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CLASSIFICATION OF THE SUPERFAMILY CHALCIDOIDEA.

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INTRODUCTION.

About fourteen years ago Mr. Herbert H. Smith placed in my hands for study part of his extensive collection of South American parasitic Hymenoptera, representing the old families *Proctotrypidæ*, *Cynipidæ* and *Chalcididæ*. The collection was a valuable one and when I took it I confidently expected to find time to finish with it within two or three years; but so much other material was thrust upon me for study that I found it a physical impossibility to do it justice in that length of time; only a few short papers on it have been published. The work accomplished during these past fourteeen years has I think fully demonstrated that I have not been idle, my knowledge of the groups, genera, and species of the Hymenoptera has greatly increased and broadened, and I now feel better able to do justice to the splendid collection received so many years ago.

The Herbert H. Smith collection of insects, made in South America, representing nearly all orders, has been acquired by the Carnegie Museum, Pittsburgh, Pa., and much to my regret, the many fine species, except a set of duplicates in my hands, and which I had always hoped might be secured by the National Museum, must go to that Museum. Dr. W. J. Holland, the Director of the Carnegie Museum, desires now that I complete my work as soon as possible and return the material in my possession. In acceding to this request I have stipulated that he publish my classification of the chalcid-flies, or the Superfamily Chalcidoidea, as a part of this work, and it is through his liberality that I am able to give so many fine illustrations and present in a more attractive form my ideas on the classification of another great complex in the Order Hymenoptera.

The *Proctotrypoidea* and *Cynipoidea* in the collection will be described in another paper.

In this contribution I have restricted myself to elucidating the chalcid-flies and have divided it into two parts. The first part is devoted to a classification of the superfamily Chalcidoidea; the second part deals with the South American Chalcidoidea. In this latter part, besides my report upon the Herbert H. Smith collection, the descriptions of the new genera and species, is given a complete bibliographical catalogue of all the known South American species.

PART I. CLASSIFICATION OF THE CHALCID-FLIES, OR THE SUPERFAMILY CHALCIDOIDEA.

Among the ten great groups or superfamilies of the Hymenoptera, recognized by the author, there is none so large numerically, more important economically, or so difficult to study and classify as the superfamily Chalcidoidea or the Chalcid-flies. The species exist everywhere not by hundreds, but by thousands and millions, and they are probably of far greater importance, from an economic standpoint, than are the Ichneumonoidea or ichneumon-flies.

Only a few of them, comparatively speaking, are in any sense injurious, a single minor group, the tribe *Isosomini*, in the family Eurytomidæ, alone being injurious to vegetation. All the others, except the fig-insects forming the family *Agaonidæ*, the *Megastigminæ*, a subfamily in the Torymidæ, and some few hyperparasitic genera in different families, being genuine parasites and beneficial to man. It is true, however, that some of the chalcid-flies destroy a few beneficial insects, but the vast majority of the known species destroy mostly the injurious species in the other orders, *i. e.*, the Coleoptera, the Lepidoptera, the Diptera, the Rhynchota, etc.; they attack the eggs, the larvæ, and the pupæ, and in some cases even the imagoes of their hosts, and their value to many great industries of the world cannot easily be estimated. Who, for example, can estimate the value of the fig-insects to the fig industry of the United States? Through the efforts of Dr. L. O. Howard and Mr. W. T. Swingle, of the U. S. Department of Agriculture, the caprifier of the Smyrna fig, *Blastophaga psenes* Linné (*grossorum* Gravenhorst), has been successfully introduced into the fig-orchards of California, and the experiments already made fully demonstrate the great value this little chalcid-fly has to the fig industry. It is evidently destined to revolutionize fig-growing in the United States, making it exceedingly profitable, and, on account of the superiority of the American-grown

Smyrna fig pollenized by these Chalcid-flies, will in time diminish the importation of the Smyrna fig. The *Megastigminæ* too, I suspect, are like the fig-insects, and will be found to be of great importance as pollenizers of various plants and trees.

At present the known genera and species of the Chalcidoidea are considerably less in number than are the Ichneumonoidea recently classified by the writer; but this is due simply to the fact that the literature on the subject, in various languages, is widely scattered, in many foreign journals, magazines, proceedings of learned societies, etc., and the minute size of most of the species and the difficulty of their study, have deterred entomologists from giving them any attention. Only a little over 5,000 species have been described.

If we look back for a century and a half we find comparatively few who have given much attention to these "atoms of creation," and of these a few names only stand out conspicuously as students of this great complex. The study of the group began about one hundred and fifty years ago with Linnæus in Sweden and with Geoffroy in France. Linné, or Linnæus, in his Systema Natura, tenth edition, published in 1758, described several species under his genera *Ichneumon*, *Cynips*, *Sphex*, etc. Others took up their study, and an interest in them was aroused in Sweden, Austria, Germany, France, Italy, and England. In Sweden, besides Linné, Swederus, Fabricius, Zetterstedt, Dalman, Boheman, Dahlbom and Thomson did much valuable work in the group; in Germany, Klug, Nees von Esenbeck, Bouché, Ratzeburg, and Förster—the last mentioned, the greatest systematic worker in the group; in Austria, Reinhard and Mayr; in Russia, Motschulsky; in France, Geoffroy, Latreille, Fonscolombe, Perty, Guérin, Giraud, Sichel, and André; in Italy, Spinola and Rondani; in England, Curtis, Haliday, Westwood, Walker, Saunders, Kirby, and Cameron; and in America, Say, Fitch, Cresson, Walsh, Riley, Provancher, Howard, and Ashmead. A few others might be mentioned, but those specified are the ones whose names stand out prominently as adding materially to our knowledge of the group during the eighteenth and nineteenth centuries.

For years I have been studying this great complex and in the following pages have attempted to define the families, subfamilies, tribes, and genera of the world. The work has been a gigantic and most laborious one, necessitating the microscopic examination of many thousands of these minute creatures; but if it shall be found that I have brought some order into their classification, that I shall excite an interest in the collecting of the many thousands still unknown, and that I shall stimulate others to study them, my time has not been wasted and I shall be amply repaid.

Superfamily VII. *CHALCIDOIDEA.*

1758. Cynips, Linné (partim), Syst. nat., Ed. 10ª, I., p. 343.
1802–05. Diplolepaires, Familie soixante deuxième (partim) Latreille, Hist. Nat. Crust. et Ins., XIII., p. 198.
1802–05. Cynipseres, Familie soixante-troisième (partim), opus. cit., p. 211.
1809. Diploleparіæ, Familia quinta (partim) Latreille, Gen. Crust. et Ins., III., p. 15.
1809. Cynipsera, Familia sexta (partim) Latreille, opus. cit., supra, p. 21.
1811. Diploleparia, Familia (partim) Spinola, Ann. du Mus. Natur., XVII., p. 138.
1820. Pteromalini, Familia (partim) Dalman, Kongl. Svensk. Vet.-Akad. Handl., p. 132.
1825. Chalcidites, Quatrième Tribu (partim) Latreille, Fam. Natur. d. Règne anim., p. 446.
1830. Chalcida, Family, Leach, Edinb. Encycl., IX., p. 144.
1840. Chalcididæ, Family, Westwood, Intro. Mod. Class. Ins., II., p. 154.
1846. Chalcidites, Order, Walker, List Chalc. Brit. Museum, I., p. 1.
1856. Chalcidiæ, Förster, Hym. Stud., II., pp. 1–90.
1875. Pteromalidæ, Familia, Thomson, Hym. Skand., IV., p. 3.
1877. Chalcidita, Tribe 4, Förster, Ueber den Syst. Werth d. Flügelg. bei d. Hym., p. 19.
1886. Chalcididæ, Family, Howard, Ent. Amer., I., p. 197.
1897. Chalcidoidea, Superfamily VII., Ashmead, Proc. Ent. Soc. Washington, IV., p. 243.

TABLE OF FAMILIES.

1. Hind wings exceedingly narrow, linear, pedunculate at base; ovipositor issuing from beneath just anterior to tip of abdomen; antennæ without a ring-joint, the scape rather small, short, compressed..... 12

   Hind wings never very narrow, nor linear, not pedunculate at base; ovipositor issuing far anterior to the tip of abdomen; antennæ elbowed, with 1, 2, or 3 ring-joints, very rarely without, the scape large and rather long. 2

2. Axillæ triangularly produced or advanced forward into the basal region of the scapulæ, their base or anterior margin *on* or *in advance* of an imaginary line drawn from tegula to tegula; anterior tibial spur most frequently small or weak; tarsi 3–4-jointed, rarely 5-jointed or heteromerous..... 10

   Axillæ normal, or at least never produced forward into the basal region of the scapulæ, their base or anterior margin straight and always back of an imaginary line drawn from tegula to tegula; anterior tibial spur large and strong; tarsi 5-jointed (rarely 4-jointed, or 3- or 4-jointed in some wingless males) 3

3. Head in ♀ oblong, with a deep, broad longitudinal furrow above, the occipital margin superiorly, usually with a small recurved tubercle or spine at its middle; mandibles or palpi most frequently furnished with saw-like appendages; anterior and posterior legs very stout, their tibiæ very much shorter than their femora, the middle legs very slender, sometimes aborted; hypopygium very

prominent, acute, cultriform or lanceolate; ovipositor long, prominently exserted; ♂ always apterous, the head anteriorly with a deep triangular fovea, in which are placed the short 3–9-jointed antennæ; the abdomen in the ♂ is broadly sessile, long and tubular, thickened at base, or broadened apically with a tubercle or filament at each apical angle.....Family LX. AGAONIDÆ.

Head rarely oblong and quite differently formed, never with a deep broad longitudinal furrow above, most frequently transverse, or subquadrate, the occipital margin never with a small recurved spine; mandibles and palpi without saw-like appendages; middle legs not especially slender, the anterior and posterior legs are often stout, but their tibiæ are always longer, at least never shorter than their femora; hypopygium rarely very prominent; ♂ most frequently winged, rarely apterous; in the latter case the abdomen is normal, not long and tubular.

Mesopleura large, entire, without a femoral furrow, except occasionally in some males, the mesepisternum large, triangular, not extending to base of front coxæ; middle tibial spur saltatorial, most frequently long and stout, or dilated at base..... 8

Mesopleura always with a femoral furrow or impression, the mesepisternum variable, rarely large, except in the *Cleonymidæ*, most frequently small, wedge-shaped, or linear and extending to base of front coxæ; if large and triangular, either the anterior or the posterior femora are much swollen; middle tibial spur not saltatorial, usually short or weak, never very stout.

Hind tibiæ with 2 apical spurs, rarely with 1 only; in the latter case the radius terminates in a large, rounded stigma, the ovipositor very long..... 4

Hind tibiæ with 1 apical spur; ovipositor rarely long; if long the stigma is small..... 9

4. Mandibles falcate, usually with 1 or 2 teeth within; thorax most frequently very gibbous, the scutellum usually very large, often abnormally developed, elevated and produced posteriorly, the axillæ connate, not distinctly separated from the surrounding surface and broadly united along their inner margins..... 6

Mandibles usually 3–4-dentate at apex, rarely falcate, with 1 or 2 teeth within; thorax not, or very slightly, gibbous, the axillæ distinctly separate, their inner margins most frequently widely separated, very rarely touching.

Hind coxæ rarely much larger than the anterior coxæ, most frequently smaller or equal; if much larger, the pronotum is elongate, mesepisternum large, the hind legs very long, the postmarginal vein very long; ovipositor very rarely prominent..... 5

Hind coxæ very large and long, usually five or six times larger than the anterior coxæ.

Hind coxæ subtriquetrous, or at least compressed into a sharp ridge above; hind femora rarely very much swollen, and most frequently simple, rarely with one large tooth or denticulate beneath; hind tibia usually straight; abdomen most frequently subcompressed (more rarely depressed), with a long ovipositor; if without an exserted ovipositor, the abdomen is conical or conic-ovate with a peculiar sculpture, the radius (stigmal vein) usually very short, the hind tibiæ at apex normal..... Family LXI. TORYMIDÆ.

Hind coxæ usually very long and subcylindrical; hind femora always much swollen and most frequently armed with teeth beneath or finely serrated, rarely without teeth; hind tibiæ strongly curved and obliquely truncately produced at apex, so that the tarsi seem to be attached a little before tips; abdomen of various shapes, most frequently conical or conic-ovate, more rarely globose, or oblong-oval, the ovipositor very rarely prominent; radius variable, rarely very short..... Family LXII. CHALCIDIDÆ.

5. Pronotum rarely transverse-quadrate, conical or conically produced anteriorly, or very short, transverse linear, and very much narrowed medially, rarely as wide as the mesonotum..... 7

Pronotum large, quadrate or transverse quadrate, never very short, if somewhat shortened always as wide as the mesonotum.

Pronotum quadrate or subquadrate; abdomen in ♀ not triangulated, either globose, ovate, conic-ovate or lanceolate and compressed or subcompressed, the hypopygium most frequently prominent plowshare-shaped; second dorsal segment never very large; mandibles not strong, most frequently 4-dentate.....Family LXIII. EURYTOMIDÆ.

Pronotum shorter, more transverse and as wide as the mesonotum; abdomen in ♀ most frequently triangulated, or globose, the second and third segments occupying most of the dorsal surface, the following very short and more or less retracted within the third; hypopygium not prominent; mandibles 2- or 3-dentate at apex.....Family LXIV. PERILAMPIDÆ.

6. Second abdominal segment very large and most frequently enclosing the following; coxæ not large, subglobose, nearly equal; all legs very slender; radius scarcely developed, its stigma sessile or subsessile.....Family LXV. EUCHARIDÆ.

7. Mesepisternum not large, triangular; anterior femora never much swollen, the posterior femora also normal or only slightly swollen; marginal vein in hind wings usually long, the costal cell not reaching to the hooklets or spinulæ and most frequently very narrow; radius well developed.

Family LXVI. MISCOGASTERIDÆ.

Mesepisternum large, triangular; either the anterior or the posterior femora are much swollen and sometimes toothed, or both are swollen with the hind femora toothed; if with slender legs, the hind legs are very long, their coxæ long, cylindrical, while the radius (stigmal vein) in front wings is very short, with the postmarginal vein very long extending to the apex of the wing (*Pelecinella*).

Family LXVII. CLEONYMIDÆ.

8. Mesonotum either depressed, with more or less distinct parapsidal furrows, the scapulæ longitudinally ridged, or convex or subconvex, entirely without furrows, rarely convex with distinct furrows; axillæ most frequently meeting at inner basal angles, rarely very widely separated.

Family LXVIII. ENCYRTIDÆ.

9. Mesonotum subconvex with incomplete or complete parapsidal furrows; hind coxæ rarely much larger than the front coxæ; axillæ separated, not meeting at inner basal angles; mesepisternum usually small, wedge-shaped or triangular; hind wings with a long marginal vein; mandibles usually stout, 3- or 4-dentate at apex.....Family LXIX. PTEROMALIDÆ.

10. Hind coxæ normal; mesopleura impressed 11

Hind coxæ abnormally large and dilated, their femora flat or compressed; tarsi very long; mesopleura entire, not impressed; marginal vein in front wings most frequently extraordinarily lengthened, the radius very short, scarcely dilated; mesonotum without furrows ..... Family LXX. ELASMIDÆ.

11. Tarsi 4–5-jointed, rarely heteromerous; anterior wings not short and broad, with the pubescence normal, marginal and radial veins normal; postmarginal vein often wanting; mesonotum with complete or incomplete furrows.....Family LXXI. EULOPHIDÆ.

Tarsi 3-jointed; anterior wings short and broad, broadly rounded at apex with the pubescences most frequently arranged in rows, more rarely normally pubescent; marginal and radial veins united in the form of a strongly curved line ∩.....Family LXXII. TRICHOGRAMMIDÆ.

12. Pronotum usually large, rounded, or conically produced anteriorly; wings always with a long marginal fringe, nearly veinless and always without a radius (stigmal vein), the marginal vein most frequently reduced to a mere dot; antennæ in ♀ most frequently terminating in a distinct fusiform or egg-shaped solid club, more rarely with a 2-jointed club; tarsi 4–5-jointed.

Family LXXIII. MYMARIDÆ.

tionably closely allied. It is, however, easily separated from the *Eucharidæ* by many salient differences, and I agree with Dr. Förster in considering it a distinct family. It has some affinities allying it with the family *Miscogasteridæ*, the affinities existing also in the *Eucharidæ* and particularly through Cameron's genus *Orasema*.

Chrysolampus Spinola belongs to this family and not with the *Pteromalidæ*, where Dr. Von Dalla Torre has placed it. His changing the well-known subfamily *Sphigigasterinæ* into *Chrysolampinæ*, is therefore unnecessary and unwarranted. *Chrysolampus* is identical with *Lamprostylus* Förster.

The group attacks principally Lepidoptera, but will also attack other insects, as I have bred *Perilampus* sp. from Chrysopa cocoons.

The genera are not numerous and are characterized in the following table:

TABLE OF GENERA.

1. Abdomen petiolate 6
   Abdomen sessile or subsessile 2
2. Scutellum normal, although sometimes very large, not produced into a long spine 3
   Scutellum produced into a long spine ..... **Euperilampus** Walker (type *Perilampus gloriosus* Walk.).
3. Thorax smooth, not coarsely punctate 5
   Thorax coarsely punctate.
   Antennæ 13-jointed 4
   Antennæ 9-jointed (teste Kriechbaumer) ..... **Sericops** Kriechbaumer (type *S. fasciata* Kriechbaumer).
4. Flagellum very short, compacted into a short club ..... **Philomides** Haliday (type *P. paphius* Haliday).
   Flagellum not very short, at the most subclavate ... **Perilampus** Latreille (type *Cynips italica* Fabricius).
5. Antennæ inserted below the middle of the face, 13-jointed; stigmal and postmarginal veins abbreviated. **Chrysomalla** Förster (type *C. roseri* Förster).
6. Antennæ simple 7
   Antennæ pectinate. ♂ (♀ unknown) ..... **Aperilampus** Walker (type *Perilampus discolor* Walker).
7. Metathorax thickly and deeply punctate ..... **Chrysolampus** Spinola = *Lamprostylus* Förster (type *C. splendidula* Spinola).
   Metathorax not so punctured, smooth or with only a few punctures ..... **Elatus** Walker (type *E. thenæ* Walker).

Family LXV. EUCHARIDÆ.

1846. Eucharidæ, Family 5 (partim), Walker, List. Chalc. British Museum, I., p. 21.
1856. Eucharoidæ, Familie 8, Förster, Hym. Stud., II., pp. 18, 22 and 42.
1886. Eucharinæ, Subfamily, Howard, Ent. Amer., I., p. 198.
1897. Eucharidæ, Family LXV., Ashmead, Proc. Ent. Soc. Washington, IV., p. 235.
1899. Eucharidæ, Family LXV., Ashmead, *loc. cit.*, p. 245.

1900. Eucharidæ, Family LXV., Ashmead, Proc. U. S. National Museum [illegible] p. 202.

In this family are found some of the most singular looking and wonderfully shaped Chalcids known, the structure of the thorax, and particularly of the scutellum, being most wonderfully and curiously modified and developed; and this development, in connection with the brilliant metallic green and blue colors of its members, makes the group the most striking and attractive of any in the Superfamily. Some of the species are now known to be parasitic upon ants and probably the whole group attacks these insects. In temperate regions the family is poorly represented, but in tropical countries, where ants most abound and flourish in enormous colonies, these insects are not rare and seem to have reached a very highly specialized development.

The known genera may be tabulated as follows:

TABLE OF GENERA.

1. Females 2
   Males 21
2. Antennæ 13-jointed or less 3
   Antennæ 14-pointed or more.
   Scutellum simple; antennæ 16–18-jointed ..... **Eucharissa** Westwood (type *E. speciosa* Westw.).
   Scutellum produced posteriorly into a spine which is longitudinally striate; antennæ 14-jointed. **Saccharissa** Kirby (type *Eucharis contingens* Walker).
3. Scutellum simple, neither bidentate nor produced into long processes 4
   Scutellum bidentate or produced posteriorly into long processes over the abdomen 11
4. Antennæ moniliform 5
   Antennæ not moniliform 6
5. Abdomen compressed, ascending ..... **Eucharis** Latreille (type *Cynips adscendens* Fabr.).
   Abdomen neither compressed nor ascending.
   Hind tarsi with the first joint much thickened; antennæ 11-jointed ..... **Tricoryna** Kirby (type *Eucharis jello* Walt.).
   Hind tarsi with the first joint very long, but not thickened ..... **Metagea** Kirby (type *Eucharis Zalates* Walk.).
6. Joints of antennæ not serrate, cylindrical 7
   Joints of antennæ serrate or subdentate 9
7. Antennæ 13-jointed, the joints short 8
   Antennæ 11-jointed, the joints long.
   Thorax smooth, polished; petiole of abdomen abruptly enlarged at apex. **Pseudometagea** Ashmead (type *Metagea schwarzii* Ashm.).
   Thorax rugose; petiole of abdomen normal, long and cylindrical ..... **Psilogaster** Blanchard (type *P. cupreus* Blanchard).
8. Thorax not greatly elevated, similar to *Chrysolampus* in the Perilampidæ, punctate and with complete parapsidal furrows; mandibles long, acute at apex, the right mandible with *two* teeth within, the left with *one* tooth within ..... **Orasema** Cameron (type *O. stramineipes* Cam.).

9. Antennæ 11-jointed 10
Antennæ 13-jointed ..... **Rhipipallus** Kirby (type *Eucharis volusus* Walk.).

10. Scutellum rounded, not conically elevated posteriorly; wings hyaline. **Pseudochalcura** Ashmead, n. gen. (type *Leucharis gibbosa* Provancher).
Scutellum subconically elevated posteriorly; wings with a substigmal cloud ..... **Chalcura** Kirby (type *Eucharis deprivata* Walk.).

11. Scutellum with the processes very long, usually as long as the abdomen and sometimes very broad, forming a shield over the abdomen, or conically produced 13
Scutellum bidentate, the processes never very long.
Metathorax armed with strong lateral projections or teeth 12
Metathorax unarmed, without teeth.
A hump-like elevation above the metapleura ..... **Stilbula** Spinola (type *Ichneumon cynipiformis* Rossi).
No hump-like elevation above the metapleura ..... **Schizaspidia** Westwood (type *S. furcifera* Westw.).

12. Metathoracic processes curving downwards ..... **Lophyrocera** Cameron (type *L. stramineipes* Cam.).
Metathoracic processes consisting of two diverging horizontal teeth ..... **Tetramelia** Kirby (type *Schizaspidia plagiata* Walk.).

13. Scutellum not conically produced 14
Scutellum conically produced over the abdomen.
Head with a deep antennal furrow; hind femora very broad; abdomen subsessile, fusiform, depressed ..... **Destefania** Dalla Torre (type *Sternodes Pasateri* De Stef.).

14. Scutellar processes long and slender, generally curving inward toward tips 18
Scutellar processes very broad and covering the entire abdomen.
Thorax not pubescent, the apex of the scutellar processes simple, or cleft or notched 15
Thorax pubescent, the apex of the scutellar processes rounded and not sharply cleft, the notch extending two thirds the entire length 17

15. Scutellar processes long, broad and contiguous, but very flat, the extremities rounded, subtruncate, or furnished with two rounded short spines 16
Scutellar processes not so shaped.
Scutellar processes very broad, triangular ..... **Thoracantha** Latreille (type *T. latreillei* Guérin).
Scutellar processes long, contiguous and acutely pointed at tips, longitudinally striate. **Uromelia** Kirby (type *Thoracantha striata* Perty).

16. Mesonotum and scutellum medially impressed; head almost as wide as the thorax; antennæ 10-jointed, the third joint as long as the scape, the following much wider than long ..... **Dicœlothorax** Ashmead (type *D. platycerus* Ashm.).
Mesonotum and scutellum not so impressed, the scutellar processes having the basal portion as wide as the thorax, briefly compressed in the center, then dilated and at the apex furnished with two rounded short spines ..... **Lætocantha** Shipp (type *Thoracantha nasuta* Walk.).

17. Antennæ 10-jointed, the first funicle joint the longest, the following short ..... **Dilocantha** Shipp (type *Thoracantha flavicornis* Walk.).

18. Head and eyes normal, not tuberculate 19
Head and eyes tuberculate.
Antennæ 12-jointed ..... **Isomeralia** Shipp (type *Thoracantha coronata* Westw.).

19. Antennæ 11-jointed, the third joint not much longer than the fourth 20

Antennæ 10-jointed, the third joint very long, as long as all of the other joints united.

Lirata Cameron (type *L. luteogaster* Cam.).

20. Thorax not pubescent, the scutellum always longitudinally striate ..... **Kapala** Cameron (type *Eucharis fuscata* Fabr.).

Thorax clothed with a fine pubescence, the scutellum smooth, not longitudinally striate, the processes smooth to their apices, where they are transversely serrate ..... **Lasiokapala** Ashmead (type *L. serrata* Ashm.).

21. Scutellum spined, bidentate or produced into long processes extending over the ~~scutellum~~ abdomen 22

Scutellum normal, simple 23

22. Scutellum bidendate or produced into long processes that extend over the abdomen 28

Scutellum produced into a spine-like process.

Antennæ never more than 13-jointed 29

Antennæ 18-jointed ..... **Saccharissa** Kirby.

23. Antennæ 10–13-jointed 24

Antennæ 22-jointed ..... **Eucharissa** Westwood.

24. Antennæ simple, without branches 25

Antennæ ramose or with branches 28

25. Flagellar joints moniliform 26

Flagellar joints cylindrical, not moniliform 27

26. Abdomen compressed, ascending ..... **Eucharis** Latreille.

Abdomen neither compressed nor ascending.

First joint of tarsi much thickened ..... **Tricoryna** Kirby.

First joint of tarsi very long, slender ..... **Metagea** Kirby.

27. Antennæ 10–11-jointed.

Petiole of abdomen abruptly enlarged at apex; thorax smooth ..... **Pseudometagea** Ashmead.

Petiole of abdomen normal, long, cylindrical; thorax rugose ..... **Psilogaster** Blanchard.

Antennæ 13-jointed, rather short; thorax closely punctate, the parapsidal furrows distinct; right mandible with two teeth within, the left with one tooth within ..... **Orasema** Cameron.

28. Scutellum spined, bidentate or produced into long processes that extend over the abdomen 29

Scutellum normal, unarmed.

Antennæ with 4 branches; wings hyaline ..... **Pseudochalcura** Ashmead.

Antennæ with more than four branches; wings with a substigmal cloud or fascia.

Chalcura Kirby.

29. Scutellum not conically produced into a spine 30

Scutellum conically produced into a spine ..... **Destefania** Dalla Torre.

30. Scutellum with the processes very long, usually as long as the abdomen and sometimes very broad, forming a shield over the abdomen 32

Scutellum bidentate, the teeth never very long.

Metathorax armed with strong lateral projections or teeth 31

Metathorax unarmed without teeth

A hump-like elevation above the metapleura ..... **Stibula** Spinola.

No hump-like elevation above the metapleura ..... **Schizaspidia** Westwood.

31. Metathoracic processes curving downwards; antennæ simple ..... **Lophyrocera** Cameron.

Metathoracic processes consisting of two horizontal teeth; antennæ with 9 branches.

Tetramelia Kirby.

32. Scutellar processes long and slender, generally curving inward toward tips 36
Scutellar processes broad, contiguous their entire length or at least basally 33
33. Scutellar process long, broad and contiguous, but very flat, the extremities [illegible] furnished with two rounded, short spines 34
Scutellar processes not so shaped.
Scutellar process very broad, deeply, semicircularly emarginate at apex; antennæ with 9 branches ..... Thoracantha Latreille.
Scutellar processes long, triangularly pointed and longitudinally striate; antennæ with 8 branches ..... Uromelia Kirby.
34. Thorax pubescent 35
Thorax *not* pubescent.
Mesonotum and scutellum medially impressed; antennæ 10-jointed ..... Dicœlothorax Ashmead.
Mesonotum and scutellum not impressed, the scutellar processes at base as wide as the thorax, briefly compressed in the center, then dilated and at apex furnished with two rounded, short spines ..... Lætocantha Shipp.
35. Scutellar processes at apex rounded and not sharply cleft, the notch extending two thirds the entire length ..... Dilocantha Shipp.
36. Head and eyes normal, not tuberculate 37
Head and eyes tuberculate ..... Isomeralia Shipp.
37. Antennæ 11-jointed, the third joint not much longer than the fourth 38
Antennæ 10-jointed, the third joint very long, as long as the other joints united ... Lirata Cameron.
38. Thorax not pubescent, the scutellum longitudinally striate ..... Kapala Cameron.
Thorax clothed with a fine pubescence, the scutellum smooth, not striate, the apices of the scutellar processes serrate ..... Lasiokapala Ashmead.

Family LXVI. MISCOGASTERIDÆ.

1833. Miscogasteridæ, Family 4 (partim), Walker, Ent. Mag., I, p. 370.
1856. Miscogasteroidæ, Familie 14 (partim), Förster, Hym. Stud., II, pp. 19, 24 and 51.
1875. Pteromalina, Tribus (partim), Thomson, Hym. Skand., IV., pp. 12 and 216.
1886. Pteromalinæ, subfamily (partim), Howard, Ent. Amer., I, p. 198.
1897. Miscogasteridæ, Family LXVI., Ashmead, Proc. Ent. Soc. Washington, IV., pp. 235 and 245.
1900. Miscogasteridæ, Family LXVI., Ashmead, Proc. U. S. National Museum, XXIII., p. 202.

This family very closely resembles the family *Pteromalidæ*, and the two are separated with difficulty, the only reliable character to separate them being the number of apical spurs on the hind tibiæ. In this family the hind tibiæ have *two* apical spurs, while in the *Pteromalidæ* there is but *one* apical spur. It is a good character but not easily seen in the smaller species, and the greatest care and caution must be exercised in examining specimens before they can be placed in their proper families. A very strong lens is required to see the spurs and sometimes it will be found

ne abdomen more depressed, the pedicel as well as the scape being yellow; otherwise it is hardly distinguishable from the female.

Brazil: Chapada; Santarem. Ten specimens.

Genus RILEYA Ashmead.

RILEYA ORBITALIS, sp. nov.

Female.—Length 2 mm. Head and thorax, except the pronotum which is more or less brownish or yellowish, mostly black, the abdomen brown, the apex black; orbits, face below antennæ, scape, tegulæ, and the legs, except the basal half of the hind femora, yellow or brownish-yellow, the tips of the tibiæ and the tarsi paler or yellowish-white; flagellum subclavate, light brown, joints five and six of funicle wider than long. Wings hyaline, the veins pale yellowish; the marginal vein is a little more than twice the length of the stigmal, the postmarginal vein being long.

The abdomen is conic-ovate, cylindrical, nearly twice the length of the thorax, pointed at apex, the third segment very large, occupying the greater part of the whole surface of abdomen.

Brazil: Santarem.

FAMILY LXIV. PERILAMPIDÆ.

Genus PERILAMPUS Latreille.

PERILAMPUS BRASILIENSIS, sp. nov.

(Plate XXXIV., Fig. 4.)

Female. — Length 4.8–5 mm. Blue, the head behind the ocelli, the fore part of the middle mesothoracicl obe, and the inner front angle of the lateral lobes æneous; the head is smooth with several longitudinal striæ between the eyes and the scrobes, the pronotum coarsely, irregularly punctate, the middle mesothoracic lobe and the scutellum coarsely transversely striate, the lateral mesothoracic lobes with some long, oblique striæ posteriorly. The extreme tips of the tibiæ and the tarsi are testaceous.

Brazil: Chapada, in April. Two specimens.

FAMILY LXV. EUCHARIDÆ.

Genus EUCHARIS Latreille.

EUCHARIS DICERODERA Spinola? = *Kapala.*

Eucharis dicerodera Spinola, Mem. Acad. Sc. Torino (2), XIII., 1851, p. 43, ♂.—Dalla Torre, Cat. Hym., V., 1898, p. 360.

Brazil.

Genus ORASEMA Cameron.

ORASEMA FESTIVA (Fabricius).

Eucharis festiva Fabricius, Syst. Piez., 1804, p. 157.

Orasema festiva Kirby, Journ. Linn. Soc. London, Zool., XX., 1886, p. 29.— Dalla Torre, Cat. Hym., V., 1898, p. 361.

Brazil.

ORASEMA RAPO (Walker).

(Plate XXXIV., Fig. 5.)

Eucharis rapo Walker, Monogr. Chalc., II., 1839, p. 66, ♀.

Orasema rapo Kirby, Journ. Linn. Soc. London, Zool., XX., 1886, p. 26. — Dalla Torre, Cat. Hym., V., 1898, p. 361.

Brazil: Chapada, in April; Santarem; Corumba, in May. Fifteen specimens.

PSEUDOCHALCURA Ashmead, gen. nov.

This genus resembles *Chalcura* Kirby, but the wings are hyaline, *without* a fuscous spot, and the antennæ, in the male, have only *four* branches.

PSEUDOCHALCURA NIGROCYANEA, sp. nov.

(Plate XXXIV., Fig. 6.)

Male.— Length 3.5 mm. Blue-black, coarsely, reticulately punctate, with a faint æneous tinge above, the trochanters, apices of femora and all tibæ and tarsi, and the scape and pedicel of antennæ honey-yellow, the flagellum brown-black or brown, paler towards apex, joints one to four each with a long branch above. The abdomen is æneous black, with a very long petiole, the length of the hind femora, the body subcompressed, viewed from the side subtriangular.

Female. — Length about 4 mm. Agrees fairly well with the male except that the flagellum is brown, joints one to four acutely lobed above, while the abdomen is larger, the petiole much shorter, being hardly two thirds the length of the hind femora.

Brazil: Chapada, in April. Six specimens.

Genus STIBULA Spinola.

STIBULA NIGRICEPS, sp. nov.

(Plate XXXV., Fig. 2.)

Male.— Length 3 mm. Brownish-yellow, the head, except the eyes which are brown, being entirely black; the flagellum from the second joint is brown-black, the scape, pedicel, and the first joint of the flagellum being yellow; the first joint of the flagellum is very long, more than twice as long as the scape.

The thorax is brownish-yellow marked with black as follows: The middle mesothoracic lobe has two oblong, nearly confluent, spots anteriorly, the lateral lobes have a spot above, while the scutellum has a transverse line across the base and a central line ending on the two spines at the apex of the scutellum, black. The abdominal petiole and the legs are yellow.

Brazil: Santarem, in April. One specimen.

Genus SCHIZASPIDEA Westwood.

SCHIZASPIDEA MACULATA Westwood.

Schizaspidea? maculata Westwood, Thesaur. ent. Oxon., 1874, p. 153, ♀; Pl. 28, f. 1.
Orasema maculata Kirby, Journ. Linn. Soc. London, Zool., XX., 1886, p. 29.—Dalla Torre, Cat. Hym., V., 1898, p. 361.

Brazil.

SCHIZASPIDEA PRETENDENS Walker.

Schizaspidea pretendens Walker, Trans. Ent. Soc. London (3), I., 1862, p. 385, ♂.—Dalla Torre, Cat. Hym., V., 1898, p. 364.

Brazil: Chapada, in May. One specimen, badly damaged.

Genus TETRAMELIA Kirby.

TETRAMELIA MERIDIONALIS Kirby.

Tetramelia meridionalis Kirby, Ann. and Mag. Nat. Hist. (6), IV., 1889, p. 144, ♀.—Dalla Torre, Cat. Hym., V., 1898, p. 364.

Brazil.

TETRAMELIA PLAGIATA (Walker).

(Plate XXXV, Fig. 1.)

Schizaspidia plagiata Walker, Trans. Ent. Soc. London (3), I., 1862, p. 385, ♂.—Westwood, Thesaur. ent. Oxon., 1874, p. 152; Pl. 28, f. 11.
Tetramelia plagiata Kirby, Journ. Linn. Soc. London, Zool., XX., 1886, p. 31.—Dalla Torre, Cat. Hym., V., 1898, p. 364.

Brazil: Chapada, in November. One male specimen.

Genus THORACANTHA Latreille.

THORACANTHA LATREILLEI Guérin.

Thoracantha latreillei Guér. Iconogr. Régn. an. Ins., VII., 1829–44, p. 415; Pl. LXVII., f. 8.—Blanchard, Hist. nat. Ins., III., 1840, p. 257.—Walker, Ann. & Mag. Nat. Hist., XII., 1843, p. 45, ♀.—Kirby, Journ. Linn. Soc. London Zool., XX., 1886, p. 32.—Dalla Torre, Cat. Hym., X., 1898, p. 365.
Thoracantha coleopteroides (Waterhouse) Westwood, Trans. Ent. Soc. London, II., 1839, p. 196.
Galearia violacea Brullé, Hist. nat. Ins., Hym., IV., 1846, p. 572.

Thoracantha apta Walker, Trans. Ent. Soc. London (3), I., 1862, p. 384, ♂.— Westwood, Thesaur. ent. Oxon., 1874, p. 153; Pl. 28, f. 3.

Acrostela apta Shipp, The Entom., XXVI., 1894, p. 188.— Dalla Torre, Cat. Hym., V., 1898, p. 366.

Brazil: Santarem and Villa Nova; Chapada, in March, April and November; Santarem. Twelve male and two female specimens.

THORACANTHA ROMANDII Guérin.

Thoracantha romandii Guérin, Iconogr. Règne anim., VII., Ins., 1845, p. 415.— Dalla Torre, Cat. Hym., V., 1898, p. 366.

Colombia.

Genus UROMELIA Kerby.

UROMELIA STRIATA (Perty).

Thoracantha striata Perty, Delect. anim. artic. Brasil, 1833, p. 134; T. 28, f. 15 and 16. — Blanchard, Hist. nat. Ins., III., 1840, p. 257.

Uromelia striata Kirby, Journ. Linn. Soc. London, Zool., XX., 1886, p. 37. — Dalla Torre, Cat. Hym., V., 1898, p. 367.

Thoracantha flabellatus Westwood, Proc. Soc. London, III., 1835, p. 52, ♂.

Thoracantha aculeata Westwood, *opus cit.*, 1835, ♀.

Chalcis (*Thoracantha*) *aculeata* Blanchard, Cuvier: Règne anim., Ed. 3ª, Ins., II. 1849; T. 113, f. 8.

Thoracantha aculeata Westwood, Thesaur. ent. Oxon., 1874, p. 154; Pl. 28, f. 9.

Lasionychus flabellatus Shipp, The Entom., XXV., 1894, p. 188. — Dalla Torre, Cat. Hym., V., 1898, p. 367.

Brazil: Santarem. Five specimens.

Genus DICŒLOTHORAX Ashmead.

Allied to *Lætocantha* Shipp, but easily distinguished by the deep impressions on the mesonotum and the scutellum, and by the very broad and different shape of the scutellar processes, which form a broad shield over the abdomen.

DICŒLOTHORAX PLATYCERUS, sp. nov.

(Plate XXXV., Fig. 3.)

Female. — Length 3.8 mm. Æneous black, the antennæ, the legs, except the coxæ and a median longitudinal stripe on the closely united scutellar projections, testaceous. The disk of the mesonotum and the scutellum are concavely excavated, the bottom of the concavities being smooth and highly polished, the scutellar processes being longitudinally striated. The pronotum is greatly elevated and coarsely

transversely striated. The head is coarsely shagreened, with some irregular elevated lines. The antennæ are short, the first joint being very long, clavate, about the length of the scape, or nearly as long as all remaining joints united, the second funicle joint only a little longer than thick, the following transverse.

The male differs from the female only slightly in the antennæ. The first joint of the flagellum is a little shorter about the length of the flagellum, the funicle joints two to four being much wider, subdentate *above*.

Brazil: Santarem. Two specimens.

Genus DILOCANTHA Shipp.

DILOCANTHA FLAVICORNIS (Walker).

Thoracantha flavicornis Walker, Trans. Ent. Soc. London (3), I., 1862, p. 382.—Westwood, Thesaur. ent. Oxon., 1874, p. 153; Pl. 28, f. 3.

Dilocantha flavicornis Shipp, The Entom., XXVII., 1894, p. 184.—Dalla Torre, Cat. Hym., V., 1898, p. 366.

Brazil: Villa Nova (Bates).

Genus ISOMERALIA Shipp.

ISOMERALIA CORONATA (Westwood).

Thoracantha coranata Westwood, Thesaur. ent. Oxon., 1874, p. 154; Pl. 28, f. 10.

Isomeralia coranata Shipp., The Entom., XXVII., 1894, p. 188.—Dalla Torre, Cat. Hym., V., 1898, p. 366.

Brazil: Bonito Provence, Pernambuco (Albert Koebele).

Genus LIRATA Cameron.

LIRATA BATESELLA (Westwood).

Thoracantha batesella Westwood, Thesaur. ent. Oxon., 1874, p. 154; Pl. 28, f. 8, ♂.—Dalla Torre, Cat. Hym., V., 1898, p. 365.

Brazil: Santarem. One male specimen.

LIRATA PALLESCENS (Walker).

Thoracantha pallescens Walker, Trans. Ent. Soc. London (3), I., 1862, p. 380, ♂.

Lirata pallens Shipp, The Entom., XXVII., 1894, p. 188.—Dalla Torre, Cat. Hym., V., 1898, p. 367.

Brazil: Villa Nova (Bates); Chapada, in March and November. Four specimens, two males.

The female has not been described. It may be easily recognized by the difference in the antennæ; the first joint of the funicle is very long, as long or a little longer than the scape, or nearly as long as all the remaining joints united, acute at apex above, joints two to four of funicle short but also acute at apex above.

LIRATA SURGENS (Walker).

Thoracantha surgens Walker, Trans. Ent. Soc. London (3), I., 1862, p. 384, ♂.

Lirata surgens Shipp, The Entom., XXVII., 1894, p. 188.—Dalla Torre, Cat. Hym., V., 1898, p. 367.

Brazil: Santarem.

Genus KAPALA Cameron.

KAPALA ALTA (Walker).

Thoracantha alta Walker, Trans. Ent. Soc. London (3), I., 1862, p. 383, ♀.—Dalla Torre, Cat. Hym., V., 1898, p. 365.

Brazil.

KAPALA ANCHURA (Walker).

Thoracantha anchurus Walker, List Chalc. Brit. Mus., I., 1846, p. 88.—Dalla Torre, Cat. Hym., 1898, p. 365.

Brazil.

KAPALA FURCATA (Fabricius).

Eucharis furcata Fabricius, Syst. Piez., 1804, p. 158, ♀.—Latreille, Gen. Crust. et Ins., III., 1807, p. 21.—Lamarck, Hist. nat. anim. s. vert., IV., 1817, p. 160.—Lamarck, *opus cit.*, Ed. 2ª, IV., 1835, p. 370.—Walker, Monogr. Chalc., II., 1839, p. 65.

Eucharis flabellatus Fabricius, Syst. Piez., 1804, p. 158, ♂.

Thoracantha furcata Walker, The Entom., I., 1841; Pl. 9, f. 2.

Chirocerus furcatus Brullé, Hist. nat. Ins. Hym., IV., 1846, p. 571; T. 38, f. 5.—Lucas, La Sagra's Hist. fis., etc., Cuba., VII., 1856, p. 762. — Desmarest, Chenu. Encycl. hist. nat. Annelles, 1860, p. 161; fig. 141.

Schizaspidia furcata Walker, Notes on Chalc., Pt. 4, 1871, p. 66, f. 2.—Walker, The Entom., VI., 1872, p. 88, fig.

Kapala furcata Cameron, Biol. Centr.-Am. Hym., I., 1884, p. 103; Pl. 5, f. 15.—Dalla Torre, Cat. Hym., V., 1898, p. 365.

Brazil: Chapada, in May and April; Santarem. Six female and four male specimens.

When in Berlin in the winter of 1889–90, I saw specimens of this species bearing MS. names: *Thoracantha elevata* Westw., *T. spinosa* Illiger, etc.

KAPALA INEXAGENS (Walker).

Thoracantha inexagens Walker, Trans. Ent. Soc. London (3), I., 1862, p. 381, ♀.—Dalla Torre, Cat. Hym., V., 1898, p. 365.

Brazil: Santarem (Bates); Chapada, in May. One specimen.

I am inclined to think this species is only a variety of *K. furcata* Fabr.

KAPALA ATRATA (Walker).

Thoracantha atrata Walker, Trans. Ent. Soc., London (3), I., 1862, p. 383, ♂.—Dalla Torre, Cat. Hym., V., 1898, p. 365.

Brazil.

KAPALA CYNIPSEA (Walker).

Thoracantha cynipsea Walker, Trans. Ent. Soc. London (3), I., 1869, p. 379, ♀♂.—Dalla Torre, Cat. Hym., V., 1898, p. 365.

Brazil: Santarem, Villa Nova.

KAPALA DICERODERA (Spinola).

Eucharis dicerodera Spinola, Mem. accad. sc. Torino (2), XIII., 1851, p. 43, ♂.—Dalla Torre, Cat. Hym., V., 1898, p. 360.

Brazil: Para.

KAPALA REFLEXA (Walker).

Thoracantha reflexa Walker, Trans. Ent. Soc. London (3), I., 1862, p. 382, ♀.—Dalla Torre, Cat. Hym., V., 1898, p. 366.

Brazil: Santarem (Mr. Bates).

KAPALA ROMANDII (Guérin).

Thoracantha romandii Guér. Iconogr. règn. anim., VIII., Ins., 1845, p. 415.—Dalla Torre, Cat. Hym., V., 1898, p. 366.

Colombia.

KAPALA STRIATISSIMA (Walker).

Thoracantha striatissima Walker, Trans. Ent. Soc. London (3), I., 1862, p. 380, ♀.—Dalla Torre, Cat. Hym., V., 1898, p. 366.

Brazil: Santarem (Mr. Bates).

KAPALA SPLENDENS sp. nov.

(Plate XXXV., Fig. 4.)

Female.—Length 8–8.5 mm. Very robust, the head and thorax brilliant me-llic green, the abdomen blue or blue green, with æneous reflections, usually brassy bove, the antennæ and the legs except the coxæ, yellowish, the wings subfuscous, ne veins brown. The face is longitudinally striate, the striæ becoming transverse elow the insertion of the antennæ, the thorax coarsely transversely striate, the utellum and the scutellar processes longitudinally striate.

Brazil: Chapada, in April and November. Four specimens.

This is the largest and most brilliant of any Eucharid yet discovered.

Genus LASIOKAPALA Ashmead.

Allied to *Kapala* Cameron, but easily distinguished by being hairy or pubescent, d by the smoothness of the head. The lateral lobes of the mesonotum and the

scutellum, including the long processes, are also smooth, not striate; the scutellar processes are transversely striate or serrate at their apices.

LASIOKAPALA SERRATA, sp. nov.

(Plate XXXV., Fig. 5.)

Female.—Length 3.5 mm. Æneous black; the antennæ, the long scutellar processes and the legs are honey-yellow. The head in front is smooth without striæ; the thorax is hairy or pubescent, perfectly smooth, except the middle mesothoracic lobe above which is coarsely, transversely striate; the middle lobe and the scutellum have a deep depression on their disks; while the long scutellar processes are smooth to near their apices, their apices or tips above are laterally transversely striate or serrate.

Brazil: Chapada.

FAMILY LXV. MISCOGASTERIDÆ.

SUBFAMILY I. PIRENINÆ.

Genus HERBERTIA Howard.

HERBERTIA HOWARDI, sp. nov.

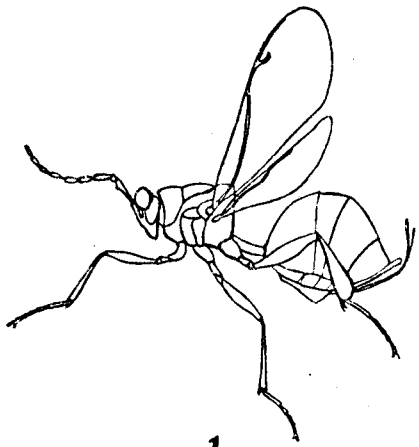
(Plate XXXV., Fig. 6.)

Female.—Length 2.4 mm. Blue black, the thorax above with a slight æneous tinge; eyes very large, brown, pubescent; scape honey-yellow, the flagellum brown-black; tibiæ and tarsi pale yellow. The head and thorax above are shagreened or feebly punctate, pubescent; the mesopleuron has a broad, rather deep sulcus; the wings are hyaline, the veins brownish, the stigmal vein very small, the marginal vein very long, while the postmarginal vein is also long. The abdomen is ovate, a little longer than the thorax, the first body segment being the longest and occupying nearly the half of the whole surface, the following segments very short, subequal in length.

Brazil: Rio de Janeiro in August. One specimen.

HERBERTIA BRASILIENSIS, sp. nov.

Female.—Length 1.6 mm. Head and thorax bluish, the abdomen æneous black; ocelli reddish-yellow; eyes large, hairy; flagellum brown-black; tibiæ and tarsi yellowish-white. The head and the thorax are only feebly shagreened, the lateral mesothoracic lobes being almost smooth; the wings are hyaline, the veins as in *H. howardi* except paler in color. The abdomen is ovate, pointed at apex, on



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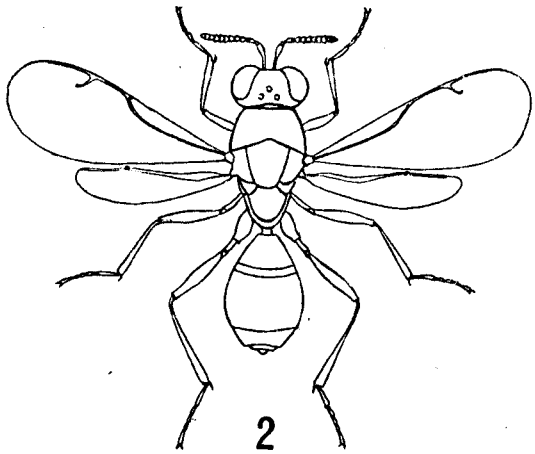

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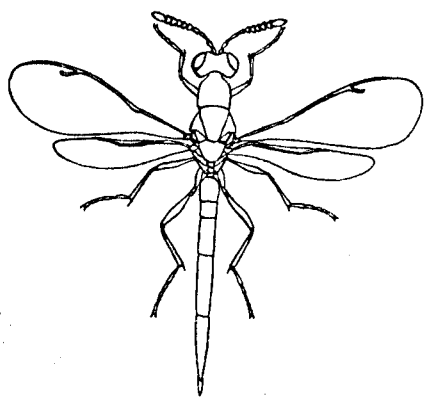

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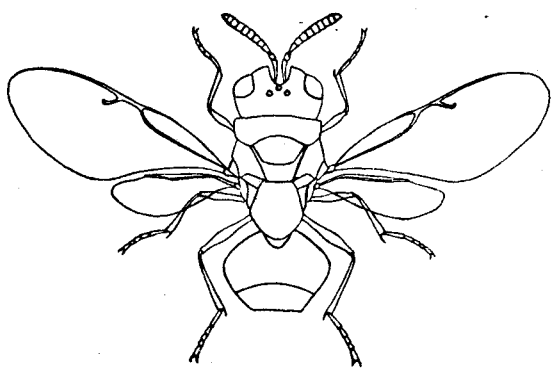

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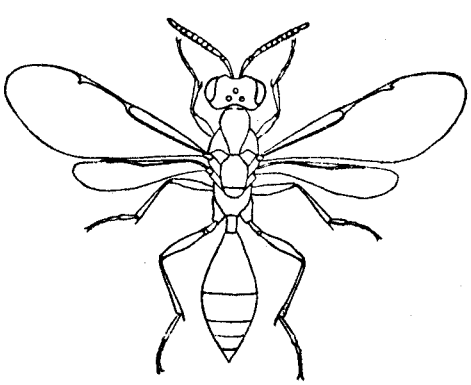

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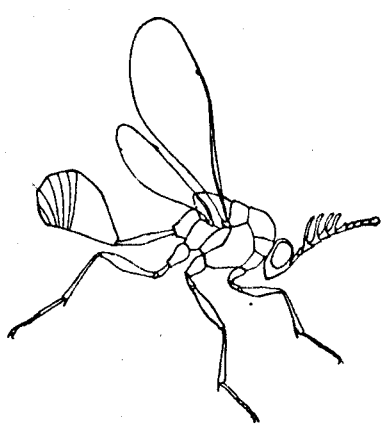

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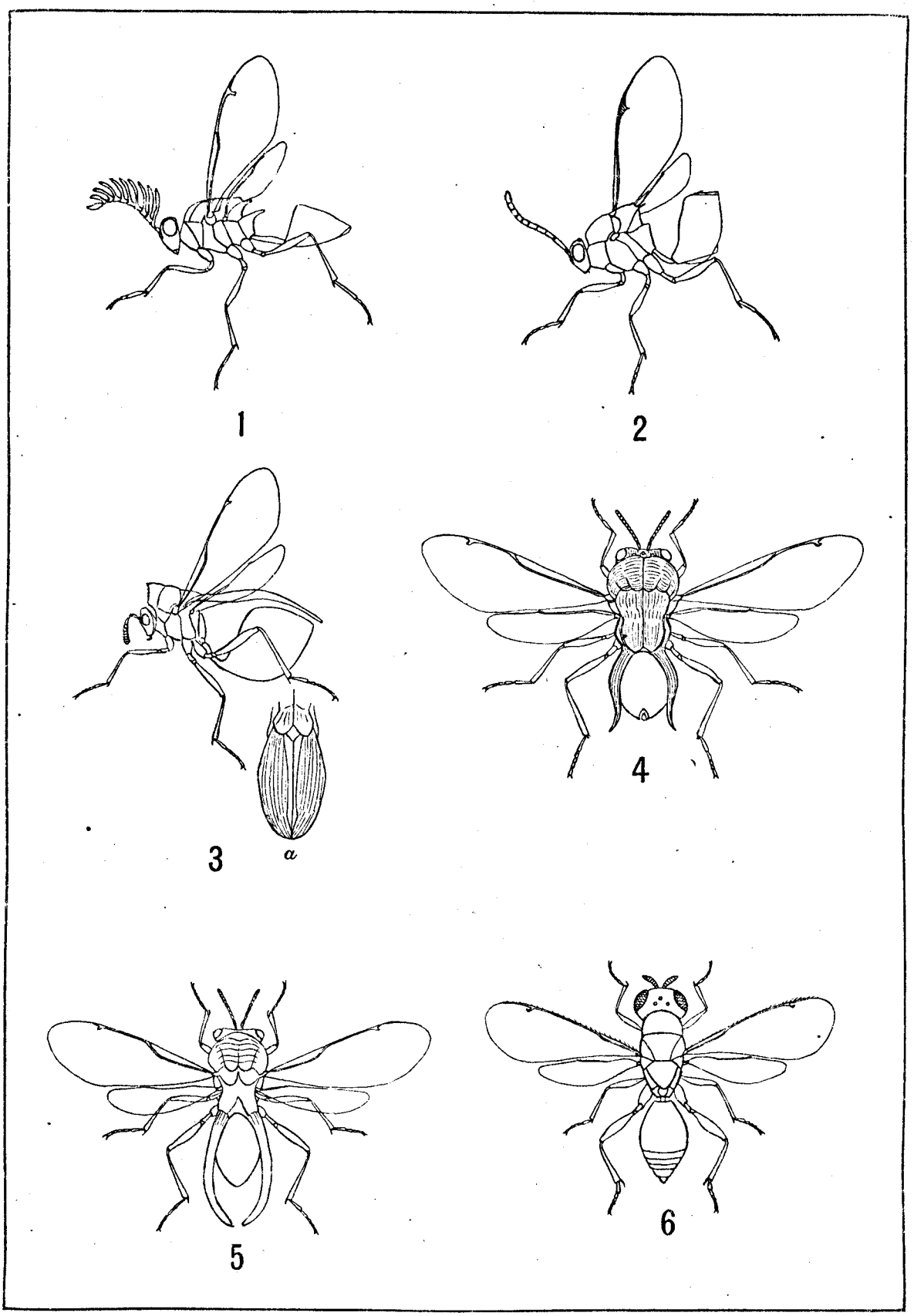
1. *Eudoxinna transversa* Walker, ♀.
2. *Neorileya flavipes* Ashmead, ♀.
3. *Macrorileya œcanthi* Ashmead, ♀.
4. *Perilampus brasiliensis* Ashmead, ♀.
5. *Orasema rapo* Walker, ♀.
6. *Pseudochalcura nigrocyanea* Ashmead, ♀.



1. *Tetramelia plagiata* Walker, ♂.
2. *Stibula nigriceps* Ashmead, ♂.
3. *Dicœlothorax platycerus* Ashmead, ♀.
   a, scutellum seen from above.
4. *Kapala splendens* Ashmead, ♀.
5. *Lasiokapala serrata* Ashmead, ♀.
6. *Herbertia howardi* Ashmead, ♀.