

## H. Sauter's Formosa Collection: *Ichneumonidae*.

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(With 17 Text-Figures.)

In two previously published papers by me<sup>1)</sup> and one by Uchida<sup>2)</sup> most of the *Ichneumonidae* collected on Formosa by Sauter have been discussed. In this paper a miscellaneous residue is described.

Unless otherwise stated, holotypes of new species are in the Deutsches Entomologisches Institut, Berlin-Dahlem, Germany.

The figures are by Mary F. Benson of the Bureau of Entomology and Plant Quarantine.

### *Pycnopyge bella* Cush.

*Pycnopyge bella* Cushman, Philippine Journ. Sci., **20**, 553, fig. 2, 1922.

One of each sex was taken at Kankau (Koshun).

The male has the pale markings smaller and the antennae cylindrical throughout and entirely black, but differs otherwise only sexually from the female.

### *Caenojoppa formosana* (Uchida), new combination

*Elasmognathias formosanus* Uchida, Ins. Matsumurana, **4**, 121, figs. a and b, 1930.

A series of 44 specimens, including both sexes, in the Sauter collection exhibits much variation in color. The black of the propodeum, metapleurum, and hind coxa is sometimes largely or entirely replaced by ferruginous. The cheeks are sometimes largely black and sometimes testaceous rather than, yellow, and the yellow of the posterior orbits is frequently virtually absent. The sixth tergite varies from largely yellow to very narrowly yellow-margined. The face in the female is sometimes black with only small yellow spots in the upper facial orbits, and sometimes the orbital spots occupy all but a narrow median line; the clypeus is usually entirely yellow, but sometimes has a triangular, median, black mark continuous with the black of the face. In the male the clypeus is entirely yellow and the face usually entirely so, but rarely is colored as in the female.

### *Caenojoppa cephalotes* (Ashm.)

*Elasmognathus cephalotes* Ashmead, Proc. U. S. Nat. Mus., **29**, no. 1424, p. 406, 1905.

<sup>1)</sup> Ent. Mitteil., **14**, 41—50, 1925; Insecta Matsumurana, **8**, 1—50, 1933.

<sup>2)</sup> Journ. Fac. Agr. Hokkaido Imp. Univ., **33**, 133—222, 1932.

*Elasmognathias cephalotes* Ashmead, Proc. Ent. Soc. Wash., **8**, 1905;

Cushman, Philippine, Journ. Sci., **20**, 561, 1922 (in Key).

*Cuenojoppa cephalotes* Heinrich, Mitt. Zool. Mus. Berlin, **20**, 125, 1934.

Two females and one male taken at Kankau (Koshun) are in the Sauter collection. The male lacks the supraorbital yellow spots but appears not to differ otherwise from Philippine specimens.

*Nesostenodontus formosanus*, new species

Differs from the generic description, based only on the genotype, *bakeri* Cush., in the very distinct malar space; the not anteriorly tumid humeral margin of pronotum; the distinctly, though not strongly, convex scutellum; and the distinct apical and median carinae of propodeum. Differs further from *bakeri* by many of the characters below.

Female. Length 7 mm.

Head polished, face and frons finely and rather densely punctate, clypeus sparsely so; malar space three-fourths as long as basal width of mandible; cheek fully three-fourths as broad as temple; eye distinctly shorter than width of face; diameter of an ocellus hardly half as long as ocellular line; antenna fully three-fourths as long as body.

Thorax shining, mesoscutum and mesopleurum rather finely and moderately densely punctate, prescutum very finely and densely so anteriorly; pronotum, scutellum, postscutellum, mesopleural elevations, metapleurum, and propodeum, the last only basally and laterally, polished and at most very sparsely punctate; humeral margin of pronotum tumid only posteriorly; propodeum with distinct median and apical carinae, petiolar and posterior lateral areas transversely rugose, areola as broad as long; hind coxa smooth and polished above; sparsely punctate below.

Abdomen narrowly fusiform; postpetiole only a little broader than petiole, spiracles beyond apical fourth of segment; postpetiole sparsely punctate, second tergite densely, confluent punctate basally, more sparsely punctate and polished apically, tergites 3—5 successively less distinctly punctate, others smooth.

Black, with whitish markings as follows: Very broad, complete orbital rings nearly meeting on face and vertex, clypeus, anterior and humeral margins of pronotum, scutellum, subalar tubercle, a spot below hind wing, both upper and lower divisions of metapleurum, large ovate spot on each side of propodeum largely covering combined lateral and pleural areas, broad apical bands on tergites 1 and 2, broad apical angles and narrow margins of tergites 3—5, and tergites 6—7 very largely; antenna testaceous basally, blackish apically, scape at apex and an incomplete annulus white; mandible except a long narrow triangle of white near base, adjacent portion of cheek, and margin of clypeus testaceous; wings hyaline,

venation blackish; front and middle legs testaceous, coxae, trochanters entirely, and femora anteriorly and dorsally white; hind leg rufopiceous, coxa white above, femur more reddish in middle, tibia pale stramineous, blackish at base and apex, tarsus stramineous, a dorsal streak basally and last three joints blackish.

Type locality. Hoozan, Formosa.

One female.

*Ischnojoppa luteator* (Fab.)

Originally described in *Ichneumon*, this species has been redescribed several times and referred to several genera. The following is the synonymy of Formosan material:

*Exephanes akonis* Matsumura, Thousand Insects of Japan, Suppl. 4, 240, pl. 5, fig. 25, 1912.

*Atanyjoppa akonis* (Mats.) Uchida, Journ. Coll. Agr. Hokkaido Imp. Univ., 18, 62, 1926.

*Ischnojoppa luteator* (Fab.) Sonan, Trans. Nat. Hist. Soc. Formosa, 22, 84, 1932.

In the last reference above, Sonan synonymized *akonis* Mats. with *luteator* (Fab.).

The Sauter collection includes three females taken at Kankau (Koshun).

Genus *Lusius* Tosq.

*Lusius* Tosquinet, Mem. Soc. Ent. Belg., 10, 384, 1903. Genotype, *Lusius macilentus* Tosq.

*Oedematopsis* Morley, Fauna of British India, *Hym.*, *Ichn.*, vol. 3, pt. 1, p. 50, fig. 9, 1913 (not *Oedematopsis* Tschek.). New synonym.

That *Oedematopsis apollo* Morley is congeneric with the genotype of *Lusius* I think there can be no doubt. The two species may even prove to be synonymous.

*Lusius* is related to *Ischnopsidea* Viereck (= *Ischnus* of Authors, not Gravenhorst), from which it differs most strikingly in the loss or obsolescence of the second intercubitus, of the cubitus beyond the second recurrent, and of the apical abscissae of all longitudinal veins in the hind wing; in the noncarinate first tergite, and in the long slender valves of the male genital sheath.

*Lusius apollo* (Morley), new combination

*Oedematopsis apollo* Morley, Fauna of British India, *Hym.*, *Ichn.*, vol. 3, pt. 1, p. 50, fig. 9, 1913.

Four males from Taihorin are included in the Sauter material; also ten females and four males from Mindanao and Luzon, Philippine Islands, in the C. F. Baker collection are before me.

The agreement of these specimens with Morley's description and figure is so close that it is evident that Morley overlooked the edentate mandibles.

Usually the longitudinal carinae of the propodeum are absent or obsolete and the apical carina is frequently so, only the basal carina being always strong. In some specimens the obsolete veins of the front wing are more distinct than in others and the areolet is rendered quite obvious.

The head and mesoscutum are polished, the mesopleurum and mesosternum densely and rather coarsely punctate, the propodeum is transversely rugulose, and the abdomen, except the largely polished first tergite, opaque.

The black spot of the vertex varies from virtual absence to a broad band extending back to the occipital carina. The markings of the mesoscutum may be intensely black, the lateral vittae usually confluent with the prescutellar spot, or they may be virtually absent. The two spots on the propodeum and the two on the second tergite vary from distinct and nearly black to entirely absent.

*Mansa minor* (Szepligeti), new combination

*Pseudomansa minor* Szepligeti, Ann. Mus. Nat. Hung., **14**, 230, 1916.

*Mansa tarsalis* Uchida (not Cameron), Journ. Fac. Agr. Hokkaido Imp. Univ., **30**, p. 168, pl. 2, fig. 19, 1931.

Before me are a female and a male from Dehra Dun, United Provinces, India, that I take to be *latiscutis* (Cameron) and *tarsalis* (Cameron), respectively, which I believe to be the sexes of the same species. These represent a species distinct from the ten females and five males in the Sauter Collection, that I take to be *minor* (Szepligeti). In *minor* the vertex is straight across and nearly at the level of the superior tangent of the eyes, the first intercubitus is distinctly less strongly oblique (fig. 15) and the male antenna lacks all trace of an annulus. In what I take to be *tarsalis*, on the other hand, the vertex is deeply concave, the first intercubitus more strongly oblique (fig. 16), and the antenna of the male distinctly annulated with yellowish.

The male of *minor* differs from the female in lacking the antennal annulus and in having the entire hind tarsus and the apex of the tibia blackish.

*Mansa formosana*, new species (fig. 17).

*Mansa latiscutis* Uchida (not Cameron), Journ. Fac. Agr. Hokkaido Imp. Univ., **30**, 168, Pl. 2, fig. 2, 1931.

In the citation above Uchida has synonymized *Pseudomansa minor* Szepligeti with *Mansa latiscutis* (Cameron). It is evident from his figure

and from his description that he had the present species before him, for in describing what he supposed to be the male of *latiscutis* he states that the antenna has an annulus, that the areolet is much wider before than behind, and that the hind tarsus has only the apical two joints and the apices of the other joints dark.

Female. Length 12—16 mm.

Vertex and frons deeply concave; frons densely and coarsely punctate medially; face very coarsely punctate laterally, more finely so medially, the punctation tending to oblique rugosity on each side below antennae; clypeus punctate, smooth apically and with a narrowly reflexed margin; malar space nearly twice as long as basal width of mandible; middle of antennal foramen opposite lower fourth of eye; antenna about as long as body, with 35—36 joints, slightly thickened and flattened on under side between middle and apex.

Thorax densely punctate, more finely so on mesoscutum, the sculpture tending to rugosity on pleura and propodeum; scutellum transversely flattened, lateral carinae extending to about middle; propodeal carinae distinct, basal carine strong. Areolet (fig. 17) about one and a half times as long on radius as on cubitus, first intercubitus strongly inclivous and weakly curved, second reclivous and strongly recurved.

Abdomen very densely and finely punctate, mat; first tergite polished, postpetiole with a few punctures on each side, with a median impression and usually with a smaller impression on each side near the spiracle; sheath slightly longer than first tergite.

Yellowish ferruginous; head, except frons and vertex, more yellowish; antenna ferruginous basally, with scape paler, apical half blackish, with a whitish annulus between the ferruginous and black; tarsi yellowish, apical joints brownish, joints 2—4 of hind tarsus narrowly black basally; wings pale yellowish hyaline, venation ferruginous with radius, medius, basal vein, nervulus, and basal abscissae of discoideus and subdiscoideus piceous.

Male. Malar space barely one and a half times as long as basal width of mandible; antennal foramen above upper third of eye; flagellum tapering from thick base to slender apex; thorax (except propodeum) and abdomen much more sparsely punctate; flagellum blackish, reddish below at base, with a yellowish annulus. Otherwise much like female.

Type locality. Kankau (Koshun), Formosa.

Paratypes. No. 51994, U. S. National Museum.

Four females and two males in the Sauter Collection, the allotype taken at Taihorin and the four paratypes at Hoozan.

Genus *Chreusa* Cameron

?*Hemigester* Brullé, Hist. Nat. Ins. Hym., 4, 266, pl. 41, fig. 1, 1846.

*Chreusa* Cameron, Mem. Manch. Lit. Phil. Soc., **43**, 209, 1899; Morley, Fauna of British India, Hym., vol. 3, Ichn., pt. 1, p. 31, fig. 6, 1913; Sonan, Trans. Nat. Hist. Soc. Formosa, **22**, 85, 1932.

*Cryptodema* Morley, Fauna of British India, Hym., vol. 3, Ichn., pt. 1, p. 312, fig. 84, 1913.

*Hemigaster* Cushman (not Brullé?), Philippine Journ. Sci., **20**, 575, 1922.

Brullé's figure of the genotype of *Hemigaster* disagrees with the description of the genus in the form of the abdomen. This is probably due to an error on the part of the artist, and *Chreusa* should probably be synonymized with *Hemigaster*. Because of this discrepancy, however, I hesitate to publish the synonymy. Nevertheless my own two species of *Hemigaster* are unquestionably referable to *Chreusa*.

*Cryptodema* Morley is based on a species apparently very closely allied to the genotype of *Chreusa*.

*Chreusa anormis* (Morley), new combination

*Cryptodema anormis* Morley, Fauna of British India, Hym., vol. 3, Ichn., pt. 1, p. 313, fig. 84, 1913.

*Chreusa malayensis* (Cushman), new combination

*Hemigaster malayensis* Cushman, Philippine Journ. Sci., **20**, 576, 1922.

*Chreusa taiwana* Sonan

*Chreusa taiwana* Sonan, Trans. Nat. Hist. Soc. Formosa, **22**, 85, 1932.  
Four females and six males from Taihorin and Kankau (Koshun).

*Apophysius unicolor* Uchida

*Apophysius unicolor* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., **30**, 191, fig. 14, pl. 2, fig. 16, 1931.

One male of this species is in the Sauter material. It agrees very well with the description, but the stigma is much longer than shown in Uchida's figure, the fracture of the discocubital vein is basad of the middle, the second discoidal cell is narrower at base, and the petiolar area is broader anteriorly and is not divided posteriorly by a carina continuous with the lateral portions of the apical carina.

*Apophysius rufus*, new species

Very closely allied to *unicolor* Uchida. from which it is at once distinguishable by the largely black head.

Female. Length 10 mm.

Head in front view hardly one and a third times as broad as long, pubescence cinereous; malar space short but distinct; clypeus a little broader than long; convergence of eyes from above downward as 3—2; ocellocular line barely longer than width of ocellar triangle, postocellar

line half as long as diameter of an ocellus; face mat, very finely and densely punctate, head otherwise more sparsely punctate.

Thorax polished, very sparsely and inconspicuously punctate; propodeum almost perpendicular from basal carina; lateral carinae except basally and lateral abscissae of apical carina absent; areola very narrow, not separated from petiolar area; apophyses somewhat less prominent than in *bakeri* Cushman; hind tibia and tarsus of equal length.

Abdomen not strongly compressed, polished; second tergite distinctly wider at apex than at base, spiracle in middle; sheath hardly as long as first tergite.

Yellowish ferruginous; head black, with face, clypeus, mandibles, and scape yellowish; flagellum ferruginous, slightly darker apically; a longitudinal mark on each lateral lobe of mesoscutum, the two confluent behind, blackish; front and middle legs stramineous; hind tarsus and ovipositor sheath blackish; wings yellowish hyaline, venation piceous, stigma testaceous.

Male. Essentially like female.

Type locality. Kankau (Koshun), Formosa.

Paratype. No. 51995, U.S. National Museum.

The paratype is generally paler than the type and with a trace of a median stripe on the mesoscutum.

Two females and one male, the type and allotype taken at the type locality and the paratype at Taihorin.

### *Syrites persimilis*. new species

Very closely related to *metathoracica* (Ashmead), from which it may be distinguished by its piceous scape and tegulae and the lack of pale margins on tergites 3—5. It averages somewhat larger and, judging from the material at hand, always has the thorax black anteriorly.

Female. Length 6—7 mm.

In my key to the species of *Syrites*<sup>1)</sup> the female runs to *cancellatus* (Brullé) on the thoracic and antennal coloration, but differs in the black clypeus.

Head in front view transversely subtriangular; frons irregularly rugulose, face and clypeus finely, densely punctate; eyes weakly convergent below, barely as long as width of face at antennae; occipital and hypostomal carinae moderately high, the former bending mesad at nearly a right angle to meet the latter; antenna slender, filiform, 26—29-jointed.

Thorax: pronotum rugulose-punctate; mesoscutum transversely rugose anteriorly, obliquely so posteriorly, with a longitudinal, finely granulated

<sup>1)</sup> Philippine Jour. Sci., 20, 581, 1922.

impression in the middle of each lobe; scutellum convex between the lateral carinae, reticulate-rugose; pleura and sternum finely and densely punctate, partly rugulose so, speculum polished and sparsely punctate; propodeum irregularly reticulate-rugose, completely areolated, the carinae sometimes partly obscured by sculpture, basal area large, triangular, areola pentagonal, as broad as long or broader.

Abdomen narrowly elongate-oval, first four tergites strongly sculptured and separated by deep sutures, others smooth and largely retracted; first tergite triangular, as broad as long, with strong lateral carina from base through spiracle to apex, and median carinae to beyond spiracles, a strongly curved, transverse groove from spiracle to spiracle, basad of which the surface is more finely and apicad of which it is more coarsely, longitudinally rugose; tergite 2 much broader than long, with a curved, subapical, transverse impression, basad of the groove more finely and in the groove very coarsely longitudinally rugose, extreme apex polished; tergite 3 fully as long as 2, more finely rugose and with its transverse impression nearly straight and near the middle; tergite 4 much narrower and shorter than 3, more finely sculptured and with no impression; ovipositor sheath distinctly shorter than first tergite.

Head, anterior portion of thorax, and the abdomen beyond tergite 2 black; propodeum, metathorax, more or less of mesopleurum, and tergites 1 and 2 ferruginous; apices of tergites beyond fifth white; antenna, including scape, piceous; legs ferruginous, front coxa more or less piceous, apical third or more of hind femur, hind tibia, except a white annulus at base, and hind tarsus blackish, calcaria white; wings hyaline, front wing with a broad, transverse, fuscous fascia involving apical half of stigma and extending about two-thirds across wing; venation blackish, base of stigma and radices white, tegula piceous.

Type locality. Canton, China.

Type. No. 51996, U. S. National Museum.

Paratypes. Deutsches Entomologisches Museum.

Three females collected by C. W. Howard at the type locality; three collected by Sauter at Taihorin and Kankau, Formosa; and three taken at Nau, Siam, by T. D. A. Cockerell.

The extent of the ferruginous color is very variable, sometimes involving the entire mesopleura and sternum, even the scutellum being more or less reddish; sometimes also tergite 3 is more or less ferruginous at base.

#### Genus *Acerataspis* Uchida

*Cerataspis* Uchida, Trans. Sapporo Nat. Hist. Soc., **13**, 275, figs. 1-4, 1934 (preoccupied by *Cerataspis* Gray, 1847).



*Acerataspis* Achida, Ins. Matsumurana, 9, 23, 1934. New name for *Cerataspis* Uchida, not Gray.

The following new species is in the Sauter collection.

*Acerataspis formosana*, new species

Differs from the generic description in that the propodeum is not completely areolated, but Uchida's figure contradicts the description in this respect. The basal area and areola are confluent, as are the petiolar and apical lateral areas. Also the areolet is rather broadly sessile, the claws in the female have a few large teeth rather than dense pectination, and the carinae of the abdomen extend nearly to the middle of the fourth tergite. Despite these differences, which are of specific rather than generic significance, there appears no doubt that the present species is properly referred to the genus.

Female. Length 8 mm.

Differs from the original description of the genotype, *clavata* Uchida), in the characters mentioned above and in having the flagellum much paler below and the apical corners of tergite 1, tergites 2 and 3 except laterally and medially toward base, and more than apical half of tergite 5 yellow. Also the scutellum and a line below the tegula are yellow; these markings are not mentioned in Uchida's description, but the pale scutellum is shown in his figure.

Male. Like the female except that the tarsal claws are thickly pectinate, the propodeum is more coarsely rugose, and the black of the abdomen is somewhat more extensive.

Type locality. Suisharyo, Formosa.

Allotype. No. 51997, U. S. National Museum.

One female (type) and one male (allotype).

*Latibulus* Gistel

*Crypturus* Gravenhorst, Ichn. Eur., vol. 1, p. 655, 1879 (preoccupied by *Crypturus* Illiger, 1811).

*Latibulus* Gistel, Naturg. Thierr., p. VIII, 1848.

*Endurus* Rondani, Bull. Soc. Ent. Ital., 8, 66, 1876.

In renaming the preoccupied *Crypturus* Grav., Rondani overlooked the fact that Gistel had already done so.

Morley<sup>1)</sup> has synonymized *Arthula* Cameron with *Endurus*. It is, of course, very closely allied to *Endurus*, but the slightly postfurcal position of the second recurrent vein, the distinct notauli, and the absence of the apical carina of the propodeum appear sufficient for generic distinction.

<sup>1)</sup> Ann. Mag. Nat. Hist., ser. 8, 16, 388, 1915.

*Latibulus tuberculatus*, new species

Remarkable for the very deep impressions and high elevations of tergites 2—6, the abdomen having a superficial resemblance to that of certain species of *Trogus*. The only female of the genotype, *argiolus* (Gravenhorst), that I have seen has faint traces of these impressions and an undescribed Chinese species is almost intermediate in this respect.

Female. Length 12 mm., antenna 7.5 mm.

Entire body, and also the coxae, very densely, minutely punctate, mat; pronotum laterally, mesopleurum in middle, metapleurum below, and propodeum between the transverse carinae coarsely reticulate-rugose, the petiolar area transversely so.

Head hardly as broad as thorax; frons with a deep median sulcus flanked on either side by a high ridge, scrobes transversely striate; face less than half as long as broad; malar space nearly two-thirds as long as basal width of mandible; clypeus shallowly, arcuately emarginate; eyes longer than width of face, subhemispherical, slightly convergent below; antenna 28-jointed, rather stout, basal joint of flagellum less than thrice as long as thick.

Thorax: Basal carina distinct, apical carina strong but somewhat obscured by coarse sculpture; radius and cubitus virtually contiguous; nervulus antefurcal; postnervulus broken at upper third; nervellus broken slightly below middle.

Abdomen rather stout, tergites beyond second nearly or quite twice as broad as long; first segment little more than twice as long as broad at apex, with a median, longitudinal groove and a shallow impression on each side behind spiracle, petiole distinctly broader than thick, sternite extending only slightly beyond spiracles; tergites 2—6 basally constricted, with a very deep impression on each side of middle and a very high, median, longitudinal ridge or tubercle, the impressions deepest and the tubercle relatively highest and shortest on 6, tergites 3—6 also with shallow impressions laterally behind spiracles; apical tergite with its margin strongly incurved so that when the hypopygium is appressed to the under side the ovipositor projects from a small subcircular opening; hypopygium convex, narrowly truncate at apex.

Black to brown with copious yellow markings, the dark color of head and abdomen brown, of thorax and coxae largely black; yellow markings as follows: Face, orbits, malar space, clypeus apically, mandibles basally, palpi, spot on scape, pronotum in lower angle and entirely around dorsal margin, propleura below, triangular spots in positions of notauli and extending obscurely back onto disk, subalar tubercle, spots along anterior margin and in lower and upper posterior angles of mesopleurum, apical half or more of scutellum and the scutellar carinae, postscutellum,

apex of metapleurum, petiolar area, and apical margins of tergites 1—7, the color extending forward along the median and lateral ridges; antennae ferruginous; front coxa brown with a yellow spot anteriorly; middle coxa yellow in apical half; hind coxa with a yellow spot above at base and a yellow streak below from apex to near base; front and middle trochanters yellow, basal joint of each more or less brown; hind trochanter with basal joint black, yellow at apex; tarsi yellowish; legs otherwise ferruginous, with tibiae paler, especially basally; wings hyaline with brownish venation.

Male. Eyes less prominent and more strongly convergent, frontal ridges higher and sharper; brown of head and abdomen darker; yellow markings mostly larger; otherwise much like female.

Type locality. Taihorin, Formosa.

Allotype. No. 51998, U. S. National Museum.

One of each sex.

### Genus *Anomalon* Panzer

Three species are represented in the Sauter material. They may be distinguished by the following key.

1. Postnervulus broken far above middle; frontal orbits yellow . .

. . . *frontalis*, new species

Postnervulus broken at or near middle; frontal orbits immaculate . . 2

2. Petiole black . . . . . *nigribasis*, new species

Petiole stramineous . . . . . *formosanum* (Uchida)

### *Anomalon frontalis*, new species

Female. Length 10 mm.

Head finely punctate, densely so on frons, sparsely so on face and weakly and sparsely so on temples; temple strongly receding, slightly convex, in dorsal view slightly more than half as long as short diameter of eye; ocellocular line shorter than postocellar line and distinctly longer than diameter of an ocellus; frons with a sharp median carina; convergence of eyes about as 4—3; cheek measured from eye to nearest point on occipital carina fully half as broad as short diameter of eye; antenna half as long as body, slender filiform, apical joint slightly thicker than next joint.

Thorax mostly rugose; pronotum smooth and polished in humeral angle, striato-rugose below; mesoscutum irregularly but more or less transversely rugose, with narrow median ridge on prescutum and broader area on each side above tegula finely punctate; scutellum margined to apex, almost smooth and polished discally, foveolate apically; postscutellum with two deep foveae; mesopleurum almost regularly, longitudinally,

coarsely rugose, speculum polished; mesosternum subpolished, mesopleura flanked on each side by a carina; metapleurum and propodeum coarsely reticulate-rugose, basal carina and median areas rather distinct; postnervulus broken at or near upper third; legs very slender, basal third of hind femur notably so.

Abdomen very slender; second tergite much longer than first and fully seven times as long as broad at base, spiracle distinctly behind middle; ovipositor very slender, straight, sheath barely as long as second tergite.

Head black; frontal orbits, scape, pedicel, and mandibles yellow; flagellum brown, palpi stramineous; apical margins of clypeus and malar space piceous; thorax black, immaculate except for more or less distinct piceous or yellowish spots on collar and scutellum and at origins of notauli; tegulae brownish piceous, paler apically; wings hyaline, venation brown, costa and metacarpus paler, radices yellow; front leg brownish stramineous, coxa and trochanter largely yellow; hind leg dark brown, coxa nearly black at base, stramineous above at apex, tibia and tarsus pale basally; middle leg intermediate in color; abdomen brownish piceous, fourth tergite paler laterally; first tergite at base and apex and a more or less distinct spot at apex of second yellow.

Male. Remarkably like female; head thicker, with temples longer and less strongly receding; markings of mesoscutum and scutellum absent.

Type locality. Kankau (Koshun), Formosa.

Paratypes. No. 51999, U. S. National Museum.

Twenty-two females and two males, all collected at the type locality.

*Anomalon nigribasis*, new species

Female. Of same size and form as *frontalis* Cushman, but differing as follows: Temple narrower and hardly half as long as short diameter of eye; ocellocular line barely as long as diameter of an ocellus; cheek distinctly less than half short diameter of eye; lateral lobes of mesoscutum, as well as prescutum, with narrow, finely sculptured ridges; scutellum very coarsely reticulate-rugose, basal groove very deep; mesopleurum irregularly rugose; postnervulus broken shortly above middle; ovipositor sheath slightly longer than second tergite.

Frontal orbits immaculate; mandibles and a more or less distinct small spot on each side of vertex reddish, scape and pedicel reddish testaceous; thorax immaculate black except that the collar is margined with piceous; wing radices brownish stramineous; legs darker throughout, front coxa and trochanter reddish piceous, hind coxa virtually black throughout; petiole black, tergites 1 and 2 apically reddish.

Male. Head thicker, with temples longer and less strongly receding; apices of tergites 1 and 2 not definitely paler.

Type locality. Kankau (Koshun), Formosa.

Paratypes. No. 52000, U. S. National Museum.

Described from 18 females and 11 males, all from the type locality.

*Anomalon formosanum* (Uchida), new combination.

*Nototrachys foliator* var. *formosanus* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., **21**, 232, 1928.

A single female taken by Sauter at Suisharyo appears without doubt to belong here.

I remove it from varietal rank because of venational differences. The apical abscissa of the radius is much less strongly curved both at the base and at the apex than in *foliator*, and the subdiscoideus originates at the middle of postnervulus, much lower than in *foliator*. In addition the frons is finely punctate and dull, not at all transversely rugose; and the upper portion of the pronotum is polished and weakly punctate.

It is very closely allied to *nigrubasis* Cushman, from which it differs in having the temples longer and less strongly receding, the eyes somewhat less convergent, the postnervulus broken at the middle, and the petiole yellow.

*Schizoloma* sp.

A single specimen without abdomen and hind tarsi, but apparently a male, was captured by Sauter at Hoozan.

What is left of this specimen differs apparently in no essential way from the palaearctic *capitatum* Desv.

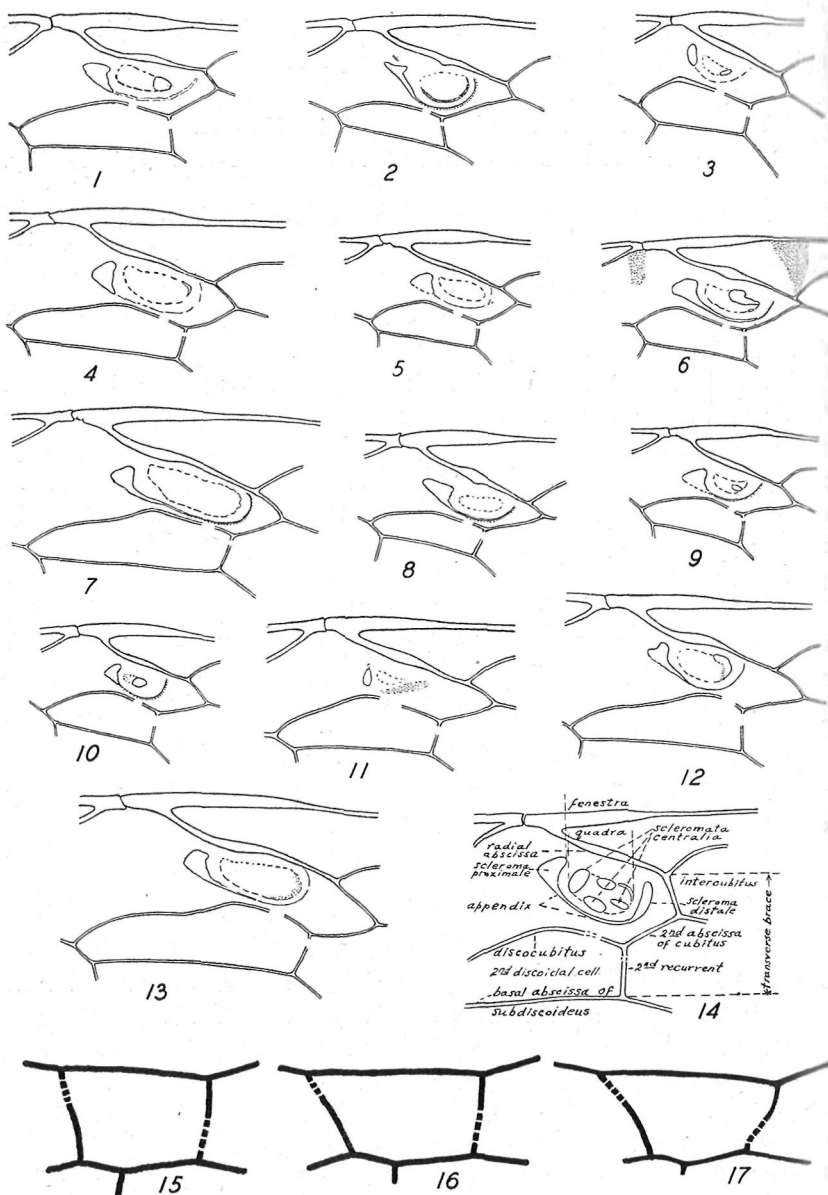
*Therion circumflexum* var. *rufomaculatum* (Uchida), new combination

*Exochilum circumflexum* var. *rufomaculatum* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., **21**, 237, pl. 6, fig. 15, 1928.

Two females were collected by Sauter at Taihorin.

Genus *Heteropelma* Wesmael

The genotype (*calcator* Wesmael) and most of the other species referred to this genus exhibit a very peculiar structure that I do not find mentioned in the literature. On the under side of the swollen second joint of the hind tarsus of the male is a flat or convex area extending from the base nearly to the apex and defined by deeply impressed lines. This structure is even more strongly developed in the male of *Schizoloma*. It does not occur, however, in the two North American species of *Heteropelma*, *datanae* Riley and *flavicornis* (Say).



Figs. 1—13. — Portions of front wings of species of *Enicospilus*: 1. *frater* Cush.; 2. *centralis* Cush.; 3. *flavocephalus* Kirby; 4. *stenophleps* Cush.; 5. *shinkanus* Uch.; 6. *bifasciatus* Uch.; 7. *pallidistigma* Cush.; 8. *nigrostemma-ticum* (Enderl.); 9. *analisis* Mats. & Uch.; 10. *nigrivenalis* Cush.; 11. *nigrimargi-nalis* Cush.; 12. *sauteri* Cush.; 13. *nigristigma* Cush. — Fig. 14. — Schematic figure of the same with nomenclature of parts. — Figs. 15—17. — Areolets of species of *Mansa*; 15. *minor* (Szepl.); 16. *tarsalis* (Cam.); 17. *formosana* Cush.

*Heteropelma perlongum*, new species

Female. Length 22 mm., antenna 13 mm.

Head and thorax with rather long, dense, erect, cinereous pubescence. Head small, in dorsal view with temples sharply receding and nearly flat, hardly half as long as short diameter of eye, closely punctate; frons rather deeply concave, irregularly rugose, with a prominent, median, toothlike carina below; eyes very large, strongly convergent; combined face and clypeus fully twice as long as broad at level of clypeal foveae, face sparsely punctate, clypeus nearly smooth, apex arcuate; cheek very narrow, hardly broader than malar space; antenna very slender, all flagellar joints longer than broad.

Thorax for the most part roughly sculptured; pronotum distinctly punctate in humeral angle, otherwise rugose, with a sharp toothlike projection at lower anterior angle; mesoscutum rugose-punctate, punctures more distinct laterally; scutellum rugose, impressed medially; mesopleurum rugulose-punctate below, with a deep rugose impression below subalar tubercle and a broad, deep, foveolate impression in lower posterior corner, the two connected by a shallower, oblique, largely polished groove; metapleurum and propodeum coarsely reticulate-rugose, propodeum extending well beyond middle of hind coxa; legs very slender, hind coxa nearly three times as long as deep, hind basitarsus fully four times as long as second joint, inner calcarium longer than second joint.

Abdomen exceedingly slender, nearly three times as long as head and thorax, tergites 1 and 2 comprising fully half the total length, tergite 3 fully twice as long as deep.

Black, with legs and abdomen largely ferruginous and wings hyaline; face, lower part of frontal orbit, a more or less distinct streak behind eye, clypeus, malar space, mouth parts and under side of scape yellow; pronotal tooth, tegulae and meso-metapleural suture reddish; front and middle coxae and trochanters and hind tarsus yellowish; hind tibia apically blackish; wings yellowish hyaline, veins blackish, stigma stramineous, costa basally reddish; tergite 2 blackish dorsally; ovipositor sheath yellow.

Male. Eyes even larger, with resulting narrowing of the surrounding areas; second joint of hind tarsus with an impressed area extending about two-thirds length from base and occupying median half of joint. Otherwise, except sexually, much like female.

Type locality. Hoozan, Formosa.

Allotype. No. 5200, U. S. National Museum.

One of each sex, the allotype taken at Kosempo, Formosa. A second male is in too poor condition for inclusion in the type series.

*Heteropelma tarsale*, new species

Remarkable chiefly for the anomalous form of the second joint of the hind tarsus in the male, which lacks the impressed area.

Female. Length 21 mm; antenna 10 mm.

Similar in form to *perlongum* Cush., from the above description of which it differs principally as follows: Pubescence of head and thorax whitish; combined face and clypeus about one and a half times as long as broad at level of clypeal foveae; antenna somewhat stout, joints of apical third or more as thick as long; mesopleurum more finely and distinctly punctate below, not rugulose, impressions and furrows shallower; propodeum barely reaching middle of hind coxa.

Piceo-rufous, with legs and abdomen largely reddish and wings yellowish hyaline; inner and superior orbits, face, clypeus, malar space, and mouthparts yellow; vertex and middle of frons blackish; antenna ferruginous, yellowish toward apex, black at extreme apex; thorax darker dorsally and ventrally; sutures and notauli paler; scutellum, tegulae, and subalar tubercles yellow; front and middle legs stramineous, their coxae and trochanters yellow; hind leg ferruginous, tibia apically blackish, tarsus, except apically, yellow; tergite 2 dorsally blackish; ovipositor sheath yellowish; venation blackish, stigma stramineous, costa reddish.

Male. Antenna longer and more slender than in female, with all flagellar joints distinctly longer than thick; hind basitarsus about six times as long as second joint, which is inflated and less than half as thick at apex as at base, with a subapical constriction.

Usually darker than female, the red of head and thorax sometimes largely replaced by black; front and middle legs entirely yellow.

Type locality. Kankau (Koshun), Formosa.

Paratypes. No. 52002, U. S. National Museum.

Three of each sex collected at the type locality and one male from Koshun.

*Trichomma enaphalocrocis* Uchida

*Trichomma enaphalocrocis* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., 21, 239, Pl. 5, fig. 20, 1928, female; Clark, U. S. Dept. Agr., Tech. Bul. 455, pp. 11 and 25, 1934.

Ten females in the Sauter material were collected at Kosempo, Taihorin, and Kankau (Koshun).

The specimens exhibit considerable variation in the convergence of the eyes and consequently of the width of the face. Also the ferruginous color of the head and thorax is sometimes partly replaced by piceous.

The second reference above records an unsuccessful attempt to introduce the species into the United States as a parasite of *Pyrausta nubilalis*.



*Trichomma nigricans* Cameron

*Trichomma nigricans* Cameron, Spolia Zeyl., 3, 130, 1905, female; Enderlein, Stett. Ent. Zeit., **82**, 11, 1921, female, male.

Eight females and one male collected at Taihorin, Suisharyo, Hoozan, and Taihoku appear to be referable to this species.

The species differs from *enaphalocrocis* Uchida virtually only in having the head and thorax black instead of ferruginous and the yellow markings somewhat smaller. In one female the yellow orbital ring is interrupted on the vertex.

This species is widely distributed in the Oriental Region, exhibiting marked color variations, of which *enaphalocrocis* will probably prove to be one.

*Aphanistes* spp.

Two males of this genus are in the Sauter collection, one taken at Kankau (Koshun), the other at Kosempo. They represent two species, neither of which I can reconcile with the description of *kankonis* Uchida, which is based on the female.

*Gongropelma tainense* Uchida

Journ. Fac. Agr. Hokkaido Imp. Univ., 21, 258, 1928.

One male captured at Kankau (Koshun).

*Gongropelma* sp.

A single female in too poor condition for description seems not to be referable to any of the described species. It was captured at Taihorin.

*Agrypon facetum* Enderlein

*Agrypon facetum* Enderlein, Stett. Ent. Zeit., **82**, 14, 1921.

Described originally from two females from Sumatra, this species is very widely distributed in the Oriental Region. In addition to 6 females and one male in the Sauter collection, there are before me about 60 specimens (only 6 of which are males) from Sumatra (Jacobson) and Mindanao, Palawan, Panay, Biliran, Samar, Sibuyan, Luzon (as far north as Baguio, in the mountains of Benguet), and Hong Kong, all in the C. F. Baker collection.

Considering the wide distribution of the species the variation is very slight, the principal variation being in the extent of yellow around the eyes and the extent of black on the hind legs. The darkest specimens are from the southern Philippines and the lightest from the northern Philippines.

The male differs hardly at all, except in sexual characters from the female.

*Agrypon trochanterale*, new species

Very similar in general appearance to *facetum* Enderlein, but the propodeum extending barely beyond middle of hind coxa.

Female. Length 14 mm, antennae 12 mm.

Head and thorax clothed with short, dense, silvery pubescence.

Head from above hardly half as thick as broad; temples flat, sharply receding, barely half as long (antero-posteriorly) as short diameter of eye; vertex and temples finely punctate; frons irregularly rugulose, with a median carina; eyes strongly convergent below; face minutely punctate, a sharp, straight, transverse carina at top and below this a few indistinct rugae; clypeus polished, apex acute.

Thorax, except mesoscutum, rugose, propodeum and metapleurum coarsely and reticulately so; mesoscutum finely, densely punctate, notauli rugulose; propodeum reaching middle of hind coxa; legs very slender, hind tibia and tarsus hardly swollen, apical joint of hind trochanter nearly as long as basal joint; radius weakly curved at apex; postnerve broken above upper third.

Abdomen very slender, postpetiole little broader than petiole, second tergite not broader at apex than at base; ovipositor sheath less than two-thirds as long as first tergite.

Black, with legs and abdomen largely red; face, lower part of frontal orbit, a supraorbital spot, clypeus, mouthparts, cheek, and front coxa and trochanter yellow; antenna black above, dark reddish below, scape yellowish below; hind trochanter and base of femur somewhat piceous, tibia blackish at apex, tarsus yellow; wings hyaline, veins black, stigma dark stramineous; second and apical tergites blackish dorsally, ovipositor sheath yellow.

Type locality. Kankau (Koshun), Formosa.

Paratype. No. 52003, U. S. National Museum.

Two females in poor condition, the paratype taken at Suisharyo.

Genus *Atrometus* Foester.

Only two Oriental species have been referred to this genus: *sericeus* Szepligeti and *minutus* Ashmead. The latter does not even belong to the Therionini. I find the following as to its identity and relationship.

*Nesomesochorus minutus* Ashmead, new combination

*Atrometus minutus* Ashmead, Proc. U. S. Nat. Mus., **28**, 144, 1904, ♂.  
*Chiodes* (sic!) *Chriodes oculatus* Ashmead, Proc. U. S. Nat. Mus., **28**, 966, 1905, ♂ (new synonymy).

*Nesomesochorus oculatus* Ashmead, op. cit., p. 968, ♀ (new synonymy).

The types of all three names are before me.

The anomalous structure of this species renders its placing in the classification difficult, but it seems incredible that Ashmead should have placed specimens in three different genera representing three tribes and two subfamilies. Assigning it, apparently without question, to *Atrometus* in 1904 and to *Chriodes* in 1905, on the next page after treating it as *Chriodes* he expressed himself as much perplexed as to its position, and erected for it the new genus *Nesomesochorus* and the new tribe *Nesomesochorini*, to stand next to the *Mesochorini*.

Betrem (Tijds. Ent., vol. 75, 1932, suppl., p. 89), in erecting his obviously closely allied genus *Klutiana*, also was puzzled as to where to place it. He excludes it from the Ophioninae because, among other reasons, of its supposed lack of the subapical notch on the ovipositor. This notch is, however, present. In the Tryphoninae he finds similarities in *Thymaris*, but equally significant diversities. He ultimately comes to the conclusion that the genus must be nearest to the Hemitelini, though he does not definitely place it in that tribe.

In my opinion the closest affinity of the tribe *Nesomesochorini* is with the Cremastini. With the members of this tribe it agrees in general form of body, especially of the first two abdominal segments, and the apical compression of the abdomen; in the completely areolated propodeum; in the distinctly separated clypeus; in the even more distinct notauli and sternaui; in the very similar ovipositor, with very small apical portion preceded by a somewhat distinct thickening; and in some features of the venation, notably the short abscissula and the basally weak mediella.

From the description *Metanomalon* Morley (Fauna of British India, Hym., vol. 3, Ichn., pt. 1, p. 431, 1913), appears to be very closely allied to, if not synonymous with, *Nesomesochorus*, the most discordant feature being the color pattern of the genotype. It seems impossible that Morley's figure could have been drawn from the insect described by him.

*Nesomesochorus* is not represented in the Sauter collection.

#### ✓ *Atrometus puerilis*, new species

Distinct from *sericans* Szepligeti from Singapore in its smaller size and much shorter antennae.

Female. Length 6 mm., antenna 3.5 mm.

Head and thorax clothed with dense, short, appressed, silvery pubescence.

Head in dorsal view hardly half as thick as broad, occiput deeply concave, temples strongly convex, weakly receding, and about two-thirds as long as short diameter of eye, deeply and rather densely punctate; vertex and frons convex, densely and deeply punctate, eyes large, but

not bulging, strongly convergent below; face punctate, more sparsely so laterally; clypeus obtusely pointed.

Thorax strongly pyriform; pronotum laterally rugulose, striately so in lower half; mesoscutum very densely and rather coarsely punctate, mat; mesopleurum densely punctate, more or less striate above; metapleurum and propodeum reticulate-rugose, the latter medially impressed; legs rather stout, especially the hind tibia, hind tarsus only slightly thickened; intercubitus, second recurrent, and portion of cubitus between them subequal in length; second discoidal cell acute at base and with a short petiole; abscissula and intercubitella subequal.

Abdomen very slender; first segment somewhat broader at spiracles, but apex hardly broader than petiole; second segment somewhat broader at apex than at base, spiracles at apical third.

Black, with legs and abdomen largely reddish; face, clypeus, mouth-parts, cheeks, a spot on upper part of temple, scape, and front and middle coxae and trochanters yellow; hind leg more or less infusate, especially apex of tibia; wings hyaline, veins black, stigma partly dark stramineous, tegulae stramineous; abdomen dark reddish, infusate basally and above toward apex, more yellowish ventrally; ovipositor sheath yellow.

Type locality. Kankau (Koshun), Formosa.

Paratype. No. 52004, U. S. National Museum.

Two specimens, the paratype from Baguio in the Benguet Mountains of northern Luzon, Philippine Islands, in the C. F. Baker collection.

#### Genus *Enicospilus* Stephens

*Enicospilus* Stephens, Illustr. Brit. Ent., **7**, 126, pl. 40, fig. 10, 1835.

*Henicospilus* Bridgman and Fitch, Ent., **17**, 176, 1884 (emendation).

*Dicamptus* Szepligeti, Gen. Ins, fasc. 34, p. 28, 1905 (new synonymy).

*Amesospilus* Enderlein, Beitr. Kenn. Land. Süßwasserfauna Südwest Africa, **1**, 222, 1914—1916 (new synonymy).

The most remarkable feature of the species of this genus is the hairless area in the apical portion of the cubital cell, which usually is bordered by or bears one or more sclerotized spots or streaks (fig. 14). To a remarkable degree the presence or absence and the form, size, and position of these spots and of the size, form, and position of the area itself are of specific significance. In examining this structure I have noted that it is more complex than appears at first glance. This and its specific significance warrant a nomenclature of the area for use in taxonomic work. I have for the most part adapted the nomenclature proposed by Enderlein.

The hairless area I propose to call the fenestra (window). More or less of the middle of the fenestra is of somewhat different texture,

sometimes only slightly different, from the outer margins. It is also at a very slightly higher level. For this I propose the term *quadra* (pane or panel). For the sclerotized spots on and surrounding the fenestra I propose the term *scleromes* (*scleromata*). The proximal sclerome (*scleroma proximale*) borders the fenestra proximally; it is of various forms, usually triangular, guttiform, or lunate, frequently with a long narrow appendix following the posterior margin of the fenestra, sometimes even around the distal margin. It is usually hairy. Often only the apical portion of the appendix is evident or this portion is broader than the rest, forming the distal sclerome (*scleroma distale*). This is usually less heavily sclerotized than the proximal sclerome and is less definitely limited on the inner side. The central scleromes (*scleromata centralia*), one to three in number, are situated on the quadra. They are sometimes merely linear sclerotizations of the margin, but usually extend onto the disk and assume a great variety of sharply defined forms. They may be situated at any point around the margin, but usually beyond the middle. When in the form of linear marginal thickenings the central sclerome is similar to the appendix in texture; when on the disk it is more like the proximal sclerome.

Some or all of the scleromes may be absent, but apparently a central sclerome is never present in the absence of the proximal sclerome, though either the proximal or the distal sclerome may occur in the absence of the other.

For the sake of brevity in descriptions I propose two other new venational terms. Radial abscissa denotes the basal abscissa of radius. The three veins intercubitus, second abscissa of cubitus, and second recurrent form a brace across the wing for which I propose the term transverse brace. The relative lengths of these veins are specifically very nearly constant, and in the following descriptions the relation is expressed in the form of a ratio (e. g., 3:5:4), the first figure representing the intercubitus, the second figure the cubital abscissa, and the third the recurrent.

The many modifications of the fenestra and its scleromes, together with associated modifications in the course and position of the neighboring veins, have furnished the characters for many supposed genera, usually based on single characters. In my opinion there is no taxonomic or biological justification for the erection of such groups even in the subgeneric sense. The only reason with any cogency whatever for such action is the breaking up of large genera into groups of more convenient size.

Schmiedeknecht (*Opuscula Ichneumonologica*, fasc. 18, p. 1428, 1908) has synonymized some of these useless genera and in the citations above I have indicated other synonymy.

The Sauter collection includes 47 specimens of *Enicospilus* mostly in very bad condition partly due to an accident during my study of the specimens. The following are in sufficiently good condition for recognition.

*Enicospilus shinkanus* Uchida (fig. 5)

*Henicospilus shinkanus* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., 21, 217, 1928.

The single female in the Sauter collection, from Kankau (Koshun), agrees well with the description, except that there is no distinct median longitudinal carina on the propodeum. The fenestra extends from the basal fourth of the radial abscissa nearly to the apex. The only sclerome, the proximal, is roundly triangular, hairy both above and below, ferruginous, without a distinct appendix. The quadra occupies most of the fenestra and is not sharply defined. The radial abscissa is slender, only slightly broadened in basal half. The veins of the transverse brace are in the ratio of 1:2:1.4. The second discoidal cell is slightly widest at middle, where the discocubitus is more sharply curved than elsewhere; the second recurrent is hardly a third as long as the basal abscissa of the subdiscoideus, the two forming nearly a right angle.

*Enicospilus nigrostemmaticum* (Enderlein), new combination (fig. 8)

*Amesospilus nigrostemmaticus* Enderlein, Stett. Ent. Zeit., 82, 19, 1921.

*Henicospilus fuscomaculatus* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., 21, 216, Pl. 7, fig. 5, 1928 (new synonymy).

The six specimens in the Sauter collection exhibit great variation in the extent of black or dark staining, one specimen lacking all trace of it except in the stemmaticum, which is somewhat piceous. The fenestra extends from distinctly before the middle nearly to the apex of the basal abscissa of the radius. Only the proximal sclerome is present. It is unusually elongate triangular, heavily sclerotized, brown, with a slender pale appendix reaching to the apex of the fenestra. The quadra is rather small, moderately distinct, elongate oval. The radial abscissa is considerably broadened in the middle and abruptly narrowed just beyond the middle on the posterior side. The veins of the transverse brace are in approximately the proportion of 2:6:3; the second cubital cell is broadest just beyond the middle, with the discocubitus rather strongly arched and faintly undulant and the second recurrent about one-third as long as the basal abscissa of the subdiscoideus and forming a slightly acute angle with it.

*Enicospilus bifasciatus* Uchida (fig. 6)

*Henicospilus bifasciatus* Uchida, Journ. Fac. Agr. Hokkaido Imp. Univ., 21, 222, Pl. 5, fig. 12, 1928.

Two males in the Sauter collection taken at Taihorin and Hoozan are both somewhat lighter colored than is indicated for the type, the dark color of the thorax being less extensive and that of the abdomen red-brown instead of blackish, while the alar fasciae are faint, but they agree so exactly otherwise with the description that there appears little doubt that they belong here.

The fenestra extends from the basal third nearly to the apex of the radial abscissa, with a proximal and one central sclerome. The proximal sclerome is roundly triangular, with the appendix nearly to the apex of the fenestra, stramineous, sparsely hairy below, hairless above. The quadra is rather small, sharply defined posteriorly, vaguely so anteriorly, with the rather large, stramineous, horizontal, somewhat comma-shaped sclerome along its anteroapical margin. The radial abscissa is rather abruptly, fusiformly broadened in the middle, tapering thence in both directions. The veins of the transverse brace are in the approximate proportion of 1:5:2. The second discoidal cell is widest distinctly before the middle, where the discocubitus is strongly curved, and the second recurrent is one-third as long as the basal abscissa of the subdiscoides, the two veins forming a sharply acute angle.

*Enicospilus centralis*, new species (fig. 2)

Similar to *bifasciatus* Uchida and *nigrostemmaticum* (Enderlein) in form and structure, in the blackish pattern of the thorax, and especially in the short intercubitus and long second abscissa of the cubitus; but at once distinguishable from the former by the linear central sclerome concentric with the appendix of the much longer proximal sclerome, and from the latter, which it resembles in the form of the proximal sclerome, in the presence of a central sclerome.

Female. Length 17 mm.

Head very strongly narrowed behind, very subtly sculptured, almost polished; eyes distinctly convergent below antennae; combined face and clypeus nearly two-thirds as broad at level of foveae as long and much broader than frons at top; cheeks very narrow; malar space nearly obliterated; antennae (broken).

Thorax with a dull luster; scutellum margined to apex, rather narrow, nearly without sculpture except irregular roughening at apex; pronotum obliquely, finely striate laterally; mesopleurum more coarsely, horizontally striate, the striation finer and merging into very fine dense punctation above; prepectus and mesosternum finely and indistinctly punctate and dull; metapleurum rather finely, obliquely striate; propodeum basad of carina subpolished, apicad coarsely, obliquely rugoso-striate; fenestra extending from basal third to apical fourth of basal abscissa of

radius, with appendiculate proximal and linear central scleromes, proximal sclerome elongate triangular, merging gradually into the slender, strongly curved appendix which extends around the apex of the fenestra, hairless dorsally; quadra sharply defined on posterior half of its margin by a linear arcuate sclerome that parallels the appendix; radial cell nearly hairless in basal angle; radial abscissa abruptly widened below at middle, tapering in both directions; veins of transverse brace approximately in the ratio of 1:5:2; second discoidal cell nearly parallel-sided in its apical two-thirds, only slightly narrower at apex, second recurrent hardly one-third as long as basal abscissa of subdiscoideus and forming with it a distinctly acute angle; nervellus slightly inclivous.

Abdomen slender; first tergite straight, postpetiole not decurved; gastrocoeli of second tergite nearly at middle, spiracle distinctly beyond apical third.

Dark brown to black, head largely and thoracic markings yellow, with legs, antennae, and basal four segments of abdomen pale ferruginous; triangular spot on face with its lower angles prolonged across clypeal foveae, more or less of stemmaticum, occiput and postvertex, and temples partly brown; pronotum anteriorly, stripes in notauli confluent with marginal stripes to tegulae, upper angle of mesopleurum, and spot laterad of base of scutellar carina yellow; propodeum basally and laterally more reddish; wings hyaline, with a faint cloud below apex of stigma, venation and scleromes ferruginous; costa, stigma, and metacarpus stramineous.

Male. Essentially like female.

Type locality. Kankau (Koshun), Formosa.

Paratypes. No. 52005, U. S. National Museum.

One female (type) and four males all taken at the type locality.

*Enicospilus flavocephalus* Kirby (fig. 3)

*Henicospilus flavocephalus* Kirby, Monog. Christ. Isl. Fauna, p. 82, 1900.

*Henicospilus similis* Matsumura and Uchida, Ins. Matsumurana, 1, 72, 1926.

One female taken at Taihorin is in the Sauter material. It has the wings basally rather sparsely hairy, the proximal sclerome and the area between it and the fold from base of stigma being hairless both dorsally and ventrally. The fenestra extends from the basal sixth of the radius to the apical third. The proximal sclerome is elongately suboval with its long diameter perpendicular to the front margin of the wing, testaceous, with no trace of an appendix. The quadra is small, elongate oval, with a narrow fusiform sclerome along its postero-apical margin. The radial abscissa is nearly straight, broad at base and increasing slightly in breadth to basal third, thence tapering to apex; the veins of the transverse brace are in the proportion of 1:1.8:1.5. The second cubital



cell is widest distinctly basad of middle, the intercubitus subgeniculate and abruptly thickened at that point, thence tapering to the apex, the second recurrent two-fifths as long as basal abscissa of the subdiscoideus and forming with it an acute angle.

*Enicospilus analis* Matsumura and Uchida (fig. 9)

*Henicospilus analis* Matsumura and Uchida, Ins. Matsumurana, 1, 72, Pl. 3, fig. 18, 1926.

*Henicospilus analis* Uchida, Jvurn. Fac. Agr., Hokkaido Imp. Univ., 21, 225, 1928.

First described as having the central sclerome „punctförmig“ and later „linear“, apparently from the same specimens. One specimen with this sclerome sublinear in the Sauter collection taken at Taihorin I somewhat doubtfully identify as this species.

The fenestra extends from the basal fourth to the apical fifth of the radial abscissa. The proximal sclerome is subtriangular, ferruginous, hairy both above and below, with a slender appendix nearly reaching the radius. The quadra is rather small, parallel to the appendix posteriorly, concavely curved anteriorly, with the elongately oval central sclerome near and oblique to the postero-apical margin. The radial abscissa is evenly somewhat thickened in the middle and tapers toward both ends. The veins of the transverse brace are approximately in the ratio of 2 : 5 : 3; while the second discoidal cell is widest beyond the middle, with the discocubitus evenly arched at that point and the second recurrent one-third as long as the basal abscissa of the subdiscoideus, the two veins meeting in a slightly acute angle.

*Enicospilus nigrivenalis*, new species (fig. 10)

Similar to *analis* Mats. and Uch., but at once distinguishable by the dark venation, much larger oval central sclerome, and relatively longer intercubitus.

Female. Length 21 mm.

Head mostly polished, with only the face distinctly, finely punctate; temples sharply receding, weakly convex, very short; combined face and clypeus more than two-thirds as broad as long, much broader than vertex; cheeks and malar space very narrow; antennae (broken).

Thorax laterally mostly striate, dorsally very finely and obscurely punctate, ventrally densely and finely punctate; pronotum in humeral angle sparsely punctate; longitudinal striation of mesopleurum running into distinct, fine punctation above; prepectal carina roundly curved below; oblique striation of metapleurum confused basally; propodeum smooth basad of carina, rather coarsely rugose beyond, the rugae basally

longitudinal, shortly becoming oblique on each side of median line; fenestra extending from basal fourth to slightly beyond apical fourth of basal abscissa of radius; proximal sclerome subtriangular, hairy both above and below, appendix rather stout and nearly reaching radius; quadra very small, nearly its distal half occupied by the large, broadly oval central sclerome; radial abscissa broadest just basad of middle, tapering toward both ends; veins of transverse brace approximately in the ratio of 3 : 5 : 4; second discoidal cell slightly broadest at middle, discocubitus roundly curved at that point; second recurrent slightly more than a third as long as basal abscissa of subdiscoideus, the two veins forming a slightly acute angle; nervulus slightly antefurcal; nervellus perpendicular to submediella.

Ventral margin of first abdominal segment faintly decurved; gastrocoeli before middle of second tergite.

Ferruginous; orbits, stemmaticum, frons, and sides of face below antennae yellow; wings hyaline, venation blackish, costa and scleromes testaceous; abdomen beyond fourth segment blackish.

Male. Essentially like female.

Type locality. Kankau (Koshun), Formosa.

Allotype. No. 52006, U. S. National Museum.

One of each sex in the Sauter collection, the allotype male taken at Taihorin.

*Enicospilus pallidistigma*, new species (fig. 7)

Female. Length 28 mm.

Head smooth, virtually without sculpture, sharply narrowed behind eyes; combined face and clypeus two-thirds as broad as long, much broader at clypeal foveae than vertex across anterior ocellus; cheeks and malar space very short.

Pronotum strongly striate in scrobe, faintly punctate along humeral margin; mesoscutum very finely, obscurely punctate and pilose; scutellum transversely striate; mesopleurum coarsely, obliquely striato-rugose, the upper third or more finely, closely punctate; sternum very densely and finely sculptured and pilose, mat; prepectal carina sharply angled below; metapleurum with a few sharply irregular rugae; propodeum nearly smooth before carina, very coarsely rugose behind, the basal rugae longitudinal and short, those apically irregularly arcuate; fenestra extending from basal third of basal abscissa of radius to beyond its apex; proximal sclerome triangular, with the anterior angle truncate, hairless above, hairy below, appendix very slender, complete around apex of fenestra; quadra occupying most of fenestra, very distinctly defined especially along posterior and apical margins though not there sclerotized and without a

central sclerome; radial abscissa thickest slightly before middle, tapering gradually toward base and more abruptly so toward apex; veins of transverse brace approximately in the ratio of 3 : 4 : 3; second discoidal cell very long, broadest distinctly beyond middle, discocubitus strongly sinuate, second recurrent one-fourth as long as basal abscissa of subdiscoideus, the two veins forming an obtuse angle; nervulus very slightly ante-furcal; nervellus oblique to mediella.

First abdominal segment faintly decurved below; tergite 2 with gastrocoeli just before middle, spiracles beyond apical third.

Flavous; mesoscutum with 3 brownish stripes; sternum light brown; legs and basal two segments of abdomen more ferruginous, abdomen otherwise blackish with sides of tergites 3—4 and part of 5 broadly flavous; antenna ferruginous, anellus piceous; wings hyaline, radial cell faintly infumate, veins dark brown, stigma mostly and metacarpus pale, sclerome and discocubitus, basal of bulla, testaceous.

Type locality. Suisharyo, Formosa.

One specimen.

*Enicospilus nigristigma*, new species (fig. 13)

Female. Similar in size and sculpture to *pallidistigma*, but dark ferruginous with stemmaticum, only one stripe on mesoscutum, stigma, and abdomen beyond segment 2 black. Differing otherwise from *pallidistigma* as follows: Pronotum and mesopleurum more extensively striate, the striation extending nearly to dorsal margins, that of pleurum, especially below, more nearly horizontal; metapleurum irregularly reticulate-rugose; fenestra much smaller, not reaching apex of radial abscissa; proximal sclerome broader anteriorly and rounded rather than truncate, appendix obsolescent beyond middle; scape, pedicel, and basal joint of flagellum piceous.

Type locality. Taihorin, Formosa.

One specimen.

*Enicospilus stenophleps*, new species (fig. 4)

Similar in venation, especially in the form of the second discoidal cell, to *pallidistigma* and *nigristigma*, but smaller, with thoracic markings paler and abdomen entirely ferruginous.

Female. Length 24 mm.

Head strongly narrowed behind, temples very short and nearly flat; face minutely punctate, combined face and clypeus two-thirds as broad at level of clypeal foveae as long, very slightly broader than vertex at level of anterior ocellus; cheek and malar space very narrow.

Thorax dorsally nearly smooth, laterally finely punctato-striate nearly

throughout; prepectal carina angulate below; propodeum nearly smooth basad of carina, apically regularly rugose, the rugae shortly longitudinal at base, oblique behind; fenestra extending from basal fourth to apical sixth of radial abscissa; proximal sclerome subtriangular, its anterior angle narrowly truncate, hairless above, hairy below, appendix obsolescent; quadra rather large, oval, moderately well defined, with a small, indefinitely outlined, somewhat lunate central sclerome on antero-apical margin; basal abscissa of radius unusually slender, widest before middle, weakly sinuous; veins of transverse brace approximately in the ratio of 4:7:5; second discoidal cell widest beyond middle, discocubitus more strongly curved at that point, sinuous, second recurrent a little more than one-fourth as long as basal abscissa of subdiscoideus, the two veins forming an obtuse angle; nervulus antefurcal; nervellus strongly oblique to mediella.

First segment of abdomen faintly curved below; gastrocoeli far before middle of second tergite, spiracles at apical third.

Head yellow; thorax yellowish ferruginous, mesoscutum with three reddish stripes on a yellow ground, mesosternum brownish ferruginous; wings hyaline, venation blackish, stigma, metacarpus, and discocubitus ferruginous, scleromes brownish testaceous; abdomen ferruginous, petiole stramineous, sheath blackish.

Type locality. Kosempo, Formosa.

One specimen.

*Enicospilus sauteri*, new species (fig. 12)

Male. Length 24 mm.

Similar in form, sculpture, and color to *stenophleps*, but with radius much stouter and second discoidal cell broadest near apex; and differing further as follows: Face much broader than vertex; mesopleurum striate rather than punctato-striate; metapleurum rugose rather than striate; propodeal rugosity more irregular; fenestra reaching from basal fourth to apical fourth of radial abscissa; proximal sclerome with anterior angle more broadly truncate and apical angle more drawn out, the appendix distinct to middle of fenestra; central sclerome in same position but larger and more definite; basal abscissa much thicker in basal half than in apical half, rather abruptly smaller at middle and only slightly tapering toward base; intercubitus, second abscissa of cubitus, and second recurrent in the ratio of 3:5:5; second discoidal cell broadest at apical fourth, strongly narrowing toward base, intercubitus sinuous, second recurrent more than a third as long as basal abscissa of subdiscoideus, the two veins forming a right angle; thoracic markings less distinct.

Type locality. Taihorin, Formosa.

One specimen.

*Enicospilus frater*, new species (fig. 1)

Male. Length 23 mm.

Similar in size, structure, sculpture, and color to *stenophleps*, but distinct in the stouter base of the radius, the different form and position of the scleromes, and the shape of the second discoidal cell. Differing from the above description of *stenophleps* as follows: Mesopleurum distinctly striate rather than punctato-striate, the striae less extensive; propodeal rugosity less regular; fenestra a little smaller, originating near basal third of radial abscissa; proximal sclerome elongate, roundly triangular, its upper margin parallel to costal margin; central sclerome occupying apical fourth of quadra, subacute apically, truncate praximally; radial abscissa thickened in its middle half, the thickened part concavely curved below; veins of transverse brace in the ratio of 2 : 5 : 3.5; second discoidal cell shorter, intercubitus not sinuous, second recurrent one-third as long as basal abscissa of subdiscoideus, the two veins forming a slightly acute angle; tergites 3 and 4 darkened dorsally, yellowish laterally.

Type locality. Taihorin, Formosa.

One specimen.

*Enicospilus nigrimarginalis*, new species (fig. 11)

Male. Length 22 mm.

Similar in size and color to *stenophleps*, but mesopleurum finely and densely punctate, with little indication of striation and the wing structure quite different. Differing from above description of *stenophleps* as follows: Posterior area of propodeum arcuately rugose throughout; fenestra small, reaching from basal fifth to apical third of radial abscissa; proximal sclerome small, guttiform, with pointed end toward stigma, hairless both above and below, with a very broad, faint indication of the detached appendix; quadra very small and poorly defined, without a sclerome; radial abscissa nearly straight, thick basally, slender apically, thickest just before middle and becoming rather abruptly smaller beyond; veins of transverse brace in the ratio of 3 : 5 : 4; second discoidal cell broadest at about middle, discocubitus abruptly curved at this point, weakly sinuous basad, second recurrent vein one-third as long as basal abscissa of subdiscoideus; venation brown, paler across middle of fore wing and on hind wing, subcosta and subcostella blackish.

Type locality. — Taihorin, Formosa.

Haratype. — No. 52007, U. S. National Museum.

One specimen in the Sauter collection and one reared by T. Shiraki in January 1912, at Taihoku, Formosa, from *Orgyia postica*.