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The Pemphilid wasps are clearly and definitely circumscribed, but there is today no complex of the Sphecoids, save perhaps the Gorytines, in which more confusion reigns or lack of agreement exists as to what constitutes valid and natural supraspecific categories. Since Fabricius in 1775 first recognized the group as distinct under the name *Crabro*, no less than seventy-five names have been proposed for presumed discrete genera or subgenera within this assemblage. And almost from 1815, when Leach first advocated the division of *Crabro* into several genera,[1] until the present time, two diametrically opposed, vociferous and often militant schools of thought have flourished: that exemplified by such authors as Lepeletier and Brullé, Dahlbom, Morawitz, Thomson, and Ashmead who have divided the group into an ever increasing number of genera and subgenera, and countervailingly those who like Westwood, Shuckard, Smith, Kohl, Fox, and most recently Arnold, have relegated into synonymy the names of previous authors and united almost all the species into one large, all inclusive, portmanteau genus *Crabro*. Arguments can be adduced in support of each thesis.

These wasps are exceedingly, often bewilderingly, protean in their characteristics. They are divisible into innumerable natural groups, some of which are very well marked, while others are difficult to separate out, or apparently differ in points that exist in but one sex. Since the first attempt at a supraspecific classification of these wasps by Lepeletier and Brullé over a century ago,[2] each subsequent worker, as he perceived some apparently new and striking feature, too often made it forthwith the basis of a new genus or subgenus, frequently without adequately consulting and reviewing the work of his predecessors and contemporaries, with the result that Pelion has been piled on Ossa and that in turn upon Olympus. Moreover, until recently, uncertainty and conflicting opinion as to what properly constituted the correct specific

1 In his article on Entomology in Brewster's Edinburgh Encyclopaedia, Leach gave three species as exponents of *Crabro: cribrarius, subterraneus,* and *tibialis,* with the statement that these three species could be considered the types of as many genera. The subsequent history of the group has long since confirmed the accuracy of Leach's observation.

2 Lepeletier de St. Fargeau and Brullé gave the first elaborate generic classification of these wasps in 1835 [Ann. Soc. Ent. France, III, pp. 683-810]. In their monograph they recognized eleven genera: *Crabro* and ten others which they then erected: *Solenius, Blepharipus, Ceratocolus, Thyreopus, Thyreus, Crossocerus, Lindenius, Dasyproctus, Corynopus* and *Physoscelus*. Although they were unaware of the fact, their groups *Physoscelus* and *Corynopus* combined were the equivalent of Kirby's 1829 genus *Rhopalum*, now an absolute synonym of *Euplilis* Risso, 1826, while their *Ceratocolus* was congeneric with Billberg's long unnoticed 1820 name *Lestica*.

type of each of this multitude of names has added materially to the existing confusion. Confronted with this ever increasing, perplexing and apparent plethora of generic and subgeneric names, too many of which were ill defined, poorly understood, contradictory, and often synonymous, it is little wonder therefore that modern authors, bewildered by this nomenclatorial incubus, have usually chosen to reject and consign to synonymic oblivion most if not all the names of previous investigators rather than face the prospect, let alone the pangs of taxonomic dyspepsia.

The present state of confusion is due largely to the fact that, save for Kohl's effort[3] in 1896 and three years later the somewhat unsatisfactory endeavour of Ashmead,[4] no comprehensive survey of the Pemphilid supraspecific categories has ever been presented. Indeed until the present, practically every investigation of these wasps has been limited, often of necessity it is true, to the fauna of but a single region or subregion. And therein lies the basis of most difficulties encountered by modern authors.

The European and Nearctic Pemphilid fauna has naturally been more fully investigated and described than that of any other region. As the Neotropical and Ethiopian, the Australian and Oriental species have been described, they have usually been thrust willy-nilly into some Palaearctic or Nearctic classificatory pigeon hole, convenient and readily available perhaps, but often ill suited to them. For of the seventy-five categories proposed to date, no less than fifty-four or almost three-fourths the sum total of all names proposed, are based upon European or North American species.[5] Conversely, in the Neogaeic Realm, which, by reason of its long isolation, has developed one of the richest and most distinctive faunas in this group, only five categories have been recognized.[6] A similar condition prevails in the remaining regions: the Ethiopian has merely five[7] also, and the Hawaiian a like number,[8] the Oriental region but one,[9] and the Australian none. This does not necessarily imply, however, that Holarctic groups are absent from the other zoogeographic regions; they generally are present, sometimes relatively unaltered in their facies, but other times in such a modified guise or derived form that recognition as discrete subgenera, or even genera, may not be inappropriate now if they are considered in the light of their relationship to the whole

3 Kohl: Ann. k. k. Naturhist. Hofmus. Wien, XI, pp. 476-495; 499-500, (1896).

4 Ashmead: Canad. Entom., XXXI, pp. 163-174; 212-220, (1899).

5 Of these fifty-four generic or subgeneric names, approximately two-thirds are based upon Palaearctic species and but one-third on North American forms.

6 Neotropical groups: *Podagritus* Spinola, 1851. *Ischnolynthus* Holmberg, 1902. *Entomocrabro* Kohl, 1905. *Holcorhopalum* Cameron, 1904. *Merospis* Pate, 1941.

7 Ethiopian groups: *Dasyproctus* Lepeletier & Brullé, 1835. *Megapodium* Dahlbom, 1844 (emended by Schulz in 1906 to *Megalopodium*) a synonym of *Dasyproctus*. *Neodasyproctus* Arnold, 1926. *Microcrabro* Saussure, 1892.

8 Hawaiian groups: *Nesocrabro* Perkins, 1899; and *Hylocrabro*, *Melanocrabro*, *Oreocrabro* and *Xenocrabro*, all erected by Perkins in 1902. *Cf.* discussion of these groups under the genus *Ectemnius*.

9 Oriental groups: *Hingstoniola* Turner & Waterston, 1926.

world fauna of the group. Indeed, certain entities like *Anacrabro, Entomocrabro,*[10] *Enoplolindenius,*[11] *Quexua,*[12] and *Dasyproctus* are so distinct as a result of their long isolation in some one or several closely adjacent regions that there cannot be the slightest question they now represent and must be regarded as discrete genera. And finally, if these be accorded distinct taxonomic and nomenclatorial rank, then the large residue of species must be allocated to their natural genera and subgenera.

Undoubtedly the most outstanding contributions to the classification of these wasps are embodied in Kohl's treatment of the group in his 1896 review of the Sphecoid genera[13] and in his magnificent masterpiece "Die Crabonen der paläarktischen Region"[14] published two decades later. In each paper Kohl recognized only two genera: first, the New World entity *Anacrabro,* and secondly, a large comprehensive genus *Crabro* which, however, he divided into a finely organized series of segregates termed "Hauptartengruppen," each of which consisted of a nicely integrated aggregation of "Artengruppen" and their subordinate "Gruppen." To each category Kohl applied, insofar as such were available, generic or subgeneric names proposed by previous authors. This ultraconservative classification of Kohl is in sharp contrast to Ashmead's proposal in 1899 that the old genus *Crabro,* together with the Neogaeic *Anacrabro,* should constitute an independent family of thirty-eight discrete genera distributed among five distinct subfamilies. Yet irreconcilably antithetical though they seem, the systems of Kohl and Ashmead are not so dissimilar and incompatible as they appear at first glance. The difference between the two is mainly one of degree: the "Hauptartengruppen" and "Artengruppen" and "Gruppen" of Kohl correspond in large measure to Ashmead's subfamilies and genera. But notwithstanding this, the two schools have continued their divergent ways; they have lumped and split to their heart's content and quarrelled enormously.

The conservatives have steadfastly contended it is foolhardy to accord the natural entities into which the Pemphilid wasps break up the rank of anything more than species groups, or subgenera at most. The late Franz Friedrich Kohl, the leading modern proponent of this school, has presented their thesis most brilliantly and masterfully in the following words:

> . . . Der heutigen Entgleisung, die Zersplitterung nachweisbar natürlicher Artgruppen der bisherigen guten Gattungen ins masslose fortzusetzen, wie sie in neuerer Zeit bei manchen Hymenopterenfamilien eingerissen ist, vermochte der Verfasser nicht zu folgen. Diese Erscheinung bedeutet für sein Empfinden einen Mangel an Gefühl für

10 *Cf.* Pate: A Review of the genus *Entomocrabro.* Rev. Entom. (Rio de Janeiro), XII, pp. 45-61, (1941).

11 *Cf.* Pate: The New World Genera and Species of the Foxita Complex. Rev. Entom. (Rio de Janeiro), XIII, pp. 367-421, (1942).

12 *Cf.* Pate: On *Quexua,* a new genus of Pemphilidine Wasps from Tropical America. Rev. Entom. (Rio de Janeiro), XIII, pp. 54-75, (1942).

13 Ann. k. k. Naturhist. Hofmus. Wien, XI, pp. 476-500, (1896).

14 Ann. k. k. Naturhist. Hofmus. Wien, XXIX, pp. 1-452, (1915).

natürliche Verwandtschaft und ist manchmal vielleicht gar nur die Folge einer Sucht, neue Namen in die Wissenschaft einzuführen. Das Schlimme daran ist der Umstand, dass die neu hergestellten Gattungen keine Gattungen sind, weil die Merkmale, auf denen sie gegründet wurden, die eigentlichen Artmerkmale bedeuten, zu denen der Mehrzahl nach auch die sekundären Geschlechtsmerkmale gehören. Mit diesem Vorgehen erstirbt vor allem der Einblick in das Wesen und in das ganze oft sehr verworrene Gefüge der Verwandtschaft vollständig. Es wäre ein leichtes, bei den paläarktischen Crabronen die bereits begonnene Zersplitterung mit Hinweis auf schon vorhandene Beispiele so weit fortzusetzen, dass die alte Gattung *Crabro* aus gerade so viel Gattungen bestände, als sie Arten hat, also die ganze Zersplitterungssucht ad absurdum geführt wäre. . .15

Yet Kohl's arrangement of the various entities in a carefully organized plexus of descending series, wherein "Artengruppen" are subordinated to "Hauptartengruppen" and "Gruppen" to "Artengruppen," with the name of a previous author attached to practically every category, often coupled with the recognition of new groups and the proposal of names for them, refutes many of the most fervid arguments advanced by him and his disciples. Moreover, these taxonomic tories in labelling as genera-mongers afflicted with the itch and divers other grievous ills, — in branding as vexatious paralogists so submerged in rapt contemplation of minute trivia that their perspective of the whole has been lost or distorted, — needlessly exacerbate those who maintain the Pemphilid wasps comprehend a number of discrete genera and subgenera. But that too much ill advised and often unwarranted division within the complex has occurred in the past cannot be denied. Nevertheless to accept and employ today the ultraconservative, ponderous and unwieldy classification of Kohl seems no less impracticable than to follow to its uttermost ramifications Ashmead's immoderately radical system. Obviously a classification that will effect a reconciliation of these two divergent views and incorporate the better features of each is now urgently required in order to extricate the group from the taxonomic bog in which it has too long been mired. Detailed and critical analyses of the structural characteristics displayed by the various groups, evaluated, interpreted and combined with the data derived from a study of the distribution and ethology of the component forms, now indicate that many of the entities lightly dismissed in the past as mere figments of the taxonomic imagination represent and must be accorded the rank of discrete genera and subgenera. The prime object of the present paper is a preliminary exposition of this thesis.

Twenty-five genera are recognized as distinct here. Undoubtedly more will be discovered when the Neotropical, Ethiopian, Oriental and Australian faunas are more thoroughly known. However, in view of the tangle in which this group has existed for so long, caution is advised in the hasty proposal of any new groups. Moreover, I may have been overly sanguine both in the rank accorded some of the Neotropical entities described as new on the following pages and also in the recognition of so many subgeneric groups in certain large genera such as *Crossocerus* and *Ectemnius*. However, time and additions to our knowledge, which is still far from complete, will take care

15 Ex "Die Crabronen der paläarktischen Region." Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 2, (1915).

of this. For no classification, particularly a tentative one such as this purports to be, can ever hope to be perfect in every detail.

A key to the genera is presented on a following page. This will serve to differentiate the various genera and also to briefly characterize them. Diagnoses of many of the previously known groups have been given by Kohl in his monograph of the Palaearctic forms, a paper of such exquisite and painstaking character that it must inevitably be the basis of any future investigation of these wasps. I have recently presented reviews of several groups (*Entomocrabro, Foxita* and *Enoplolindenius, Quexua, Tracheliodes, Encopognathus,* the subgenera *Hoplocrabro* and *Blepharipus,* and the subgeneric categories of *Crossocerus*) and eventually, as opportunity permits, will tender illustrated and critical revisions of the remainder. In the following account, the subgeneric names and synonyms of each genus are given, together with a brief statement of the correct genotype of each name: detailed information about the latter may be found in my paper on the type species of the Sphecoid generic names.[16]

Basis of the Present Study.—This survey and tentative classification of the genera of Pemphilidine wasps is based upon an examination of a large amount of North American material, and in particular a study of the types of Cresson, Packard, Fox and several others. A representative collection of Palaearctic forms, determined largely by the late Franz Friedrich Kohl, has proven invaluable. Extensive Neotropical collections from the Guianas, Colombia, Brazil, Argentina, Chile, Peru and the Antilles taken by various Cornell University expeditions, the Oxford University Expeditions to British Guiana, and Drs. J. C. Bequaert, O. W. Richards, J. Smart, E. McC. Callan, and various others has served as a basis for a preliminary interpretation of the rich and varied fauna of this region. For the Orient, material taken in Formosa by Gressitt and Sauter; Philippine and Indian collections in the Museum of Comparative Zoölogy at Harvard; and a small but diversified lot from the East Indies through Dr. J. van der Vecht of Buitenzorg, Java, have all aided materially in understanding the faunal composition of this region. A small lot of Australian specimens in the Museum of Comparative Zoölogy has given a slight indication of some of the problems involved in a study of the fauna of that region. A few Hawaiian forms have also been studied. Finally, to Dr. George Arnold, Director of the National Museum of Southern Rhodesia, and Captain R. H. R. Stevenson, both of Bulawayo, I am particularly indebted for their extraordinary kindness in contributing specimens of many Ethiopian forms.

Ethology

The biology of the members of this general group is quite varied. The more generalized forms are terricolous and generally fossorial. Some such as *Anacrabro, Rhectognathus, Entomocrabro* and others, have developed a psammophore to aid them in the excavation of their burrows.[17] Many, however,

16 Mem. Amer. Ent. Soc., no. 9, (1937).

17 *Cf.* Barth: Bull. Wisconsin Nat. Hist. Soc., VI, pp. 147 *et seq.*, (1908). *V. et.:* Pate: Trans. Amer. Ent. Soc., LXVI, pp. 252-256, (1940).

have become xylicolous, nesting in brambles, canes, pithy stems like elder, and in the rotten wood of old logs and stumps. This latter habit has probably arisen from the custom which certain groups like *Cuphopterus* practice of utilizing for their nesting sites pre-existing holes, crannies, or the abandoned burrows of wood-boring beetles. An excellent index for the probable type of nesting habit is the shape of the pygidial area of the female: in terricolous forms, it is usually broad, flat and trigonal, whereas in xyloecetes it is generally strongly narrowed and more or less excavate apically. But this criterion is not absolute. There are a number of borderline cases like the subgenera *Cuphopterus* and *Acanthocrabro* which are xylicolous despite the fact that the pygidia are relatively broad, flat and trigonal. In 1934, Minkiewicz, in a very interesting review of the biology of the various groups of Sphecoid wasps, proposed the terms *Planicrabronides* or *Chthonocrabronides* for the fossorial terricolous forms, and *Dendrocrabronides* or *Coelocrabronides* for those that nested in stems and rotten wood.[18]

These wasps generally attack various Diptera, although some are quite catholic in their choice of provisions; microlepidoptera, caddis flies, sawflies, chalcids, and even mayflies are occasionally found stored in their nests. Many *Blepharipus* and *Lindenius* prey more or less exclusively upon Homoptera (Cicadellidae, Aphididae, etc.) or Heteroptera (Miridae). The genera *Encopognathus* and *Tracheliodes* are myrmecotherous, the latter restricting its attention wholly to worker ants of the Dolichoderine genera *Liometopum* and *Tapinoma*. Mirids and other Heteroptera form the exclusive prey of *Anacrabro;* while *Entomognathus* is largely if not wholly a predator upon Chrysomelid beetles, generally of the tribe Halticini.

The stored nests and burrows of these wasps are frequently parasitized by various Sarchophagid, Miltogrammine and Anthomyid flies, and Chrysid and Mutillid wasps. Detailed records of these will be given in the appropriate place as each genus or subgenus is eventually reviewed.

A brief statement of the biology of the various groups has been included under each genus on the following pages. This will be elaborated upon and discussed in detail as the various groups are revised. A compendium of the known biology of the various species was given by Kohl in his monograph of the Palaearctic forms.[19] In 1926 Hamm and Richards presented an excellent review of the ethology of the British species.[20] The recent papers of Maneval, and in particular those of Guido Grandi,[21] have added materially to our

18 Minkiewicz, R.—Nids et proies des Sphegiens de Pologne. Polski Pismo Ent., XII, pp. 181-256, (1934).

19 Kohl, F. F. Lebensweise der paläarktischen Crabronen. Ann. k. k. Naturhist. Hofmus. Wien, XXIX, pp. 352-440, ill. (1915).

20 Hamm, A. H. & O. W. Richards.—The Biology of the British Crabronidae. Trans. Ent. Soc. London, pp. 279-331, (1926).

21 Grandi has published these data chiefly in his excellently illustrated series of papers entitled: "Contributi alla conoscenza biologica e morfologica degli Imenotteri melliferi e predatori," published in the following journals: Redia, vol. XVI, (1925). Rivista di Scienze Naturali "Natura," vol. XVI, (1925). Boll. Lab. Zool. gen. agr. R. Scu. sup. Agric. Portici, vol. XIX, (1926). Mem. Soc. Ent. Ital., vols. V-VI, (1927-28). Boll. Lab. Ent. R. Ist. Sup. Agr. Bologna, vols. I-IX, (1929-37).

knowledge of the biology and morphology of the immature stages of many of the wasps.

KEY TO THE GENERA*

1. Abdominal tergites abruptly flexed under at the sides so that the ventral and dorsal portions of the tergites form a sharp edge at their junction; sternites flat or concave. Both sexes with pygidial area on last abdominal tergite. Eyes with inner orbits arcuate, divergent above and below; mandibles falcate, the apices simple and acuminate, the lower margins more or less excised. (New World forms) ..... *Anacrabro* Packard

Abdominal tergites not abruptly flexed under at the sides, at most only the first two with a sharp edge laterally; sternites more or less convex 2

2 (1). Maxillary palpi with five segments, labial palpi with three segments. Abdomen petiolate, the first segment more or less elongate, petiolate, and frequently nodose at apex 3

Maxillary palpi with six segments, labial palpi with three or four segments. Abdomen usually sessile or subsessile, occasionally petiolate 5

3 (2). Fore wings with the recurrent vein received toward the apical third of the cubital vein, the first abscissa of cubitus thus twice or more the length of second abscissa. Males as well as females with a distinct pygidial area on ultimate abdominal tergite. Mesopleura with prepectus sharply margined or angulate anteriorly. (Neotropical and Australian forms) ..... *Podagritus* Spinola

Fore wings with the recurrent vein received at or before the middle of the cubital vein, the first abscissa thus never more than one and a half times the length of the second. Only females with a distinct pygidial area on ultimate abdominal tergite 4

4 (3). Mesopleura with prepectus sharply margined anteriorly. Head cubical; occipital carina well developed, more or less flanged and a complete circle in extent; mandibles bidentate at apex, the lower tooth strongly divergent from the upper straight one, and armed basally on inner margins with a long acuminate spinoid tooth. Abdomen with first segment not appreciably nodose apically, and those distad of it fusiform (females) or gradually ampliate to the clavate apex (males). Hind tibiae obterete, not strongly clavate apically. Vertex and thorax usually very coarsely punctate. (Sonoran Nearctic forms) ..... *Moniaccera* Ashmead

Mesopleura with prepectus rounded, not sharply margined anteriorly. Head transversely subrectangular in dorsal aspect and broader than long; temples not well developed; occipital carina not well developed, neither flanged nor a complete circle in extent; mandibles with apices evenly bidentate, the lower tooth not strongly divergent from the upper one, and inner basal margin without such long acuminate spinoid tooth. Abdomen with first segment usually nodose at apex, and fusiform distad of it in both sexes. Hind tibiae more or less strongly clavate apically. Vertex and thorax at most finely punctate. (Cosmopolitan forms) ..... *Euplilis* Risso

5 (2). Labial palpi with three segments 6

Labial palpi with four segments 7

6 (5). Eyes with inner orbits parallel or subparallel, the face broad below and the antennal sockets remote from nearest lower inner orbit; front on anterior vertical aspect without a marginate scapal basin, and on dorsal horizontal plane not bisected by a longitudinal carinule; occipital carina

* *Hingstoniola* Turner & Waterston not included.

not a complete circle in extent, neither flanged nor foveolate. Pronotum generally ecarinate; mesonotum without transverse carinules anteriorly; mesopleura with prepectus sharply margined anteriorly but without a vertical carina before middle coxae; mesosternum rounded anteriorly; propodeum without lateral carinae. Fore trochanters slender, elongate. Males with middle tibiae usually with an apical calcar. (Holarctic forms) ..... *Tracheliodes* A. Morawitz

Eyes with inner orbits strongly convergent toward clypeus, the face narrow below, the antennal sockets contiguous to each other and to nearest lower inner orbit; front on anterior vertical aspect with a sharply marginate scapal basin, and on dorsal horizontal plane bisected by a longitudinal carinule; occipital carina a complete circle in extent and usually flanged and foveolate. Pronotum sharply transversely carinate. Mesonotum with a pair of transverse carinules anteriorly; mesopleura anteriorly on prepectus with a sharply carinate epicnemium which is continuous ventrally with a sharply margined mesosternum, and also with a sharp vertical carina before middle coxae; propodeum with well developed lateral carinae. Fore trochanters relatively short and normal. Males with middle tibiae lacking an apical calcar. (New World forms) ..... *Enoplolindenius* Rohwer

7 (5). Mesopleura with two epicnemia: a sharp and distinctly carinate one anteriorly on prepectus, and also a rather well developed one posteriorly on mesopleura to accommodate the middle legs. Dull, opaque, matt forms, with the first abdominal segment elongate, petiolate and usually strongly nodose at apex and separated from second segment by a strong constriction. (Ethiopian, Oriental, Australian, Eremian and Mediterranean forms) ..... *Dasyproctus* Lepeletier & Brullé

Mesopleura at most with only a sharply carinate epicnemium anteriorly on prepectus. More or less fulgid forms with the abdomen sessile or subsessile, seldom with the first segment elongate-petioliform and nodose at apex 8

8 (7). Mandibles more or less falcate, with the apices simple and acute. Males as well as females with a distinct pygidial area on last abdominal tergite, but never with a tibial shield on fore legs. Ocelli arranged in a curved line, a low or high isosceles or equilateral triangle 9

Mandibles with the apices bidentate, tridentate, or blunt and obliquely truncate (rarely simple, in which case the males have a tibial shield on on fore legs). Males generally without a distinct pygidial area on last abdominal tergite. Ocelli usually not arranged in a very flat triangle 16

9 (8). Mandibles entire beneath. Eyes naked. Mesopleura usually without a vertical carina before middle coxae 10

Mandibles with lower margins distinctly excised. Mesopleura sometimes with a vertical carina before middle coxae 14

10 (9). Mesopleura with a sharp and distinct vertical carina before middle coxae. Males without a pygidial area on last abdominal tergite 19

Mesopleura simple, without such carina before middle coxae. Males with a distinct pygidial area on last abdominal tergite 11

11 (10). Ocelli situated in a curved line or a very low and broad isosceles triangle; vertex without postocular tubercles. Hind wing with anal lobe longer than the short submedian cell. Abdomen sessile, the tergites with basal acarid chambers. (Holarctic and Oriental forms) ..... *Lindenius* Lepeletier & Brullé

Ocelli situated in a high equilateral triangle. Hind wing with anal lobe shorter than, or at most subequal in length to, the submedian cell.....12

12 (11). Abdominal tergites without basal acarid chambers. Both sexes with mandibles simple and acute at apex and with a pygidial area on last abdominal tergite. Vertex with distinct postocular tubercles 13

Abdominal tergites with basal acarid chambers. Only females with mandibles simple and acute at apex. Males without a pygidial area on last abdominal tergite. Vertex without postocular tubercles 19

13 (12). Abdomen sessile or subsessile, first segment never nodose at apex. Pronotum usually transversely carinate, the tubercles never attaining the tegulae. Temples with a vertical carina descending from postocular tubercles to hypostomal carinule or posterior articulation of mandibles. (Neotropical forms) .....*Quexua* Pate

Abdomen petiolate, the first segment nodose at apex. Pronotum ecarinate, the tubercles attaining the tegulae. Temples ecarinate. (Neotropical forms) [Type: *Amaripa thauma* new species] .....*Amaripa* new genus

14 (9). Eyes hairy; face usually broad below, the antennal sockets more or less well separated from each other. Fore wing with marginal cell elongate, two and a half to three times as long as wide; transverse cubital vein straight, oblique, inclivous; recurrent vein joining cubitus at or beyond the middle but not causing the latter to be appreciably angled backward. Hind wing with anal lobe generally longer than submedian cell. Mesopleura with or without a vertical carina before middle coxae. Abdominal tergites with basal acarid chambers. Females generally without a psammophore. (Cosmopolitan, except Australian Region).....
.....*Entomognathus* Dahlbom

Eyes naked (rarely very finely and sparsely puberulent), and without such combination of characters 15

15 (14). Fore wing with marginal cell very short, only about twice as long as wide; transverse cubital vein straight, oblique, inclivous, joining the radial vein before the middle of the marginal cell; recurrent vein joining cubitus distinctly before middle of latter and causing it to be appreciably angled backward; first discoidal cell rhomboidal. Hind wing with anal lobe subequal in length to, or shorter than submedian cell. Mesopleura without a vertical carina before middle coxae but with foveolate hypersternauli present. Face narrow below, the antennal sockets contiguous to each other and to nearest lower inner orbits. Abdominal tergites without basal acarid chambers. Females with a psammophore. Fulgid, finely punctate, Neotropical forms.....*Entomocrabro* Kohl

Fore wing with marginal cell elongate, two and a half to three times as long as wide; transverse cubital vein usually angulate medially, the upper (anterior) ordinate straight and perpendicular, the lower (posterior) ordinate oblique and inclivous, transverse cubital vein joining radius about middle of marginal cell; recurrent vein joining cubitus at or beyond the middle but not causing the latter to be appreciably angled backwards; first discoidal cell trapezoidal. Hind wing with anal lobe generally longer than submedian cell. Face broad below, the antennal sockets relatively remote from each other or from the nearest lower inner orbit. Abdominal tergites generally with basal acarid chambers. Females often with a psammophore. (Cosmopolitan, except Australian Region)
.....*Encopognathus* Kohl

16 (8). Fore wing with the recurrent vein received on the cubitus at or about the middle of the submarginal cell, the two abscissae of cubitus thus more or less subequal in length, the second abscissa at least distinctly longer

than the transverse cubital vein. Mesopleura usually without a vertical carina before middle coxae, though often with a sharp tubercle. Ocelli arranged in either a low isosceles or a high equilateral triangle. Antennae twelve-segmented in females and thirteen-segmented in males (rarely with but twelve segments but in such case males are furnished with a large tibial shield); antennal flagellum of males generally fringed beneath with hair 19

Fore wing with the recurrent vein received in outer third of submarginal cell, the second abscissa of cubitus thus much much shorter than the first abscissa and generally shorter than, or at most subequal in length to, the transverse cubital vein. Mesopleura generally with a vertical carina before middle coxae; mesopleura and propodeum usually distinctly, often coarsely punctured. Ocelli generally arranged in a low triangle. Antennae twelve-segmented in both sexes (except in *Neodasyproctus*); the flagellum of males rarely fringed beneath with hair..... 17

17 (16). Abdomen with first segment elongate-petioliform and more or less nodose at apex, twice to two and a half times as long as wide at apex and separated by a distinct constriction from remainder of abdomen. Occipital carina attaining posterior angles of the large campanulate oral fossa; clypeus with disc merely tumid, not keeled; antennae thirteen-segmented in males and twelve-segmented in females, the scapes ecarinate in both sexes; mandibular apices bidentate in males, tridentate in females, the inner margins edentate in both sexes. Propodeum short, gibbous, coarsely punctate throughout, and without trace of either a dorsal enclosure or lateral carinae. Males with an apical calcar on middle tibiae. Females with pygidial area broad, flat, trigonal. Fulgid South African forms with the head, thorax and propodeum coarsely punctate, the abdomen impunctate or at best very finely punctate..... *Neodasyproctus* Arnold

Abdomen sessile or subsessile, (rarely if ever with first segment petioliform, but in such case then without above combination of characters). Antennae twelve-segmented in both sexes..... 18

18 (17). Vertex with distinct supra-orbital foveae. Mesopleura very coarsely and deeply sculptured, the punctures not confluent; abdomen distinctly, often coarsely, punctate or sculptured. Males generally without an apical calcar on middle tibiae. (Widespread)..... *Lestica* Billberg

Vertex without or with very indistinct supra-orbital foveae. Mesopleura usually not coarsely punctate, but often horizontally striate; abdomen finely punctate or impunctate. Males generally with a distinct apical calcar on middle tibiae. (Cosmopolitan) ..... *Ectemnius* Dahlbom

19 (16). Mesopleura with a vertical, often foveate, carina before middle coxae. [10; 12] Antennal scapes usually carinate lengthwise 20

Mesopleura without a vertical carina before middle coxae, at most with a sharp tubercle there. Antennal scapes usually ecarinate 25

20 (19). Front with a concave, sharply and completely margined scapal sinus on anterior vertical aspect, and with dorsal horizontal plane bisected by a longitudinal carinule; occipital carina a complete circle in extent..... 24

Front without a concave, sharply marginate scapal sinus on anterior vertical aspect, and the dorsal horizontal plane not bisected by a carinule(or, if rarely, an incompletely margined scapal sinus and a very fine carinule bisecting dorsal face is present, then the occipital carina is not a complete circle in extent); occiptal carina either incomplete or a complete circle in extent 21

21 (20). Hind wings with the anal lobe but one-half, or at most two-thirds the

length of submedian cell. Occipital carina either a complete circle in extent or attaining the hypostomal carinule. Ocelli situated in a very low isosceles triangle 22

Hind wings with the anal lobe as long as or longer than the submedian cell. Occipital carina neither a complete circle in extent nor attaining the hypostomal carinule. Ocelli situated in a higher isosceles triangle..... 23

22 (21). Occipital carina attaining the posterior angles of hypostomal carinule; antennal scapes bicarinate lengthwise; males with mandibles falcate, simple and acuminate at apex; females with mandibles obliquely truncate at apex. Mesosternum and dorsal surface of pronotum rounded, ecarinate anteriorly; mesopleura perfulgid, with rather sparse puncturation and no trace of either mesopleurauli or hypersternauli. Fore wing with marginal cell squarely truncate at apex. (Neotropical forms) [Type: *Chimila paë* new species] ..... *Chimila* new genus

Occipital carina a complete circle in extent, strongly flanged, more or less foveolate, and on midventral line well separated from apex of hypostomal carinule; antennal scapes bicarinate lengthwise; females with mandibles bidentate at apex. Mesosternum and dorsal surface of pronotum sharply margined or carinate anteriorly; mesopleura fulgid, more or less impunctate, but strongly and horizontally costulate or striate, and with strong, well developed and usually foveolate mesopleurauli and hypersternauli. Fore wing with marginal cell obliquely truncate at apex. (Neotropical forms) [Type: *Paë paniquita* new species]..... *Paë* new genus

23 (21). Mesosternum and dorsal surface of pronotum sharply and transversely margined or carinate anteriorly. Abdomen maculated with yellow, the first segment perfectly sessile with second. Antennal scapes unicarinate; front with an incompletely margined scapal sinus on anterior vertical face and dorsal horizontal plane bisected by a very fine, almost imperceptible carinule. Females with mandibles tridentate at apjex, and pygidial area not bisected by a longitudinal carinule. (Neotropical forms) [Type: *Taruma bara* new species] ..... *Taruma* new genus

Mesosternum and dorsal surface of pronotum rounded, not sharply margined anteriorly. Abdomen immaculate black, the first segment strongly nodose at apex and separated from second by a strong constriction. Antennal scapes bicarinate lengthwise. Front without trace of a marginate scapal sinus, or carinule bisecting dorsal face. Females with mandibles bidentate at apex; the pygidial area bisected by a longitudinal carinule. (Oriental and Australian forms) [Type: *Piyuma koxinga* new species] ..... *Piyuma* new genus

24 (20). Mesopleura with well developed sternauli. Temples with a foveolate groove along posterior orbits. Upper margin of scapal sinus projecting forward in a thin, down-curved, laminate plate over apices of scapes which are carinate lengthwise. Males with middle tibiae but one-half length of femora and without an apical calcar. Females without a small, opaque, finely and closely punctate spot anteriolaterally on each side of second abdominal sternite. (Oriental forms) [Type: *Crabro spinifrons* Bingham, 1897] ..... *Vechtia* new genus

Mesopleura with sternauli absent, though indications of foveolate hypersternauli may be evident. Temples simple, without such down-curved laminate plate; scapes unicarinate lengthwise. Males with middle tibiae subequal in length to femora and with an apical calcar. Females with a small opaque, finely and closely punctate, oval or ovate spot anteriolaterally on each side. (Neotropical forms) ..... *Foxita* Pate

25 (19). Ocelli arranged in a high, more or less equilateral triangle. Propodeum usually finely sculptured; generally with a delicately sculptured, trigonal

or semicircular enclosure on dorsal face. Males with flagellum generally fringed beneath with hair. (Cosmopolitan) ..... *Crossocerus* Lepeletier & Brullé

Ocelli arranged in a curved line or low isosceles triangle. Propodeum coriaceous to clathrately areolate; dorsal face generally without a clearly defined enclosure. Females with a flat trigonal pygidial area. Males often with flagellum fringed beneath with hair, and fore tibiae with a large shield in some subgenera. (Holarctic and Neotropical forms) ..... *Pemphilis* Risso

ANACRABRO Packard

Anacrabro Packard, Proc. Ent. Soc. Philadelphia, VI, p. 67, (1866). [Type: *Anacrabro ocellatus* Packard, 1866.]

The sharply inflexed abdominal tergites and flat or concave abdominal venter cause *Anacrabro* to be the most distinctive and easily recognized genus of the Pemphilidine wasps.

Distribution.—This genus is confined wholly to the New World, and, although originally described and based upon a common and widespread Nearctic species, *A. ocellatus*, nevertheless *Anacrabro* is primarily an entity of the Neotropical Region where it is represented by half a dozen or more species. Several species, some of doubtful validity, have been described from Nearctic America.

Ethology.—The species of *Anacrabro* nest in dry or sandy soil. The females are generally provided with a well developed psammophore which they employ in the construction of their burrows. The cells are provisioned with Heteroptera, chiefly Mirids.

ENTOMOGNATHUS[22] Dahlbom

Entomognathus Dahlbom, Hymen. Europ., I, p. 295, (1844). [Type: *Crabro brevis* Van der Linden, 1829.]

The hairy eyes, and in addition the simple falcate mandibles excised on their lower margins and the presence of a distinct pygidial area in the males as well as the females, readily differentiates *Entomognathus* from all other Pemphilid genera. As here understood, the present complex is equivalent to the group which Kohl in 1915 defined as the "Artengruppe *Entomognathus*."[23]

Subgenera.—As in *Encopognathus*, the species comprising *Entomognathus* are divisible into several distinctive groups which may be accorded subgeneric rank. These are briefly characterized below, and will be more fully described and discussed in a forthcoming review of the genus.

KEY TO THE SUBGENERA OF ENTOMOGNATHUS

1. Mesopleura with well developed sternauli and a vertical carina before middle coxae; fore wing with marginal cell more or less obliquely truncate at apex; antennae with thirteen articles in males and twelve in females 2

22 The gender of *Entomognathus* is feminine, not masculine.
23 Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 310, (1915).

Mesopleura without sternauli or a vertical carina before middle coxae; fore wing with marginal cell more or less squarely truncate at apex, the costa not appreciably produced beyond apex; hind wing with anal lobe distinctly longer than submedian cell 3

2. Fore wing with costa distinctly produced beyond apex of marginal cell; hind wing with anal lobe distinctly shorter than submedian cell; eyes with posterior orbits not margined by a foveolate groove; pronotum ecarinate dorsally; (Oriental forms); [Type: *Entomognathus siraiya* new species] ..... *Koxinga* new subgenus

Fore wing with costa not produced beyond apex of marginal cell; hind wing with anal lobe distinctly longer than submedian cell; eyes with posterior orbits margined by a foveolate groove; pronotum generally with anterior dorsal margin transversely carinate or sharply margined; (South African forms); [Type: *Thyreopus (Entomognathus) apiformis* Arnold, 1926] ..... *Mashona* new subgenus

3. Antennae of both sexes twelve-segmented; abdominal tergites three to five or six with caudal margins more or less angulate medially; (New World forms); [Type: *Entomognathus texanus* Cresson, 1887 24] ..... *Toncahua* new subgenus

Antennae of males with thirteen, of females with twelve segments; abdominal tergites with caudal margins truncate, not angulate medially; (Old World forms) ..... *Entomognathus* Dahlbom

Distribution.—The genus *Entomognathus* is a moderate sized complex of about two dozen described species. Representatives of it occur in practically every major zoögeographic area of the world. No species are yet known from the Australian Region.

Ethology.—The species of *Entomognathus* are fossorial forms which excavate their burrows in sandy or clayey soil or in talus slopes. The nests are generally provisioned with Chrysomelid beetles, particularly those belonging to the tribe Halticini.

Entomognathus (Koxinga) siraiya[25] new species

The distinguishing features given for *Koxinga* in the foregoing key to subgenera will likewise serve at present to differentiate *siraiya* from the other described species of *Entomognathus*.

Type.—♂; Taihorinsho, Formosa. Elevation, about 100 metres. September 7, 1909.

Male.—6 mm. long. Fulgid black; the following stramineous: mandibles except red apices, clypeus, scape, pronotum dorsally to and including the tubercles, tegulae with two large spots, prepectus, axillae, scutellum, postscutellum, fore and middle coxae apically, hind coxae entirely, all trochanters, all femora apically, fore and middle tibiae entirely, hind tibiae with a broad streak lengthwise on anterior faces, all tarsi, and on abdominal tergites as follows: fourth with a narrow fascia, fifth and sixth almost entirely. Legs

24 Not to be confused with *Crabro texanus* Cresson, 1872, which is referable to the subgenus *Hypocrabro* of the genus *Ectemnius*.

25 After the Siraiya, a tribe of the Pepo group, who formerly inhabited the Kagi district in south-central Formosa.

exclusive of yellow maculation, and axillary sclerites, light brunneous. Abdominal venter and entire last segment, sordid badeous. Wings hyaline, iridescent; veins and stigma light brunneous.

Head fulgid; suborbicular, wider than high in anterior aspect; clypeus and lower front with a moderate vestiture of appressed silvery hair; upper front, vertex and temples with a thinner clothing of pubescence, that of vertex suberect and light aeneous. Eyes distinctly hairy; inner orbits narrowly separated below from antennal sockets, arcuately divergent above, posterior orbits not margined by a foveolate sulcus; front behind scapes shallowly concave, with a glabrous, nitidous subcircular area, bisected above by a faint impression running forward from the median ocellus and with fine, well separated, setigerous acupunctures. Vertex more sparsely punctate than front; ocelli in a curved line, the postocellar line subequal in length to the ocellocular distance, postocellar line bisected by a fine impression, a furrow running obliquely forward from each hind ocellus to upper inner orbits; temples ecarinate; occipital carina well developed, flanged, strongly foveolate, a complete circle in extent, tangent below to apex of hypostomal carinule. Antennae with scapes subcylindrical, ecarinate, three-fifths the vertical eye length; pedicel obterete, subequal in length to second flagellar article; flagellum simple, finely puberulent, first segment two-thirds length of second, ultimate article simple, terete, twice the length of penult segment; antennal sockets rather close to each other and to nearest lower inner orbit, antennocular line three-fifths the interantennal distance. Clypeus transversely subelliptical, median length three-eighths the vertical eye length; flat laterally, the disc strongly, ovally tumid, not bisected by a keel; the lobe medio-apically with a transverse, linear, subtruncate flange, broadly and shallowly retuse apically, and laterad and separated from this by a broad emargination with a sharp dentiform angle on each side. Mandibles falcate; apices acuminate; lower margins strongly excised medially; inner margin with a cleft obtuse dentiform angle medially.

Thorax perfulgid; dorsally with a thin vestiture of rather long, erect, subaeneous hair; pleura with more noticeable decumbent silvery hair; with a sparse, widely separated, fine setigerous acupuncturation throughout. Pronotum short, transverse; anterior dorsal margin broadly rounded, ecarinate; tubercles carinate anteriorly. Mesonotum simple; axillae moderate, the lateral edges broadly rounded, immarginate; scutellum flatly tumid, anterior margin with a deep efoveate furrow, immarginate laterally; postscutellum simple. Mesopleura anteriorly on prepectus with a very sharp margin which is continuous ventrally with the sharply margined anterior edge of mesosternum; episternal suture impressed, foveolate; mesopleural pit moderate; before middle coxae with a sharp vertical carina continuous below with the strong, subfoveate sternauli which are confluent anteriorly with the omauli; metapleura with fine, sparse, setigerous acupuncturation. Propodeum fulgid, very short; with a thin vestiture of short, erect, light hair; dorsal face transversely linear, medially with a row of about six rather small, subrectangular areoles, laterad of which on each side is a large subtrigonal enclosure punctate and somewhat irregularly rugulate within; posterior face truncate, vertical, sharply carinate

above, disc with a narrow, marginate, subcampanulate areole, more or less open and irregularly rugulate above, nitidous, glabrous, perfulgid within, acute and shortly stalked ventrally, lateral surfaces finely punctate; lateral carinae well developed throughout, simple below; lateral faces with fine, well separated, setigerous acupuncturation.

Fore and middle legs relatively simple; fore metatarsi moderately flattened. Middle tibiae with an apical calcar; not appreciably spinose on outer faces. Hind femora subfusiform; hind tibiae thickened and greatly enlarged toward apex, their outer faces with several rows of fine spinules; longer hind tibial calcar one-half the length of much thickened hind metatarsi which are longer than four distal segments combined.

Fore wing with marginal cell at least three times as long as wide, with costa distinctly produced beyond the obliquely truncate apex; radial vein with second abscissa four-fifths the length of first abscissa; transverse cubital vein straight, oblique, inclivous, subequal in length to second abscissa of cubitus which in turn is one-third the length of first cubital abscissa. Hind wing with anal lobe distinctly separated off, and four-fifths the length of submedian cell.

Abdomen fulgid; with a thin vestiture of decumbent hair; somewhat constricted between the segments; basal acarid chambers very well developed. Tergites and sternites with a uniform, moderately coarse, separated, setigerous puncturation throughout. First five tergites with a distinct translucent flange along truncate caudal margins; last tergite with a subquadrate, strongly margined pygidial area, the disc coarsely punctate, apical margin flatly rounded.

Allotype.—♀; Topotypical. Same data as type.

Female.—7 mm. long. Agrees with male (type) except as follows:

Livery much the same but abdomen bright ferruginous and without yellow maculation. Scutellar disc black.

Head the same but with shallow, rather poorly defined, broad sublunate supra-orbital foveae. Antennocular line three-eighths the interantennal distance. Clypeus with median length one-half the vertical eye length; laterad of apical flange with two small teeth on each side.

Fore tarsi without an appreciable pecten. Middle and hind tibiae spinulose on outer faces.

Abdomen in general the same. Pygidial area broad and equilaterally trigonal, apex narrowly rounded, disc flat, coarsely punctate and furnished with decumbent aeneous setulae.

This distinctive species is described from a series of males and females, all taken at Taihorinsho, Formosa. All agree with the typical pair in all essential features.

ENCOPOGNATHUS[26] Kohl

Encopognathus Kohl, Ann.k. k. Naturhist. Hofmus. Wien, XI, p. 486, (1896). [Type: *Crabro (Encopognathus) Braueri* Kohl, 1896.]

26 The gender of *Encopognathus* is feminine, not masculine as hitherto believed and recorded.

Rhectognathus Pate, Entom. News, XLVII, p. 147, (1936). [Type: *Encopognathus (Rhectognathus) pectinatus* Pate, 1936.]

Tsaisuma Pate, Lloydia, VI, p. 57, (1943). [Type: *Lindenius wenonah* Banks, 1921.]

Aryana Pate, Lloydia, VI, p. 68. (1943). [Type: *Encopognathus (Aryana) oxybeloides* Pate, 1943.]

The genus *Encopognathus* is a small relict complex divisible into four distinct subgenera: the Nearctic entities *Tsaisuma* Pate and *Rhectognathus* Pate, the Oriental *Aryana Pate,* and the nominate group which is confined to the Ethiopian Region. A review of the taxonomy, distribution and ethology of *Encopognathus* has been presented recently elsewhere.[27]

Distribution. — The genus *Encopognathus* has a wide but discontinuous distribution. Representatives of it are known from western North America, the Mediterranean region, India, and South Africa.

Ethology.—The species of *Encopognathus* are fossorial, myrmecotherous forms.

ENTOMOCRABRO Kohl

Entomocrabro Kohl, Verh. k. k. Zool.-Bot. Ges. Wien, LV, p. 356, (1905). [Type: *Crabro (Entomocrabro) Dukei* Kohl, 1905.]

The diagnostic characters of *Entomocrabro* have been presented in the foregoing analytical key to the genera. A review of this interesting little genus and its component forms has been recently published elsewhere.[28]

Distribution.—The genus *Entomocrabro* is a small complex confined wholly to the Neotropical Region, where it ranges throughout the Amazonian basin in Brazil and the intermontane region of central Peru to as far north as the central west coast area of Guatemala. Five species are known at present.

Ethology.—The biology of the group is unknown. However, inasmuch as the females are usually furnished with a rather well developed psammophore and in addition have a broad, flat, coarsely punctate, trigonal pygidial area, the species in all probability are fossorial forms.

Amaripa[29] new genus

The general habitus of *Amaripa* is very similar to that of *Euplilis,* but the sharply margined and epicnemiate prepectus, the simple falcate mandibles, and the different number of segments in the palpi readily separates the present entity from that genus.

The closest ally of *Amaripa* is the preceding Neogaeic entity *Entomocrabo* with which it agrees in the basic structure of the thorax, particularly the mesopleura, the simple falcate mandibles, and the main venational fea-

27 *Cf.:* Pate: On the Taxonomy of the genus *Encopognathus.* Lloydia, VI, pp. 53-76, (1943).

28 *Cf.* Pate: A Review of the genus *Entomocrabro.* Rev. Entom. (Rio de Janeiro), XII, pp. 45-61, (1941).

29 After the Amaripa Indians of British Guiana.

tures of the fore and hind wings. Moreover, like *Entomocrabro*, the present genus lacks basal acarid chambers on the abdominal tergites. But the petiolate abdomen, the non-emarginate inferior mandibular margins, the much longer marginal cell of the fore wing, and the absence of supra-orbital foveae on the vertex, readily differentiate *Amaripa* from *Entomocrabro*.[28] Finally, the present genus is unique in the Pemphilidine wasps in that the pronotal tubercles attain the tegulae.

Generic Characters. — Small, at most finely punctate, perfulgid forms. Head subquadrate in anterior aspect, transversely subrectangular in dorsal aspect. Eyes large, apparently naked,[30] much more coarsely facetted anteriorly than posteriorly; inner orbits arcuate anteriorly and below to strongly divergent above; malar space wanting. Front below between inner orbits narrow, shallowly concave, but without a concave marginate scapal sinus; bisected above by a strong furrow running forward from anterior ocellus. Vertex flat; supra-orbital foveae absent; ocelli large, their diameter subequal in length to postocellar line, arranged in an equilateral triangle, the postocellar line much shorter than the ocellocular distance; a sharp tubercle behind each compound eye; temples moderate, simple, ecarinate; occipital carina distinct but not strongly flanged nor a complete circle in extent, nor attaining the hypostomal carinule. Antennae twelve-segmented in females; situated low on face on dorsal margin of clypeus, the sockets contiguous to each other and to nearest lower inner orbit; scapes cylindrical, ecarinate, slightly bowed, more than half the vertical eye length; pedicel cylindrical elongate, longer than either first or second flagellar articles; flagellum simple. Clypeus short, transverse, usually with a short produced lobe medioapically, the disc not keeled. Maxillary palpi with six, labial palpi with four segments. Mandibles subfalcate; apices simple, acuminate; lower margins entire; inner margins with a cleft obtuse prominence on basal half. Females without a distinct psammophore.

Thorax with pronotum situated slightly below level of the lightly arched mesonotum, and rounded, not transversely carinate anteriorly, the lateral angles rounded, the tubercles flat and attaining the tegulae. Mesonotum ecarinate, but may be otherwise variously modified; axillae prominent, with lateral margins sharply reflexed upward into laminate plates; scutellum and postscutellum relatively simple. Mesopleura anteriorly with a sharply margined epicnemium; both episternal suture and hypersternauli present, distinct and strongly foveolate; episternauli, mesopleurauli and sternauli absent; mesopleural pit large and distinct; simple, neither carinate nor tuberculate before middle coxae. Mesosternum rounded, not transversely carinate anteriorly. Propodeum with dorsal face more or less areolate; lateral carinae present and well developed, bifurcate ventrally.

Legs relatively simple; fore tarsi not flattened in females. Pulvilli very small and inconspicuous; claws very slender, elongate, and almost straight, subchelate.

Fore wing with the marginal cell three times as long as wide, broadly

30 Very finely and sparsely puberulent under a magnification of 120 diameters.

truncate at apex and with a large trigonal, though indistinct, appendiculate cell; radial vein with the first abscissa four-sevenths (.572) the length of second abscissa; transverse cubital vein straight, oblique, inclivous, one-third the length of second abscissa of cubitus; submarginal cell irregularly subhexagonal, the cubitus distinctly angled backward at point of reception of the arcuate recurrent vein; cubitus with first abscissa three-fifths the length of second abscissa; first discoidal cell small, irregularly rhomboidal. Hind wing with anal lobe large and slightly longer than the submedian cell.

Abdomen petiolate, the first segment nodose at apex and separated from the first segment by a distinct constriction; remainder of abdomen fusiform. Tergites without basal acarid chambers and finely punctate at most; ultimate tergite of females with a broad, flat trigonal pygidial area.

GENOTYPE: *Amaripa thauma* new species.

Amaripa thauma[31] new species

The curiously formed mesonotum and axillae, and the bristly legs readily differentiate this peculiar little species from all of its allies in the Neotropical Region.

Type.—♀; Moraballi Creek, Essequibo River, British Guiana. September 19, 1929. (Oxford University Expedition.) [British Museum (Natural History).]

Female.—4.25 mm. long. Black; the following flavofulvous: trophi, palpi, mandibles except red apices, clypeal disc, antennal pedicel and scapes; pronotal tubercles, tegulae and axillary sclerites, fore legs entirely, middle legs distad of coxae, hind coxae, trochanters and base and apex of femora and base of tibiae. The following castaneous: basal third of third abdominal tergite, abdominal venter, entire last abdominal segment, middle coxae, hind femora except base and apex, hind tibiae largely, and hind tarsi entirely. Wings clear hyaline, iridescent; stigma and veins dark castaneous.

Head perfulgid; clypeus, except glabrous disc, with long appressed sericeous silvery pubescence; temples with a thin vestiture of long appressed lanate silvery hair. Front on lower vertical aspect between inner orbits narrow, perfulgid, glabrous, nitidous, shallowly concave, simple and unarmed, without a marginate scapal sinus but traversed by fine parallel horizontal rugulae; upper portion of front and vertex perfulgid, glabrous, nitidous, bisected anteriorly by a strong longitudinal impression running forward from anterior ocellus, upper inner orbits paralleled by a row of long erect, convergent, bristle-like setae (like the outer vertical bristles of Muscoidean flies); supraorbital foveae absent but a large poorly defined circular depression near each hind ocellus between them and the nearest upper inner orbit; ocelli rather large, arranged in an equilateral triangle, the postocellar line four-ninths (.45) the ocellocular distance; a short longitudinal furrow bisecting the postocellar

31 From *thauma*, a wonder or marvel; in allusion to the unusual habitus of the species.

line; a sharp tubercle, which is concave at tip, just behind each compound eye; a transverse row of erect bristle-like setae between the postocular tubercles; temples perfulgid, with scattered setigerous acupuncturation, and a short impression running dorsad from posterior mandibular condyles, otherwise simple and ecarinate; occipital carina sharp, distinct, finely foveate anteriorly, but neither flanged, a complete circle in extent, nor attaining the hypostomal carinule. Antennae elongate; scapes cylindrical, slightly bowed, ecarinate, about seven-tenths (.727) the vertical eye length; pedicel cylindrical, elongate one and three-fourths the length of first flagellar article; flagellum simple, finely puberulent, first two segments subequal in length, ultimate article simple, terete, twice the length of penult segment. Clypeus short, transverse, median length about one-fourth (.272) the vertical eye length, with a strongly tumid to subtuberculate, glabrous and nitidous disc, laterad of which on each side the surface is strongly concave, produced medio-apically into a short, broad truncate lobe. Mandibles falcate, the outer faces with long, suberect, bristle-like setulae; lower margins entire; apices simple, acuminate; inner margins on basal half with an obtuse prominence cleft medially. No psammophore present.

Thorax more or less perfulgid; pronotum situated somewhat below level of mesonotum; with a moderately heavy vestiture of lanate decumbent silvery pubescence; dorsal face ecarinate anteriorly; lateral angles rounded; pronotal tubercles flat, attaining the tegulae. Mesonotum gently arched, anteriorly and laterally with a thin vestiture of long, appressed, silvery hair, the disc perfulgid and with a few scattered, erect, long, setulae, bisected on anterior half by a longitudinal welt, laterad of which on each side is a deep, elongate subcuneate fovea, hind angles just in front of axillae produced into a thick, conical, backward projecting, spinoid tubercle; axillae with a rather heavy vestiture of appressed to erect long silvery hair, lateral margins strongly reflexed upward to form a thin, translucent, incurved laminate plate; scutellum perfulgid, laterally with a thin vestiture of long decumbent silvery hair, very sparsely acupunctate, the anterior margin efoveate, but anterior half with a wide, deep, concave, transverse trough, the posterior half strongly tumid; postscutellum flat, simple, finely puberulent. Mesopleura on prepectus and anterior face with appressed, silvery lanate hair, remainder perfulgid, nitidous and glabrous; prepectus anteriorly with a sharply margined epicnemium; somewhat inflated behind the strongly impressed and foveate episternal suture; mesopleural pit large, distinct; posterior margin simple, efoveate; hypersternauli well developed for entire length and strongly foveate; episternauli and sternauli both absent; simple, neither carinate nor tuberculate before middle coxae. Metapleura glabrous, nitidous, hind margin coarsely foveate. Mesosternum with a thin vestiture of appressed silvery pubescence, and rounded, not transversely carinate anteriorly. Propodeum with a moderate vestiture of suberect, silvery hair on posterior face, otherwise glabrous and perfulgid; dorsal face discally with a large trapeziform area delimited by carinae and divided into three areoles: the median one large and suborcate, the lateral ones elongate subrectangular, the lateral areas of dorsal face traversed by a few indistinct irregular regulae; posterior face separated from dorsal face by a transverse, curved,

multiangulate carinule, and bisected by a deep, immarginate, vertical furrow, laterad of which the surface is finely acupunctate; lateral carinae strong, well developed for entire length, and bifurcate below; lateral faces glabrous, nitidous.

Legs relatively simple. Femora with a few elongate setae. Tibiae and tarsi with a rather heavy vestiture of long, decumbent to suberect white hair and bristle-like setulae. Fore and middle tibiae with a strong bristle, subequal in length to metatarsi, just behind the apical calcar. Hind tibiae with two aciculate calcaria, the longer one-half the length of hind metatarsi. Fore tarsi very hairy but without a distinct pecten. Pulvilli very small, inconspicuous. Claws simple, slender, almost straight, elongate, and subchelate.

Abdomen perfulgid; petiolate, the first segment slender, twice as long as wide at apex, distinctly nodose at apex and separated there by a strong constriction remainder of fusiform abdomen which has a very sparse vestiture of short decumbent aeneous setulae which are longer, suberect to erect along apical margins of segments. Tergites without basal acarid chambers; with sparse and scattered, fine setigerous acupuncturation; ultimate tergite with a broad flat trigonal pygidial area which is glabrous, nitidous and perfulgid. Sternites subglabrous, subnitidous.

This curious and interesting little form of the tropical Guianan forest is known only from the unique female described above.

LINDENIUS Lepeletier & Brullé

Lindenius Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 791, (1835). [Type: *Crabro albilabris* Fabricius, 1793.]

Chalcolamprus Wesmael, Bull. Acad. R. Sci. Belg., XIX, p. 590, (1852). [Type: *Crabro albilabris* Fabricius, 1793. Isogenotypic with *Lindenius* Lepeletier & Brullé 1835.]

Trachelosimus A. Morawitz, Bull. Acad. Sci. St. Petersbourg, IX, p. 249, (1866). [Type: *Crabro armatus* Van der Linden, 1829.]

The genus *Lindenius* as here understood, is equivalent to the group which Kohl defined in 1915 as the "Artengruppe *Lindenius*."[32] The complex is a relatively compact entity, although *Trachelosimus* of Morawitz seems to form a distinct phyletic unit within it and may eventually be recognized as a valid subgenus.

Distribution.—The genus *Lindenius* is primarily Holarctic in distribution, poorly represented in the Orient, and apparently absent from the Neotropical, Australian and Ethiopian Regions.

Ethology.—The species of *Lindenius* nest in sandy ground and provision their burrows chiefly with small Diptera (Chloropidae, Dolichopodidae, Simuliidae, Trypetidae, etc.), and Heteroptera (Miridae). One species (*Lindenius armatus*) is reported to store its nests with small parasitic Hymenoptera (Chalcididae: *Pteromalus;* and Braconidae: *Apanteles*).

32 Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 272, (1915).

TRACHELIODES A. Morawitz

Brachymerus Dahlbom, Hymen. Europ., I, p. 525, (1845). [*Nec* Chevrolat, 1841.] [Type: *Crabro (Crossocerus) curvitarsus* Herrich-Schaeffer, 1840.]

Tracheliodes A. Morawitz, Bull. Acad. Sci. St. Petersbourg, IX, p. 249, (1866). [Type: *Crabro (Crossocerus) curvitarsus* Herrich-Schaeffer, 1840.]

Fertonius Pérez [in Ferton], Act. Soc. Linn. Bordeaux, XLIV, p. 341, (1892). [Type: *Crabro 5-notatus* Jurine, 1807.]

The broad face, with the inner orbits subparallel and not strongly convergent below as in most of the other genera of this complex, and the six-segmented maxillary and three-segmented labial palpi distinguish *Tracheliodes* from all other members of the Pemphilid wasps. A monograph of the genus has been presented recently elsewhere.[33]

Distribtuion.—The genus *Tracheliodes* is a small relict entity confined for the most part to the Holarctic Region, with a few species in Assam, Burma and eastern China. The range of the various species is apparently closely correlated with those of the ants upon which the wasps prey.

Ethology.—The species of *Tracheliodes* either excavate their burrows in the soil or utilize abandoned holes made in trees by wood-boring beetles. The nests are stored with worker ants of the Dolichoderine genera *Liometopum* or *Tapinoma*.

PEMPHILIS Risso

Crabro Fabricius, Syst. Entom., (Char. Gen., p. 12), p. 373, (1775). [*Nec* Geoffroy, 1762.] [Type: *Vespa cribaria* Linnaeus, 1758. Isogenotypic with *Pemphilis* Risso, 1826, *q. v.*]

Pemphilis Risso, Hist. Nat. Europ. Merid., V, p. 227, (1826). [Type: *Vespa cribaria* Linnaeus, 1758.]

Thyreopus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 751, (1835). [Type: *Vespa cribaria* Linnaeus, 1758. Isogenotypic with *Pemphilis* Risso, 1826, *q. v.*]

Anothyreus Dahlbom, Hymen. Europ., I, pp. 519 & 526, (1845). [Type: *Crabro lapponicus* Zetterstedt, 1838.]

Thyreocnemus A. Costa, Ann. Mus. Zool. Napoli, VI, p. 64, (1871). [Type: *Thyreocnemus pugillator* A. Costa, 1871.]

Paranothyreus Kohl, Ann. k. k. Naturhist. Hofmus. Wien, XI, p. 490, (1896). [Type: *Crabro hilaris* F. Smith, 1856.]

Synothyreopus Ashmead, Canad. Entom., XXXI, p. 213, (1899). [Type: *Crabro tumidus* Packard, 1867.]

Dyscolocrabro Kohl, Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 138, (1915). [Type: *Crabro (Thyreopus Dyscolocrabro) chalybeus* Kohl, 1915.]

Agnosicrabro Kohl, Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 138, (1915). [Type: *Crabro occultus* Fabricius, 1805.]

Hemithyreopus Kohl, Ann. k. k. Naturhist. Hofmus. Wien XXIX, p. 138, (1915). [Type: *Crabro (Ceratocolus) Loewi* Dahlbom, 1845.]

Parathyreopus Kohl, Ann. k. k. Naturhist. Hofmus. Wien. XXIX, p. 138, (1915). [Type: *Crabro filiformis* Radoszkowski, 1877.]

This is the nominate genus of the present large complex of the Sphecoid

33 *Cf.*: Pate: A Review of the myrmecotherous genus *Tracheliodes*. Lloydia (Cincinnati), V. pp. 222-244, ill., (1942).

wasps. Most authors have employed Lepeletier and Brullé's name *Thyreopus* for it, a few have used *Crabro* Fabricius, but, as explained below, *Pemphilis* Risso is adopted here.

The genus *Pemphilis* is practically identical with the group which Kohl in 1915 defined as the "Artengruppe *Thyreopus*."[34] About seventy species are referable to *Pemphilis* which is divisible into at least nine distinct subgenera: *Pemphilis* in the restricted sense, of which *Crabro* Fabricius and *Thyreopus* Lepeletier & Brullé are absolute synonyms; *Synothyreopus* Ashmead; *Parathyreopus* Kohl; *Thyreocnemus* A. Costa; *Anothyreus* Dahlbom; *Paranothyreus* Kohl; *Agnosicrabro* Kohl; *Hemithyreopus* Kohl; and *Dyscolocrabro* Kohl.

Distribution.—The present genus is primarily Holarctic in distribution, although a few species occur in the northern portion of the Neotropical Region. Apparently there are no representatives of *Pemphilis* in the Ethiopian, Oriental or Australian faunas.

Ethology.—The species of *Pemphilis* nest in dry or sandy soil, or rotten wood if sufficiently soft, and provision their nests with a variety of Diptera.

Nomenclatorial Notes.—In 1775 Fabricius established the genus *Crabro*[35] for a somewhat miscellaneous assortment of thirteen species. As a consequence of the designation by Latreille,[36] and various subsequent authors as well, of *Vespa cribaria* Linnaeus, 1758, as genotype, the name *Crabro* has been associated with some entity of the present group of Sphecoid wasps for well over a century and half. Fabricius' use of the name *Crabro,* however, was considerably antedated by Geoffroy who first employed it for the sawfly customarily known as *Cimbex.*[37] Though Fabricius eventually, and subsequent authors likewise, were aware of Geoffroy's name, they chose to ignore it, save in bibliographic citations. Indeed, it was not until Bradley in 1919 published his excellent critique[38] of Morice and Durrant's scholarly exposition of the "Erlangen List"[39] that Geoffroy's name was brought forcibly to the attention of modern hymenopterists. As Bradley pointed out, Geoffroy's usage of *Crabro,* though not binomial, was binary:[40] the generic name was uninomial and must therefore under the zoölogical code be accepted. Thus since *Crabro* Fabricius, 1775, is a homonym of *Crabro* Geoffroy, 1762, it is invalid, and, save as a matter of bibliographic record, is of no further consequence in the present group.

The next generic name proposed in the present group was *Lestica* Billberg, 1820.[41] This, as a result of Rohwer's designating *Crabro subterraneus* Fabri-

34 Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 133, (1915).
35 Fabricius: Syst. Entom., pp. 12 & 373, (1775).
36 Latreille: Consid. Gener., Tabl. Method., p. 438, (1810).
37 Geoffroy: Hist. abr. Insect., II, p. 261, (1762).
38 Bradley: Trans. Ent. Soc. London, pp. 50-75, (1919).
39 Morice & Durrant: Trans. Ent. Soc. London, pp. 339-436, (1915). *V. et.:* Idem, pp. 432-442, (1917).
40 Bradley: Trans. Ent. Soc. London, p. 66, (1919).
41 Billberg: Enumerat. Insect., p. 107, (1820).

cius, 1775 as genotype,[42] is now applicable to the section of this general complex which has hitherto gone under the name *Ceratocolus* Lepeletier & Brullé, 1835. But inasmuch as I now believe these wasps comprehend a number of discrete genera, Billberg's name is of no further import at the present juncture. Nevertheless, it must be borne in mind by those who opine these wasps comprise but a single large genus, that Billberg's name *Lestica* must be used for it, and furthermore, that the supra-generic groups in turn be called the Lesticini and Lesticinae.

The next generic names to appear in this assemblage were Risso's *Pemphilis* and *Euplilis*,[43] both of which were published in 1826. The first of these I demonstrated in 1935 is an absolute synonym of *Crabro* Fabricius, 1775,[44] and since Fabricius' name is a homonym of Geoffroy's earlier *Crabro*, the type genus of the present complex must henceforth be known as *Pemphilis* Risso. In 1935 I merely called attention to this situation and left it to the judgment of my fellow workers what course they might choose to follow. Two years later when I published my paper on the types of the Sphecoid generic names,[45] I still hesitated to make such a radical change. Now, however, I see no alternative but to do so and hereafter will use *Pemphilis* Risso, 1826 and Pemphilidini in the sense of *Crabro* Fabricius, 1775 and Crabronini, for the reasons set forth below.

For well over a century *Crabro* in the sense of Fabricius has been used in this complex of the Sphecoid wasps, but if Geoffroy's name is adopted, then the name is transferred from the Aculeates to the sawfly group which for an equally long period has been known as *Cimbex*. As a result of certain representations brought before them, the International Commission on Zoölogical Nomenclature, meeting at Lisbon in 1935 during the Twelfth International Zoölogical Congress, decided to suppress *Crabro* Geoffroy, 1762, and validate *Crabro* Fabricius, 1775 for the wasps, and *Cimbex* Olivier, 1790, for the sawfly genus, by placing both on the Official List of Generic Names.[46] But their action was ineffectual on at least two scores: first, the published attempt to do so was illegal and not in conformance with the Rules of Nomenclature which stipulate that intent to conserve or change a name must be published at least one year prior to such action; and secondly, it has since been shown by Ross[47] that the name *Clavellarius* Olivier, 1789 has priority over *Cimbex* Olivier, 1790, thus automatically removing both *Crabro* and *Cimbex* from the List. Thus to save these names, in what is purported to be their generally accustomed senses, will require one, if not several more petitions, decisions, and "opinions." Indeed, pleas ot such an effect are, I believe, either now before, or in process of being formulated for presentation to the Commis-

42 Rohwer: Psyche, XVIII, p. 154, (1911).

43 Risso: Hist. nat. Europ. merid., V, p. 227, (1826).

44 Pate: Ent. News, XLVI, pp. 245-246, (1935).

45 Pate: The Generic Names of the Sphecoid Wasps and their type species. Mem. Amer. Ent. Soc., no. 9, pp. 1-103, (1937).

46 C. R. XII Congr. Internat. Zool. (Lisbon, 1935), I, pp. 191-193, (1936).

47 Ross: Illinois Biol. Monograph., XV, no. 2, pp. 59-60, (1937).

sion.[48] But these petitions are merely futile temporal expedients. Moreover, as so frequently happens in such cases, they are made by powerful but quite unrepresentative provincial lobbyist groups whose knowledge and comprehension of the situation is lamentably inadequate. I do not believe in nomina conservanda, save perhaps in very exceptional or extraordinary circumstances. And certainly the case of *Crabro* Fabricius cannot be considered to fall in either of those categories. For there is little agreement in the literature in the application of *Crabro* to any particular group of these wasps: indeed, Lepeletier and Brullé's name *Thyreopus* is in far more common and constant use, and if a conservandum is presumably in order, it would be far more logical to make it for that name.

In adopting the course I now propose to follow, I fully realize I shall be subject to much criticism. But I am merely trying to do what my predecessors should have done long ago; what my contemporaries apparently now lack the courage to do: and that is to face the music instead of ruining another hundred and fifty or more years of literature by blindly accepting inaccurate statements and fiat decisions based too often upon incomplete research, as well as specious reasoning and an inadequate comprehension of the facts and fundamental principles involved.

EUPLILIS Risso

Euplilis Risso, Hist. Nat. Europ. Merid., V, p. 227, (1826). [Type: *Sphex clavipes* Linnaeus, 1758. Isogenotypic with *Rhopalum* Kirby, 1829, *Physoscelus* Lepeletier & Brullé, 1835, and *Physoscelis* Westwood, 1839, *q. v.*]

Rhopalum Kirby [in Stephens], Nomen. Brit. Insect, p. 34, (1829). [Type: *Sphex clavipes* Linnaeus, 1758.]

Corynopus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 802, (1835). [Type: *Sphex coarctata* Scopoli, 1763. Isogenotypic with *Dryphus* Herrich-Schaeffer, 1840, *q. v.*]

Physoscelus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 804, (1835). [Type: *Sphex clavipes* Linnaeus, 1758.]

Physoscelis Westwood, Introd. Mod. Class. Insects, II, Synops. Gener., p. 80, (June, 1839). [Type: *Sphex clavipes* Linnaeus, 1758.]

Dryphus (?) Herrich-Schaeffer, Nomencl. Ent., Zw. Hft., p. 123, (1840). [Type: *Sphex coarctata* Scopoli, 1763.]

Alliognathus Ashmead, Canad. Entom., XXXI, p. 219, (1899). [Type: *Crabro occidentalis* Fox, 1895.]

Three genera, *Euplilis*, *Podagritus* and *Moniaecera*, are differentiated from all other Pemphilid wasps by their three-segmented labial and five-segmented maxillary palpi, and their slender, elongate, petiolate abdomens. Hitherto all the forms possessing this distinctive combination of features were generally assigned to *Rhopalum*, i.e. *Euplilis*, but, as indicated in the foregoing analytical table to the genera, there is ample justification for considering *Podagritus* and *Moniacera* discrete generic entities.

The genus *Euplilis* is divisible into three subgenera: *Euplilis* in the

48 *Cf.*: The Generic Names of British Insects. Pt. 5: The Generic Names of the British Hymenoptera Aculeata, . . . prepared by O. W. Richards. (1937).

restricted sense, of which *Rhopalum, Physoscelus* and *Physoscelis* are absolute synonyms; *Corynopus* Lepeletier & Brullé, with its recently discovered synonym *Dryphus* Herrich-Schaeffer; and *Alliognathus* Ashmead.

Distribution.—The present genus is a moderate sized complex of small forms, with representatives in all the major zoögeographic areas of the world.

Ethology.—The species of *Euplilis* are primarily rubicolous, nesting in brambles such as raspberry canes, or in the stems of currants, mallows and elder. Often, however, they construct their galleries in the rotten wood of logs and old stumps, and on occasion utilize pre-existing cavities like the abandoned holes of wood-boring beetles, cracks and crannies in old walls, or even the interior of straws for their nests. They provision their cells with small Diptera (Chironomidae, Mycetophilidae, Cecidomyidae, Chloropidae, etc.), Psocids or aphids.

MONIAECERA Ashmead

Moniaecera Ashmead, Canad. Entom., XXXI, p. 220, (1899). [Type: *Crabro abdominalis* Fox, 1895.]

The generic validity of *Moniaecera* has remaining unrecognized ever since Ashmead established it in 1899. However, as indicated in the key to genera, there are congeries of characters which entitle it to generic rank.

Distribution.—The genus *Moniaecera* is a small group of half a dozen or more species, confined largely if not wholly to Sonoran Nearctic America (Georgia to California), with its epicentre apparently in the southwestern United States.

Ethology.—According to Hartman,[49] *Moniaecera abdominale* constructs its burrows in sandy soil and provisions them with the Cicadellid *Kolla bifida* (Say).

PODAGRITUS Spinola

Podagritus Spinola [in Gay], Hist. fis. pol. Chile, Zool., VI, p. 353, (1851). [Type: *Podagritus Gayi* Spinola, 1851.]

The present group has usually been treated as a synonym, or at most but a subgenus of *Rhopalum*, i.e. *Euplilis*, but *Podagritus* is indubitably entitled to generic rank. The salient characteristics of *Podagritus* have been presented in the key to genera on a preceding page.

Subgenera.—The Neotropical species of *Podagritus* for the most part have the occipital carina more or less of a complete circle in extent, and the mesopleura with a sharply carinate epicnemium anteriorly on the prepectus. Moreover, the anterior portion of the lateral propodeal faces are furnished with another epicnemium for the reception of the hind legs; this propodeal epicnemium is usually delimited posteriorly by a more or less sharp keel or carina which descends obliquely from the propodeal spiracle. Furthermore,

49 Bull. Univ. Texas, no. 65, Sci. Ser. no. 6, p. 43, (July, 1905).

the marginal cell of the fore wing is generally obliquely truncate apically, and the mandibles are usually very indistinctly bidentate at apex.

Conversely, the Australian forms — incorrectly assigned hitherto to *Rhopalum,* i.e. *Euplilis* — have the prepectal epicnemium merely angulate, not sharply carinate anteriorly as in the Chilean species, and moreover show no trace of propodeal epicnemia. In addition, the occipital carina is quite incomplete, the mandibles are distinctly bidentate at apex, and the marginal cell of the fore wing is usually squarely truncate at apex. The Australian species evidently represent the more generalized stock of *Podagritus* and, when a revisional study of all the component forms is made, may prove separable as a distinct subgenus to which the name *Echuca* may be applied (Type: *Crabro tricolor* Smith, 1856).

Distribution.—The genus *Podagritus* is present in Australia and in the Neogaeic Realm, being particularly well developed in the Chilean province of the latter region.

Ethology. — The Chilean species of *Podagritus,* according to Claude-Joseph,[50] nest in dry or sandy soil and provision their burrows with various Diptera.

QUEXUA Pate

Quexua Pate, Rev. Entom. (Rio de Janeiro), XIII, p. 55, (1942). [Type: *Quexua (Quexua) cashibo* Pate, 1942.]

Arecuna Pate, Rev. Entom. (Rio de Janeiro), XIII, p. 58, (1942). [Type: *Quexua (Arecuna) essequibo* Pate, 1942.]

This distinctive little tropical American entity, which is divisible into two well marked subgenera: *Arecuna* and *Quexua,* has been recently described and reviewed elsewhere.[51]

Distribution.—The five known species of *Quexua* are confined to the tropical forest areas of the New World. The epicentre is apparently in the Amazonian basin of South America.

CROSSOCERUS Lepeletier & Brullé

Crossocerus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 763, (1835). [Type: *Sphex palmipes* Linnaeus, 1767.]

Blepharipus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 728, (1835). [Type: *Blepharipus nigrita* Lepeletier & Brullé, 1835.]

Cuphopterus A. Morawitz, Bull. Acad. Sci. St. Petersbourg, IX, p. 252, (1866). [Type: *Crabro (Blepharipus) monstrosus* Herrich-Schaeffer (in Dahlbom)].

Coelocrabro Thomson, Hymen. Scandinav., III, pp. 262, 264, (1874). [Type: *Crabro pubescens* Shuckard, 1837 (=? *Blepharipus nigrita* Lepeletier & Brullé, 1835).]

Hoplocrabro Thomson, Hymen. Scandinav., III, pp. 262, 277, (1874). [Type: *Crabro 4-maculatus* Fabricius, 1793.]

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50 Ann. Sci. Nat., Zool., (10), XI, pp. 69-77, (1928).

51 *Cf.:* Pate: On *Quexua,* a new genus of Pemphilidine Wasps from Tropical America. Rev. Entom. (Rio de Janeiro), XIII, pp. 54-75, (1942).

Epicrossocerus Ashmead, Canad. Entom., XXXI, p. 215, (1899). [Type: *Crabro insolens*, Fox, 1895.]

Stenocrabro Ashmead, Canad. Entom., XXXI, p. 216, (1899). [Type: *Crabro planipes* Fox, 1895.]

Dolichocrabro Ashmead, Canad. Entom., XXXI, p. 216, (1899). [Type: *Dolichocrabro Wickhamii* Ashmead, 1902.]

Synorhopalum Ashmead, Canad. Entom., XXXI, p. 218, (1899). [Type: *Crabro decorus* Fox, 1895.]

?Ischnolynthus Holmberg, An. Mus. Nac. Hist. Nat. Buenos Aires, (3), II, p. 472, (1902). [Type: *Ischnolynthus foveolatus* Holmberg, 1902.]

Ablepharipus Perkins, Trans. Ent. Soc. London, p. 390, (1913). [Type: *Crabro podagricus* Van der Linden, 1829.]

Acanthocrabro Perkins, Trans. Ent. Soc. London, p. 391, (1913). [Type: *Crabro vagabundus* Panzer, 1798.]

Yuchiha Pate, Lloydia, VI, p. 272 (1944). [Type: *Crossocerus (Yuchiha) xanthochilos* Pate, 1944.]

Apocrabro Pate, Lloydia, VI, p. 282 (1944). [Type: *Crossocerus (Apocrabro) aëla* Pate, 1944.]

Nothocrabro Pate, Lloydia, VI, p. 314 (1944). [Type: *Crabro nitidiventris* Fox, 1895.]

Stictoptila Pate, Lloydia, VI, p. 315 (1944). [Type: *Crabro confertus* Fox, 1895.]

The genus *Crossocerus* is rivalled in size and complexity in the Pemphilid wasps only by *Ectemnius*. The hundred or more species which comprise *Crossocerus* are extremely diverse in their structural features. Sixteen names have been proposed for entities for their reception, and of these the following dozen may be recognized as discrete and valid subgenera: *Crossocerus* in the restricted sense, of which *Stenocrabro* Ashmead may be considered a subordinate section; *Blepharipus* Lepeletier & Brullé, of which *Coelocrabro* is an absolute synonym; *Cuphopterus* Morawitz; *Hoplocrabro* Thompson; *Epicrossocerus* Ashmead; *Synorhopalum* Ashmead; *Ablepharipus* Perkins; *Acanthocrabro* Perkins; *Yuchicha* Pate; *Apocrabro* Pate; *Nothocrabro* Pate; and *Stictoptila* Pate. All these subgeneric entities of *Crossocerus* have been recently defined and reviewed.[52] As here understood, the genus *Crossocerus* is approximately equivalent to Kohl's "Artengruppe *Crossocerus*."[53]

Distribution.—The genus *Crossocerus* is predominantly Holarctic in distribution, but various subgenera have representatives in the Neotropical, Oriental and Ethiopian Regions. Turner has incorrectly referred a number of Australian species to this genus. So far as is known, no forms occur in the latter region.

Ethology.—The species of *Crossocerus* are either terricolous or xylicolous. Diptera are the usual prey of the majority of the species, but some forms provision their nests with Hemiptera, and a few occasionally resort to caddis flies, small moths, or even mayflies or sawflies. The ethology of the various subgenera has been fully discussed or indicated in a recent review of the genus.[52]

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52 *Cf.* Pate: The Subgenera of Crossocerus, with a Review of the Nearctic Species of the subgenus Blepharipus. Lloydia, VI, (1944).

53 Kohl: Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 193, (1913).

Piyuma[54] new genus

Crabro Turner [in part], Proc. Zool. Soc. London, 1908, p. 258, (1908).—Williams, Philippine Journ. Sci., XXXV, p. 100, (1928).
Crabro (Crossocerus) Turner, Ann. & Mag. Nat. Hist., (8), X, p. 63, (1912).

From all other members of the priscan Crossoceroid complex, *Piyuma* is readily distinguished by the structure of the abdomen, particularly the first segment which is subpetioliform, subnodose apically, and separated from the second segment by a rather strong constriction. Its nearest relative, albeit somewhat remote, is the Neogaeic entity *Taruma* with which it agrees in the relative position of the ocelli, the long anal lobe of the hind wing, and the incomplete occipital carina, but from which it may be distinguished, in addition to the shape of the abdomen, by the bicarinate antennal scapes, the bidentate mandibular apices, the absence of any indication of a marginate scapal sinus on the front, the rounded and ecarinate pronotum and mesosternum, and the immaculate black abdomen, as well as the distinctive conformation of the female pygidial area.

Generic Characters. — Moderately small, fulgid, finely punctate forms. Head subquadrate in anterior aspect, transversely subrectangular in dorsal aspect. Eyes naked, more coarsely facetted anteriorly than posteriorly; inner orbits very strongly convergent toward clypeus and antennal sockets. Malar space wanting. Front with upper portion flat and on same plane as vertex, not bisected by a carinule, abruptly rounded into the vertical aspect which is narrow, more or less concave between inner orbits but without a marginate scapal sinus. Vertex without supra-orbital foveae; ocelli rather large, arranged in a moderately high isosceles triangle which is broadest at base; temples moderate; occipital carina more or less well developed but not appreciably flanged, foveate, a complete circle in extent nor attaining the hypostomal carinule. Antennae distinctly thirteen-segmented in males and twelve-segmented in females, situated low on face on dorsal margin of clypeus, the sockets contiguous to each other and to nearest lower inner orbit; scapes straight, slender, elongate, subcylindrical, flat anteriorly and longitudinally bicarinate, *i.e* both inner and outer anterior margin with a sharp longitudinal carinule; pedicel subcylindrical, subequal in length to first flagellar article; flagellum simple, in males without excisions or expansions, but each article with a few inconspicuous erect hairs or setae beneath. Clypeus short; transverse, linear and flat laterally to flatly tectate discally, provided there with a sharp median longitudinal keel or carinule which terminates abruptly a short distance before the apical margin of the short, broad, weakly trilobed or tricrenulate median lobe. Mandibles stout; apices bifid in both sexes; lower margins entire; inner margins edentate. Females without a psammophore.

Thorax with pronotum short, transverse, situated on a level with the mesonotum, rounded and ecarinate dorsally and laterally, but hind margin strongly impressed. Mesonotum simple, with separated, moderate punctures throughout, mesonotal laminae not appreciably developed; axillae well devel-

54 After the Piyuma (*seu* Puyuma) of southeastern Formosa (Taiwan).

oped but immarginate laterally; suture mesonotum and scutellum, and scutellum and postscutellum deeply impressed but not foveolate. Mesopleura more or less fulgid; with fine, well separated punctures throughout; prepectus with a sharply carinate epicnemium anteriorly; a sharp vertical carina before middle coxae; episternal suture and hind margins of mesopleura and metapleura strongly foveolate; episternauli, mesopleurauli, hypersternauli, and sternauli all wanting; mesopleural pit large and distinct; mesosternum rounded, not transversely carinate anteriorly. Propodeum finely sculptured; dorsal face with an indistinctly delimited nitidous, trigonal area discally; lateral carinae present and well developed, simple and not bifurcate below; lateral faces more or less nitidous.

Fore legs simple in both sexes; neither tibiae, tarsi, nor femora appreciably dilated, expanded or flattened; trochanters normal, not elongate; females without a distinct pecten on fore tarsi. Middle and hind legs normal; middle tibiae subequal in length to femora in both sexes, and with a distinct apical calcar on middle and two on hind tibiae.

Fore wing with marginal cell more than twice as long as wide, broadly, squarely truncate at apex and with a distinct appendiculate cell, the transverse cubital vein straight, oblique, inclivous and received at basal third of radial vein, the first abscissa of which is one-half the length of second abscissa; recurrent vein received at middle of cubitus, the two abscissae of which are subequal in length. Hind wings with anal lobe subequal in length to the submedian cell.

Abdomen immaculate black; fulgid and finely punctate at most; sessile to subsessile, the first segment more or less subnodose at apex and separated from second by a strong constriction; remainder of abdomen fusiform in female, subclavate in male. Tergites with distinct basal acarid chambers, and folded under roundly and imbricate with the convex sternites; second sternite without a small, opaque, finely and closely punctate oval spot anteriolaterally on each side. Males without a pygidial area on ultimate tergite, the punctuation of which is not appreciably coarser than that of penult tergite; sternites simple, without tubercles or processes. Females with an opaque, finely coriaceous, broadly trigonal pygidial area which is somewhat narrowed apically and bisected by a longitudinal carinule, the lateral margins glabrous.

GENOTYPE: *Piyuma koxinga* new species.

Distribution.—The present genus is an Oriental and Australian entity. At present, I know two forms that are definitely referable to *Piyuma:* the Formosan *koxinga,* described below, and Turner's Australian species *prosopoides.*[55] The Philippine form, *Crabro makilingi,*[56] which Williams described from Luzon, is likewise in all probability a member of this genus.

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55 *Crabro prosopoides* Turner, Proc. Zool. Soc. London, 1908, p. 528, (May 12, 1908); [♀,♂; QUEENSLAND: Mackay; Townsville].—*Crabro (Crossocerus) prosopoides* Turner, Ann. & Mag. Nat. Hist., (8), X, p. 63, (1912).

56 *Crabro makilingi* Williams, Philippine Journ. Sci., XXXV, p. 100, pl. 6, fig. 8, (1928); [♀; PHILIPPINE ISLANDS: Los Baños, Luzon].

Ethology.—In his interesting paper on the natural history of a Philippine nipa house, Williams states that at Los Baños on Luzon he found the species *makilingi* nesting in deserted termite tunnels in a bamboo upright forming a house support.[57] From the absence of a psammophore and of a pecten on the fore tarsi of the females, I infer the biology of both *koxinga* and *prosopoides* is probably quite similar to that of *makilingi*.

Piyuma koxinga[58] new species

The present Formosan species is most closely related to Turner's Queensland form *prosopoides*. But in that species the antennal scapes, the entire pronotum, scutellum and postscutellum, and the greater part of the legs are deep, bright yellow; the head, thorax, and abdomen are quite closely and relatively coarsely punctate, while the metapleura and lateral faces of the propodeum are more or less horizontally striate; moreover, the posterior face of the propodeum, as well as the lateral areas of the dorsal surface, are distinctly striatopunctate, and the dorsal trigonal enclosure is radiately striate at base. In *koxinga*, however, the scapes, postscutellum and legs are dark; the somatic puncturation much finer and more sparse; the metapleura and lateral faces of the propodeum nitidous, or at most with very sparse acupuncturation like the posterior face of the propodeum, while the dorsal enclosure is very poorly delimited and completely nitidous.

Type. — ♂; Taihorinsho (Tairin), Tainan-Shyu, Formosa. Elevation, about 100 meters. September, 1909.

Male.—6 mm. long. Black; fulgid; the following deep stramineous; pronotum with a transverse fascia dorsally, pronotal tubercles, and anterior half of scutellum. Sordid castaneous: antennal scapes, pedicel and flagellum beneath, fore tarsi, tibial calcaria, and axillary sclerites. Scapes posteriorly, flagellum above, and middle and hind tarsi, light brunneous. Palpi sordid luteous. Wings hyaline, slightly tinted with fuscous; veins and stigma dark castaneous.

Head subfulgid; clypeus with an appressed, sericeous, silvery pile; front and vertex more sparsely clad with short, erect, inconspicuous dark aeneous puberulent pubescence; temples with a thin clothing of decumbent silvery hair above, becoming thicker, longer and erect below. Front flat, glabrous, subitidous, without a distinct scapal sinus; vertex with fine, evenly disposed, moderately close setigerous punctures; supra-orbital foveae absent; ocelli situated in a moderately high isosceles triangle which is broadest at base; ocellocular line three-fourths the postocellar distance; temples fulgid, with puncturation similar to, but somewhat more sparse than, that on vertex; occipital carina distinct but neither flanged, foveolate, a complete circle in extent, nor attaining the hypostomal carinule. Antennae short, reaching about to occiput; scapes straight, subcylindrical, flat anteriorly and longitudinally bicarinate,

57 Philippine Journ. Sci., XXXV, p. 85, (1928).

58 After Koxinga (Chêng Kung) who in 1662 established the Kingdom of Formosa, last outpost of the Ming dynasty.

one-half the vertical eye length; pedicel subcylindrical, twice the length of the first flagellar article; flagellum simple, finely puberulent, first segment short, two-thirds the length of second, ultimate article subequal in length to two preceding segments combined, and somewhat compressed, keeled beneath and roundly truncate at apex, all segments with an erect preapical seta beneath, the sixth to tenth articles nitidous and somewhat flattened to slightly concave beneath and with the apices slightly produced. Clypeus transversely subhexagonal, with the lateral portions attenuate and flat; median length one-fourth the vertical eye length; flatly tectate discally and bisected by a sharp, longitudinal carinule which terminates abruptly a short distance before the apex; produced medially into a short broad lobe, the apical margin of which is tricrenulate and laterally with a dentiform angle separated from median tricrenulate portion by a rather long and shallow emargination. Mandibles bidentate at apex; lower margins entire.

Thorax fulgid; clothed dorsally with a thin vestiture of short, erect, light aeneous hair, pleura and sterna more sparsely clad with decumbent silvery hair. Pronotum short, transverse, sparsely and finely punctate; anterior dorsal margin rounded, ecarinate, the lateral angles rounded, the posterior margin deeply, abruptly, transversely impressed. Mesonotum with fine, separated, setigerous punctures throughout; sutures between mesonotum and scutellum and scutellum and postscutellum deeply impressed but efoveate; axillae moderate, lateral edges weakly angulate posteriorly; scutellum flatly tumid, punctured like mesonotum; postscutellum simple, punctate like scutellum. Mesonotum perfulgid; finely but somewhat more sparsely punctate than mesonotum; anteriorly with a sharp epicnemium; omauli efoveate, but episternal suture, vertical carina before middle coxae, and posterior margin strongly foveate; mesopleural pit large, distinct, strongly impressed; metapleura perfulgid, with sparse, fine acupuncturation, hind margin foveolate; mesosternum rounded anteriorly. Propodeum fulgid; with a thin vestiture of suberect, inconspicuous, light hair on dorsal and posterior faces; dorsal face discally with a glabrous, nitidous, trigonal area which is not delimited by furrows or foveolae, the anterior margin transversely foveolate, bisected by a fine longitudinal carinule which is obsolescent posteriorly, lateral areas of dorsal face finely, sparsely acupunctate; posterior face finely, sparsely acupunctate throughout, bisected on lower half by a vertical carinule, and on upper half by a deep, immarginate furrow, laterad of which the surface is traversed by a few fine, horizontal, subparallel carinulae; lateral carinae present, well developed for their entire length, and simple below; lateral faces glabrous, and nitidous save for a few minute acupunctures.

Legs simple; fore tarsi not appreciably flattened. Middle tibiae not spinose on outer faces, apically with a distinct calcar. Hind coxae simple; hind femora with rather long, erect white hair beneath, and obliquely flattened below but without a trenchant edge lengthwise; hind tibiae moderately spinose on outer faces, with two apical calcaria, the longer subcultriform and six-tenths the length of hind metatarsi.

Abdomen fulgid; tergites with fine, evenly disposed acupunctures through-

out, each bearing a rather long, decumbent aeneous hair; sternites perfulgid, the first three more sparsely punctate and pubescent than the remainder. First segment subnodose apically; a strong constriction between first and second segments; second to sixth tergites inclusive with well developed basal acarid chambers; ultimate tergite without a pygidial area, the lateral margins not appreciably inflexed below, and the disc not more coarsely punctate than the sixth tergite. All sternites simple, seventh without processes or tubercles, caudal margin of sixth very broadly and shallowly excavate, of seventh truncate; hypopygium flat, elongate, subrectangular, the apical margin roundly truncate and with six elongate bristles.

Allotype.—♀; Taihorinsho (Tairin), Tainan-Shyu, Formosa. Elevation, about 100 meters. May, 1909.

Female.—6 mm. long. Similar to the male (type) except as follows:

Black; the following stramineous: pronotum, tubercles, scutellum, fore and middle tibiae with an elongate spot outwardly at base, hind tibiae annulate at base, and middle and hind metatarsi. Otherwise livery as in male.

Head in general the same as male but scape nine-sixteenths (.5625) the vertical eye length; pedicel four-thirds the length of first flagellar article; flagellum simple, finely puberulent, the first segment three-fifths the length of second, ultimate article subequal in length to two preceding segments combined.

Thorax generally the same as male but the puncturation of mesonotum somewhat finer and closer.

Fore tarsi without a distinct pecten.

Abdomen as in male; but ultimate tergite with a glabrous trigonal pygidial area, the lateral margins rather strongly narrowed toward apex but not furnished with any erect bristles, the disc subopaque, very finely coriaceous and bisected by a nitidous longitudinal carina.

Specimens examined.—14; 8 males, 6 females, as follows:

FORMOSA: Taihorinsho (Tairin), Tainan-Shyu; elevation about 100 meters; April: 2 ♂; May: 3 ♂; November, 1909: 1 ♀, 1 ♂. Tainan, Tainan-Shyu; July 22, 1911: 1 ♂. Kankau (Koshun), Takao-Shyu; elevation 10 meters; June, 1912: 5 ♀, 1 ♂.

The paratypes agree with the typical pair in all essential features of livery and structural detail.

Taruma[59] new genus

Superficially *Taruma* resembles *Piyuma* in many respects, but unlike that Oriental entity the abdomen of the present genus is distinctly maculated with yellow, and, moreover, has no constriction between the first and second segments. Furthermore, the antennal scapes of *Taruma* are only unicarinate, and the mesosternum and dorsal face of the pronotum are sharply carinate anteri-

59 After the Taruma Indians of British Guiana.

orly, while the females have the mandibles tridentate at apex and the pygidium subnitidous and not bisected by a longitudinal carinule.

Generic Characters.—Moderately small, perfulgid, finely punctate forms. Head subquadrate in anterior aspect, transversely subrectangular in dorsal aspect. Eyes naked, more coarsely facetted anteriorly than posteriorly; inner orbits very strongly convergent toward clypeus and antennal sockets. Malar space wanting. Ocelli rather large, arranged in a broad, moderately high isosceles triangle. Temples moderate; occipital carina rather well developed, weakly flanged and foveate but not a complete circle in extent nor attaining the hypostomal carinule. Antennae situated low on face on dorsal margin of clypeus, the sockets contiguous to each other and to nearest lower inner orbit; twelve-segmented in females, and probably thirteen-segmented in males; scapes straight, slender, elongate, slightly flattened anteriorly and longitudinally unicarinate; pedicel subcylindrical, subequal in length to first flagellar article; flagellum simple. Front with upper portion flat and on same plane as vertex, bisected by a shallow furrow which runs forward from anterior ocellus and in which lies a very fine, barely perceptible, longitudinal carinule, the anterior vertical aspect of front with a glabrous, nitidous, concave scapal sinus which is very weakly margined laterally but immarginate dorsally. Vertex simple, without supra-orbital foveae. Clypeus short; transverse and linear laterally to flatly tectate discally, produced medially into a short, narrow, subtruncate lobe. Maxillary palpi with six, labial palpi with four segments. Mandibles stout; apices trifid in females; lower margins entire. Females without a psammophore.

Thorax with pronotum short, transverse, situated about on a level with the mesonotum, and with dorsal surface sharply carinate anteriorly, the lateral angles acute, and posterior margin moderately impressed. Mesonotum simple, with separated, moderate, setigerous punctures throughout; axillae well developed; suture between mesonotum and scutellum, and scutellum and postscutellum deeply impressed and distinctly foveate. Mesopleura perfulgid; with fine well separated punctures throughout; anteriorly with a sharply carinate epicnemium which is continuous ventrally with the sharply carinate anterior margin of the mesosternum; a sharp vertical carina before middle coxae; episternal suture vertical or almost so from below tegulae; episternauli, mesopleurauli, hypersternauli, and sternauli all wanting; mesopleural pit large and distinct. Propodeum with but little sculpture; dorsal face with a nitidous, semicircular area delimited on disc by a strongly foveate groove; posterior face bisected by an immarginate groove or furrow; lateral carinae present and well developed, simple and not bifurcate below; lateral faces more or less nitidous.

Fore legs simple; females with fore tarsi slightly flattened and with a weak pecten. Middle and hind legs normal; middle tibiae subequal in length to femora, and with a distinct apical calcar on middle, and two calcaria on hind tibiae.

Fore wing with marginal cell three times as long as wide, broadly and squarely truncate at apex and with a distinct appendiculate cell; radial vein

with first abscissa less than one-half (.44) the length of second abscissa; transverse cubital vein straight, oblique, inclivous, three fifths the length of second abscissa of cubitus which is subequal in length to first abscissa of cubitus. Hind wing with anal lobe slightly surpassing the short submedian cell in length.

Abdomen black with yellow maculations; impunctate or very finely punctate at most; fusiform, the first segment perfectly sessile with the second, no strong constriction between them. Tergites with basal acarid chambers, and folded under roundly and imbricate with the convex sternites; second sternite with a small, opaque, finely and closely punctate oval spot anteriolaterally on each side. Females with a subnitidous, elongate trigonal pygidial area somewhat narrowed apically, but not bisected by a longitudinal carina, the lateral margins furnished with a few short, erect, aeneous setulae.

GENOTYPE: *Taruma bara* new species.

The genus *Taruma* has been erected for the reception of the following distinctive and peculiar South American form.

Taruma bara[60] new species

The distinguishing features given for the genus will likewise serve to differentiate *bara* from all other Neotropical Pemphilid wasps.

Type. — ♀. In Colony House, in Clearing, Mazaruni, British Guiana. September 14, 1937, (O. W. Richards and John Smart.) [British Museum (Natural History).]

Female. — 5 mm. long. Fulgid black; the following deep stramineous: palpi, basal half of mandibles (apices red), scapes, pedicel, pronotum dorsally to and including the tubercles, prepectus with a large spot, axillary sclerites with a discal spot, axillae, scutellum with a rather large spot laterally on each side, postscutellum entirely, middle and hind coxae at apex, all trochanters, fore and hind femora above on apical half, middle femora largely, fore tibiae entirely, and middle and hind tibiae on outer faces, all tarsi, and abdomen with a large ovate spot on each side of second, third and fourth tergites. Pedicel and flagellum light brunneous above, light fulvous beneath. Wings clear hyaline, iridescent; veins and stigma light brunneous.

Head subquadrate in anterior aspect, broadly subrectangular in dorsal aspect; clypeus with a dense, appressed, silvery sericeous pile; vertex and upper portion of front with a thin inconspicuous vestiture of short suberect hair; temples similarly clothed with decumbent silvery hair. Front on anterior vertical aspect between lower inner orbits with a shallow, concave, glabrous and nitidous basin which is very weakly marginate laterally but immarginate above; upper horizontal portion flat, on same plane as vertex, and with fine well separated setigerous acupunctures, and running forward from median ocellus bisected by a shallow impression in which lies a very fine carinule.

60 After the Bara Indians of the Guianas.

Vertex punctate like front; supra-orbital foveae not evident; ocelli rather large, arranged in a broad, moderately high, isosceles triangle, postocellar line eight-tenths the ocellocular distance; temples moderately developed; occipital carina well developed but not a complete circle in extent nor attaining hypostomal carinule, somewhat flanged and inconspicuously foveolate below and laterally; oral fossa campanulate; hypostomal carinule distinct but not flanged nor foveolate. Antennae with scapes slender, subcylindrical, unicarinate, six-tenths the vertical eye length; pedicel subcylindrical, four-fifths the length of first flagellar article; flagellum simple, finely puberulent, first segment one and two-thirds the length of second, ultimate article simple, terete, one and a half times length of penult segment. Clypeus low subtrigonal in outline; median length about one-fourth (.233) the vertical eye length; flat and attenuate laterally to tectate discally where it is bisected by a longitudinal keel; produced medially into a short broad truncate lobe, the apical width of which is seven-tenths the median clypeal length, the lateral margins of lobe oblique and inconspicuously bicrenulate. Mandibles stout; tridentate at apex; lower margins entire. Psammophore absent.

Thorax in dorsal aspect distinctly narrower than (but four-fifths the width of) head; dorsally with an inconspicuous vestiture of very short, suberect, light aeneous hair; pleura with a thin clothing of longer decumbent silvery pubescence. Pronotum short, transverse, situated about on a level with the lightly arched mesonotum, and strongly, transversely carinate anteriorly to and including the tubercles, the lateral angles acutely dentate, weakly notched medially, dorsal surface transversely, posterior margin strongly, impressed. Mesonotum simple, with fine, separated, setigerous punctures throughout, posterior angles with small, moderate laminae; axillae moderate in size, lateral margins broadly rounded; scutellum flatly tumid, with scattered acupunctures, anterior margin coarsely foveate, posterior margin finely foveolate; postscutellum simple. Mesopleura with fine, well separated, setigerous acupunctures throughout; anteriorly with a sharply carinate epicnemium which is continuous ventrally with the sharply, transversely carinate mesosternum; a sharp vertical carina before middle coxae; omauli, the straight oblique episternal suture, and posterior margin strongly foveate; mesopleural pit distinct; metapleura glabrous, nitidous, hind margin coarsely foveate. Propodeum with a very thin vestiture of short, suberect, puberulent silvery hair on dorsal and posterior faces; dorsal face with a large semicircular enclosure delimited by a weakly foveolate shallow impression, and bisected by a fine longitudinal carinule, laterad of which the surface is perfulgid and without sculpture; posterior face bisected by an immarginate vertical furrow, the lateral areas perfulgid and without sculpture; lateral carinae present, well developed for their entire length and simple below; lateral faces glabrous and nitidous.

Legs simple, stout, unmodified. Tarsi with last segment more or less inflated, the claws simple and large, the pulvilli distinct; metatarsi subequal in length to three following segments combined; fore metatarsi slightly flattened beneath, and with a weak pecten of short stiff setulae. Middle and hind tibiae moderately spinose on outer faces; middle tibiae with one apical calcar; hind

tibiae with two calcaria, the larger one elongate-subcultriform and two-thirds the length of hind metatarsi.

Fore wing with marginal cell three times as long as wide, broadly, squarely truncate at apex; radial vein with first abscissa five-ninths (.45) the length of second abscissa; transverse cubital vein straight, oblique, inclivous, three-fifths the length of second abscissa of cubitus which is subequal in length to first abscissa of cubitus. Hind wing with anal lobe large, well separated off, and slightly surpassing the apex of the submedian cell.

Abdomen sessile, subfusiform; perfulgid, with fine, well separated, setigerous acupuncturation throughout; tergites with a very thin vestiture of short, decumbent, silvery to aeneous hair. Second to penult tergites with basal acarid chambers. Ultimate tergite with an elongate trigonal pygidial area which is somewhat narrowed and excavate apically, the lateral margins with a few bristles, the disc glabrous and nitidous save for a few scattered coarse punctures at base. Sternites subnitidous and subglabrous save for transverse preapical rows of erect setulae.

Only the unique female of this little Guianan species is known.

Paë[61] new genus

The present genus is a discrete entity somewhat intermediate between *Chimila* and *Foxita*. Like the latter, *Paë* has the occipital carina very well developed, strongly flanged, and a complete circle in extent; the pronotum and mesosternum sharply margined anteriorly; and the mesopleura furnished with hypersternauli. But unlike that genus, *Paë* lacks a strongly marginate scapal sinus, as well as a carinule bisecting the upper front; furthermore, the mesopleura are more or less opaque and horizontally costulate rather than fulgid and simply punctate, and moreover, in addition to the well developed hypersternauli, are unique in possessing another pair of foveolate furrows, the mesopleurauli, which are situated above and parallel to the hypersternauli. Finally, the anal lobe of the hind wing of *Paë* is short and but half the length of the submedian cell, whereas in *Foxita* the submedian cell and anal lobe are subequal in length. The differential characters separating *Paë* from *Chimila* have been presented in the introductory discussion of that genus.

Generic Characters.—Moderate sized, finely and closely punctate, fulgid to subopaque forms. Head broadly subrectangular in dorsal and anterior aspects; subquadrate in lateral aspect due to the well developed and somewhat swollen temples. Eyes naked, much more coarsely facetted anteriorly than posteriorly; inner orbits very strongly convergent toward clypeus and antennal sockets. Malar space wanting. Front with upper portion flat and on same plane as vertex but not bisected by a carinule, the anterior vertical aspect narrow, concave, but without a marginate scapal sinus. Vertex simple, without supra-orbital foveae; ocelli rather large, situated in a low isosceles triangle tending toward a curved line; occipital carina very well developed, flanged

61 After the Paë (*seu* Paës, Paëz, *sive* Paësez) Indians of the central cordillera of Colombia.

and more or less foveolate, a complete circle in extent and separated on mid-ventral line of head from the hypostomal carinule bordering the subquadrate to subrectangular oral fossa; hypostomal carinule well developed in the form of a strong rolled margin or edge, and from middle of its lateral margins with a weak carina passing laterad at right angles, then curving forward and terminating in the apex of the inframandibular lobe. Antennae twelve-segmented in females, (and probably thirteen-segmented in males), situated low on face on dorsal margin of clypeus, the sockets contiguous to each other and to nearest lower inner orbit; scapes straight, subcylindrical, flat anteriorly and longitudinally bicarinate, *i.e.* both inner and outer anterior lateral margin with a sharp longitudinal carinule; pedicel obterete, shorter than first flagellar article; flagellum simple. Clypeus short and arcuately linear laterally, median lobe with a broad transverse, concave, subopaque bevel which is sharply margined dorsally and provided medially with a more or less nasutiform porrect process. Maxillary palpi with six, labial palpi with four segments. Mandibles stout, the apices bifid; lower margins entire; inner margins with two successive arcuate preapical excisions thus producing two obtuse preapical dentiform angles, and in addition on basal half with a large and strong acute tooth. Females without a psammophore.

Thorax with pronotum short, transverse, situated on a level with the mesonotum, sharply and transversely carinate anteriorly to and including the tubercles, posterior margin deeply impressed. Mesonotum subopaque; coriaceous to finely striatopunctate; broadly, shallowly concave discally; laterally with well developed laminae more or less overlying bases of tegulae and separated from rest of mesonotum by a rather strong and foveolate groove; axillae large, subovate, dorsal surface weakly concave, lateral edges with more or less distinct reflexed margins; scutellum and postscutellum simple. Mesopleura subfulgid to opaque; with parallel horizontal striae or costulae; anteriorly with a sharply margined epicnemium which is continuous ventrally with the sharp and transversely margined mesosternum; a sharp (indistinct in some species) vertical carina before middle coxae; omauli and episternal suture present and foveolate; episternauli and sternauli absent; mesopleural pit small but distinct; hypersternauli present, well developed for entire length and foveolate; a short horizontal and foveolate groove, the mesopleuraulus, present above and parallel to each hypersternaulus. Propodeum with a large and well defined semicircular area traversed by costulae radiating from anterior on dorsal face; posterior face with a subcuneate discal impression; lateral carinae present, well developed for entire length and simple below.

Legs simple. Fore tarsi not appreciably flattened nor with a distinct pecten in females. All tarsi with the last segment more or less inflated, the claws large and normal, the pulvilli large. Middle tibiae with one apical calcar; hind tibiae with two calcaria, and the outer posterior face with a broad shallow sulcus running lengthwise, the inner surface with a dense vestiture of short velvety pile.

Fore wing with marginal cell four times as long as wide and broadly obliquely truncate at apex; radial vein with the first abscissa one-half to three-

fifths the length of the second abscissa; transverse cubital vein straight, oblique, inclivous, and one-half the length of second abscissa of cubitus which is six- to seven-tenths the length of first abscissa of cubitus. Hind wing with the anal lobe small, cuneate, distinctly separated off, and about one-half the length of the submedian cell.

Abdomen sessile; more or less fusiform; impunctate to finely punctate; third to fifth tergite inclusive with basal acarid chambers; second and third tergites with a more or less distinct strangulation on basal half. Females with a distinct pygidial area which is very strong narrowed apically, the lateral margins of pygidial area glabrous.

GENOTYPE: *Paë paniquita* new species.

As yet, only the female sex of *Paë* is known. The males, however, when discovered, will doubtless agree with the foregoing diagnosis. Moreover, their antennae will probably be found to be thirteen-segmented with the flagellar articles relatively simple; the middle tibiae be furnished with an apical calcar; the abdomen lack a distinct pygidial area on the ultimate tergite; and the mandibles exhibit essentially the same peculiar conformation displayed by the females.

Distribution.—The genus *Paë* is a Neotropical entity apparently confined, at least in great measure, to the tropical forest areas of northern South America. Two species, which are referable to it, are described herewith: the Colombian *paniquita*, and the Guianan *amaripa*.

Paë paniquita[62] new species

The shorter, somewhat differently formed clypeal lobe, the relatively shorter antennal scapes, the subequal postocellar and ocellocular distances, the strongly produced, subangulate hind angles of the hypostomal carinule, as well as the more extensive yellow livery, readily differentiate the present Colombian form *paniquita* from the following Guianan species *amaripa*.

Type. — ♀; Muzo, Department of Boyaca, Colombia. Elevation, 900 meters. July, 1936. (Joseph C. Bequaert.) [Museum of Comparative Zoölogy.]

Female.—8 mm. long. Black; the following deep stramineous; mandibles except red apices, pronotum dorsally, pronotal tubercles, axillae, scutellum with a small spot at each anterior lateral angle, postscutellum, fore and middle femora beneath and posteriorly, hind femora with a small apical spot on anterior faces, fore and middle tibiae on anterior and outer faces, hind tibiae with a broad transverse preapical band, and abdomen: second tergite with a large, broad, transverse, irregular spot laterally on each side, third and fourth tergite with broad basal fasciae which are constricted medially, fifth tergite entirely save for a small brunneous spot on disc, sixth tergite laterally, third sternite on anterior half, fourth sternite with a narrow median

62 After the Paniquita Indians of Colombia.

fascia interrupted medially and a small irregular preapical spot medially. Fulvous: palpi, pedicel, flagellum, tegulae, fore and middle tibiae exclusive of yellow markings, all tarsi, abdominal venter, and pygidium. Wings clear hyaline, iridescent; veins and stigma brunneous.

Head broadly subrectangular in anterior and dorsal aspect, subquadrate in lateral aspect; more or less fulgid. Clypeus, except disc, and front between inner orbits with dense appressed silvery sericeous pile; vertex and temples with a thinner and more inconspicuous vestiture of aeneous to silvery puberulent pubescence. Eyes much more coarsely facetted anteriorly than posteriorly; naked.[63] Front between inner orbits very narrow, concave, without any distinct scapal basin; upper horizontal portion of front on same plane as vertex, both flat and with fine, close setigerous acupuncturation throughout; supraorbital foveae absent or very indistinct; ocelli arranged in a low triangle tending toward a curved line, the postocellar and ocellocular distances subequal; temples very well developed, ecarinate, but somewhat inflated a short distance behind posterior orbits; occipital carina very well developed, flanged, more or less strongly foveolate and a complete circle in extent, sharply angulate laterally above, roundly angulate laterally below, well separated on midventral line of head from hypostomal carinule bordering the subquadrate oral fossa; hypostomal carinule developed into a strong rolled margin which at hind angles is produced into a rather prominent downcurved obtuse dentoid angulation; from middle of lateral margins of hypostomal carinule a weak carina passes laterad at right angles, then curves forward and terminates in the apex of the inframandibular lobe. Antennae with the scapes two-thirds the vertical eye length, straight, subcylindrical, flat anteriorly and strongly bicarinate; pedicel obterete, five-eighths the length of first flagellar article; flagellum simple, finely puberulent, second segment seven-eighths the length of first segment, ultimate article simple, terete, subequal in length to the two preceding segments combined. Clypeus flat and arcuately linear laterally, median length almost a fifth (.171) the vertical eye length, the median lobe transversely oval, concave, glabrous, impunctate, subfulgid, and transversely striate, the dorsal edge sharply margined and armed with a large depressed, porrect dentoid process medially, the apical margin trisinuate and strongly bidentate. Mandibles large, stout, apices bifid; lower margins entire; inner margins with a preapical tooth, basad of which is another dentoid process formed by the arcuate margin, the basal half armed with a large acute tooth. Psammophore absent.

Thorax subfulgid to fulgid; dorsally with a thin and inconspicuous vestiture of short, erect, aeneous puberulent hair; pleura and sterna with a similar but more noticeable clothing of silvery pubescence. Pronotum transverse, situated slightly below the level of mesonotum, the anterior dorsal margin very sharply, transversely carinate to and including tubercles, the lateral angles rounded, deeply notched medially, posterior margin strongly impressed. Mesonotum subopaque; very finely, closely striatopunctate throughout, the striations oblique to transverse anteriolaterally, curving around on disc and becoming longitudinal posteriorly; anterior half bisected by a fine longitudinal line,

63 Very finely and sparsely puberulent under magnification of 120 diam.

parallel to which on each side is a sharp carinule, the surface broadly, shallowly concave between the lateral carinules; mesonotal laminae well developed and sharply defined mesad by a foveolate impression; axillae large, subovate, dorsal surface weakly concave, lateral edges with an indistinct reflexed margin; suture between mesonotum and scutellum simple but strongly impressed; scutellum flatly tumid, finely longitudinally striatopunctate, posterior margin foveolate; postscutellum simple, finely punctate. Mesopleura more or less fulgid; finely punctate; prepectus and upper portion of pleura traversed by sharp, subhorizontal, parallel rugulae; anteriorly with a sharp epicnemium which is continuous ventrally with the sharp and transversely margined anterior edge of the mesosternum; episternauli and sternauli wanting; omauli and the straight oblique episternal suture strongly foveate; hypersternauli present, well developed for their entire length, and strongly foveate, parallel to and between them and the small but distinct mesopleural pit is another short, strongly foveolate furrow (the mesopleurauli); a sharp vertical carina before middle coxae; hind margin strongly foveolate; metapleura subfulgid, finely puberulent, traversed by parallel horizontal rugulae, hind margin foveolate. Propodeum subfulgid; with an inconspicuous vestiture of short, suberect, aeneous to silvery puberulent hair; dorsal face with a large subsemicircular enclosure defined by a strongly foveolate groove, bisected by a narrow, strongly marginate furrow and traversed by a series of strong carinules radiating from the anterior margin, the areas between the carinules finely and somewhat irregularly striatopunctate; posterior face with a broad, obcuneate and inconspicuously margined discal impression which is opaque and more or less scabrous within, the lateral surfaces finely striate above, the lower half traversed by three or four parallel horizontal carinules; lateral carinae present for entire length, simple below; lateral faces fulgid, horizontally aciculate.

Legs stout, relatively simple. Tarsi with last segment large, strongly inflated; claws normal; pulvilli large and distinct; fore tarsi not flattened or otherwise modified, without a distinct pecten. Middle tibiae moderately spinose on outer faces, and with a distinct apical calcar. Hind tibiae moderately to strongly spinose on outer faces, the outer posterior face with a strong but shallow groove running for almost entire length of tibiae, the inner faces furnished with a thick pile of short aeneous velvety pubescence, and apically with two acuminate calcaria, the longer almost three-fifths (.583) the length of hind metatarsi.

Fore wing with the marginal cell four times as long as wide, broadly and obliquely truncate at apex; radial vein with first abscissa almost three-fifths (.59) the length of second abscissa; transverse cubital vein straight, oblique, inclivous, one-half the length of second abscissa of cubitus which in turn is but seven-tenths the length of first abscissa of cubitus. Hind wing with the anal lobe small, cuneate, distinctly separated off, and but one-half the length of submedian cell.

Abdomen sessile, subfusiform. Tergites with a thin and inconspicuous vestiture of short decumbent, light aeneous puberulent hair; second and third tergites with a moderately strong subbasal strangulation, third to fifth tergites

inclusive with basal acarid chambers; ultimate tergite with a trigonal pygidial area which is more or less excavate and very strongly narrowed apically. Sternites nitidous and practically glabrous save for a transverse preapical row of erect setulae.

Male.—Unknown.

This interesting species is known only from the unique female described above.

Paĕ amaripa[64] new species

Although resembling the preceding species so closely that it may be easily confused with it, *amaripa* differs from *paniquita* in the relatively longer clypeus and antennal scapes and the much less extensively maculated abdomen and thorax. Furthermore, in *paniquita* the postocellar distance is subequal in length to the ocellocular line, whereas in *amaripa* the postocellar line is but three-fourths the ocellocular distance.

Type. — ♀. In High Forest, on Tukeit Trail along Potaro River at Kaietur Falls, British Guiana. September 9, 1937. (O. W. Richards & J. Smart.) [British Museum (Natural History).]

Female.—8 mm. long. Black; the following stramineous: palpi, mandibles except for red apices, scapes, pronotum along anterior dorsal margin, pronotal tubercles, axillae, a narrow line along anterior margin of postscutellum, fore and middle femora with a line beneath, fore tibiae on outer faces, middle and hind tibiae with a large preapical spot on outer faces, all tarsi, and on abdomen: second tergite with a narrow longitudinal line along sides, and the third, fourth and fifth tergites with a broad, transverse, trigonal macula laterally on each side. Fulvous: fore tibiae on inner faces, and pedicel and flagellum. Tegulae and axillary sclerites bruneous. Wings clear hyaline, iridescent; veins and stigma brunneous.

Head broadly subrectangular in anterior and dorsal aspect, subquadrate in lateral aspect; fulgid to subopaque. Clypeus, except disc, and front between inner orbits with dense appressed silvery sericeous pile; vertex and temples with a thinner, more inconspicuous vestiture of aeneous to silvery puberulent pubescence. Eyes naked, much more coarsely faceted anteriorly than posteriorly. Front between inner orbits very narrow, concave, without any distinct scapal basin; upper horizontal portion of front on same plane as vertex, both flat and with fine, close, setigerous acupunctures throughout; supra-orbital foveae absent; ocelli situated in a low isosceles triangle tending toward a curved line, the postocellar line about three-fourths (.76) the ocellocular distance; temples very well developed, ecarinate, but somewhat inflated a short distance behind posterior orbits; occipital carina very well developed, flanged, more or less strongly foveolate and a complete circle in extent, sharply angulate laterally above, roundly angulate laterally below, well separated on midventral line of head from hypostomal carinule bordering the subquadrate oral

64 After the Amaripa Indians of the Guianas.

fossa; hypostomal carinule developed into a strong rolled margin but not produced at hind angles into a rather prominent downcurved obtuse dentoid angulation as in *paniquita;* from middle of lateral margins of hypostomal carinule with a weak transverse carina as in *paniquita.* Antennae with the scapes about three-fourths (.76) the vertical eye length, straight, subcylindrical, flat anteriorly and strongly bicarinate; pedicel obterete, five-sevenths the length of first flagellar article; flagellum simple, finely puberulent, second segment six-sevenths the length of first segment, ultimate article simple, terete, three-fourths the length of two preceding segments combined. Clypeus flat and arcuately linear laterally, median length almost a fourth (.235) the vertical eye length, the median lobe with a wide, transverse, concave, glabrous, impunctate, subfulgid, and transversely striate bevel, the dorsal edge of which is sharply margined and produced medially into a large depressed, porrect to downcurved nasutiform dentoid process, the apical margin truncate and elliptically excised medially. Mandibles large, stout, apices bifid; lower margins entire; inner margins with a preapical tooth, basad of which is another dentoid process formed by the arcuately excised margin, the basal half armed with a large acute tooth. Psammophore absent.

Thorax opaque to subfulgid; dorsally with a thin and inconspicuous vestiture of short, erect, aeneous puberulent hair; pleura and sterna with a similar but more noticeable clothing of silvery pubescence. Pronotum transverse, situated slightly below level of mesonotum, the anterior dorsal margin very sharply, transversely carinate to and including the tubercles, deeply notched medially, lateral angles subacute, posterior margin strongly impressed. Mesonotum subopaque; coriaceous to very finely and indistinctly, closely striatopunctate throughout, the striations similar to, but more indistinct than in, *paniquita;* anterior half bisected by a fine longitudinal line, parallel to which on each side is a sharp carinule, the surface broadly and shallowly concave between the lateral carinules; mesonotal laminae well developed and sharply defined mesad by a foveolate impression; axillae large, subovate, dorsal surface weakly concave, lateral edges with an indistinct reflexed margin; suture between mesonotum and scutellum strongly impressed; scutellum flatly tumid, finely and longitudinally striatopunctate, anterior margin subfoveate, posterior margin foveolate; postscutellum simple, finely punctate. Mesopleura subopaque to fulgid; finely punctate, the prepectus and upper portion of pleura traversed by fine, sharp, subhorizontal, parallel carinulae; anteriorly with a sharp epicnemium which is continuous ventrally with the sharp and transversely margined anterior edge of mesosternum; episternauli and sternauli wanting; omauli and the straight oblique episternal suture strongly foveate; hyposternauli present, well developed for their entire length, strongly foveate; mesopleurauli short, strongly foveate; a weak to evanescent carina before middle coxae; hind margin strongly foveolate; metapleura subfulgid, finely puberulent, traversed by parallel, horizontal aciculation, hind margin foveolate. Propodeum opaque; with an inconspicuous vestiture of short, suberect, aeneous to silvery puberulent hair; dorsal face with a large subsemicircular enclosure defined by a series of strong, subcontiguous carinules radiating from the anterior margin; posterior face with a narrow, obcuneate, immargi-

nate discal impression which is opaque and scabrous within, the lateral surfaces traversed above and below by a series of horizontal, parallel carinules, the surface between the carinules closely acupunctate; lateral carinae present for entire length, simple below; lateral faces fulgid, horizontally aciculate.

Legs stout, relatively simple. Tarsi with last segment large, strongly inflated; claws normal; pulvilli large and distinct; fore tarsi not flattened or otherwise modified, without a distinct pecten. Middle tibiae moderately spinose on outer faces, and with a distinct apical calcar. Hind tibiae moderately to strongly spinose on outer faces, the outer posterior face with a rather broad, shallow, concave groove running lengthwise on basal half of tibiae, the inner faces furnished with a thick pile of short, aeneous, velvety pubescence, and apically with two acuminate calcaria, the longer two-thirds the length of hind metatarsi.

Fore wing with marginal cell four times as long as wide, broadly and obliquely truncate at apex; radial vein with first abscissa about one-half (.53) the length of second abscissa; transverse cubital vein straight, oblique, inclivous, one-half the length of second abscissa of cubitus which in turn is about six-tenths the length of first abscissa of cubitus. Hind wing with the anal lobe small, cuneate, distinctly separated off from axillary region, and but one-half length of submedian cell.

Abdomen sessile, subfusiform. Tergites with a thin and inconspicuous vestiture of short, decumbent, light aeneous puberulent hair; first three tergites with a fine but distinct, close puncturation throughout, remaining tergites with inconspicuous and well separated acupunctures; second and third tergites with moderately strong subbasal strangulation; third to fifth tergites inclusive with basal acarid chambers; ultimate tergite with a trigonal pygidial area which is more or less excavate and very strongly narrowed apically. Sternites nitidous and practically glabrous save for a transverse preapical row of erect setulae.

Male.—Unknown.

Only the unique female of this species is known.

Chimila[65] new genus

The short anal lobe of the hind wing, the position of the ocelli, the arcuate subapical emargination of the mandibles and the shape of the female pygidial area, all attest the close relationship of *Chimila* to *Paë*. But the structure of the head and thorax is markedly different in the two entities. In *Chimila,* the clypeus has a simple, flat, subhexagonal median lobe; the mandibles are simple at apex and are furnished with but one dentiform angle immediately basad of the subapical arcuate emargination; the occipital carina merely attains the hind angles of the hypostomal carinule bordering the oral fossa; while on the thorax the pronotum and mesosternum are both rounded and ecarinate anteriorly, and the mesopleura are fulgid, finely and sparsely punctate and devoid

65 After the Chimila Indians of Colombia.

of both hypersternauli and mesopleurauli. Conversely, in *Paë*, the clypeus is armed with a characteristic porrect nasutiform process; the mandibles are bifid at apex and provided with two dentiform angles immediately basad of the arcuate subapical emargination. Furthermore, as in the members of the Foxita complex in the restricted sense, the occipital carina is a complete circle in extent, strongly flanged and foveolate. Finally, both the pronotum and mesosternum of *Paë* are sharply and transversely carinate, while the mesopleura are more or less opaque, horizontally striate to finely costulate, and unique in possessing both hypersternauli and mesopleurauli.

Generic Characters.—Fulgid, finely punctate, medium sized forms. Head subquadrate in anterior aspect, transversely subrectangular in dorsal aspect; temples moderate, normal, not inflated as in *Paë*. Eyes naked, more coarsely facetted anteriorly than posteriorly; inner orbits very strongly convergent toward clypeus and antennal sockets. Malar space wanting. Front with upper portion flat and on same plane as vertex, and not bisected by a carinule, the anterior vertical aspect very narrow and somewhat concave but without a marginate scapal sinus. Vertex without supra-orbital foveae; ocelli rather large, arranged in a low isosceles triangle tending toward a curved line; occipital carina well developed, attaining the hind angles of the hypostomal carinule bordering the oral fossa. Antennae distinctly thirteen-segmented in males and twelve-segmented in females, situated low on face on dorsal margin of clypeus, the sockets contiguous to each other and to nearest lower inner orbit; scapes straight, subcylindrical, elongate, flat anteriorly and longitudinally bicarinate, *i.e.* both inner and outer margin with a sharp longitudinal carinule; pedicel subcylindrical, subequal to slightly longer than first flagellar article; flagellum simple in both sexes, without fringes of hair beneath in males. Clypeus short and transverse laterally, medially with a flat to weakly tectate subhexagonal lobe which is more or less truncate apically. Maxillary palpi with six segments, labial palpi with four segments. Mandibles stoutly subfalcate, the apices simple in both sexes; lower margins entire; inner margins arcuately excised just before apex and thus producing an obtuse preapical dentiform angle, and on basal half with a large acute tooth. Females without a psammophore.

Thorax with pronotum short, transverse, situated on a level with the mesonotum, rounded and ecarinate dorsally and laterally, but hind margin very strongly impressed. Mesonotum simple, more or less striate, transversely so anteriorly and obliquely posteriolaterally; with well developed laminae overlying the bases of the tegulae laterally; axillae large, their lateral margins broadly rounded; scutellum and postscutellum simple. Mesopleura fulgid, finely punctate; anteriorly with a sharply margined epicnemium on prepectus; with a sharp and strong vertical carina before middle coxae; mesopleural pit distinct; episternal suture foveate; episternauli, mesopleurauli, hypersternauli and sternauli all absent. Mesosternum rounded anteriorly. Propodeum finely sculptured; dorsal face with a large semicircular enclosure; posterior face bisected by a vertical impression; lateral carinae present, well developed for entire length and simple below.

Legs simple. Fore tarsi not appreciably flattened in either sex; females

with a weak pecten. Middle tibiae with an apical calcar in both sexes; hind tibiae not sulcate on outer posterior face, furnished with two calcaria. Claws normal; pulvilli large.

Fore wing with marginal cell at least three times as long as wide, and broadly, squarely truncate at apex; radial vein with the first abscissa slightly more than half (.55) the length of second abscissa; transverse cubital vein oblique, slightly sinuate, and about one-half (.55) the length of the second abscissa of cubitus which is three-fifths the length of first abscissa of cubitus. Hind wing with the anal lobe elongate-oval, distinctly separated off, and but one-half the length of submedian cell.

Abdomen sessile, fusiform, impunctate to finely punctate; second to fifth tergites with basal acarid chambers but without traces of strangulation. Females with a pygidial area which is very strongly narrowed apically. Males without a pygidial area on ultimate tergite, the puncturation of which is somewhat more distinct than on preceding tergite; all sternites, as well as inflexed portions of tergites, simple, without processes or tubercles.

GENOTYPE: *Chimila paë* new species.

The genus *Chimila* has been erected primarily for the reception of the following distinctive Neogaeic species, *Chimila paë*. Like *Paë*, the present genus is evidently another of the little known entities inhabiting the tropical forests of South America.

Chimila paë[66] new species

The distinctive conformation of the clypeus and mandibles, and the unusual yellow and pallid livery readily differentiate *Chimila paë* from all other described northern South American Pemphilid wasps.

Type. — ♀; Muzo, Department of Boyaca, Colombia. Elevation, 900 meters. June, 1936. (J. C. Bequaert.) [Museum of Comparative Zoölogy.]

Female.—8 mm. long. Black; the following deep stramineous: mandibles on basal half, clypeus, scapes, pedicel, first flagellar article, pronotum to and including the tubercles, prepectus, axillae, scutellum with a large spot at each anterior lateral angle, postscutellum, fore and middle femora beneath and behind, fore tibiae with a stripe on outer faces, middle tibiae with a similar stripe interrupted medially, hind tibiae with a large ovate preapical spot on outer faces, and abdomen: second, third and fourth tergites with an elongate transverse spot laterally on each side, fifth tergite with the spots larger and united medially, last segment entirely save for apical portion of pygidium. Pallid (lacteous): middle trochanters, hind coxae and trochanters, hind femora entirely save for elongate spots medially on anterior face and distal half of posterior face, first abdominal tergite entirely save for a broad apical border and the caudal half of lateral margins and abdominal venter largely. Dark bruneous: palpi, mandibular apices, apical segments of flagellum, tegu-

66 After the Paë Indians of the central Cordillera of Colombia.

lae and axillary sclerites, all tarsi, legs except for yellow and pallid maculation, and apex of pygidium. Wings clear hyaline, iridescent; veins and stigma brunneous.

Head subfulgid; clypeus, and front along inner orbits and just above apices of scapes, with appressed silvery sericeous pile; upper portion of front and vertex with more inconspicuous, suberect, subaeneous, puberulent pubescence; temples with a vestiture of appressed silvery hair. Front flat to very shallowly concave between inner orbits, discally with an elongate vertical, glabrous and nitidous but immarginate scapal basin which is simple and unarmed medially just above antennal sockets; vertex and upper horizontal portion of front fulgid, with fine, well separated setigerous acupunctures; supra-orbital foveae absent; ocelli situated in a low isosceles triangle (tending toward a curved line), the anterior ocellus less than its own diameter from the hind ocelli, ocellocular and postocellar distances subequal; temples fulgid, with fine setigerous acupuncturation; occipital carina strong, simple, efoveate, attaining the hind angles of the somewhat flanged and foveate hypostomal carinule bordering the subtrapeziform oral fossa. Antenna short, reaching about to occiput, scapes straight, subcylindrical, flat anteriorly and bicarinate, almost three-fifths (.5831) the vertical eye length; pedicel cylindrical; flagellum simple, finely puberulent, first two articles subequal in length, the first seven-eighths the length of pedicel, ultimate article simple, terete, seven-tenths the length of two preceding segments combined. Clypeus flat and arcuately linear laterally, median length one-fourth the vertical eye length, medially with a flat, subhexagonal lobe which is bisected by an almost imperceptible keel, the margin subtruncate, beaded, the lateral margins oblique, beaded, with a double concave margin. Mandibles subfalcate, the apices simple; lower margins entire; inner margins with an arcuate subapical excision forming a preapical dentoid process, the basal half with a large and strong acute tooth. Psammophore absent.

Thorax more or less fulgid; dorsally with a moderate and inconspicuous vestiture of short, erect, light aeneous hairs; pleura and sterna with a sparse clothing of decumbent, longer silvery hair. Pronotum short, transverse, situated on a level with mesonotum, rather strongly inflated dorsally but not carinate anteriorly, the lateral angles rounded, strongly notched medially, pronotal tubercles flat, not attaining the tegulae. Mesonotum lightly arched, finely and transversely striatopunctate anteriorly, obliquely so lateroposteriorly, discoposteriorly with well separated setigerous acupunctures, anterior third with three subparallel, well separated, longitudinal lines medially, laterally with mesonotal laminae overlying the bases of the tegulae; axillae rather large, with lateral margins broadly rounded; suture between mesonotum and scutellum deeply impressed and simple; scutellum flatly tumid; suture between scutellum and postscutellum deeply impressed and indistinctly subconsute; postscutellum simple, finely punctate. Mesopleura perfulgid, with fine, well separated setigerous punctures throughout; anteriorly with a sharply margined epicnemium; episternal suture oblique, straight, and strongly foveate; mesopleural pit distinct; a strong and sharp vertical carina before middle coxae; hind mar-

gin simple, efoveate; metapleura fulgid, finely puberulent, finely horizontally striate, hind margin finely foveolate; mesosternum rounded anteriorly. Propodeum fulgid, dorsal and posterior faces with a very thin and inconspicuous vestiture of short, suberect, light hair; dorsal face with a large, semicircular area poorly delimited by a weakly foveate furrow, anterior margin foveate, disc with fine, well separated, setigerous acupunctures and bisected by a longitudinal carinule; posterior face bisected by a strong vertical furrow laterad of which the surface is subnitidous becoming finely punctate laterally and transversely, horizontally rugulate ventrally; lateral carinae present and more or less distinct for entire length, simple below; lateral faces glabrous and subnitidous.

Legs stout, normal. Middle and hind tibiae moderately spinose on outer faces; middle tibiae with one apical calcar; hind tibiae with two aciculate calcaria, the longer four-sevenths (.572) the length of hind metatarsi; claws normal; pulvilli large; fore tarsi not appreciably flattened or otherwise modified and with a weak pecten.

Fore wings with marginal cell three times as long as wide, broadly and squarely truncate at apex; radial vein with first abscissa five-ninths the length of second abscissa; transverse cubital vein straight, oblique, inclivous, five-ninths the length of second abscissa of cubitus which is three-fourths the length of first abscissa of cubitus. Hind wing with the anal lobe lenticular, distinctly separated from axillary region, and one-half the length of submedian cell.

Abdomen sessile, fusiform, fulgid. Tergites with fine, indistinct, setigerous puncturation, and clothed with a thin vestiture of decumbent, light aeneous hair; second to fifth tergite inclusive with basal acarid chambers; ultimate tergite with a pygidial area which is trigonal basally terminating in an elongate, canaliculate, linguiform process; sternites subglabrous, subnitidous, with a transverse preapical row of erect setulae.

Allotype.—♂; Muzo, Department of Boyaca, Colombia. Elevation, 900 meters. June 20-30, 1936. (J. C. Bequaert.) [Museum of Comparative Zoölogy.]

Male.—6 mm. long. Resembles the female (type) in all essential details of livery and structure excepa as follows:

Livery: Black; the following deep stramineous: scapes anteriorly, pronotum dorsally, pronotal tubercles, prepectus largely, axillae, scutellum anteriorly with two large, almost confluent spots, postscutellum, fore and middle femora posteriorly and at apex, hind femora with a large spot above at apex, fore and middle tibiae with a stripe on outer faces, hind tibiae with a large preapical spot on outer faces. Fuliginous: palpi, flagellum, tegulae and axillary sclerites, femora and tibiae except for yellow markings, and tarsi entirely. Abdomen immaculate black. Wings clear hyaline, iridescent; veins and stigma brunneous.

Head largely as in female, but vertex and front more closely punctate;

ocellocular line about eight tenths (.81) the postocellar distance. Antennal scapes almost three-fifths (.59) the vertical eye length; flagellum simple, unmodified, finely puberulent, without fringes of hair beneath, first two articles subequal in length, the first five-sixths the length of pedicel, ultimate article simple, terete, five-fourths the length of penult segment. Clypeus of same conformation as that of female, the median length about one-fourth (.235) the vertical eye length. Mandibles as in female.

Thorax in general as in female.

Legs simple, unmodified. Middle tibiae with a distinct apical calcar; hind tibiae with two aciculate calcaria, the longer about five-ninths (.56) the length of hind metatarsi.

Abdomen fulgid, sessile, fusiform. First two tergites with distinct, though fine, puncturation, the remaining tergites with almost imperceptible fine puncturation; first tergite bisected on basal two-thirds by a deep longitudinal furrow; ultimate tergite without a pygidial area, the disc somewhat more distinctly punctate than penult tergite, the lateral margins inflexed but simple and covering the lateral portions of the flat, elongate subrectangular hypopygium which is entire and quadrisetose at apex. Sternites simple, without processes or tubercles, the apical margins entire, more or less truncate.

Specimens examined.—In addition to the typical pair, described above, I have examined two females (paratypes) taken during June, 1936, at Muzo, Colombia. These agree with the type (female) in all essential structural details; the livery of these two specimens is likewise practically the same as that described above for the type.

FOXITA Pate

Foxita Pate, Rev. Entom. (Rio de Janeiro), XIII, p. 368, (1942). [Type: *Foxita atorai* Pate, 1942.]

This interesting genus and its component species have been recently characterized and reviewed elsewhere.[67]

Distribution.—The genus *Foxita* comprehends five species at present. All are confined to the tropical and subtropical areas of the South American continent.

ENOPLOLINDENIUS Rohwer

Enoplolindenius Rohwer, Proc. U. S. Nat. Mus., XL, p. 562, (1911). [Type: *Lindenius (Enoplolindenius) clypeatus* Rohwer, 1911.]

Iskutana Pate, Rev. Entom. (Rio de Janeiro), XIII, p. 390, (1942). [Type: *Enoplolindenius (Iskutana) georgia* Pate, 1942.]

The genus *Enoplolindenius* comprises a dozen species which are referable to two well marked subgenera: *Iskutana* Pate and *Enoplolindenius* in the restricted sense. The genus and its component species have been recently reviewed.[67]

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67 *Cf.* Pate: The New World Genera and Species of the Foxita Complex. Rev. Enttom. (Rio de Janeiro), XIII, pp. 367-421, (1942).

Distribution.—The genus *Enoplolindenius* is confined wholly to the New World. The more generalized species, which are referable to *Iskutana,* are peripheral in distribution (southern and central United States, northern Argentina, southwestern Brazil, etc.), whereas the more specialized forms of the nominate subgenus centre their ranges about the Amazonian basin and southern and central Middle America. This pattern is a striking example of the "age and area" type of distribution.

HINGSTONIOLA Turner & Waterston

Crabro (Hingstoniola) Turner & Waterston, Ann. & Mag. Nat. Hist., (9), XVII, p. 189, (1926). [Type: *Crabro (Hingstoniola) duplicata* Turner & Waterston, 1926.]

Turner and Waterston originally proposed the present entity as a subgenus for the reception of a peculiar new species taken in Sikkim by Major Hingston. Though I know this merely from the figures and description of Turner and Waterston, I believe in the light of evidence now at hand that *Hingstoniola* merits recognition as a discrete genus. Moreover, in all likelihood, it is another representative of the Foxita complex, not too distantly related perhaps to *Vechtia.* From the latter, however, *Hingstoniola* is easily distinguished by the markedly different venation of the fore wing, the structure of the scapal sinus and upper front region, the position of the ocelli, and, in the male sex, by the patellate fore tarsi and the dentate fore femora.

Vechtia[68] new genus

Crabro Bingham, Fauna Brit. India, Hymen., I, p. 321, (1897). [In part.]

The genus *Vechtia* is an Oriental representative of the Foxita complex. The peculiar down-curved laminate production of the dorsal margin of the scapal sinus, the foveolate temporal sulcus, the longitudinally costulate mesonotum, the well developed sternauli, and, in the male sex, the unusually short middle tibiae which are devoid of an apical calcar, all distinguish *Vechtia* from its nearest relative, the Neogaeic entity, *Foxita.*[67]

Generic Characters.—Moderate sized, fulgid, finely punctate forms. Head broadly subrectangular in anterior and dorsal aspects, subquadrate in lateral aspect. Eyes large, naked, more coarsely facetted anteriorly than posteriorly, strongly convergent toward clypeus and antennal sockets. Malar space wanting. Front on anterior vertical aspect between the lower inner orbits with a sharply marginate scapal sinus, the dorsal margin of which is produced into a down-curved laminate plate which overlies the apices of the scapes and bases of flagella when antennae are in repose; upper horizontal portion of front flat, on some plane as vertex, bisected by a longitudinal carinule running forward from median ocellus. Vertex flat; supra-orbital foveae not apparent; ocelli rather large, arranged in a rather low, subequilateral triangle; upper obits margined by a distinct, though narrow, sulcus which is foveolate posteriorly and is thus continued vertically on temples to posterior mandibular condyles;

68 I take great pleasure in dedicating this interesting genus to Dr. J. van der Vecht of the Institut voor Plantenziekten, Buitenzorg, Java, N. E. I.

temples well developed; occipital carina strong and well developed, more or less flanged, foveolate, and a complete circle in extent but separated on mid-ventral line from the well developed and more or less foveolate hypostomal carinule bordering the broad U-shaped oral fossa. Antennae distinctly thirteen-segmented in males and twelve-segmented in females, situated low on face on dorsal margin of clypeus, the sockets contiguous to each other but slightly separated from the nearest lower inner orbit; scape subcylindrical, elongate, outer anterior lateral margin sharply carinate lengthwise, the inner anterior lateral margin longitudinally carinate on basal half; pedicel short, more or less cylindrical; flagellum simple in both sexes, without fringes of hair below in males. Clypeus short, transverse, disc bisected by a strong nitidous keel, and with a short, broad, more or less truncate median lobe. Mandibles stout; apices bifid in males, trifid in females; lower margins entire. Females without a psammophore.

Thorax with pronotum situated on a level with mseonotum and sharply, transversely carinate anteriorly to and including the tubercles. Mesonotum lucid, impunctate but rather strongly longitudinally costulate, anterior half with two widely separated longitudinal keels between which the disc is broadly and shallowly concave; laminae slightly developed at posterior lateral angles; axillary moderate, lateral margins broadly rounded; scutellum longitudinally striate, bisected by a fine longitudinal carinule; postscutellum simple. Mesopleura with fine and separated acupuncturation throughout; prepectus horizontally costulate and anteriorly with a sharply margined epicnemium which is continuous ventrally with the sharp and transversely carinate mesosternum; episternal suture straight, oblique, more or less foveate; mesopleural pit small; before middle coxae with a sharp vertical carina which is continuous ventrally with the well developed sternauli; episternauli, mesopleurauli and hypersternauli all absent. Propodeum short; dorsal face more or less coarsely areolate and separated from posterior face by a transverse carina; posterior face bisected by a longitudinal impression; lateral carinae present, well developed for entire length and bifurcate below.

Legs with all the tarsi simple in both sexes, the metatarsi slender, elongate, subequal in length to or longer than the four distal segments combined; fore metatarsi of females with a very rudimentary pecten of short setulae; claws normal; pulvilli normal. Fore femora and tibiae of both sexes simple, unmodified, edentate. Middle femora and tibiae of females simple, normal, the tibiae subequal in length to femora and with an apical calcar. Males with middle femora somewhat broadened, obliquely flattened below and with a dense brush of hairs there; the middle tibiae short, but one-half the length of femora, and without an apical calcar, but prolonged at apex on inner side into a slender acuminate spinoid process. Hind femora and tibiae simple in both sexes and furnished with two apical calcaria.

Fore wing with marginal cell four times as long as wide and broadly, squarely truncate at apex; radial vein with first abscissa about seven-tenths the length of second abscissa; transverse cubital vein oblique, inclivous, somewhat sinuous, one-half the length of second abscissa of cubitus which in turn is six-

fifths the length of first abscissa. Hind wing with anal lobe large, elongate oval, well separated off, and as long as submedian cell.

Abdomen sessile, broadly subfusiform; finely punctate at most; more or less maculated with yellow. Tergites folded under roundly and imbricate with the strongly convex sternites; second sternite without a small, opaque, finely and closely punctate spot anteriolaterally on each side. Females on last tergite with a distinct pygidial area which is strongly narrowed and excavate apically, the lateral margins glabrous. Males without a pygidial area on ultimate tergite, the puncturation of which is not appreciably more distinct than on penult segment; tergites without inflexed ventral processes; sternites simple, without tubercles or processes; the hypopygium simple, flat, subquadrate or subrectangular, with the apex entire and bisetose.

GENOTYPE: *Crabro spinifrons* Bingham, 1897 [=*Vechtia spinifrons* (Bingham)].

Distribution.—The genus *Vechtia* is an Oriental entity confined largely if not wholly to the Indo-Malayan province. The complex ranges from south-central Siam (Bangkok), through the Malay peninsula (Tenasserim) and Sumatra and well into Java (Buitenzorg and Malang).

DASYPROCTUS Lepeletier & Brullé

Dasyproctus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 801, (1835). [Type: *Dasyproctus bipunctatus* Lepeletier & Brullé, 1835.]

Megapodium Dahlbom, Hymen. Europ., I, p. 295, (1844). [Type: *Megapodium Westermanni* Dahlbom, 1844.]

Megalopodium Schulz, Spolia Hymenopterologica, p. 202, (1906). [Emendation for, and isogenotypic with *Megapodium* Dahlbom, 1845.]

The dull opaque habitus, the biepicnemiate mesopleura, and the distinctively shaped petiolate abdomen, stamp *Dasyproctus* as a discrete generic unit. As here understood, *Dasyproctus* agrees in the main with Kohl's characterization in 1915 of the "Artengruppe *Dasyproctus*"[69] and Arnold's definition[70] of the same entity in his monograph of the South African Sphegidae.

In 1915 Kohl, at the suggestion of Brauns, listed *Holcorhopalum* as a synonym of *Dasyproctus,* but although I am not familiar with Cameron's Central American group, I am reasonably certain that *Holcorhopalum* has little if anything in common with *Dasyproctus*.

Distribution.—The genus *Dasyproctus* comprises about fifty species, chiefly Ethiopian and Oriental in distribution, but it is also sparingly represented in the Australian and Eremian faunas. No representatives of it occur in the New World.

Ethology.—The species of *Dasyproctus* nest in the living flower stalks of aloes, lilies, brambles and similar plants, or in the abandoned holes made by wood-boring Bostrichid and Cerambycid beetles in the trunks of trees. The

69 Kohl: Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 328, (1915).
70 Arnold: Ann. Transvaal Mus., XI, p. 357, (1926).

nest is usually in the form of a tunnel, separated into several cells by plugs of triturated pith; each cell is provisioned with a number of Diptera.

Carpenter has recently reported that at Tanga on the East African coast, W. A. Lamborn found *Dasyproctus bipunctatus lichtenburgensis* Arn., nesting in hollow stems during August, 1917.[71] The prey stored consisted chiefly of the Ortalid *Rivellia*, with a few *Aciura tetrachaeta* Bezzi, and also a few unidentified Agromyzids and Dolichopodids. Numerous specimens of a Mutillid wasp, *Promecilla unicingulata* Bischoff, were reared from the nests of this *Dasyproctus*.

NEODASYPROCTUS Arnold

Thyreopus (species-group *Neodasyproctus*) Arnold, Ann. Transvaal Mus., XI, p. 373, (1926). [Type: *T[hyreopus] (Neodasyproctus) Kohli* Brauns (in Arnold, 1926).]

Arnold originally proposed this entity as merely a species group or subgenus, but recently has rejected it along with all the other generic and subgeneric categories of this general complex. Nevertheless, a critical study of the genotypic species, *N. kohli*, indicates *Neodasyproctus* is a valid group worthy of being accorded generic status.

Superficially *Neodasyproctus* resembles *Dasyproctus* but lacks the characteristic opaque dull matt habitus of that genus. Moreover, in the present group the antennal scapes are ecarinate; the scapal basin of the front is immarginate above; the mesopleura, although furnished with a short vertical carina before the middle coxae, lack a sharply margined epicnemium posteriorly for the reception of the middle legs; while the propodeum is coarsely punctate throughout and lacks any trace of a dorsal enclosure or lateral carinae; the mesosternum is rounded and ecarinate anteriorly; the hind wing has the anal lobe distinctly shorter than the submedian cell; and the pygidial area of the female is broad, flat and trigonal. Conversely, in *Dasyproctus*, the antennal scapes are sharply carinate lengthwise; the scapal basin of the front is sharply margined above; the mesopleura are furnished with two sharply margined epicnemia: one anteriorly on the prepectus which is continuous ventrally with the sharply margined mesosternum, and another posteriorly for the reception of the middle legs; while the propodeum as a rule is more or less coarsely areolate or reticulate and provided with distinct and well developed lateral carinae; the anal lobe of the hind wing is usually at least subequal in length to the submedian cell; and the pygidial area of the female is strongly narrowed and excavate apically. Furthermore, in *Dasyproctus* the pronotum is flat above with the anterior and lateral margins sharply and continuously carinate, whereas in *Neodasyproctus* the dorsal surface of the pronotum is both transversely tumid, furrowed and with the anterior but not the lateral margins sharply carinate.

Distribution.—This curious group is known at present only from South Africa.

71 Carpenter: Proc. R. Ent. Soc. London, (A), XVII, p. 48, (1942).

Ethology.—Arnold states that *Neodasyproctus kohli* is rubicolous, nesting in hollow stems.

ECTEMNIUS Dahlbom

Ectemnius Dahlbom, Hymen. Europ., I, p. 389, (1845). [Type: *Crabro guttatus* Van der Linden, 1829.]

Clytochrysus A. Morawitz, Bull. Acad. Sci. St. Petersbourg, VII, p. 454, (1864). [Type: *Crabro comptus* Lepeletier & Brullé, 1835.]

Thyreocerus A. Costa, Ann. Mus. Zool. Napoli, VI, p. 65, (1871). [Type: *Crabro crassicornis* Spinola, 1808.]

Mesocrabro Verhoeff, Ent. Nachr., XVIII, p. 70, (1892). [Type: *Crabro gutatus* Van der Linden, 1829. Isogenotypic with *Ectemnius* Dahlbom, 1845, *q. v.*]

Hypocrabro Ashmead, Canad. Entom., XXXI, p. 168, (1899). [Type: *Crabro decemmaculatus* Say, 1823.]

Pseudocrabro Ashmead, Canad. Entom., XXXI, p. 169, (1899). [Type: *Crabro chrysargyrus* Lepeletier & Brullé, 1835.]

Xestocrabro Ashmead, Canad. Entom., XXXI, p. 169, (1899). [Type: *Crabro sayi* Cockerell, 1910.]

Xylocrabro Ashmead, Canad. Entom., XXXI, p. 169, (1899). [Type: *Crabro stirpicola* Packard, 1866.]

Metacrabro Ashmead, Canad. Entom., XXXI, p. 169, (1899). [Type: *Crabro lituratus* Panzer, 1805.]

Protothyreopus Ashmead, Canad. Entom., XXXI, p. 170, (1899). [Type: *Crabro rufifemur* Packard, 1866.]

Nesocrabro Perkins, Fauna Hawaii, I, pt. 1, p. 25, (1899). [Type: *Crabro rubrocaudatus* Blackburn, 1886.]

Oreocrabro Perkins, Trans. Ent. Soc. London, p. 146, (1902). [Type: *Crabro abnormis* Blackburn, 1886.]

Hylocrabro Perkins, Trans. Ent. Soc. London, p. 147, (1902). [Type: *Crabro (Solenius) tumidoventris* Perkins, 1899.]

Melanocrabro Perkins, Trans. Ent. Soc. London, p. 147, (1902). [Type: *Crabro (Solenius) curtipes* Perkins, 1899.]

Xenocrabro Perkins, Trans. Ent. Soc. London, p. 148, (1899). [Type: *Crabro nesiotes* Pate, 1937.]

Lophocrabro Rohwer, Connecticut St. Geol. & Nat. Hist. Surv., Bull. no. 22, p. 667, (1916). [Type: *Crabro singularis* Smith, 1856.]

Merospis Pate, Entom. News, LII, p. 121, (1941). [Type: *Ectemnius (Merospis) cyanauges* Pate, 1941.]

The genus *Ectemnius*, as understood here, is approximately equivalent to the group which Kohl defined as the "Artengruppe *Crabro*."[72] Many authors have erroneously applied Lepeletier and Brulle's name *Solenius* to it.

The present complex is one of the largest genera of the Pemphilid wasps. About one hundred and fifty species have been described which are referable to it. These species are very diverse in their structural features, and seventeen names have been proposed for various subgeneric entities within the complex. Of these, the following may be recognized as discrete subgenera: *Ectemnius* in the restricted sense, of which *Mesocrabro* Verhoeff is an absolute synonym; *Clytochrysus* Morawitz; *Thyreocerus* Costa; *Hypocrabro* Ashmead, a large assemblage of which Ashmead's groups *Pseudocrabro*, *Xestocrabro*, and *Xylocrabro* are synonyms; *Metacrabro* Ashmead; *Protothyreopus* Ashmead; *Lophocrabro* Rohwer; and *Merospis* Pate.

72 Kohl: Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 21, (1915).

About twenty endemic Pemphilid wasps have been described from the Hawaiian Islands. For the reception of these peculiar forms, Perkins erected five genera: *Nesocrabro, Oreocrabro, Melanocrabro, Hylocrabro,* and *Xenocrabro*. All of these entities are apparently most closely related to *Ectemnius* in the broad sense, and probably are merely peculiar subgenera of it. Undoubtedly *Nesocrabro* forms a distinct and natural group worthy of subgeneric rank, but the remaining subgenera of Perkins should probably be combined and grouped under the subgeneric name *Oreocrabro*, at least until such time as the Hawaiian Pemphilid fauna may be thoroughly and adequately reviewed.

Distribution.—The genus *Ectemnius* is cosmopolitan with representatives in all the major zoögeographic regions of the world.

Ethology.—The great majority of the species of *Ectemnius* are xyloecetes, nesting in logs, old stumps, dead branches, brambles and canes, or in the abandoned holes of wood-boring beetles. A few construct their burrows in the soil. All provision their nests with a variety of Diptera.

LESTICA Billberg

Lestica Billberg, Enumeratio Insectorum, p. 107, (1820). [Type: *Crabro subterraneus* Fabricius, 1775.]
Solenius Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 713, (1835). [Type: *Solenius interruptus* Lepeletier & Brullé, 1835.]
Ceratocolus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 739, (1835). [Type: *Crabro alatus* Panzer, 1797.]
Thyreus Lepeletier & Brullé, Ann. Soc. Ent. France, III, p. 761, (1835); [*nec* Panzer, 1806]. [Type: *Apis clypeata* Schreber, 1759. Isogenotypic with *Clypeocrabro* Richards, 1935, *q. v.*]
Hypothyreus Ashmead, Canad. Entom., XXXI, p. 171, (1899). [Type: *Crabro subterraneus* Fabricius, 1775. Isogenotypic with *Lestica* Billberg, 1820, *q. v.*]
Clypeocrabro Richards, Trans. R. Ent. Soc. London, LXXXIII, p. 167, (1935). [Type: *Apis clypeata* Schreber, 1759. Proposed as a new name to replace, and isogenotypic with, *Thyreus* Lepeletier & Brullé, 1835, *nec* Panzer, 1806, *nec* Swainson, 1821.]

The genus *Lestica* corresponds to Kohl's 1915 Artengruppe *Ceratocolus*.[73] At least four major subdivisions occur within the genus, and these may be regarded as subgenera as follows: *Lestica* Billberg, in the restricted sense, of which *Hypothyreus* Ashmead is an absolute synonym; *Ceratocolus* Lepeletier & Brullé; *Clypeocrabro* Richards (olim *Thyreus* Lepeletier & Brullé); and *Solenius* Lepeletier & Brullé.[74]

Distribution.—The genus *Lestica* is a moderate sized complex, with representatives in all the major zoögeographic areas with the possible exception of the Australian Region. All the New World forms are referable to the subgenus *Solenius*.

Ethology.—The species of *Lestica* prey primarily upon Muscoidean flies and other Cyclorhaphous Diptera, but there are some records of moths being

73 Kohl: Ann. k. k. Naturhist. Hofmus. Wien, XXIX, p. 107, (1915).
74 Not to be confused with *Solenius* in the sense of Kohl, 1915 and other authors; that group is a subgenus of *Ectemnius* Dahlbom, 1845.

captured and stored in their burrows. The choice of nesting site varies in the different subgenera: the species of *Ceratocolus* and *Lestica* in the restricted sense construct their burrows in sandy soil; those of the subgenus *Solenius* in the stems of pithy plants such as brambles, catalpa and elders, in old rotten wood or logs, or in the abandoned holes of wood-boring beetles. The species of *Clypeocrabro* seem to utilize primarily the abandoned borings of other insects.

GENERA INCERTAE SEDIS

The following entities I know merely from the original descriptions which are usually so incomplete and unsatisfactory that the names cannot be placed with any certitude until the types have been studied carefully. Although treated here for the sake of convenience as genera, they may very possibly be merely subgenera, or, even more likely, synonyms of some one of the preceding groups which are recognized here as valid.

HOLCORHOPALUM Cameron

Holcorhopalum Cameron, Trans. Amer. Ent. Soc., XXX, p. 264, (1904). [Type: *Holcorhopalum fovealum* Cameron, 1904.]

Cameron's description of this Mexican entity is very unsatisfactory. If *Holcorhopalum* is a Pemphilid wasp, it apparently combines certain features of both the *Euplilis* and *Lindenius* groups, and may possibly be related to *Amaripa*. In 1915 Kohl, at Braun's suggestion, placed it as a synonym of the Old World genus *Dasyproctus*, but I consider it very unlikely that *Holcorhopalum* has anything in common with that exclusively Old World complex.

ISCHNOLYNTHUS Holmberg

Ischnolynthus Holmberg, An. Mus. Nac. Buenos Aires, (3), II, p. 472, (1903). [Type: *Ischnolynthus foveolatus* Holmberg, 1903.]

On the authority of Brèthes,[75] I have tentatively referred *Ischnolynthus* to *Crossocerus* (sens. lat.), although I suspect that eventually it will be found to be a member of the *Foxita* rather than the *Crossocerus* complex.

MICROCRABRO Saussure

Crabro (Microcrabro) Saussure [in Grandidier], Hist. Nat. Madagascar, XX, (Hymen.), p. 574, (1892). [Type: *Crabro (Microcrabro) micromegas* Saussure, 1892.]

Saussure established this group as a subgenus for the reception of a peculiar little slender Malagasy species. I know it only from the original description and figures, and from them infer that it may be related to, or perhaps a synonym or subgenus of, the genus *Crossocerus*.

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75 Brèthes: An. Mus. Nac. Buenos Aires, (3), XIII, p. 282, (1911).

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Generic and Subgeneric Names