color characters to a small extent in a table to species. The color of the face and legs—whether face and coxae are yellowish or black—will be found of considerable help, although varying to a slight degree. The wings are usually somewhat fuscous, rarely clear hyaline, but the degree of infuscation varies more or less within the species, and alone is not dependable for the separation of species. In sculpture there is likewise so much variation that it becomes difficult to use sculptural characters in a key without qualification, although the presence or absence of punctate or reticulate sculpture on the frons, and on the mesonotum, pleura and propodeum is very reliable. The abdominal sculpture is variable but can be relied upon to a large degree for

distinguishing between groups of species, when supported by other characters. Usually the mesonotal pubescence is restricted to the parapsidal grooves and the space behind the middle lobe, but in a few species pubescence arises over the entire surface of the lobes as well as from the parapsidal furrows; this character appears to be very constant within species. The length of the head antero-posteriorly is relatively constant, and in the small number of cases where the difference between species is sufficient to permit the employment of this character, it is good. The length of the malar space, the number and the relative length of the antennal segments have considerable value, but again, must be used with care and supported by other characters. Wing venation, particularly the length of the second abscissa of radius as compared with the first and third abscissae and with the first intercubitus, the relative length also of that part of cubitus which lies between the recurrent and the first intercubitus, and the length of the radial cell, which is dependent on the point where radius attains the wing margin, will be found very helpful, but within limits. It will be seen from this brief discussion that variability is so pronounced in species of *Microbracon* that determinations should be made only after a very careful weighing of all points. It is hoped that the following key together with the notes found in the text will aid considerably in making such determinations. Unfortunately it was found necessary to classify the females and males separately beyond the thirteenth couplet. By doing this it has been possible to present a key to the females which will probably be found quite satisfactory; while if the males had been incorporated the fullest use could not have been made of the variations in the length of the ovipositor sheaths between different species, one of the most valuable characters. Any key to the males of *Microbracon* must, it seems to me, be rather unsatisfactory, because of the apparently complete intergradation of species. The one here given will, however, probably serve to identify the normal males. The identity of those which represent the extremes in variation must often be left in doubt unless they can be connected by biological records with females or more normal males. In the following table 66 species are included in the female key and 73 species in the male key; seven species which are known only in the male sex, and in all cases but one based upon a single specimen, can not be placed in the female key because of the necessity of making much use of the relative length of the ovipositor sheaths in this part of the table. Some other species are known only from female specimens, and in these cases the position assigned in the male key was determined by characters exhibited by the females, after making

necessary allowance for sexual variations. It has seemed desirable to place several of the species in two different positions in the female key.

KEY TO THE SPECIES OF MICROBRACON

1. Mesoscutum and scutellum more or less, the lateral face of pronotum, the meso- and meta-pleura, propodeum and posterior coxae minutely closely punctate or reticulate, opaque..... 2.
Mesoscutum, scutellum, lateral face of pronotum mostly, and mesopleura smooth and polished..... 10.
2. Second abscissa of radius about twice as long as the first, decidedly longer than first intercubitus and usually distinctly more than half the third abscissa of radius; pubescence on mesoscutum restricted to the region of the parapsidal furrows; ovipositor sheaths sometimes nearly as long as the abdomen..... 3.
Second abscissa of radius much less than twice as long as, often scarcely longer than, the first, not or scarcely longer than first intercubitus, and much less than half the third abscissa of radius; pubescence on mesoscutum usually not restricted to the parapsidal furrows, but arising over the surface of the lobes as well; ovipositor sheaths at most but little more than half as long as the abdomen..... 5.
3. Parapsidal furrows rather thickly hairy, anteriorly as well as posteriorly; propodeum without a distinct median longitudinal groove; the portion of cubitus between first intercubitus and recurrent about half as long as first intercubitus; ovipositor sheaths less than half as long as the abdomen..... 1. *quinnipiacorum* Viereck.
Parapsidal grooves sparsely hairy, especially anteriorly; propodeum with a median longitudinal groove; the portion of cubitus between first intercubitus and recurrent very short, the recurrent being nearly interstitial with first intercubitus; ovipositor sheaths as long as the abdomen beyond first tergite..... 4.
4. Mesoscutum uniformly closely punctate and opaque; frons with a distinct median longitudinal groove descending from median ocellus; antennae slender, the flagellar segments much longer than broad; last abscissa of cubitus not distinctly longer than the preceding abscissa; third abscissa of radius not distinctly longer than the first and second combined..... 2. *punctatus*, new species.
Mesoscutum shining, smooth and polished anteriorly; frons without a distinct groove below median ocellus; flagellar segments of female antennae rather stout, mostly but very little longer than broad; last abscissa of cubitus much longer than the preceding abscissa; third abscissa of radius distinctly longer than the first and second combined..... 3. *sphenophori*, new species.
5. Second abdominal tergite rugulose or ruguloso-punctate, usually longitudinally so; if not distinctly rugulose then with a basal median embossed area set off by short longitudinal grooves; suturiform articulation usually rather broad and foveolate; oblique furrows on first tergite often broad and distinctly foveolate..... 8.
Second abdominal tergite evenly closely punctate, or finely granular, not rugulose, and without a basal median area set off by longitudinal impressions; suturiform articulation usually very fine; oblique furrows on first tergite usually narrow, not foveolate..... 6.

6. Ovipositor sheaths at least half as long as the abdomen; cubitus between recurrent and first intercubitus at least as long as recurrent, usually decidedly longer; propodeum without a median longitudinal carina on posterior half----- 4. *gelechia* (Ashmead).
5. *diversicolor* (Viereck).
- Ovipositor sheaths less than half as long as the abdomen; cubitus between recurrent and first intercubitus not longer than recurrent, often shorter; propodeum with a median longitudinal carina on posterior half----- 7.
7. Scutellum broad, at least as broad as long, very faintly sculptured, sub-polished; first abscissa of radius at least as long as second, usually a little longer; radial cell very short, not longer than third cubital cell; metacarpus not longer, usually shorter, than third abscissa of radius; cubitus between recurrent and first intercubitus nearly or quite as long as recurrent; last abscissa of cubitus much more than twice the preceding abscissa----- 6. *erucarum* (Cushman).
Scutellum a little longer than broad at base, minutely reticulately sculptured and opaque; first abscissa of radius not as long as the second; metacarpus longer than third abscissa of radius; cubitus between recurrent and first intercubitus much shorter than recurrent; last abscissa of cubitus not more than twice the preceding abscissa.
7. *americanus* (Ashmead).
8. Antennae rather stout, distinctly tapering somewhat toward the tip, in the female 19 to 22-segmented, the flagellar segments but very little longer than broad; head and thorax usually mostly yellowish; the black ocellar spot usually nearly separated from the occipital spot; face mostly or wholly pale----- 8. *cushmani*, new name.
Antennae slender, not distinctly tapering toward the tip; flagellar segments in the female much longer than broad; head and thorax usually mostly black; ocellar and occipital spots broadly confluent; face largely blackish----- 9.
9. Ovipositor sheaths fully half as long as the abdomen; second abdominal tergite and the third basally longitudinally rugulose; the oblique furrows on first tergite not distinctly foveolate; the portion of cubitus between recurrent and first intercubitus longer than recurrent; first abscissa of radius very nearly or quite as long as the second.
9. *platynotae* (Cushman).
Ovipositor sheaths less than half as long as the abdomen; second abdominal tergite and the third basally longitudinally rugulose; the oblique furrows on first tergite broad and foveolate; the portion of cubitus between recurrent and first intercubitus not longer, usually shorter, than recurrent; first abscissa of radius nearly always shorter than second.
10. *xanthonotus* (Ashmead).
10. Second abscissa of radius not or scarcely longer than the first abscissa, not longer than first intercubitus and hardly one-third as long as third abscissa of radius; mesonotal lobes pubescent; antennae stout, tapering to the tip, the female antennae 13 to 19-segmented and not extending beyond the apex of the thorax; ovipositor sheaths hardly half as long as the abdomen----- 11.
Second abscissa of radius much longer than the first abscissa, longer than first intercubitus, and very rarely less than half as long as third abscissa of radius; mesonotal lobes usually bare, the pubescence nearly always restricted to the region of the parapsidal furrows; female antennae not as above----- 12

11. Antennae of female 13 to 15-segmented; of male, 18 to 23-segmented; first flagellar segment of male antennae usually distinctly longer than the second, the segments beyond the first but very little longer than broad; abdomen smooth and shining, rarely distinctly punctate.
11. *hebetor* (Say).
- Antennae of female 17 to 19-segmented, very rarely 16-segmented; of male, 20 to 27-segmented, the first flagellar segment of male antennae usually not distinctly longer than the second, the segments beyond the first one and one-half times as long as broad; 3d, 4th, and 5th abdominal tergites nearly always distinctly punctate----- 12. *brevicornis* (Wesmael).
12. Stigma long and narrow, the radius arising distinctly behind its middle; radial cell short, ending far before apex of wing; first abscissa of radius very short, much less than half the first intercubitus; abdomen sculptured above ----- 13.
- Radius arising at or before middle of stigma----- 14.
13. Propodeum mostly smooth and shining, without a complete median longitudinal carina; ovipositor sheaths about as long as the abdomen
13. *scanticorum* Viereck.
- Propodeum finely rugulose except at extreme base and provided with a prominent median longitudinal carina; ovipositor sheaths about as long as the abdomen beyond 2d tergite----- 14. *pyralidiphagus*, new species.
14. Females ----- 15.
- Males ----- 16.
15. Dorsum of abdomen mostly smooth and polished, the sculpture when present restricted to the three basal tergites, only rarely occurring on the third; the sculpture on second and third tergites when present usually in the form of longitudinal striae and usually restricted to the middle two-thirds of the tergite; propodeum mostly or entirely smooth and polished; frons usually smooth and polished, if sculptured, the face and coxae are black; face rarely yellow; if so, the abdomen, including first and second tergites, is entirely smooth and polished----- 16.
- Dorsum of abdomen sculptured, although sometimes very minutely so, over most of its surface; very rarely not distinctly sculptured beyond second tergite, but then the latter is entirely finely granular, the frons is finely reticulately sculptured and the face and coxae are yellow; face and coxae very rarely black; if so, then abdomen is distinctly sculptured over nearly its entire surface----- 17.
16. Ovipositor sheaths protruding at least very nearly the length of the abdomen, sometimes much longer----- 18.
- Ovipositor sheaths protruding not more than half the length of the abdomen beyond its apex----- 17.
17. Opening between clypeus and mandibles unusually large, its transverse diameter at least as long as the distance from lower margin of antennal foramina to lower margin of clypeus; posterior tarsi short and stout, much shorter than posterior tibiae; propodeum with a nearly complete median longitudinal carina; at least posterior coxae black; ovipositor sheaths protruding less than the length of the first abdominal tergite-- 18.
- Opening between clypeus and mandibles not so large; posterior tarsi usually at least as long as their tibiae; propodeum very rarely with a nearly complete median carina, and then not combining all the above characters ----- 19.

18. Wings strongly infumated; last segment of posterior tarsi unusually large, broadening strongly from base to apex, much longer than the second segment and nearly as long as the metatarsus; antennae usually 24 to 30-segmented; propodeum mostly smooth except for the median carina
15. *gastroideae* (Ashmead).
Wings hyaline or very nearly; last segment of posterior tarsi not so large; antennae usually 21 to 24-segmented; propodeum finely rugulose
16. *brachyurus* (Ashmead).
19. Second abdominal tergite with conspicuous, more or less triangular, areas of weaker chitination laterally joining the broad membranous margins of the first tergite; second tergite much shorter than the third; dorsum of abdomen entirely smooth and polished, without even a suggestion of sculpture; longitudinal groove on lateral face of pronotum incomplete, being distinct only anteriorly----- 20.
Second abdominal tergite not as above; at least not agreeing entirely with the above characterization----- 21.
20. Head and thorax black; abdomen mostly black; legs more or less blackish----- 17. *melanaspis* (Ashmead).
Body mostly yellowish or yellowish-brown, legs, including coxae, yellowish----- 18. *juncicola* (Ashmead.)
21. Frons entirely, and usually the vertex to some extent, closely minutely punctate or reticulate and opaque; parapsidal grooves entirely thickly hairy; head black with contrasting yellow orbital lines; thorax short and stout, black; wings rather strongly dusky on basal half; second abscissa of radius rarely distinctly twice the first----- 22.
Frons smooth and polished, at most with faint sculpture just above insertion of antennae; at least not combining all the above characters.---- 23.
22. Second abdominal tergite usually smooth and shining, and provided with two abbreviated oblique foveolate impressions medially toward base; scattered pubescence arising from surface of middle lobe of mesoscutum anteriorly; antennae normally 21 to 25-segmented---- 19. *politiventris* (Cushman).
Second abdominal tergite finely sculptured over nearly its entire surface and without such impressions on the basal middle; surface of middle lobe of mesoscutum without pubescence although the long hairs arising from the parapsidal furrows lie upon the lobes; antennae normally 24 to 29-segmented ----- 20. *pygmaeus* (Provancher).
23. Head thin antero-posteriorly, hardly thicker at insertion of antennae than at clypeus, the face not distinctly receding; propodeum completely polished, without a stub of a median ridge at apex; first abdominal tergite wholly smooth and polished; head and thorax black; coxae black.
21. *connecticutorum* Viereck.
Head not so thin, rather prominent just below insertion of antennae, the face receding; propodeum usually with a distinct stub of a median ridge posteriorly----- 24.
24. Abdomen wholly smooth and polished, the second tergite with two abbreviated oblique furrows medially setting off a basal median area; parapsidal furrows thickly hairy; head more than usually thick antero-posteriorly, being about as thick antero-posteriorly just below insertion of antennae as high; antennae normally 30 to 32-segmented, tapering distinctly toward tip; face yellow; thorax usually mostly yellow--- 22. *psilocorsi* Viereck.
Second abdominal tergite without oblique furrows setting off a basal median area; parapsidal grooves sparsely hairy; head, including face, and thorax black----- 25.

25. Second and third abdominal tergites almost entirely minutely granular; propodeum usually with a nearly complete median longitudinal carina.
23. *meromyzae* (Gahan).
Third and following abdominal tergites completely smooth and polished; second tergite only with faint roughening medially..... 26.
26. Hypopygium attaining apex of abdomen; ovipositor sheaths slender; legs, including all coxae, and the abdomen laterally and on the venter, bright yellow; propodeum smooth and polished with only a very short stub of a median ridge posteriorly; posterior tarsi slender.
24. *nigridorsum* (Ashmead).
Hypopygium not distinctly attaining apex of last dorsal abdominal segment; ovipositor sheaths broad; abdomen usually black; posterior tarsi rather stout, the last tarsal segment as long as the second and more than half the metatarsus..... 27.
27. All coxae and more or less of the femora black... 25. *ashmeadi*, new name.
Legs yellow, the posterior coxae blackish at base..... 26. *uncas* Viereck.
28. Antennae very slender, all the flagellar segments more than twice as long as thick; legs including all coxae bright yellow; wings perfectly clear hyaline, with no suggestion of duskiness..... 29.
Antennae not so slender; at least not combining the above characters... 30.
29. Ovipositor sheaths nearly as long as the body; abdomen entirely smooth and polished; face yellow; thorax and abdomen largely yellowish.
27. *angelesius* (Provancher).
Ovipositor sheaths slightly shorter than the abdomen; second abdominal tergite finely striate; head, including face, black; thorax and abdomen largely black..... 28. *auripes* (Provancher).
30. Head thin antero-posteriorly, the face rather flat, not prominent at insertion of antennae and scarcely receding below; propodeum completely smooth and polished, without a stub of a median ridge at apex; ovipositor sheaths at least a little longer than the abdomen, and usually fully as long as the body; antennae normally 20 to 30-segmented..... 31.
Head rather thick antero-posteriorly at insertion of antennae, the face distinctly receding below; propodeum usually with a stub of a median ridge at apex; ovipositor sheaths at most a little longer than the abdomen... 34.
31. Second abdominal tergite with conspicuous membranous or weakly chitinized areas laterally opposite the broad membranous margins of the first tergite; ovipositor sheaths as long as the body, antennae usually 20 to 26-segmented..... 32.
Second abdominal tergite without such membranous areas laterally; head and thorax usually black or blackish; coxae usually, though not always, black or brown..... 33.
32. Head, thorax, abdomen, legs, mostly yellow; second abdominal tergite usually as long as the third or nearly..... 29. *rudbeckiae*, new species.
Head and thorax wholly black; abdomen black except for the membranous parts of first and second tergites; second tergite much shorter than third..... 30. *tenuiceps*, new species.
33. Ovipositor sheaths as long as the body; second abdominal tergite more or less sculptured..... 31. *nuperus* (Cresson).
Ovipositor sheaths slightly longer than the abdomen; abdomen completely smooth and polished..... 32. *curtus* (Provancher).

34. Transverse diameter of opening between clypeus and mandibles but little or no greater than the distance from the opening to the eyes; malar space about as long as first segment of antennal flagellum----- 35
 Transverse diameter of opening between clypeus and mandibles much greater than the distance to the eyes; malar space shorter than first segment of antennal flagellum----- 37.
35. Thorax stout, not nearly twice as long as high; stigma brown, with its costal thickening and more or less of the membrane toward base, bright yellow; antennae normally 30 to 34 segmented; ovipositor sheaths a little longer than the abdomen----- 33. *hyslopi* Viereck.
 Thorax not stout, very nearly twice as long as its greatest height; stigma unicolorous, brown; antennae normally 25 to 30-segmented; ovipositor sheaths scarcely as long as the abdomen----- 36.
36. Propodeum with a distinct median longitudinal carina on posterior half and with a somewhat rugulose median line on basal half; second abscissa of radius more than twice as long as the first; flagellar segments of antennae but very little longer than broad; legs usually reddish yellow or brown with only the coxae blackish----- 34. *nitidus* (Provancher).
 Propodeum smooth and polished without a median carina on posterior half and not rugulose along the median line basally; second abscissa of radius not twice the first; flagellar segments of antennae considerably longer than broad; usually all coxae, trochanters, and more or less of all femora black----- 35. *tychii*, new species.
37. Second abdominal tergite more or less striate, the third entirely smooth and polished; antennae not stout, all flagellar segments much longer than broad; radius going practically to extreme apex of wing, the third cubital cell scarcely as wide at apex as the second discoidal; abdomen black except more or less of the second and third tergites; antennae normally 29 to 33-segmented----- 36. *pini*, new species.
 Second and third abdominal tergites somewhat striate, the latter weakly so and, rarely, entirely smooth; antennae stout, most of the flagellar segments but little or no longer than broad; radius attaining wing margin decidedly before apex of wing; third cubital cell broader at apex than second discoidal cell; abdomen usually mostly ferruginous, with only the first tergite and a median spot on second black; antennae normally 32 to 37 segmented----- 38.
38. Third abscissa of radius as long as last abscissa of cubitus; all segments of antennal flagellum distinctly longer than broad; posterior tibiae wholly black----- 37. *sesiae*, new species.
 Third abscissa of radius distinctly shorter than last abscissa of cubitus and scarcely as long as first and second abscissae of radius combined; some segments of antennal flagellum not distinctly longer than broad; posterior tibiae fuscous only at apex----- 38. *nevadensis* (Ashmead).
39. Second abdominal tergite almost smooth, strongly shining and provided with two distinct abbreviated furrows that set off a basal median area, and usually with two longitudinal furrows laterally; third, fourth, and fifth tergites granular, subopaque; antennae shorter than the body, normally 20 to 24 segmented; wings faintly dusky basally; ovipositor sheaths as long as, or a little longer than, the abdomen; a small yellowish species with a few dusky markings on thorax.
 39. *thurberiphagae*, new species.
 Second abdominal tergite not as above, usually more strongly sculptured than the following; otherwise not combining all the above characters. 40.

40. Antennae slender, normally 22 to 29-segmented, most of the flagellar segments twice as long as thick, the basal segments of flagellum more than twice as long as thick and not at all thicker, sometimes more slender, than the apical segments; wings perfectly clear hyaline with not even a suggestion of duskiess; radius arising much before middle of stigma; propodeum smooth and polished; ovipositor sheaths as long as the abdomen or slightly shorter; legs bright yellow----- 41.
Antennae not as above; if apparently so, then not that combination of characters ----- 43.
41. Abdomen very finely sculptured, smooth laterally; second tergite minutely striato-punctate, the following weakly punctate, strongly shining; antennae normally 22 to 24-segmented; abdomen usually yellow.
40. *pityophthori*, new species.
Abdomen coarsely sculptured; suturiform articulation very broad, foveolate; antennae normally 26 to 29-segmented; abdomen largely black above----- 42.
42. Abdomen, especially second tergite, strongly longitudinally rugulose, the second tergite usually with a complete median longitudinal raised line; parapsidal grooves thickly hairy anteriorly as well as posteriorly; abdomen black above, more or less yellow medially on third, fourth and fifth tergites----- 41. *laemosacci*, new species.
Abdomen, coarsely granular; parapsidal grooves not thickly hairy anteriorly; abdomen blackish above, yellow laterally.
42. *metacomet* Viereck.
43. Wings long and rather narrow, uniformly somewhat infumated, the wing membrane abnormally thickly hairy over its entire surface; cubitus and subdiscoideus nearly parallel, the second discoidal cell scarcely broadening apically; radial cell very long, the radius going to extreme apex of wing; propodeum entirely finely rugulose; antennae slender, normally more than 40-segmented; ovipositor sheaths as long as the abdomen or slightly longer----- 43. *atricollis* (Ashmead).
Wings not as above; otherwise not that combination of characters----- 44.
44. Propodeum entirely, except at extreme base, rugulose; most of the flagellar segments of antennae scarcely longer than broad; abdomen beyond third tergite very faintly, almost indistinctly, sculptured; thorax mostly yellow----- 45.
Propodeum usually smooth and polished, although often with short diverging ridges medially behind, and sometimes very delicately punctate or faintly minutely reticulate over a large part of its surface----- 46.
45. Ovipositor sheaths considerably longer than the abdomen; antennae normally 33 to 36-segmented; second abdominal tergite rather evenly finely sculptured, without a rugose area on basal middle.
44. *analcidis* (Ashmead).
Ovipositor sheaths a little shorter than the abdomen; antennae normally 29 to 32-segmented; second abdominal tergite with an irregularly rugulose area on basal middle----- 45. *podunkorum* Viereck.
46. Ovipositor sheaths not half as long as the abdomen----- 47.
Ovipositor sheaths more than half as long as the abdomen----- 50.
47. Head, including the face, black; either the frons completely smooth and polished or the parapsidal grooves thickly hairy----- 48.
At least the face yellow; parapsidal grooves sparsely hairy; frons finely reticulately sculptured----- 49.

48. Parapsidal grooves thickly hairy; frons closely punctate and opaque; thorax stout; head with pale yellow inner and superior orbital lines; propodeum without a median longitudinal carina; antennae usually 24 to 29-segmented..... 20. *pygmaeus* (Provancher).
 Parapsidal grooves sparsely hairy; frons smooth and polished; thorax slender; head wholly black, without pale orbital lines; propodeum with a complete or nearly complete median longitudinal carina; antennae usually 28 to 32-segmented..... 23. *meromyzae* (Gahan).
49. Second abdominal tergite very finely punctate; third and following tergites very faintly so, almost polished; antennae usually 29 to 33-segmented..... 46. *montowesi* Viereck.
 Abdomen closely granular above, opaque or subopaque; antennae normally 34 to 40-segmented..... 47. *cephi* Gahan.
50. All coxae black; remainder of legs more or less blackish; head including face, black; thorax black; abdomen usually red, short, broad oval, rugulose on second tergite, granular on third, fourth and fifth tergites; antennae normally 25 to 29-segmented; ovipositor sheaths about as long as the abdomen beyond first segment..... 48. *hemimenae* Rohwer.
 Coxae yellow, rarely posterior coxae somewhat infuscated, and then not agreeing entirely with the above..... 51.
51. Propodeum smooth and polished, usually with a complete or nearly complete median longitudinal carina; abdomen strongly sculptured, the second tergite irregularly rugose medially and usually much shorter than the third; wings decidedly infuscated; stigma dark brown; second abscissa of radius usually much more than twice the first; antennae normally 34 to 40-segmented; malar space about as long as first segment of antennal flagellum; ovipositor sheaths about as long as the abdomen, not distinctly longer..... 49. *oenotherae*, new species.
 Propodeum without a median carina, although usually with a stub of a carina at apex; otherwise not exactly as above..... 52.
52. Ovipositor sheaths at most as long as the abdomen beyond first tergite. 61.
 Ovipositor sheaths as long as the abdomen or longer..... 53.
53. Second abdominal tergite finely granular or punctate, never strongly rugose; third and following tergites very delicately, usually very faintly sculptured, strongly shining; suturiform articulation fine, straight, the second tergite not emarginate medially; antennae stout, the segments of the apical half of flagellum scarcely longer than broad; malar space about as long as first flagellar segment; wings very nearly hyaline..... 54.
 Second to fifth or sixth abdominal tergites usually granular, the second often more or less rugose; if abdomen is not distinctly granular on third and following tergites the antennae are more slender, or the malar space is much shorter than the first flagellar segment; at least not combining all the above characters..... 56.
54. Ovipositor sheaths about as long as the body or nearly; abdomen usually black above except for the suturiform articulation and a lateral spot at base of second tergite, which are yellow; antennae normally 26 to 29-segmented..... 50. *papaipemae* Gahan.
 Ovipositor sheaths about as long as the abdomen; second and third tergites usually yellowish; remainder of abdomen more or less blackish..... 55.
55. Suturiform articulation distinctly minutely foveolate; face yellow; antennae normally 29 to 32-segmented..... 51. *apicatus* (Provancher).
 Suturiform articulation very fine, weakly impressed, not foveolate; face brownish black; antennae normally 24 to 27-segmented.

56. Second abscissa of discoideus as long as the recurrent vein; wings somewhat fuscous, the stigma yellow; abdomen strongly granular above, the second tergite more or less rugulose; suturiform articulation rather broad, foveolate, and somewhat arcuate, the second tergite somewhat emarginate behind; flagellar segments of antennae rather stout, most of them only a little longer than broad; malar space about as long as first flagellar segment..... 53. *mellitor* (Say).
Second abscissa of discoideus not as long as the recurrent vein; otherwise not agreeing completely with the above..... 57.
57. Propodeum finely punctate or granular over its posterior half, and with a median carina posteriorly; abdomen granular on the second to sixth tergites, the second usually with an irregularly rugose area on basal middle; segments of the antennal flagellum mostly but very little longer than broad..... 54. *nigropectus* (Provancher).
Propodeum not punctate over posterior half, although usually with a short median ridge posteriorly and a few lateral ridges diverging from this. 58.
58. Transverse diameter of the opening between clypeus and mandibles scarcely greater than the distance between this opening and the eye; malar space as long, or nearly, as first segment of antennal flagellum; ovipositor sheaths very slender, but broadening rather conspicuously near tip.
55. *furtivus* (Fyles).
Transverse diameter of the opening between clypeus and mandibles much greater than the distance between this opening and the eye; malar space much shorter than first segment of antennal flagellum..... 59.
59. Ovipositor sheaths very nearly as long as the entire body; face usually blackish; abdomen usually mostly black.... 56. *tachypteri*, new species.
Ovipositor sheaths about as long as the abdomen; face yellow; abdomen usually mostly yellow..... 60.
60. Second abdominal tergite usually with a shining irregularly rugose area on basal middle; third and following tergites granular; abdomen rather broad-oval; first and second segments of antennal flagellum usually about equal and usually twice as long as thick, the apical segments of flagellum slender, usually twice as long as thick; first abdominal tergite, a median spot at base of second and more or less of the apical tergites usually blackish..... 57. *variabilis* (Provancher).
Second abdominal tergite not as above; the tergites beyond third usually not granular, very faintly sculptured and shining; first segment of antennal flagellum usually decidedly longer than second, the second not twice as long as thick; most of the flagellar segments beyond second but very little longer than broad, the apical segments stout; abdomen usually entirely yellow..... 58. *sanninoideae* Gahan.
61. Segments of antennal flagellum very stout, beyond the first scarcely as long as broad; second abdominal tergite very finely punctate, the following tergites exceedingly faintly sculptured and strongly shining; propodeum finely punctate on posterior half..... 59. *hobomok* Viereck.
Segments of antennal flagellum not so stout..... 62.
62. Malar space as long as first segment of antennal flagellum; transverse diameter of opening between clypeus and mandibles scarcely greater than distance from this opening to the eye; stigma, including its costal margin largely yellow, brown at apex; second abscissa of radius much more than twice the first; propodeum usually minutely punctate or reticulate

- over most of its surface; abdomen granular on the second to sixth tergites; antennae normally 29 to 35-segmented----- 60. *caulicola* Gahan. Malar space not as long as first segment of antennal flagellum; rarely nearly so, but then not combining all the above characters----- 63.
63. Second abdominal tergite very finely sculptured, usually a little striate medially, the following almost smooth, exceedingly faintly, almost indistinctly, punctate; propodeum smooth and polished with a stub of a median carina posteriorly----- 64.
- Second abdominal tergite more coarsely sculptured, usually with an irregularly rugose area on basal middle, the following tergites granular; rarely the third and those beyond nearly smooth, but then the propodeum is minutely punctate or reticulate over most of its surface----- 65.
64. Coxae more or less infuscated above; face blackish; wings rather strongly dusky; ovipositor sheaths about as long as the abdomen beyond 1st tergite ----- 61. *niger* (Provancher). Coxae entirely pale yellow; face yellow, wings nearly hyaline.
62. *aequalis* (Provancher).
65. Antennae normally 23 to 29-segmented, shorter than the body, the segments of apical half of flagellum but little longer than wide; second abdominal tergite usually as long as the first and longer than the third; malar space very nearly as long as first flagellar segment; propodeum usually faintly punctate over its posterior half----- 63. *argutator* (Say). Antennae usually as long as the body, the flagellar segments much longer than broad; second abdominal tergite usually shorter than the first and scarcely as long as the third----- 66.
66. Propodeum finely punctate or reticulate or very minutely granular over most of its surface, more coarsely roughened medially and with a median ridge posteriorly; abdomen beyond third tergite very delicately sculptured, irregularly transversely lineolated----- 64. *geraei*, new species. Propodeum smooth and polished, with only a stub of a median longitudinal ridge posteriorly and with some short lateral carinae diverging from this; abdomen usually granular on the second to sixth tergites----- 67.
67. Antennae normally 34 to 40-segmented; malar space usually distinctly more than half the transverse diameter of the opening between clypeus and mandibles ----- 68. Antennae normally 24 to 32-segmented; malar space scarcely half the transverse diameter of the opening between clypeus and mandibles.
57. *variabilis* (Provancher).
68. Suturiform articulation slightly arcuate, the second tergite a little emarginate medially behind; first segment of antennal flagellum usually not twice as long as wide; first tergite and a median basal spot on second black; thorax usually mostly blackish----- 65. *lutus* (Provancher). Suturiform articulation straight, the second tergite not at all emarginate behind; first segment of antennal flagellum twice as long as wide; second tergite entirely yellow, without a blackish spot medially at base.
66. *cerambycidiphagus*, new species.
69. Dorsum of abdomen mostly smooth and polished, the sculpture when present very rarely extending to the third tergite; propodeum smooth and polished, sometimes with a median carina or a stub of a median ridge at apex; frons usually smooth and polished; if sculptured, the face and coxae black; face very rarely yellow; if so, then the abdomen is entirely smooth and polished----- 70.

- Dorsum of abdomen mostly sculptured; very rarely not distinctly sculptured beyond second tergite, but then frons is finely reticulately sculptured and face and coxae are yellow; face and coxae very rarely black and then abdomen is distinctly sculptured..... 96.
70. Opening between clypeus and mandibles unusually large, its transverse diameter as long as, or longer than, the distance from lower margin of antennal foramina to lower margin of clypeus; propodeum with a complete median longitudinal carina; posterior tarsi short and stout, shorter than their tibiae..... 71.
- Opening between clypeus and mandibles not so large; at least not agreeing entirely with the above..... 72.
71. Wings strongly infuscated; last segment of hind tarsi very large, broadening strongly toward apex and much longer than second tarsal segment; antennae 25 to 27 segmented..... 15. *gastroideae* (Ashmead).
Wings hyaline or very nearly; last segment of hind tarsi normal, not broadening strongly toward apex and not longer than second tarsal segment; antennae usually 21 to 23 segmented... 16. *brachyurus* (Ashmead).
72. Second abdominal tergite with conspicuous, more or less triangular areas of weaker chitinization laterally opposite the broad membranous margins of first tergite; abdomen, including first tergite, wholly smooth and polished, propodeum completely polished without a stub of a median ridge at apex..... 73.
- Second abdominal tergite without such membranous areas laterally; first abdominal tergite usually more or less sculptured at apex; propodeum most frequently, though not always, with a stub of a carina at apex... 76.
73. Antennae usually 23 to 26 segmented, usually shorter than the body; third abscissa of radius distinctly longer than the first and second abscissae combined and about twice as long as the second; last abscissa of cubitus distinctly longer than the preceding abscissa; wings usually rather strongly dusky..... 74.
- Antennae usually 28 to 32 segmented, longer than the body; third abscissa of radius not distinctly longer than the first and second combined and not nearly twice as long as the second; last abscissa of cubitus not distinctly longer than the preceding; wings faintly infuscated..... 75.
74. Head, thorax, and abdomen yellowish, sometimes with fuscous markings; legs yellow; second abdominal tergite usually as long as third, or nearly..... 29. *rudbeckiae*, new species.
Head, thorax, and abdomen, black; legs black; second abdominal tergite usually much shorter than third..... 30. *tenuiceps*, new species.
75. Head and thorax black; abdomen mostly black; legs more or less blackish..... 17. *melanaspis* (Ashmead).
Head, thorax, and abdomen mostly yellowish; legs yellowish.
18. *juncicola* (Ashmead).
76. Frons entirely, and usually the vertex to some extent, closely minutely punctate or reticulate and opaque; parapsidal grooves completely thickly hairy; head black with contrasting yellow orbital lines; thorax short and stout, black; wings rather strongly infuscated..... 77.
- Frons usually smooth and polished, rarely with faint sculpture just above insertion of antennae; at least not exactly as above..... 78.
77. Second abdominal tergite usually smooth and polished, and provided with two distinct short oblique foveolate impressions medially toward base; antennae usually 21 to 24 segmented; middle lobe of mesoscutum with scattered pubescence arising from its surface anteriorly.
19. *politiventris* (Cushman).

- Second abdominal tergite usually finely sculptured over nearly its entire surface and without such impressions toward the base; antennae normally 24 to 29-segmented; surface of middle lobe entirely destitute of pubescence although the long hairs arising in the parapsidal grooves lie upon the lobes----- 20. *pygmaeus* (Provancher).
78. Head thin antero-posteriorly, hardly longer at the intersection of the antennae than at the clypeus, the face not strongly receding; thorax rather stout; propodeum completely smooth and polished, without even a stub of a median ridge posteriorly; wings rather strongly infuscated on basal half----- 79.
- Head not thin, rather prominent just below insertion of antennae, the face receding; propodeum most frequently with a distinct short stub of a median ridge at apex----- 81.
79. Parapsidal grooves rather thickly hairy posteriorly; all coxae and more or less of remainder of legs, black; first abscissa of radius usually nearly as long as first intercubitus and much more than half the second abscissa of radius----- 21. *connecticutorum* Viereck.
- Parapsidal grooves exceedingly sparsely hairy----- 80.
80. Second abdominal tergite usually with a rather prominent polished basal median area and with some sculpture adjoining this; coxae and more or less of remainder of legs black----- 31. *nuperus* (Cresson).
- Second abdominal tergite, like remainder of abdomen, completely polished; legs, including all coxae, usually uniformly yellowish-red or reddish-brown----- 32. *curtus* (Provancher).
81. Abdomen wholly smooth and polished, the second tergite with two short oblique furrows setting off a basal median area; parapsidal furrows thickly hairy; head more than usually thick antero-posteriorly; antennae usually 29 to 32 segmented, tapering distinctly toward tip; face yellow; body usually mostly yellow; legs yellow, posterior coxae sometimes a little infuscated----- 22. *psilocorsi* Viereck.
- Abdomen rarely entirely smooth and polished, and then not agreeing completely with the above characters----- 82.
82. Legs including all coxae bright yellow; antennae never stout, all flagellar segments decidedly longer than broad; suturiform articulation always very fine; wings frequently hyaline----- 83.
- Legs dark brown or blackish; coxae black or blackish; wings distinctly infuscated----- 88.
83. Propodeum usually with a complete or nearly complete median longitudinal carina; second and third tergites finely sculptured; first abdominal tergite mostly rugose----- 23. *meromyzae* (Gahan).
- Propodeum smooth and polished with only a short stub of a median ridge posteriorly; third tergite always entirely smooth and polished----- 84.
84. Abdomen entirely polished with no indication of sculpture; wings perfectly clear hyaline; face yellow; thorax and abdomen usually entirely yellow----- 27. *angelesius* (Provancher).
- Second abdominal tergite nearly always a little sculptured; face black; thorax and more or less of abdomen black----- 85.
85. First abscissa of radius about as long as inner side of stigma and nearly as long as first intercubitus; second abscissa of radius not twice the first; wings distinctly fuscous on basal two-thirds; flagellar segments of antennae not twice as long as thick----- 67. *cinctus* (Provancher).
- Not agreeing entirely with the above----- 86.

86. Propodeum somewhat sculptured medially at base and with a distinct median ridge on apical third; posterior tarsi scarcely as long as their tibiae, the last tarsal segment fully as long as the second, and stout
26. *uncas* Viereck.
Propodeum perfectly smooth and polished except for an exceedingly short, often indistinct, stub of a median ridge at apex; posterior tarsi longer than their tibiae, the last tarsal segment not nearly as long as the second ----- 87.
87. Antennae very slender, normally 27 to 32-segmented, all flagellar segments at least twice as long as broad; head entirely black
28. *auripes* (Provancher).
Antennae usually 33 to 36-segmented, the flagellar segments mostly less than twice as long as broad; head usually with very narrow inner and superior ferruginous orbital lines-----24. *nigradorsum* (Ashmead).
88. Posterior tarsi stout, the last tarsal segment fully as long as the second and more than half the metatarsus; abdomen slender; first tergite long and narrow, broadening gradually from base and about twice as long as broad at apex; second tergite at most with faint sculpturing medially; suturiform articulation very delicate; stigma large; abdomen black----- 89.
Posterior tarsi more slender, the last tarsal segment shorter than the second and not more than half the metatarsus; otherwise not as above---- 90.
89. Abdomen completely polished; wings strongly infuscated.
68. *wawequa* Viereck
Abdomen with second tergite a little striate medially; wings slightly dusky on basal two-thirds----- 25. *ashmeadi*, new name.
90. Second and third abdominal tergites rather evenly striate; suturiform articulation broad, coarsely foveolate; last abscissa of radius shorter than first and second combined; propodeum with a median carina on apical half; all segments of antennal flagellum longer than broad
69. *sulcifrons* (Ashmead).
Third abdominal tergite rarely sculptured and then with only very faint roughening toward base; at least not the above combination of characters----- 91.
91. Stigma yellow at base and along costal margin; malar space about as long as first segment of antennal flagellum; all flagellar segments longer than broad, the first and second of equal length----- 33. *hyslopi* Viereck.
Stigma unicolorous, brown----- 92.
92. Antennae stout, frequently broadening faintly beyond the first flagellar segment, and narrowing again toward apex, most of the flagellar segments but little or no longer than broad; second abscissa of radius usually twice the first; abdomen frequently ferruginous with only first tergite and median spot on second, black----- 93.
Antennae more slender, all flagellar segments much longer than broad; second abscissa of radius usually distinctly less than twice the first; abdomen black with more or less of second and third tergites pale--- 95.
93. Antennae normally 25 to 30-segmented; propodeum with a median carina on apical half and more or less rugulose on the median line toward base; second abscissa of radius more than twice the first, the third longer than the first and second combined; abdomen with second and third tergites mostly yellowish or red, the remainder black.
34. *nitidus* (Provancher).
Antennae normally 32 to 37-segmented; propodeum not so completely sculptured on the median line; abdomen usually ferruginous with only first tergite and a median spot on second black----- 94

94. Third abscissa of radius shorter than last abscissa of cubitus and not distinctly as long as first and second abscissae of radius combined; flagellar segments of antennae mostly not longer than broad; posterior tibiae dusky only at apex..... 38. *nevadensis* (Ashmead).
Third abscissa of radius as long as last abscissa of cubitus and fully as long as the first and second abscissae of radius combined; all flagellar segments of antennae a little longer than broad; posterior tibiae wholly black..... 37. *sesiae*, new species.
95. Propodeum with a prominent stub of a median ridge on its posterior third; first abscissa of radius not as long as the side of stigma bordering first cubital cell..... 36. *pini*, new species.
Propodeum without a distinct stub of a median carina extending one-third the distance toward base; first abscissa of radius as long as the side of stigma bordering first cubital cell..... 35. *tychii*, new species.
96. Second abdominal tergite almost smooth, strongly shining and provided with two distinct short furrows that set off a basal median area and usually with two longitudinal furrows laterally; third, fourth, and fifth tergites granular; antennae shorter than the body, usually 20 to 24-segmented; radius arising much before middle of stigma; posterior coxae strongly infuscated..... 39. *thurberiphagae*, new species.
Not agreeing entirely with the above..... 97.
97. Antennae very slender, usually 22 to 29-segmented, all of the flagellar segments fully twice as long as thick, the basal segments not thicker than the apical segments, the antennae not tapering toward tip; wings perfectly clear hyaline; stigma long; radius arising much before its middle; propodeum smooth and polished..... 98.
Antennae not as above; at least not that combination of characters..... 100.
98. Abdomen very delicately sculptured, smooth laterally; antennae usually 22 to 24-segmented; abdomen usually yellow.
40. *pityophthori*, new species.
Abdomen coarsely sculptured; suturiform articulation very broad, foveolate; antennae usually 26 to 29-segmented; abdomen mostly black above..... 99.
99. Abdomen, especially second tergite, strongly longitudinally rugose, the second tergite usually with a complete median longitudinal raised line; parapsidal grooves rather thickly hairy anteriorly as well as posteriorly; abdomen black above, more or less yellow medially on third, fourth, and fifth tergites..... 41. *laemosacci*, new species.
Abdomen coarsely granular; parapsidal grooves not thickly hairy anteriorly; abdomen blackish above, yellow laterally. 42. *metacomet* Viereck.
100. Wings long, uniformly infuscated to apex, the wing membrane abnormally thickly hairy over its entire surface; cubitus and subdiscoideus nearly parallel, the second discoidal cell scarcely broadening apically; radial cell exceptionally long, radius going to extreme apex of wing; propodeum entirely finely rugulose; antennae slender and more than 40-segmented..... 43. *atricollis* (Ashmead).
Wings not agreeing with the above characterization..... 101.
101. All coxae and trochanters black; more or less of remainder of legs, especially posterior tibiae, blackish; head, including face, deep black; wings strongly infuscated; thorax black; abdomen usually more or less red..... 48. *hemimena* Rohwer.
Coxae yellow, rarely a little infuscated; face very rarely brownish-black..... 102

102. Propodeum, except at extreme base, rugulose; most flagellar segments but very little longer than broad; body usually yellowish; abdomen only very faintly sculptured beyond second tergite..... 103.
Propodeum usually smooth and polished, although often with diverging ridges medially, and sometimes delicately punctate or reticulate over most of its surface..... 104.
103. Second abdominal tergite with an irregularly rugose area on basal middle; antennae usually 28 to 32-segmented..... 45. *podunkorum* Viereck.
Second abdominal tergite rather evenly finely sculptured; antennae usually 32 to 36-segmented..... 44. *analcidis* (Ashmead).
104. Propodeum faintly reticulate on its posterior half; sometimes more distinctly granular over its entire surface; thorax never wholly black.. 105.
Propodeum smooth and polished, with no indication of such reticulation..... 108.
105. Second abscissa of radius much more than twice the first; radius going to extreme apex of wing, the third abscissa of radius almost on a straight line with the second; wings distinctly somewhat infuscated, the stigma usually yellow; antennae rather slender, usually 30 to 36-segmented; body entirely yellow, very rarely with propodeum and first tergite dusky; ocell-ocular line not more than twice the diameter of an ocellus..... 60. *caulicola* Gahan.
Second abscissa of radius usually not more than twice the first, and usually making a distinct angle with the second 106.
106. Antennae normally 23 to 29-segmented; second abdominal tergite usually fully as long as the first and longer than the third; propodeum and first abdominal tergite usually infuscated; mesonotal lobes often more or less blackish..... 63. *argutator* (Say).
Antennae usually 27 to 37-segmented; second abdominal tergite very rarely longer than third..... 107.
107. Flagellar segments of antennae slender; antennae composed of 27 to 33 segments; abdomen beyond 3d tergite usually only very faintly sculptured; propodeum and first abdominal tergite usually yellow; head, sometimes including part of face, and anterior parts of mesonotum, usually blackish..... 64. *geraei*, new species.
Flagellar segments mostly only a little longer than broad; antennae normally composed of 32 to 37 segments; third to fifth abdominal tergites granular and opaque; propodeum and first abdominal tergite, and usually venter of thorax, black.... 54. *nigropectus* (Provancher).
108. Abdomen not or only indistinctly sculptured beyond third tergite, strongly shining, suturiform articulation very fine..... 109.
Abdomen granular on second to fifth tergites; suturiform articulation often rather broad, foveolate..... 115.
109. Antennae stout, most of the flagellar segments but little or no longer than broad..... 110.
Antennae slender, flagellar segments much longer than broad; face yellow; abdomen mostly yellow..... 112.
110. Suturiform articulation usually finely foveolate; antennae usually 28 to 33-segmented; face yellow; abdomen usually largely ferruginous, blackish at base and apex; frons and vertex mostly ferruginous, black only medially 51. *apicatus* (Provancher).
..... 59. *hobomok* Viereck.
Suturiform articulation not distinctly foveolate; antennae usually 24 to 29-segmented; face usually brownish-black; frons and vertex wholly black..... 111.

111. First abdominal tergite with a foveolate groove just inside the lateral margins; abdomen black, with only the suturiform articulation and a lateral spot on second tergite yellow; segments of antennal flagellum all a little longer than broad; posterior coxae more or less infuscated. 50. *papaipemae* Gahan.
- First abdominal tergite without a distinct foveolate groove inside lateral margins, but with elongate apical lateral pits; abdomen with second and third tergites mostly pale; most segments of antennal flagellum not distinctly longer than broad; all coxae yellow. 52. *nanus* (Provancher).
112. Face yellow; all coxae bright yellow; abdomen usually mostly yellow. 113. Face brownish-black; posterior coxae more or less infuscated above; abdomen mostly blackish. 61. *niger* (Provancher).
113. Third cubital cell long, the last abscissa of cubitus much longer than the preceding, the third abscissa of radius considerably longer than the first and second abscissae combined; second abscissa of radius usually not twice the first; abdomen black except the suturiform articulation and second tergite laterally. 70. *canadensis* (Ashmead).
- Last abscissa of cubitus not distinctly longer than the preceding; third abscissa of radius not longer than first and second abscissae combined; second abscissa of radius at least twice the first; abdomen mostly yellow. 114.
114. Propodeum very smooth and polished with only an exceedingly short stub of a median ridge at apex; first flagellar segment more than twice as long as broad and distinctly longer than the scape; scape yellow. 46. *montowesi* Viereck.
- Propodeum with a median carina extending nearly half-way to the base; first flagellar segment of antennae nearly twice as long as broad, but scarcely as long as the scape; scape black. 62. *aequalis* (Provancher).
115. Malar space one-third as long as the eye height; ocelli very small, the ocell-ocular line three times as long as the diameter of an ocellus; second abdominal tergite considerably shorter than third; sixth tergite, as well as all the preceding, sculptured; propodeum usually with a nearly complete median longitudinal carina; antennae usually 33 to 40-segmented. 49. *oenotherae*, new species
- Malar space not nearly one-third the eye-height; ocell-ocular line not three times as long as the diameter of an ocellus; second abdominal tergite usually as long as the third; sixth tergite practically always completely polished. 116.
116. Distance between clypeal foveae more than twice as long as malar space; antennae usually 24 to 32-segmented, very rarely with 33 or 34 segments. 117.
- Distance between clypeal foveae not distinctly twice as long as malar space; or, if apparently as long, then with antennae 34 to 40-segmented; antennae rarely with less than 33 segments. 121.
117. Head, including face black or brownish-black. 118.
- Face pale yellow; frons and vertex mostly yellow. 119.
118. Thorax and abdomen entirely or mostly yellow; propodeum impressed, almost grooved along the median line, with some transverse rugae in the depression; thorax not stout, about twice as long as high, viewed laterally. 71. *konkapoti* Viereck.
- Thorax and abdomen mostly black; propodeum smooth and polished except for a stub of a median ridge at apex, not impressed along the median line; thorax stout. 56. *tachypteri*, new species

119. Second to fifth abdominal tergites evenly granular and opaque, the second not longitudinally rugulose and without a median irregularly rugose shining area; ocell-ocular line a little more than twice the diameter of an ocellus; last abscissa of radius scarcely as long as first and second abscissae combined..... 72. *rhyssemati* (Ashmead).
 Second abdominal tergite usually with a median irregularly rugose shining area at base, or longitudinally rugose; fourth and fifth tergites usually much more weakly sculptured and shining; last abscissa of radius usually a little longer than first and second abscissae combined; ocell-ocular line scarcely twice as long as greatest diameter of an ocellus...120.
120. Thorax, viewed laterally, twice as long as high; antennae usually 31 to 34-segmented, the first flagellar segment usually distinctly longer than the second; abdomen usually entirely yellow beyond first tergite.
 58. *sanninoideae* Gahan.
 Thorax more compact, not twice as long as its greatest height; antennae usually 24 to 32-segmented, the first and second flagellar segments usually of equal length and twice as long as broad; abdomen usually with first tergite, median spot on second, and more or less of apical tergites blackish.....57. *variabilis* (Provancher).
121. Recurrent vein not distinctly longer than second abscissa of discoideus, and but very little longer than the portion of cubitus between recurrent and first intercubitus; antennae rather stout, none of the flagellar segments twice as long as broad; second tergite usually slightly emarginate at the middle posteriorly; wings usually infuscated, with the stigma yellow.....53. *mellitor* (Say).
 Recurrent vein longer than second abscissa of discoideus and usually twice as long as the portion of cubitus between recurrent and first intercubitus; antennae usually more slender, with at least the basal flagellar segments and the terminal segments twice as long as broad..... 122.
122. Last segment of posterior tarsi as long as the second; second abscissa of radius more than twice the first; measured on the cubitus the third cubital cell shorter than the second; second abdominal tergite not irregularly strongly rugose on basal middle; antennae 34 to 40-segmented; thorax long, not stout.....47. *cephi* Gahan.
 Last segment of posterior tarsi shorter than second; at least not exactly as above..... 123.
123. Second abdominal tergite with an irregularly rugose shining area on basal middle; antennae usually 35 to 42-segmented; malar space scarcely more than half the distance between clypeal foveae..... 124.
 Second abdominal tergite without such irregularly rugose area on basal middle, evenly granular or somewhat longitudinally sculptured medially..... 125.
124. Suturiform articulation straight, the second abdominal tergite not at all emarginate behind; second abdominal tergite, like remainder of abdomen, usually entirely yellow..... 66. *cerambycidiphagus*, new species.
 Suturiform articulation broadly a little emarginate behind; second tergite usually with a black median spot, and more or less of remainder of abdomen usually blackish or fuscous.....65. *lutus* (Provancher).
125. Face more or less blackish; second abscissa of radius not distinctly twice the first; thorax wholly black.....73. *cooki* (Ashmead).
 Face yellow; second abscissa of radius usually distinctly more than twice the first.....55. *furtivus* (Fyles).

1. MICROBRACON QUINNIPIACORUM Viereck

Microbracon quinniapiacorum VIIECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), p. 207.

Type.—In the Connecticut Agricultural Experiment Station at New Haven.

The antennae of the type are 31-segmented and slender, the basal flagellar segments twice, or nearly twice, as long as broad; frons, vertex, mesoscutum, scutellum, pro-, meso-, and metapleura, propodeum and dorsum of abdomen entirely, uniformly finely punctate or reticulate and opaque; parapsidal grooves pubescent; the surface of the middle lobe of mesoscutum bare; propodeum with a stub of a median ridge at apex; wings only very slightly dusky; second abscissa of radius at least twice as long as the first, the first and second abscissae combined scarcely as long as the third; second abdominal tergite much longer than the third; in the type the ovipositor sheaths project scarcely the length of the first abdominal tergite. Ferruginous; head, thorax and base of abdomen more or less marked with blackish. A small species, about 2 mm. in length.

Distribution.—Connecticut, Maryland.

Host.—Unknown.

Known only from the type, and one female specimen in the United States National Museum, labeled "Md., Collection Ashmead."

2. MICROBRACON PUNCTATUS, new species

Female.—Length 2.8 mm. Head rather thick antero-posteriorly at insertion of antennae, the face receding somewhat below; face including clypeus, frons, and vertex finely closely punctate and opaque; frons with a distinct median groove from anterior ocellus to the antennae; antennae 28-segmented, nearly or quite as long as the body, the two basal flagellar segments about twice as long as wide, all the following much longer than broad; mesoscutum and scutellum, pro-, meso- and metapleura, propodeum, and posterior coxae all finely evenly punctate and opaque; propodeum with a distinct complete median longitudinal groove; pubescence on mesonotum sparse and restricted to the parapsidal grooves; second abscissa of radius more than twice as long as the first, the latter about half the first intercubitus; third abscissa of radius about as long as the first and second abscissae combined; last abscissa of cubitus about as long as the preceding abscissa; the portion of cubitus between recurrent and first intercubitus very short, the recurrent nearly interstitial with first intercubitus; abdomen ovate; first tergite evenly punctate, opaque; the second and third finely punctate or minutely granular, the posterior tergites much more weakly so and more shining; ovipositor sheaths as long as the abdomen beyond first tergite.

Ferruginous; frons, vertex and occiput piceous; antennae yellowish below toward base, brownish to brownish-black above and apically; wings hyaline, stigma brown; legs ferruginous.

Type.—Cat. No. 26661, U.S.N.M.

Type-locality.—Nassau County, New York.

Host.—The type is labeled "With larva of *Listronotus latiusculus*." Described from a single specimen taken by F. H. Chittenden.

3. MICROBRACON SPHENOPHORI, new species

Fig. 6

Female.—Length 3 mm. Head very nearly as long antero-posteriorly as high; eyes rather small, hardly more than half as long as the height of head; distinctly though sparsely hairy; malar space short, less than half the transverse diameter of the opening between clypeus and mandibles, which is about equal to the distance from base of antennae to clypeus; face and frons closely minutely punctate and opaque, the vertex faintly punctate; vertex and temples broad; frons without a distinct median groove descending from median ocellus; ocell-ocular line more than three times the diameter of an ocellus; antennae missing beyond 19th segment; first flagellar segment about twice as long as broad, much longer than the second, the following but very little longer than broad; mesoscutum and scutellum very faintly punctate, more distinctly so in the region of the parapsidal grooves, shining; anteriorly the mesoscutum is very smooth and shining, not distinctly punctate; pleura entirely, propodeum and posterior coxae, minutely evenly punctate and subopaque; the propodeum with a more or less distinct median furrow; pubescence on mesoscutum very sparse and restricted to the parapsidal furrows; fore wing with radius going nearly to the apex; second abscissa of radius fully twice the first, but the first and second combined less than the third; the first abscissa of radius about half the first intercubitus; last abscissa of cubitus much longer than the preceding; the portion of cubitus between recurrent and intercubitus very short, the recurrent nearly interstitial with first intercubitus; posterior femora rather stout, but little more than three times as long as broad; abdomen long and narrow; first tergite evenly punctate, like the propodeum; the following tergites very minutely punctate, becoming gradually less distinctly so posteriorly, the apical tergites being smooth and shining; ovipositor sheaths as long as the abdomen beyond the first tergite. Entirely yellow including antennae and legs; wings hyaline, stigma and veins yellowish.

Male.—Essentially as in the female; the malar space is a little shorter; the antennae are 36-segmented, and the flagellar segments

longer than in the female; on the basal half the antennae are yellowish, on the apical half blackish.

Type.—Cat. No. 26660, U.S.N.M.

Type-locality.—Charleston, Missouri.

Host.—*Sphenophorus callosus* Olivier.

Described from three specimens reared by Bagby and Satterthwaite, August 16 to 25, 1917 under Webster No. 17835.

4. MICROBRACON GELECHIAE (Ashmead)

Fig. 23

Bracon gelechia ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 623.

Bracon notaticeps ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888) p. 624.

Bracon, species RILEY and HOWARD, Insect Life, vol. 2, 1890, p. 349.

Habrobracon gelechia JOHNSON, Ent. News, vol. 6, 1895, p. 324.

Bracon, species JOHANNSEN and PATCH, Bull. 195, Maine Agr. Exp. Sta., 1912, p. 243.

Habrobracon johannseni VIIECK, Proc. U. S. Nat. Mus., vol. 42, 1913, p. 622.

Habrobracon tetrulophae VIIECK, Proc. U. S. Nat. Mus., vol. 42, 1913, p. 623.

Habrobracon gelechia CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 106.

Habrobracon johannseni CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 107.

Habrobracon gelechia STEARNS, Journ. Econ. Ent., vol. 12, 1919, p. 348.

Type.—The types of *gelechia*, *notaticeps*, *johannseni*, and *tetrulophae* are all in the United States National Museum, and respectively bear Type Catalogue Nos. 2919, 2920, 14720, and 14721.

The female antennae normally are 22 to 26-segmented, although very small specimens rarely have as few as 19 or 20 segments in the antennae; the antennae of the males are 22 to 27-segmented; the flagellar segments are always much longer than broad, the first being twice as long as broad. The entire body is closely finely punctate and opaque or subopaque; the propodeum is without a distinct stub of a carina posteriorly; the color varies greatly, but the head is nearly always black, with pale inner and superior orbital lines, and the thorax is black; the first abscissa of the radius is almost invariably about as long as the second, and the portion of cubitus between the recurrent and the first intercubitus is fully as long as the recurrent, and in small specimens longer.

Distribution.—Throughout the United States.

Hosts.—*Gelechia*, species (Ashmead); (*Gelechia*) *Phthorimaea cinerella* Murtfeldt (Ashmead); "oak-leaf skeletonizer" (Ashmead); (*Tetrulophae*) *Wanda baptisiella* Fernald (Viereck); "4-spotted oak-leaf tyer;" (*Gelechia*) *Aristotelia roseosuffusella* Clemens (Riley and Howard); *Canarsia hammondi* Riley; *Pyrausta nubilalis* Huebner; *Laspeyresia molesta* Busck (Stearns); *Gelechia hibiscella* Busck; *Phthorimaea operculella* Zeller; *Papaipema*,

species in pinks; *Desmia funeralis* Huebner; *Polychrosis viteana* Clemens; and *Archips argyrospila* Walker.

A large quantity of material which is in the United States National Museum has been examined. This includes, in addition to the types, specimens from the hosts listed above and from the following localities: Riley Co., Kansas; Franklin Co., Arkansas; Bentonville, Arkansas (D. Isely). Watertown, Massachusetts (D. H. Craig); Peabody and Wakefield, Massachusetts (D. W. Jones and H. L. Parker); Cedar Point, Maryland; Oswego, New York; Whitesburg, New Jersey (H. B. Scammell); Leesburg, Virginia (L. A. Stearns); Rutherford, New Jersey (E. L. Dickerson); Fairfax County, Virginia (J. F. Strauss); Norfolk, Virginia (F. H. O'Neill); Carlisle, Pennsylvania (P. R. Myers); Northeast, Pennsylvania; Champaign, Illinois. Salineville, Ohio; Agricultural College, Michigan; Spokane, Washington (H. E. Newman); Los Angeles and El Monte, California (J. E. Graf). Most of this material was reared in the Bureau of Entomology under various Chittenden, Quaintance and Webster numbers. There is also a series of this species at the Gipsy Moth Laboratory, reared by R. T. Webber from an unknown tortricid on *Monarda didyma*, at Melrose Highlands, Massachusetts, under Gipsy Moth Laboratory No. 12164 C 21.

5. MICROBRACON DIVERSICOLOR (Viereck)

Habrobracon diversicolor VIERECK, Ent. News, vol. 32, 1921, p. 174.

Type.—In the California Academy of Sciences.

The type of this species has not been seen; but from the original description it appears to be *gelechia* (Ashmead). However, I prefer to hold the name distinct until an opportunity is presented for an examination of the type.

Distribution.—Berkeley, California.

Host.—Unknown.

6. MICROBRACON ERUCARUM (Cushman)

Fig. 24

Habrobracon erucarum CUSHMAN, Proc. U. S. Nat. Mus., vol. 58, 1920, p. 291.

Type.—Cat. No. 22870, U.S.N.M.

Near *americanus* (Ashmead) and *gelechia* (Ashmead), but separable from these by the characters given in the foregoing table. Usually entirely black except for very narrow, sometimes mostly obsolete, pale inner orbital lines, the venter of the abdomen, which is usually yellow, and usually more or less of the tibiae, which are somewhat brownish; the mesonotum, pleura, and propodeum are faintly closely

punctate; the scutellum almost polished; the abdomen beyond the second tergite is smooth and shining, only faintly minutely reticulate; the radial cell is exceptionally small, measured along the wing margin but little longer than the stigma; the first abscissa of radius is usually longer than the second; the only entire female antenna seen has 22 segments, that of the male 25.

Distribution.—Utah; Colorado; Arizona.

Host.—*Euxoa*, species.

In addition to the type series the United States National Museum has one specimen from Chiric Mountains, Arizona (H. G. Hubbard); and another from Colorado (C. F. Baker).

7. MICROBRACON AMERICANUS (Ashmead)

Trachyusa americana ASHMEAD, Bull. Colorado Biol. Assoc., 1, 1890, p. 18.

Habrobracon americanus GAHAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 123.

Type.—Cat. No. 13421, U.S.N.M.

Although in his description Ashmead stated that he had but one specimen, and that a male, the specimen in the National Museum labeled "type" is a female. It agrees in every detail with Ashmead's description and I have no doubt whatever that it is the specimen which he had before him. The face, frons, vertex, temples, even occiput to some extent, and the entire thorax, minutely punctate or reticulate and opaque; antennae of type 23-segmented; antennae of two other specimens, one female and one male, likewise 23-segmented, not tapering toward tip; the two basal flagellar segments twice as long as broad; middle lobe of mesoscutum destitute of pubescence medially; propodeum with a distinct median carina on its posterior third or half; abdomen beyond second tergite a little more strongly punctate and less shining than in *erucarum*; radial cell short, the radius attaining wing margin much before the apex; second abscissa of radius distinctly longer than first, and at least as long as first intercubitus; the portion of cubitus between recurrent vein and first intercubitus decidedly shorter than recurrent; ovipositor sheaths projecting much less than half the length of the abdomen beyond apex of the last dorsal segment; head black except for narrow superior orbital lines and a yellowish spot on cheeks adjoining the malar space; thorax and abdomen mostly or entirely black; coxae black; remainder of legs more or less black; one male in the National Museum has the abdomen almost entirely red, and the antennae 22-segmented.

Distribution.—Colorado.

Host.—Unknown.

In addition to the type there are three specimens, one female and two males, in the United States National Museum, all from Colorado, the female labeled "Colo. 2075," the two males "Colo. 413."

8. MICROBRACON CUSHMANI, new name

Fig. 17

Habrobracon variabilis CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 103 (not Provancher).

Type.—Cat. No. 18275, U.S.N.M.

Separated from *xanthonotus* and *platynotae* by the antennae, which, especially in the female, are stout and taper toward the tip; and by the paler head and thorax. It is further distinguished from *platynotae* by the usually coarser longitudinal sculpture of the second tergite, and from *xanthonotus* by the longer ovipositor sheaths, which are a little more than half as long as the abdomen. Head and thorax entirely finely granularly sculptured; antennae of female usually 19 to 22-segmented; of male, normally 21 to 25 segmented; malar space of female at least as long as the first flagellar segment; of male, nearly as long; wings a little dusky on basal half or more; second abscissa of radius only a little or no longer than the first; last abscissa of radius as long as the last abscissa of cubitus, the latter not distinctly twice the preceding abscissa of cubitus; the portion of cubitus between recurrent and first intercubitus fully as long as recurrent; abdomen entirely or nearly entirely sculptured, the second tergite coarsely so; the oblique grooves on first tergite usually foveolate; head, thorax, and abdomen usually mostly testaceous, the thorax often more or less fuscous; legs mostly yellowish-brown.

Distribution.—Occurs from Florida to Arizona and north to Illinois and Pennsylvania; also found on the Virgin Islands.

Hosts.—*Canarsia hammondi* Riley; *Acrobasis nebulella* Riley; *Mineola indiginella* Zeller; *Mesocondyla gastralis* Guenee; *Enarmonia prunivora* Walsh.

Represented in the National Museum by considerable material from the above-named hosts and from the following localities: Champaign, Illinois; Brownsville, Texas (Bridwell); Tucson, Arizona; Siloam Springs, Arkansas (S. W. Foster); Bentonville, Arkansas (D. Isely); Anderson, Missouri (F. L. Wellman and D. Isely); Kirkwood, Missouri; Thomasville, Georgia; Monticello, Florida (J. B. Gill); and St. Croix, Virgin Islands. Most of this material was reared in the Bureau of Entomology under Quaintance Nos. 5083, 9160, 16459, 16487, 20730.

9. MICROBRACON PLATYNOTAE (Cushman)

Habrobracon platynotae CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 104.

Type.—Cat. No. 18276, U.S.N.M.

Distinguished from *cushmani* as noted under that species; from *xanthonotus* it differs especially by the characters given in the key; from *gelechia*, which it very closely resembles in general appearance

and in the length of ovipositor, it can be separated by the broader, foveolate suturiform articulation, the presence of a median area on the second tergite set off by short longitudinal furrows, and by the usually more coarsely granular sculpture of the abdomen. Antennae of female usually 22 to 25 segmented, of the male 24 to 27 segmented; first flagellar segment twice as long as thick; head and thorax entirely finely granular; first abscissa of radius usually as long as the second; the part of cubitus between recurrent and intercubitus longer than the recurrent; propodeum without a distinct median carina posteriorly; head and thorax mostly black; abdomen usually testaceous, except at base.

Distribution.—Hollywood, California; Durango, Mexico.

Hosts.—*Platynota*, species; *Pectinophora gossypiella* Saunders.

In addition to the types the National Museum has a small series of specimens reared from the pink bollworm, at Tlahualilo and Lirido, Durango, Mexico, by A. C. Johnson and N. B. McKinney.

10. MICROBRACON XANTHONOTUS (Ashmead)

Fig. 26

Bracon xanthonotus ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 618.

Habrobracon hopkinsi VIREECK, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 380.

Habrobracon mali VIREECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 641.

Habrobracon xanthonotus CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 105.

Type.—Cat. No. 14757, U.S.N.M. The types of *hopkinsi* (Cat. No. 12284) and *mali* (Cat. No. 15331) are also in the National Museum.

A thorough study of the types of *xanthonotus*, *hopkinsi*, and *mali* can leave no doubt that all, as Cushman suggested, belong to the same species. The characters upon which they were originally separated are all extremely variable. Some series exhibit practically all intergradations. The head and thorax are finely punctate or minutely granular; the antennae are slender, and in the female normally 23 to 27-segmented, in the male usually 25 to 28-segmented; the first flagellar segment is more than twice as long as thick, in the male nearly three times as long as thick; malar space in female as long as first segment of flagellum, but considerably shorter in the male; second abscissa of radius nearly always a little longer than the first; third abscissa of radius going very nearly to extreme apex of wing and as long as last abscissa of cubitus; the part of cubitus between recurrent and first intercubitus nearly always a little shorter than the recurrent, apparently as long as recurrent in some small males; abdomen usually strongly sculptured, the second tergite and base of third usually longitudinally rugulose; the oblique grooves on first

tergite coarsely foveolate, the apex of this tergite commonly rugose; second tergite nearly always with a median basal area set off by longitudinal foveolate furrows; ovipositor sheaths distinctly less than half the length of the abdomen; head and thorax usually black, more or less marked with yellow or red; abdomen varying from mostly testaceous to entirely black; legs varying from mostly blackish to testaceous.

Distribution.—California; Washington; Virginia; Minnesota; New Hampshire.

Hosts.—*Notolophus oslari* Barnes; *Malacosoma pluvialis* Dyar; *M. constricta* Packard.

The foregoing discussion and characterization are based on the types of *xanthonotus*, *mali*, and *hopkinsi*, and on considerable additional material in the United States National Museum. This material includes series reared from *Malacosoma pluvialis*, at Pullman, Washington, under Washington Experiment Station No. 025; from *M. constricta*, at Sacramento, California, under Bureau of Entomology No. 2747; and from an unknown lepidopterous larva, at Vienna, Virginia, under Quaintance No. 7863 (R. A. Cushman). There are also collected specimens from Santa Cruz Mountains, Yosemite, Summerdale and Alameda, California; Durham, New Hampshire (Weed and Fiske); and St. Anthony Park, Minnesota.

11. MICROBRACON HEBETOR (Say)

Bracon hebetor SAY, Bost. Jour. Nat. Hist., vol. 1, 1836, p. 252.

Bracon dorsator SAY, Bost. Jour. Nat. Hist., vol. 1, 1836, p. 253.

Bracon brevicornis KIRBY, Trans. Ent. Soc. Lond., 1884, p. xxxi.—MARSHALL, Trans. Ent. Soc. Lond., 1885, p. 24, pl. 1, fig. 1a and b.

Bracon juglandis ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 621.

Habrobracon hebetor JOHNSON, Ent. News, vol. 6, 1895, p. 324.

Bracon (Habrobracon) honestor RILEY and HOWARD, Ins. Life, vol. 7, 1895, p. 428. Misprint for *hebetor*, corrected in general index.

Habrobracon beneficentior VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 182.

Habrobracon brevicornis CUSHMAN, Proc. Ent. Soc. Wash., vol. 16, 1914, p. 101.—WHITING, Biol. Bull. 34, 1918, p. 350.

Habrobracon juglandis CUSHMAN, Proc. Ent. Soc. Wash., vol. 24, 1922, p. 213.

Type.—The types of *hebetor* Say and *dorsator* Say have been lost; that of *juglandis* Ashmead and that of *beneficentior* Viereck are in the United States National Museum, the former bearing type catalogue No. 2913, the latter, No. 13494.

This species is exceedingly close to *brevicornis* (Wesmael), and the two have been much confused in literature. Cushman (1922) cleared up this matter, calling attention to the difference in habit in the two species, and pointing out some morphological differences, although he did not regard *juglandis* Ashmead as identical with *hebetor* Say. It appears, after a careful consideration of Say's

description of *hebetor*, that there can be no reasonable doubt that Say and Ashmead were dealing with the same species. In fact, Ashmead determined some specimens of this species in the National Museum as *hebetor* Say, although failing to recognize the identity of *juglandis* with this material. The combination of characters ascribed to *hebetor* by Say is found nowhere else in the Braconidae, and after allowing for the wide range of variation occurring in the species, will be found to agree nicely with *juglandis*. *Bracon dorsator* Say is also, without question, this species; and a study of the type of *Habrobracon beneficentior* Viereck shows this species, too, to be identical with *hebetor* Say. References in literature to *Bracon* or *Habrobracon brevicornis*, *hebetor* or *juglandis* as parasites of the Mediterranean flour moth, *Ephestia kuehniella*, of the meal moth, *Plodia interpunctella*, or of the bee-moth, *Galleria mellonella*, concern this species.

The females of *hebetor* are readily distinguished from those of *brevicornis* by the antennae, which are 13 to 15-segmented in the former, and 17 to 19-segmented in the latter. The males of the two species are much more difficult to distinguish, but the characters mentioned in the key will nearly always separate them. The abdomen in *hebetor* is almost invariably somewhat smoother, with the punctures less distinct, than in *brevicornis*. In color this species is exceedingly inconstant.

Distribution.—Apparently occurs throughout the world, wherever its hosts, particularly the flour and meal moths, are present.

Hosts.—*Ephestia kuehniella* Zeller; *E. elutella* Huebner; *E. cahiritella* Zeller; *Plodia interpunctella* Huebner; *Galleria mellonella* Linnaeus; *Vitula edmansii* Packard; *Sitotroga cerealella* Olivier.

The above discussion is based on abundant reared and collected material in the United States National Museum. Series from the following hosts and localities are contained in this collection; *Ephestia kuehniella*—Reno, Nevada (S. B. Doten); San Francisco, California (G. Compere and W. G. Johnson); *Vitula edmansii* in *Bombus* nests—Riverton, New Jersey and Champaign, Illinois (T. H. Frison); *Sitotroga cerealella*—Potchefstroom, S. Africa (W. F. Schepp); *Galleria mellonella*—Fillmore, California (J. F. McIntyre); *Plodia interpunctella*—Jamaica Plain, Massachusetts (J. G. Jack); also specimens from cone galls on *Salix longifolia*, Reno, Nevada (G. G. Schweiss); a series from seeds of *Prosopis juliflora*, Cairo, Egypt (H. Morrison); another from a larva infesting soy beans, Mayaguez, Porto Rico (W. A. Mace); 6 specimens labeled "on ship with cocoa beans, O. K. Courtney;" a series reared from infested corn, Santo Domingo, West Indies

(W. V. Tower); 8 specimens from a lepidopterous larva in seeds of *Canarium indicum*, Buitenzorg, Java (L. L. Spessard); 12, labeled "*Grewia cana*, Transvaal, S. Africa;" 2 from St. Petersburg, Russia (J. Schreiner); 1 from Charroux, France (Oberthur); 4 from a seed storehouse, Yates City, Illinois (W. S. Abbott); other specimens from Jacksonville, Florida; Morgantown, West Virginia; Agricultural College, Michigan, and Milton, Massachusetts; and a series of several hundred individuals bred by P. W. Whiting in connection with genetic studies on this species at the University of Pennsylvania.

12. MICROBRACON BREVICORNIS (Wesmael)

Fig. 19

Bracon brevicornis WESMAEL, Nouv. Mem. Acad. Sci. Bruxelles, vol. 11, 1838, p. 23, fig. 2.—BRISCHKE, Schr. Naturf. Ges. Danzig, ser. 2, vol. 4, 1882, p. 135.

Habrobracon brevicornis CUSHMAN, Proc. Ent. Soc. Wash., vol. 24, 1922, p. 122.

Type.—Probably in the Brussels Academy of Science.

The similarity of this species to *hebetor* (Say) and the confusion of the two species in literature are discussed under *hebetor*.

Distribution.—This species apparently occurs throughout Europe. It has recently been introduced into Massachusetts from France, as a parasite of the imported European Corn-Borer, *Pyrausta nubilalis* Hübner. While it is too early to say whether or not it has become definitely established in the United States, it is included in this paper because of the probability that it will eventually establish itself here.

Hosts.—*Dioryctria abietella* Zinck (Brischke); *Pyrausta nubilalis* Hübner.

The following material has been examined: a series of 16 specimens in the National Museum, reared from *Pyrausta nubilalis* at Auch, Gers, France and Hyeres, Var, France, by W. R. Thompson, in the United States Bureau of Entomology, under Webster No. 16490; collected specimens in the National Museum from Saxony and Berlin, Germany, and La Chatre, France; and several hundred specimens bred at the Corn Borer Laboratory of the Bureau of Entomology, at Arlington, Massachusetts, in reproduction work with this species.

13. MICROBRACON SCANTICORUM Viereck

Microbracon scanticorum VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916) pp. 205, 207.

Type.—In the Connecticut Agricultural Experiment Station, at New Haven.

The following notes were made on an examination of the type and are given here because the species was originally poorly characterized: Antennae broken at 27th segment, first flagellar segment

much longer than the second; malar space shorter than first flagellar segment; transverse diameter of opening between clypeus and mandibles much greater than the distance from the opening to the eyes and about twice the malar space; face minutely sculptured; frons smooth and polished; thorax smooth and polished; parapsidal furrows sparsely hairy; propodeum polished with a stub of a median ridge at apex, and a more or less distinct median roughened groove from the anterior end of this stub to the base of propodeum; propodeum also provided with two lateral oblique foveolate grooves; radius arising distinctly beyond middle of stigma; first abscissa of radius less than one-third the length of the second abscissa and less than half the first intercubitus; radius attaining wing margin much before apex of wing; the portion of cubitus between recurrent and first intercubitus very short, the recurrent very nearly interstitial with first intercubitus; first abdominal tergite finely sculptured apically and laterally; second tergite very minutely granular with a more strongly roughened area medially; following tergites very delicately punctate, the apical tergites very faintly or indistinctly so; suturiform articulation very fine, arcuate, not distinctly foveolate; ovipositor sheaths just about as long as the abdomen. Mostly yellowish; dorsum of thorax more or less blackish; propodeum and first abdominal tergite blackish; wings slightly fuliginous; legs, including all coxae, yellow.

Distribution.—West Thompson, Connecticut; Algonquin, Illinois.

Host.—Unknown.

Known only from the type, and one additional specimen, a homotype determined by Muesebeck, labeled "Algonquin, Ill. 5-16-96, No. 6603." The latter is in the United States National Museum.

14. MICROBRACON PYRALIDIPHAGUS, new species

Resembles *scanticorum* in that the radius arises from beyond the middle of a rather long, narrow, non-angular stigma; in the very short first abscissa of radius, and the rather short radial cell; it differs from that species particularly as noted in the key.

Female.—Length, 3.3 mm. Head transverse but rather thick antero-posteriorly at insertion of antennae; face finely granular and opaque; frons smooth and polished; antennae 36-segmented, slightly shorter than the body; first flagellar segment about twice as long as thick; mesonotum and mesopleura smooth and polished; parapsidal grooves sparsely pubescent, more thickly so posteriorly; propodeum finely rugulose over most of its surface and provided with a distinct median longitudinal carina; metapleura finely sculptured; stigma rather narrow, not angular; the radius arising distinctly beyond the middle of stigma; radial cell short, the radius attaining wing margin much before apex of wing; first abscissa of radius short, decidedly less than half the first intercubitus and

hardly one-third the second abscissa of radius; posterior femora stout, about three times as long as broad; first abdominal tergite strongly rugulose, the sculpture occurring on the middle of the plate as well as laterally; second tergite about as long as third, granularly rugulose, its posterior margin straight; third tergite granular; the fourth and fifth somewhat granular but less strongly than third; ovipositor sheaths about as long as that part of the dorsum of abdomen beyond second tergite. Reddish brown; head entirely black; mesonotal lobes, metanotum, propodeum and pectus blackish; wings entirely a little fuscous; legs ferruginous, the apex of posterior tibiae and the posterior tarsi dusky; abdomen reddish-brown, the first tergite somewhat infuscated.

Type.—Cat. No. 26664, U.S.N.M.

Type-locality.—Crowley, Louisiana.

Described from a single specimen labeled "Parasite of *Chilo* and *Diatraea*, Crowley, La., 9-8-23, J. W. Ingram."

15. MICROBRACON GASTROIDEAE (Ashmead)

Fig. 1

Bracon gastroideae ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 617.

Type.—Cat. No. 2904, U.S.N.M.

The opening between clypeus and mandibles is enormous, its transverse diameter being greater than the length of the face below antennae; female antennae usually 24 to 27-segmented, the basal flagellar segment twice as long as broad, all the following somewhat longer than broad; thorax smooth and polished; parapsidal grooves very sparsely hairy; propodeum with a nearly complete median longitudinal carina, otherwise mostly smooth and polished; first abscissa of radius usually not more than half the first intercubitus and less than half the second abscissa of radius; radial cell rather short, the radius attaining wing margin distinctly before apex of wing; tarsi stout, the posterior tarsi shorter than their tibiae, in the female much shorter; the last segment of posterior tarsi very large, broadening strongly toward apex; much longer than the second segment and more than twice the fourth; in the female at least, and usually in the male, the posterior tibiae three times as long as the metatarsi; abdomen smooth and polished, the second tergite sometimes a little longitudinally sculptured at base; ovipositor sheaths scarcely as long as the first abdominal tergite. Head and thorax black; wings strongly infuscated; coxae black; usually base of femora and more or less of tibiae and tarsi blackish or fuscous; abdomen usually red with first tergite and a median spot on second black, although sometimes abdomen is entirely black.

Distribution.—Ohio; Michigan; Illinois; Massachusetts; Canada.

Host.—*Gastroidea cyanea* Melsh.

In addition to the type which is from Columbus, Ohio, the National Museum has specimens from Agricultural College, Michigan; Algonquin, Illinois; and Canada (C. F. Baker). There is also a specimen, taken at Arlington, Massachusetts, in the collection of the Corn Borer Laboratory of the Bureau of Entomology at Arlington.

16. MICROBRACON BRACHYURUS (Ashmead)

Bracon brachyurus ASHMEAD, Can. Ent., vol. 23, 1891, p. 1.

Type.—Cat. No. 6853, U.S.N.M.

Very similar to *gastroideae*, with which it agrees in the large opening between clypeus and mandibles, the presence of a median carina on the propodeum, the wing venation, the short posterior tarsi, and the very short ovipositor. It can be readily distinguished, however, by the characters given in the key. The ocelli are exceptionally small, the ocell-ocular line being four times the diameter of an ocellus; the propodeum more or less finely rugulose; head and thorax black; abdomen usually entirely black; posterior coxae black; the two anterior pairs usually yellowish.

Distribution.—Ottawa, Canada.

Host.—Unknown.

The United States National Museum has, in addition to the type, one other specimen, also from Ottawa, Canada.

17. MICROBRACON MELANASPIS (Ashmead)

Fig. 5

Bracon melanaspis ASHMEAD, Can. Ent., vol. 23, 1891, p. 1.

Type.—Cat. No. 6863, U.S.N.M.

Distinguished especially by the character of the second tergite as described in the key. Frons polished; antennae longer than the body; malar space in the female fully as long as the distance between clypeal foveae; parapsidal grooves rather conspicuously hairy, especially posteriorly; propodeum completely polished without a suggestion of a stub of a median carina at apex; first abscissa of radius about three-fourths the first intercubitus and more than half the second abscissa of radius; posterior legs slender; abdomen completely polished; the chitinized plate of the first tergite slender, parallel-sided; the lateral membranous margins of first tergite broad; second tergite with weakly chitinized areas laterally opposite the membranous margins of the first tergite: the following tergites with the apical margins membranous; suturiform articulation represented by a fine impressed arcuate line, without a suggestion of foveolae; ovipositor sheaths scarcely half as long as the abdomen.

Black; head and thorax black; abdomen black, the membranous parts of the dorsum paler; legs usually blackish.

Distribution.—Ottawa, Canada; S. W. Harbor, Maine.

Host.—Unknown.

Known only from the type, and one other fine female specimen which is in the Boston Society of Natural History and was taken by C. W. Johnson at S. W. Harbor, Maine, July 13, 1918.

18. MICROBRACON JUNCICOLA (Ashmead)

Bracon juncicola ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 620.
Microbracon sebequanash VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 204 and 206.

Type.—Cat. No. 2911, U.S.N.M. The type of *sebequanash* is in the Connecticut Agricultural Experiment Station at New Haven.

Exceedingly like *melanaspis* in structure, but is probably a distinct species. The few specimens that have been seen differ markedly in color from the type of *melanaspis*, being mostly yellow. Face yellow; thorax and abdomen largely yellow; legs, including all coxae, yellow; malar space about as in *melanaspis*; antennae likewise are similar, being slender and usually 25 to 30-segmented; parapsidal grooves rather strongly pubescent posteriorly; propodeum completely polished with not even an indication of a stub of a median ridge at apex; suturiform articulation exceedingly delicate, merely a fine impressed line; as in *melanaspis*, the apical margins of the tergites beyond the second are usually more or less membranous; ovipositor sheaths hardly half as long as the abdomen.

Distribution.—From Missouri to West Virginia and Connecticut.

Hosts.—Evidently species of *Coleophora* (Ashmead).

The above notes are based on the types of *juncicola* and *sebequanash*, and on several other specimens in the National Museum from the following localities: Highspire, Pennsylvania; Ohio; West Virginia; Algonquin, Illinois.

19. MICROBRACON POLITIVENTRIS (Cushman)

Habrobracon politiventris CUSHMAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 517.

Type.—Cat. No. 21639, U.S.N.M.

Very similar to *pygmaeus*, which it very closely resembles in size, color, habitus, malar space, the sculptured frons and vertex, the pubescence of the parapsidal furrows, the color and venation of the wings, and in other points. It is often difficult to distinguish from that species.

Malar space in the female usually fully as long as the transverse diameter of the opening between clypeus and mandibles; vertex and

frons closely punctate and opaque; antennae usually 21 to 25-segmented; thorax stout; parapsidal furrows completely strongly hairy; the surface of the middle lobe of mesoscutum with scattering pubescence anteriorly; propodeum usually faintly minutely reticulate over most of its surface; metapleura with long pubescence; second abscissa of radius nearly always less than twice the first, and sometimes only half the third; the portion of cubitus between recurrent and first intercubitus usually about half the first intercubitus; abdomen rather broad, smooth and polished; the second tergite usually considerably longer than the third, polished, and provided with two short oblique foveolate furrows medially; ovipositor sheaths not or scarcely half as long as the abdomen. Black; head black, with pale yellow orbital lines; thorax black; wings dusky; coxae black or blackish; femora usually yellow; tibiae and tarsi mostly blackish; abdomen black, usually bright yellow laterally.

Distribution.—From Maine to Virginia, and west to Iowa.

Hosts.—*Polychrosis viteana* Clemens; *Eulia triferana* Walker; *Archips paralella* Robinson or *Pandemis lamprosana* Robinson. The parasite is gregarious, several individuals developing on a single host.

In addition to the types the collection of the United States National Museum contains two specimens reared from *Eulia triferana*, at Washington, District of Columbia, under Chittenden No. 6099⁰²; a series reared from a lepidopterous larva on wild cherry, by R. A. Cushman, at Vienna, Virginia, under Quaintance No. 7719; a specimen labeled "Ia. Exp. Sta., Plum curculio"; and one specimen from Hanover, New Hampshire (C. M. Weed). At the Gipsy Moth Laboratory there is a series reared by J. V. Schaffner from a collection of two different species of Tortricidae, *Archips paralella* and *Pandemis lamprosana* taken at Melrose Highlands, Massachusetts; one or the other of these was the host. The collection of the Boston Society of Natural History has a specimen collected at Liberty, Maine, by J. A. Cushman.

20. MICROBRACON PYGMAEUS (Provancher)

Figs. 3, 15

Bracon pygmaeus PROVANCHER, Natural. Canad., vol. 12, 1880, p. 144.

Bracon junci ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 619.

Bracon trifolii ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 622.

Bracon kansensis VIERECK, Trans. Kans. Acad. Sci., vol. 19, 1905 (1903-04), p. 268.

Microbracon colcophorae ROHWER, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 231.

Microbracon massasoit VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 205 and 207.

Type.—Yellow label 555, Museum of Public Instruction, Parliament Building, Quebec, Canada. The types of *junci* (Cat. No. 2910)

trifolii (Cat. No. 2916) and *coleophorae* (Cat. No. 18180) are in the United States National Museum; that of *kansensis* is in the Kansas University collection; and that of *massasoit* is in the collection of the State Agricultural Experiment Station, at New Haven, Connecticut.

Very similar to the preceding as pointed out in the discussion under that species; but the characters given in the table to species will serve to distinguish between the two.

Malar space in the female as long as the transverse diameter of the opening between clypeus and mandibles; frons and vertex closely punctate and opaque; antennae usually 24 to 29-segmented; thorax stout; mesoscutum with long and rather thick pubescence along the anterior lateral margins and in the parapsidal grooves; metapleura thickly pubescent; propodeum smooth and shining, not minutely reticulate; second abscissa of radius rarely distinctly twice as long as the first; posterior tibiae and tarsi slender; plate of first abdominal tergite usually a little roughened laterally and across the apex; second tergite usually more or less finely granularly sculptured, without oblique foveolate furrows medially toward base; very rarely third and fourth tergites granular, usually smooth and shining; ovipositor sheaths projecting about half the length of the abdomen. Head black with contrasting yellow inner orbital lines; thorax mostly black, sometimes ferruginous behind the middle lobe of mesoscutum and on the scutellum; wings dusky on basal two-thirds; coxae usually black, although sometimes mostly testaceous; posterior tibiae at apex and their tarsi fuscous; abdomen often mostly reddish testaceous with the first tergite and the apical tergites black, but this is variable, the entire abdomen sometimes being black.

Distribution.—Very widely distributed. Occurs from Canada to Florida and westward to California.

Hosts.—*Coleophora leucochrysell*a Clemens (Rohwer); *C. volckei* Heinrich; and various undetermined species of *Coleophora*.

In addition to the types of *pygmaeus*, *junci*, *trifolii*, *coleophorae*, and *massasoit*, I have seen the following material: In the National Museum, a series reared from *Coleophora volckei* at Washington, District of Columbia, by E. R. Selkregg, under Quaintance No. 7890; another series reared from the same host, at Watsonville, California by W. H. Volck; several specimens from a species of *Coleophora* on *Amaranthus* at Washington, District of Columbia; and collected specimens from Cedar Point, Maryland; Jacksonville, Florida; Algonquin, Illinois; Agricultural College, Maryland; Onaga and Riley Co., Kansas; Vienna, Virginia (R. A. Cushman); Ames, Iowa (C. W. Mally); Indiana; Colorado. The Boston Society of Natural History has one specimen taken by C. W. Johnson at S. W. Harbor,

Maine. At the Gipsy Moth Laboratory there is a specimen reared from a species of *Coleophora* taken at Wilmington, Massachusetts. The original description of *kansensis* and notes on the type by A. B. Gahan leave no doubt that this species is *pygmaeus*.

21. MICROBRACON CONNECTICUTORUM Viereck

Microbracon connecticutorum VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 205 and 209.

Type.—In the State Agricultural Experiment Station at New Haven, Connecticut.

Resembles *nuperus* and *curtus* in having the head thin antero-posteriorly, in the smooth and polished frons, the completely polished propodeum and the smooth abdomen, but differs especially in the much shorter ovipositor sheaths.

Following are notes made on an examination of the type: Face, frons and vertex smooth and shining; malar space as long as the transverse diameter of the opening between clypeus and mandibles; antennae missing; thorax stout; parapsidal grooves posteriorly, and the metapleura, thickly pubescent; propodeum completely smooth and polished, without a suggestion of a stub of a median ridge at apex; first abscissa of radius nearly as long as the first intercubitus, the second abscissa hardly one and one-half times as long as the first; the portion of cubitus between recurrent vein and first intercubitus nearly as long as the recurrent; abdomen smooth and polished, with a few extremely faint punctures or striae on second tergite; the plate of the first tergite completely polished; ovipositor sheaths not projecting half the length of the abdomen.

Distribution.—New Haven, Connecticut.

Host.—Unknown.

Known only from the type.

22. MICROBRACON PSILOCORSI Viereck

Microbracon psilocorsi VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 143.

Type.—Cat. No. 14317, U.S.N.M.

Resembles *politiventris* in habitus, and in some details, but is easily distinguished. Head thick antero-posteriorly at insertion of antennae; face strongly receding; eyes very short, broad-oval; frons polished; antennae usually 30 to 33-segmented, tapering distinctly toward tip; the ten or twelve basal segments of flagellum more or less subequal; thorax stout, rather thickly pubescent in the parapsidal grooves and on metapleura; scutellum large; radius arising much before middle of stigma and going to extreme apex of wing; second abscissa of radius much more than twice the first; the part of cubitus between recurrent and first intercubitus only half the length of recurrent; measured along cubitus the third cubital cell not distinctly as long as the second; propodeum smooth and polished;

abdomen entirely smooth and polished; second tergite with a basal median area set off by short oblique foveolate furrows, and sometimes with less distinct longitudinal furrows laterally; second tergite about as long as the third; ovipositor sheaths less than half as long as the abdomen. Mostly yellowish; face yellow; frons and vertex sometimes piceous to blackish; mesonotal lobes, lateral faces of scutellum, metathorax, propodeum, and pectus more or less piceous, sometimes thorax mostly blackish except on the pleura; wings infumated on basal two-thirds; legs yellow, the posterior coxae sometimes infuscated; abdomen usually yellowish, with first tergite, and the third and following medially, more or less blackish.

Distribution.—Cuero, Texas.

Host.—(*Psilocorsis*) *Cryptolechia*, species.

Known only from the type series.

23. MICROBRACON MEROMYZAE (Gahan)

Bracon (Tropidobracon) meromyzae GAHAN, Proc. U. S. Nat. Mus., vol. 46, 1913, p. 432.

Type.—Cat. No. 16350, U.S.N.M.

Head rather thick antero-posteriorly, not broad; face and frons smooth and polished; antennae slender, usually 28 to 32-segmented, as long as the body in the female, longer in the male; thorax slender, polished; parapsidal grooves sparsely hairy; propodeum polished, usually with a nearly complete median longitudinal carina; radius going practically to extreme apex of wing; second abscissa of radius twice as long as the first; the chitinized plate of first tergite slender, rugose laterally and at apex; second and third tergites finely granular, shining; rarely the fourth tergite faintly granular in part; remainder of dorsum of abdomen smooth and polished; ovipositor sheaths less than half the length of abdomen. Head wholly black; thorax black, pectus sometimes more or less yellowish; wings very slightly dusky; legs, including all coxae, bright yellow; abdomen more or less blackish above, second and third tergites mostly yellow.

Distribution.—South Dakota.

Host.—*Meromyza americana* Fitch.

Known only from the types, and two additional specimens, from Brookings, South Dakota, in the United States National Museum.

24. MICROBRACON NIGRIDORSUM (Ashmead)

Bracon nigradorsum ASHMEAD, Can. Ent., vol. 23, 1891, p. 2.

Type.—Cat. No. 6862, U.S.N.M.

Head rather thick antero-posteriorly, the face strongly receding; temples broad; eyes short, broad-oval; face and frons smooth and polished; antennae slender, 35-segmented in the type, the first flagel-

lar segment twice as long as broad, all the following one and one-half times as long as broad, thorax stout, smooth and polished; parapsidal grooves sparsely hairy; propodeum smooth and polished; first abdominal tergite somewhat roughened laterally and at apex; second tergite with a little very faint sculpture medially; suturiform articulation very fine; third and following tergites completely smooth and polished; ovipositor sheaths projecting hardly half the length of the abdomen. Head black, with very narrow ferruginous inner and superior orbital lines; thorax black; wings hyaline; legs, including all coxae, bright yellow; abdomen in type honey-yellow, with first tergite and transverse median spots on second, third and fourth tergites, black.

Distribution.—Ottawa, Canada.

Host.—Unknown.

The type is the only specimen known to me.

25. MICROBRACON ASHMEADI, new name

Macrodyctium politum ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 252;
[not (*Bracon politus* Provancher) = *Microbracon nuperus* (Cresson).]

Type.—Cat. No. 5712, U.S.N.M.

Head not thin antero-posteriorly, face receding; eyes broad; face and frons smooth and polished; opening between clypeus and mandibles small, its transverse diameter not greater than the distance from the opening to the eye; thorax long and slender, fully twice as long as its greatest depth; parapsidal grooves sparsely hairy; metanotum longer than usual; propodeum long, with a stub of a median carina at apex and a few short ridges diverging from this; stigma large, long; both second and third cubital cells long; last abscissa of radius longer than first and second abscissae combined; posterior tarsi rather stout, the apical tarsal segment large and fully as long as the second; abdomen long and narrow; first tergite slender, broadening gradually toward apex, and a little rugulose laterally and at apex; second tergite with faint striae medially; suturiform articulation very delicate; remainder of tergum polished; hypopygium not attaining apex of last dorsal segment; ovipositor sheaths less than half as long as the abdomen. Head, thorax and abdomen entirely black; wings a little infuscated; legs, including coxae, black; tibiae yellow on the basal half.

Distribution.—Alaska.

Host.—Unknown.

Known only from the unique type.

26. MICROBRACON UNCAS Viereck

Microbracon uncas VIIECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 206 and 208.

Type.—In the State Agricultural Experiment Station, at New Haven, Connecticut.

Exceedingly similar to *ashmeadi*, agreeing in habitus, in the small size of the opening between clypeus and mandibles, in the smooth frons, in the form, sculpture and pubescence of thorax; in the venation of the wings; in the stout tarsi and large last tarsal segment; in size, shape and sculpture of the abdomen; in the hypopygium not attaining apex of last dorsal abdominal segment; the length of the ovipositor sheaths, and the general color. Appears to differ only in the color of the legs, which are yellow, with the posterior coxae a little blackish at extreme base. The propodeum has, in addition to the apical median carina, a slight median longitudinal elevation and adjoining fine sculpture at base.

Distribution.—New Haven, Connecticut.

Host.—Unknown.

Known only from the type.

27. MICROBRACON ANGELESIUS (Provancher)

Bracon angelcsius PROVANCHER, Addit. faun. Canad. Hymen., 1888, p. 372.

Bracon cecidomyiae ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 616.

Bracon euuræ ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 621.

Type.—Yellow label 1486, Museum of Public Instruction, at Quebec, Canada; the head is broken off, but is mounted on one of the labels. The types of *cecidomyiae* (Cat. No. 2903) and *euuræ* (Cat. No. 2914) are in the United States National Museum.

Distinguished especially by the very slender antennae, the long ovipositor, the entirely polished abdomen, hyaline wings, and color of the body. Head rather thick antero-posteriorly; face receding rather strongly; antennae of the type, and those of the type of *euuræ*, are broken at or beyond the middle; the type of *cecidomyiae* has 32-segmented antennae; in all three the first flagellar segment is nearly three times as long as broad, and all the following segments are fully twice as long as broad; frons polished; thorax polished; parapsidal grooves very sparsely hairy anteriorly, more closely hairy behind; propodeum smooth and polished, with a short stub of a median carina at apex; anterior wings of type are missing; in the types of *euuræ* and *cecidomyiae* the radial cell is large and long, and the second abscissa of radius is not distinctly twice as long as the first; posterior femora slender; abdomen completely smooth and polished; ovipositor sheaths one and one-half times as long as

the abdomen. Face yellow; vertex and occiput more or less piceous; thorax yellow, the pectus and the propodeum usually fuscous or blackish; wings perfectly clear hyaline; legs, including all coxae, bright yellow, the posterior tibiae at apex and their tarsi more or less infuscated; abdomen yellow or yellowish-ferruginous with transverse fuscous or blackish bands on the second, third, and fourth tergites.

Distribution.—California.

Hosts.—Euura, species, which forms galls on *Salix*; and a cecidomyid gall on *Mimulus*.

Known only from the types of *angelesius*, *cecidomyiae*, and *euurae*. A thorough study of the three types clearly shows them to be conspecific.

28. MICROBRACON AURIPES (Provancher)

Bracon auripes PROVANCHER, Addit. faun. Canad. Hymen., 1888, p. 372.

Type.—Blue label 670, yellow label 1571, Museum of Public Instruction, at Quebec, Canada.

Following are notes made upon an examination of the type: Head missing; thorax slender, smooth and polished; radius going practically to extreme apex of wing; second abscissa of radius more than twice the first, the third longer than first and second combined; recurrent vein more than twice as long as the portion of cubitus between recurrent and first intercubitus; first abdominal tergite slender, broadening gradually toward apex, with a finely foveolate groove just inside the lateral margins; second tergite longer than third, finely ruguloso-striate; suturiform articulation very fine; remainder of abdomen highly polished; ovipositor sheaths very nearly as long as the abdomen. Thorax black with a large testaceous spot behind middle lobe of mesoscutum, and with the propleura testaceous; wings hyaline; legs, including all coxae, wholly yellow; abdomen black above, with narrow yellow lateral margins and with a bright yellow spot at the apex; venter mostly yellowish. A homotype and other specimens in the same series show the species to have a black, smooth and polished, evenly rounded head, with very slender antennae, which have all the flagellar segments more than twice as long as thick, and are 27 to 32-segmented. The thorax is sometimes entirely black.

Distribution.—Ottawa, Canada; Massachusetts.

Hosts.—Lepidopterous larvae boring in various weeds, such as *Amaranthus*, *Ambrosia*, *Xanthium*, etc.

In addition to the type, I have seen a large series of specimens reared from such plants as indicated above, at the Corn Borer Laboratory of the Bureau of Entomology, at Arlington, Massachusetts.

This material is from Watertown, Malden, Melrose, Stoneham, Saugus, and Wakefield, Massachusetts. One of these specimens was compared with the type, designated a homotype, and placed in the United States National Museum.

29. MICROBRACON RUDBECKIAE, new species

Figs. 2, 22

Female.—Length. 3.3 mm. Head rather thin, not prominent at insertion of antennae, the face rather flat, not, or very slightly, receding; eyes small; ocelli small; ocell-ocular line more three times the diameter of an ocellus; postocellar line about twice the diameter of an ocellus; opening between clypeus and mandibles large, its transverse diameter nearly twice the length of malar space; face, frons, vertex, temples, smooth and polished; antennae 24-segmented, shorter than the body, basal flagellar segments the longest; thorax stout, smooth, and polished; the parapsidal grooves sparsely hairy; propodeum entirely polished, without even a suggestion of a stub of a carina at apex; second abscissa of radius usually distinctly less than twice the first: the third longer than the first and second combined and usually about twice as long as the second, which is but little longer than the first intercubitus; the portion of cubitus between recurrent and first intercubitus more than half as long as the recurrent; the last abscissa of cubitus considerably longer than the preceding abscissa; legs slender; last segment of posterior tarsi not as long as the second; abdomen a little longer than the thorax; the chitinized plate of the first tergite nearly parallel-sided, angled at the spiracles, smooth and polished, with two fine curved grooves converging toward the base; second tergite transverse, with conspicuous membranous areas laterally opposite the membranous margins along the first tergite, and with a slight tubercle at base and adjoining fine striae; third and following tergites smooth and polished; ovipositor sheaths distinctly longer than the entire body. Yellow; vertex of head and occiput more or less piceous; mesonotal lobes and propodeum sometimes a little dusky; wings distinctly infuscated on basal two-thirds, nearly hyaline at apex; legs including all coxae yellow, the tibiae usually slightly dusky.

Male.—Antennae 26-segmented. Essentially as in the female.

Type.—Cat. No. 26662, U.S.N.M.

Type-locality.—Mineral Wells, Texas.

Host.—A larva living in the head of *Rudbeckia amplex*.

Described from 20 female and 2 male specimens reared by C. R. Jones. The number of segments in the antennae in this series varies from 23 to 26.

30. MICROBRACON TENUICEPS, new species

Fig. 7

Very similar in structure to *rudbeckiae*, but is almost completely black, has the second abdominal tergite wholly smooth and polished, and differs in numerous details; also resembles *nuperus*, but differs as noted in the key.

Female.—Length, 3 mm. Head thin antero-posteriorly, scarcely thicker at insertion of antennae than at the clypeus, the face not or hardly receding; the frons almost vertical; face, frons, vertex, and temples smooth and polished; eyes nearly twice as long as broad, faintly hairy; transverse diameter of opening between clypeus and mandibles not twice the length of the malar space; post-ocellar line not distinctly twice, the ocell-ocular line not distinctly three times, as long as the diameter of an ocellus; antennae 23-segmented, the basal flagellar segment nearly three times as long as broad, the following gradually decreasing in length, but most of them fully twice as long as broad; thorax rather stout, completely smooth and polished; parapsidal furrows sparsely hairy anteriorly, more thickly so posteriorly; propodeum entirely polished, without even a stub of a median longitudinal ridge at apex; first abscissa of radius longer than the recurrent vein; second abscissa of radius much less than twice the first, only half the third, and but very slightly longer than the first intercubitus; radius attaining wing margin distinctly before the apex; last abscissa of cubitus a little longer than the preceding abscissa; legs slender, the posterior femora at least four-fifths as long as their tibiae; abdomen about as long as the thorax, completely smooth and highly polished; the chitinized plate of first tergite broad, and with two fine impressed curved lines converging toward base; second abdominal tergite with a small but conspicuous, more or less triangular, membranous area at either side joining the lateral membranous margins of the first tergite; second tergite much shorter than the third; hypopygium attaining apex of last dorsal abdominal segment; ovipositor sheaths fully as long as the entire body. Black; head and thorax wholly black; wings strongly infuscated; legs deep black, except the anterior femora at apex, their tibiae within, and the middle and posterior tibiae at extreme base, where they are brownish; abdomen black except the membranous margins along first tergite, the membranous areas in the basal lateral angles of the second, and a very small spot in the basal lateral angles of the third, which are bright yellow, contrasting strongly with the deep black of the remainder of the abdomen.

Type.—Cat. No. 27142, U.S.N.M.

Type-locality.—Chester, Virginia.

Host.—? *Phytonomus nigrirostris* Fabricius.

Described from a fine single specimen taken by W. J. Schoene in connection with studies of the clover weevil, *Phytonomus nigrirostris*. C. W. Johnson, of the Boston Society of Natural History, has several fine specimens of this striking species, which were collected by him at Bar Harbor, Southwest Harbor, Salisbury Cove, and Mount Desert, Maine; one small female in this collection has only 18 segments in the antennae.

31. MICROBRACON NUPERUS (Cresson)

Bracon nuperus CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 187, line 20.

Bracon minimus CRESSON, Trans. Amer. Ent. Soc., vol. 4, 1872, p. 187, line 31.

Bracon politus PROVANCHER, Addit. faun. Canad. Hymen., 1888, p. 373.

Microbracon (Bracon) nuperus PIERCE, U. S. D. A., Bur. Ent. Bull. 63, 1909, p. 44.

Type.—No. 1636, Philadelphia Academy of Sciences, Philadelphia, Pennsylvania. The types of *minimus* (Cat. No. 1613, allotype; holotype lost) and *politus* (Cat. No. 1969) are in the United States National Museum. The allotype of *vernoniae* Ashmead, which also belongs here, is likewise in the National Museum.

Resembles *tenuiceps* in the general conformation of the head, in the polished frons, completely polished propodeum, in the dusky wings and the long ovipositor, but can be readily separated. It is very closely allied to *curtus*, and some males can probably be distinguished only with great difficulty; the female differs in the longer ovipositor.

Head thin, the face but slightly receding; eyes shorter than in *tenuiceps*; transverse diameter of the opening between clypeus and mandibles not distinctly one and one-half times the length of the malar space in either sex; ocell-ocular line at least three times the diameter of an ocellus; antennae usually 21 to 30 segmented, the number varying with the size of the insect; thorax, with propodeum, entirely highly polished; second abscissa of radius about twice the first; the third longer than the first and second combined; radius attaining wing margin before the apex; last abscissa of cubitus longer than the preceding abscissa; plate of first abdominal tergite rather broad posteriorly, smooth and polished, sometimes more or less punctate along apical margin; second tergite usually with a polished elevation medially at base, and more or less rugulose on the basal two-thirds; suturiform articulation usually slightly arcuate medially and finely foveolate; second tergite as long as the third; third and following completely polished; ovipositor sheaths as long as the body. Head black, rarely with poorly defined ferruginous inner orbital markings; thorax wholly black, although rarely with some ferruginous or testaceous markings; wings strongly infuscated on

basal two-thirds, more hyaline at apex; legs, at least the coxae, nearly always black; rarely the coxae mostly ferruginous or testaceous; femora sometimes testaceous or yellowish-brown, although frequently mostly black; abdomen varying from entirely ferruginous or testaceous, except at extreme base, to entirely black except more or less of second and third tergites.

Distribution.—From Montana to Mexico, and from Illinois to California; apparently more common over the western half of the United States.

Hosts.—? *Orthoris crotchii* LeConte; larva feeding in seed capsules of *Vernonia*.

In addition to the types, the following material, all of it in the National Museum, has been examined; the allotype of *vernoniae* Ashmead, which is certainly *nuperus*; two specimens labeled "parasite on dipteran in seeds of *Vernonia*, Kirkwood, Missouri, M. E. Murtfeldt;" one female bearing Bureau of Entomology No. 3557°, and dated May 18, 1885, which are the same data found on the labels of the allotype of *vernoniae*; one specimen labeled "Pullman, Washington, C. V. Piper, Wash. Exp. Sta. No. 010;" and collected specimens from Helena, Montana; Las Cruces, New Mexico (Cockerell); Texas (Belfrage); Alameda Co., California; Forest Grove, Oregon (L. P. Rockwood); "40 miles north of Lusk, Wyoming;" Torreon Coahuilo, Mexico; Algonquin, Illinois. There is one specimen at the Gipsy Moth Laboratory of the Bureau of Entomology from Fresno, California (M. E. Phillips). Pierce records the species as having been reared in very large numbers from *Orthoris crotchii*, feeding in the seed pods of *Mentzelia nuda* at Clarendon, Texas.

32. MICROBRACON CURTUS (Provancher)

Phylax curtus PROVANCHER, Addit. faun. Canad. Hymen., 1886, p. 130.

Zele curtus PROVANCHER, Addit. faun. Canad. Hymen., 1888, p. 380.

Type.—Blue label 277, yellow label 1276, Museum of Public Instruction, Quebec, Canada.

Head thin antero-posteriorly, the face scarcely receding; malar space, in female, about as long as first flagellar segment; face and frons smooth and polished; antennae of type 25-segmented, none of the flagellar segments twice as long as thick; thorax stout, smooth and polished; propodeum completely polished, without even a stub of a median ridge at apex; radius arising before middle of stigma; second abscissa of radius scarcely twice the first; last abscissa of cubitus not distinctly longer than the preceding abscissa; abdomen broad-oval, entirely smooth and polished, with no suggestion of sculpture on the second tergite, in which respect this species appears to differ from *nuperus*; ovipositor sheaths slightly longer than the ab-

domen. Head and thorax mostly brownish-black to black; wings strongly infuscated on basal two-thirds; legs, including coxae testaceous to reddish-brown; abdomen mostly testaceous to ferruginous.

Distribution.—Ottawa, Canada.

Host.—Unknown.

The foregoing notes are based on the type, and a homotype (determined by Rohwer); the latter is in the United States National Museum; it bears no locality data.

33. MICROBRACON HYSLOPI Viereck

Microbracon hyslopi VIIEECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 143.

Type.—Cat. No. 14316, U.S.N.M.

Head not very prominent at insertion of antennae; face slightly receding; malar space in female about as long as first segment of antennal flagellum; the transverse diameter of the opening between clypeus and mandibles but little greater than the distance from this opening to the eye; face very faintly punctate; frons weakly punctate just above insertion of antennae; antennae usually 30 to 40 segmented; the two basal flagellar segments of equal length, all flagellar segments considerably longer than broad, but none of them distinctly twice as long as broad; ocell-ocular line three times as long as the diameter of an ocellus; thorax stout, smooth and polished; propodeum with a distinct stub of a median ridge at apex; radius not attaining apex of wing, second abscissa of radius about twice as long as the first, the third about as long as the first and second combined; the portion of cubitus between recurrent and first intercubitus more than half as long as recurrent; abdomen robust, mostly smooth and polished; first tergite rugulose along posterior margin; second tergite more or less rugulose or granular; third tergite rarely faintly punctate; ovipositor sheaths fully as long as the abdomen. Head black, sometimes with ferruginous or testaceous inner and superior orbital markings; cheeks and temples sometimes testaceous; thorax with mesoscutum and scutellum and more or less of the pleura usually testaceous; propodeum and pectus black; rarely thorax almost wholly black; wings rather strongly infuscated, the stigma, at least at base and along costal margin bright yellow; all coxae and trochanters, and usually most of the middle and hind femora, tibiae and tarsi, black; abdomen usually mostly testaceous, with black median areas on most of the tergites.

Distribution.—Washington, Oregon, Utah, Colorado.

Host.—*Etiella zinckenella schisticolor* Zeller.

In addition to the type the United States National Museum has three specimens reared from a lepidopteron on *Trifolium* at Manzan-

ita, Oregon, by L. P. Rockwood, and one specimen from Colorado. At the Gipsy Moth Laboratory there are two specimens from Salt Lake City.

34. MICROBRACON NITIDUS (Provancher)

Bracon nitidus PROVANCHER, Natural. Canad., vol. 14, 1883, p. 15.

Type.—Yellow label 1026, Museum of Public Instruction, at Quebec, Canada.

The following notes were made upon an examination of the type: Frons polished; antennae 28-segmented, stout, the flagellar segments beyond second only a little longer than broad: transverse diameter of opening between clypeus and mandibles but very little greater than the distance from the opening to the eyes; malar space as long as or longer than the first segment of antennal flagellum; thorax nearly twice as long as its greatest height, smooth and polished; propodeum mostly smooth and polished, with a median longitudinal carina extending from the apex half way to the base, and finely sculptured along the median line between the end of this carina and the base, usually also with a little faint sculpture either side of the median line on the basal half; second abscissa of radius a little more than twice as long as the first; the third abscissa slightly longer than the first and second abscissae combined; first abdominal tergite broad posteriorly, finely rugulose laterally and a little punctate along the apical margin; second tergite slightly rugulose over a small basal middle area, very faintly punctate over most of the remainder of its surface, strongly shining, third and following tergites smooth and polished; ovipositor sheaths about as long as the abdomen. Head blackish; face brownish-black; thorax black; wings a little dusky; legs reddish-yellow, the coxae black or blackish; abdomen black, the second and third tergites mostly yellowish-ferruginous; apical margin of third tergite black; base of fourth tergite reddish.

Distribution.—Canada; Maine.

Host.—Unknown.

In addition to the type, I have seen a female specimen taken by C. W. Johnson at Fort Kent, Maine, August 19, 1910, which, following comparison with the type, I designated a homotype. This specimen is in the collection of the Boston Society of Natural History. It differs from the type only in having 25 instead of 28 segments in the antennae, and in having the parts that are testaceous in the type, reddish or reddish-brown. Mr. Johnson has taken two other female specimens of this species, at Southwest Harbor and Mount Desert, Maine, respectively. He has very kindly presented one of these to the National Museum.

35. MICROBRACON TYCHII, new species

Fig. 21

Somewhat resembles *hyslopi*, but can be readily distinguished by the characters given in the key.

Length 3.8 mm. Head rather thick antero-posteriorly at insertion of antennae; face strongly receding below; temples broad; transverse diameter of opening between clypeus and mandibles but very little greater than the distance from the opening to the eyes; malar space as long as first segment of antennal flagellum, or very nearly; antennae shorter than the body, 28-segmented, tapering slightly toward tip, the basal flagellar segment about twice as long as broad, all the following considerably longer than broad; postocellar line about twice, ocell-ocular line three times, as long as the diameter of an ocellus; face very faintly punctate and clothed with long hairs; frons smooth and polished; thorax rather robust, although about twice as long as high, smooth and polished; parapsidal furrows with scattered long hairs; propodeum smooth and polished without a distinct median longitudinal carina posteriorly, but sometimes with a faint stub of a median ridge at apex; metapleura, propodeum laterally, and the posterior coxae clothed with long silken hairs; second abscissa of radius usually decidedly less than twice the first; the latter about as long as the side of stigma bordering the first cubital cell; the third abscissa of radius longer than the first and second abscissae combined; abdomen fully as long as the thorax; plate of first tergite more or less sculptured laterally and posteriorly; second tergite transverse, about as long as the third, with a low polished tubercle at base in the middle, and the integument immediately adjoining the tubercle more or less finely sculptured; the second tergite laterally and posteriorly, and the third and following tergites entirely, smooth and polished; suturiform articulation fine, smooth, not at all foveolate; ovipositor sheaths about as long as the abdomen or slightly shorter. Black; head entirely black; thorax black, the scutellum usually yellowish or ferruginous at apex and along its sides, and sometimes poorly defined pale markings on the mesopleura and pectus; wings dusky toward base, more hyaline apically; all coxae and trochanters, and more or less of the femora basally, black; the tibiae and tarsi more or less blackish or fuscous; abdomen black except along the lateral margins.

Male.—Essentially as in the female. The antennae are 30-segmented; the malar space is a little shorter and the opening between clypeus and mandibles a little larger, than in the opposite sex.

Type.—Cat. No. 26669, U.S.N.M.

Type-locality.—Los Angeles County, California.

Host.—*Tychius semisquamosus* LeConte.

Described from 24 specimens reared in May and June, 1892, by D. W. Coquillet.

36. MICROBRACON PINI, new species

Fig. 14

Closely resembles *tychii*, but differs in the somewhat shorter malar space, the larger opening between clypeus and mandibles, in the presence of a distinct sharp stub of a median longitudinal ridge at the apex of propodeum; in the first abscissa of radius being shorter than the inner side of stigma, and in the legs being usually less black.

Female.—Length, 3 mm. Head much thicker antero-posteriorly at insertion of antennae than at the lower margin of clypeus; transverse diameter of opening between clypeus and mandibles greater than the distance from the opening to the eyes, malar space much shorter than the first segment of antennal flagellum; temples not as broad as in the preceding species, postocellar line scarcely one and one-half times, ocell-ocular line less than three times, the diameter of an ocellus; antennae 31-segmented, the first flagellar segment about twice as long as broad, all the following considerably longer than broad; face and frons polished; thorax smooth and polished, parapsidal furrows sparsely hairy; propodeum polished, with a distinct stub of a median longitudinal ridge at apex; second abscissa of radius decidedly less than twice the first; the third abscissa longer than the first and second abscissae combined; last abscissa of cubitus much longer than the preceding abscissa; the portion of cubitus between recurrent and first intercubitus much more than half as long as the recurrent; abdomen long-oval; plate of first tergite more or less sculptured laterally and apically; second tergite reguloso-striate medially, smooth and shining laterally; third and following tergites smooth and polished; rarely the third faintly sculptured; ovipositor sheaths about as long as the abdomen beyond first tergite. Black; head and thorax wholly black; wings very slightly dusky; coxae usually mostly black or blackish, remainder of legs brownish with more or less infuscation; abdomen black; second tergite usually yellowish-brown except medially where it is black; third tergite usually somewhat yellowish along basal margin and laterally.

Male.—Agrees with the female except for the usual sexual differences. Antennae 33-segmented, the flagellar segments a little more slender than in the female.

Type.—Cat. No. 27143, U.S.N.M.

Type-locality.—Gardner, Massachusetts.

Allotype-locality.—Saugus, Massachusetts.

Host.—*Pissodes strobi* Peck.

Described from 8 female and 4 male specimens reared at the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts, from the above-named host, by J. V. Schaffner under Gipsy Moth Laboratory Nos. 12164 H 1-a, and 12164 H 1-b. There are several additional specimens in the United States National Museum, reared from *Pissodes strobi* taken at Rainbow, Windsor, and Portland, Connecticut, by S. N. Spring, B. H. Walden and M. P. Zappe.

37. MICROBRACON SESIAE, new species

Figs. 8, 9

Very similar to *nevadensis*, but distinguished as noted in the table to species.

Female.—Length, 4 mm. Head thick at insertion of antennae; face short, receding below; transverse diameter of the opening between clypeus and mandibles considerably greater than the shortest distance from the opening to the eyes, and nearly as long as the distance from lower margin of antennal foramina to the clypeus; malar space shorter than first segment of antennal flagellum; eyes broad, very sparsely hairy; ocell-ocular line about three times as long as the diameter of an ocellus; face finely punctate; frons very faintly punctate just above antennae; antennae 32-segmented in type, stout, most of the flagellar segments only a little longer than broad; thorax stout, smooth and polished; parapsidal grooves very sparsely hairy; propodeum smooth and polished, with a short stub of a median longitudinal ridge at apex and a few short lateral ridges diverging from this; posterior tibiae and tarsi long, the third segment of tarsi about as long as the fifth, the second much longer; radius attaining wing margin distinctly before the apex; second abscissa of radius twice as long as the first; the third fully as long as the first and second combined and as long as the last abscissa of cubitus; the latter is distinctly longer than the preceding abscissa of cubitus, the third cubital cell being longer, measured along the cubitus, than the second; abdomen long-oval; the chitinized plate of the first tergite sculptured laterally and along the apical margin; second tergite usually mostly finely longitudinally striate with a more or less triangular median embossed area, which is broadest at the base of the tergite; third tergite nearly always finely striate toward base; remainder of dorsum of abdomen smooth and polished; ovipositor sheaths about as long as the abdomen. Head black, usually with poorly defined ferruginous orbital markings; thorax black, usually somewhat marked with ferruginous, especially in the parapsidal furrows and on the propleura; wings

dusky, weakly so toward apex; coxae and trochanters black or blackish; the femora varying from entirely ferruginous-testaceous to almost entirely black; even in specimens having the posterior femora wholly ferruginous the hind tibiae are entirely black except at extreme base and their tarsi are black; abdomen mostly yellowish ferruginous, with the first tergite and the embossed area on second black; sometimes apex of abdomen is more or less blackish.

Male.—Agrees with the female in all essential characters. The antennae of allotype are 34-segmented.

Type.—Cat. No. 26663, U.S.N.M.

Type-locality.—Wallingford, Connecticut.

Host.—(*Sesia*) *Aegeria tipuliformis* Linnaeus.

Described from 7 female and 8 male specimens reared by B. A. Porter in the Bureau of Entomology. In this series the number of segments in the antennae varies from 32 to 37.

38. MICROBRACON NEVADENSIS (Ashmead)

Bracon nevadensis ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 623.

Type.—Cat. No. 2916, U.S.N.M.

Exceedingly similar to *sesiae*; but the antennal segments are even stouter than in that species; the radial cell is shorter; the last abscissa of radius is distinctly shorter than the last abscissa of cubitus; and the duskiess of the posterior tibiae is confined to the apical third. The antennae are very stout, most of the flagellar segments being not longer than broad and some of them being broader than long; opening between clypeus and mandibles large; the thorax is not quite so deep as in *sesiae*, being twice as long as its greatest height; in the sculpture of the abdomen and the color of the body the two species agree almost exactly; the difference in the color of the tibiae noted above appears to be constant; the ovipositor sheaths are about as long as the abdomen.

Distribution.—California; Idaho.

In addition to the type, the United States National Museum has four specimens recorded as a parasite of *Chrysothrix deleta* LeConte on strawberry, at Coeur d'Alene, Idaho, under Bureau of Entomology No. 4765⁰².

39. MICROBRACON THURBERIPHAGAE, new species

Microbracon, new species, WEBB, Journ. Econ. Ent., vol. 16, 1923, p. 545.

Female.—Length, 2.5 mm.; head rather thick at insertion of antennae; face strongly receding below; malar space much shorter than first segment of antennal flagellum and only a little more than half the transverse diameter of the opening between clypeus and mandi-

bles: postocellar line one and one-half times, ocellocular line less than three times, as long as the diameter of an ocellus; antennae 23 segmented in the type, shorter than the body, all the flagellar segments considerably longer than broad, the first twice as long as broad; eyes very short-oval, only a little longer than broad; face faintly punctate, shining; frons closely minutely punctate or reticulate; thorax compact, smooth and polished; scutellum large, the furrow between it and the mesoscutum very fine, minutely foveolate; propodeum polished, with a short stub of a median longitudinal ridge at apex; radius arising much before the middle of the long stigma and going to extreme apex of wing; second abscissa of radius twice, or nearly, as long as the first, the third about as long as the first and second combined; abdomen short oval; the chitinized plate of the first tergite broad posteriorly, more or less rugulose laterally and faintly sculptured along apical margin; second tergite emarginate medially behind, mostly smooth, shining, with a small basal median embossed area set off by short impressions, and usually with two longitudinal furrows laterally, suturiform articulation arcuate and finely foveolate; third, fourth, and fifth tergites evenly granular; ovipositor sheaths a little longer than the abdomen. Yellow; antennae and stemmaticum black; occiput blackish; wings very slightly dusky; legs yellow, the posterior tibiae at apex and their tarsi dusky; abdomen entirely yellow.

Male.—Agrees with the female except for the usual sexual differences; antennae 23-segmented; the mesonotal lobes, the propodeum, and the posterior coxae are somewhat infuscated.

Type.—Cat. No. 26667, U.S.N.M.

Type-locality.—Sabino Canyon, Arizona.

Host.—*Thurberiphaga diffusa* Barnes.

Described from two female and five male specimens reared by C. H. T. Townsend, October 2, 1918. The thorax and abdomen are sometimes more or less marked with black, and the middle and posterior coxae, at least of the males, are sometimes black. The number of segments in the antennae varies, in this series, from 21 to 23.

40. MICROBRACON PITYOPHTHORI, new species

Female.—Length, 2.3 mm. Head much thicker at insertion of antennae than at the clypeus, the face strongly receding; malar space nearly as long as the transverse diameter of the opening between clypeus and mandibles, but much shorter than the first segment of antennal flagellum; eyes short oval, hardly one and one-half times as long as broad; ocelli small; postocellar line about one and one-half times, ocell-ocular line three times, as long as the diameter of an ocellus; antennae very slender, slightly shorter than

the body. 23-segmented; the first flagellar segment three times as long as thick, all the following at least twice as long as thick; face very faintly punctate, shining; frons minutely reticulately punctate; thorax robust, smooth and polished; parapsidal grooves very sparsely hairy anteriorly, more closely so posteriorly; propodeum smooth and polished with an exceedingly short stub of a median ridge at apex; stigma very long; veins slender; radius arising much before middle of stigma and going to extreme apex of wing; first abscissa of radius long; second abscissa hardly twice the first; the third as long as the first and second combined; abdomen broad-oval; chitinized plate of first tergite finely rugulose apically; second tergite delicately ruguloso-striate, with a more or less distinct fine median raised line down the middle; suturiform articulation slightly arcuate medially and curving forward strongly at the sides, weakly foveolate; third and fourth tergites finely granular, smooth laterally, the fourth with a fine impressed transverse line at the base; fifth tergite very faintly punctate, strongly shining; ovipositor sheaths as long as the dorsum of abdomen beyond first tergite. Head piceous, the face yellowish ferruginous; thorax dark reddish brown; legs, including all coxae, yellow; wings perfectly clear hyaline; abdomen yellowish ferruginous.

Type.—Cat. No. 27144, U.S.N.M.

Type-locality.—Las Vegas, New Mexico.

Host.—*Pityophthorus*, species.

Described from two female specimens reared by Barber and Schwarz from the above host, which was infesting twigs of *Pinus edulis*.

41. MICROBRACON LAEMOSACCI, new species

Closely related to the preceding species, as indicated in the key, but differing especially in the characters there noted.

Female.—Length, 3 mm.; head thick antero-posteriorly at insertion of antennae; face receding; transverse diameter of opening between clypeus and mandibles fully twice as long as the malar space, and much longer than the distance from the opening to the eyes; eyes broad-oval; postocellar line slightly longer than the diameter of an ocellus; ocell-ocular line twice the diameter of an ocellus; antennae slender, a little shorter than the body, 27-segmented; the first and second flagellar segments nearly three times as long as thick, all the following at least twice as long as thick; thorax compact, smooth, and polished; parapsidal grooves thickly hairy anteriorly as well as posteriorly; propodeum polished, with a short stub of a median longitudinal ridge at apex; stigma long; radius arising much before middle of stigma and going practically to the apex of

wing; first abscissa of radius longer than the recurrent; the second not or hardly twice as long as the first; the third longer than the first and second combined; last abscissa of cubitus longer than the preceding abscissa; radiella distinct only at base; abdomen broad-oval; first tergite finely rugulose except at extreme base; second tergite broadly emarginate behind, strongly longitudinally rugulose, with a usually distinct fine raised line down the middle; suturiform articulation very broad, coarsely foveolate; third, fourth, fifth, and sixth tergites granular, the third more or less longitudinally sculptured; ovipositor sheaths very nearly as long as the abdomen. Head testaceous, a large median spot on the front and vertex, and the occiput black; thorax black, the parapsidal grooves and a large spot behind middle lobe of mesoscutum ferrugino-testaceous; legs, including all coxae, yellow; the posterior tibiae at apex and their tarsi dusky, wings clear hyaline; abdomen curiously marked: the first tergite black, the second mostly black, with two small basal spots and the middle of the apical margin reddish-yellow; third, fourth, fifth, and sixth tergites black, reddish-yellow medially and at the sides.

Male.—Agrees with the female in all essential characters; the antennae are 28-segmented; the sixth abdominal tergite is smooth and polished.

Type.—Cat. No. 26666, U.S.N.M.

Type-locality.—Altitude, 4,700 feet, Superstition Mountains, Arizona.

Host.—*Laemosaccus*, species in *Thurberia*.

Described from seven females and sixteen males reared by H. S. Barber. The number of segments in the antennae varies in this series from 26 to 29. The series is remarkably constant in the striking color pattern.

42. MICROBRACON METACOMET Viereck

Microbracon metacomet VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 206, 208.

Type.—In the State Agricultural Experiment Station, at New Haven, Connecticut.

Face and frons finely punctate; antennae broken at tip, 25 segments remaining, very slender, the first flagellar segment nearly three times as long as thick, the remainder twice as long as broad; thorax smooth and polished; legs slender; first abscissa of radius long; the second not distinctly twice the first; the third much longer than the first and second abscissae combined; last abscissa of cubitus decidedly longer than the preceding abscissa; abdomen long, very coarsely granular or rugulose, and nearly as coarsely so on the fifth tergite as on the third: suturiform articulation broad,

foveolate, and somewhat arcuate medially, the second tergite being a little emarginate behind; hypopygium large; ovipositor sheaths nearly as long as the abdomen. Face yellow; antennae mostly yellowish; frons, vertex and occiput mostly piceous to blackish; thorax wholly black; legs, including coxae, bright yellow; wings clear hyaline; abdomen mostly blackish above, yellow laterally.

Distribution.—New Canaan, Connecticut.

Host.—Unknown.

Known only from the unique type.

43. MICROBRACON ATRICOLLIS (Ashmead)

Bracon atricollis ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 622.
Microbracon nawaasorum VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 205, 207.

Type.—Cat. No. 2917, U.S.N.M. The type of *nawaasorum* is in the Connecticut Agricultural Experiment Station at New Haven.

Very distinct from all other species of the genus. Head thick at insertion of antennae; face and frons minutely granular; ocell-ocular line at least three times the diameter of an ocellus; antennae long, slender, usually about 40-segmented, most of the flagellar segments twice as long as broad; thorax long, mostly smooth and polished; parapsidal grooves sparsely hairy; propodeum finely rugulose; metapleura granular; the metapleura and the propodeum laterally thickly clothed with long hairs; posterior tibiae and tarsi slender; last segment of all tarsi long; stout, the claws large; wings long, the entire wing membrane uniformly very densely covered with very short pubescence; stigma rather long and narrow; radius arising at or before its middle and going to extreme apex of wing; first abscissa of radius a little longer than the recurrent vein; the second abscissa of radius more than twice the first; the third as long as the first and second combined and almost on a straight line with the second; the portion of cubitus between recurrent and intercubitus more than half as long as the recurrent; lower side of cubital cell decidedly more than twice the first intercubitus and longer than the lower side of third cubital cell; last abscissa of radius longer than last abscissa of cubitus; cubitus and subdiscoideus nearly parallel, the second discoidal cell not or scarcely broadening toward apex; the chitinized plate of first tergite strongly rugose; second tergite longer than the third, finely granularly rugulose, much less strongly sculptured than first tergite; third, fourth, and fifth tergites very delicately sculptured, the fifth only faintly; ovipositor as long as the abdomen or a little longer. Head yellow; thorax mostly yellow; pronotum above, propodeum, and metapleura partly, blackish; abdomen yellow, the first tergite black, the following tergites more or less blackish medially.

Distribution.—? Missouri; Connecticut; Illinois.

Host.—Unknown.

Known only from the holotypes of *atricollis* and *nawaasorum*, and one additional female specimen, labeled "Algonquin, Ill. 18-12-95-134, 4855." The only complete antennae are those on the type of *nawaasorum*, which have 43 segments. A thorough study of the types shows *nawaasorum* to be, without doubt conspecific with *atricollis*.

44. MICROBRACON ANALCIDIS (Ashmead)

Bracon analcidis ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 619.

Type.—Cat. No. 2908, U.S.N.M.

Superficially quite similar to *sphenophori*, but differs especially in the thorax being smooth and polished, except on the propodeum which is mostly rugulose. Head thick antero-posteriorly at insertion of antennae; face and frons finely punctate; opening between clypeus and mandibles large, its transverse diameter twice as long as the malar space; antennae 35-segmented, the flagellar segments beyond second but little or no longer than broad; first flagellar segment much longer than second; propodeum rugulose, smooth and shining at base; second abscissa of radius more than twice as long as the first, the latter about half the first intercubitus; abdomen long; first tergite sculptured apically and laterally; second and third very delicately granular, the following smooth and shining; ovipositor sheaths considerably longer than the abdomen. Entirely yellow; wings nearly hyaline; antennae, and the legs including all coxae, yellow.

Distribution.—Missouri.

Host.—(*Analcis*) *Tyloderma fragariae* Riley.

Known only from the unique type.

45. MICROBRACON PODUNKORUM Viereck

Microbracon podunkorum VIIEECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 205, 207.

Type.—In the Connecticut Agricultural Experiment Station at New Haven.

Resembles the preceding species in the rugulose propodeum, and the delicately sculptured abdomen, but differs as noted in the key. Antennae 31-segmented, stout, most of the flagellar segments but little or no longer than broad; face and frons finely punctate and opaque; thorax mostly polished; parapsidal furrows sparsely hairy; propodeum completely finely rugulose; second abscissa of radius twice as long as the first; abdomen a little longer than the thorax; plate of first tergite rugulose laterally and at apex; second tergite finely granular with a strongly shining rugulose basal median area; third

tergite very minutely granular; fourth and following tergites increasingly faintly sculptured, the fifth and sixth being almost completely smooth; ovipositor sheaths as long as the abdomen beyond first tergite. Yellow; propodeum, first abdominal tergite, and a basal median spot covering the shining rugulose area on the second tergite, black; wings very nearly hyaline; legs, including all coxae, yellow.

Distribution.—Branford, Connecticut; Cadet, Missouri.

Host.—*Aristotelia absconditella* Walker.

Known only from the holotype, and a single female in the National Collection recorded under Bureau of Entomology number 4575° which was reared December 30, 1889, as a parasite of *Aristotelia absconditella*.

46. MICROBRACON MONTOWESI Viereck

Microbracon montowesi VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 206, 208.

Type.—In the State Agricultural Experiment Station at New Haven, Connecticut.

Head not thin, but the temples narrow, receding directly behind the eyes; head broader than the thorax; eyes unusually large, the face hardly broader between eyes than long between the antennal foramina and the lower margin of clypeus; face minutely punctate laterally, smooth and shining medially; frons very weakly punctate, shining; antennae as long as the body, 32-segmented, all the flagellar segments considerably longer than broad; thorax stout, smooth and polished; parapsidal grooves sparsely hairy; propodeum smooth and polished, with a very short stub of a median ridge at apex; first abscissa of radius about as long as recurrent vein; second abscissa of radius about twice as long as the first; abdomen broad-oval; chitinized plate of first tergite almost entirely smooth, slightly sculptured at the apex; second tergite very delicately granular; third and following tergites smooth and shining; ovipositor sheaths less than half as long as the abdomen. Face yellow; frons and vertex mostly piceous to blackish; occiput black; thorax black, with fine ferruginous lines in the parapsidal furrows, and with the apex of scutellum and the propleura, ferruginous; wings very slightly dusky; legs, including all coxae, yellow; the posterior tibiae at apex and their tarsi dusky; abdomen yellow except the first tergite and a basal median spot on the second, which are black.

Distribution.—New Haven, Connecticut.

Host.—?*Priophorus acericaulis* McGillivray.

The above notes are based on the type. The United States National Museum has two male paratypes, reared with the type from maple leaf-stems infested with larvae of the above-named saw-

fly. These paratypes agree with the type in the essential characters; the antennae are 28-segmented; the third and fourth abdominal tergites are very faintly partly sculptured.

47. MICROBRACON CEPHI Gahan

Fig. 20

Microbracon cephi GAHAN, Proc. Ent. Soc. Wash., vol. 20, 1918, p. 19.

Microbracon cephi CRIDDLE, Can. Ent., vol. 55, 1923, p. 3.

Type.—Cat. No. 21772, U.S.N.M.

Transverse diameter of the opening between clypeus and mandibles much greater than the distance from this opening to the eyes, in the male at least twice as long as the malar space; frons minutely punctate or reticulate; antennae rarely with less than 35 segments; all the flagellar segments considerably longer than broad; thorax long, rather slender, highly polished; parapsidal furrows sparsely hairy; metanotum a little longer than is usual in the genus; propodeum usually longer than first abdominal tergite; last segment of posterior tarsi large, usually fully as long as the second tarsal segment; second abscissa of radius more than twice as long as the first, the third about as long as the first and second combined; last abscissa of cubitus usually a little shorter than the preceding abscissa; abdomen long oval; first abdominal tergite rugulose laterally and apically; second to fifth tergites in the male, second to sixth in the female, granular; ovipositor sheaths not distinctly half the length of the abdomen, usually appearing much less than half. Yellow; usually entirely yellow, or with the mesonotal lobes, propodeum and first abdominal tergite piceous to blackish; rarely with the thorax almost wholly black and the abdomen mostly blackish above; wings a little dusky; legs, including coxae, yellow.

Distribution.—North Dakota; Minnesota; Manitoba, Canada. Probably occurs throughout the range of its chief host, the Western Wheat-stem Sawfly.

Host.—*Cephus cinctus* Norton.

In addition to the type series the United States National Museum has considerable material, all reared in the Bureau of Entomology, by C. N. Ainslie, from *Cephus cinctus* taken at various points in North Dakota and Minnesota.

48. MICROBRACON HEMIMENAE Rohwer

Fig. 11

Microbracon hemimenae ROHWER, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 232.

Type.—Cat. No. 18434, U.S.N.M.

A very distinct species, combining a black head and black coxae with a sculptured frons and a nearly completely sculptured abdomen.

Malar space in the female nearly as long as the transverse diameter of the opening between the clypeus and mandibles; in the male considerably shorter; postocellar line slightly longer than the diameter of an ocellus; ocell-ocular line less than three times as long as the diameter of an ocellus; antennae about as long as the body, usually 24 to 28-segmented, all the flagellar segments much longer than broad; face and frons minutely punctate or reticulate, opaque; thorax stout, smooth and polished; radius arising before middle of stigma; second abscissa of radius about twice the first; abdomen short and broad, especially in the female; plate of first tergite broad, more or less sculptured; second tergite rugulose, shining; suturiform articulation broad, foveolate; third, fourth and fifth tergites granular; ovipositor sheaths about as long as the dorsum of abdomen beyond first tergite, or nearly. Head black, sometimes with ferruginous orbital lines; thorax black, the parapsidal furrows and a spot behind middle lobe of mesoscutum sometimes ferruginous; wings strongly infumated, more weakly so toward apex; coxae and trochanters black; femora sometimes more or less black; posterior tibiae black except at extreme base; tarsi blackish; abdomen red, the first tergite black; sometimes, especially in the males, more or less of the abdomen beyond first tergite also blackish.

Distribution.—Plummer Island, Maryland.

Host.—*Hemimene plummerana* Busck.

In addition to the types the National Museum has a large series bearing the same data as the type specimens.

49. MICROBRACON OENOTHERAE. new species

Very similar to *mellitor*, from which it differs in having usually a complete median longitudinal carina on the propodeum, in the shorter second abdominal tergite, and the relatively longer flagellar segments of the antennae.

Female.—Length, 4 mm.; head rather thick at insertion of antennae; transverse diameter of the opening between clypeus and mandibles but very slightly longer than the distance from the opening to the eyes; antennae 35-segmented, the first flagellar segment twice as long as broad, all the following much longer than broad; face and frons very faintly punctate; thorax stout, smooth and polished; parapsidal grooves sparsely hairy; propodeum polished with a complete median longitudinal carina; second abscissa of radius more than twice as long as the first; the third slightly longer than the first and second combined; abdomen long-oval; plate of first tergite more or less sculptured apically and laterally; second tergite very short, much shorter than the third, with a large median shining rugose area; remainder of second tergite granular; third, fourth, fifth and

sixth tergites strongly granular; ovipositor sheaths about as long as the abdomen. Head, thorax and abdomen yellow; antennae blackish; the median line of propodeum dusky; legs, including all coxae, yellow; the middle and hind tibiae and all tarsi more or less dusky or blackish; wings strongly infuscated, especially toward the base.

Male.—Agrees in most essential characters with the female. Antennae broken, 28 segments remaining, the flagellar segments nearly twice as long as broad; eyes small; ocell-ocular line about three times the diameter of an ocellus; malar space fully one-third the eye-height; propodeal carina not so distinct as in the type.

Type.—Cat. No. 27145, U.S.N.M.

Type-locality.—Knoxville, Tennessee.

Allotype-locality.—Vienna, Virginia.

Host.—*Mompha eloisella* Clemens.

Described from 7 females and one male; the type and two female paratypes were reared from the above host at Knoxville, Tennessee, by C. C. Hill in the Bureau of Entomology, under Knoxville No. 16334; the allotype was reared by R. A. Cushman from *Mompha*, at Vienna, Virginia, under Quaintance No. 7805; two female paratypes were secured by H. B. Weiss from seed capsules of evening primrose in Middlesex Co., New Jersey; and two other paratypes are labeled "On *Oenothera*, Glendale, Md., H. H. Bartlett, Oct. 23, 1915." All the specimens agree very closely with the type in color and structure; the number of segments in the antennae varies from 33 to 36.

50. MICROBRACON PAPAIPEMAE Gahan

Microbracon papaipemae GAHAN, Proc. U. S. Nat. Mus., vol. 61, 1922, p. 4

Type.—Cat. No. 24983, U.S.N.M.

Distinguished particularly by the color, the delicate sculpture of the abdomen, the very fine straight suturiform articulation and the long ovipositor, the short and stout antennae, and the sculptured frons. Antennae shorter than the body, 26 to 28-segmented in the type series; face granular; frons finely reticulately sculptured; thorax polished; parapsidal grooves sparsely hairy; propodeum polished, with a short stub of a median carina at apex and a few short ridges diverging from it; second abscissa of radius more than twice as long as the first; the third fully as long as the first and second combined and going to the apex of wing; last abscissa of cubitus no longer than the preceding abscissa; abdomen long-oval; first tergite sculptured laterally and at apex; second tergite granular with a finely rugulose area medially; suturiform articulation very fine, perfectly straight; third and following tergites gradually more delicately sculptured, the fourth and fifth faintly so; ovipositor sheaths

nearly as long as the body. Head black, except the face which is yellow; thorax black; wings nearly hyaline; legs yellowish, the hind tibiae and tarsi blackish; abdomen black, the membranous margins of first tergite, the sides of the second tergite and the suturiform articulation, yellow.

Distribution.—Rye, New York.

Host.—*Papaipema frigida* Smith.

Known only from the four female specimens of the type series.

51. MICROBRACON APICATUS (Provancher)

Bracon apicatus PROVANCHER, Natural. Canad., vol. 12, 1880, p. 143.

Type.—In the Museum of Public Instruction at Quebec, Canada.

The transverse diameter of the opening between clypeus and mandibles slightly greater than the distance from the opening to the eyes; antennae of type broken, 25 segments remaining; the flagellar segments stout, those beyond the second but very little longer than broad; malar space about as long as the first flagellar segment; frons minutely closely punctate or reticulate and opaque; thorax polished; propodeum polished, with a prominent stub of a median ridge at apex and a little fine sculpture adjoining this; second abscissa of radius more than twice as long as the first; abdomen of type missing; head yellow, with a median spot on front and vertex enclosing ocelli, and the occiput, blackish; thorax black, the propleura, lateral anterior angles of mesoscutum, the parapsidal furrows and the space behind the middle lobe of mesoscutum, ferruginous; legs, including all coxae, testaceous; the posterior tibiae at apex and their tarsi, fuscous.

Distribution.—Canada; ?Maine; ?Long Island, New York.

Host.—Unknown.

The above notes are based on the type. The United States National Museum has two specimens without locality data, one of them called *apicatus* by Ashmead, another from Ottawa, Canada, also named *apicatus* by Ashmead, and two specimens from Long Island, New York, all of which appear to be this species although positive identification is difficult owing to the loss of the type abdomen. The head and thorax, with their appendages, agree perfectly with the type in structure and color, and in placing the species in the key I have considered these specimens to be *apicatus*. The single complete antenna has 30 segments; the abdomen is very delicately sculptured beyond the second tergite; the second is granular; the suturiform articulation, straight, finely minutely foveolate; the ovipositor sheaths as long as the abdomen. One specimen, with 30-segmented antennae, in the collection of the Boston Society of Natural History, was collected by C. W. Johnson at Bar Harbor, Maine. The abdomen of all

of these specimens is somewhat longer than suggested by Provancher's description, and the type may be a different species, but the agreement of the antennae, and of the structure, sculpture and color of the thorax, is striking.

52. MICROBRACON NANUS (Provancher)

Bracon nanus PROVANCHER, Natural, Canad., vol. 12, 1880, p. 143.

Type.—In the Museum of Public Instruction at Quebec, Canada; bears yellow label 725.

Frons finely reticulately sculptured and opaque; antennae 24-segmented, the segments of apical half of flagellum scarcely longer than broad; thorax smooth and polished; propodeum polished, with a stub of a median longitudinal ridge at apex and a slight longitudinal impression in front of this stub; radius going nearly to the apex of wing; second abscissa of radius more than twice as long as the first; second abdominal tergite finely granular; third tergite with only a faint suggestion of sculpture; remainder of dorsum of abdomen smooth and polished; ovipositor sheaths as long as the abdomen. Head mostly blackish, face brownish-black; thorax black; wings nearly hyaline; legs, including all coxae, bright testaceous; abdomen black above, the second tergite mostly, the third laterally, and most of the venter, yellow.

Distribution.—Canada.

Host.—Unknown.

The above notes are based on the type. The only other specimen known to me is a female, without locality data, which is in the United States National Museum.

53. MICROBRACON MELLITOR (Say)

Figs. 4, 18

Bracon mellitor SAY, Bost. Journ. Nat. Hist., vol. 1, 1836, p. 256.

Bracon xanthostigma CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 303.

Bracon vernoniae ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889, (1888), p. 619.

Bracon anthonomi ASHMEAD, Insect Life, vol. 5, 1893, p. 185.

Bracon mellitor HUNTER and HINDS, U. S. D. A., Bur. Ent. Bull. 45, 1904, p. 106, fig. 4.—PIERCE, U. S. D. A., Bur. Ent. Bull. 73, 1908, p. 39.

Microbracon pembertonii BRIDWELL, Proc. Haw. Ent. Soc., vol. 4, pt. 1, 1919 (1918), p. 115.

Type.—The type of *mellitor* is lost; that of *xanthostigmus* is in the Philadelphia Academy of Sciences, and bears No. 1687.1; the types of *vernoniae* (Cat. No. 2909), *anthonomi* (Cat. No. 1360), and paratypes of *pembertonii* (Cat. No. 23615) are in the United States National Museum.

Say's description of *mellitor* will fit any one of several other species of *Microbracon* as well as this species. But since the name *mellitor*

has been widely used in literature on economic entomology for the species here treated under that name, and since it is impossible to show conclusively that Say did not actually prepare his description from a specimen of this species, it seems best to continue to use the name *mellitor*. There is tremendous variation in the size of individuals of this species, and with this is combined rather marked variability in structure and sculpture, particularly in the males, which it is often very difficult to identify. The malar space in the female is about as long as the first segment of the antennal flagellum; it is considerably shorter in the male; the antennae are rather stout, and are from 26 to 40-segmented, the smallest number of segments being found in very small males; most frequently the antennae are from 32 to 36-segmented; most of the flagellar segments are usually only a little longer than broad; the thorax is polished; the propodeum with a stub of a median ridge at apex; second abscissa of radius usually not distinctly twice as long as the first; the third not longer than the first and second combined; the radius attaining the wing margin before the apex; abdomen usually broadly oval; the second tergite varying from strongly granular to mostly rugose, nearly always distinctly a little emarginate medially behind; the third to sixth tergites in the female, the third to fifth in the male, granular; ovipositor sheaths at least as long as the abdomen, sometimes considerably longer, a good deal of variation being evident in the same series of specimens. In color *mellitor* is nearly always entirely testaceous or ferruginous, with the propodeum and the first tergite blackish; rarely the thorax has black markings on the mesonotum and pectus.

Distribution.—Occurs at least from Texas to South Dakota and eastward to the Atlantic States, where it is found as far north as southern Massachusetts. Also occurs in the Hawaiian Islands; and quite probably is much more widely distributed than here noted.

Hosts.—*Anthonomus grandis* Boheman; *A. signatus* Say; *Polychrosis viteana* Clemens; *Pectinophora gossypiella* Saunders. Material from these hosts has been examined. Other hosts, recorded by Pierce, which records are probably correct, include *Anthonomus albopilosus* Dietz, *A. eugenii* Cano, *A. fulvus* LeConte, *A. squamosus* LeConte, *Desmoris scapalis* LeConte.

The National Museum has a large quantity of material of this species reared from the cotton boll weevil, at various points in the cotton-growing area of the United States; also an extensive series reared by R. A. Cushman from the grapeberry moth at Northeast, Pennsylvania, in the Bureau of Entomology under Quaintance numbers, 11100, 11082, 14410, 14472; many specimens from the same host reared by H. G. Ingerson at Sandusky, Ohio; and collected specimens from points in Kansas, South Dakota, Florida, Texas, New

Jersey, Virginia. In the collection of the Boston Society of Natural History are two specimens from Woods Hole and Horseneck Beach, Massachusetts, collected by C. W. Johnson. A study of the types leaves no doubt that *xanthostigmus*, *vernoniae*, *anthonomi*, and *pembertonii* are the same species. The allotype of *vernoniae* is *nuperus*, as stated under that species.

54. MICROBRACON NIGROPECTUS (Provancher)

Bracon nigropectus PROVANCHER, Natural. Canad., vol. 12, 1880, p. 143.

Type.—In the Museum of Public Instruction, at Quebec, Canada.

Malar space about as long as the first segment of antennal flagellum; face and frons minutely granular, opaque; antennae of type missing beyond 10th segment; the flagellar segments beyond second but little longer than broad; thorax smooth and polished; parapsidal grooves sparsely hairy; propodeum is mostly finely punctate, and is provided with a stub of a median longitudinal ridge posteriorly, with some short ridges diverging from this stub; second abscissa of radius not quite twice as long as the first; first abdominal tergite sculptured apically and laterally; second tergite granular, with an irregularly rugose basal median area; third, fourth, fifth, and sixth tergites finely granular; ovipositor sheaths about as long as the abdomen. Head yellow, antennae blackish; thorax yellow except propodeum and mesopectus, which are blackish; abdomen yellow, the first tergite with a blackish spot and third and fourth tergites weakly infuscated medially; wings nearly hyaline; legs, including coxae, yellow.

Distribution.—Canada; Vermont.

Host.—Unknown.

The above description is based on the type. The only other specimen which I have seen is a female taken at Bennington, Vermont, by C. W. Johnson. This specimen, which is in the collection of the Boston Society of Natural History, was compared with the type, and designated a homotype. The male is unknown.

55. MICROBRACON FURTIVUS (Fyles)

Fig. 25

Bracon furtivus FYLES, Can. Ent., vol. 24, 1892, p. 34.

Bracon fungicola ASHMEAD, Journ. Cincinnati Soc. Nat. Hist., vol. 27, 1895, p. 46.

Type.—The types of both species are in the United States National Museum, *furtivus* Cat. No. 14762 and *fungicola* Cat. No. 6864.

This species is extremely variable, especially in color; the specimens of some series are entirely or almost entirely yellow; those of other series are mostly black; all intergradations occur. The an-

tennae are rather slender, all the flagellar segments being considerably longer than broad, and the two basal flagellar segments usually being about equal; face and frons finely sculptured; transverse diameter of the opening between clypeus and mandibles scarcely greater than the distance from the opening to the eyes, in the female; malar space long; propodeum smooth and polished, with a stub of a median ridge at apex; second abscissa of radius usually more than twice as long as the first; last abscissa of radius not longer than the first and second abscissae combined; first abdominal tergite rugulose apically and laterally; second and following tergites granular, opaque; ovipositor sheaths as long as, or a little longer than, the abdomen, and slender, but broadening conspicuously on the apical fifth. Color varying from wholly yellow to mostly black; but face and legs, including coxae, always yellow.

Distribution.—From Canada to North Carolina, as judged by the material examined; probably occurs wherever its primary hosts are found.

Hosts.—*Gnorimoschema gallaesolidaginis* Riley; *G. gallaeasteriella* Kellicott.

The above notes are based on the types and extensive series in the National Museum reared from *Gnorimoschema gallaesolidaginis* by R. A. Cushman, at Vienna and East Falls Church, Virginia, and northern Pennsylvania, and by R. W. Leiby in North Carolina. At the Gypsy Moth Laboratory there is a series reared from the same host taken at Melrose Highlands, Massachusetts. I have been unable to separate *fungicola* from *furtivus*.

56. MICROBRACON TACHYPTERI, new species

Distinguished especially by combining a sculptured frons and a short, broad, sculptured abdomen, with a blackish face and very long ovipositor.

Female.—Length, 3.3 mm. Head not thick; temples not broad, receding directly behind the eyes; face receding somewhat below; transverse diameter of opening between clypeus and mandibles nearly twice as long as the malar space and about equal to half the width of the face; malar space much shorter than the first segment of antennal flagellum; ocell-ocular line a little more than twice as long as the diameter of an ocellus; antennae 32-segmented, all the flagellar segments much longer than broad, the first two of equal length and about twice as long as broad; face and frons minutely granular; thorax short, stout, smooth and polished; parapsidal grooves sparsely hairy; propodeum polished, with a short stub of a median longitudinal ridge at apex; stigma large; second abscissa of radius about twice the first; the third a little longer than the first and second combined, and slightly longer than the

last abscissa of cubitus; radius going practically to extreme apex of wing; abdomen short and broad; first tergite with the chitinized plate large, strongly elevated posteriorly and rugulose laterally and along apical margin; second tergite short and broad, slightly emarginate medially behind, and finely rugulose or granular; suturiform articulation arcuate, foveolate; third tergite much more finely sculptured than the second; fourth, fifth, and sixth tergites very delicately sculptured, the sculpture becoming faint on the fifth and sixth; ovipositor sheaths about as long as the entire body. Black; head including the face, except narrowly along the eyes, black or blackish; malar space ferruginous; thorax black, the propleura, parapsidal grooves, and space behind the middle lobe of mesoscutum, more or less ferruginous; legs, including coxae, testaceous, except the apical half of posterior tibiae and the posterior tarsi, which parts are blackish; wings slightly dusky; dorsum of abdomen black, yellowish laterally, the second and third tergites more broadly yellowish laterally.

Type.—Cat. No. 26665, U.S.N.M.

Type-locality.—French Creek, West Virginia.

Host.—*Tachypterus quadrigibbus* Say.

Described from a single specimen reared by F. E. Brooks under Quaintance No. 9521. The United States National Museum has another female specimen of this species labeled "Stony Island, N. Y., July 8, 1896."

57. MICROBRACON VARIABILIS (Provancher)

Opius variabilis PROVANCHER, *Addit. faun. Canad. Hymen.*, 1888, p. 382.

Bracon tortricicola ASHMEAD, *Proc. U. S. Nat. Mus.*, vol. 11, 1889 (1888), p. 621.

(*Opius variabilis* PROVANCHER) = *Microbracon dorsator* GAHAN, *Proc. U. S. Nat. Mus.*, vol. 49, 1915, p. 93.

Microbracon dorsator, var. *variabilis* VIERECK, *Bull. 22, Conn. Geol. and Nat. Hist. Survey*, 1917 (1916), p. 207.

Type.—In the Museum of Public Instruction, Parliament Building, Quebec, Canada. The type of *tortricicola* (Cat. No. 2915) is in the United States National Museum.

Head not thick, the temples receding directly behind the eyes; transverse diameter of the opening between clypeus and mandibles much greater than the distance from the opening to the eyes, in the male fully twice as long as the malar space, in the female one and one-half times as long; face and frons minutely punctate or reticulate; antennae usually 25 to 32-segmented, all the flagellar segments much longer than broad, the first two usually of about equal length and twice as long as broad, the apical segments slender; thorax compact, smooth, and polished; parapsidal grooves sparsely hairy; propodeum polished, with a stub of a median longitudinal ridge at apex; second abscissa of radius more than twice as long as the first; the third not

distinctly longer than the first and second combined; abdomen broad-oval; chitinized plate of first tergite rugulose laterally and at apex; second tergite broad, usually very faintly medially emarginate behind, granular, and usually with a basal median, shining, irregularly rugose area; suturiform articulation rather broad, foveolate; third to fifth tergites, and sometimes the sixth in the female, granular; ovipositor sheaths usually about equal to the dorsum of the abdomen beyond first tergite but sometimes apparently as long as the abdomen. Yellow, more or less marked with black; sometimes entirely yellow; but more frequently with a spot enclosing ocelli, occiput, mesonotal lobes, propodeum, pectus, first abdominal tergite and a basal median spot on second, black or blackish; face always yellow; rarely thorax almost entirely black, and the abdomen largely blackish or dusky above; wings very slightly dusky; legs, including all coxae, yellow, the posterior tibiae at apex and all the tarsi more or less dusky. A study of the types of *variabilis* and *tortricicola* has convinced me that they belong to the same species.

Distribution.—Canada, Missouri, Connecticut, Pennsylvania, Virginia, West Virginia.

Hosts.—*Polychrosis viteana* Clemens; *Conotrachelus nenuphar* Herbst; Tortricid in seeds of *Ambrosia* (Ashmead); larva in seed-pod of *Oenothera biennis*; *Tachypterus quadrigibbus* Say.

The above characterization is based on the types, and on a large quantity of material in the National Museum. This material includes extensive series reared by R. A. Cushman from *Polychrosis viteana* at Northeast, Pennsylvania, under Quaintance Nos. 11058, 11070, 11432, and 14462; several series reared from *Conotrachelus nenuphar* by the same investigator, at Vienna, Virginia, under Quaintance Nos. 7025, 7050, and 7837; also several specimens obtained by Cushman from the seed pods of the evening primrose, at Vienna, Virginia, under Quaintance No. 7195; and a single female reared from *Tachypterus quadrigibbus* Say, at French Creek, Virginia, by F. E. Brooks, under Quaintance No. 9505.

58. MICROBRACON SANNINOIDEAE Gahan

Fig. 12

Microbracon sanninoideae GAHAN, Proc. U. S. Nat. Mus., vol. 53, 1917, p. 196.

Type.—Cat. No. 20374, U.S.N.M.

Differs from *mellitor*, to which it is quite similar in general appearance, in having a much larger opening between clypeus and mandibles; in the shorter malar space; in the second abscissa of radius being more than twice the first, and the third longer than the first and second combined; in the posterior margin of the second tergite being straight, and in the tergites beyond the second being

more weakly sculptured. The transverse diameter of the opening between clypeus and mandibles is usually twice as long as the malar space; face and frons minutely punctate or reticulate; antennae usually with 30 to 34 segments, the first flagellar segment longer than the second, none beyond the first twice as long as broad; propodeum polished, with a stub of a median ridge at apex; radius going more nearly to extreme apex of wing than is the case in *mellitor*; abdomen long-oval, beyond the second tergite usually very delicately sculptured, the sculpture becoming faint beyond the fourth tergite; suturiform articulation straight, finely foveolate; ovipositor sheaths about as long as the abdomen. Usually entirely yellow, except the antennae and posterior tarsi, but sometimes the thorax, especially on the mesonotal lobes, propodeum and pectus, and the abdomen at base, more or less black.

Distribution.—Occurs at least from Connecticut to Georgia, and westward to Kansas and Arkansas.

Host.—(*Sanninoidea*) *Aegeria exitiosa* Say.

In addition to the types the National Museum has the following material: 2 specimens reared from *A. exitiosa* at Indianapolis, Indiana, by F. N. Wallace; 1 obtained from the same host by E. M. Craighead, at Chambersburg, Pennsylvania; 1 taken on peach at Hamden, Connecticut, by M. P. Zappe; 1 from Riley Co., Kansas (Marlatt); 6 reared from the peach borer at Fort Valley, Georgia, by C. H. Alden; 15 from the same host at Rogers, Arkansas; many specimens reared by E. B. Blakeslee from *A. exitiosa*, at Winchester, Virginia, and collected specimens from Harrisburg and Enterline, Pennsylvania.

59. MICROBRACON HOBOMOK Viereck

Microbracon hobomok VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 206, 208.

Type.—In the State Agricultural Experiment Station, at New Haven, Connecticut.

The following notes are based on the type: Malar space nearly as long as the first segment of antennal flagellum; antennae broken, 20 segments remaining, the flagellar segments beyond the first scarcely as long as broad; frons finely sculptured; thorax polished; parapsidal grooves sparsely hairy; propodeum mostly polished, with a stub of a median ridge at apex, a few short ridges diverging from this stub, and the median part of the posterior face somewhat punctate; last abscissa of radius a little longer than the first and second abscissae combined; abdomen long-oval; the first tergite rugulose along the apex; second tergite finely granular; suturiform articulation fine, straight; third to fifth tergites very delicately sculptured, the sculpture becoming faint on the fourth and fifth; ovipositor

sheaths as long as the abdomen beyond first tergite. Face yellow; vertex and occiput somewhat piceous; thorax mostly black, the pleura ferruginous; legs, including all coxae bright testaceous; wings very slightly dusky; abdomen yellowish, the first tergite, and a basal median spot on the second, blackish; apical tergites more or less brownish. This species is very similar to *apicatus*, but differs especially in the shorter ovipositor. I have seen no males of either species; doubtless it will be found almost impossible to separate the two species on the basis of this sex.

Distribution.—Branford, Connecticut.

Host.—Unknown.

Known only from the holotype.

60. MICROBRACON CAULICOLA Gahan

Fig. 13

Microbracon caulicola GAHAN, U. S. Nat. Mus., vol. 61, 1922, p. 2.

Type.—Cat. No. 24982, U.S.N.M.

Closely resembles *mellitor*, but differs in the shorter ovipositor, in the longer flagellar segments of antennae, the usually straight posterior margin of second abdominal tergite; in the second abscissa of radius being much more than twice as long as the first, in the radius going more nearly to the extreme apex of wing, and in the propodeum being usually minutely reticulated over most of its surface. The antennae are usually 29 to 35-segmented, the two basal flagellar segments usually twice as long as thick; propodeum usually delicately reticulated, sometimes granular and more strongly sculptured on the median line; abdomen broadly oval; the first tergite rugulose laterally and at apex, the second coarsely granular or rugulose; the third to sixth tergites in the female, the third to fifth in the male, granular, much less strongly sculptured than the second; ovipositor sheaths nearly as long as the dorsum of the abdomen beyond first tergite. Usually entirely yellow; rarely the propodeum and first abdominal tergite more or less fuscous; wings dusky, the stigma nearly always yellow except at apex; in some small male specimens the stigma is brownish; legs, including all coxae, yellow.

Distribution.—Evidently occurs throughout the eastern half of the United States wherever its principal hosts are found.

Hosts.—*Pyrausta ainsliei* Heinrich; *P. penitalis* Grote; *P. nubilalis* Hübner.

In addition to the types and the other material mentioned by Gahan as being contained in the collection of the National Museum, there are two specimens received from R. W. Harned, of Mississippi, bearing his No. S4750. At the Corn Borer Laboratory of the Bureau of Entomology, at Arlington, Massachusetts, there is a large quantity of material of this species, most of it reared from *Pyrausta ainsliei*,

from Champaign and Urbana, Illinois. There is also a series in this collection, recorded as probably from *Pyrausta nubilalis*, the introduced European Corn Borer, taken at Woburn, Massachusetts; and a single specimen reared from *Pyrausta ainsliei* by H. W. Allen, at Agricultural College, Mississippi.

61. MICROBRACON NIGER (Provancher)

Opius niger PROVANCHER, Addit. faun. Canad. Hymen., 1888, p. 381.

Microbracon niger GAHAN, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 93.

Type.—In the Museum of Public Instruction at Quebec, Canada.

The following notes are based on the type: Head not thin; frons distinctly finely punctate; opening between clypeus and mandibles small, circular, its transverse diameter scarcely greater than the distance from the opening to the eyes; antennae broken, only 13 segments of one remaining, the other entirely missing; flagellar segments slender, very nearly twice as long as thick; thorax stout, smooth and polished; parapsidal furrows sparsely hairy; propodeum polished, with a short stub of a median ridge at apex and a few short ridges diverging from this stub; radius arising much before middle of stigma; second abscissa of radius fully twice as long as the first; second cubital cell long; third abscissa of radius hardly as long as the first and second abscissae combined; last abscissa of cubitus scarcely as long as the preceding abscissa; second abdominal tergite minutely granular, finely striate medially; third tergite finely punctate; remainder of dorsum of abdomen smooth; ovipositor sheaths about as long as the abdomen behind first tergite. Head black, the face brown; thorax black; wings strongly infumated on basal half; legs yellowish, the coxae more or less dusky above, the posterior tibiae and tarsi dusky; abdomen piceous. A very small specimen.

Distribution.—Cap Rouge, near Quebec, Canada.

Host.—Unknown.

Known only from the unique type.

62. MICROBRACON AEQUALIS (Provancher)

Bracon aequalis PROVANCHER, Natural. Canad., vol. 12, 1880, p. 141.

Type.—In the Museum of Public Instruction, at Quebec, Canada.

The following notes are based on the type: Face and frons finely sculptured; flagellar segments of antennae considerably longer than broad, the first nearly twice as long as broad; thorax smooth and polished; propodeum with a median carina extending from the apex nearly half way to the base; second abscissa of radius fully twice as long as the first; first tergite sculptured apically and laterally; second tergite finely striate either side of the middle, punctate laterally; third and following tergites faintly punctate; ovipositor

sheaths as long as the abdomen beyond second tergite. Face yellow; frons, vertex, and occiput more or less piceous or blackish; thorax black; legs, including all coxae, yellow; wings nearly hyaline; abdomen yellow, first tergite black, the apical tergites brownish.

Distribution.—Canada.

Host.—Unknown.

The unique type is the only specimen of this species that I have seen.

63. MICROBRACON ARGUTATOR (Say)

Fig. 10

Bracon argutator SAY, Journ. Bost. Soc. Nat. Hist., vol. 1, 1836, p. 233.

Type.—Lost.

The species here regarded as *argutator* agrees very well with Say's description, and it seems more desirable to identify it as that species than to describe it as new. Head rather thick at insertion of antennae; temples broad; malar space in the female nearly as long as the first segment of antennal flagellum; antennae normally 25 to 30-segmented, shorter than the body in the female; eyes short-oval; face and frons finely punctate; thorax smooth and polished; parapsidal grooves weakly hairy; propodeum usually mostly weakly reticulately sculptured, and more or less rugulose along the median line; second abscissa of radius about twice as long as the first, the third slightly longer than the first and second combined; abdomen long-oval, the first tergite sculptured apically and laterally; the second granular, usually as long as the first and longer than the third, more than half as long as broad at base; third, fourth and fifth tergites much more delicately sculptured, shining; ovipositor sheaths projecting the length of the abdomen beyond second tergite or a little more. Yellow; sometimes entirely yellow, with only a spot enclosing the ocelli black; the abdomen often of a paler yellow than the thorax; sometimes the occiput, mesonotal lobes, propodeum, pectus and first abdominal tergite more or less blackish; wings slightly dusky, the stigma more or less yellowish; legs, including all coxae, yellow.

Distribution.—Indiana; Missouri.

Host.—"Lepidopterous larva boring in *Elymus*;" *Saluria*, species.

The United States National Museum has considerable material reared from the above hosts at Lafayette, Indiana and Charleston, Missouri, by C. N. Ainslie, in the Bureau of Entomology, under Webster Nos. 14705 and 14781.

64. MICROBRACON GERAEI, new species

Very similar to *argutator*, but distinguished as noted in the table to species.

Female.—Length, 3 mm. Head rather thick at insertion of antennae; malar space much shorter than first flagellar segment of an-

tennae; transverse diameter of the opening between clypeus and mandibles very much greater than the distance from the opening to the eyes, and at least one and one-half times as long as the malar space; face and frons very delicately punctate; antennae usually 27 to 33-segmented, slender, usually as long as the body, the first flagellar segment about twice as long as broad; thorax smooth and polished; propodeum finely reticulate or minutely granular and opaque or sub-opaque; second abscissa of radius hardly twice as long as the first, the third a little longer than the first and second combined; last abscissa of cubitus longer than the preceding abscissa; abdomen long-oval; first tergite rugulose laterally and at apex; second tergite large, about as long as third, and about twice as broad at base as long, granular, often a little rugulose medially; third, fourth, and fifth tergites, and sometimes the sixth, exceedingly delicately sculptured; ovipositor sheaths nearly as long as the dorsum of the abdomen beyond first tergite. Yellow; usually the frons, vertex, occiput and mesonotal lobes more or less black; even in the specimens which have these parts deep black, the propodeum and the abdomen including first tergite are almost invariably yellow; wings very slightly dusky; legs including coxae, yellow, the apical tarsal segment black.

Male.—Antennae of allotype 31-segmented; other males vary in this respect, the number of segments being usually 27 to 32. Sometimes the thorax is almost entirely black, although usually at least the pectus and the propodeum are pale; face occasionally with a quadrate blackish spot. In some specimens the fourth and following abdominal tergites are entirely polished.

Type.—Cat. No. 26668, U.S.N.M.

Type-locality.—Sioux City, Iowa.

Host.—" *Geraeus* larva in *Panicum*."

Described from eight female and three male specimens reared by C. N. Ainslie in the Bureau of Entomology, under Webster No. 8885. In addition to the type series there is considerable material in the National Museum, all of it reared from *Panicum* by C. N. Ainslie, at Sioux City, Iowa and Elk Point, South Dakota.

65. MICROBRACON LUTUS (Provancher)

Bracon lutus PROVANCHER, Natural. Canad., vol. 12, 1880, p. 142.

Bracon lixi ASHMEAD, Canad. Ent., vol. 25, 1893, p. 67.

Type.—In the Museum of Public Instruction at Quebec, Canada. The type of *lixi* is in the United States National Museum (Cat. No. 2145).

Very closely related to *variabilis* and often very difficult to distinguish from that species; it is generally more robust, has longer antennae, a slightly longer malar space, and usually slightly shorter ovipositor sheaths. A study of the types of *lutus* and *lixi* has con-

vinced me that they are the same species. Eyes very broad, not distinctly one and one-half times as long as broad, in the female; malar space, in the female, very nearly half as long as the distance from the lower margin of antennal foramina to lower margin of clypeus; antennae usually 36 to 40-segmented; all the segments at least one and one-half times as long as broad; face and frons finely punctate, opaque; thorax stout, smooth and polished; propodeum mostly polished; second abscissa of radius a little more than twice as long as the first; the third slightly longer than the first and second abscissae combined; second abdominal tergite granular, with a shining irregularly rugose area on basal middle; third, fourth, fifth, and in the female, the sixth, tergites finely sculptured; suturiform articulation rather broad, foveolate, usually a little arcuate medially; ovipositor sheaths as long as the abdomen beyond second tergite or a little longer. Yellow; spot enclosing ocelli, and occiput usually blackish; thorax varying from mostly black to blackish only on the mesonotal lobes and propodeum; wings usually slightly dusky; legs, including all coxae, yellow; abdomen yellow, with first tergite and a median spot on second, black; apical tergites usually brownish.

Distribution.—Canada; Virginia; New York; Massachusetts; Pennsylvania.

Hosts.—*Lixus scrobicollis* Boheman, in *Ambrosia trifida*; *Papaipema nebris* Guenee.

But little material of this species, in addition to the types, has been seen. The United States National Museum has two specimens reared by H. Bird at Rye, New York, from *Papaipema nebris*; and a collected specimen from Natrona, Pennsylvania. The Corn-Borer Laboratory of the Bureau of Entomology has two specimens reared from *Ambrosia* at Manchester, Massachusetts. All these specimens are females.

66. MICROBRACON CERAMBYCIDIPHAGUS, new species

Fig. 16

Very similar to the preceding in habitus, structure and sculpture; it will frequently be found difficult to distinguish them. The characters given in the key together with the description should, however, suffice to separate these two species, at least in the female sex.

Female.—Length 3.5 mm. Head about as in *lutus*; temples receding directly behind eyes; malar space as in *lutus*; postocellar line hardly exceeding the diameter of an ocellus; antennae of type 37-segmented, the two basal flagellar segments and also the apical segments twice as long as thick; thorax stout, smooth and polished; propodeum a little roughened medially toward apex; second abscissa of radius more than twice as long as the first; the third a little

longer than the first and second abscissae combined; abdomen broadly oval; first tergite with the chitinized plate broad and sculptured apically; second tergite broad, nearly three times as broad at base as long, not at all emarginate posteriorly, granular, with an irregularly rugose area on its basal middle; suturiform articulation straight medially, curving forward a little laterally; third to sixth tergites finely granular; ovipositor sheaths about as long as the abdomen beyond second tergite. Head, thorax and abdomen completely yellow; wings very nearly hyaline; legs, including all coxae, wholly yellow.

Male.—Essentially as in the female; the antennae of the allotype are 36-segmented; the malar space is much shorter than in the female; stemmaticum, occiput, mesonotal lobes, pectus, propodeum and spot on first tergite, black.

Type.—Cat. No. 26670, U.S.N.M.

Type-locality.—Harrisburg, Pennsylvania.

Host.—*Oberia*, species in *Crataegus* and *Prunus*.

Described from ten female and two male specimens reared by H. B. Kirk.

The color is more or less variable, but even in the darkest specimens of the type series the abdomen beyond first tergite is entirely yellow.

67. MICROBRACON CINCTUS (Provancher)

Phylax cinctus PROVANCHER, Natural. Canad., vol. 12, 1880, p. 175.

Zele cinctus PROVANCHER, Addit. faun. Canad. Hymen., 1888, p. 380.

Type.—In the Museum of Public Instruction, at Quebec, Canada.

The following notes are based on the type, which is a male: Head not thin; frons polished; transverse diameter of opening between clypeus and mandibles a little longer than the distance from the opening to the eye; antennae broken, 16 segments remaining, none of the flagellar segments twice as long as thick; thorax smooth and polished; parapsidal grooves sparsely hairy; propodeum polished, with a short stub of a median ridge at apex and a slight impression just before the stub; first abscissa of radius fully as long as the inner side of stigma; the second abscissa of radius less than twice the first; abdomen missing; head and thorax black; wings dusky; legs, including all coxae, yellow. Somewhat resembles *meromyzae*, but the thorax is not so long and slender as in that species, the first abscissa of radius is longer, and the propodeum is without the median carina which is usually distinct in *meromyzae*.

Distribution.—Canada.

Host.—Unknown.

Known only from the broken holotype.

68. MICROBRACON WAVEQUA Viereck

Microbracon wavequa VIERECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 204, 206.

Type.—In the State Agricultural Experiment Station at New Haven, Connecticut.

Following are notes made upon an examination of the type, a male specimen in good condition: Head rather thick at insertion of antennae; face and frons smooth and polished; antennae 34-segmented, all the flagellar segments longer than broad, the first distinctly longer than the second; thorax long, rather slender, apparently twice as long as high, smooth and polished; propodeum polished, with a short stub of a median ridge at apex; first abscissa of radius very long, about three-fourths as long as the first intercubitus and more than half the second abscissa of radius; last abscissa of cubitus longer than the lower side of second cubital cell; abdomen long; plate of the first tergite with two elongate pits laterally at apex; medially at apex this tergite is polished; second and following tergites completely polished; suturiform articulation very fine, not punctate or foveolate. Head and thorax wholly black; abdomen piceous black; wings very strongly infumated; all coxae, and fore and middle femora mostly, black; posterior femora black at base on the outer side.

Distribution.—New Haven, Connecticut.

Host.—Unknown.

Known only from the unique type.

69. MICROBRACON SULCIFRONS Ashmead

Microbracon sulcifrons ASHMEAD, Bull. 1, Colo. Biol. Assoc., 1890, p. 15.

Type.—Cat. No. 13638, U.S.N.M.

Head rather prominent at insertion of antennae, the face receding below; face medially, and the frons, smooth and polished; antennae rather stout, none of the flagellar segments twice as long as thick; thorax stout, smooth and polished; propodeum with a median carina extending nearly half way from the apex toward base and with a few short ridges diverging from this stub; legs of type missing beyond coxae; metacarpus nearly twice as long as the stigma; second abscissa of radius at least twice the first, the third not distinctly as long as the first and second combined; abdomen rather short; first tergite sculptured laterally and apically; second tergite and basal two-thirds of third finely striate; suturiform articulation broad, straight, and strongly foveolate; apical third of third tergite and the fourth and following tergites smooth and polished. Body wholly black; coxae black; wings dusky.

Distribution.—Smith's Park Gulch, Colorado.

Host.—Unknown.

The male type is the only specimen of this species that I have seen.

70. MICROBRACON CANADENSIS (Ashmead)

Opius canadensis ASHMEAD, Canad. Ent., vol. 23, 1891, p. 4.

Microbracon canadensis GAHAN, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 93.

Type.—Cat. No. 15061, U.S.N.M.

Somewhat resembles *furtivus*, but the last abscissa of radius is much longer, and the sculpture of the abdomen does not agree with any specimens of *furtivus* examined. Malar space at least one-third the length of the face from antennal foramina to lower margin of clypeus; antennae broken, the segments beyond the nineteenth missing; first flagellar segment about twice as long as broad, the following subequal, about one and one-half times as long as broad; thorax smooth and polished; second abscissa of radius less than twice the first; the third much longer than the first and second combined, and going to the apex of the wing; last segment of posterior tarsi slender; first abdominal tergite sculptured laterally and at apex; the second granular, more or less striate medially; suturiform articulation straight, finely foveolate; the third tergite finely granular; the fourth faintly so, strongly shining; the following smooth and polished. Head piceous black, the face yellow; antennae yellowish beneath toward base; thorax wholly black; legs, including coxae, yellow; wings very slightly dusky; abdomen black, except the second tergite laterally and the suturiform articulation.

Distribution.—Ottawa, Canada.

Host.—Unknown.

The above characterization is based on the male type, which is the only specimen I have seen.

71. MICROBRACON KONKAPOTI Viereck

Microbracon konkapoti VIIEECK, Bull. 22, Conn. Geol. and Nat. Hist. Survey, 1917 (1916), pp. 205, 207.

Type.—In the State Agricultural Experiment Station, at New Haven, Connecticut.

The following notes are based on the type, which is a male specimen: Somewhat resembles *rhyssemati* in habitus and sculpture of the abdomen, but differs in the color of the head, especially the face, and in the sculpture of the propodeum. Face smooth and shining medially; frons very faintly punctate; antennae broken, 20 segments remaining, the first and second flagellar segments of about equal length, twice as long as broad; malar space less than half the transverse diameter of the opening between clypeus and mandibles; thorax rather long and slender, smooth and polished; propodeum polished, with a short stub of a median ridge at apex, and from this stub toward the base medially impressed, almost grooved, the impression traversed by transverse ridges; first abscissa of radius a little longer than the recurrent vein and more than half as long as the

second abscissa of radius; radius going to the wing apex, the radial cell broad; first abdominal tergite sculptured at apex; second, third, fourth and fifth tergites rather evenly closely granular, the fourth and fifth a little less strongly so than the second and third. Entire body honey-yellow except the head which is piceous black; the face mostly blackish; legs, including all coxae, yellow; wings slightly dusky.

Distribution.—West Thompson, Connecticut.

* *Host*.—Unknown.

Known only from the holotype.

72. MICROBRACON RHYSEMATI (Ashmead)

Bracon rhysemati ASHMEAD, Journ. Cincinnati Soc. Nat. Hist., 1894, p. 46.

Type.—Cat. No. 1362, U.S.N.M.

Face and frons very minutely punctate; antennae 28 to 30-segmented, all of the flagellar segments much longer than broad; transverse diameter of the opening between clypeus and mandibles at least twice as long as the malar space; thorax smooth and polished; parapsidal furrows very sparsely hairy; propodeum polished, with a median longitudinal carina at least on the apical third, this carina sometimes nearly complete, radius going practically to the wing apex; second abscissa of radius twice as long as the first, the third scarcely as long as the first and second combined; first abdominal tergite finely sculptured at apex; second, third, fourth, and fifth tergites strongly granular, opaque; sixth tergite faintly punctate, shining. Yellow, the mesonotal lobes, disk of first abdominal tergite and the apical tergites very slightly dusky; wings faintly dusky; legs, including coxae, yellow. The female is unknown.

Distribution.—Ohio.

Host.—*Rhysematus lineaticollis* Say.

In addition to the three specimens of the type series the United States National Museum has one male specimen from Columbus, Ohio.

73. MICROBRACON COOKII (Ashmead)

Bracon cookii ASHMEAD, Proc. U. S. Nat. Mus., vol. 11, 1889 (1888), p. 624.

Type.—Cat. No. 2921, U.S.N.M.

Very similar to *furtivus*; it cannot be satisfactorily distinguished from that species on the basis of the male holotype, the only specimen of *cookii* that I have seen. This specimen, however, has a large quadrate blackish spot on the face, in which respect it differs from all specimens of *furtivus* examined. The host record, if correct, should leave little doubt that *cookii* represents a distinct species. The following notes are based on the type: Ocell-ocular line about twice as long as the diameter of an ocellus; face and frons very minutely punctate; antennae broken; thorax smooth and polished; propodeum

polished; first abscissa of radius about as long as recurrent vein; the second hardly twice as long as the first; the third scarcely as long as the first and second combined; second intercubitus longer than the recurrent vein; chitinized plate of first abdominal tergite broadening rather gradually posteriorly, rugulose apically and laterally; second, third and fourth tergites granular, opaque; fifth tergite very finely granular, shining; frons, vertex and occiput blackish except along the eyes; face with a large quadrate black spot; thorax entirely black; wings very faintly dusky; legs, including all coxae yellow, the posterior tibiae and tarsi more or less dusky; first abdominal tergite and a median spot on the second, black; the apical tergites somewhat fuscous.

Distribution.—Lansing, Michigan.

Host.—"Leaf-miner in basswood."

Known only from the unique type.

SPECIES OF MICROBRACON NOT INCLUDED IN THE KEY

MICROBRACON RUFOMARGINATUS (Ashmead)

Bracon rufomarginatus ASHMEAD, *Canad. Ent.*, vol. 25, 1893, p. 68.

Type.—I have been unable to locate the type of this species. Judged by the original description it is very similar to, possibly identical with, *politiventris* (Cushman); if the type is found and proves to be *politiventris*, it will be necessary to place the latter name in synonymy.

Type-locality.—Morgantown, West Virginia.

Host.—Unknown.

MICROBRACON PICEICEPS (Viereck)

Bracon piciceps VIERECK, *Trans. Kans. Acad. Sci.*, vol. 19, 1905, p. 268.

Type.—In the University of Kansas.

It has been impossible to place this species on the basis of the original description and notes by Mr. Gahan who has examined the type, principally because the type is a male specimen and males of the group to which this species belongs are exceedingly difficult to identify. It appears to come nearest to *mellitor*.

Type-locality.—Douglas County, Kansas.

Host.—Unknown.

SAY'S SPECIES OF THE GENUS BRACON

When attempting to determine which of Say's species, described in the genus *Bracon*, belong to *Microbracon*, it became necessary to review thoroughly all of the species placed in *Bracon* by Say; and it appears desirable to include in this paper a list of these species with the names of the genera to which they seem to be referable. Some

of them have long since been assigned to their proper genera but are nevertheless included here in order to make the list complete. Mr. A. B. Gahan, of the Bureau of Entomology, very kindly aided in these determinations, and the following list expresses both his opinion and that of the writer. The species, the transfer of which has previously been published, are indicated by an asterisk.

<i>argutor</i> -----	<i>Microbracon.</i>	<i>pullator</i> -----	<i>Spathius.</i>
* <i>dorsator</i> -----	<i>Microbracon.</i>	* <i>rugator</i> -----	<i>Campyloneurus.</i>
<i>exhalans</i> -----	<i>Doryctes.</i>	<i>rugulosus</i> -----	<i>Rogas.</i>
* <i>explorator</i> -----	<i>Cardiochiles.</i>	<i>scrutator</i> -----	<i>Rogas.</i>
* <i>hector</i> -----	<i>Microbracon.</i>	<i>stigmator</i> -----	<i>Rogas.</i>
<i>honestor</i> -----	<i>Spathius.</i>	* <i>thoracicus</i> -----	<i>Triaspis.</i>
<i>inescator</i> -----	<i>Spathius.</i>	* <i>tibiator</i> -----	<i>Cardiochiles.</i>
* <i>ligator</i> -----	<i>Helconidca.</i>	<i>transversus</i> -----	<i>Chremylus.</i>
* <i>mellitor</i> -----	<i>Microbracon.</i>	* <i>trilobatus</i> -----	<i>Triaspis.</i>
<i>paululor</i> -----	<i>Spathius.</i>	<i>truncator</i> -----	<i>Zete.</i>
<i>pectinator</i> -----	<i>Odontobracon.</i>	<i>vestitor</i> -----	<i>Rogas.</i>
<i>populator</i> -----	<i>Capitonius.</i>	* <i>viator</i> -----	<i>Cardiochiles.</i>

HOST LIST

COLEOPTERA

<i>Anthonomus albopilosus</i> Dietz---	<i>Microbracon mellitor</i> (Say).
<i>eugenii</i> Cano-----	<i>mellitor</i> (Say).
<i>fulvus</i> LeConte-----	<i>mellitor</i> (Say).
<i>grandis</i> Boheman---	<i>mellitor</i> (Say).
<i>signatus</i> Say-----	<i>mellitor</i> (Say).
<i>squamosus</i> LeConte---	<i>mellitor</i> (Say).
<i>Chrysobothris deleta</i> LeConte---	<i>nevadensis</i> (Ashmead).
<i>Conotrachelus nenuphar</i> Herbst---	<i>variabilis</i> (Provancher).
<i>Desmoris scapalis</i> LeConte-----	<i>mellitor</i> (Say).
<i>Gastroidca cyanca</i> Melsh-----	<i>gastroideae</i> (Ashmead).
<i>Geracus, species</i> -----	<i>geraci</i> Muesebeck.
<i>Laemosaccus, species</i> -----	<i>laemosacci</i> Muesebeck.
<i>Listronotus latiusculus</i> Boheman---	<i>punctatus</i> Muesebeck.
<i>Licus scrobicollis</i> Boheman-----	<i>lutus</i> (Provancher).
<i>Oberea, species</i> -----	<i>cerambycidiphagus</i> Muesebeck.
? <i>Orthoris crotchii</i> LeConte-----	<i>nuperus</i> (Cresson).
? <i>Phytonomus nigrirostris</i> Fabri-	
cius-----	<i>tenuiceps</i> Muesebeck.
<i>Pissodes strobi</i> Peck-----	<i>pini</i> Muesebeck.
<i>Pityophthorus, species</i> -----	<i>pityophthori</i> Muesebeck.
<i>Rhyssematius lineaticollis</i> Say---	<i>rhyssemati</i> (Ashmead).
<i>Sphenophorus callosus</i> Olivier---	<i>sphenophori</i> Muesebeck.
<i>Tachypterus quadrigibbus</i> Say---	<i>tachypteri</i> Muesebeck.
	<i>variabilis</i> (Provancher).
<i>Tychius semisquamosus</i> LeConte---	<i>tychii</i> Muesebeck.
<i>Tyloderma frugariae</i> Riley-----	<i>analcidis</i> (Ashmead).

HYMENOPTERA

<i>Cephus cinctus</i> Norton-----	<i>Microbracon cephi</i> Gahan.
<i>Eunura, species</i> -----	<i>angelcius</i> (Provancher).
? <i>Priophorus acericaulis</i> McGilliv-	
vray-----	<i>montowesi</i> Viereck.

LEPIDOPTERA

<i>Acrobasis nebulella</i> Riley.....	<i>Microbracon cushmani</i> Muesebeck.
<i>Acgeria exilis</i> Say.....	<i>sanninoidae</i> Gahan.
<i>tipuliformis</i> Linnaeus....	<i>sesiae</i> Muesebeck.
<i>Archips argyropsila</i> Walker.....	<i>gelechia</i> (Ashmead).
<i>paralella</i> Robinson.....	<i>politiventris</i> (Cushman).
<i>Aristotelia absconditella</i> Walker...	<i>podunkorum</i> Viereck.
<i>rososuffusella</i> Clemens	<i>gelechia</i> (Ashmead).
<i>Causasia hammondi</i> Riley.....	<i>cushmani</i> Muesebeck.
	<i>gelechia</i> (Ashmead).
<i>Chilo</i> , species	<i>pyralidiphagus</i> Muesebeck.
<i>Coleophora leucochrysell</i> Cle-	
mens	
<i>volckei</i> Heinrich....	<i>pygmaeus</i> (Provancher).
<i>Coleophora</i> , species.....	<i>pygmaeus</i> (Provancher).
	<i>juncicola</i> (Ashmead).
<i>Cryptolechia</i> , species.....	<i>pygmaeus</i> (Provancher).
<i>Desmia funeralis</i> Huebner.....	<i>psilocorsi</i> Viereck.
<i>Diatraea</i> , species	<i>gelechia</i> (Ashmead).
<i>Dioryctria abietella</i> Zinck.....	<i>pyralidiphagus</i> Muesebeck.
<i>Enarmonia prunivora</i> Walsh.....	<i>brevicornis</i> (Wesmael).
<i>Ephestia cahiritella</i> Zeller.....	<i>cushmani</i> Muesebeck.
<i>elutella</i> Huebner	<i>hebetor</i> (Say).
<i>kuehniella</i> Zeller	<i>hebetor</i> (Say).
<i>Etiella zinckenella schisticolor</i>	<i>hebetor</i> (Say).
Zeller.....	
<i>Eulia triferana</i> Walker.....	<i>hystopi</i> Viereck.
<i>Euxoa</i> , species.....	<i>politiventris</i> (Cushman).
<i>Galleria mellonella</i> Linnaeus....	<i>crucarum</i> (Cushman).
<i>Gelechia hibiscella</i> Busck.....	<i>hebetor</i> (Say).
<i>Gelechia</i> , species.....	<i>gelechia</i> (Ashmead).
<i>Gnortimoschema gallaecorticella</i>	<i>gelechia</i> (Ashmead).
Kellicott.....	
<i>gallacsolidagi-</i>	<i>furtivus</i> (Fyles).
<i>nis</i> Riley.....	
<i>Hemimene plummerana</i> Busck....	<i>furtivus</i> (Fyles).
<i>Laspeyresia molesta</i> Busck.....	<i>hemimeneae</i> Rohwer.
<i>Malacosoma constricta</i> Packard..	<i>gelechia</i> (Ashmead).
<i>pluvialis</i> Dyar.....	<i>xanthonotus</i> (Ashmead).
<i>Meromyza americana</i> Fitch.....	<i>xanthonotus</i> (Ashmead).
<i>Mesocondyla gastralis</i> Guenee....	<i>meromyzae</i> (Gahan).
<i>Mineola indiginella</i> Zeller.....	<i>cushmani</i> Muesebeck.
<i>Mompha cloisella</i> Clemens.....	<i>cushmani</i> Muesebeck.
<i>Notolophus oslari</i> Barnes.....	<i>oenotherae</i> Muesebeck.
<i>Pandemis lamprosa</i> Robinson..	<i>xanthonotus</i> (Ashmead).
<i>Papaipema frigida</i> Smith.....	<i>politiventris</i> (Cushman).
<i>nebris</i> Guenee.....	<i>papaipemae</i> Gahan.
<i>Papaipema</i> , species.....	<i>lutus</i> (Provancher).
<i>Pectinophora gossypiella</i> Saun-	<i>gelechia</i> (Ashmead).
ders.....	
<i>Phthorimaca vincella</i> Murtfeldt..	<i>mellitor</i> (Say).
<i>operculicla</i> Zeller....	<i>platynotae</i> (Cushman).
	<i>gelechia</i> (Ashmead).
	<i>geluchiae</i> (Ashmead).

<i>Platynota</i> , species.....	<i>Microbracon platynotae</i> (Cushman).
<i>Plodia interpunctella</i> Huebner....	<i>hebetor</i> (Say).
<i>Polychrosis vitcana</i> Clemens.....	<i>gelechia</i> (Ashmead).
	<i>mellitor</i> (Say).
	<i>politiventris</i> (Cushman).
	<i>variabilis</i> (Provancher).
<i>Pyrausta ainslicii</i> Heinrich.....	<i>caulicola</i> Gahan.
<i>nubilalis</i> Hnebner.....	<i>caulicola</i> Gahan.
	<i>gelechia</i> (Ashmead).
	<i>hebetor</i> (Say).
<i>penitalis</i> Grote.....	<i>caulicola</i> Gahan.
<i>Saluria</i> , species.....	<i>argutator</i> (Say).
<i>Sitotroga cerealella</i> Olivier.....	<i>hebetor</i> (Say).
<i>Thurberiphaga diffusa</i> Barnes....	<i>thurberiphagae</i> Muesebeck.
<i>Vitula edmansii</i> Packard.....	<i>hebetor</i> (Say).
<i>Wanda baptisiella</i> Fernald.....	<i>gelechia</i> (Ashmead).

EXPLANATION OF PLATES

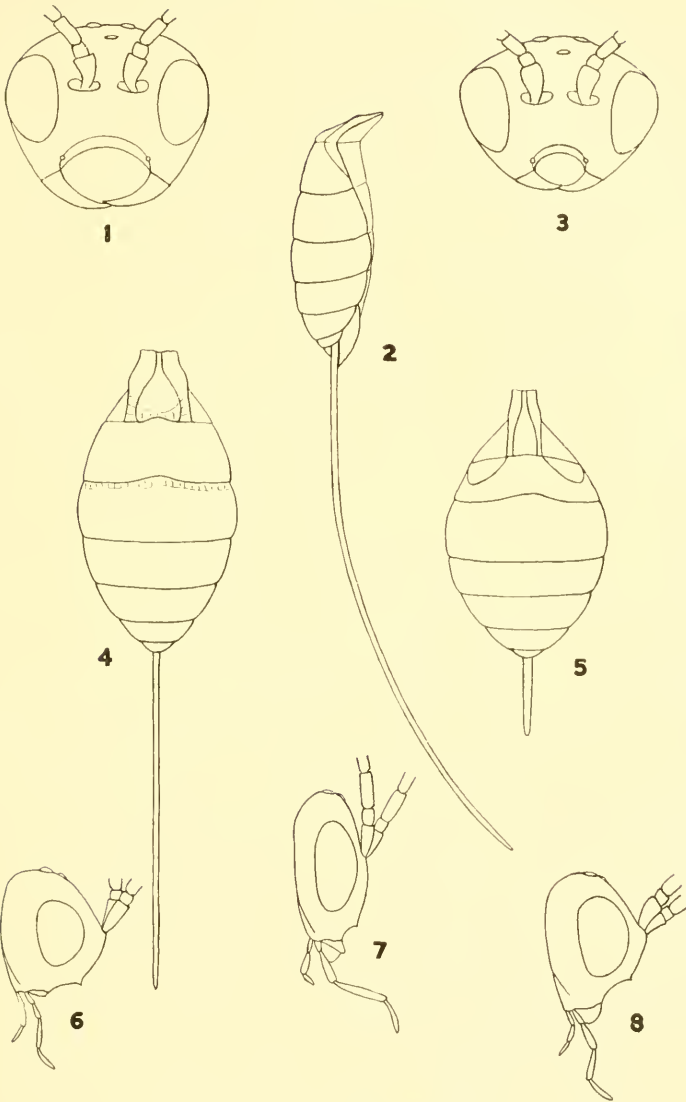
The drawings on Plate 1 are by the writer. The photographs on Plate 2 were taken by Mr. C. E. Hood, of the Bureau of Entomology.

PLATE 1

- FIG. 1. *Microbracon gastroideae*. Front view of head.
 2. *Microbracon rudbeckiae*. Lateral view of abdomen.
 3. *Microbracon pygmaeus*. Front view of head.
 4. *Microbracon mellitor*. Dorsal view of abdomen.
 5. *Microbracon melanaspis*. Dorsal view of abdomen.
 6. *Microbracon sphenophori*. Lateral view of head.
 7. *Microbracon tenuiceps*. Lateral view of head.
 8. *Microbracon sesiae*. Lateral view of head.

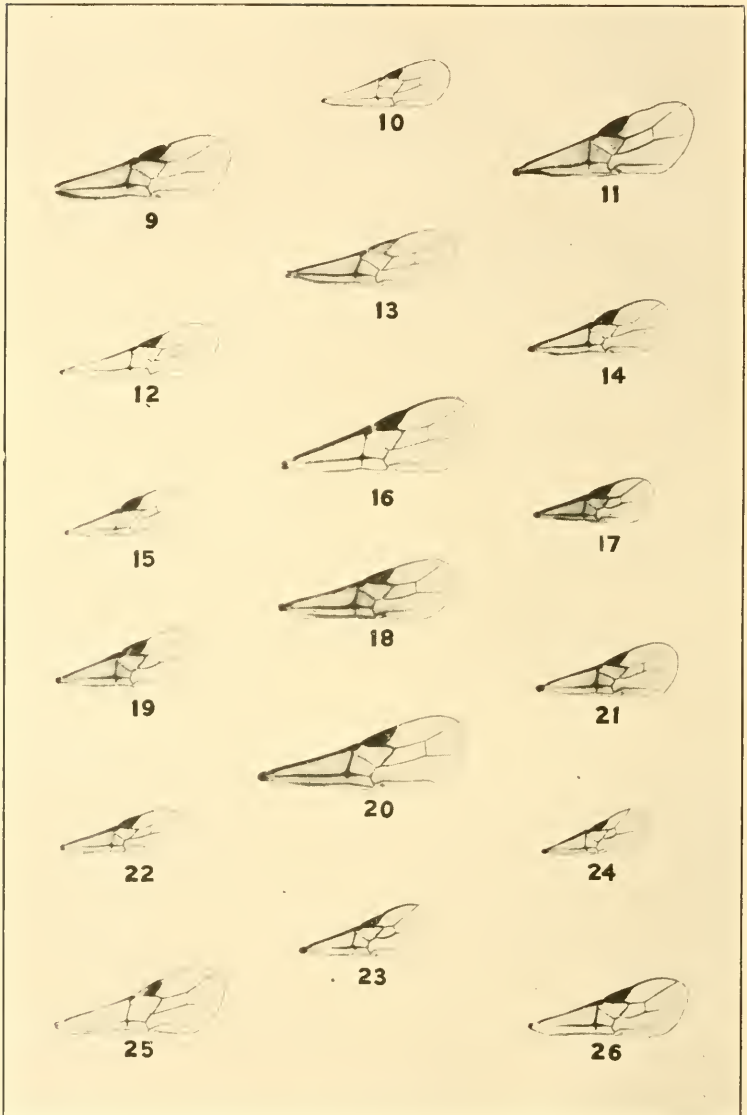
PLATE 2

- FIG. 9. *Microbracon sesiae*. Anterior wing.
 10. *Microbracon argutator*. Anterior wing.
 11. *Microbracon hemimenae*. Anterior wing.
 12. *Microbracon sauninoideae*. Anterior wing.
 13. *Microbracon caulicola*. Anterior wing.
 14. *Microbracon pini*. Anterior wing.
 15. *Microbracon pygmaeus*. Anterior wing.
 16. *Microbracon ccranbycidiphagus*. Anterior wing;
 17. *Microbracon cushmani*. Anterior wing.
 18. *Microbracon mellitor*. Anterior wing.
 19. *Microbracon brevicornis*. Anterior wing.
 20. *Microbracon cephi*. Anterior wing.
 21. *Microbracon tychii*. Anterior wing.
 22. *Microbracon rudbeckiae*. Anterior wing.
 23. *Microbracon gelechia*. Anterior wing.
 24. *Microbracon cruciarum*. Anterior wing.
 25. *Microbracon furtivus*. Anterior wing.
 26. *Microbracon xanthonotus*. Anterior wing.



DETAILS OF MICROBRACON

FOR EXPLANATION OF PLATE SEE PAGE 84



WINGS OF SPECIES OF MICROBRACON

FOR EXPLANATION OF PLATE SEE PAGE 84

SPECIES INDEX

[Accepted specific names are in roman; synonyms in italics]

	Page		Page
<i>aequalis</i> (Provancher)-----	73	<i>metacomet</i> Viereck-----	57
<i>americanus</i> (Ashmead)-----	28	<i>minimus</i> (Cresson)-----	47
<i>analcidis</i> (Ashmead)-----	59	<i>montowesi</i> Viereck-----	60
<i>angelesius</i> (Provancher)-----	43	<i>nanus</i> (Provancher)-----	65
<i>anthonomi</i> (Ashmead)-----	65	<i>navaasorum</i> Viereck-----	58
<i>apicatus</i> (Provancher)-----	64	<i>nevadensis</i> (Ashmead)-----	54
<i>argutator</i> (Say)-----	74	<i>niger</i> (Provancher)-----	73
<i>ashmeadi</i> Muesebeck-----	42	<i>nigradorsum</i> (Ashmead)-----	41
<i>atricollis</i> (Ashmead)-----	58	<i>nigropectus</i> (Provancher)-----	67
<i>auripes</i> (Provancher)-----	44	<i>nitidus</i> (Provancher)-----	50
<i>brachyurus</i> (Ashmead)-----	36	<i>notaticeps</i> (Ashmead)-----	26
<i>brevicornis</i> (Wesmael)-----	33	<i>nuperus</i> (Cresson)-----	47
<i>canadensis</i> (Ashmead)-----	79	<i>oenotherae</i> Muesebeck-----	62
<i>caulicola</i> Gahan-----	72	<i>papaipemae</i> Gahan-----	63
<i>cecidomyiae</i> (Ashmead)-----	43	<i>pembertonii</i> Bridwell-----	65
<i>cephi</i> Gahan-----	61	<i>piceiceps</i> (Viereck)-----	81
<i>cerambycidiphagus</i> Muesebeck-----	76	<i>pini</i> Muesebeck-----	52
<i>beneficientior</i> (Viereck)-----	31	<i>ptyophthori</i> Muesebeck-----	55
<i>cinctus</i> (Provancher)-----	77	<i>platynotae</i> (Cushman)-----	29
<i>coleophorae</i> Rohwer-----	38	<i>podunkorum</i> Viereck-----	59
<i>connecticutorum</i> Viereck-----	40	<i>politiventris</i> (Cushman)-----	37
<i>cookii</i> (Ashmead)-----	80	<i>politum</i> (Ashmead)-----	42
<i>curtus</i> (Provancher)-----	48	<i>politus</i> (Provancher)-----	47
<i>cushmani</i> Muesebeck-----	29	<i>psilocorsi</i> Viereck-----	40
<i>diversicolor</i> (Viereck)-----	27	<i>punctatus</i> Muesebeck-----	24
<i>dorsator</i> (Say)-----	31	<i>pygmaeus</i> (Provancher)-----	38
<i>erucarum</i> (Cushman)-----	27	<i>pyralidiphagus</i> Muesebeck-----	34
<i>euurae</i> (Ashmead)-----	43	<i>quinnipiacorum</i> Viereck-----	24
<i>fungicola</i> (Ashmead)-----	67	<i>rhyssemati</i> (Ashmead)-----	80
<i>furtivus</i> (Fyles)-----	67	<i>rudbeckiae</i> Muesebeck-----	45
<i>gastroideae</i> (Ashmead)-----	35	<i>rufomarginatus</i> (Ashmead)-----	81
<i>gelechia</i> (Ashmead)-----	26	<i>sanninoideae</i> Gahan-----	70
<i>geraei</i> Muesebeck-----	74	<i>scantleorum</i> Viereck-----	33
<i>hebetor</i> (Say)-----	31	<i>sebequanash</i> Viereck-----	37
<i>hemimeneae</i> Rohwer-----	61	<i>sesiae</i> Muesebeck-----	53
<i>hobomok</i> Viereck-----	71	<i>sphenophori</i> Muesebeck-----	25
<i>hopkinsi</i> (Viereck)-----	30	<i>sulcifrons</i> (Ashmead)-----	78
<i>hyslopi</i> Viereck-----	49	<i>tachypteri</i> Muesebeck-----	68
<i>johannseni</i> (Viereck)-----	26	<i>tenuceps</i> Muesebeck-----	46
<i>juglandis</i> (Ashmead)-----	31	<i>tetralophae</i> (Viereck)-----	26
<i>junci</i> (Ashmead)-----	38	<i>thurberiphagae</i> Muesebeck-----	54
<i>juncicola</i> (Ashmead)-----	37	<i>tortricicola</i> (Ashmead)-----	69
<i>kansensis</i> (Viereck)-----	38	<i>trifolii</i> (Ashmead)-----	38
<i>konkapoti</i> Viereck-----	79	<i>tychii</i> Muesebeck-----	51
<i>laemosacci</i> Muesebeck-----	56	<i>uncas</i> Viereck-----	43
<i>liri</i> (Ashmead)-----	75	<i>variabilis</i> (Cushman)-----	29
<i>lutus</i> (Provancher)-----	75	<i>variabilis</i> (Provancher)-----	69
<i>mali</i> (Viereck)-----	30	<i>vernoniae</i> (Ashmead)-----	65
<i>massasoit</i> Viereck-----	38	<i>wawequa</i> Viereck-----	78
<i>melanaspis</i> (Ashmead)-----	36	<i>xanthonotus</i> (Ashmead)-----	30
<i>mellitor</i> (Say)-----	65	<i>xanthostigmus</i> (Cresson)-----	65
<i>meromyzae</i> (Gahan)-----	41		