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A GENERIC REVISION OF THE ICHNEUMON-FLIES OF
THE TRIBE OPHIONINI

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A NUMBER of years ago I planned a revision of the North American species of the hymenopterous genus *Ophion* and to that end assembled from many sources a great number of specimens. Study of this material made it evident that *Ophion* as we had known it was made up of several more or less discordant elements and indicated the need of a generic revision of the tribe Ophionini. This was undertaken, with the results set forth in the following pages.

Unfortunately, representatives of a considerable number of the described genera have been unavailable to me, and some of these I have found impossible to place in my arrangement because of the inadequacy of the descriptions. Several, however, I have been enabled to place through the generous cooperation of J. F. Perkins, of the British Museum. Such characters as the possession or lack of the postpectoral carina, the position of the second abdominal spiracle, the presence or absence of a fenestra when scleromes are lacking, and even the form of the mandibles and the course of the radius are, in many cases, not referred to in generic descriptions; and every description omits mention of one or more of the series of characters which I have chosen for use as generic group characters. Most of the genera of which no identified specimens are available and of which I have been unable to identify any species in the large amount of material before me are not included in the key to genera. However, the probable affinities of each are discussed.

Study of such genera as have been available to me has led to the discovery of a number of characters not previously employed in the classification of the group. Using these characters, together with the best of the old characters and others gleaned from generic and specific descriptions, I have attempted to produce a more nearly natural classification than any published heretofore.

SOURCES OF MATERIAL

This study is based principally on material in the collection of the United States National Museum, which contains specimens of Ophionini from all the zoogeographic regions of the earth, including representatives of a majority of the previously described genera and of all the new genera described in this revision. A vast amount of North American material, mostly referable to *Ophion* and *Enicospilus* secured on loan from the collections of many institutions and private collectors, has been studied. Particularly important, with respect to the present revision, are the collections received from the California Academy of Sciences, the American Museum of Natural History, the University of Kansas, Cornell University, and the private collection of Henry K. and Marjorie C. Townes, since these contain material of many more of the Nearctic genera other than *Ophion* and *Enicospilus* than do any of the others. To these and to other institutions from which material was secured I hereby extend my thanks.

ILLUSTRATIONS

All the figures, except plate 55, figure 71, were drawn by Arthur D. Cushman, scientific illustrator, U. S. Bureau of Entomology and Plant Quarantine. I am grateful to him for the accuracy of his drawings.

TRIBAL CHARACTERS AND RELATED TRIBES

Among the tribes of the Ophioninae are three, Ophionini, Hellwigiini, and Anomalini (Nototrachini), that have traditionally been separated from the rest of the tribes in tribal keys by the single character of the position of the second recurrent vein basad of the intercubitus. This has resulted in the placing in the Ophionini of genera, especially certain genera of Therionini, that obviously do not belong there when other characters are taken into consideration.

Some authors have included *Hellwigia* Gravenhorst in the Ophionini, while Morley unites the Anomalini with Ophionini and excludes *Hellwigia*. The genera *Hellwigia* and *Hellwigiella* Szépligeti are obviously not at all closely related. Since this paper was sent to press I have, through the kindness of Dr. H. K. Townes, been able to examine specimens of both genera. *Hellwigiella* I find to belong to the Ophionini, but *Hellwigia* I believe to belong to the Campoplegini, as indicated on a later page.

The genus *Ophiopterus* Brullé has consistently been referred to the Ophionini because of the strongly antifurcal second recurrent vein, but in all other respects it is therionine.

Another tribe that comes into the complex is the Ophionellini, made up of the venationally anomalous *Ophionellus* Westwood and *Hymenopharsalia* Morley (*Pharsalia* Cresson), the latter referred by Ashmead to the Anomalini because of the single calcarium on the middle tibia. *Ophionellus* is unknown to me, but, in my opinion, all the other characters of *Hymenopharsalia* ally it too closely with such therionine genera as *Atrometus* Foerster and *Podogaster* Brullé to justify either placing it in the Anomalini or maintaining it as a distinct tribe.

The following diagnosis in key form should present no difficulty in the placing of a genus in its proper tribe:

KEY TO THREE OF THE TRIBES OF THE SUBFAMILY OPHIONINAE

1. *Mandible*, when closed and in cephalic view, with lower tooth not directly posterior to upper tooth, but at a lower level and visible; *eyes* parallel or divergent below, never distinctly convergent (i. e., face not narrower than frons), always at least shallowly emarginate opposite antennal foramina; *occipital carina* medially far below level of posterior ocelli, fading out below or joining hypostomal carina at a considerable distance from lower articulation of mandible, rarely entirely absent; *epomia* entirely lacking; *propodeal spiracle* lateral in position, very long and slitlike; *front tibia* without a minute tooth at apex opposite calcarium; *middle tibia* with two calcaria; *claws* usually long, each with a strong, many-toothed pecten; *second recurrent vein* basad of intercubitus by a distance nearly or quite as great as length of intercubitus; *intercubitus* strongly oblique and nearly continuous with basal abscissa of radius; *nervellus* sharply broken, discoidella distinct, rarely nervellus not broken but interstitial at its upper end with discoidella; *hind tarsus* with apical two joints not especially small; *ovipositor* rarely exerted. . . . **Ophionini**
- Mandible*, when closed and in cephalic view, with lower tooth directly posterior to upper tooth and not visible; *eyes* more or less convergent and at most with inner margins arcuately concave; *occipital carina* medially usually at or near level of posterior ocelli and joining hypostomal carina very close to lower articulation of mandible, sometimes (*Anomalini*, *Anomalon verbosum* Cresson) far below ocelli, rarely (*Podogaster* Brullé) fading out below and not reaching hypostomal carina or (*Clatha* Cameron) obsolete medially; *epomia* strong, originating on lower anterior margin of pronotum and running dorsad nearly to dorsal margin; *propodeal spiracle* subdorsal in position and long or short oval but not slitlike; *front tibia* with a minute tooth at apex opposite calcarium; *middle tibia* usually with two calcaria, but sometimes (*Anomalini*, *Hymenopharsalia*, *Ophionellus*, and an unnamed North American genus of Therionini) with only one; *claws* simple or at most weakly pectinate and usually small; *second recurrent vein*, except in *Anomalini* and genus *Ophiopterus*, distad of intercubitus or proximad by a distance much less than length of intercubitus, rarely (*Hymenopharsalia*, *Ophionellus*) entirely absent; *intercubitus* perpendicular or nearly so, at least not nearly continuous with basal abscissa of radius; *nervellus* broken or unbroken; *hind tarsus* usually with apical two joints small; *ovipositor* usually distinctly exerted. 2

2. *Second recurrent vein* far basad of intercubitus; *middle tibia* with only one calcarium; *occipital carina* medially far below level of posterior ocelli.

Anomalini

Second recurrent vein usually distad of intercubitus, occasionally slightly basad, rarely (*Ophiopterus*) far basad or (*Hymenopharsalia*, *Ophionellus*) entirely absent; *middle tibia* with two calcaria, rarely (*Hymenopharsalia*, *Ophionellus*, and an unnamed North American genus) with only one; *occipital carina* medially almost at level of posterior ocelli, rarely (*Anomalon verbosum* Cresson) far below----- **Therionini**

HOST RELATIONS AND LARVAL CHARACTERS

Host relations and larval characters indicate that the three tribes, Ophionini, Anomalini, and Therionini, are distinct natural groups and support the placing of *Hymenopharsalia* in the Therionini. The Ophionini are internally parasitic in lepidopterous larvae, the Anomalini in coleopterous larvae, and the Therionini in lepidopterous pupae.

My knowledge of the larvae is based largely on exuviae extracted from cocoons or host pupae from which known specimens were reared. The most significant characters are to be found in the sclerotization of the margins of the head capsule and mouth parts. In the accompanying illustrations of these sclerotizations in typical genera of each of the three tribes, quite different patterns will be noted.

In the ophionine larva (pl. 49, figs. 1-3) the entire labium (*lm*) except the areas surrounding the palpi (*lp*) is lightly sclerotized, with a more heavily sclerotized horseshoe-shaped sclerome (*sd*) around the opening of the silk duct in a deep emargination on the upper margin; there is no sclerotic bridge across the clypeus, the sclerotization extending for only a short distance along the frontal suture (*f*) above the dorsal articulation of the mandible; the hypostomal margin (*hy*) of the epicranium is heavily sclerotized with a long branch (*st*) extending across the maxilla and a somewhat less heavily sclerotized extension (*oc*) downward along the margin of the occipital foramen; the lower margin of the stipes of maxilla (*mx*) is heavily sclerotized and the surface of the cardo (*cd*) of maxilla lightly so; the mandibles (*md*) are extremely small.

In the therionine larva (pl. 49, figs. 5-8), on the other hand, the labium is sclerotized only along its superior lateral margins and the margins of the silk duct opening, its lower margin being very poorly if at all defined; there is a strong sclerome across the clypeus (*cl*), fused laterally with the pleurostomal margins, thus forming with the hypostomal margin a strong brace extending entirely across the head above the mouth, and sometimes spreading far back from the margins, notably so in *Therion* and *Heteropelma*; the very heavily sclerotized hypostomal margin lacks entirely the branch across the maxilla and the extension along the occipital foramen; the sclerotized margin of the stipes of the maxilla is long and slender and there is no evident

sclerotization of the cardo; the mandibles are very stout and overlap across the median line.

The anomaline larva (pl. 49, fig. 4) is, in some respects, more or less intermediate between those of the other two tribes. The labial ring is narrow but apparently complete, although its lower margin perhaps outlines the palpal areas rather than the actual basal margin of the labium, and there is a median extension between the palpal areas; the brace across the head above the mouth is complete but slender, and the part across the clypeus is much more arched than in the therionine larva; the maxillar branch is present but very short; the marginal sclerome of the maxillary stipes is long and slender and the cardo is not sclerotized, the mandible is stout at the base with a long slender point, the two mandibles nearly meeting on the median line.

TERMINOLOGY

For the most part the terminology employed is that characteristic of the vast bulk of the literature of the Ichneumonidae, and that of the wing veins and cells is in general that of Rohwer and Gahan's "Horismology of the Hymenopterous Wing."¹ A few new or unusual terms, however, need definition:

Abcissula.—The basal abscissa of radiella (pl. 53, fig. 52).

Basal constriction of propodeum.—The constriction dividing that part of propodeum basad of the basal carina or its normal position into *frenum* (anterior portion) and *basal area* (posterior portion) (pl. 52, figs. 43, 44).

Epipleura.—The lateral portions of the tergites extending as free flaps beyond the line of attachment of the ventral membrane. On tergite 2 the epipleura are usually set off by carinae and are inflexed, but are not so defined or inflexed in the *Thyreodon* group and in a few other genera.

Fenestra.—A hairless area in the apical portion of the discocubital cell usually more or less outlined by sclerotic thickenings (*scleromes*) and frequently also with one or more scleromes on its surface. This and its parts are fully described and discussed in my paper on the Ichneumonidae of the Sauter Formosan collection²; and the terminology of the parts is indicated on figure 52 of the present work. This structure is characteristic of *Enicospilus* and absent in the *Ophion* and *Thyreodon* groups of genera (pl. 53, fig. 50).

Paramere.—One of the paired outer valves of the male genitalia (pl. 55, figs. 84, 85).

Postnervulus.—The combined second and third abscissae of the brachius (pl. 53, fig. 52).

¹ Proc. Ent. Soc. Washington, vol. 18, pp. 20-76, 1916.

² Arb. morph.-tax. Ent., vol. 3, p. 302, fig. 14, 1937.

Postpectus.—The incurved part of mesosternum anterior to middle coxae, frequently defined by transverse carinate extensions of the carinae that flank the coxal foramina (pl. 52, figs. 36–38, 40, 42).

Postpectoral carina.—The carina defining the postpectus.

Pronotal sinus.—A cleft in the humeral angle of pronotum between the humeral angle itself and the flange by which the pronotum is attached to mesopleuron. In *Ophion* and *Thyreodon* the sinus is broad, exposing the spiracular sclerite, whereas in *Enicospilus* it is narrow and the spiracular sclerite is hidden by the humeral angle (pl. 55, figs. 72–74).

Spiracular sclerite.—A small, free sclerite between the base of the tegula and the humeral angle of the pronotum, sometimes concealed by the latter (pl. 55, figs. 72–74).

Transverse brace.—The combined intercubitus, second abscissa of cubitus and second recurrent vein. The comparative lengths of these elements is stated as a ratio, e. g., 1:2:4, the figures representing the veins in the same order as mentioned above (pl. 53, fig. 52).

Umbo of second tergite.—A median, convex, polished articulating area at base of second tergite set off laterally by pits and usually dorsally by a constriction or impression. It is characteristic of the *Ophion* group of genera and undeveloped in the *Enicospilus* and *Thyreodon* groups (pl. 56, figs. 94–99).

Tribe OPHIONINI

GROUP CHARACTERS AND GENERIC CHARACTERS

In order to construct a key placing the genera in as near their natural relationship as possible it has been necessary in most cases to employ groups of characters rather than single characters. A vast majority of the species of the tribe belong to the genera *Ophion*, *Enicospilus*, and *Thyreodon*, and the principal couplets, Nos. 1 and 7, of the key embody the most significant characters distinguishing typical members of those genera. Although the characters in couplet 7 are stated positively, not all the genera or, indeed, all species of the basic genera agree with all the characters applying to the categories in which they belong. Agreement with a majority of the characters in either alternate determines the subsequent course of a specimen through the key.

Very few of the characters employed in the key are peculiar to single genera or even to single groups of genera. The anomalous hind claws (pl. 55, fig. 77) and frenulum (pl. 54, fig. 56) of *Spilophion*, the notched apical front tarsal joint of *Ophiogastrella* (pl. 55, fig. 75), and the remarkably long and slender ligula of *Agathophiona* (pl. 50, fig. 28) apparently occur in no other genus, and are of themselves diagnostic.

Of the characters in the first couplet of the key none by itself is entirely diagnostic of the members of the *Therion* group of genera, with the exception of the recurved and pointed or narrowly rounded clypeus. The narrow tapering stigma occurs in *Stauropoctonus* and even in some species of *Enicospilus*; the strongly reclivous nervellus with the fracture far above the middle in several genera of the *Ophion* group and even in some species of *Ophion*; the unseparated epipleura of tergite 2 in *Aulophion* (a new genus) and in some species of *Enicospilus*; while the broad, weakly twisted mandible differs only in being stouter than in *Ophion*. Only genera possessing all these characters properly belong in the *Thyreodon* group.

Of the characters of the *Ophion* group the gradually narrowed and weakly twisted mandible occurs also in *Spilophion* and even in a few species of *Enicospilus*, which genus exhibits all degrees of torsion from that of *Ophion* nearly to the extreme twisting found in *Stauropoctonus*; the triangular stigma occurs in *Abanchogastra*; the lack of the fenestra in *Banchogastra*, *Pycnophion*, *Abanchogastra*, and *Stauropoctonus*, all belonging to the *Enicospilus* group; the curved abscissula in *Spilophion* and *Abanchogastra*.

The strong postpectoral carina of the *Enicospilus* group occurs in *Aglaophion* of the *Thyreodon* group and in *Clistorapha* (a new genus) of the *Ophion* group, and is absent in *Aulophion*.

In some genera of both the *Ophion* and *Enicospilus* groups the basal abscissa of the radius is neither straight and unthickened as in *Ophion* nor thickened in the middle and sinuate as in typical *Enicospilus*, but is thickened and curved basally.

The occipital carina, normally complete or very nearly so, is entirely lacking in a few genera of the *Ophion* and *Enicospilus* groups.

KEY TO THE GENERA OF THE OPHIONINI

1. Clypeus more or less distinctly recurved apically and acute or sharply rounded (rarely narrowly truncate) (pl. 51, figs. 32-35); stigma (pl. 53, fig. 50) extremely narrow, hardly broader than apex of combined costa and subcosta and merging gradually into metacarpus, radius nearly at base; nervellus (pl. 53, fig. 50) strongly reclivous and usually broken distinctly above middle; epipleura of tergite 2 not distinctly separated from tergite; mandible (pl. 51, figs. 32-35) very broad and very little twisted (see couplet 7)..... 2
- Clypeus not as described above or the insect differs by one or more of the other characters..... 6
2. Postpectoral carina incomplete or absent (pl. 52, figs. 37-39)..... 4
- Postpectoral carina complete (pl. 52, fig. 36)..... 3
3. Radius basally, basal vein, and abscissula not thickened; nervellus broken at about upper third..... 4. *Aglaophion* Cameron
- Radius basally, basal vein, and abscissula thickened; nervellus broken far below upper third..... 5. *Euryophion* Cameron

4. Tropi of normal form; propodeum extending far over hind coxae (pl. 51, figs. 29, 30)----- 5
 Tropi anthophagous, both labium and maxillae unusually long (pl. 50, fig. 25); propodeum hardly extending beyond insertions of hind coxae (pl. 51, fig. 31)----- 3. *Rhynchophion* Enderlein
5. Joint 2 of maxillary palpus not inflated; ocelli small, distant from eyes; hind coxae (pl. 51, fig. 29) not or barely extending beyond apex of propodeum.
 1. *Thyreodon* Brullé
 Joint 2 of maxillary palpus inflated; ocelli very large, usually touching eyes; hind coxae (pl. 56, fig. 87) extending beyond apex of propodeum by nearly half their length----- 2. *Athyreodon* Ashmead
6. Hind coxae not extending beyond apex of propodeum; (mandible not strongly twisted; tergite 3 emarginate at apex; tarsi stout).
 6. *Orientospilus* Morley
 Hind coxae extending beyond apex of propodeum----- 7
7. [Agreement with a majority of the characters in either alternate determines the subsequent course of a species through the key.] Mandible gradually narrowed from base to apex, not conspicuously twisted (pl. 50, figs. 17-21); pronotal sinus (pl. 55, fig. 73) broad, exposing spiracular sclerite; mesopleuron with speculum defined below by a more or less distinct oblique groove; postpectus not defined (pl. 52, fig. 41); basal constriction of propodeum (pl. 52, fig. 43) more or less distinctly divided into a median and two lateral foveae; tergite 2 with umbo more or less distinct (pl. 56, figs. 91, 92, 94-99); spiracles of tergite 2 distinctly basad of apical third (pl. 56, figs. 90-99); stigma triangular, tapering from radius to apex, radius at or beyond basal third (pl. 53, fig. 51); basal abscissa of radius either straight and unthickened (pl. 53, fig. 51) or thickened and curved basally (pl. 54, fig. 54), but never sinuate or thickened in middle; apical abscissa of radius (pl. 53, fig. 51; pl. 54, figs. 54, 55, 57) at most only slightly curved forward basally; fenestra not at all defined (a hairless area below base of stigma should not be confused with fenestra) (pl. 53, fig. 51; pl. 54, figs. 54, 55, 59); abscessula curved basally (pl. 53, fig. 51); nervellus broken from distinctly below middle to far above middle, upper abscissa perpendicular (pl. 54, fig. 55a) or reclivous (pl. 54, figs. 54a, 59a); scutellum not margined--- 8
- Mandible abruptly narrowed between middle and base and so twisted that teeth are in a plane perpendicular to longitudinal axis of body, apex very narrow (pl. 50, figs. 15, 22); pronotal sinus (pl. 55, fig. 74) narrow, spiracular sclerite concealed; mesopleuron without a defined speculum; postpectus defined, the carina usually complete and closing mesosulcus (pl. 52, fig. 40); basal constriction of propodeum (pl. 52, fig. 44) undivided though sometimes coarsely foveolate; tergite 2 without umbo (pl. 56, figs. 90, 93, 100, 101); spiracles of tergite 2 at or about apical third (pl. 56, figs. 100, 101); stigma narrow with radius very near base, usually subparallel-sided beyond radius and rather abruptly tapering apically (pl. 53, fig. 52); basal abscissa of radius more or less thickened to beyond middle and usually more or less sinuate or undulant (pl. 53, fig. 52; pl. 54, figs. 61, 62; pl. 55, figs. 63-70); apical abscissa of radius (pl. 53, fig. 52; pl. 54, figs. 53, 56, 58, 60) strongly curved forward basally, then decurved to apex; fenestra (pl. 53, fig. 52; pl. 54, figs. 61, 62; pl. 55, figs. 63-70) present, with or without scleromes; abscessula straight (pl. 53, fig. 52); nervellus broken below (rarely at middle, upper abscissa inclivous to perpendicular; scutellum margined, usually to apex)----- 22

8. Basal abscissa of radius straight, not thickened basally 9
 Basal abscissa of radius curved and thickened basally (pl. 54, figs. 54, 55, 59)..... 16
9. Mouth parts normal, maxillae and labium not abnormally long..... 10
 Mouth parts anthophagous, both maxillae and labium abnormally long (pl. 50, figs. 26-28)..... 15
10. Stigma triangular, radius at or beyond basal third; apical joint of front tarsus normal, not emarginate on outer side..... 11
 Stigma very long and subparallel-sided for much of its length, radius nearly at base (pl. 54, fig. 57); apical joint of front tarsus (at least in female) with a deep, rounded emargination on lower outer margin (pl. 55, fig. 75)..... 12. **Ophiogastrella** Brues
11. Scutellum, metapleuron, and subalar tubercle not inflated..... 12
 Scutellum, metapleuron, and subalar tubercle inflated (pl. 52, fig. 45).
 11. **Australophion** Morley
12. Occipital carina distinct and complete (pl. 50, fig. 14)..... 13
 Occipital carina lacking (pl. 50, fig. 12)..... 10. **Alophophion**, new genus
13. Discocubitus ascending so close to radius that discocubital cell is much narrower at that point than at second recurrent, strongly curved both above and below ramellus, which is very long and clavate (pl. 55, fig. 71)..... 8. **Rhopalophion** Seyrig
 Discocubitus various in form, but not as described above..... 14
14. Mandible abruptly rectangular at apex, teeth indicated only by a broad, deep longitudinal furrow; tergite 1 only as long as coxa plus trochanter, postpetiole as long as petiole; tergite 2 without lateral foveae at base.
 9. **Apatophion** Shestakov
 Mandible with distinct teeth apically; tergite 1 longer than coxa plus trochanter, postpetiole shorter than petiole; tergite 2 with lateral foveae at base.
 7. **Ophion** Fabricius
15. Lobes of ligula only moderately elongate, spatulate (pl. 50, fig. 26); ovipositor long, slender, recurved, sheath fully as long as first segment of abdomen (pl. 56, fig. 91); temples narrow, receding (pl. 50, fig. 26).
 13. **Potophion**, new genus
 Lobes of ligula extremely long and slender, nearly or quite as long as thorax (pl. 50, fig. 28); ovipositor stout, not exerted (pl. 56, fig. 98); temples very broad, buccate (pl. 50, figs. 11, 28)..... 14. **Agathophiona** Westwood
16. Mesosternum with a conspicuous tubercle on each side at apical third.
 15. **Eremotylus** Foerster
 Mesosternum without such tubercles..... 17
17. Eyes very shallowly emarginate (pl. 50, fig. 23); clypeus (pl. 50, fig. 23) very short, concavely truncate at apex, in profile forming a distinct angle with face, finely punctate; prepectoral carina at most faintly indicated (pl. 52, fig. 48); upper abscissa of nervellus perpendicular (pl. 54, fig. 55a).
 16. **Simophion**, new genus
 Eyes deeply emarginate (pl. 50, figs. 17-20, 24); clypeus (pl. 50, figs. 17-20, 24) less conspicuously short, truncate or arcuate at apex, in virtually same plane as face, usually coarsely punctate; prepectoral carina usually distinct; upper abscissa of nervellus usually more or less reclivous, if not the fracture is above middle (pl. 54, figs. 54a, 59a)..... 18
18. Head very thin, prolonged below eyes, mouth parts anthophagous, both ligula and lacinia abnormally long (pl. 50, figs. 14, 20, 27); hypopygium in female extending far beyond apical tergite, the ovipositor when sheathed directed dorsocephalad (pl. 56, fig. 99)..... 17. **Trophophion**, new genus

- Head neither abnormally thin nor abnormally prolonged, mouth parts normal, not anthophilous; hypopygium of normal form (pl. 56, figs. 95, 96) ---- 19
19. Nervellus broken at or below middle (pl. 54, fig. 54); abdomen not unusually compressed or heavily sclerotized dorsally, not serrate in profile (pl. 56 fig. 96); clypeus short and very broadly truncate (pl. 50, figs. 17, 18)-- 20
- Nervellus broken far above middle (pl. 54, fig. 59); abdomen very strongly compressed along dorsal margin, serrate in profile, middle tergites being creased and more heavily sclerotized medially and with prominent apices (pl. 56, figs. 95, 97); clypeus large and long (pl. 50, figs. 19, 24)----- 21
20. Postpectus defined, mesosulcus closed (pl. 52, fig. 42).
18. **Clistorapha**, new genus
Postpectus not defined, mesosulcus open----- 19. **Boethoneura**, new genus
21. Apical margin of clypeus very broadly truncate, labrum broadly exposed (pl. 50, fig. 24); lower margin of mandible evenly curved (pl. 50, fig. 24); legs and antennae stout----- 20. **Genophion** Felt
Apical margin of clypeus arcuate or, rarely, narrowly truncate medially, labrum narrowly exposed (pl. 50, fig. 19); lower margin of mandible bent at the middle, straight before and beyond bend (pl. 50, fig. 19); legs and antennae slender----- 21. **Chilophion**, new genus
22. Occipital carina absent (pl. 50, fig. 13); mandible very small, so twisted that upper tooth appears to be on inner margin (pl. 50, fig. 15); scutellum not margined laterally; mesopleuron with a distinct longitudinal furrow from fovea to top of prepectus (pl. 52, fig. 49); stigma extremely narrow, tapering from radius, which is very near base (pl. 54, figs. 53, 58); basal abscissa of radius thick and curved basally, apical abscissa strongly curved forward at base (pl. 54, figs. 53, 58), abscissula slightly thickened and weakly curved basally; apical joint of trochanter in middle and hind leg with a sharp, decurved tooth on outer apical margin (pl. 55, fig. 83)----- 23
Occipital carina present; differing also from most of the other characters above----- 24
23. Postpectus completely defined; nervulus postfurcal; postnervulus broken shortly above middle; nervellus broken at about middle; epipleura of segment 2 distinctly separated from tergite throughout.
22. **Stauropacton** Brauns
Postpectus not defined; nervulus antifurcal to interstitial; postnervulus broken far above middle; nervellus broken far below middle; epipleura of segment 2 separated from tergite only basad of spiracles and there weakly so----- 23. **Aulophion**, new genus
24. Spiracles of tergite 2 at, before, or somewhat behind middle, but always basad of apical third (pl. 56, figs. 90, 93); stigma elongate triangular; basal abscissa of radius neither thickened nor sinuate; no fenestra; second discoidal cell pointed or very narrow at base; first abdominal segment stout (pl. 56, figs. 90, 93); ocelli small----- 25
Not agreeing entirely with above----- 26
25. Postpectoral carina complete, mesosulcus closed; first abdominal segment very short and broad, sternite not nearly reaching spiracles, tergite 2 with spiracles distinctly basad of middle; ovipositor not exerted (pl. 56, fig. 93).
24. **Banchogastra** Ashmead
Postpectoral carina obsolete, mesosulcus open; metapleuron tumid; first abdominal segment more slender, sternite reaching spiracles, tergite 2 with spiracles at or beyond middle; ovipositor strongly exerted (pl. 56, fig. 90).
25. **Pycnophion** Ashmead

26. Claw of hind tarsus with pecten extending beyond apex (pl. 55, fig. 77); mandible gradually narrowed from base to apex; penultimate hook of frenulum usually very different from others (pl. 54, fig. 56c); (abscissula strongly curved basally [pl. 54, fig. 56b]; a hairless area below stigma but no well-defined fenestra [pl. 54, fig. 56])..... 26. *Spilophion* Cameron
 Claw of hind tarsus normal (pl. 55, fig. 80); mandible usually abruptly narrowed; penultimate hook of frenulum normal..... 27
27. Stigma broad with radius near middle, basal abscissa of radius not thickened; no fenestra (pl. 54, fig. 60); abscissula curved, nervellus broken at middle, upper abscissa perpendicular..... 27. *Abanchogastra* Perkins
 Stigma narrow with radius near base; basal abscissa of radius more or less thickened; fenestra distinct, with or without scleromes (pl. 53, fig. 52; pl. 54, figs. 61, 62; pl. 55, figs. 63-70); abscissula straight; nervellus broken below middle, upper abscissa usually inclinous. 28. *Enicospilus* Stephens

1. Genus *THYREODON* Brullé

PLATE 49, FIGURE 1; PLATE 51, FIGURES 29, 32; PLATE 52, FIGURES 38, 47; PLATE 53, FIGURE 50; PLATE 55, FIGURES 72, 84; PLATE 56, FIGURE 86

Thyreodon BRULLÉ, Histoire naturelle des insectes, Hyménoptères, vol. 4, p. 150, pl. 42, fig. 3, 1846.—SZÉPLIGETI, in Wytzman, Genera insectorum, fasc. 34, p. 25, 1905.—HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 106, 1912.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 7, 1912.—ENDERLEIN, Zool. Anz., vol. 39, p. 626, figs. 1-4, 6, 1912. [Genotype: *Thyreodon cyaneus* Brullé. By designation of Hooker, 1912.]

Oleter SHESTAKOV, Konowia, vol. 5, p. 259, 1926. [Genotype: (*Oleter selenaction* Shestakov) = *Thyreodon laticinctus* Cresson.] Monobasic.

A genus of very large species, exclusively American and largely tropical in distribution. I have listed above only the more significant contributions to literature on the genus.

Head (pl. 51, fig. 32): Narrower than thorax; temples buccate to receding; occipital carina usually not reaching hypostomal carina, genae broad below; eyes rather small, moderately emarginate opposite antennae; malar space half or more as long as basal width of mandible; ocelli very small, removed from the eyes by more than their diameter; frons with deep antennal scrobes bounded medially by a prominent interantennal ridge and laterally by carinae along the eyes, the carinae usually turning away from the eye margins above toward the lateral ocelli; face moderately convex; clypeus not distinctly separated, long, pointed at apex and in profile with apex recurved, foveae very large and deep; labrum concealed; mandible broad and short, strongly narrowed from base to apex, not strongly twisted, teeth subequal; trophi of normal length; second joint of maxillary palpus flat, triangular; antenna shorter than body, rather stout, subsetiform, scape very short and squarely truncate at apex.

Thorax: Stout; pronotum with a deep transverse foveolate furrow dorsally, bounded posteriorly by a high ridge and anteriorly by the

recurved margin; pronotal sinus (pl. 55, fig. 72) broad, exposing the spiracular sclerite; mesoscutum precipitous anteriorly, notaulices more or less distinct, broad, usually foveolate or rugose; scutellum short, precipitous apically, basal fovea and lateral areas very deep, lateral carina high, extending at most to top of apical slope; prepectoral carina (pl. 52, figs. 38, 47) ascending well up on mesopleura, where it frequently bends abruptly toward, and usually reaches anterior margin; postpectoral carina (pl. 52, fig. 38) distinct only medially, where it is sometimes represented only by a tubercle on each side of mesosulcus; metapleuron (pl. 51, fig. 29) small, triangular, flat, deeply inset; propodeum (pl. 51, fig. 29) bulbous, without carinae, precipitous apically, basal constriction (pl. 51, fig. 29) very deep and narrow, spiracles very long, situated near bottom of constriction. Wings (pl. 53, fig. 50) densely hairy, with neither a hairless area below base of stigma nor a fenestra; stigma extremely narrow, no broader than combined costa and subcosta, radius very close to base, stigma very gradually tapering from radius and merging imperceptibly with metacarpus; radial cell very narrow; basal abscissa of radius neither strongly thickened nor curved, apical abscissa a long sigmoid curve; basal abscissa of radius, intercubitus and apical abscissa of cubitus forming a nearly straight line, only slightly angled at the nodes; basal vein straight or slightly deurved at lower end; discocubitus curved, without ramellus; intercubitus as long as or longer than second abscissa of cubitus; discoidal cell not or barely as long as brachial cell; lower apical angle acute; postnervulus broken above middle; nervellus from shortly antefurcal to shortly postfurcal; frenulum with many widely separated and frequently unevenly spaced hooks and extending from near radius about halfway to apex of wing; abscissula straight or weakly curved, cubitella usually not nearly reaching margin of wing; nervellus strongly reclivous, broken far above middle, upper abscissa strongly inclivous. Legs short, hind leg not or barely as long as abdomen; hind coxa (pl. 51, fig. 29) not extending beyond apex of propodeum; front and middle coxae each with a more or less tubercle-like extension below articulation of trochanter; claws moderately curved, pectination short and dense.

Abdomen (pl. 56, fig. 86): More than twice as long as head and thorax, strongly compressed beyond first segment; first segment slender, spiracle at about apical fifth, petiole usually compressed, postpetiole short, convex above; tergite 2 much shorter than tergite 1 and longer than 3, without an umbo, spiracles beyond middle but before apical third, gastrocoeli nearer to spiracles than to base, epipleura not at all separated from tergite; sternite 2 reaching to about middle of tergite 2, sternite 3 not or barely reaching apex of tergite 2; tergite 3 with a distinct, subcircular gastrocoelus-like area at extreme

base on each side; middle tergites^a not[†] emarginate medially; ovipositor not exerted; male hypopygium with apex arcuate or medially emarginate, paramere (pl. 55, fig. 84) acutely pointed at apex and frequently subapically angulate on lower margin.

This genus, containing about 30 species, is divisible into two fairly distinct groups, one including the genotypes of both *Thyreodon* and *Oleter*, characterized by small head, sloping temples, more distinct notaulices, frequently with prominent rugae at their anterior ends, and slenderer habitus; and the other consisting of *T. atricolor* (Olivier), *grandis* Cresson, *fernaldi* Hooker, and their relatives with larger head, broader temples, obsolescent notaulices and stouter habitus. These appear to be all characters of specific rather than generic significance.

2. Genus ATHYREODON Ashmead

PLATE 51, FIGURE 33; PLATE 52, FIGURE 37; PLATE 56, FIGURE 87

Athyreodon ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 87, 1900.—HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 100, 1912. [Genotype: (*Athyreodon thoracicus* Ashmead) = *Athyreodon atriventris* (Cresson), according to Hooker, 1912.] Monobasic.

Tipulophion KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, p. 75, 1901.—SCHULZ, Zeitschr. Hym. Dip., vol. 3, p. 252, 1903; Spolia hymenopterologica, p. 97, 1906. [Genotype: (*Tipulophion gigas* Kriechbaumer) = *Athyreodon atriventris* (Cresson), according to Hooker, 1912.] Monobasic.

Macrophion SZÉPLIGETI, in Wytzman, Genera insectorum, fasc. 34, p. 32, 1905.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1420, 1908.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 14, 1912. [Genotype: (*Macrophion ornatus* Szépligeti) = (*Thyreodon*) *Macrophion grenadensis* (Ashmead), according to Morley, 1912. By designation of Viereck, Proc. U. S. Nat. Mus., vol. 42, p. 640, 1912.]

Hooker seems to have been correct in synonymizing the genotypes of *Athyreodon* and *Tipulophion* with *atriventris* (Cresson), and there appears little doubt that both *Macrophion ornatus* Szépligeti and *Thyreodon grenadensis* are also *atriventris*.

This genus, also Neotropical, is closely related to *Thyreodon*, from which, in the species that resemble *Thyreodon* most closely, it is rather weakly separated. With the acquisition of more material it may be found necessary to synonymize it with *Thyreodon*, but on the basis of the 9 or 10 species available to me it is distinguishable as follows:

Head (pl. 51, fig. 33): Temples usually very narrow and genae narrow below, rarely both broad; eyes larger, more deeply emarginate; malar space usually very short, rarely as in *Thyreodon*; ocelli large, ocellular space frequently obsolete and rarely as long as diameter of an ocellus; antennal scrobes small and poorly defined; clypeus sharply rounded but not angulate at apex; second joint of maxillary palpus inflated.

Thorax (pl. 52, fig. 37): Propodeum usually not distinctly inflated, not reaching apex of hind coxa, basal constriction less deep and metapleuron not so deeply inset, rarely approaching the condition in *Thyreodon*. Wings with discoidal cell usually longer than, rarely equal in length to, brachial cell, lower apical angle nearly or quite a right angle; frenulum shorter than in *Thyreodon*, hooks fewer and more closely spaced; cubitella reaching wing margin; nervellus frequently not broken, the brachiella originating at its upper end. Hind leg longer than abdomen, coxa extending beyond apex of propodeum by nearly half the length of coxa; front coxa only slightly, middle coxa not at all tuberculate apically.

Abdomen (pl. 56, fig. 87): Petiole usually terete; sternite 2 not reaching middle of tergite 2, sternite 3 not reaching apex of tergite 2.

The critical characters of this genus are the inflated second joint of the maxillary palpus, the large ocelli and the extension of the hind coxae beyond the propodeum.

3. Genus RHYNCHOPHION Enderlein

PLATE 50, FIGURE 25; PLATE 51, FIGURES 31, 35; PLATE 52, FIGURE 39; PLATE 55, FIGURES 76, 85; PLATE 56, FIGURE 88

Rhynchophion ENDERLEIN, Zool. Anz., vol. 39, p. 630, figs. 5, 7, 8, 1912. [Genotype: *Rhynchophion odontandropax* Enderlein.] Monobasic.

A third American genus of the *Thyreodon* group, anomalous in the anthophagous trophi and the entire lack of the postpectoral carina, and differing from *Thyreodon* otherwise as follows:

Head (pl. 50, fig. 25; pl. 51, fig. 35): Broader across temples than across eyes; eyes smaller than in *Thyreodon* and only arcuately emarginate, malar space longer; antennal scrobes shallow and not carinately defined; mandible longer, subparallel-sided, lower tooth the larger; trophi anthophagous, both labium and maxillae unusually long; second joint of maxillary palpus slender, terete; scape somewhat obliquely truncate.

Thorax: Pronotum with only a shallow groove dorsally, posterior and anterior margins not at all elevated; notaulices obsolete; mesopleuron with a broad longitudinal impression at level of fovea; prepectoral carina (pl. 52, fig. 39) developed only ventrally; postpectoral carina not at all indicated medially; metapleuron (pl. 51, fig. 31) large, subovate, convex; propodeum (pl. 51, fig. 31) not at all inflated, basal construction shallow medially, spiracles situated behind constriction. Wings very densely clothed with long, recumbent hair; lower apical angle of discoidal cell right or slightly obtuse; frenulum short, hooks closely and evenly spaced. Legs rather slender, hind leg much longer than abdomen; front and middle coxae not at all tuber-

culate apically; hind coxa (pl. 51, fig. 31) extending nearly its entire dorsal length beyond apex of propodeum.

Abdomen (pl. 56, fig. 88): Not or barely twice as long as combined head and thorax, very strongly compressed and, in side view, very deep; first segment rather stout, slightly deurved, postpetiole not bulbous, spiracles shortly behind apical third; tergite 2 shorter than 3, spiracles at about middle, gastrocoeli near base; sternite 2 reaching apex of tergite 1, sternite 3 to apex of tergite 2; male hypopygium broad, apex deeply emarginate on each side of middle and with a median acute tooth, paramere (pl. 55, fig. 85) rounded at apex.

This genus apparently includes comparatively few species, of which only two besides the genotype are described. It is largely tropical in its range but extends into the southwestern part of the United States.

RHYNCHOPHION ODONTANDROPLAX Enderlein

Rhynchophion odontandroplox ENDERLEIN, Zool. Anz., vol. 39, p. 630, figs. 5, 7, 8, 1912.

I have identified as this species a female from São Paulo, Brazil, in the collection of Henry K. and Marjorie C. Townes, which agrees almost perfectly, except in sexual characters, with the original description. The clypeus in this species, while of the same type as in the other species, is somewhat truncate medially.

RHYNCHOPHION FLAMMIPENNIS (Ashmead), new combination

Thyreodon flammipennis ASHMEAD, Proc. California Acad. Sci., ser. 2, vol. 4, p. 125, 1894.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 12, 1912.—HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 129, 1912.

The range of this species, originally described from Baja California, Mexico, is shown to extend from Ecuador to the southwestern United States by the following specimens in the United States National Museum: One male, Posorja, Ecuador, F. Campos R.; one female, Tlahuililo, Durango, Mexico, A. Busck; one female, two males, Douglas, Ariz., August 22, 1932, and August 2, 1933, W. W. Jones, and one female, August 20, 1932, collector unknown; one female, Tucson, Ariz.; and one female, northern New Mexico, A. O. Weese.

RHYNCHOPHION LIGULIFER (Morley), new combination

Thyreodon ligulifer MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 9, 1912.

Morley's description of the elongate trophi, the less inflated and less deeply constricted propodeum, and the more prominent coxae leaves no doubt that this species belongs in *Rhynchophion*. Morley overlooked the same characters in *flammipennis*, which he discussed on a later page of the same work.

4. Genus *AGLAOPHION* Cameron

PLATE 51, FIGURES 30, 34; PLATE 52, FIGURES 36, 46; PLATE 56, FIGURE 89

?*Dictyonotus* KREICHBAUMER, Zool. Jahrb. Syst., vol. 8, p. 197, 1894. [Genotype: *Ophion* (*Dictyonotus*) *melanarius* Kreichbaumer.] Monobasic.

Aglaophion CAMERON, Journ. Straits Branch Roy. Asiatic Soc., No. 39, p. 131, 1903.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 15, 1912. [Genotype: *Aglaophion flavinervis* Cameron.] Monobasic.

Hybopleurax ENDERLEIN, Zool. Anz., vol. 39, p. 624, 1912. [Genotype: *Hybopleurax sumatranum* Enderlein.] Monobasic. New synonymy.

Coracophion SHESTAKOV, Konowia, vol. 5, p. 261, 1926. [Genotype: *Coracophion manganicolor* Shestakov.] Monobasic. New synonymy.

This genus is the Old World representative of the *Thyreodon* group. It is restricted in distribution to the eastern part of the Palearctic region and the Oriental region.

I have not seen the genotype of *Aglaophion* but believe I am correct in transferring it to the genus *Thyreodon purpurascens* Smith, as which I have identified certain specimens in the United States National Museum from China and Japan. As *Hybopleurax sumatranum* Enderlein I have identified a specimen in the United States National Museum, and on this basis synonymize *Hybopleurax* with *Aglaophion*. These two are the only described species I know, aside from the genotype, that are referable to the genus. The possible synonymy of this genus with *Dictyonotus* Kriechbaumer is discussed under the latter genus.

From the other genera of the *Thyreodon* group this genus may at once be distinguished by its complete and high postpectoral carina (pl. 52, fig. 36) and deeply emarginate tergites. From the above description of *Thyreodon* it also differs as follows:

Head (pl. 51, fig. 34): About as wide as thorax; eyes more shallowly emarginate; malar space nearly as long as basal width of mandible; antennal scrobes shallow and less distinctly defined; clypeus rather distinctly separated, recurved but rounded at apex; second joint of maxillary palpus clavate.

Thorax: Pronotum not deeply grooved dorsally, neither anterior nor posterior margin prominent; mesoscutum hardly precipitous anteriorly, notaulices obsolete; mesopleuron (pl. 52, fig. 46) with a longitudinal groove or impression at top of prepectus dividing the pleuron into approximately equal upper and lower areas; sternaulices obsolete; metapleuron strongly convex, frequently tuberculate; propodeum (pl. 51, fig. 30) not bulbous, basal constriction only moderately deep, spiracles situated behind constriction. Wings with lower apical angle of second discoidal cell right or slightly obtuse; frenulum much shorter and with comparatively few (about 10) hooks; cubitella nearly reaching margin of wing; nervellus broken at or near upper third. Legs

longer, hind leg much longer than abdomen; hind coxa extending about half its dorsal length beyond propodeum; front and middle coxae not produced beyond articulations of trochanters; claws more strongly curved apically, with stout, well-separated teeth.

Abdomen (pl. 56, fig. 89): Barely twice as long as head and thorax; spiracles of first segment at about apical fourth; petiole terete; tergites 3-7 emarginate medially.

AGLAOPHION FLAVINERVIS Cameron

As stated above, I have not seen this species, but some notes on the type supplied by Mr. Perkins should aid materially in its identification:

"Occipital carina strong and complete; ocular carina on frons distinctly raised; apical margin of clypeus outwardly reflexed; mandible similar to that of *Thyreodon*; pronotal sinus deeply emarginate; notauli absent; pit before postscutellum distinct; mesopleuron with a broad, deep, smooth, transverse furrow; sternauli very weakly indicated anteriorly; postpectoral carina very strong and complete; metapleuron weakly intumescent; propodeum about as long as broad, basal constriction very narrow, deep, partially interrupted (by becoming shallower) laterad; stigma as in *Enicospilus*; radial cell narrow and in form like that of *Thyreodon*, but a little broader, apically sharply curved to the costa; fenestra absent; basal abscissa of radius of hind wing almost straight; second tergite without umbo, spiracles beyond middle; tergites 3-5 deeply incised dorsally."

AGLAOPHION PURPURASCENS (Smith), new combination

Thyreodon purpurascens SMITH, Trans. Ent. Soc. London, p. 395, 1874.—SCHULZ, *Spolia hymenopterologica*, p. 98, 1906.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 10, 1912.—UCHIDA, Journ. Fac. Agr. Hokkaido Imp. Univ., vol. 21, p. 200, 1928; *Insecta Matsunurana*, vol. 14, pp. 43, 124, 1940.

Ophion metallicum RADOSZKOWSKI, Horae Soc. Ent. Rossica, vol. 21, p. 433, 1887.—SCHULZ, *Spolia hymenopterologica*, p. 97, 1906.

?*Dictyonotus melanarius* KRIECHBAUMER, Zool. Jahrb. Syst., vol. 8, p. 197, 1894. *Coracophion manganicolor* SHESTAKOV, Konowia, vol. 5, p. 261, 1926.

Uchida appears to be correct in synonymizing *Ophion metallicum* Radoszkowski and *Coracophion manganicolor* Shestakov with *purpurascens*. The doubtful synonymy of *Dictyonotus melanarius* Kriechbaumer is mine; for discussion of this see under *Dictyonotus*.

As this species I have identified the following female specimens in the United States National Museum: One, Hashimoto, Japan, June 26, 1928, T. R. Gardner; two, Gifu, Japan, Y. Nawa; one, Kuling, Kiangsi, China, N. Gist Gee; and one without locality.

J. F. Perkins examined the type and made the following notes comparing the species with *Aglaophion flavinervis*: "Differs in having the mandible in front of a line joining the base anteriorly to the V between the teeth, strongly depressed; clypeus conspicuously, though not strongly, outwardly reflexed in the apical one-third (at an angle of about 150°); ocular carina of the same form as in *Euryophion*, but the weak groove to the ocelli is not interrupted; propodeum and metapleura of the same form as in *Aglaophion*, but a little shorter, tergites 3-5 weakly excised apically."

AGLAOPHION SUMATRANUM (Enderlein), new combination

Hybopleurax sumatranum ENDERLEIN, Zool. Anz., vol. 39, p. 625, 1912.

A female captured by H. M. Pendlebury at Nakon Sri Tamarat, Khao Luang, Siam, on March 30, 1922, agrees perfectly with the description.

5. Genus EURYOPHION Cameron

Euryophion CAMERON, Ann. South African Mus., vol. 5, p. 83, 1906.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 15, 1912. [Genotype: *Euryophion nigripennis* Cameron.] Monobasic.

This African genus is unknown to me, and I should have been unable to place it without the assistance of J. F. Perkins. With this assistance I place it, I think satisfactorily, in the *Thyreodon* group, where it appears to be the South African analog of *Aglaophion*. The following description is compounded of the characters given by Cameron and Morley together with those furnished by Mr. Perkins:

Large insects, exceeding 25 mm. in length, entirely black wings.

Head: Strongly swollen behind eyes; occipital carina with a median notch directed toward the neck; frons margined by carinae both below and at sides, carina at side of frons extraordinarily raised and continued to posterior ocellus by a groove which runs from eye to front of posterior ocellus, the carina and groove interrupted shortly before ocellus by a short, deep, transverse furrow; clypeus medially reflexed and truncate; mandibles broad, not conspicuously twisted; eyes parallel and not emarginate; ocelli small; mandibles short and broad, only slightly twisted; antenna thick, tapering and about as long as forewing.

Thorax: Mesoscutum with a shallow median longitudinal furrow, notaulices obsolete; scutellum not margined; postscutellum elevated; mesosternum flat, sternaules shallow anteriorly, deep posteriorly; postpectoral carina complete, but difficult to see ventrally as it runs close to the coxae; metapleuron with a large tubercle in middle; propodeum not longer than broad, not conspicuously intumescent

basally, basal constriction very narrow. Wings with stigma and radial cell very narrow, the stigma merging imperceptibly with metacarpus, radius nearly at base; basal vein, basal abscissa of radius and abscissula somewhat thickened, apical abscissa of radius bent sharply forward apically. Legs with hind coxa extending distinctly beyond apex of propodeum; tarsal joints 1-4 compressed.

Abdomen: First segment short and broad; tergite 2 deeper than long, with epipleura extremely broad, spiracles shortly behind middle.

In making his notes on this genus Mr. Perkins did not have the genotype before him, but based his observations on the types of *Euryophion magnificus* Morley and *E. superbus* Morley, which he believed properly referred to the genus.

6. Genus ORIENTOSPILUS Morley

Orientospilus MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 6, 1912. [Genotype: *Orientospilus individuus* Morley. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 107, 1914.]

This genus is unknown to me. As described, it presents a confusing combination of characters. The short, tumid propodeum overlying the hind coxae suggests *Thyreodon*, the emarginate third tergite *Aglaoiphion*, and the fenestra *Enicospilus*; but the character that seems to ally it with any genus distinguishes it from each of the others.

Mr. Perkins examined the genotype and sent me the following notes:

"Mandible slightly twisted, but very strongly tapering, upper tooth much longer than lower; clypeus broadly, shallowly emarginate apically; pronotal sinus broad; speculum not set off; postpectoral carina absent; scutellum margined; basal constriction of propodeum deep and undivided, intumescent behind this (similar to *Thyreodon*, but laterally less sharply constricted at base); umbo present; spiracles of second tergite (which has extremely narrow epipleura) a little beyond middle; stigma as in *Enicospilus*; basal abscissa of radius thickened basally and sharply curved; apical abscissa weakly, evenly arched towards the anterior margin, fenestra absent; abscissula sharply curved at base."

It is particularly noteworthy that Perkins' observation on the lack of the fenestra is diametrically opposite that of the author of the genus, who described the fenestra as present and with scleromes.

Enicospilus reticulatus Cameron, 1899 (not 1902), which Morley refers to this genus differs in nearly every character from the original description of the genus. As I have identified it this species is an *Enicospilus*, anomalous only in its broad and weakly twisted mandibles. It is closely allied to *E. flavoplagiatus* Cushman.

7. Genus *OPHION* Fabricius³

PLATE 49, FIGURE 3; PLATE 50, FIGURE 21; PLATE 52, FIGURES 41, 43; PLATE 53, FIGURE 51; PLATE 55, FIGURES 73, 81; PLATE 56, FIGURE 94

Ophion FABRICIUS, *Entomologia systematica* . . ., Suppl., pp. 210, 235, 1798; *Systema Piezatorum*, p. 130, 1804. [Genotype: *Ichneumon luteus* Linnaeus.

By designation of Curtis, *British entomology*, vol. 13, p. 600, 1836.]

Paniscus SCHRANK, *Fauna Boica*, p. 316, 1802. [Genotype: *Ichneumon luteus* Linnaeus.] Monobasic.

Neophion MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 30, 1912. [Genotype: *Neophion crassus* Morley. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 100, 1914.]

To give a bibliography of this genus would be to list the works, dealing with the genus, of virtually all the more prominent students of the Ichneumonidae since the time of Gravenhorst. Suffice it here to cite a few of the more useful works for the identification of species: European species, Schmiedeknecht, *Opuscula ichneumonologica*, fasc. 4, pp. 1334-1348, 1908, and supplement, fasc. 24, pp. 24-47, 1935. American species, Hooker, *Trans. Amer. Ent. Soc.*, vol. 38, pp. 21-50, 1912. Species of the world as represented in the British Museum of Natural History, Morley, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, pp. 53-66, 1912. Eastern Asiatic species, Uchida, *Journ. Fac. Agr. Hokkaido Imp. Univ.*, vol. 21, pt. 2, pp. 204-211, 1928. New Neotropical species, Szépligeti, *Ann. Mus. Nat. Hungarici*, vol. 4, p. 133, 1906. Central American species, Cameron, *Biologia Centrali-Americana, Hymenoptera*, vol. 1, p. 293, 1906. The keys in these works fall far short of including all the described species, and recourse must be had to the many scattered descriptions of species.

Under strict interpretation of the International Code of Zoological Nomenclature, *Paniscus* Schrank is isogenotypic, and therefore synonymous, with *Ophion* Fabricius. Believing, however, that stability of the nomenclature of the genera involved would be best served by the preservation of the names in their traditional senses, I some years ago⁴ attempted, I fear rather unsuccessfully, to show that Schrank's conception of *Paniscus* was based on the excellent figures in DeGeer's "Memoires pour Servir a l'Histoire des Insectes," 1771, which almost certainly illustrate the insect long known as *Paniscus cephalotes* Holmgren. The alternative was to synonymize *Paniscus* with *Ophion* and substitute for *Paniscus* in the traditional

³ Since this synonymy was written Dr. Henry K. Townes has published his monumental "A Catalogue and Reclassification of the Nearctic Ichneumonidae" (*Mem. Amer. Ent. Soc.*, No. 11, 1944-45), on p. 730 of which, in addition to the synonyms listed here, he also synonymizes *Genophion* Felt and *Ophiogastrella* Brues. In my opinion the venational characters by which I have separated these two genera from *Ophion* are of much more than specific significance.

⁴ *Proc. U. S. Nat. Mus.*, vol. 64, art. 20, p. 21, 1924.

sense *Netelia* Gray. The last-mentioned name is monobasic, with *Paniscus inquinatus* Gravenhorst as type, and was originally defined by the single character of the number of hooks in the frenulum. This species has not otherwise been recognized since its description in 1829, and the correctness of the identification of Gray's specimen is extremely doubtful. Townes, in 1938,⁵ synonymized *Paniscus* Schrank with *Ophion* and used *Netelia* Gray for *Paniscus* of authors. Although I feel that this action was too precipitate and will perhaps not receive the support and following of a majority of the contemporary specialists on the Ichneumonidae, his action seems to have blocked the preservation of *Paniscus* in the sense sanctioned by well over a hundred years of usage, and I shall follow him in the use of *Netelia*. There is, however, still the threat of instability in the nomenclature of the genus if the type of *Paniscus inquinatus* Gravenhorst is still in existence, for there is no assurance that examination of the type will show it to be congeneric with the species now to be known as *Netelia*, especially those of the subgenus *Netelia* as identified by Townes.

Ophion is a genus of world-wide distribution and contains many hundreds of species differing widely among themselves but each possessing virtually all the characters in the foregoing key that apply to the *Ophion* group of genera. In this somewhat heterogeneous assemblage are included a number of groups of species which are more or less well distinguished from the general mass of more typical forms but are not, I think, generically distinct. Such species as *bifoveolatus* Brullé, *coloradensis* (Felt), *slossonae* Davis, and others in the North American fauna are representatives of such groups, and one is perhaps justified in suspecting that some of the generic names that have been proposed apply to such groups. It may be possible and advisable to employ some of these names, and others not yet proposed, in the subgeneric sense.

The synonymy of *Neophion* Morley is on the authority of J. F. Perkins, who examined the type of *N. crassus* Morley and pronounced it a species of *Ophion*.

The genus is characterized as follows:

Head (pl. 50, fig. 21): Various in form, but always with trophi normal, with none of the elements greatly elongate; mandible gradually narrowed from base to apex and not conspicuously twisted, teeth equal or lower tooth the longer; clypeus truncate or broadly arcuate at apex; occipital carina distinct.

Thorax: Pronotal sinus (pl. 55, fig. 73) broad, exposing spiracular sclerite; notaulices more or less distinct at least anteriorly; mesopleuron with speculum distinct; prepectoral carina (pl. 52, fig. 41)

⁵ Lloydia, vol. 1, pp. 163-231, 1938.

present; postpectus not defined; scutellum, subalar tubercles, and metapleura more or less convex but not inflated; scutellum rarely completely margined; propodeum (pl. 52, fig. 43) excarinate to completely areolated, not produced over hind coxae, basal constriction neither especially deep nor especially long, divided into a median and two lateral foveae; frenum much shorter medially than basal area. Wings (pl. 53, fig. 51) without fenestra or scleromes, though frequently with a hairless area below base of stigma; stigma elongately triangular, tapering evenly from radius to apex, radius at or beyond basal third; basal vein and basal portion of discocubitus usually convergent toward anterior margin; basal abscissa of radius straight, not thickened basally, apical abscissa sinuous or straight, rarely curving forward at base; abscissula curved basally; nervellus broken from slightly below to distinctly above middle, upper abscissa perpendicular. Legs stout to very slender; apical joint of front tarsus and all claws (pl. 55, fig. 81) normal in form.

Abdomen (pl. 56, fig. 94): Tergite 2 with umbo distinct, spiracles at or near middle, rarely far before or distinctly behind middle, epipleura distinctly separated throughout; ovipositor not exerted.

8. Genus RHOPALOPHION Seyrig

PLATE 55, FIGURE 71

Rhopalophion SEYRIG, Mus. Nat. Hist. Nat., Mission Scientifique de l'Omo, vol. 3, Zool., fasc. 18, Hym. 2, Ichneumonidae, p. 49, 1935. [Genotype: *Rhopalophion curvus* Seyrig.] Monobasic and designated.

Described from four African species, only one of which is named. This genus is, I think, not distinct from *Ophion*, though lacking a specimen I prefer not to synonymize it. The most conspicuous character and the one on which the genus was principally founded, the course of the discocubitus (pl. 55, fig. 71), is very doubtfully of generic significance. The one character mentioned that deters me from synonymizing the genus is described as follows: "2e abscisse radiale des ailes postérieures droites ou tres légèrement sinuée (contrairement au genre *Ophion* où elle est fortement recourbée à la base)." It seems probable, since the second abscissa of radiella in *Ophion* is always straight, that the "2" is a typographical error for "1" and that the description applies to the abscissula, which, in *Ophion*, is more or less distinctly curved basally. The form of the mandible, as described, and of the stigma and basal abscissa of radius and the lack of the fenestra as shown in the figure of the wing, indicate close relationship to *Ophion*.

9. Genus APATOPHION Shestakov ^{6a}

Apatophion SHESTAKOV, Konowia, vol. 5, p. 262, 1926.—MEYER, Konowia, vol. 16, p. 18, 1937. [Genotype: *Apatophion mirsa* Shestakov.] Monobasic.

Despite the paucity of characters given in the original description that would aid in placing this genus in the foregoing key, it seems evident that it belongs in the *Ophion* group and very close to *Ophion*. In fact, Meyer treats it as a subgenus of *Ophion*, distinguishing it only by the character of the postpetiole being as long as the petiole. Meyer is probably correct in this treatment.

The genus should be readily distinguished by the combination character of a very short first abdominal segment with the postpetiole as long as the petiole, broad temples, rather stout and basally attenuate antennae, peculiarly formed mandibles in which the teeth are separated only by a deep groove on the outer surface (this may be due to the wearing away of the teeth), exareolate propodeum, lack of foveae at the base of tergite 2, broad stigma, sinuate apical abscissa of radius. The lack of foveae at the base of tergite 2, if this implies the absence of the umbo, is very unusual for the *Ophion* group.

The genotype (from Persia) is a rather small ophionine (12 mm.), black with ferruginous markings and legs and flavous wings.

10. Genus ALOPHOPHION,⁶ new genus

PLATE 50, FIGURE 12

Remarkable in its entire lack of the occipital carina and differing only by that character from all species of *Ophion*, this group of species should perhaps be considered only a geographical subgenus of *Ophion*. But the several species before me, all from southern South America, present such uniformity of structure as to form a compact group more conveniently treated here as a genus.

^{6a} After this paper was sent to the printer a specimen identified by Dr. Townes as *Hellwigella similis* Szépligeti was received from him. This specimen is certainly not referable to the same tribe as *Hellwigella* but belongs to the Ophionini. In the foregoing key to genera it runs directly to *Apatophion* Shestakov, and, despite the very evident teeth on the mandibles, I believe it belongs to that genus. At my request Dr. Townes has compared it with the original description and reports that it agrees very well, not only with the generic description but also with the description of the genotype, except in details of coloration, especially the color of the wings, which in *H. similis* are blackish and in *A. mirsa* are described as flavous.

If we accept Dr. Townes's identification of *H. similis* as correct, the following should replace "9. Genus *Apatophion* Shestakov" and its citation, and *Hellwigella* Szépligeti should replace *Apatophion* Shestakov in the key to genera:

9. Genus HELLWIGIELLA Szépligeti

Hellwigella SZÉPLIGETI, Genera Insectorum, fasc. 34, p. 23, 1905. [Genotype: *Hellwigella nigripennis* Szépliget]. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 67, 1914.]

Apatophion SHESTAKOV, Konowia, vol. 5, p. 262, 1926.—MEYER, Konowia, vol. 16, p. 18, 1937. [Genotype: *Apatophion mirsa* Shestakov.] Monobasic.

⁶ From ἀλόφος = without a ridge, in reference to the lack of the occipital carina.

In addition to the lack of the occipital carina, all the species, of which only the genotype is identified specifically, conform to the following description:

Head (pl. 50, fig. 12): Broad behind, temples nearly reaching outside tangents of eyes; stemmaticum high and sharply defined by a surrounding groove; malar space short; mandible rather long and little narrower at apex than at base; clypeus broadly truncate.

Thorax: Notaulices rather deep and foveolate anteriorly; prepectoral carina complete; scutellum not at all margined; propodeum long, in profile with a gradual, weakly convex slope. Wings with a hairless area below base of stigma; discocubitus broken but with at most a very short ramellus, basal portion nearly parallel to basal vein; second discoidal cell rather long and narrow; postnervulus and nervellus broken distinctly above middle.

Abdomen: rather slender.

Genotype.—*Ophion chilensis* (Spinola).

11. Genus AUSTRALOPHION Morley

PLATE 52, FIGURE 45

Australophion MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, pp. 4, 30, 1912. [*Genotype*: *Ophion peregrinus* Smith.] Monobasic.

I have seen no specimen of the genotype, but there appears no doubt that the species described below is properly referred to the genus. Despite the remarkable inflation of the scutellum, subalar tubercles, and metapleura, this species is hardly more than subgenerically distinct from *Ophion*. It agrees with all the key characters leading to *Ophion*.

AUSTRALOPHION INFLATUS, new species

Male.—Length 17 mm., antenna 20 mm.

Head: Temples strongly convex but not reaching outside tangents of eyes; occipital carina complete, joining hypostomal carina far above ventral articulation of mandible; ocelli not touching eyes, stemmaticum only moderately high and defined by rather weak grooves; face very little broader than frons, clypeus broadly truncate; malar space distinct but short; mandible considerably narrowing toward apex; antennae slightly longer than body and very slender, all joints much longer than thick.

Thorax (pl. 52, fig. 45): Polished, finely and sparsely punctate; notaulices broad and shallow anteriorly; scutellum high, almost hemispherical, fovea deep; frena of scutellum and postscutellum not at all foveolate; prepectoral carina complete; subalar tubercle and metapleuron very large and convex; propodeum rather short and

convex, its surface uneven but not definitely rugose, its posterior angles rather prominent with two carinae diverging backward from each. Wings with a small hairless area below base of stigma; apical abscissa of radius curving slightly forward from base; discocubitus sharply broken by a distinct ramellus, basal abscissa strongly convergent with basal vein; postnervulus broken distinctly above middle; nervellus broken slightly below middle. Legs very slender; claws (male) very densely pectinate.

Abdomen: Slender.

Brown, with legs to apices of femora concolorous, tibiae and tarsi stramineous, antennae black, and the following markings lemon yellow: inner orbits, an elongate spot in posterior orbit, a spot on lower anterior margin of pronotum, scutellum, postscutellum, tegulae, subalar tubercle, a large spot in lower posterior angle of mesopleuron, and the metapleuron; wings slightly infumate, venation dark brown, paler basally.

Type locality.—Egmont, New Zealand.

Type—U.S.N.M. No. 57603.

One male taken February 29, 1920, by R. J. Tillyard.

12. Genus OPHIOGASTRELLA Brues

PLATE 54, FIGURE 57; PLATE 55, FIGURE 75

Ophiogastrella BRUES, ANN. ENT. SOC. AMER., vol. 5, p. 201, pl. 27, fig. 1, 1912.

[Genotype: *Ophiogastrella maculithorax* Brues.] Monobasic and designated.

Through the kindness of C. T. Brues I have been able to study the two paratypes of the genotype, and one of these is now deposited in the United States National Museum.

The peculiarly formed apical joint of the front tarsus (pl. 54, fig. 57) with its notched lower outer margin and the venation of the forewing (pl. 55, fig. 75), especially the long narrow stigma with radius near base, the strongly curved apical abscissa of radius, and the very short intercubitus distinguish this genus immediately. Brues described the vertex as "not margined behind," but I find that the occipital carina, though not strong, is complete. The second discoidal cell is short and broad, with the lower posterior angle sharply acute, the base very short and the discocubitus very strongly curved, but without a ramellus; the nervulus distinctly antefurcal; the nervellus broken at about its lower third. The prepectoral carina is obsolete above and weak elsewhere. The speculum is indistinctly defined because of the very weak groove and the fact that the entire mesopleuron is polished; the scutellum is carinately margined to apex. Otherwise the genus agrees with all the key characters leading to the *Ophion* group of genera.

The genotype is the smallest (7-8 mm. long) species of the Ophionini known to me.

13. **POTOPHION**,⁷ new genus

PLATE 50, FIGURE 26; PLATE 56, FIGURE 91

Essentially *Ophion* in all the group characters, this genus is remarkable for the anthophagous trophi (pl. 50, fig. 26) and exerted ovipositor (pl. 56, fig. 91). Those two characters should suffice to distinguish it. Some of the other characters mentioned in the following description of the genotype, especially the form of the head, may also be of generic significance.

Genotype.—*Potophion caudatus*, new species.

POTOPHION CAUDATUS, new species

Head (pl. 50, fig. 26): About as long as broad; eyes long and narrow; combined face and clypeus much longer than broad, slightly broader than frons; temples sharply receding; occipital carina weak, especially medially and at lower extremities; cheeks and malar space very narrow; ocelli large, but not touching eyes; mandible much broader at base than at apex; trophi, especially the labium, unusually long, lobes of ligula about three times as long as broad.

Thorax: Slender; notaulices weak; scutellum not at all margined; prepectoral carina strong, complete, very strongly sinuate; postpectoral carina lacking; propodeum long, only moderately convex, with complete basal and medially interrupted apical carinae. Wings with radius at basal third of stigma, its apical abscissa gently recurved; a sharply defined hairless area below base of stigma; discocubitus sharply broken by a long ramellus, its basal abscissa strongly convergent with basal vein; lower apical angle of second discoidal cell acute, postnervulus broken a little above middle; veins of transverse brace in about the ratio of 1:2:4, abscissula long, strongly curved at base, gently sinuate beyond; nervellus broken a little below middle.

Abdomen (pl. 56, fig. 91): Strongly compressed beyond tergite 2; postpetiole depressed, more than half as long as petiole; tergite 2 with spiracles very slightly basad of middle, umbo distinct, epipleura separated throughout; ovipositor recurved, sheath about as long as first tergite.

Ferruginous, with head largely, thorax laterally, parapsidal stripes and lateral margins of mesoscutum, postscutellum, and petiole yellow; dorsal edge of abdomen somewhat brownish; sheath blackish; wings hyaline, costa and stigma yellow, other veins brown.

Type locality.—Mount Omei, Szechwan, China, 11,000 feet.

Type.—U. S. N. M. No. 57604.

Two females, both captured by D. C. Graham, the holotype in July 1936, and the paratype at 12,000 feet, 30 miles north of Tatseinlu, Szechwan, on July 9, 1923.

⁷ From *ποτός* = drinking, in reference to the long trophi.

14. Genus AGATHOPHIONA Westwood

PLATE 50, FIGURES 11, 28; PLATE 56, FIGURE 98

Agathophiona WESTWOOD, Tijdschr. Ent., vol. 25, p. 20, pl. 4, figs. 5-13, 1882.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 297, pl. 12, fig. 11, 1886.—ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 87, 1900.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1419, 1908. [Genotype: *Agathophiona fulvicornis* Westwood.] Monobasic.

An anomalous genus, in respect to both the mouth parts and the abdominal structure, but exhibiting most of the characters of the *Ophion* group.

Head (pl. 50, figs. 11, 28): Temples buccate and extending far beyond outside tangents of eyes; occipital carina distinct but not reaching hypostomal carina; eyes and ocelli small, eyes shallowly emarginate; ocellocular line and malar space distinct; clypeus deeply separated, broad, flat, broadly truncate at apex; labrum exposed; antenna stout, tapering both basally and apically, much shorter than body; mandible only slightly narrower at apex than at base, somewhat twisted, teeth bluntly rounded; trophi elongate, especially the ligula, which is prolonged into two slender processes each grooved on the inner side and fitting together to form a slender tube extending, when at rest, posteriorly to or beyond apex of propodeum, galea of maxilla elongately oval and thin, both maxillary and labial palpi very slender.

Thorax: Short-ovate; pronotum with scrobes weakly defined, pronotal sinus broad, exposing spiracular sclerite; mesoscutum precipitous anteriorly, notaulices deep but short; scutellum broad, precipitate posteriorly, margined only basally; mesopleuron and sternum convex, prepectoral carina complete, speculum defined, fovea deep, postpectus not defined; metapleuron evenly convex, lower marginal carina not especially strong; propodeum very short, precipitate and somewhat concave behind, barely overlapping hind coxae, basal carina absent, apical carina present only laterally, basal constriction indistinctly interrupted, very narrow dorsally except medially where it is in the form of a pit, frenum extremely short; spiracle large, elongate, well behind bottom of constriction. Wings densely hairy both dorsally and ventrally and without fenestra or hairless area in discocubital cell; stigma narrowly triangular, radius at about basal fourth; basal abscissa of radius not thickened, weakly curved basally, apical abscissa nearly straight; veins of transverse brace in about the proportions of 1:1.5:3; discocubitus strongly curved, usually without trace of ramellus; second discoidal cell two-thirds as broad apically as long posteriorly, posterior angle acute, base broad, the postnervulus being broken at about middle, nervulus distinctly post-furcal; abscissula strongly curved basally; nervellus broken at or

slightly above middle, reclivous, upper abscissa perpendicular. Legs stout and rather short; hind coxa rather short-ovate, flattened dorsally; hind femur little longer than combined coxa and trochanter; tibia somewhat expanded apically, inner calcarium barely half as long as basitarsus, nearly uniform in thickness and without a conspicuous fringe of long hairs along inner margin; basitarsus much shorter than other joints combined, apical joint much longer than fourth, rather slender and decurved, claws rather weakly curved, coarsely pectinate in female, closely so in male.

Abdomen (pl. 56, fig. 98): Rather weakly compressed and in profile slender; first tergite broad and stout with spiracles at about apical two-fifths, sternite barely reaching a point ventrad of spiracles; tergites 1-3 subequal in length; tergite 2 with umbo, gastrocoeli near base, indistinct, spiracles about at middle; tergite 6 in female deeply cleft medially; hypopygium in female extremely long, directed downward (in museum specimens) and wrapped around the ovipositor which is directed upward with its tip enclosed in the short sheath, which does not extend above the apical tergite, ovipositor rather long and stout with the deep round dorsal notch near the apex; male genitalia unusually long.

The genotype is the only known species. It is shining black with pale reddish antennae and tarsi and deeply infumate wings. It is known only from Mexico.

15. Genus EREMOTYLUS Foerster

Eremotylus FOERSTER, Verh. naturh. Ver. preuss. Rheinlande, vol. 25, p. 150, 1868 (no species included).—THOMSON, Opuscula entomologica, fasc. 12, p. 1193, 1888.—BRAUNS, Arch. Ver. Freunde Naturg. Mecklenburg, vol. 43, p. 98 (1889), 1890.—SZÉPLIGETI, in Wytzman, Genera insectorum, fasc. 34, p. 35, 1905 (part).—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1450, 1908; suppl. fasc. 24, p. 49, 1935. [Genotype: *Anomalon marginatus* (Gravenhorst) Jurine. First species included.]

Comptoneura KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, pp. 22, 23, 1901. [Genotype; *Anomalon marginatus* (Gravenhorst) Jurine. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 27, 1914.] Isogenotypic with *Eremotylus* (Foerster) Thomson.

I have seen no specimen representing this genus. Certain North American species have been referred to it, but according to the descriptions by Thomson and Brauns and the additional characters communicated by J. F. Perkins such reference is incorrect. They are properly referable to *Enicospilus* despite their lack of alar scleromes.

In erecting *Eremotylus* it was Foerster's intention to include in it those species of *Ophion* in the broad sense, in which the discocubitus is unbroken and the discocubital cell lacks scleromes. In his unpublished manuscript he assigned to it *Ophion bombycivorus* Gravenhorst and *Ophion undulatus* Gravenhorst. *Ophion marginatus* he

left in *Ophion*, but from descriptions of that species it is apparent that it agrees with the original description of *Eremotylus* and can stand as the genotype.

Subsequent to its original description *Eremotylus* has had three somewhat different interpretations. The first, and the one here followed, was that of Thomson, with *Ophion marginatus* Gravenhorst as type. Ashmead (1896) gave it a second interpretation when he placed in it his *E. arctiae*, an American species of *Enicospilus* without scleromes; while Kriechbaumer referred to it *Ophion undulatus* Gravenhorst, genotype of *Allocamptus* Thomson and *Cymatoneura* Kriechbaumer on a later page of the same paper in which he had erected *Cymatoneura* for that species. The last two interpretations I consider synonymous with *Enicospilus* Stephens. Mr. Perkins writes, "the only species I recognize as belonging to *Eremotylus* is *marginatus* Grav.," and "*Camptoneura curvinervis* Kriechbaumer, I consider, belongs to a distinct genus."

The following generic description of *Eremotylus* is compiled from those by Thomson and Brauns, with several characters (indicated by quotation marks) furnished by Mr. Perkins interpolated:

Head: Temples broad; occipital carina distinct; ocelli small, not touching eyes; clypeus not separated, apex rounded; mandible stout, "not conspicuously twisted," teeth equal.

Thorax: "Pronotal sinus broad"; prepectoral carina above and notaulices obsolete; postpectoral carina absent; "speculum sharply defined below, strongly transcostate"; mesosternum with a conspicuous tubercle on each side at posterior third; scutellum acutely margined; propodeum short, basal constriction divided (Perkins says, "sharply excavated and undivided"), basal carina acutely elevated in middle, apical carina interrupted. Wings with "stigma narrowly lanceolate"; radius basally thickened and abruptly curved, "apical abscissa evenly curved"; "fenestra absent"; discocubitus not convergent with basal, ramellus absent; brachial cell not narrowed apically, upper margin straight; nervulus slightly antefurcal; postnervulus broken far above middle; abscissula strongly curved basally; nervellus broken below middle, nearly perpendicular.

Abdomen: Membrane of tergite 1 reaching spiracle of tergite 2; tergite 2 with umbo distinct and "with a deep elongate furrow on each side, which is subparallel with the lateral margin and extends to about one-half the distance from the base to the spiracle, the spiracle at middle of segment."

Such of the key characters as are included in the above description indicate that *Eremotylus* belongs in the *Ophion* group and probably near *Boethoneura*, new genus.

16. SIMOPHION,⁸ new genus

PLATE 50, FIGURE 23; PLATE 52, FIGURE 48; PLATE 54, FIGURE 55; PLATE 56, FIGURE 92

This and the next five genera form a series separable from the rest of the *Ophion* group of genera by the form and course of the basal abscissa of radius, which is distinctly thickened at the extreme base and rather abruptly bent or curved immediately beyond the thickening, whence it is straight to the interception of the intercubitus. From all the other genera the present genus differs in the peculiar form of the clypeus, the obsolete or lacking prepectoral carina, and the weakly emarginate eyes.

Head (pl. 50, fig. 23): Thick, temples strongly convex and nearly or quite reaching outside tangents of eyes, occiput and frons not or very shallowly concave; occipital carina rather weak but complete; frontal orbits slightly tumid; eyes parallel, very weakly emarginate; stemmaticum sharply defined, ocelli not nearly touching eyes; malar space short; clypeus very short, broadly truncate, usually concavely so, at apex, protruding in such manner as to form a distinct angle with face; mandible long and narrow, lower margin bent at nearly a right angle, teeth narrow, upper one the longer; palpi very slender; antenna slender, filiform, much shorter than body.

Thorax: Pronotal sinus distinct but unusually shallow, spiracular sclerite visible; mesoscutum very strongly convex and precipitous anteriorly, notaulices obsolete or wanting; scutellum narrow, margined at most basally, its frenum and that of postscutellum shallow; prepectoral carina (pl. 52, fig. 48) very weak or absent; postpectoral carina absent; speculum defined; propodeum excarinate, basal constriction shallow. Wings (pl. 54, fig. 55) with discal ciliation short and sparse, a hairless area below stigma; stigma nearly as in *Enicospilus*, radius at about basal fourth; basal abscissa of radius thickened and curved at extreme base, apical abscissa somewhat recurved from base; basal vein decurved at base; discocubitus with first recurrent portion sinuous, cubitus portion rather strongly arched, the two portions joining in a rather sharp curve or a slight angle, sometimes with a trace of ramellus, first recurrent and basal vein nearly parallel; intercubitus half or more as long as second abscissa of cubitus; nervulus interstitial or postfurcal; postnervulus broken shortly above, nervellus shortly below, middle; frenulum short, with 6-9 slender hooks spaced rather far apart. Legs very slender; claws weakly curved, pecten (♀) with short, fine teeth.

Abdomen (pl. 56, fig. 92): Slender, tergite 1 decurved, petiole terete, postpetiole depressed; tergite 2 with distinct umbo, spiracles at or slightly beyond middle, epipleura completely separated.

⁸ From *σμῦσις*=snubnosed, in reference to the short, projecting clypeus.

Genotype.—*Simophion excarinatus*, new species.

SIMOPHION EXCARINATUS, new species

Female.—Head: Temples hardly reaching outside tangents of eyes; posterior tangent of eyes bisecting posterior ocelli; malar space less than half as long as basal width of mandible; clypeus concavely truncate, more than twice as broad as long; antennae extremely slender, 45-jointed, all flagellar joints longer than thick.

Thorax: Densely and finely pubescent and laterally minutely punctate and mat, shining dorsally and ventrally; propodeum finely rugulose posteriorly, shining basally. Legs extremely slender, hind femur about 10 times as long as deep, of nearly uniform depth throughout; inner hind calcarium hardly one-fourth as long as basitarsus.

Abdomen: Polished, very minutely pubescent; tergites 2 and 3 subequal in length and nearly as long as 1, 4 and 5 subequal and fully three-fourths as long as 3, 6 two-thirds as long as 5, 7 and 8 together about equal to 6.

Dark brown; orbits so broadly yellowish white as to make the head appear largely of that color; mesoscutum somewhat darker than rest of thorax, sometimes with prescutum paler or with faint traces of parapsidal stripes; wings hyaline, stigma and veins dark brown, metacarpus, a spot at apex of costa and radices pale, tegulae stramineous.

Type locality.—Tempe, Ariz.

Type.—U. S. N. M. No. 57605.

Paratypes.—California Academy of Sciences; collection of Henry K. and Marjorie C. Townes.

Seven specimens, including the holotype, collected at light at Tempe, Ariz., by E. V. Walter and M. Martinez in February and March, 1923 to 1926, under Tempe No. 4916; 1 female, Gila Bend, Ariz., March 1, 1930, C. D. Lebert; 2 females, Phoenix, Ariz., 1933, R. H. Crandall; and 2 females, Needles, Calif., February-March 1922, J. A. Kusche.

In addition to the genotype, representatives of 4 other species are before me. All are from the arid regions of the southwestern United States. All of the 40 specimens are females.

17. TROPHOPHION,^o new genus

PLATE 50, FIGURES 14, 20, 27; PLATE 55, FIGURE 78; PLATE 56, FIGURE 99

A remarkable genus differing in many respects from the more typical genera of the *Ophion* group, notably in the form of the head, the anthophagous mouth parts, the basally curved and thickened radius and the very little compressed abdomen with the female

^o From τροφή = food, in reference to the long trophi.

hypopygium elongate and protruding. In the last-mentioned character and the anthrophagous mouth parts it resembles *Agathophiona*, but whereas in the latter genus it is the labium that is most highly developed, in the present genus it is the maxillae and the prolongation is much less. *Trophophion* is most closely related to *Genophion* Felt, from which it can be at once distinguished by its long thin head, subclavate antennae, the form of the abdomen, the unusually large and coarsely pectinate claws, and by many other characters mentioned in the following description.

Head (pl. 50, figs. 14, 20, 27): Extremely thin and long, occiput deeply concave; temples strongly convex; malar space very long; occipital carina fading out below and not reaching hypostomal carina; face and clypeus weakly convex, clypeus broadly truncate; labrum semicircularly exposed, maxillae and labium very long, especially the galea, palpi unusually short; mandible long and narrow, scarcely narrowed toward apex, strongly curved, only slightly twisted; eyes narrow; ocelli very small, stemmaticum not elevated and not defined by a groove; antenna much shorter than body, flagellum slender at base, gradually thicker toward apex.

Thorax: Stout; pronotum long and flat medially, with no transverse groove; pronotal sinus broad, exposing spiracular sclerite; mesoscutum moderately convex, notaulices absent; scutellum evenly convex, margined only at base; speculum weakly defined; prepectus narrow, carina obsolete above, postpectus not defined, propodeum very short, apical slope precipitous, not at all overlapping hind coxae, median and lateral foveae of basal constriction deep and widely separated. Wings with coarse veins and dense, short discal ciliation, a small hairless area below base of stigma; stigma narrowly triangular, with radius at basal third; basal abscissa of radius thickened and curved at base, apical abscissa straight; second discoidal cell short and broad, lower apical angle acute, discocubitus strongly curved; frenulum with 6 or 7 hooks; abscissula rather weakly curved at base; nervellus broken above middle, upper abscissa perpendicular to mediella. Legs very stout and short; apical tarsal joints long, claws (pl. 55, fig. 78) long and coarsely pectinate, with few teeth.

Abdomen (pl. 56, fig. 99): Weakly compressed; tergite 1 decurved; tergite 2 with umbo short and rather weakly defined, spiracles at middle; apical tergites in female deeply emarginate medially; hypopygium in female very long and protruding, ovipositor when sheathed pointing dorsocephalad.

Genotype.—*Trophophion tenuiceps*, new species.

TROPHIOPHION TENUCEPS, new species

Female.—Length 12 mm., antenna 8 mm.

Head: More than twice as broad as thick; temple extending slightly beyond outside tangent of eye; diameter of ocellus shorter than ocellular line and hardly half as long as postocellar line; eye more than twice as long as broad, shallowly emarginate within; malar space distinctly longer than basal width of mandible; galea three times as long as broad; antenna 30-jointed, subapical joints of flagellum thicker than long and nearly twice as thick as basal joint.

Thorax: Evenly and rather densely punctate laterally (including speculum) and ventrally, more sparsely and finely so and more polished dorsally; propodeum with basal carina rather distant from base, distinct on each side of middle but fading out medially and laterally, posterior face precipitate from basal carina, surface before carina polished and punctate, apical slope indistinctly transversely rugulose with traces of apical carina laterally. Wings with basal abscissa of radius half as long as apical abscissa; veins of transverse brace in about the proportion of 2:5:6; second discoidal cell shorter than brachial cell, second recurrent more than half as long as basal abscissa of subdiscoideus; basal vein and base of discocubitus subparallel; nervulus interstitial and inclivous; postnervulus broken slightly above middle; nervellus broken at about upper third. Legs stout and short, hind femur barely reaching apex of tergite 2 and less than four times as long as deep; apical tarsal joints slender, decurved, each as long as the corresponding second joint, claw two-thirds as long as apical joint, pecten with five long, strong teeth.

Abdomen: Polished and virtually impunctate.

Bright ferruginous; wings hyaline with a brownish longitudinal stain along apical anterior margin of each and one along basal vein; venation black, costa and base of stigma yellowish; tarsal claws and ovipositor sheath black.

Male.—Essentially like the female, except that tergites are not emarginate.

Type locality.—Phoenix, Ariz.

Holotype and allotype.—U. S. N. M. No. 57606.

Paratypes.—California Academy of Sciences; Citrus Experiment Station, Riverside, Calif.; collection of Henry K. and Marjorie C. Townes.

Described from four females and two males, the holotype and male and female paratypes collected at Phoenix, Ariz., April 12, 1939, by R. H. Crandall; the allotype and a female paratype at Palm Springs, Calif., March 22, 1916, by C. L. Fox; and a female in Palm Canyon, Calif., March 25, 1933, by P. H. Timberlake.

18. CLISTORAPHA,¹⁰ new genus

PLATE 50, FIGURE 18; PLATE 52, FIGURE 42; PLATE 54, FIGURE 54; PLATE 56, FIGURE 96

From all the other genera of the *Ophion* group this genus is immediately distinguishable by its possession of a complete postpectoral carina.

Head (pl. 50, fig. 18): Thick; temples strongly convex; occiput deeply concave, carina complete; eyes and ocelli large, malar space and ocellocular line much reduced, eyes deeply emarginate and nearly parallel within (rarely in species with very strongly buccate temples, the eyes and ocelli are smaller, the malar space and ocellocular line rather long, and the face is considerably broader than the frons); clypeus short, broadly truncate, coarsely punctate; labrum conspicuously protruding beyond clypeus; mandible not strongly twisted, narrow and strongly curved, little narrower at apex than at base; antenna filiform, not or barely as long as body.

Thorax: Pronotal sinus broad, spiracular sclerite exposed; mesoscutum sloping anteriorly, notaulices complete; scutellum margined at least basally; speculum distinct; prepectoral and postpectoral carinae (pl. 52, fig. 42) complete; propodeum moderately convex in profile. Wings (pl. 54, fig. 54) densely, finely pilose, with a hairless area below stigma; stigma elongate triangular, with radius at about basal third; basal abscissa of radius curved and thickened at base, apical abscissa slightly curved; discocubitus strongly curved, without ramellus, basal portion nearly parallel to basal vein; second discoidal cell much narrowed at base, its lower apical angle acute; nervulus distinctly antefurcal to shortly postfurcal; frenulum short, with only 5 or 6 hooks; abscissula curved, somewhat thickened basally; nervellus weakly broken at or below middle, upper abscissa reclivous. Legs short and rather stout, hind femur barely reaching beyond apex of tergite 2; claws closely pectinate, not more closely so in male than in female.

Abdomen (pl. 56, fig. 96): Strongly compressed, tergite 2 with spiracles shortly beyond middle, umbo distinct, epipleura separated throughout; male genitalia with paramere deep, its ventral margin evenly curved to the subacute apex.

Genotype.—*Ophion subfuliginosus* Ashmead.

Several other species occur in the arid southwestern United States, all undescribed.

¹⁰ From κλειστός=closed, and ραφή=suture, in reference to the closing of the mesosulcus by the postpectoral carina.

CLISTORAPHA SUBFULIGINOSA (Ashmead), new combination

Ophion subfuliginosus ASHMEAD, Proc. California Acad. Sci., ser. 2, vol. 4, p. 126, 1894.—HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 29, 1912. [Lectotype (hereby designated): The female specimen from El Taste, Baja California, Mexico, in the collection of the California Academy of Sciences.]

One of the El Taste cotypes of this species (a female) is in the United States National Museum and the other two and the El Chíncho specimen are in the California Academy. Through the kindness of the Academy and of E. Gorton Linsley I have had the opportunity to examine the male and the female from El Taste.

In addition to the types I have seen the following specimens: One female from near San Fernando, Ariz., August 28, 1925, R. Budlong; one of each sex, St. Xavier Mission, Tucson, Ariz., July 29, 1924, E. P. Van Duzee; two females and three males, San Pedro River, Fairbanks, Ariz., September 6, 1927, J. A. Kusche; one female, Washington Mountains, near Nogales, Ariz., September 7, 1927, J. A. Kusche; Baboquivari Mountains, Ariz., September 15, 1928, O. C. Poling; three females, 30 miles east of Quijotoa, Pima County, Ariz., August 28–29, 1927, Cornell University lot No. 542 sub. 336; Cobabi Mountains, 80 miles west-southwest of Tucson, Ariz., September 3, 1921, E. R. Tinkham.

In his second reference to this species (Proc. California Acad. Sci., ser. 2, vol. 5, p. 547, 1895) Ashmead recorded two specimens, a female and a male, from San José del Cabo, Baja California. These specimens, both females though one is labeled male by Ashmead, are in the National Museum. They are misidentified and are not congeneric with *subfuliginosus*, but belong to the genotype species of the new genus *Boethoneura* described below.

19. BOETHONEURA,¹¹ new genus

PLATE 50, FIGURE 17

Closely related to *Clistorapha*, but lacks the postpectoral carina. Agrees otherwise with the above description of *Clistorapha*, although the temples are narrower, the clypeus relatively longer, the stigma broader, the discocubitus more sharply curved in the middle and frequently with a trace of the ramellus.

Genotype.—*Boethoneura arida*, new species.

Several other species, all undescribed, occur in the arid southwestern part of the United States.

¹¹ From *βοηθία*=reinforce, and *νεύρον*=nerve, in reference to the thickened base of radius.

BOETHONEURA ARIDA, new species

Ophion subfuliginosus ASHMEAD, Proc. California Acad. Sci., ser. 2, vol. 5, p. 547 1895 (not Proc. California Acad. Sci., ser. 2, vol. 4, p. 126, 1894). Misidentification. No description.

For explanation of the above citation see *Clistorapha subfuliginosus* (Ashmead).

Female.—Length 13 mm.

Head (pl. 50, fig. 17): Occiput deeply concave; temple rather strongly convex, but not nearly reaching outside tangent of eye; eye nearly twice as long as broad, rather shallowly emarginate; ocelli narrowly but distinctly separated from eyes; malar space short but distinct; face and clypeus nearly flat, coarsely punctate, the face more densely and finely so medially and polished and nearly impunctate laterally, the head elsewhere impunctate and polished; clypeus twice as broad as long, very broadly truncate at apex; exposed portion of labrum nearly as long as clypeus, heavily sclerotized, punctate, with long rather dense hair; mandible more than twice as long as broad basally, tapering to apex, slightly twisted, punctate; antenna slightly shorter than body \pm 40-jointed, slender, of nearly uniform diameter except for a slight apical taper.

Thorax: Stout, shining, punctate, mesoscutum less distinctly so, notaulices briefly impressed anteriorly; scutellum high, polished and sparsely punctate, margined basally, its frenum more coarsely and densely punctate; frenum of postscutellum striate; propodeum with basal carina medially and the apical carina laterally distinct, the latter sometimes complete, basal area polished and sparsely punctate, the rest of the surface finely rugoso-punctate; spiracles large, elongate reniform. Wings rather densely ciliate with bare areas below base of stigma and in base of radiellian cell; stigma narrowly triangular with radius distinctly basad of middle; thickening of basal abscissa of radius extending nearly to middle; apical abscissa slightly curved; basal vein slightly curved for most of its length with a sharper reverse curve above its junction with median vein; discocubitus bent just basad of bulla, the basal portion a weakly sigmoid curve; veins of the transverse brace about in the ratio 1:2:3; second recurrent about half as long as basal abscissa of subdiscoideus, the angle between the two veins slightly acute; nervulus interstitial to slightly antefurcal; postnervulus broken at about upper third; radiella strongly curved and somewhat thickened basally; nervellus broken at or slightly below middle, its upper abscissa distinctly reclivous; frenulum composed of 5 or 6 closely spaced hooks. Legs rather short and stout, hind femur barely reaching apex of tergite 2; claws rather coarsely pectinate.

Abdomen: Stout, hardly twice as long as head and thorax; first

segment slightly decurved, spiracle at about apical third; tergite 2 a little more than three times as long as broad at base.

Ferruginous; vertex, frons, subalar tubercles and scutellum, and sometimes the notaulices, yellowish; wings hyaline, radial cell infumate basally and along anterior margin, stigma and costa ferruginous, other veins blackish.

Type locality.—San José del Cabo, Baja California, Mexico.

Holotype and paratypes.—U. S. N. M. No. 57607.

Paratypes.—California Academy of Sciences; American Museum of Natural History (New York); Cornell University.

Nine females, the holotype and two others from the type locality; two from Phoenix, Ariz., April 19, 1933, R. H. Crandall; one from 14 miles east of Oracle, Ariz., July 27, 1924, J. O. Martin; Kits Peak, Rincon, Baboquivari Mountains, Ariz., August 1, 1946, 4,050 ft.; one from Congress, Ariz., May 6, 1902, Oslar; one from Yerington, Lyon County, Nev., July 29, 1909. A headless male from Yerington, Nev., in the collection of Cornell University probably belongs here, but because of its poor condition it is not included in the type series.

20. Genus GENOPHION Felt

PLATE 50, FIGURE 24; PLATE 55, FIGURE 79; PLATE 56, FIGURE 95

Genophion FELT, New York State Mus. Bull. 76 (19th Rep. State Ent.), p. 123, 1904. [Genotype: (*Genophion gilletti* Felt) = *Genophion costalis* (Cresson). By original designation.]

Hooker¹² synonymized *Genophion gilletti* Felt with *Ophion costalis* Cresson, thereby inferentially synonymizing the genus with *Ophion* although he did not list it in the synonymy of *Ophion*. In my opinion the genus is distinct.

Head (pl. 50, fig. 24): Thick; temples strongly convex; occiput concave, carina usually complete though rarely obsolete below; eyes narrow, not bulging, shallowly, broadly emarginate; ocelli small to rather large, but never nearly touching eyes; malar space distinct, frequently very long; clypeus rather flat, large, broadly truncate, labrum prominent; mandible narrow, evenly curved, not much broader at base than at apex; antenna much shorter than body, slightly thickened before apex.

Thorax: Stout; pronotum rather long medially, with transverse groove shallow, pronotal sinus broad, exposing spiracular sclerite; mesoscutum strongly convex in profile, notaulices obsolete; scutellum large, subquadrate, strongly convex, usually margined basally; mesopleuron with speculum weakly defined; prepectoral carina strong

¹² Trans. Amer. Ent. Soc., vol. 38, p. 26, 1912.

though usually not quite reaching anterior margin; postpectoral carina absent; propodeum strongly convex in profile, entirely without carinae. Wings densely hairy with a hairless area below base of stigma, stigma triangular, with radius at about basal third; basal abscissa of radius thickened and curved basally, apical abscissa straight or weakly curved; discocubitus strongly curved, without ramellus, basally subparallel with basal vein; second discoidal cell narrow at base, lower apical angle acute; nervulus postfurcal; abscissula curved basally; nervellus broken far above middle, upper abscissa reclivous; frenulum very short, with only 5 or 6 hooks. Legs rather short and stout, hind femur reaching little beyond apex of tergite 2; claws (pl. 55, fig. 79) closely pectinate, no more closely so in male than in female.

Abdomen (pl. 56, fig. 97): Very strongly compressed, its upper margin serrate in profile due to the heavily sclerotized and acute apices of the compressed tergites; segments 1 and 2 stout; tergite 2 with spiracles at about middle, umbo very distinct, epipleura completely separated; male genitalia with paramere slender, its ventral margin straight basally then bent upward and rising obliquely to the acute apex.

This is another genus of the arid southwestern part of the United States, being represented there by five or six species, of which only the genotype is described.

GENOPHION COSTALIS (Cresson), new combination

Ophion costale CRESSON, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 366.—HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 26, 1912.

Ophion costalis Cresson, DALLA TORRE, Catalogus hymenopterorum, vol. 3, pt. 1, p. 189, 1901.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, pp. 58, 60, 1912.

Genophion gilletti FELT, New York State Mus. Bull. 76 (19th Rep. State Ent.), p. 123, 1904.

I have examined the types of both *costalis* and *gilletti* and have seen three additional specimens, a male from Colorado (C. F. Baker), a female from Boulder, Colo., June 7, 1922, about 6,650 feet (American Museum of Natural History), and a male from Mount Diablo, Calif., April 20, 1935 (G. E. and R. M. Bohart).

21. CHILOPHION,¹³ new genus

PLATE 50, FIGURE 19; PLATE 54, FIGURE 59; PLATE 55, FIGURE 82; PLATE 56, FIGURE 97

Most closely related to *Genophion* in the basally bent and curved radius, in the strongly reclivous nervellus with the fracture far above middle and the upper abscissa also reclivous and in the serrate abdomen; but differing in the form of the clypeus, which is thick, flat, and

¹³ From χείλος = lip, in reference to the large clypeus.

apically arcuate, the long, slender legs and antennae and in some of the other characters detailed in the following description:

Head (pl. 50, fig. 19): Thick; temples strongly convex but not especially broad; occiput concave, carina complete; eyes rather narrow, not bulging, broadly emarginate; ocelli rather large, but not contiguous with eyes, stemmaticum prominent and sharply defined by grooves; malar space distinct but not long; clypeus large, thick, flat, apex broadly arcuate, labrum very narrowly exposed; mandible rather long and narrow, its lower margin sharply curved in middle; antenna slender, filiform.

Thorax: Rather slender, pronotal sinus broad, exposing spiracular sclerite; mesoscutum moderately convex in profile, notaulices obsolete; scutellum subtriangular, strongly convex, not margined; speculum defined; prepectoral carina distinct except at upper end and rarely obsolescent throughout; postpectoral carina absent; propodeum weakly convex in profile, entirely without carinae. Wings (pl. 54, fig. 59) rather sparsely hairy, a hairless area below base of stigma; stigma elongate triangular, radius at or slightly basad of basal third; basal abscissa of radius thickened and curved at base, apical abscissa somewhat curved; basal vein rather strongly decurved at lower end; nervulus postfureal; second discoidal cell rather long, its lower apical angle acute, base not especially narrow; discocubitus straight basally, curved apically, without ramellus, basal portion nearly parallel with basal vein; frenulum very short, with 6 or 7 hooks; abscissula curved basally; nervellus broken far above middle, upper abscissa reclivous. Legs slender; claws (pl. 55, fig. 82) rather closely pectinate.

Abdomen (pl. 56, fig. 97): Slender basally, strongly compressed beyond tergite 2, serrate in profile, the compressed tergites heavily sclerotized along dorsal margins and acute at apices.

Genotype.—*Ophion abnormis* Felt.

Another genus of the arid southwestern part of the United States, whence I have seen several species, of which only the genotype is described.

CHILOPHION ABNORMIS (Felt), new combination

Ophion abnormum FELT, New York State Mus. Bull. 76 (19th Rep. State Ent.), p. 121, pl. 2, fig. 5, 1904.

Erymotylus felti VIERECK, Trans. Kansas Acad. Sci., vol. 19, p. 312, 1905.

Ophion abnormis HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 47, pl. 3, fig. 15, 1912, female, not male.

Hooker is correct in synonymizing *felti* with *abnormis*. Except for the abnormal discocubitus of the type of the latter, the two types are virtually identical, and I have labeled a specimen in the National Museum that I compared with both types as a homotype of both species. The males that Hooker referred to *abnormis* and the type of

Ophion abnormis magniceps Hooker have nothing to do with the present genus, but are *Ophion*.

In addition to the types I have examined the following specimens: Six females, Denver, Colo., April 26; two females, Denver, Colo., June 10, 1901, Dyar and Crandell; one female, Anniston Camp, Colo., June 1933, Cockerell; two females, Fort Collins, Colo., June 24, 1913; two females, Hamilton County, Kans., 3,350 feet, F. H. Snow; one female, Stanton County, Kans., 3,000 feet, S. J. Hunter.

22. Genus *STAUROPOCTONUS* Brauns

PLATE 50, FIGURE 15; PLATE 54, FIGURE 53; PLATE 55, FIGURE 83

Stauropoctonus BRAUNS, Arch. Ver. Freunde Naturg. Mecklenburg, vol. 43, p. 93, (1889) 1890.—KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, p. 22, 1901.—SZÉPLIGETI, in Wytzman, Genera insectorum, fasc. 34, p. 35, 1905 (as synonym of *Eremotylus* Foerster).—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1448, 1908; suppl., fasc. 24, p. 47, 1935. [Genotype: *Ophion bombycivorus* Gravenhorst.] Monobasic.

Stauropodoctonus [sic!] Brauns, MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 16, 1912 (part).—UCHIDA, Journ. Fac. Agr. Hokkaido Imp. Univ., vol. 21, p. 213, 1928 (part).

Nipponophion UCHIDA, Journ. Fac. Agr. Hokkaido Imp. Univ., vol. 21, p. 201, 1928. [Genotype: *Nipponophion variegatus* Uchida. By original designation.] New synonymy.

This and the next genus form a distinct group characterized especially by the entire lack of the occipital carina; very small mandible with the upper tooth shifted to the inner margin, so that when closed the mandible appears edentate; a longitudinal groove dividing the mesopleuron into nearly equal upper and lower parts; extremely narrow, attenuate stigma with radius near base, basally thickened and strongly curved radius; and the presence on the outer apical margin of the trochanter in middle and hind legs of a sharp decurved tooth. Of these, the peculiarly formed mandible and the trochanteral tooth occur only in these two genera and in no other genus do the other characters listed occur in the same combination.

Neither Szépligetí nor Morley nor Uchida understood this genus, for Szépligetí synonymized it with *Eremotylus* Foerster, Morley synonymized with it *Spilophion* Cameron, and Uchida accepted Morley's interpretation while redescribing it as *Nipponophion*. Both *Eremotylus* and *Spilophion* have the occipital carina distinct, whereas the lack of this carina is one of the most anomalous characters of *Stauropoctonus*.

Head (pl. 50, fig. 15): Unusually small; temples somewhat convex but narrow and sharply receding; occipital carina entirely absent, postvertex descending perpendicularly from ocelli, which are very large and contiguous with eyes; eyes large, bulging, deeply emarginate,

parallel below antennae; face strongly convex, narrow, but broader than frons, clypeus almost continuous with face, convex, broadly rounded at apex, narrowly exposing labrum; malar space extremely short; mandible small, so strongly twisted that upper tooth is on inner margin; antenna long, very slender, attenuate.

Thorax: Pronotal sinus moderately broad, exposing spiracular sclerite; mesoscutum moderately convex, notaulices obsolete; scutellum margined only basally; mesopleuron longitudinally impressed from fovea to top of prepectus; postpectoral carina complete and high; propodeum briefly prolonged over hind coxae, basal carina very strong, apical carina not defined, basal constriction divided into median and lateral foveae. Wings (pl. 54, fig. 53) with dense long hair, a hairless area below base of stigma, but without fenestra; stigma very narrow, merging imperceptibly with metacarpus, radius near base; basal abscissa of radius conspicuously thickened and curved basally, apical abscissa strongly curved; discocubitus concavely curved basally, convexly curved apically, basal portion slightly convergent with basal vein; lower outer angle of second discoidal cell right; nervulus interstitial or postfureal; postnervulus broken at or above middle; abscissula slightly thickened and weakly curved at base; nervellus rectangularly broken at about middle; legs extremely slender; apical joint of trochanter in middle and hing legs (pl. 55, fig. 83) with an acute tooth on outer side at apex; claws closely pectinate.

Abdomen: Slender, strongly compressed; petiole convex dorsally; tergite 2 broadly constricted basally, with a deep longitudinal groove on each side, but with no umbo, spiracles at apical two-fifths, epipleura separated and sharply infolded.

I have not seen the genotype, and the above description is drawn from a damaged specimen of *Nipponophion variegatus* Uchida and the new species described below. J. F. Perkins says (*in litt.*): "*S. bombycivorus* Gr. agrees entirely with the generic diagnosis of the Chinese species."

STAUROPOCTONUS VARIEGATUS (Uchida), new combination

Nipponophion variegatus UCHIDA, Journ. Fac. Agr. Hokkaido Imp. Univ., vol. 21, p. 201, 1928.

STAUROPOCTONUS CHEZANUS, new species

Distinct from all the other described species in its almost uniformly ferruginous color.

Female.—Length 25 mm., antenna incomplete.

Temples very narrow; combined face and clypeus twice as long as width of face; eye less than twice as long as broad; thorax sparsely and minutely punctate, mesopleuron below longitudinal furrow and metapleuron more coarsely and densely so, mesopleuron rugoso-punctate

before middle coxa; basal carina of propodeum only moderately high, basal area sloping into basal constriction, not precipitate, apical slope flat with rugae radiating from foramen, and outlined laterally by high curved rugae, below which the sides are vertically rugose.

Ferruginous; head largely yellow, stemmaticum black; scape, pedicel and anellus piceous above, flagellum yellowish ferruginous slightly darkened basally; mesoscutum with three brownish longitudinal fasciae, the median one darker and more distinctly defined; tergite 3 dorsally brownish, laterally together with entire fourth tergite yellowish; tergites beyond fourth dark ferruginous; wings faintly infumate, hairless area hyaline, base of costa and stigma and metacarpus reddish, venation elsewhere blackish; legs concolorous with body.

Type locality.—Beh Luh Din, 30 miles north of Chengtu, Szechwan, China.

Type.—U. S. N. M. No. 57608.

One specimen captured July 27, 1933, at 6,000 feet altitude by D. C. Graham.

23. AULOPHION,¹⁴ new genus

PLATE 50, FIGURE 13; PLATE 52, FIGURE 49; PLATE 54, FIGURE 58

This is the American analog of *Stauropoctonus* Brauns, with which it shares all the most anomalous characters, but it is immediately distinguishable by its entire lack of the postpectoral carina and differs further as follows:

Temples (pl. 50, fig. 13) weakly convex and exceedingly narrow; eyes strongly convergent below emargination; clypeus more strongly rounded at apex, not or barely exposing labrum; pronotal sinus very broad; scutellum subquadrate, not margined basally; longitudinal impression of mesopleuron (pl. 52, fig. 49) in the form of a narrow groove; postpectoral carina entirely lacking; propodeum with basal and apical carinae complete to entirely lacking; forewing (pl. 54, fig. 58) with hairless area extending along base of radius, extreme base of radial cell also hairless; discocubitus sharply curved or subangulate at about middle, straight basally and weakly curved apically, basal portion strongly convergent with basal vein; lower outer angle of second discoidal cell sharply acute; nervulus antefurcal to interstitial; postnervulus broken far above, nervellus far below, middle; petiole flattened dorsally; tergite 2 with lateral grooves broad and shallow, epipleura not infolded, separated only basally and there only by thinner texture. Agreeing otherwise with the foregoing description of *Stauropoctonus*.

Genotype.—*Aulophion bicarinatus*, new species.

¹⁴ From αὐλός=groove, referring to the groove on the mesopleuron.

AULOPIHION BICARINATUS, new species

Female.—Length 20 mm., antenna 20 mm.

Head: Unsculptured except for very fine, sparse punctures on face; face at level of clypeal foveae distinctly narrower than frons; antenna as long as body, with 60 joints, all flagellar joints much longer than thick.

Thorax: Pronotum slightly tumid along dorsal and anterior lateral margins; mesoscutum minutely punctate; scutellum polished, its frenum and that of postscutellum finely punctate, not at all foveolate; mesopleuron polished above longitudinal groove, very minutely shagreened, finely punctate and mat below, as are also the mesosternum and metapleuron; propodeum with short, dense, erect pile, both basal and apical carinae complete and a single median carina from basal carina to apex, transverse carinae arcuate, higher laterally, median fovea of basal constriction longitudinally rugose, basal area minutely sculptured, surface behind carinae finely rugulose. Wings with basal abscissa of radius, measured across the curve, less than a third as long as apical abscissa: intercubitus slightly longer than second abscissa of cubitus; second discoidal cell nearly two-thirds as broad apically as long on subdiscoideus, postnervulus broken at upper third; intercubitella more than half as long as abscissula. Legs very long and slender, hind tibia very nearly reaching apex of abdomen.

Ferruginous; head (discolored but probably yellow), pronotum, pleura, anterolateral margins of mesoscutum, and front coxae yellow; antennae and abdomen from near base of tergite 3 infusate; wings hyaline, venation brown.

Type locality.—Costa Rica.

Type.—U. S. N. M. No. 57609.

One specimen received from the Paris Museum and captured in 1884 by de Lafon. It lacks most of the right antenna, parts of the left front and middle legs, and the apical three joints of both hind tarsi.

AULOPIHION EXCARINATUS, new species

Differs from *bicarinatus* Cushman as follows:

Male.—Length 20 mm., antennae 22 mm.

Face at level of clypeal foveae hardly narrower than frons; antenna slightly longer than body; pronotum not tumid along margins; propodeum entirely without basal and median carinae and with only faint lateral traces of apical carina, minutely punctate-rugulose; basal abscissa of radius fully a third as long as apical abscissa; second discoidal cell hardly half as broad apically as long on subdiscoideus; intercubitella less than half as long as abscissula.

Entire head and thorax, except three broad ferruginous fasciae on mesoscutum, yellow, as are also all coxae and trochanters; legs elsewhere and abdomen stramineous, tergite 2 and dorsal edges of compressed portion of abdomen ferruginous; antenna with scape, pedicel and annellus piceous, flagellum ferruginous above, stramineous below; stigma, costa, metacarpus and thickened base of radius ferruginous.

Type locality.—San Esteban, near Puerto Cabello, Venezuela.

Type.—Collection of Henry K. and Marjorie C. Townes.

One specimen captured by P. J. Anduze on December 20, 1939.

24. Genus BANCHOGASTRA Ashmead¹⁵

PLATE 56, FIGURE 93

Banchogastra ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 87, 1900; Fauna Hawaiensis, vol. 1, pt. 3, p. 343, pl. 9, fig. 3, 1901.—PERKINS, Fauna Hawaiensis, Suppl. 2, p. 680, 1910; Trans. Ent. Soc. London, p. 530, (1914) 1915. [Genotype: *Banchogastra nigra* Ashmead.] Monobasic.

Despite the stout form, especially of the abdomen, and the entire lack of the fenestra, this anomalous Hawaiian genus is more closely allied to *Enicospilus* than to *Ophion* in most of the important characters distinguishing those two genera. It is perhaps significant that neither *Ophion* nor any genus closely allied to it occurs in the endemic fauna of the Hawaiian Islands, whereas *Enicospilus* is represented by numerous species.

Head: Thick; temples strongly convex but considerably narrower than eyes; occiput rather deeply concave, carina complete; eyes and ocelli small, malar space and ocellular line long; eyes broadly emarginate; face and frons broad, about equal in breadth; stemmaticum distinctly set off and somewhat elevated; clypeus narrow, apex broadly rounded, labrum narrowly exposed; mandible much twisted, abruptly narrowed from base; antenna slender, filiform.

Thorax: Short and stout; pronotal sinus narrow, spiracular sclerite concealed; mesoscutum in profile moderately convex, notaulices obsolete; scutellum margined to top of the abrupt apical slope; speculum not at all defined; prepectoral carina incomplete above; postpectoral carina complete; propodeum very short, precipitous behind, not at all overlapping hind coxae, only basal carina present, basal constriction not interrupted. Wings with dense setae and without fenestra or hairless area; stigma narrowly triangular, radius at about basal third; basal abscissa of radius straight and slender, apical abscissa curving strongly from base; second discoidal cell narrow, nearly or quite pointed at base, lower apical angle acute, discocubitus

¹⁵ In his "Catalogue and Reclassification of the Nearctic Ichneumonidae" (Mem. Amer. Ent. Soc., No. 11, p. 737, 1944-45) Townes has synonymized this genus with *Enicospilus*. I exclude from *Enicospilus* all species lacking the fenestra. This and the unusually stout habitus are, I think, sufficient to justify the retention of *Banchogastra*.

gently curved, not broken, its basal portion parallel to basal vein; nervulus antefurcal; frenulum short, with 6 or 7 hooks; abscissula straight; nervellus broken slightly below middle, upper abscissa inclivous. Legs short and stout; claws closely pectinate.

Abdomen (pl. 56, fig. 93): Short, stout, weakly compressed; first segment very broad, depressed, sternite not nearly reaching spiracles; tergite 2 extremely short and broad, hardly as long as third, without umbo, spiracles basad of middle, epipleura defined only basally.

The only two species known are from the Hawaiian Islands. They are black insects having more the general aspect of an exceptionally stout campoplegine than of an ophionine.

25. Genus *PYCNOPHION* Ashmead

PLATE 56, FIGURE 90

Pycnophion ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 87, 1900; Fauna Hawaiiensis, vol. 1, pt. 3, p. 344, pl. 9, fig. 4, 1901.—PERKINS, Fauna Hawaiiensis, Suppl. 2, p. 680, 1910; Trans. Ent. Soc. London, 1914, p. 530, 1915. [Genotype: *Pycnophion molokaiensis* Ashmead.] Monobasic.

This is another anomalous Hawaiian genus allied to *Enicospilus* but remarkably different in general form, in its lack of the fenestra and in the strongly exerted, recurved ovipositor and obsolete postpectoral carina. The wing venation is nearly the same as in *Bancho-gastra*, but the form of the body is very different.

Head: Rather thick, temples narrow, weakly convex and very sharply receding; occiput narrow and weakly concave, carina complete; eyes large and bulging, deeply emarginate; vertex narrow; stemmaticum not elevated, ocelli small, not touching eyes; malar space distinct; mandible twisted, strongly narrowing from base to middle; clypeus rounded at apex, in profile strongly convex apically, labrum narrowly exposed; antenna very slender, filiform, not or barely as long as body.

Thorax: Stout; pronotal sinus narrow, spiracular sclerite concealed; mesoscutum precipitous anteriorly, notaulices obsolete; scutellum broad, margined nearly or quite to apex; prepectoral carina distinct, not quite reaching anterior margin of mesopleuron; postpectoral carina obsolete indicated only at sides; speculum not defined; metapleuron very strongly tumid; propodeum short, precipitous behind, with or without the basal carina, basal constriction not interrupted. Wings sparsely hairy except apically, with a hairless area below base of stigma, but without fenestra; stigma narrowly triangular, radius at about basal third; basal abscissa of radius straight, slender, apical abscissa strongly curved; second discoidal cell narrow, pointed or very narrow at base, lower apical angle right or slightly acute, discocubitus gently curved, basal portion parallel to basal vein;

nervulus antefurcal; frenulum short, with 5 to 8 hooks; abscissula straight; nervellus broken below middle, upper abscissa inclivous. Legs with femora rather stout, tibiae and tarsi long and slender, claws closely pectinate.

Abdomen (pl. 56, fig. 90): Stout, moderately compressed; first segment with petiole nearly terete, postpetiole depressed; ovipositor exerted at least the length of first segment, usually recurved, sheath slender.

I have seen all three of the described Hawaiian species, the single specimen of *fumipennis* Perkins unfortunately headless. This species exhibits some gradation toward *Enicospilus* in its long, narrow second tergite with the spiracles well beyond the middle and its straight ovipositor. In the other two species the second tergite is notably short with the spiracles at about the middle, and the ovipositor is recurved.

26. Genus *SPILOPHION* Cameron

PLATE 54, FIGURE 56; PLATE 55, FIGURE 77

Spilophion CAMERON, *Spolia Zeylanica*, vol. 3, pt. 10, p. 124, pl. B, fig. 13, 1905.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 16, 1912 (as synonym of *Stauropodoctonus* [sic!] Brauns). [Genotype: *Spilophion maculipennis* Cameron.] Monobasic.

Coiloneura SZÉPLIGETI, in Wytzman, *Genera Insectorum*, fasc. 34, p. 35, 1905. [Genotype: *Coiloneura melanostigma* Szépligeti. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 35, 1914.]

Since *Spilophion* and *Coiloneura* were published in the same year and apparently at almost the same time there is some question as to which actually has precedence. The evidence that I have been able to gather is as follows: Part 10 of volume 3 of "*Spolia Zeylanica*" bears the date October 1905. Fascicle 34 of "*Genera Insectorum*" is dated simply 1905, but at the bottom of the last page is printed the notation "Budapest, 14. August, 1905," which presumably is the date on which the manuscript was transmitted by Szépligeti. This fascicle of the "*Genera Insectorum*" was received at the library of the Smithsonian Institution on November 15, 1905, and the "*Spolia Zeylanica*" on November 23, 1905. If we assume that both were mailed immediately on publication, a much longer time would have been required for the "*Spolia Zeylanica*", published in Ceylon, to reach its destination than for the "*Genera Insectorum*," published in Brussels, and the fact that the former was received only 8 days after the latter would seem to give it precedence in publication. Moreover, among the recommendations under Article 28 of the International Code of Zoological Nomenclature are two which would seem to give preference to *Spilophion* over *Coiloneura*. One recommendation is

to give preference to that genus for which a genotype is specified. No genotype was specified for either, but *Spilophion* is monobasic and *Coiloneura* was based on two species. The second recommendation as stated applies to species but perhaps may also be interpreted to apply to genera. It is that a "specific name accompanied by both description and figure stands in preference to one accompanied only by a diagnosis or only by a figure." *Spilophion maculipennis* is both described and figured. For the above reasons I prefer to use *Spilophion* as the name of this genus.

The presence in this genus of the occipital carina is sufficient to prove Morley's error in synonymizing it with *Stauropoctonus*.

In a majority of the group characters *Spilophion* agrees with *Enicospilus*, especially in the body characters, but differs in most of the wing characters and in the anomalous hind claws and penultimate hook of the frenulum.

Head: Rather thin with temples strongly receding; occipital carina strong but not quite reaching hypostomal carina; eyes and ocelli large, eyes deeply emarginate, slightly more widely separated across clypeal foveae than across frons; clypeus convex, broadly truncate, with a narrow reflexed margin, labrum exposed; mandible broad, only slightly twisted and little narrower at apex than at base; antenna longer than body, very slender, filiform.

Thorax: Pronotal sinus very narrow, spiracular sclerite concealed; notaulices absent; scutellum flat, strongly margined; speculum not defined; prepectoral carina strong, postpectoral carina complete; propodeum flattened, basal carina strong, basal constriction uninterrupted. Wings (pl. 54, fig. 56) densely hairy, with a large hairless area below stigma and base of radius, but without a well-defined fenestra and with no scleromes; stigma small, triangular, tapering beyond radius, which is distant from base; basal abscissa of radius thickened at base, slightly bent or curved immediately beyond thickening, thence slender, apical abscissa strongly curved; second discoidal cell very narrow at base, its lower posterior angle slightly acute; abscissula (pl. 54, fig. 56b) curved; frenulum (pl. 54, fig. 56c) with 5 or 6 hooks, the penultimate hook usually larger and of different form from others; nervellus broken somewhat below middle at a right angle. Legs extremely slender, apex of tibia hardly reaching to apex of abdomen; claw of hind tarsus (pl. 55, fig. 77) sharply bent so that apical portion forms an acute angle with base, last tooth of pecten beyond apex of claw.

Abdomen: Slender; postpetiole little broader than petiole; tergite 2 without umbo, spiracles shortly basad of apical third; epipleura completely separated and infolded; ovipositor sheath not exerted.

SPILOPHION MACULIPENNIS Cameron

Spilophion maculipennis CAMERON, *Spolia Zeylanica*, vol. 3, p. 124, pl. B, fig. 13, 1905.

Stauropodoctonus orientalis MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 18, 1912. New name for *Spilophion maculipennis* Cameron, not (*Enicospilus*) *Stauropodoctonus maculipennis* (Cameron), 1886.

Because of Morley's error in transferring both this species and *Enicospilus maculipennis* Cameron to *Stauropodoctonus*, thereby making them secondary homonyms, it was necessary for him to rename the later species, but since they are not congeneric and neither is a *Stauropodoctonus* I here restore Cameron's name for the present species.

S. maculipennis is widely distributed in the Indo-Malayan Region.

27. Genus ABANCHOGASTRA Perkins¹⁶

PLATE 54, FIGURE 60

Athyreodon ASHMEAD, *Fauna Hawaiiensis*, vol. 1, pt. 3, p. 343, pl. 9, fig. 2, 1901 (not Ashmead, 1900).—PERKINS, *Fauna Hawaiiensis*, vol. 2, pt. 6, p. 679, 1910. [Genotype: *Athyreodon hawaiiensis* Ashmead.] Monobasic.

Abanchogastra PERKINS, *Trans. Ent. Soc. London*, 1902, pt. 2, p. 141.—SCHMIEDEKNECHT, *Opuscula ichneumonologica*, fasc. 18, p. 1421, 1908.—CUSHMAN, *Proc. Hawaiian Ent. Soc.*, vol. 12, p. 53, 1944. [Genotype: (*Abanchogastra debilis* Perkins) = *A. hawaiiensis* (Ashmead).] Monobasic.

This genus presents a curious combination of the characters of *Ophion* and *Enicospilus*, the venation largely that of *Ophion* and the head and body characters those of *Enicospilus*. In the last reference cited above I have discussed the synonymy of the genus and that of the genotype.

Head: With narrow, strongly receding temples; occipital carina fine but complete; eyes deeply emarginate; ocelli large, nearly (♀) or quite (♂) touching eyes; frons slightly narrower than face; clypeus hardly separated, apex broadly rounded, labrum rather broadly exposed; mandible abruptly narrowed from near base, strongly twisted, upper tooth longer than lower tooth; trophi normal; antennae very slender, nearly or quite as long as body.

Thorax: Slender; pronotum without definite scrobes, pronotal sinus narrow, spiracular sclerite concealed; notaulices not at all indicated; scutellum narrow, margined to beyond middle; mesopleuron nearly flat with fovea obsolete and without defined speculum; prepectus not reaching anterior margin of mesopleuron but ending abruptly just above level of lower angle of pronotum; sternalices not at all indicated; mesosternum evenly convex; postpectus weak or narrowly

¹⁶ Townes (Mem. Amer. Ent. Soc., No. 11, 1944-45) has synonymized this genus with *Enicospilus*. Because of the lack of the fenestra and the generally *Ophion*-like venation, I retain it as a distinct genus.

interrupted medially; metapleuron weakly convex, lower marginal carina rather weak throughout; propodeum, in profile, gently convex, overlapping about basal third of hind coxa, entirely without carinae, basal constriction uninterrupted, frenum long, spiracles rather small and close to bottom of constriction. Wings (pl. 54, fig. 60) densely hairy both dorsally and ventrally, without fenestra or hairless area in discocubital cell; stigma broad with radius shortly before middle; radius with basal abscissa nearly straight, not thickened, apical abscissa curving strongly forward at base; veins of transverse brace (in genotype) in ratio of 1:3:3; second discoidal cell very narrow at base, half as broad apically as long posteriorly, posterior angle acute, discocubitus strongly curved; nervulus strongly antefurcal; abscissula rather strongly curved basally; nervellus broken at about middle, reclivous, upper abscissa perpendicular. Legs very slender; hind coxa elongate; inner hind calcarium less than half as long as basitarsus, tapering from base and with a conspicuous fringe of long hair along inner margin; basitarsus nearly or quite as long as rest of joints together, joints 4 and 5 subequal and together hardly longer than 3; claws small, very coarsely pectinate, the pecten consisting of 4 or 5 long strong teeth.

Abdomen: Slender, strongly compressed apically; tergite 1 gradually broadening, postpetiole hardly twice as broad as petiole, spiracles just posterior to apical third; tergite 2 slightly shorter than 1, with shallow basal lateral grooves, but without umbo, gastrocoeli elongate, midway between base and spiracles, which are at apical third; ovipositor sheath hardly reaching apex.

28. Genus ENICOSPILUS Stephens

PLATE 49, FIGURE 2; PLATE 50, FIGURES 9, 10, 16, 22; PLATE 52, FIGURES 40, 44
 PLATE 53, FIGURE 52; PLATE 54, FIGURES 61, 62; PLATE 55, FIGURES 63-70, 74,
 80; PLATE 56, FIGURES 100, 101

Enicospilus STEPHENS, Catalogue of British insects, p. 352, 1820 (without description or species); Illustrations of British entomology, vol. 7, p. 126, pl. 40, fig. 4, 1835, p. 311, 1845.—CUSHMAN, Proc. Hawaiian Ent. Soc., vol. 12, p. 39, 1944. [Genotype: (*Ophion merdarius* Stephens, not Gravenhorst) = *Ophion combustus* Gravenhorst.] Monobasic.

Enicospilus AGASSIZ, Nomenclatoris zoologici index universalis, p. 178, 1846. Emendation of *Enicospilus* Stephens. [Autotype: *Ophion undulatus* Gravenhorst.]

Allocampus FOERSTER, Verh. naturh. Ver. preuss. Rheinlande, vol. 25, p. 150, 1868.—THOMSON, Opuscula entomologica, fasc. 12, p. 1186, 1888. [Genotype: *Ophion combustus* Gravenhorst.] Present inclusion and designation.

Allocampus THOMSON, Opuscula entomologica, fasc. 12, p. 1189, 1888, not Foerster. [Genotype: *Ophion undulatus* Gravenhorst.] Monobasic.

- Dispilus* KRIECHBAUMER, Berlin. Ent. Zeitschr., vol. 39, p. 309, 1894; Zeitschr. Hym. Dip., vol. 22, p. 154, 1901. [Genotype: *Ophion (Dispilus) natalensis* Kriechbaumer.] Monobasic.
- Eremotylus* (Foerster) ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, p. 192, 1896, not (Foerster) Thomson. [Genotype: (*Eremotylus arctiae* Ashmead) = *Enicospilus glabratus* (Say).] New combination. Monobasic.
- Pleuroneurophion* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 86, 1900.—CUSHMAN, Proc. Hawaiian Ent. Soc., vol. 12, p. 43, 1944. [Genotype: *Pleuroneurophion hawaiiensis* Ashmead.] Monobasic.
- Cymatoneura* KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, pp. 22, 74, 1901. [Genotype: *Ophion undulatus* Gravenhorst. By designation of Viereck, Proc. U. S. Nat. Mus., vol. 42, p. 635, 1912.]
- Pterospilus* KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, p. 156, 1901. [Genotype: *Ophion (Enicospilus) dubius* Tosquinet. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 126, 1914.]
- Trispilus* KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, p. 156, 1901. [Genotype: *Ophion (Enicospilus) trimaculatus* Tosquinet.] Monobasic.
- Eremotylus* (Foerster) KRIECHBAUMER, Zeitschr. Hym. Dip., vol. 1, p. 152, 1901, not (Foerster) Thomson. [Genotype: *Ophion undulatus* Gravenhorst. By present designation.]
- Leptophion* CAMERON, Proc. Zool. Soc. London, 1901, p. 227. [Genotype: *Leptophion longiventris* Cameron.] Monobasic.
- Dicamptus* SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 28, 1905. [Genotype: *Dicamptus giganteus* Szépligeti.] Monobasic.
- Metophion* SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 28, 1905. [Genotype: *Metophion bicolor* Szépligeti. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 94, 1914.]
- Ceratospilus* SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 28, 1905. [Genotype: *Ceratospilus biroi* Szépligeti.] Monobasic.
- Atoponeura* SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 34, 1905. [Genotype: (*Atoponeura concolor* Szépligeti, preoccupied in *Enicospilus* by *E. concolor* [Cresson]) = *Enicospilus atoponeurus*, new name.] Monobasic.
- Ophiomorpha* SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 34, 1905. [Genotype: (*Ophion curvinervis* Cameron, preoccupied by *O. curvinervis* Kriechbaumer) = *Ophion cameronii* Dalla Torre. By designation of Hooker, Trans. Amer. Ent. Soc., vol. 38, p. 134, 1912.]
- Cryptocamptus* BRÉTHES, Anal. Mus. Nac. Buenos Aires, vol. 19, p. 230, 1909 (new name for *Allocamptus* Thomson, not Foerster). [Autotype: *Ophion undulatus* Gravenhorst.]
- Eremotyloides* PERKINS, Trans. Ent. Soc. London, 1914, pp. 530, 532.—CUSHMAN, Proc. Hawaiian Ent. Soc., vol. 12, p. 45, 1944. [Genotype: *Eremotylus orbitalis* Ashmead.] Monobasic.
- Amesospilus* ENDERLEIN, in Michaelsen, Beitr. Kentn. Land- und Süßwasserfauna Deut. Sudw. Afrikas, vol. 1, p. 222, 1914–1916. [Genotype: *Ophion unicallosus* Vollenhoven.] Monobasic and designated.
- Schizospilus* SEYRIG, Mus. Nat. Hist. Nat., Mission Scientifique de l'Omo, vol. 3, Zool. fasc. 18, Hym. 2, Ichn., p. 79, 1935. [Genotype: *Schizospilus divisus* Seyrig. Original designation.]

As in the case of *Ophion* complete citations in the above synonymy, especially under *Enicospilus* and *Henicospilus*, would require space out of proportion to its value. The most comprehensive works are

the same as those cited under *Ophion*, but as with that genus, the major portion of the literature is scattered through many periodicals and the majority of the species are not to be found in published keys.

The name of this genus was originally spelled *Enicospilus*, but Agassiz (1846) emended it to *Henicospilus*, presumably supposing that Stephens had derived the first part of the name from the Greek word *ἐνικός*, *he* being the proper transliteration of *é*. Several authors, notably Dalla Torre, have adopted the emended spelling, while others, notably Schmiedeknecht, have used the original spelling. To obtain an unbiased opinion as to the proper form of the name I recently submitted the question to a committee on nomenclature set up in the division of insect identification, U. S. Bureau of Entomology and Plant Quarantine. The unanimous opinion of the committee was that, since Stephens did not indicate the derivation of the name, the original spelling should be preserved. This decision was based on Opinion 34 of the International Commission on Zoological Nomenclature, which rules that unless evidence of the derivation of a name is clearly indicated in the original publication the original spelling should be preserved.

It will be noted that I have cited as the genotype of *Enicospilus*, *Ophion combustus* Gravenhorst instead of *Ophion merdarius* Gravenhorst as given by Viereck, 1914. This change is based on Stephens's identification of his own figure, originally identified as "*Enicospilus merdarius*" without indication of the author of the species, as *combustus* Gravenhorst; in other words, (*Enicospilus merdarius* Stephens, 1835, not [*Ophion*] *Enicospilus merdarius* [Gravenhorst]) = *Enicospilus combustus* (Gravenhorst). In this interpretation the committee mentioned above also concurred unanimously.

Head (pl. 50, figs. 9, 22): Occipital carina present; temple usually narrow and receding, rarely buccate and reaching outside tangent of eye; eyes and ocelli large, eyes deeply emarginate; mandible usually abruptly narrowed between base and middle and strongly twisted, rarely gradually narrowed and only slightly twisted; maxillae and labium of normal length.

Thorax: Pronotal sinus (pl. 55, fig. 74) narrow, spiracular sclerite concealed; scutellum margined, usually to apex; speculum not defined; prepectoral and postpectoral carinae (pl. 52, fig. 40) strong, the latter rarely interrupted medially; basal constriction of propodeum (pl. 52, fig. 44) not divided. Wings (pl. 53, fig. 52; pl. 54, figs. 61, 62; pl. 55, fig. 70) with stigma, narrow, emitting radius near base, usually subparallel-sided distad of radius and rather abruptly tapering apically, rarely very slender and merging imperceptibly with metacarpus; basal abscissa of radius thickened and sinuate or undulant, very rarely straight and unthickened; apical abscissa strongly curved; fenestra

present, with or without scleromes, rarely small and poorly defined; abscissula straight; nervellus broken below (rarely at) middle, upper abscissa usually inclivous. Legs with middle and hind trochanters not toothed apically; pectination of claws normal (pl. 55, fig. 80).

Abdomen (pl. 56, figs. 100, 101): Tergite 2 without an umbo, its spiracles usually at or near apical third, epipleura usually completely separated and infolded, very rarely partially or entirely unseparated.

In some of the characters herein treated as making up a combination that identifies an *Enicospilus*, especially in those of the wings, there is considerable variation. Most of the synonyms listed above are based on variations of wing characters.

The stigma, typically almost parallel-sided with a rather abrupt apical taper, occasionally is like that of *Thyreodon*, extremely long and slender and merging imperceptibly with the metacarpus. The basal abscissa of the radius exhibits variation from marked curvature and undulation even exceeding that of the genotype of *Dicamptus* to the straightness and slenderness of that typical of *Ophion*. The fenestra varies from a very small and poorly defined one, as in *Ophiomorpha concolor* Szépligeti, to one occupying most of the apical part of the discocubital cell and with all of the structures distinct; some species lack scleromes entirely, others have from one to six. If only one sclerome is present it may be either the proximal or the distal one, or the quadra may be faintly sclerotized over most of its surface. Other marked differences are exhibited in the course or form of the discocubitus, the shape of the second discoidal cell, the proportional lengths of the veins of the transverse brace, the strength of the post-pectoral carina (rarely interrupted medially), and the form and sculpture of the propodeum. In a very large majority of the species the spiracles of tergite 2 are at or near the apical third, but in a few unusually stout species they are much closer to, though still distinctly beyond, the middle. Such species also tend to a lack of definite separation between the second tergite and its epipleura, whereas typically the epipleura are completely separated and inflexed; other species exhibit partial separation, the basal half or more of the epipleuron being separated and inflexed and the apical portion not clearly separated and not inflexed. Typically the mandible is abruptly narrowed before the middle and so twisted that the two teeth are in a plane nearly vertical to the longitudinal body axis, but the variation in its form extends all the way from nearly the condition found in *Stauropoctonus*, with the torsion so great that the upper tooth appears to be on the inner margin, to nearly that in *Ophion*, with less torsion and gradual taper from base to apex as exhibited by *Enicospilus flavoplagiatus* Cushman.

Few species show marked departure from the normal in more than one of the characters.

The use of the different number of scleromes as a basis for the segregation of genera or subgenera, as in the case of *Dispilus* Kriechbaumer, *Trispilus* Kriechbaumer, and *Schizospilus* Seyrig cannot be defended, for it separates closely related species and groups together unrelated species. The same is true of so-called genera based on the position of the scleromes, such as *Amesospilus* Enderlein, or on the form of the basal abscissa of radius, such as *Dicamptus* Szépligeti, or of the discocubitus, such as *Atoponeura* Szépligeti. For example, from the figures alone in a paper by Seyrig (Mission Scientifique de l'Omo, vol. 3, fasc. 18, Ichneumonidae, pt. 2, 1935, Mus. Nat. Hist. Nat.), in which he argues for the division of *Enicospilus* into three genera entirely on the number and position of the alar scleromes, it seems quite obvious that *Enicospilus medius* Seyrig, *E. mollis* Seyrig, *Amesospilus justus* Seyrig, and *A. rupeus* Seyrig are more closely related to one another than any is to *Amesospilus fortis* Seyrig or to *Enicospilus rubens* Tosquinet; and the other characters mentioned in the descriptions seem to bear this out.

To argue that a very large genus is *ipso facto* unwieldy and should therefore be broken up into smaller genera by the most convenient characters is unscientific. Many of the same characters can be used in a more truthful manner within a genus, in association with other characters, to segregate really related species. It is entirely possible that by the use of combinations of characters the huge genus *Enicospilus* can be divided into natural groups of somewhat less than generic status, and it may be found possible to use some of the many names already proposed in the subgeneric sense.

For additional examples of fenestra and wing venation in *Enicospilus* beyond those in the present paper and in the paper by Seyrig cited above, see the figures in the following publications: Cushman, Arb. morph.-tax. Ent. Beihefte aus Berlin-Dahlem, vol. 4, p. 296, figs. 1-14, 1937; Cushman, Proc. Hawaiian Ent. Soc., vol. 12, p. 55, 1944; Cameron, Biologia Centrali-Americana, Ins., Hym., vol. 1, pl. 12, 1886; Brues, Bull. Mus. Comp. Zool., vol. 62, pl. 1, 1918.

In erecting his genera *Allocamptus* and *Eremotylus*, Foerster was segregating from the old genus *Ophion* those European species in which the discocubitus is not angularly broken, *Allocamptus* to include those with scleromes in the discocubital cell and *Eremotylus* those without scleromes. In his unpublished manuscript he placed *Ophion repentinus* Holmgren, *ranibulus* Gravenhorst, *combustus* Gravenhorst, and *merdarius* Gravenhorst in *Allocamptus*, with the last indicated as his choice for genotype. To *Eremotylus* he assigned *O. bombycivorus* Gravenhorst and *undulatus* Gravenhorst, without indicating the

genotype. To *Eremotylus* in the sense of Thomson have been referred such American species as (*Thyreodon*) *Enicospilus texanus* (Ashmead) (new combination) (pl. 55, fig. 64), (*Eremotylus*) *Enicospilus rufoniger* (Hooker) (new combination) (pl. 55, fig. 66), and *Enicospilus americanus* (Christ) (pl. 55, fig. 69), the last under the name *Eremotylus macrurus* (Linnaeus). Thomson's statement that *Allocamptus* Foerster is coextensive with *Enicospilus* appears to have been the first (implied) reference of species to *Allocamptus*, and the name in this restricted sense appears never to have been used in combination with a specific name, most authors having followed Thomson's lead in applying to it *Ophion undulatus* Gravenhorst. That Thomson considered Foerster's generic names invalid because of lack of associated species is shown by his use of the names *Allocamptus* and *Eremotylus*. He applied *Allocamptus* to what Foerster thought of as *Eremotylus* and *Eremotylus* to something different from either, that is, *Ophion marginatus* (Gravenhorst) Jurine. *O. undulatus* should not be accepted as the genotype of *Allocamptus* Foerster, as was indicated by Viereck (1914), since it obviously does not agree with the original description, because of the lack of scleromes; and *Allocamptus* Thomson is a different concept, even though both are here considered synonymous with *Enicospilus*. The case of *Eremotylus* is somewhat different, for *Ophion marginatus*, the designated genotype, apparently agrees with the original description, and that genus should be accredited to Foerster, even though it appears that Thomson considered that he was publishing it in a valid manner for the first time.

Dispilus Kriechbaumer first appeared as a subgeneric name under *Enicospilus* without description other than that of its genotype. In his second reference to the name Kriechbaumer proposed *Pterospilus* as a new genus to include the subgenera *Henicospilus* (to be restricted to species with one alar sclerome), *Dispilus* (with two scleromes), and *Trispilus*, a new subgenus (with three scleromes).

Both the angulate discocubitus and the small fenestra exhibited by the genotype of *Pleuroneurophion* Ashmead (pl. 55, fig. 68) occur elsewhere in *Enicospilus*, usually not in combination. The only really anomalous feature of *Pleuroneurophion* is the exerted ovipositor (pl. 56, fig. 100). None of the species referred to *Pleuroneurophion* by Cameron, Szépligeti, and Uchida agrees in this character. In the paper cited above I have already pointed out these facts and treated *Pleuroneurophion* as a subgenus of *Enicospilus*.

The original inclusion of *Ophion undulatus* Gravenhorst in *Cymatoneura* and its subsequent designation as genotype by Viereck makes that genus isogenotypic with *Allocamptus* Thomson. Those who recognize this as a genus distinct from *Enicospilus* should use *Cymatoneura* as the generic name, since *Allocamptus* Foerster has priority

over *Allocamptus* Thomson. In describing *Cymatoneura*, Kriechbaumer mentioned only two characters, the lack of scleromes in the wing and the course of the basal abscissa of the radius, "an oder nahe der Basis verdickt, geschlangelt oder wellenförmig." As I have indicated elsewhere, both of these structures are subject to great variation within *Enicospilus*. The really most characteristic feature of the genotype of *Cymatoneura* is the form of the head with the temple strongly buccate behind the upper part of the eye and rapidly diminishing in breadth and convexity below. This does not occur in any of the other species referred to *Cymatoneura* by Kriechbaumer or in others that I know, though many have the temples strongly convex but more uniformly so. Some of these, including the genotype of *Enicospilus*, have distinct scleromes and the radius very different. Others, with the wing characters of *Cymatoneura*, have the temples very narrow. Another somewhat peculiar feature of the genotype is the slight concavity of the clypeus, best seen in profile. This is approached in such species as (*Thyreodon*) *Enicospilus texanus* (Ashmead),¹⁷ in which the clypeus is straight in profile with no inflection or reflexed margin apically. Thomson was quite wrong in stating that *undulatus* lacks the postpectoral carina.

The synonymy of *Leptophion* Cameron is on the authority of J. F. Perkins, who states that the genotype has alar scleromes and that the claws are very sharply bent apically.

There is nothing in the description of *Dicamptus* Szépligeti to distinguish it from *Enicospilus*. Though I have been unable to find a specimen of the genotype in the material available, I have identified (*Dicamptus*) *Enicospilus grammospilus* (Enderlein) (new combination) (pl. 55, fig. 70), which appears to be properly referred to *Dicamptus*, and on the strength of this synonymize *Dicamptus*. Morley treats *Dicamptus* as a subgenus of *Allocamptus* Thomson, thereby imputing to it "vertical" mandibles. Uchida, on the other hand, states that the mandibles are "horizontal." He synonymizes "*Allocamptus* Morley (not Thomson)" with *Dicamptus*, overlooking the fact that Morley included in *Allocamptus* the genotype, *undulatus* (Gravenhorst).

Most of the few characters given in the original description of *Metophion* Szépligeti (the presence of two scleromes in the wing, the strongly curved apical abscissa of the radius, and the margined scutellum) indicate affinity with *Enicospilus*; in fact, the only discordant character is found in the expression "randinal nicht ausgebildet." One would hardly say that the stigma is not developed in *Enicospilus* or in any genus of Ophionini that I have seen. Before me are specimens of a specifically unidentified species of *Enicospilus* from the

¹⁷ New combination.

Oriental fauna that agree with the description of *Metophion* in all but this character and in having the nervulus antefurcal rather than postfurcal. They also agree with the description of the genotype in the form of the alar scleromes, "einem mondformigen und einem gewöhnlichen Chitinleck," that is, a somewhat triangular proximal sclerome and a crescentic one on the anterodistal margin of the quadra. Another character worthy of special mention in which the specimens agree with the generic description is the unusually narrow, sometimes almost pointed, base of the second discoidal cell. On the strength of these facts I synonymize *Metophion* with *Enicospilus*.

I have not seen the genotype of *Ceratospilus Szépligetii*, but certain Philippine specimens of *Enicospilus* agree in all but the postfurcal nervulus, and this is too subject to variation for recognition as a generic character.

Neither the medially thickened discocubitus nor the lack of scleromes is sufficient to segregate *Atoponeura Szépligetii* as a genus distinct from *Enicospilus*. An unidentified species of *Enicospilus* from the Oriental Region exhibits these two characters (pl. 55, fig. 67).

It seems doubtful that Szépligetii knew the designated genotype of *Ophiomorpha*, although he included it originally. In describing *Ophion curvinervis*, Cameron stated, and his figure shows, that the basal abscissa of the radius is distinctly curved, which would preclude its tracing to *Ophiomorpha* in Szépligetii's key and its agreement with the original description of the genus. I have examined two specimens of *Ophiomorpha concolor Szépligetii*,¹⁸ the most logical choice for genotype, identified by Seyrig, and find that it has the basal abscissa straight, only slightly thickened and very gradually tapering from base to apex; also, the fenestra is obsolescent, being represented only by a small hairless area in the normal position of the fenestra. Unfortunately, in describing *curvinervis* Cameron refers to the fenestra only with the observation that the wings lack scleromes.

Cryptocamptus Brèthes was proposed as a substitute for *Allo-camptus Thomson*, not Foerster, its author not realizing that *Cymatoneura* was already available.

In describing *Eremotyloides* in a key to genera, Perkins did not indicate any type except inferentially. On page 529 of the paper in which the genus was described (p. 530) he stated, "I have not seen the typical species of *Eremotylus*, Först., and I think that Ashmead is wrong in attributing the one variable Hawaiian species to it." On page 532 in a discussion of the variation of Hawaiian Ophionini he employs the combination "*Eremotyloides orbitalis*" without giving the author of the species, but it seems entirely clear that *Eremotylus*

¹⁸ (*Ophiomorpha concolor Szépligetii*, preoccupied in *Enicospilus* by *E. concolor* Cresson) = *Enicospilus parvifenestratus*, new name.

orbitalis Ashmead is intended as the genotype of *Eremotyloides*, and Viereck so interpreted it. In the reference cited above I have treated *Eremotyloides* as a subgenus of *Enicospilus* showing that the fenestra may be large or small and with or without scleromes. A part of the wing of *Enicospilus (Eremotyloides) fullawayi* Cushman is illustrated herewith (pl. 55, fig. 65).

Amesospilus Enderlein is another segregate from *Enicospilus* based on a wing character, the lack of central scleromes, which it shares with many otherwise very diverse species.

Schizospilus Seyrig is a frankly artificial genus distinguished from *Enicospilus* solely by the possession of two or more scleromes on the quadra.

GENERA OF OPHIONINI NOT INCLUDED IN THIS REVISION

Genus BARYTATOCEPHALUS Schulz

Barycephalus BRAUNS, Termész. Füzet., vol. 18, p. 43, 1895.—SZÉPLIGETI, in Wytzman, Genera insectorum, fasc. 34, p. 24, 1905.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1426, 1908; suppl., fasc. 24, p. 15, 1935.—SHESTAKOV, Konowia, vol. 5, p. 257, 1926 (preoccupied by *Barycephalus* Günther, 1860). [Genotype: *Barycephalus mocsaryi* Brauns. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 19, 1914.]

Barytatocephalus SCHULZ, Zool. Ann., vol. 4, p. 23, (1909) 1911 (substitute name for *Barycephalus* Brauns, preoccupied). [Genotype: *Barytatocephalus mocsaryi* Brauns.] Autobasic.

The possession of the postpectoral carina, the weakly broken but strongly reclivous nervellus, and the large head are suggestive of *Clistorapha* Cushman, but the very small eyes and ocelli, the short antennae, the unseparated clypeus, the lack of notaulices, the ex-carinate and polished propodeum, and the strongly contrasting color pattern of *Barytatocephalus* appear to distinguish it.

The genus is still known only from the two original Hungarian species. Brauns suggested that his two species might be the sexes of the same species, but Shestakov, in describing the male of *sominiger* Brauns, showed them to be distinct.

Genus DICTYONOTUS Kriechbaumer

Dictyonotus KRIECHBAUMER, Zool. Jahrb. Syst., vol. 8, p. 197, 1894. [Genotype: *Ophion (Dictyonotus) melanarius* Kriechbaumer.] Monobasic.

Elsewhere in this revision I have indicated the possible synonymy of this genus and *Aglaophion* Cameron. I have not seen the genotype unless it is perhaps synonymous with *Aglaophion purpurascens* (Smith), which possibility several of the characters listed by Kriechbaumer would seem to preclude; *melanarius* is considerably smaller than any specimen of *purpurascens* that I have seen, while the coarsely sculptured and mat thorax and sharply defined triangular basal area of the propodeum apparently would distinguish it. Most significant of

all is the fact that the nervellus is said to be broken in the middle, which would exclude *melanarius* not only from *Aglaophion* but from the *Thyreodon* group. Nevertheless, the impression gained from the original description is of an insect of that group, and one suspects that the description of the nervellus is the result of faulty observation. Both *melanarius* and *purpurascens* occur in North China.

Krichbaumer himself considered *melanarius* more closely related to (*Ophion*) *Stauropoctonus bombycivorus* (Gravenhorst) than to any other European species (of *Ophion*), but stated: "If one does not wish to place this species in the same genus as *bombycivorus* a new genus must be erected for it (perhaps *Dictyonotus*, from $\delta\iota\kappa\tau\nu\nu\sigma$, net, and $\nu\acute{\omega}\tau\omicron\sigma$, back)."

Genus EURYCAMPTUS Morley

Eurycamptus MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 27, 1912. [Genotype: *Ophion latipennis* Kirby. By designation of Viereck, U. S. Nat. Mus. Bull. 183, p. 57, 1914.]

From the few characters given in the original descriptions of the genus and the genotype as well as some additional characters communicated by Mr. Perkins I am unable to place this genus satisfactorily in the key. Quite obviously it does not belong in the *Thyreodon* group, but the characters known to me divide almost between those of the *Ophion* and *Enicospilus* groups.

The following description of the genotype was sent me by J. F. Perkins. In it I have interpolated a few other characters from the original description; the latter are italicized.

"Occipital carina, centrally, notched towards the neck; mandibles narrowing in apical third (i. e., the posterior margin curving from about two-thirds to apex of tooth); antenna shorter than length of fore-wing; pronotal sinus broad; scutellum unmarginated; postscutellum with a very deep basal depression; speculum narrow, very sharply defined ventrally and ventro-posteriorly by a deep depression; sternauli deep, extending three-fourths distance to apex, where they are closed by broad carinae; a deep furrow before middle coxae; postpectoral carina very broadly interrupted, present only laterally and as a high costa closing mesosternal furrow posteriorly; *propodeum with a median longitudinal carina*, basal constriction deep, with median and lateral foveae very weakly differentiated; stigma narrow, about same width as in *Stauropoctonus*, but shorter; basal abscissa of radius weakly sinuate centrally, meeting stigma at an angle of about 45°, weakly though distinctly thickened in basal half; apical abscissa weakly arched towards the costa basally, curved apically to anterior margin; fenestra present but extremely narrow, joining the smooth area beneath stigma; basal abscissa of radius in hind wing curved,

weakly sinuate and thickened in basal two-thirds; *abdomen stout*; unbo absent; spiracles of second tergite at middle."

The genus probably belongs in the *Enicospilus* group, because of the present, though interrupted, postpectoral carina; very narrow and elongate stigma; sinuate and basally thickened basal abscissa of radius; the possession of the fenestra, though this apparently is unusually small and narrow; and the lack of the unbo on the second tergite.

Nearly as convincing reason for placing it in the *Ophion* group is found in the broad pronotal sinus; the unmarginated scutellum; the sharply defined speculum; the divided basal constriction of propodeum; the curved abscissula; and the location of the second tergal spiracles at the middle of the tergite. In addition to the characters that it shares with the *Ophion* group it differs further from the *Enicospilus* group by the peculiar form of the mandible.

According to Mr. Perkins the American species described in *Eurycamptus* Morley do not belong there, *E. novascotiae* being an *Ophion*. He did not indicate in his notes to what genus *E. flavipennis* belongs, merely stating that it is not *Eurycamptus* and "differs from *Enicospilus* as follows: Occipital carina narrowly interrupted centrally; pronotal sinus open; speculum set off below by an oblique furrow; postpectoral carina narrowly interrupted centrally; second tergite with spiracle a little beyond middle, as far removed from lateral margin as half the distance between the spiracle and the hind margin, the epipleura, however, narrow; abdomen not strongly compressed, petiole broader than deep, postpetiole about twice as broad as deep; scutellum unmarginated." Except that the occipital and postpectoral carinae are present, though interrupted, and that Mr. Perkins did not mention the trochanteral tooth, I would suspect that *flavipennis* is a species of *Aulophion*.

Genus PLATOPHION Hellén

Platophion HELLÉN, Acta Soc. Faun. et Flor. Fennica, vol. 56, No. 6, p. 14, 1926.—

SCHMIEDEKNECHT, Opuscula ichneumonologica, Suppl. 24, p. 25, 1935.

[Genotype: *Ophion areolaris* Brauns. By present designation.]

Described as a subgenus of *Ophion* and also so treated by Schmiedeknecht, this was differentiated from the typical subgenus only by the medially interrupted occipital carina and by the large, subquadrate scutellum. According to notes by J. F. Perkins the genus entirely lacks the occipital carina; the basal constriction of the propodeum is weakly though evidently divided; the speculum is strongly convex, but not margined anteriorly by a distinct groove; the first recurrent vein is strongly convergent with the basal; and the nervellus is very long.

These characters seem to indicate a relationship to *Stauropoctonus* and *Aulophion*, and I should not be surprised if it is really a synonym

of the former. But information as to the possession or lack of the teeth on the apical trochanteral joints is lacking, and I prefer for the present to treat *Platophion* in the category of unplaced genera.

Genus STENOPHTHALMUS Szépligeti

Stenophthalmus SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 23, 1905.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1425, 1908.—SHESTAKOV, Konowia, vol. 5, p. 256, 1926. [Genotype: *Stenophthalmus algiricus* Szépligeti. By designation of Viereck, U. S. Nat. Mus. Bull. 83, p. 137, 1914.]

Psylonychia SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 23, 1905. [Genotype: *Stenophthalmus algiricus* Szépligeti. By present inclusion and designation.] New synonymy.

The name *Psylonychia* occurs only in the description of the subfamily Ophioninae, and it is evident that Szépligeti at first intended to use this name for what he actually described as *Stenophthalmus*.

As pointed out by Shestakov, Schmiedeknecht inadvertently referred *Hellwigiella nigripennis* Szépligeti and *H. similis* Szépligeti to *Stenophthalmus*.

So far as the few characters given for this genus go, it evidently belongs to the *Ophion* group, and I doubt its distinctness from *Ophion*. Certainly the key characters of small eyes and ocelli are not sufficient to separate it.

GENERA WRONGLY INCLUDED IN THE OPHIONINI

Genus ANOMALON Panzer (NOTOTRACHYS Marshall)

Virtually all authors have employed the name *Nototrachys* for this genus, but Rohwer, Gahan, and Cushman (Proc. Ent. Soc. Washington, vol. 17, p. 149, 1915) showed that it should be known as *Anomalon*.

Because of the position of the second recurrent vein basad of the intercubitus Morley included this genus, under the name *Nototrachys*, in the Ophionini, despite the many characters that exclude it from that tribe. The combination character of the single calcarium of the middle tibia, together with the venational character, the unbroken nervellus, the swollen front and middle tibiae, the tooth at the apex of the front tibia, the simple claws, the convergent eyes and the strong epomia I consider sufficient for tribal distinction. This conclusion is supported by the host relation with the larvae of elaterid beetles (*Heteroderes*) and by larval characters, as shown on earlier pages of this revision.

Genus OPHIONONEURA Cameron

Ophiononeura CAMERON, Rec. Albany Mus., vol. 1, p. 174, 1904. [Genotype: *Ophiononeura flavomaculatus* Cameron.] Monobasic.

Ophioneura CAMERON, Ann. South African Mus., vol. 5, p. 84, 1906.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, pp. 1424, 1453, 1908. Emendation of *Ophiononeura*. Autobasic with *Ophiononeura* Cameron.

Genus **ERYTHROPHION** Cameron

Erythrophion CAMERON, Ann. South African Mus., vol. 5, p. 87, 1906.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, pp. 1424, 1453, 1908. [Genotype: *Erythrophion ferrugineus* Cameron.] Monobasic.

Genus **STICTOPHION** Cameron

Stictophion CAMERON Ann. South African Mus., vol. 5, p. 85, 1906.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, pp. 1424, 1454, 1908.

The above three genera, all based on South African species, were originally placed in the Ophionini and later transferred by Schmiedeknecht to the (Nototrachini) Anomalini, with which the unicalcarate middle tibia, simple claws, bidentate clypeus, rugose mesoscutum, long ovipositor, short wings, and unbroken nervellus, ascribed at least to *Ophiononeura* and *Erythrophion*, would ally them. To these characters, mentioned in the original descriptions, I am enabled, through the kindness of J. F. Perkins, to add the following:

Ophiononeura.—Eyes slightly convergent and not emarginate; epomia complete; foretibia with an apical tooth; second recurrent antefurcal by one and one-half times the length of intercubitus; angle between basal abscissa of radius and intercubitus about 150° .

Stictophion.—Eyes, epomia, and foretibia as in *Ophiononeura*; second recurrent antefurcal by one and one-third times the length of intercubitus; angle between basal abscissa of radius and intercubitus about 120° .

Erythrophion.—Eyes, epomia, and foretibia as in *Ophiononeura*; second recurrent antefurcal by slightly more than length of intercubitus; angle between basal abscissa of radius and intercubitus about 150° .

These added characters taken together with those furnished by the original descriptions render the placing of these genera in the Anomalini obvious.

Schmiedeknecht's statement, in his key to the genera of the Nototrachini, that the second recurrent vein is apical of the intercubitus is due to his misinterpretation of Cameron's statement "the recurrent nervure received behind the transverse cubital." It seems probable that this character was Cameron's sole reason for placing the genera in the Ophionini.

Genus **TRACHYOPTERUS** Morley

Trachyopterus MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 67, 1912. [Genotype: *Trachyopterus primus* Morley.] Monobasic.

According to J. F. Perkins this genus belongs in the Anomalini. To the very brief and inadequate description Mr. Perkins adds the following characters: "Eyes convergent and not emarginate; epomia

complete; second recurrent antefurcal by the length of intercubitus; angle between basal abscissa of radius and intercubitus about 120° ."

Genus GRAVENHORSTIA Boie

Gravenhorstia BOIE, Arch. Naturg., vol. 2, p. 42, 1836.—ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 86, 1900.—SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 24, 1905.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1427, 1908.—MORLEY, British Ichn., vol. 5, p. 259, fig., 1914.—CEBALLOS, Himenopteros de Espana, Ichn., p. 177, fig. 123, 1925. [Genotype: *Gravenhorstia picta* Boie.] Monobasic.

Odontopsis FOERSTER, Verh. naturh. Ver. preuss. Rheinlande, vol. 25, p. 150, 1868. [Genotype: *Gravenhorstia picta* Boie.] Autotypic through synonymy.

This genus has been variously placed in the Ophionini, Campoplegini, and Therionini. As *Odontopsis* it was included in the Campoplegini by Foerster. Ashmead synonymized *Odontopsis* with *Gravenhorstia* and placed it in the Ophionini, in which he has been followed by Szépligeti and by Schmiedeknecht. Morley and Ceballos relegate it correctly to the Therionini (Anomalini), with which placing J. F. Perkins (*in litt.*) concurs.

Genus KOKUJEWIELLA Shestakov

Kokujewiella SHESTAKOV, Konowia, vol. 5, p. 257, 1926. [Genotype: *Kokujewiella vicaria* Shestakov.] Monobasic.

This genus almost certainly belongs in the Therionini, as indicated by the nearly interstitial second recurrent vein, the simple claws, the convergent eyes and the black and yellow color pattern of the genotype. The author himself compares it with *Gravenhorstia*.

Genus OPHIOPTERUS Brullé

Ophiopterus BRULLÉ, Histoire naturelle des insectes, Hyménoptères, vol. 4, p. 153, pl. 42, fig. 5, 1846.—CRESSON, Proc. Acad. Nat. Sci. Philadelphia, 1873, p. 380.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 296, 1886.—SZÉPLIGETI, in Wytsman, Genera insectorum, fasc. 34, p. 37, 1905.—SCHMIEDEKNECHT, Opuscula ichneumonologica, fasc. 18, p. 1424, 1908.—HOOKER, Trans. Amer. Ent. Soc., vol. 38, p. 92, 1912. [Genotype: *Ophiopterus coarctatus* Brullé.] Monobasic.

Ophiopterus BRULLÉ, ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, p. 87, 1900.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 66, 1912. Emendation of *Ophiopterus* Brullé. Autobasic with *Ophiopterus* Brullé.

This genus has consistently been placed in the Ophionini solely because of the position of the second recurrent vein basad of the intercubitus. However, in all of the principal characters except this it agrees with the Therionini and to that tribe I assign it. The conformation of the head, with the occipital carina ascending very close to the ocelli and terminating below very close to the articulation of the mandible, the medially produced clypeus and the convergent eyes;

the strong epomia; the minute tooth at the apex of the front tibia, the bicalcarate middle tibia, the simple claws, and the unbroken nervellus are all therionine characters. The strongly rounded and colliformly produced propodeum is exactly like that of *Podogaster* Brullé and *Clatha* Cameron, and the three genera I believe to be closely related.

Genus **PSEUDANOMALON** Szépligeti

Pseudanomalon SZÉPLIGETI, in Wytzman, *Genera insectorum*, fasc. 31, p. 33, 1905. [Genotype: *Pseudanomalon gracilis* Szépligeti.] Monobasic.

I have not seen a member of this genus, but despite the antefurcal second recurrent I was inclined to relegate it to the Therionini, in which tribe a few genera have that character, because of the acute clypeus, the prolongation of the propodeum over the hind coxae, the low fracture of the nervellus, the long second tergite and the color of the genotype. This placing was confirmed by Mr. Perkins, who adds two therionine characters: front tibia with an apical tooth; occipital carina closer to ocelli than posterior ocelli are to each other.

Genus **RETANISIA** Cameron

Retansia CAMERON, *Biologia Centrali-Americana*, Hymenoptera, vol. 1, p. 299, pl. 12, fig. 10. 1886.—MORLEY, A revision of the Ichneumonidae based on the collection in the British Museum (Natural History), pt. 1, p. 4 (footnote), 1912. [Genotype: *Retansia facialis* Cameron.] Monobasic.

Morley correctly disposed of this genus, which was placed originally by Cameron in the Anomalini and transferred by Dalla Torre to the Ophionini in 1902, when he said it "is actually quite closely allied to, if not synonymous with *Acaenitus*, Latr. . . ."

Genus **HELLWIGIA** Gravenhorst

Hellwigia GRAVENHORST, *Nov. Acta Acad. Nat. Curios.*, vol. 11, p. 318, pl. 43, 1823. [Genotype: *Hellwigia elegans* Gravenhorst. By designation of Holmgren, *Öfv. Vet.-Akad. Förh.*, vol. 15, p. 321, 1858.]

In his letter transmitting specimens of the genotype Dr. Townes suggested that this genus, despite its anomalous venation and antennae, should be placed in the Campoplegini. With this suggestion I concur. The lack of the first intercubitus and the clavate antennae appear to be mere anomalies, for the whole conformation of the abdomen is distinctly like that of *Campoplegidea*, as are also the un-separated clypeus, the lack of notaulices, the presence of the postpectus, the form and position of the gastrocoeli, the long slender tarsi and calcaria, and even the curvature of the second intercubitus.

EXPLANATIONS OF PLATES

PLATE 49

Sclerotized Structures of Heads of Full-grown Larvae

1. *Thyreodon atricolor* (Olivier).
 - cd*=cardo of maxilla.
 - f*=frontal suture.
 - hy*=hypostomal sclerome.
 - lm*=labium.
 - lp*=labial palpus.
 - md*=mandible.
 - mx*=maxillary sclerome.
 - m_xp*=maxillary palpus.
 - oc*=extension from hypostomal sclerome along occipital foramen.
 - sd*=sclerome around opening of silk duct.
 - st*=stipital sclerome.
2. *Enicospilus purgatus* (Say).
3. *Ophion idoneum* Viereck.
4. *Anomalon fuscatum* (Cresson).
5. *Hymenopharsalia foutsii* Cushman.
 - cl*=sclerome across clypeus.
6. *Paranomalon apicale* (Cresson).
7. *Therion morio* (Fabricius).
8. *Heteropelma datanae* Riley, hypostomae and associated sclerotization.

PLATE 50

Head

9. *Enicospilus macrurus* (Fabricius).
10. *Enicospilus texanus* (Ashmead).
11. *Agathophiona fulvicornis* Westwood
12. *Alophophion chilensis* (Spinola).
13. *Aulophion bicarinatus* Cushman.
14. *Trophophion tenuiceps* Cushman.
15. *Stauropoctonus chezanus* Cushman.
16. *Enicospilus texanus* (Ashmead).
17. *Boethoneura arida* Cushman.
18. *Clistorapha subfuliginosa* (Ashmead).
19. *Chilophion abnormis* (Felt).
20. *Trophophion tenuiceps* Cushman.
21. *Ophion ancyloneura* Cameron.
22. *Enicospilus purgatus* (Say).
23. *Simophion excarinatus* Cushman.
24. *Genophion costalis* (Cresson).
25. *Rhynchophion flammipennis* (Ashmead).
26. *Potophion caudatus* Cushman.
27. *Trophophion tenuiceps* Cushman.
28. *Agathophiona fulvicornis* Westwood.

PLATE 51

Propodeum

- | | |
|---|--|
| 29. <i>Thyreodon atricolor</i> (Olivier). | 31. <i>Rhynchophion flammipennis</i> (Ash- |
| 30. <i>Aglaophion purpurascens</i> (Smith). | mead). |

PLATE 55

Portion of Forewing

63. *Enicospilus flavoplagiatus* Cushman.
 64. *Enicospilus texanus* (Ashmead).
 65. *Enicospilus (Eremotyloides) fullawayi* Cushman.
 66. *Enicospilus rufoniger* (Hooker).
 67. *Enicospilus* sp., an example of *Atoponeura* Szépligeti.
 68. *Enicospilus (Pleuroneurophion) hawaiiensis* (Ashmead).
 69. *Enicospilus americanus* (Christ).
 70. *Enicospilus grammospilus* (Enderlein), an example of *Dicamptus* Szépligeti.
 71. *Rhopalophion curvus* Seyrig (after Seyrig).

Humeral Angle of Pronotum

72. *Thyreodon atricolor* (Olivier).
 73. *Ophion slossonae* Davis.
 74. *Enicospilus purgatus* (Say).

Apical Joint of Front Tarsus

75. *Ophiogastrella maculithorax* Brues.

Claw

76. *Rhynchophion flammipennis* (Ashmead).
 77. *Spilophion maculipennis* Cameron.
 78. *Trophophion tenuiceps* Cushman.
 79. *Genophion costalis* (Cresson).
 80. *Enicospilus purgatus* (Say).
 81. *Ophion ancyloneura* Cameron.
 82. *Chilophion abnormis* (Felt).

Hind Trochanter

83. *Stauropactonus chezanus* Cushman.

Apex of Male Abdomen Showing Paramere

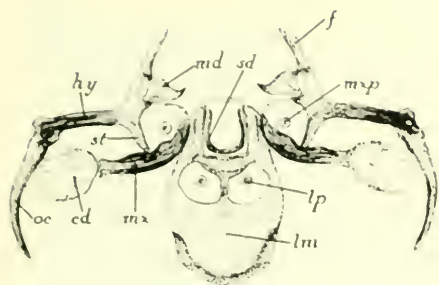
84. *Thyreodon atricolor* (Olivier).
 85. *Rhynchophion flammipennis* (Ashmead).

PLATE 56

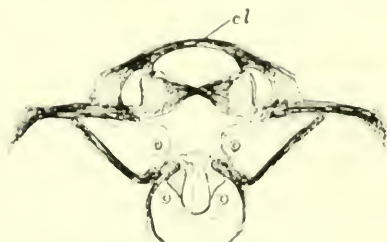
Abdomen

- | | |
|---|---|
| 86. <i>Thyreodon atricolor</i> (Olivier). | 95. <i>Genophion costalis</i> (Cresson). |
| 87. <i>Athyrcodon atriventris</i> (Cresson). | 96. <i>Clistorapha subfuliginosa</i> (Ashmead). |
| 88. <i>Rhynchophion flammipennis</i> (Ashmead). | 97. <i>Chilophion abnormis</i> (Felt). |
| 89. <i>Aglaophion purpurascens</i> (Smith). | 98. <i>Agathophiona fulvicornis</i> Westwood. |
| 90. <i>Pycnophion molokaiensis</i> Ashmead. | 99. <i>Trophophion tenuiceps</i> Cushman |
| 91. <i>Potophion caudatus</i> Cushman. | 100. <i>Enicospilus (Pleuroneurophion) hawaiiensis</i> (Ashmead). |
| 92. <i>Simophion excarinatus</i> Cushman. | 101. <i>Enicospilus purgatus</i> (Say). |
| 93. <i>Banchogastra nigra</i> Ashmead. | |
| 94. <i>Ophion ancyloneura</i> Cameron. | |

u = umbo.



1. THYREODON



5. HYMENOPHARSALIA



2. ENICOSPILUS



6. PARANOMALON



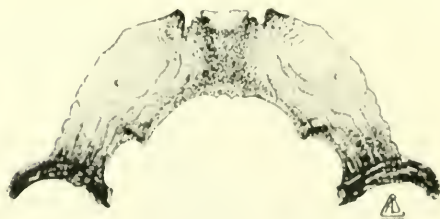
3. OPHION



7. THERION

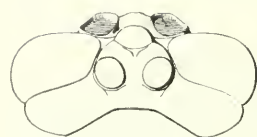


4. ANOMALON

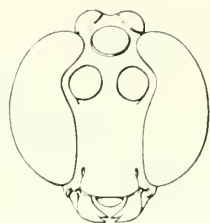


8. HETEROPELMA

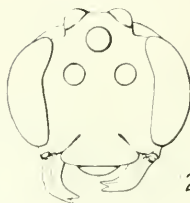
ICHNEUMON-FLIES OF THE TRIBE OPHIONINI
FOR EXPLANATION SEE PAGE 40



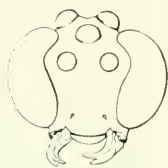
9. ENICOSPILUS



15. STAUROPOCTONUS



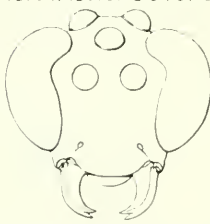
19. CHILOPHION



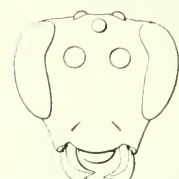
22. ENICOSPILUS



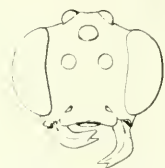
10. ENICOSPILUS



16. ENICOSPILUS



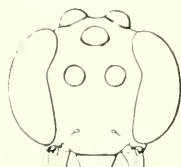
20. TROPHOPHION



23. SIMOPHION



11. AGATHOPHIONA



17. BOETHONEURA



21. OPHION



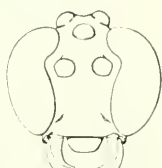
24. GENOPHION



12. ALOPHOPHION



13. AULOPHION



18. CLISTORAPHA



26. POTOPHION

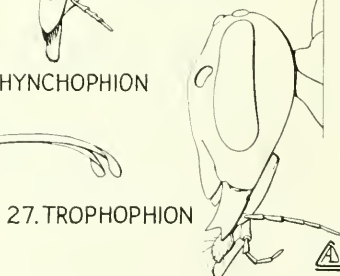


28. AGATHOPHIONA



14. TROPHOPHION

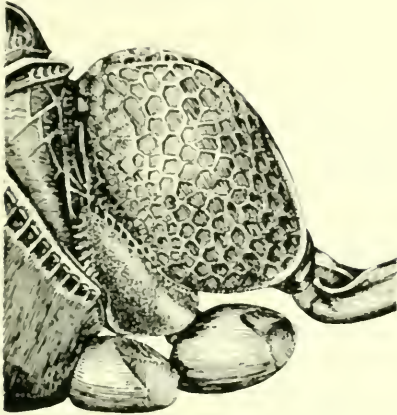
25. RHYNCHOPHION



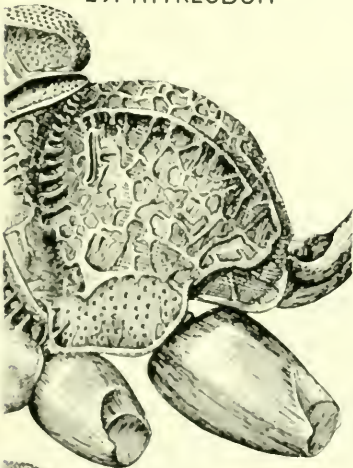
27. TROPHOPHION

ICHNEUMON-FLIES OF THE TRIBE OPHIONIINI

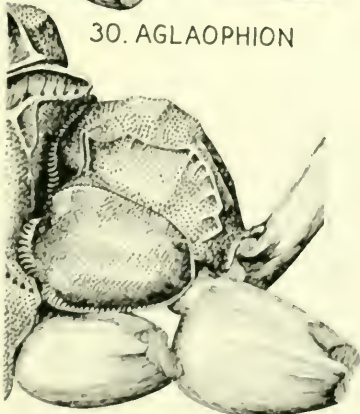
FOR EXPLANATION SEE PAGE 480



29. THYREODON



30. AGLAOPHION



31. RHYNCHOPHION



32. THYREODON



33. ATHYREODON



34. AGLAOPHION

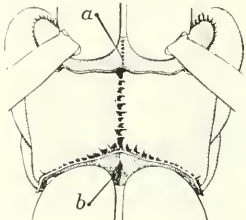


35. RHYNCHOPHION

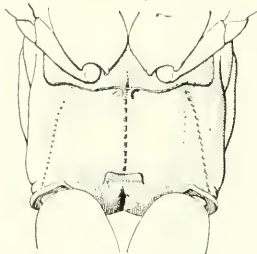


ICHNEUMON-FLIES OF THE TRIBE OPHIONINI

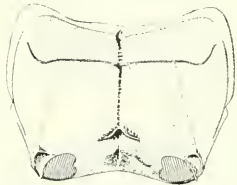
FOR EXPLANATION SEE PAGES 487-491



36. AGLAOPHION



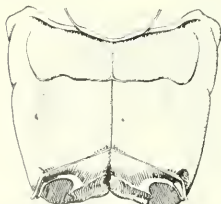
37. ATHYREODON



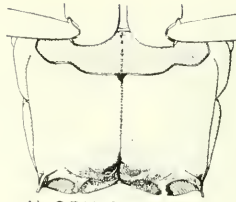
38. THYREODON



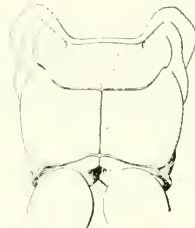
39. RHYNCHOPHION



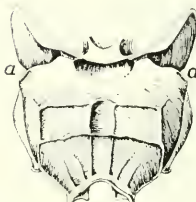
40. ENICOSPILUS



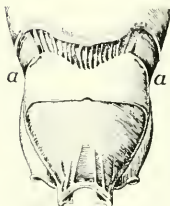
41. OPHION



42. CLISTORAPHA



43. OPHION



44. ENICOSPILUS



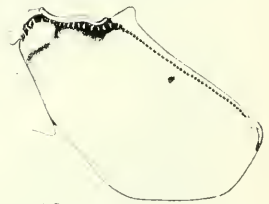
45. AUSTRALOPHION



46. AGLAOPHION



47. THYREODON



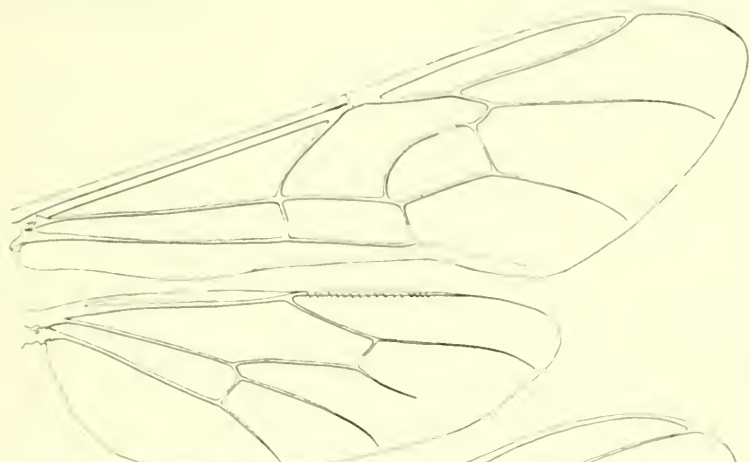
48. SIMOPHION



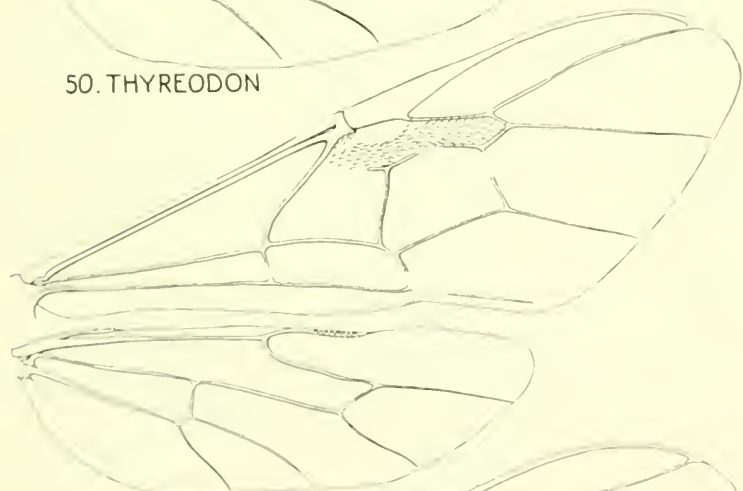
49. AULOPHION

ICHNEUMON-FLIES OF THE TRIBE OPHIONINI

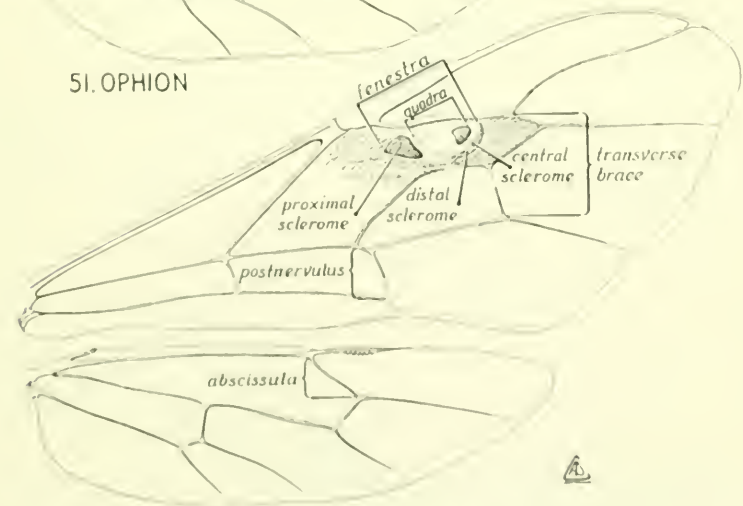
FOR EXPLANATION SEE PAGE 481



50. THYREODON



51. OPHION

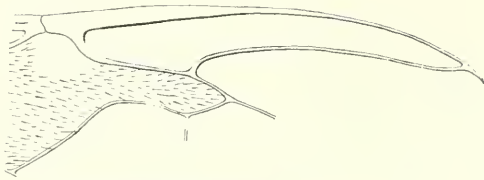


52. ENICOSPILUS

ICHNEUMON FLIES OF THE TRIBE OPHIONINI

FOR EXPLANATION SEE PAGE 431

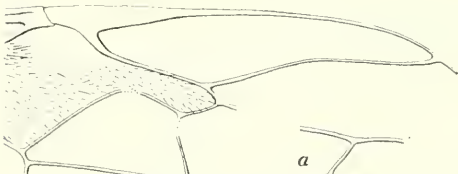




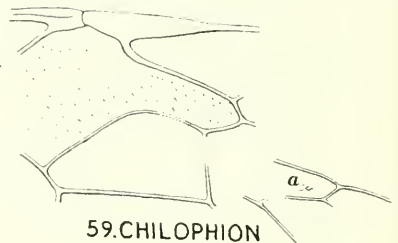
53. STAUROPOGTONUS



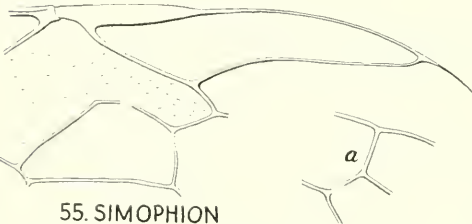
58. AULOPHION



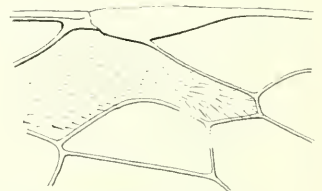
54. CLISTORAPHA



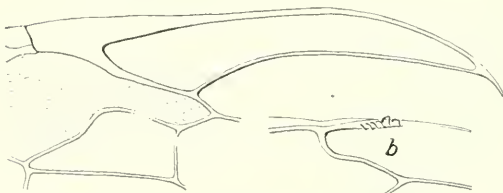
59. CHILOPHION



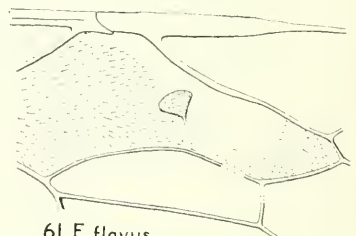
55. SIMOPHION



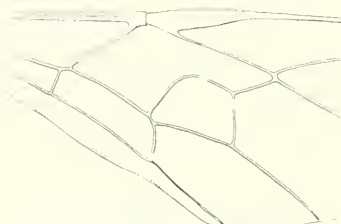
60. ABANCHOGASTREA



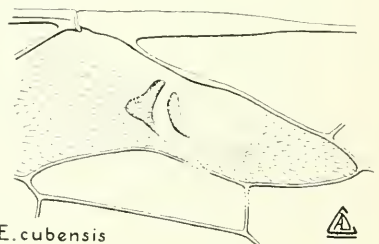
56. SPIOPHION



61. E. flavus



57. OPHIOGASTRELLA



62. E. cubensis

ICHNEUMON-FLIES OF THE TRIBE OPHIONINI

FOR EXPLANATION SEE PAGE 481



63 ENICOSPILUS flavoplagiatus



69. E. americanus



76 RHYNCHOPHION



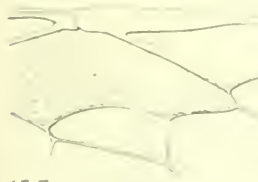
64 E. texanus



70. E. grammospilus



77 SPILOPHION



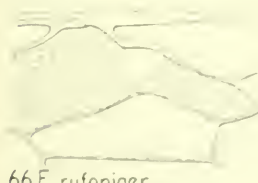
65. E. fullawayi



71. RHOPALOPHION



78 TROPHOPHION



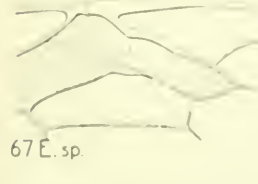
66. E. rufoniger



72. THYREODON



79. GENOPHION



67 E. sp.



73. OPHION



80. ENICOSPILUS



68 E. hawaiiensis



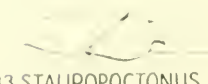
74 ENICOSPILUS



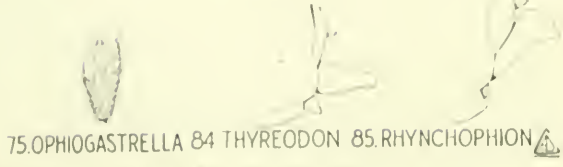
81. OPHION



82 CHILOPHION



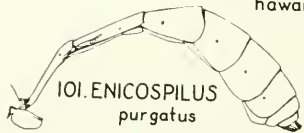
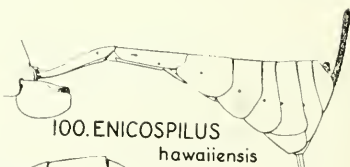
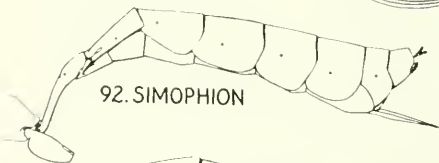
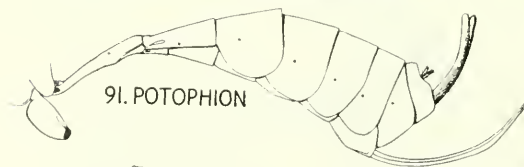
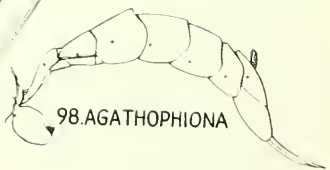
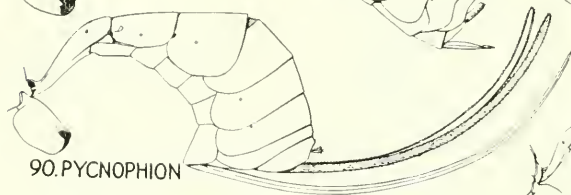
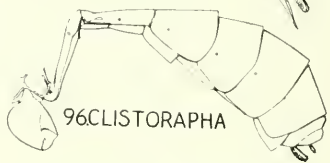
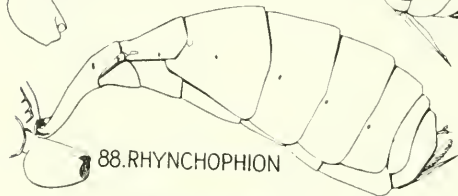
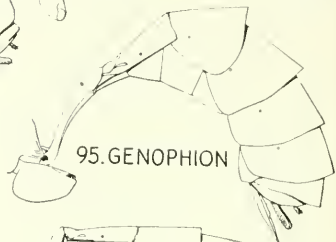
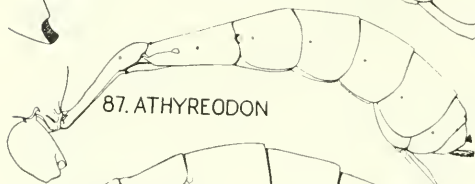
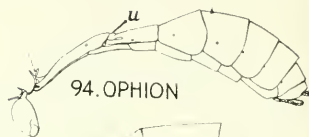
83 STAUROPOCTONUS



75. OPHIOGASTRELLA 84 THYREODON 85. RHYNCHOPHION

ICHNEUMON-FLIES OF THE TRIBE OPHIONIINI

FOR EXPLANATION SEE PAGE 48



ICHNEUMON-FLIES OF THE TRIBE OPHIONIINI

FOR EXPLANATION SEE PAGE 482