

DESCRIPTIONS OF THIRTEEN NEW AMERICAN AND ASIATIC ICHNEUMON-FLIES, WITH TAXONOMIC NOTES

By R. A. CUSHMAN

Entomologist, Bureau of Entomology, United States Department of Agriculture

This paper includes the descriptions of 13 new species of ichneumon-flies of the families Ichneumonidae and Braconidae from North and South America, China, and Korea, together with a few taxonomic notes.

Family ICHNEUMONIDAE

ECTOPIMORPHA LUPERINAE, new species

Similar in form to *E. anceps* (Cresson), but with the abdomen less strongly compressed and less attenuate at apex and differing in many other respects, as will appear in the following description. It may be even more closely related to *Amblyteles hiulcus* Cresson, which is unknown to me, but from the description the present species differs in having the black of tergites 3 to 5 apical instead of basal and the apex of the abdomen black instead of ferruginous.

Female.—Length, 12 mm. Head very minutely alutaceous, opaque, and punctate; frons transversely convex and densely punctate above, with short, shallow, polished scrobes below; temples sparsely, finely punctate, convexly convergent, length about equal to short diameter of eye; postocellar line a little longer than ocell-ocular line and nearly twice the diameter of an ocellus; eyes divergent below; face twice as broad as long, coarsely but not densely punctate, more sparsely so and more shining medially; clypeus sculptured like middle of face, barely two-thirds as broad as width of face at antennal foramina, squarely truncate at apex; labrum exposed and very broadly rounded; mouth hardly as broad as face at lower margin of eyes; malar space fully one and two-thirds times as long as basal width of mandible; antennae slender, involute, tapering at apex, apparently about two-thirds as long as body, flagellum 47-jointed (45 to 49 in female paratypes; *anceps* averages about 9 less). Thorax sculptured like the head; pronotum rather densely, finely punctate above, striate posteriorly below; mesoscutum densely, finely punctate anteriorly, less finely and densely so posteriorly, notauli faint; scutellum polished, sparsely punctate; mesopleurum and metapleurum with rather coarse, well-separated punctures, speculum very small, polished; propodeum alutaceous, punctate above, rugulose-punctate laterally, transversely

rugulose behind apical carina; areola impunctate, longer than broad, with costulae not far behind middle; spiracles slitlike, close to lateral carina. Abdomen very finely alutaceous, opaque, impunctate; postpetiole medially, and second tergite basally, faintly, longitudinally striate; gastrocoeli obsolete; compression of abdomen beginning on fourth segment; apical two tergites abruptly shorter than preceding; sheath projecting, hardly three times as long as broad.

Ferruginous; occiput medially, thoracic sutures, propleura largely, apices of hind femur and tibia and their tarsi, apical margins of tergites 2 to 5 and tergites 6 and 7 entirely, black to piceous; subalar tubercle and scutellum yellowish; antennae ferruginous, apices black; wings hyaline, faintly yellowish, stigma pale, veins black.

Male.—Differs from female principally as follows: Ocelli slightly larger; eyes parallel within; face narrower; malar space distinctly shorter than basal width of mandible; antennae very slender, not involute; metapleurum longitudinally rugulose below; propodeum more shining, more or less rugulose above; abdomen finely punctate beyond first tergite; gastrocoeli more distinct, transverse, at about basal fourth of tergite, with a strong carina running to base of tergite; abdomen only very faintly compressed apically, tergites gradually shorter, seventh abruptly shorter.

Head black; face and under side of antennae yellowish, frontal and lower posterior orbits reddish; thorax black, prescutum largely, lateral lobes anteriorly, and a spot in middle of mesopleurum, ferruginous; scutellum, humeral angle of pronotum, subalar tubercle, and propodeum except base, yellowish; front and middle legs testaceous, their coxae and trochanters yellow; hind coxa yellow above and at apex below, otherwise black, trochanters, base of femur, tibia except apex and tarsus reddish to yellowish, femur otherwise and apex of tibia black; abdomen paler than in female with first tergite black at base and apex.

Host.—*Luperina stipata* Morrison.

Type.—U.S.N.M. No. 42894, from Ames, Iowa.

Nine females and six males from the type locality, the type, allotype, and a paratype male reared from the type host by George Hendrickson on July 25, 1929, the others reared by G. C. Decker under Iowa Experiment Station No. 30. Also one female labeled Prince Albert, June 24, 1913.

Genus PHOTOCRYPTUS Viereck

Photocryptus VIERECK, Proc. U. S. Nat. Mus., vol. 46, p. 379, 1913.

Structurally this genus is closely allied to *Acroricnus* Ratzeburg, and rearing records show it to be biologically related as well, both being parasitic on wasps that use mud for their nests, such as *Eumenes* and *Sceliphron*.

Photocryptus is probably at most subgenerically distinct from *Acroricnus*, but on the basis of the few species of each genus before me they differ constantly by the following characters:

PHOTOCRYPTUS

Nervellus broken distinctly below middle and perpendicular.
 Areolet with second intercubitus nearly perpendicular, first intercubitus strongly reclivous.
 Antennae in female nearly as long as body, very slender throughout.
 Occiput broad, the temples correspondingly narrow.
 Eyes parallel within, not emarginate.
 Frons impressed medially, tumid at sides.
 Vertex impressed between eyes and ocelli.
 Clypeus very short and broad, malar space short.
 Notauli deep and distinct nearly to scutellar fovea.
 Mesopleurum less densely and somewhat more finely punctate than mesoscutum.
 Propodeum with apical carina obsolete, the petiolar area coarsely, transversely rugose.
 Metapleurum with a strong carina running obliquely from ventral margin to upper side of coxal cavity.

ACRORICNUS

Nervellus broken above middle and reclivous.
 Areolet with second intercubitus strongly inclivous, first intercubitus nearly perpendicular.
 Antennae in female much shorter than body, distinctly thickened toward apex.
 Occiput narrow, temples broader.
 Eyes convergent below and weakly emarginate opposite antennae.
 Frons nearly flat.
 Vertex at most weakly impressed between eyes and ocelli.
 Clypeus not especially short, malar space long.
 Notauli much weaker posteriorly and usually fading out near middle of mesoscutum.
 Mesopleurum more densely and coarsely sculptured than mesoscutum, the former more or less rugose.
 Propodeum with apical carina distinct, the petiolar area at most finely rugose.
 Metapleurum with only a short stub of such a carina.

PHOTOCRYPTUS PACHYMENAE (Cresson) (new combination)

Cryptanura ? pachymenae CRESSON, Proc. Acad. Nat. Sci. Philadelphia, p. 168, 1873.

In addition to a female cotype, the National Museum collection contains seven other females and six males as follows: A female from the C. F. Baker collection from Mexico; four males from San Rafael, Jicoltepec, Mexico; one female from Carillo, Costa Rica (William Schaus); one male from San Antonio, Nicaragua; one female reared by J. Zetek from nest of *Sceliphron fistularae* on Barro Colorado Island, Panama Canal Zone; one of each sex from the same locality, reared by Phil Rau, but the host not given; one female from Cano Saddle, Gatun Lake, Panama (R. C. Shannon), May, 1923; one female from Cabima, Panama (August Busck), May 20, 1911; and one female from Kalacoon, British Guiana (P. G. Howes).

This species is very closely related to the genotype, *photomorphus* Viereck, but can be immediately distinguished by the confluence of the black markings of the frons and occiput with the resulting disappearance of the conspicuous, transverse, yellow stripe behind the ocelli. In the present species, this black marking reaches the eyes, which it does not do in *photomorphus*. The second tergite is less distinctly reddish at base and has a distinct, black band across the middle, while the black of the third tergite is more distinctly removed from the base than in *photomorphus*. In the male, the abdomen is usually without black markings, but one specimen has them. The genotype appears to be no more than a variety of *pachymenae*.

Cryptanura is known to me only from Brullé's description, but *pachymenae* certainly does not belong there if only for its large anteriorly convergent areolet, this cell in *Cryptanura* being small and parallel sided as in *Polycyrtus*.

PHOTOCRYPTUS ATER, new species

Very distinct from the other two species referred to the genus by its largely black color.

Female.—Length, 8 mm.; antennae, 7 mm.; ovipositor sheath, 4 mm. Eyes very large, in front view each occupying more than one-third the width of the head; face very slightly narrower than frons; face and clypeus minutely shagreened and sparsely, weakly punctate; clypeus slightly more than twice as broad as long; malar space nearly obliterated; pronotum smooth and polished laterally, with strong rugosities in the lower angle; mesoscutum coarsely, closely punctate, scutellum sparsely so; pleura more sparsely and more finely punctate, polished; propodeum punctate before basal carina, coarsely, transversely rugose behind; inner hind calcarium nearly twice as long as outer and nearly three-fourths as long as basitarsus; abdomen slender; first tergite with postpetiole very little broader than petiole; second nearly four times as long as broad at base.

Black with the following white markings: Face, clypeus, mouth parts, cheeks, orbits, except at top of eyes behind, scape and pedicel, propleura, pronotum anteriorly, tegulae, subalar tubercle, median spot on mesoscutum, scutellum transversely at base, upper division of metapleurum and a spot at apex of lower division, a median spot and two lateral apical spots on propodeum, front and middle legs (except a black streak on posterior face of femora, the middle tarsi, and the apical joint of front tarsus), spot on upper face of hind coxae, proximal joint of hind trochanter largely, base of tibia, second to fourth joints of hind tarsus with more or less of first and fifth, first and second tergites basally and apically and others nar-

rowly at apex; wings hyaline, with an infumate spot at apex, venation black; flagellum brownish basally.

Male.—Like female but the white of the orbits is somewhat less extensive, the scutellum is white only at the sides, the white markings of the mesoscutum and propodeum are absent, the hind tarsus is black with only the under side of the fourth joint and apices of the others white, and the third tergite is white at both base and apex, while the tergites beyond are entirely black.

Type.—U.S.N.M. No. 42895, from Barro Colorado Island, Panama Canal Zone.

One specimen of each sex reared (host not given) by Phil Rau, the female under his No. 7754 and the male under No. 7815.

CALLIEPHIALTES NUCICOLA, new species

Female.—Length, 8 mm.; antennae, 5 mm.; ovipositor, 8 mm. Head polished, sparsely punctate, punctures on face coarser, face three-fourths as long as broad, roundly elevated medially; temples convexly receding. Thorax twice as long as deep and finely punctate; propodeum sparsely, more coarsely punctate, medially and apically impunctate, without median carinae, not medially impressed; nervellus broken a little above middle, perpendicular; areolet elongate; legs rather stout, third and fifth joints of hind tarsus equal. Abdomen narrow; first and second tergites longer than broad at their junction, first distinctly shorter than second; third and fourth quadrate, others transverse; punctation rather coarse and well-separated; tubercles distinct, more sparsely punctate; ovipositor sheath slightly longer than body.

Black; palpi, tegulae, short humeral line, front trochanters, apical joint of middle trochanter, and a line on upper side of each tibia from base nearly to apex, white; hind tibia below and at apex, and apices of tarsal joints, reddish fuscous, the tarsi generally paler fuscous; legs otherwise reddish testaceous; wings hyaline, veins black, stigma brown, base and apex pale, as are also the costa and metacarpus; abdomen brownish, paler laterally toward apex, first and last tergites and apical margins of second to fifth, especially laterally, black.

Male.—Face nearly as broad as long; abdomen more slender, first tergite nearly as long as second; under side of scape and pedicel white; front and middle legs white except posterior side of femora; hind trochanter white, abdomen more nearly uniformly colored.

Type host.—*Carpocapsa pomonella* (Linnaeus).

Type.—U.S.N.M. No. 42896, from Saticoy, Calif.

Described from 13 females and 16 males, 8 of the females and all the males, including the type and allotype, reared by S. E. Flanders and R. E. Barrett from the codling moth in green walnuts at the

type locality; one female reared by C. T. Dodd from an acorn of California white oak (*Quercus lobata*) at Walnut Creek, Calif.; one female (Hopkins U. S. No. 15637² reared by L. H. Weld from *Quercus* sp. at Las Vegas, N. Mex.; one female (Hopkins U. S. No. 14215f) reared by J. M. Miller from the gall of *Cynips maculipennis* Gillette at Ashland, Oreg.; one female (Bureau of Entomology No. 168^o) reared from *Walshia amorphella* Clemens, Alameda County, Calif.; and one female from Menlo Park, Calif., F. Hornung.

There is great variation in size, the largest female being 12 mm. long and the smallest male less than 4 mm.

CALLIEPHIALTES BENEFACITOR, new species

Very similar in form to *nucicola*, but differing from the description of that species as follows:

Female.—Length, 9 mm.; antennae, 7 mm.; ovipositor, 12 mm. Head more distinctly punctate, face rather densely so; face hardly two-thirds as long as broad; temples very narrow, convex. Thorax distinctly punctate, mesoscutum rather densely so, propodeum densely and more coarsely punctate, carinae represented by parallel ridges flanking a longitudinal groove; nervellus reclivous, broken distinctly above middle. Abdomen narrow, only second tergite distinctly longer than broad at base, first and third to fifth as broad as long, punctuation dense, tubercles rather low and hardly less densely punctate; ovipositor distinctly longer than body.

Black; scutellum piceous red; hind tibia fuscous above, pale below; hind tarsus except extreme base entirely fuscous; legs otherwise much as in *nucicola*, but dorsal stripes of middle and front tibiae less distinct; wings as in *nucicola*.

Male.—Face fully two-thirds as long as broad, densely punctate and with short, dense pile; abdomen only slightly more slender than in female; genitalia very long and slender.

Scape and pedicel white in front; lateral lobes of mesoscutum, subalar tubercle, and lower mesopleurum, piceous red; front and middle legs, except posterior side of femora and upper side of middle coxa, white; hind trochanter also largely white.

Host.—*Grapholitha molesta* Busck.

Type.—U.S.N.M. No. 42897, from Burlington, N. J.

Twenty-three females and 17 males, all reared from the oriental fruit moth; 14 females and 10 males from the type locality; 1 male from Hopewell, N. J.; 4 females and 3 males from Harrisburg, Pa.; 3 females and 2 males from Chambersburg, Pa.; 1 of each sex from Manchester, Pa.; and 1 female from Stewartstown, Pa.

The only striking variation is in the color of the thorax in the male. The allotype displays about the average color, some specimens having the red much brighter and embracing the entire mesosternum,

and others having the thorax entirely black except the scutellum and faint indications of red on subalar tubercles and before middle coxae. The scutellum in the female is sometimes virtually black.

Known only from New Jersey and Pennsylvania and only as a parasite of an introduced insect, this species may possibly have been introduced with its host, but I have been unable to identify it as any of the described Japanese or European species of *Ephialtes* or *Pimpla*.

EIPHOSOMA AZTECUM Cresson

Both Brues¹ and Cockerell² misplaced this species in their keys among those species with lateral black markings on the propodeum. The "spot on the flanks" of Cresson's description is on the mesopleurum, and the "lateral stripes on mesothorax" are those on the lateral lobes of the mesoscutum. In both of the above keys, a cotype of *aztecum* in the National Museum collection runs to *septentrionale* Brues, from which its polished and impunctate (except on mesoscutum) thorax and propodeum, entirely red hind femur, and longer malar space will serve to distinguish it.

EIPHOSOMA PARAGUAIENSE, new species

Runs in both Brues's and Cockerell's keys to the last couplet, but agrees with neither alternate. From *aztecum* Cresson, which, as pointed out elsewhere, is misplaced in both keys, it differs in having the lateral black markings on the propodeum and in the extensive black coloration of the hind femur. From *atrovittatum* Cresson it differs in its black hind tibia and tarsus; and from *forte* Cockerell, in its much smaller size and hyaline wings. From all three it differs in its lack of the areolet.

Female.—Length, 11 mm.; antennae, 9 mm.; ovipositor, 5 mm. Face coarsely punctate, clypeus more sparsely so, both somewhat elevated; frons transversely striate; temples shagreened; malar space barely half as long as basal width of mandible and narrower than cheek; lower portion of occipital carina and especially lower margin of mandible strongly elevated and flangelike; eyes very large and bulging slightly beyond the general contour of the head; antennae slender, basal joint of flagellum fully six times as long as thick. Thorax shining, mesoscutum, mesosternum, and lower pleurum sparsely punctate; propodeum without longitudinal carinae but strongly separated from the metapleurum, obscurely, transversely striate, more distinctly so in the broad, shallow, median impression; areolet wanting; postnervulus broken slightly above upper third; nervulus interstitial; abscissula curved, strongly oblique to metacarpella and hardly half as long as intercubitella; nervellus slightly inclivous.

¹ Psyche, vol. 18, p. 21, 1911.

² Proc. U. S. Nat. Mus., vol. 46, no. 2010, p. 61, 1913.

Abdomen of normal form; second tergite distinctly longer than first, third half as long as second, fourth and fifth equal and somewhat longer than second, sixth shorter than second; ovipositor barely more than a third as long as abdomen.

Head and thorax yellow with black markings as follows: Vertex, middle of frons, upper occiput, and upper posterior orbits; antennae except scape and pedicel; a broad stripe on each lobe of mesoscutum confluent behind with the prescutellar spot, the lateral ones reaching the lateral margin of the mesoscutum; oblique impression of mesopleurum; lateral area of scutellum and its apex; postscutellum; band in basal constriction of propodeum and metapleura, and three broad stripes on propodeum confluent with basal band; a large, irregular spot nearly encircling the hind coxa at base; trochanter and trochantella largely; basal and subapical diffused bands on hind femur; hind tibia, except reddish stain below, and hind tarsus; all coxae and trochanters, except as noted, and apices of femora yellow; front and middle legs otherwise testaceous; middle of hind femur rufo-piceous; wings hyaline, apices clouded. Abdomen ferruginous with petiole stramineous and a black to piceous, median stripe extending from postpetiole to apex.

Type.—U.S.N.M. No. 42898, from San Bernadino, Paraguay. .
One female (K. Fiebrig).

EIPHOSOMA SEPTENTRIONALE Brues

In the original descriptions of this species, Brues states that the palpi are 4-jointed without specifying to which palpi he refers and also that the sixth tergite is *as long* as the second. If the maxillary palpi have only four joints, this is abnormal; and it seems most probable that the statement in regard to the sixth tergite must be due to the omission of a word, such as "half" or "one-third."

EIPHOSOMA BATATAE, new species

In Cockerell's key³ runs to couplet 5, where in size it agrees somewhat better with *septentrionale* Brues than with *mexicanum* Cresson, although the infuscation at the apices of the wings is barely discernible. In *mexicanum*, the eyes are extremely large even for the genus and bulge all around beyond the general contour of the head, which is true neither of the present species nor of *septentrionale*.

Female.—Length, 15 mm.; antennae, 7 mm.; ovipositor, 5.5 mm. Head shining, coarsely punctate, sides of face and clypeus more sparsely so; temples shagreened, impunctate; vertex not shagreened; middle of face and clypeus somewhat elevated; eyes large but not conspicuously bulging; malar space two-thirds as long as basal width of mandible, broader than cheek; lower end of occipital carina and

³ Proc. U. S. Nat. Mus., vol. 46, no. 2010, p. 61, 1913.

margin of mandible high and flangelike; antennae slender, basal flagellar joint about six times as long as thick. Thorax shining; pronotum, scutellum, and oblique impression of mesopleurum polished; mesoscutum coarsely punctate, lower mesopleurum and sternum less distinctly punctate, metapleurum virtually impunctate; propodeum with only the two transverse carinae, separated from metapleura by carinae, medially impressed and transversely striate, laterally polished; areolet present, narrow and strongly petiolate; nervulus interstitial, base of second discoidal cell less than half as wide as apex of brachial; abscissula slightly oblique to metacarpella, about half as long as intercubitella; nervellus nearly perpendicular. Abdomen of normal slenderness, second tergite longer than first, third somewhat less than half as long as second, fourth and fifth subequal and somewhat longer than third, sixth subequal to third; ovipositor half as long as abdomen.

Head and thorax yellow with black markings as follows: Middle of frons and vertex, upper portion of occiput, and upper posterior orbits; broad stripes on three lobes of mesoscutum, the lateral ones confluent with the triangular prescutellar spot; oblique mesopleural impression; lateral portion and apex of scutellum, postscutellum, and band in constriction at base of propodeum and metapleura; median band on propodeum; spots on dorsolateral and inner faces of hind coxae, hind trochanter entirely and trochantella dorsally, femur except whitish apex and reddish band in middle, tibia except reddish stain below, and tarsi; front and middle coxae and femora pale testaceous, these legs otherwise stramineous; hind coxae and trochantella below stramineous; abdomen ferruginous; first tergite largely black, the petiole stramineous except at base and a black line on each side; other tergites more or less black on dorsal line.

Male.—Essentially like female.

Host.—Lepidopteron on sweetpotato.

Type.—U.S.N.M. No. 42899, from Bahia, Brazil.

Described from one specimen of each sex reared by G. Bondar.

Family BRACONIDAE

Genus CAPITONIUS Brullé

Aulacodes Cresson is synonymized in Dalla Torre's catalogue with *Cenocoelius* with which *Capitonius* is also synonymized. But Viereck, in his genotype list, questioned the synonymy of *Aulacodes* and *Capitonius*.

A series of eight females and three males undoubtedly referable to *Aulacodes nigriventris* Cresson received from the Tropical Plant Research Foundation makes certain the synonymy of *Aulacodes* with *Capitonius*.

Cresson says that his specimen had "about 24" antennal joints, while all the present series that have complete antennae have 27 joints. This is the only apparent difference between these specimens and the original description. Cresson also states that in *Capitonius* the antennae have only about half the number of joints. This is, of course, not the case, and is due to Cresson's failure to observe that Brullé stated that the antennae of his specimen were broken off at the eleventh joint.

HELCONIDEA NECYDALIDIS, new species

Very closely related to *frigidus* (Cresson) and possibly within the range of variation of that species, but differing from a homotype (Rohwer) of that species in the National Museum in its broader temples, broader abdomen, and shorter ovipositor.

Female.—Length, 10 mm. Head behind eyes as broad as at apex, the temples strongly convex, vertex and temples except medially strongly punctate; frons less deeply concave than in *frigidus*, the bounding ridges less strongly elevated just above antennae; eyes slightly divergent below; face coarsely and roughly rugose, especially medially where the ridges are subparallel and form several longitudinal grooves, the middle one of which comes to an acute point at the base of the frontal keel; malar space three-fifths as long as eye, the furrow broad and coarsely foveolate; clypeus little more than half as long as face and only about a third as long as broad; antennae about two-thirds as long as body, slender, basal joint of flagellum three times as long as thick. Pronotum very coarsely striate in impression, humeral angle polished and sparsely, finely punctate; mesoscutum polished, prescutum sparsely punctate, notauli coarsely foveolate; scutellum polished, sparsely finely punctate, fovea and lateral areas coarsely striate-foveolate; mesopleurum polished in middle and in humeral angle, the furrow between coarsely rugose, sternauli very coarsely foveolate; metapleurum very coarsely reticulate-rugose throughout; propodeum very coarsely reticulate with finer reticulations within the larger areas, medially with a more or less well-defined longitudinal area that comes to an acute angle basally; femoral tooth subacute. Abdomen polished, first tergite more or less distinctly rugose; second tergite barely as long as broad; sheath distinctly shorter than body.

Black, with legs and abdomen ferruginous; scape, clypeus, and mandibles ferruginous; palpi infusate stramineous; tarsi paler than tibiae, hind tibia blackish, especially above; wings dilutely infumate, venation black; abdomen with venter and extreme apex black.

Male.—Essentially like female. Antennae fully as long as body.

Host.—*Necydalis laevicollis* LeConte.

Type.—U.S.N.M. No. 42900, from Mount Douglas, Vancouver Island, British Columbia.

Described from two females and one male received from the Provincial Museum of British Columbia and reared November 22, 1925, by G. A. Hardy. The female paratype is returned to the Provincial Museum of British Columbia.

CHELONUS (CHELONELLA) PECTINOPHORAE, new species

Very similar to *busseyi* Viereck, but differs constantly, so far as the available material goes, in several details of structure.

Female.—Length, 3 mm.; antennae, 2 mm. Head from above broadly transverse, temples strongly convex, occiput rather shallowly excavated, the arc of its curvature hardly a quarter circle; vertex behind ocelli, temples, cheeks, and sides of frons minutely striate, opaque; frons medially subopaque, weakly impressed; eyes parallel within, about three-fourths as long as width of face; face minutely granularly opaque; clypeus more shining than face, minutely punctate; malar space much longer than basal width of mandible; antennae 16-jointed, only slightly thickened beyond middle, all flagellar joints longer than thick but the subapical ones only slightly so. Thorax robust; pronotum reticulate-rugose; mesoscutum shining, finely reticulate-punctate, prescutum medially and the notauli carinate, area in front of scutellum reticulate-rugose, the longitudinal rugae very irregular and only a little stronger than transverse rugae; scutellum subpolished, more or less rugose around margins, lateral areas foveolate with a broad polished margin; metanotum in the form of a broad, foveolate groove, pleura reticulate-rugose; propodeum very coarsely reticulate-rugose above, more finely so behind, the basal middle somewhat elevated, apophyses very small; basal abscissa of radius shorter than second, strongly curved and joining the second at a distinct angle. Carapace rather narrow, nearly two and a half times as long as broad, broadest near apex, densely pilose apically, longitudinally rugose, the rugosity becoming reticulate toward apex, at middle with about 18 rugae, basal carinae strong, converging posteriorly, extending on to the horizontal surface and setting off a more finely striate basal area; ovipositor not surpassing apex of carapace, very slender.

Black with basal two-fifths of abdomen, except basal area, white; scape ferruginous; palpi pale testaceous; hind legs black, apex of coxa and trochanters pale testaceous, broad annulus on tibia and tarsal joints except apices whitish; middle legs piceous and front legs largely ferruginous with same pattern as hind leg; wings hyaline with a pale fuscous cloud below stigma, stigma and veins dark brown with basal vein, base of stigma, bases of longitudinal veins, entire submedius, and all veins in hind wing whitish.

Male.—Antennae nearly as long as body, slender, 24-jointed; apical incision of carapace broadly transverse, about four times

as broad as high; all veins in front wing except at base dark, in hind wing somewhat darker than in female. Otherwise like female.

Host.—*Pectinophora gossypiella* (Saunders).

Type.—U.S.N.M. No. 42901, from Mokpo, Korea.

Two females and two males reared by T. Kambe in 1928.

These are from the same source as three males that appear to differ from the allotype only in the entire or practically entire lack of white at the base of the abdomen. These are not included in the type series, although I believe they are of the same species.

In *busseyi* Viereck the occiput is more deeply impressed, with the arc of its curvature fully a quarter circle, eyes slightly convergent below; rugose area of mesoscutum with longitudinal rugae much stronger and nearly regular; scutellum rugose except narrowly in middle; carapace more coarsely, longitudinally rugose, in middle with about 16 rugae; front and middle legs darker than in *pectinophorae*, even the front femora largely piceous.

Genus FORNICIA Brullé

Fornicia BRULLÉ, Hist. Nat. Ins. Hym., vol. 4, p. 511, pl. 44, fig. 3, 1846.

Odontofornica ENDERLEIN, Ent. Mitteil., vol. 1, p. 260, 1912.

Fornicia WILKINSON, Bull. Ent. Research, vol. 19, pp. 261-265, 1928.

Fornicia CUSHMAN, Philippine Journ. Sci., vol. 40, pp. 234-237, 1929.

Odontofornica CUSHMAN, Philippine Journ. Sci., vol. 40, pp. 234-237, 1929.

When I wrote the paper cited above, I had not seen Wilkinson's paper in which *Odontofornica* is synonymized, nor had I seen an American specimen of this genus, and, though I expressed some doubt of the distinctness of *Odontofornica*, I was content to let it stand.

Before the appearance in print of my paper, however, I had become convinced that the characters employed by Enderlein for distinguishing his genus from *Fornicia* are purely specific and that the two genera are identical. The reason for this conclusion is the receipt of a specimen, with the supposed generic characters of *Odontofornica*, captured in Costa Rica by F. Nevermann. This specimen is described below as a new species.

FORNICIA PILOSA, new species

Female.—Length, 5 mm.; antennae, 5.5 mm. Clothed with long white pile that is especially dense on temples, sides of scutellum, and metapleurum.

Face shining, with minute piliferous punctures; temples more densely punctate and pilose; vertex with few hairs; temples strongly sloping, straight; pronotum medially convex, densely punctate, and pilose, not produced at sides; mesoscutum obscurely punctate, more or less rugose in positions of the notauli, median carina low and fine; scutellum rugulose-punctate, roundly emarginate at apex; post-

scutellum spinose; mesopleurum finely punctate and pilose, posteriorly polished and glabrous; metapleurum coarsely rugose; propodeum with five well-defined basal and four apical areas, the apical slope polished on each side of median carina, otherwise coarsely reticulate-rugose; hind coxae very large, reaching three-fourths the length of the abdomen; inner calcarium reaching beyond middle of basitarsus; abdomen very coarsely reticulate-rugose, the areas more or less distinctly arranged in longitudinal rows, especially on middle of carapace, the median carina, which is very strong on the first tergite, becoming broken into a row of small reticulations on the second tergite; carapace shallowly emarginate at apex; ovipositor hardly exerted.

Black; antennae basally, labrum and mandibles apically, pale brownish; front femur apically and tibia and tarsus except apical joint brownish testaceous, as are also the middle tibia at apex and joints 2 to 3 of middle tarsus; all tibiae basally and all calcaria white; wings hyaline, more or less infumate along veins, venation blackish, stigma pale at base and apex.

Type.—U.S.N.M. No. 42902, from Hamburg Farm, Costa Rica.

One specimen captured by F. Nevermann, January 22, 1926.

VIPIO CHINENSIS, new species

In Marshall's,⁴ Kokujew's,⁵ and Fahringer's⁶ keys to species of *Vipio*, this species runs to *formidabilis* Marshall, but is distinct at once by its determinately black hind femora.

Female.—Length, 10 mm.; antennae, 7 mm.; ovipositor, 25 mm. Head transverse, polished; temples convexly sloping; face and malar space minutely punctate, latter hardly as long as basal width of mandible; clypeus with a fringe of long black hairs at base, "mouth opening" fully a half wider than its distance from eye; mandibles with group of long black hairs at base; maxillae forming a short, thick proboscis; antennae thick, filiform, flagellum slightly compressed at base, all joints except first thicker than long, those beyond middle nearly twice as thick as long. Thorax about twice as long as deep, polished, notauli broadly impressed; metapleurum and propodeum sparsely punctate, latter with a broad median groove in which is a strong carina; metacarpus little longer than stigma; basal abscissa of radius less than half as long as first intercubitus, second intercubitus much longer than first and sinuate; nervulus interstitial; legs stout, femora and hind coxae distinctly, sparsely punctate; basal joint of hind tarsus as long as combined second and third joints, fifth hardly as long as third. Abdomen slender; first and second segments longer than broad at their intersection, third as broad as

⁴ André: Spec. Hym. Europe-Algérie, vol. 5 bis, p. 30, 1897.

⁵ Hor. Soc. Ent. Rossicae, vol. 32, p. 345, 1899.

⁶ Opuscula Braconologica, Bd. 1, Lief. 2-3, p. 61, 1926.

long, others transverse; middle area of first tergite rugose-punctate, the bounding grooves obsoletely foveolate; second tergite medially roughly rugose, laterally polished with uneven punctation, gastrocoeli polished, triangular, with a carina extending posteriorly in an impression that terminates in an oval pit; third tergite broadly, arcuately emarginate apically, oblique furrows confluent near base, middle area punctate basally, surface otherwise polished, suture and furrows foveolate; fourth tergite polished with a few punctures in basal middle and with an arcuate, foveolate, transverse groove near base; other tergites polished; hypopygium extending far beyond apex.

Ferruginous; antennae, stemmaticum, maxillae, apices of joints of palpi, mesosternum, coxae, trochanters, and mid and hind femora, black; mid and hind tibiae rufous, their apices and the tarsi blackish; wings black, base of stigma yellow, hyaline streaks below stigma and along second intercubitus; tegulae ferruginous.

Male.—Malar space and space between "mouth opening" and eye shorter; abdomen a little broader relatively and more roughly sculptured, even the fourth tergite being more or less sculptured over most of its surface. Otherwise much like female.

Type.—U.S.N.M. No. 42903, from Tsinan Sung, China.

One female and three males collected June 11, 1929, by Arthur Jacot.

ATANYCOLUS ANOCOMIDIS, new species

Related to (*Bracon*) *Atanycolus simplex* (Cresson) but differing from that species in many respects, especially in color pattern, as will appear from the following description:

Female.—Length, 10 mm.; antennae, 9 mm.; ovipositor, 12 mm. Smooth and polished without sculpture except minute punctation at sides of frons and face. Head behind eyes slightly narrower than at eyes, temples apparently a little longer than short diameter of eye; frontal scrobes deep, the frons on either side distinctly swollen; eyes nearly circular, about two-thirds as long as width of face at top; clypeus transversely impressed, carina outlining its base distinct only medially; "mouth-opening" little more than half as broad as its distance from eye margin; malar space a little more than half as long as eye; scape distinctly less than half as long as thick. Thorax not at all depressed, fully as deep as broad; notauli distinct; legs moderately stout, hind femur a little more than three times as long as thick. Abdomen rather narrow; first tergite much narrower at apex than long beyond spiracles, the sides parallel, with carina from spiracle at apex running very close to margin of median triangular area, the groove outlining the median area only weakly foveolate; second tergite with embossed area distinctly narrower than half length of tergite, the defining grooves weakly foveolate, lateral

grooves weak; connate suture foveolate only medially; third tergite with only faint indications of embossed area and lateral grooves.

Ferruginous with black as follows: A large roundish spot covering middle of vertex, frons except narrow orbits, face immediately below antennae, very narrow posterior orbits, antennae, palpi, mandibles largely, maxillae, propleura, more or less of anterior lateral margin of pronotum, mesoscutum except middle of posterior margin, tegulae, most of lateral areas of scutellum and postscutellum, mesosternum, apex of metapleurum, legs, and ovipositor sheath; wings blackish, venation black; trochanters more or less piceous, apices of tarsal points more or less reddish.

Male.—Eyes much larger, distinctly longer than width of face, the short diameter longer than temple; malar space and distance from eye to "mouth-opening" correspondingly reduced; lateral furrows of second tergite and embossed area of third somewhat more distinct.

Head black except frontal orbits and more or less of posterior orbits; thorax black, pronotum more or less reddish laterally, scutellum at apex and laterally yellowish, the color extending on mesoscutum as far as tegulae; mesopleurum below and mesosternum more or less yellowish.

Host.—*Anocomis lignea* Fabricius.

Type.—U.S.N.M. No. 42904, from Tod Inlet, Vancouver Island, British Columbia.

Five females and two males received from the Provincial Museum of British Columbia and reared in May, 1926, by G. A. Hardy.

In some of the females, there are additional blackish stains on the thorax, especially laterally on scutellum, anteriorly on mesopleurum, and around the propodeal spiracles.

In the allotype male, the red of the posterior orbits is confined to a narrow line behind the eye; in the paratype, it extends nearly the width of the temple; in the paratype, the red of the pronotum and the yellow of the mesopleurum and sternum are much more extensive than in the allotype.

A paratype of each sex is returned to the Provincial Museum of British Columbia.

MICROBRACON NIGRORUFUM, new species

Female.—Length, 3.5 mm.; antennae, 3 mm.; ovipositor, 1.5 mm. Entire body smooth, shining, and clothed with long, whitish pubescence; head from above transverse, temples convexly sloping, a little shorter from front to back than short diameter of eye; eye nearly as long as shortest width of face; "mouth-opening" slightly broader than its distance from eye and equal to length of malar space; flagellum rather stout, tapering toward apex, all joints a little longer than thick. Thorax robust, ovate; notauli distinct in

anterior two-thirds; pubescence of mesoscutum practically confined to notauli; scutellum large, with long, sparse pubescence; wings very densely pilose; stigma a little more than a third as broad as long; radius reaching margin distinctly before apex, its first abscissa a little more than a third as long as second; second cubital cell twice as long on radius as broad at apex. First tergite distinctly longer than broad, its sides beyond spiracles parallel, median area longer than broad; second tergite broadly emarginate in middle at apex, suture deep and narrow and not foveolate; third tergite longer than second, fourth shorter, fifth still shorter, ovipositor a little shorter than abdomen.

Head, including all appendages, thorax, and legs entirely coal black; wings uniformly infumate; abdomen pale ferruginous to yellowish with blackish stains at base of median area of first tergite and in middle of apical tergites.

Male.—Antennae as long as body; abdomen piceous medially, pale yellowish laterally, third tergite not longer than second.

Host.—*Pectinophora gossypiella* (Saunders).

Type.—U.S.N.M. No. 42905, from Mokpo, Korea.

Two specimens of each sex reared by T. Kambe in 1928.

The female paratype is smaller than the type; the abdomen is distorted so that the tergites have not the same proportions, and it has the middle even more extensively piceous than the male.

MICROBRACON ISOMERA, new species

Female.—Of the same size and form as *nigrorufum* and agreeing with nearly all the details of structure of that species as described above, but tergites 2 to 5 are nearly all equal in length, only the third being a little longer.

In color entirely different from *nigrorufum*, being very largely pale ferruginous with the legs pale testaceous with only the tarsi more or less blackish. Top and back of head and lateral lobes of mesoscutum black; prescutum, scutellum, and lower angle of pronotum stained with piceous, wings paler toward apex.

Male.—Head more extensively black; only the inner orbits, lower checks, and malar space reddish; propodeum and pleura also somewhat stained with piceous.

Host.—*Pectinophora gossypiella* (Saunders).

Type.—U.S.N.M. No. 42906, from Mokpo, Korea.

One specimen of each sex reared by T. Kambe in 1928.

This species may be only a color phase of *nigrorufum*, but the color difference is so great that with only the material described this appears impossible.