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REVIEW OF SOME CHALCIDOID GENERA RELATED TO
CEROCEPHALA WESTWOOD

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THIS review of some genera related to *Cerocephala* Westwood was occasioned by difficulty experienced in placing satisfactorily specimens received for identification. It is hoped that the following treatment will eliminate some of the existing confusion regarding these genera and make identification somewhat more certain.

Cerocephala and its allies have been associated by most authors with the genus *Spalangia* Latreille to form a subfamily Spalangiinae or a tribe Spalangiini in the family Pteromalidae. In my opinion *Cerocephala* and its allies are not closely related to *Spalangia* and should form a separate group for which I propose the name Cerocephalinae. Although resembling each other in many respects, the two groups have quite different host relations and can be separated by several good characters. The Spalangiinae are all parasitic in dipterous puparia, while the Cerocephalinae so far as known are all associated with Coleoptera.

The Spalangiinae and Cerocephalinae may be separated by the following dichotomy:

Hind tibia with one calcarium. Antennae inserted at the extreme anterior margin of head, never separated at base by a frontal carina; funicle always 7-segmented. Forewing without a callus or tuft of bristles at the proximal end of the marginal vein and without transverse fuscous bands; scutellum usually with a punctate cross furrow before apex. Spalangiinae Westwood

Hind tibia with two calcaria. Antennae inserted well above extreme anterior margin of head although frequently distinctly below ventral extremities of eyes, always separated at base by a frontal carina or prominence; funicle 5- or 6-segmented, or rarely 7-segmented in some males. Forewing

always with a callus at proximal end of marginal vein, this callus frequently but not always bearing a tuft of erect bristles; usually with a transverse fuscous band behind stigmal vein and another at juncture of submarginal and marginal veins but occasionally without bands; scutellum without a cross furrow before apex . . . Cerocephalinae, new subfamily

Because of their bicalcarate hind tibiae the cerocephalines would run to the family Miscogasteridae in Ashmead's key to families of Chalcidoidea (Mem. Carnegie Mus., vol. 1, p. 228, 1904), and in that group, as constituted by Ashmead, they closely resemble some apterous forms in the subfamily Lelapinae, from which they differ principally by the absence of a neck on the propodeum and by differences in the shape of the head. I do not consider the Miscogasteridae to be separable as a family from the Pteromalidae. Instead, I think it should be combined with the Pteromalidae to form a large family made up of numerous smaller groups including the Cerocephalinae, Spalangiinae, and Lelapinae among numerous others.

Family PTEROMALIDAE

CEROCEPHALINAE, new subfamily

Eight genera are here included in the Cerocephalinae, viz: *Choetospila* Westwood, *Theocolax* Westwood, *Cerocephala* Westwood, *Theocolaxia* Girault, *Paralaesthia* Cameron, *Acercephala* new genus, *Neosciatheras* Masi, and *Sciatherellus* Masi. No representatives of *Paralaesthia*, *Neosciatheras*, and *Sciatherellus* have been available for study, and they are placed in the generic key solely on the basis of the descriptions. No doubt some genera have been omitted that eventually may prove to belong here.

Four genera that have previously been associated by some authors with *Cerocephala* and *Spalangia* have been excluded from Cerocephalinae. These genera are discussed at the end of the paper.

Description.—Head varying in shape from subcircular to distinctly oblong; below antennae usually concave, the margins of concavity frequently armed with one or more sharp protuberances or teeth on each side; if not concave then face with striae converging toward clypeus; antennae inserted at or below middle of head but always distinctly above clypeus and always separated at base by a raised carina or narrow plate which is frequently but not always produced anteriorly to form a sharp tooth or spine between the antennae; malar groove absent; occiput carinately margined above; head attached to neck of pronotum very close to vertex. Pronotum large, subconical, sloping from posterior margin to neck without any abrupt angulations either dorsally or laterally; parapsidal grooves distinct and complete; axillae either

just touching at the median line or narrowly separated; scutellum nearly flat, without a cross furrow; propodeum not declivous, its dorsum lying in a plane only a little lower than that of scutellum, without carinae or lateral folds and not produced into a neck posteriorly; prepectus moderately large, triangular; mesopleuron with a weak femoral impression. Wings either present or absent; when winged, marginal vein of forewing as long as submarginal or longer, with a distinct callus or thickening at its juncture with submarginal, this callus often but not always bearing a tuft of erect bristles; stigmal vein never more than one-fourth as long as marginal, usually much shorter; postmarginal vein never longer than stigmal, usually weak, and sometimes absent; discal cilia absent or vestigial but marginal cilia moderately long and dense; hind wing unusually large with the marginellian vein usually longer than submarginella. Forewing usually with one or two fuscous areas or cross bands. Hind tibia with two slender, unequal, and often very short spurs. Abdomen petiolate; ovipositor usually shortly exerted, rarely half as long as abdomen; gaster of female subcylindrical, sometimes flattened above or a little compressed from the sides; of male compressed dorsoventrally and subtruncate at apex. Tegument of head and thorax usually smooth and polished, occasionally sculptured.

KEY TO THE KNOWN GENERA OF CEROCEPHALINAE

1. Funicle 5-segmented in the female, 6-segmented in the male; club solid in both sexes. Forewing with a tuft of erect bristles at junction of submarginal and marginal veins (apterous and subapterous individuals of both sexes common) 1. *Choetospila* Westwood
- Funicle 6-segmented in female, 6- or 7-segmented in male; club of female either solid or indistinctly 3-segmented; club of male may be solid, distinctly 2-segmented or indistinctly 3-segmented. Forewing with or without a tuft of erect bristles at junction of submarginal and marginal veins (apterous forms occur) 2
2. Head, pronotum, mesoscutum, and scutellum sculptured; axillae obliquely sulcate; forewing without a tuft of bristles at junction of marginal and submarginal veins 7
- Head dorsally, and mesoscutum entirely smooth and polished; pronotum usually smooth but sometimes sculptured; axillae and scutellum usually polished but sometimes more or less striated; forewing with or without a tuft of bristles 3
3. Mandibles unusually long and conspicuous 6
- Mandibles normal 4
4. Antennae inserted very distinctly below a line connecting lower extremities of eyes; head viewed anteriorly as long as broad or longer with sides parallel; subapterous or fully winged; fully developed wing with a tuft of bristles at juncture of submarginal and marginal veins, postmarginal vein absent or represented by merely a short stub.

2. *Theocolax* Westwood

- Antennae inserted higher up, never more than slightly below a line connecting lower extremities of the eyes; head viewed anteriorly usually narrowing below, rarely with the sides nearly parallel; forewing with or without a tuft of bristles at juncture of submarginal and marginal veins; postmarginal vein distinct but never longer than stigmal vein 5
5. Forewing with a distinct tuft of bristles at juncture of submarginal and marginal veins 3. *Cerocephala* Westwood
Forewing with a callus but without a tuft of bristles at juncture of submarginal and marginal veins 4. *Theocolaxia* Girault
6. Mandibles bidentate at apex; forewing with a tuft of bristles at juncture of submarginal and marginal veins 5. *Paralaesthia* Cameron
Mandibles with four distinct teeth at apex; forewing with a callus but without a tuft of bristles at juncture of submarginal and marginal veins 6. *Acerocephala*, new genus
7. Female: Antennae clavate, inserted a little below middle of head; scape not extending above vertex; first funicular joint about twice as long as pedicel; postmarginal vein subequal to stigmal vein, the latter rather short, the stigmal knob armed with a short tooth. 7. *Neosciatheras* Masi
Male: Antennae very long, filiform, inserted a little above middle of head; scape extending above vertex; funicular segments and club elongate, cylindrical; pedicel short; postmarginal vein nearly effaced; stigmal vein long, straight, and with the stigmal knob scarcely developed and unarmed 8. *Sciatherellus* Masi

1. Genus *CHOETOSPILA* Westwood

Choetospila WESTWOOD, Thesaurus entomologicus Oxoniensis, p. 137, 1874.

Choetospila DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 207, 1898.

Spalangiomorpha GIRAULT, Mem. Queensland Mus., vol. 2, p. 333, 1913.

Choetospila has been treated as a synonym of *Cerocephala* Westwood by Ashmead (Mem. Carnegie Mus., vol. 1, p. 369, 1904) and others but may be easily distinguished from that genus by the 5-segmented funicle of the female.

Spalangiomorpha was synonymized with *Choetospila* by Girault (Insecutor Inscitiae Menstruus, vol. 5, p. 37, 1917) and later with *Cerocephala* by the same author in one of his privately published pamphlets [Indications (in new insects) of ruling power in nature, p. 3, 1925]. In a still later publication Girault (Trans. and Proc. Roy Soc. South Australia, vol. 53, p. 319, 1929) again referred to the genotype species, using the generic name *Spalangiomorpha* but pointing out that the species agreed with *Choetospila* as characterized in a table of genera by Masi (Nov. Zool., vol. 24, p. 188, 1917). I agree with Waterston (Rep. Grain Pest Committee, No. 9, p. 25, fig. 13, 1921) that *Spalangiomorpha* is certainly a synonym of *Choetospila* Westwood.

Type of the genus.—*Choetospila elegans* Westwood.

CHOETOSPILA ELEGANS Westwood

PLATE 47, FIGURES 1, 1a

Choetospila elegans WESTWOOD, Thesaurus entomologicus Oxoniensis, p. 157, pl. 25, fig. 10, 1874.—WATERSTON, Rep. Grain Pest Committee, No. 9, p. 25, fig. 13, 1921.

Spalangiomorpha fasciiventris GIRAULT, Mem. Queensland Mus., vol. 2, p. 334, 1913.

Spalangia metallica FULLAWAY, Proc. Hawaiian Ent. Soc., vol. 2, p. 286, 1913. (New synonymy.)

Spalangiomorpha fasciiventris Girault is certainly the same as *Choetospila elegans*, as was pointed out by Waterston in the report cited above. Both the description and the habitat lead to this conclusion.

The type of *Spalangia metallica* Fullaway is in the collection of the U. S. National Museum, and it differs in no way from typical *C. elegans*.

Choetospila elegans is parasitic upon stored grain weevils and has been distributed to many parts of the world in shipments of stored products. The National Museum collection contains specimens from various parts of the United States, Mexico, Puerto Rico, Panama Canal Zone, Surinam, Peru, Hawaii, Guam, South Australia, Java, India, Nigeria, and South Africa. Published records include many additional areas where the species occurs.

Very little seems to be known about the actual biology of *C. elegans* beyond the fact that it is usually associated with pests of stored grain. Its most common host apparently is the rice weevil, *Sitophilus oryza* (Linnaeus). *S. granaria* (Linnaeus), *S. linearis* Herbst, *Sitodrepa panicea* (Linnaeus), *Caulophilus latinasus* Say, *Callosobruchus quadrimaculatus* (Fabricius), and *C. chinensis* (Linnaeus) have been recorded as attacked by it. Very likely other grain-infesting beetles may serve as hosts, but no authentic records of such hosts have been published. A paper by Corbett and Miller (Federated Malay States Dept. Agr. Sci., ser. 13, p. 4, 1933) recording this species as a parasite of *Sitotroga cerealella* Olivier is not available for judgment as to the authenticity of the record. Squire (Diel Rep. Dept. Agri. British Guiana for 1924, pp. 121-124, 1925) records *C. elegans* as parasitizing an unidentified scolytid infesting British Honduras mahogany trees (*Sweitenia humilis*) in Guiana, and in the U. S. National Museum collection are 14 specimens of *C. elegans* labeled as having been reared by J. Zetek in 1924 in the Panama Canal Zone from a scolytid-infested piece of "Amargo" wood (*Vatairea* sp.).

The species is sufficiently characterized by the descriptions and figures given in the above-cited papers by Westwood and Waterston.

CHOETOSPILA FRATER (Girault), new combination

Spalangiomorpha frater GIRAULT, Mem. Queensland Mus., vol. 2, p. 334, 1913.

No representative of this Australian species is available for study. According to the description it differs from *elegans* principally by having the first funicular joint wider than long.

CHOETOSPILA TABIDA, new species

PLATE 47, FIGURES 2, 2a

This species is very similar to *elegans* but differs by having distinctly shorter antennae, by being entirely wingless in both sexes (so far as shown by the specimens at hand), by the propodeum being smooth and polished, by the ovipositor of the female not extending beyond the apex of the abdomen, and by the antennal club being unsegmented in both sexes.

Female.—Length 1.6 mm. Mostly smooth and polished, the head anteriorly, below level of insertion of antennae, weakly wrinkled, and the mesopleura reticulated.

Head viewed from in front a little longer than broad, nearly squarely truncate at vertex and at mouth, and with the sides practically parallel; compound eyes very small, subobsolete; ocelli represented merely by minute punctures; antennae inserted low down at approximately the lower fifth of head, separated at base by a sharp carina; scrobes short and shallow, poorly defined; face slightly depressed medially, with a small toothlike projection at the anterior margin on each side of clypeus; mandibles rather broad and stout. Head viewed laterally forming a rather broad ellipse, approximately twice as long as broad.

Antenna 8-segmented, strongly clavate, short, its total length only slightly greater than the frontal length of head; scape short, slightly thickened, about three times as long as broad; pedicel about half as long as scape and half as long as funicle; funicle 5-segmented, the segments all transverse and gradually increasing in width toward club; club ovoid, large, very nearly as long as entire funicle, approximately twice as long as broad and apparently not segmented.

Thorax a little narrower than head, approximately twice as long as broad; prothorax subconical, rounded at the sides, more than twice as long as mesoscutum; parapsidal grooves complete, very oblique; scutellum as long as mesoscutum, nearly circular; mesopleuron weakly reticulated; metapleuron polished; propodeum slightly longer than scutellum, weakly convex dorsally, without grooves or carinae, smooth and polished except for some very faint reticulation basad of the spiracles. Wings entirely absent.

Legs rather stout, the middle pair obviously somewhat shorter

and weaker than the other two pairs; anterior femur obviously swollen and its tibia a little thickened, each with a few moderately long hairs on its ventral margin and a few shorter ones on its outer face; posterior femur slightly swollen, with a few short hairs; posterior tibia slender at base but gradually increasing in thickness toward apex, sparsely hairy and with two rather long and slender but unequal calcaria; tarsi not thickened; posterior basitarsus equal to half the length of tibia.

Abdomen nearly as long as head and thorax combined, a little broader than thorax; petiole as long as broad, smooth; gaster elliptical in outline, twice as long as broad, smooth and polished dorsally and ventrally, nearly devoid of hairs dorsally but with numerous rather long slender bristles at apex beneath; first segment of gaster emarginate medially; ovipositor not protruding beyond apex of abdomen.

Head, thorax, legs, and abdominal petiole brownish yellow; anterior and posterior coxae whitish except dorsally; antennae concolorous with head except that club is usually, though not always, blackish; gaster wholly black or blackish.

Male.—Length 0.9 mm. Antennae uniformly testaceous, 9-segmented; funicle 6-segmented, the first four segments very short and difficult to distinguish, the last two larger; club solid, conical, a little longer than two preceding segments combined; abdomen about as long as thorax. Otherwise like the female and difficult to distinguish from it.

Type locality.—University Park, Md.

Type.—U. S. N. M. No. 57279.

Remarks.—Described from five females (one holotype) and one male collected by W. H. Anderson as pupae from the burrows of an unidentified cossonine beetle infesting a dead branch of an unidentified tree and reared to adults.

2. Genus THEOCOLAX Westwood

Theocolax WESTWOOD, Philos. Mag., ser. 3, vol. 1, p. 127, 1832.

Laesthia HALIDAY, Ent. Mag., vol. 1, p. 335, 1833.

Theocolax is very similar to *Cerocephala*, and it has been treated as a synonym by Walker (Ent. Mag., vol. 2, p. 148, 1833). It may be distinguished from *Cerocephala*, however, by having the antennae inserted distinctly below a line connecting the lower extremities of the eyes, the head viewed anteriorly as long as broad or a little longer, parallel-sided, and never with more than three small toothlike projections, one between the antennae and one on each side of the facial depression just above the base of each mandible. In some species the processes above the bases

of the mandibles are absent. Both subapterous and fully winged individuals occur. In the fully winged individuals there is a distinct tuft of erect hairs at the juncture of the marginal and submarginal veins of the forewing, exactly as in *Cerocephala*. The postmarginal vein is absent or represented by merely a short stub.

Type of the genus.—*Theocolax formiciformis* Westwood.

THECOLAX FORMICIFORMIS Westwood

PLATE 47, FIGS. 3, 3a; PLATE 48, FIGS. 1, 1a, 1b

Theocolax formiciformis WESTWOOD, Philos. Mag., ser. 3, vol. 1, p. 127, 1832:

Thesaurus entomologicus Oxoniensis, p. 138, pl. 25, fig. 11, 1874.

Laesthia vespertina HALIDAY, Ent. Mag., vol. 1, p. 336, 1833.

Cerocephala formiciformis (Westwood) WALKER, Ent. Mag., vol. 2, p. 149, 1834.

I examined Westwood's type of this species in the Hope Museum at Oxford, England, in 1927 and compared with it a specimen from Blankenburg, Thuringia, previously identified by Schmiedeknecht. This specimen, now in the U. S. National Museum, appeared to me to be homotypic. The National Museum collection also contains one specimen identified by Ruschka and said to have been reared from *Anobium striatum* Olivier at Stockholm, Sweden. This specimen is considerably paler in color than the homotype but does not seem to differ otherwise. In addition to these two specimens the collection possesses a series of 14 specimens from Auckland, New Zealand, said to have been reared from *Anobium*-infested timber by E. Bollard and D. Spiller. Apparently this series does not differ materially from the homotype except that one female in the lot has fully developed wings. Except for the perfectly developed wings, this winged specimen is exactly like the subapterous females.

Although the species has usually been described as wingless, as a matter of fact, in none of the individuals I have seen are the wings completely absent, usually being represented by small stubs approximately twice the length of the tegula. In the fully winged individual the postmarginal vein is represented by merely a very short stub; the marginal vein is a little longer than the submarginal; the stigmal vein is approximately one-sixth as long as marginal, slightly curved and not thickened at apex; the disk of wing is nearly bare; the marginal cilia are moderately long, and there is an erect tuft of black bristles at the junction of marginal and submarginal veins. There is a broad fuscous cloud embracing the apical half of the marginal and all of the stigmal vein and extending across the wing. The hind wing is about two-thirds as

wide as the forewing and rounded at its apex. The propodeum is weakly reticulated and slightly shining.

Theocolax formiciformis appears to be a common parasite of *Anobium*, having been recorded from several species of that genus. It is also said by several authors to attack (*Hylesinus*) *Leperisinus fraxini* (Panzer), but since it is known to have been confused in some instances with *Cerocephala cornigera* Westwood, a common parasite of this host, it seems very likely that all of the records of *Theocolax formiciformis* from *Leperisinus fraxini* actually refer to *Cerocephala cornigera* as was suggested by Waterston (Rep. Grain Pests Committee, No. 9, p. 12, 1921).

The species is known to occur in England, Sweden, Germany, and New Zealand and may be much more widely distributed. It is not known to occur in America.

THEOCOLAX BAKERI (Crawford), new combination

Cerocephala bakeri CRAWFORD, Philippine Journ. Sci., vol. 9, p. 460, 1914.

This Philippine species differs from *formiciformis* by being distinctly smaller, by lacking the toothlike protuberances on each side of the facial depression, and by the pedicel in the female being as long as the first and second segments of the funicle combined. It is also somewhat paler in color. All known specimens of the species are fully winged and have a conspicuous tuft of bristles at the junction of the marginal and submarginal veins. The head is oblong with parallel sides and with the antennae inserted distinctly below the ventral extremities of the eyes.

There are eight specimens in the U. S. National Museum, inclusive of the type series, all taken by C. F. Baker at Los Baños, Philippine Islands. One of these bears a label "on scolytid No. 847."

THEOCOLAX LITIGIOSA (Rondani)

Laesthia litigiosa RONDANI, Ann. Soc. Nat. Modena, vol. 1, p. 23, 1866; Arch. Zool., vol. 4, p. 191, pl. 7, fig. 7-8, 1866; Bull. Soc. Ent. Ital., vol. 9, p. 183, pl. 1, fig. 29, 1877.

Theocolax litigiosa DALLA TORRE, Catalogus Hymenopterorum, vol. 5, p. 207, 1898.

It is impossible to recognize this species from the short and very unsatisfactory descriptions by Rondani. The alleged host (a species of Cecidomyiidae) justifies a doubt that *litigiosa* belongs in *Theocolax*.

3. Genus CEROCEPHALA Westwood

Cerocephala WESTWOOD, Mag. Zool., vol. 2, Cl. IX, pl. 4, 1832.

Epimacrus WALKER, Ent. Mag., vol. 1, p. 368, 1833.

Sciatheras RATZBURG, Die Ichneumoniden der Forstinsecten . . . , vol. 2, p. 209, 1848.

Parasciatheras MASI, Nov. Zool., vol. 24, p. 189, 1917. (New synonymy.)

Proamotura GIRAULT, Insecutor Inscitiae Menstruus, vol. 8, p. 143, 1920 (new synonymy).—DODD (in part), Mem. Queensland Mus., vol. 9, p. 66, 1927.

On a succeeding page I have indicated that the genotypes of *Epimacrus* and *Sciatheras* are both synonyms of *Cerocephala cornigera* Westwood, the genotype of *Cerocephala*. This generic synonymy has been recognized by most authors for many years.

Parasciatheras was proposed as a subgenus of *Cerocephala*. The characters given in Masi's key for distinguishing the subgenus from *Cerocephala* do not function satisfactorily, and while there are certain differences between the two genotypes in head characters, these seem to be of no more than specific value. Accordingly the subgenus is suppressed.

Proamotura, described by Girault as a genus of Cleonymidae but compared by its author with *Spalangia* Latreille and *Spalangiomorpha* Girault, differs from *Cerocephala* only in minor head characters and some details of sculpture. Such differences as exist are at most of specific value only. Dodd redescribed *Proamotura aquila* Girault, the genotype, and placed in the genus three additional Australian species. All the species treated by Dodd, except the genotype, lack the tuft of erect bristles at the apex of the submarginal vein and are here transferred to *Theocolaxia* Girault.

CEROCEPHALA CORNIGERA Westwood

PLATE 47, FIGS. 4, 4a; PLATE 48, FIG. 3

Cerocephala cornigera WESTWOOD, Mag. Zool., vol. 2, Cl. IX, pl. 4, 1832.—

WALKER, Ent. Mag., vol. 2, p. 149, 1834.

Epimacrus rufus WALKER, Ent. Mag., vol. 1, p. 369, 1833.

Sciatheras trichotus RATZEBURG, Die Ichneumoniden der Forstinsecten . . . vol. 2, p. 209, pl. 3, fig. 1, 1848.

Epimacrus rufus Walker was synonymized with *C. cornigera* by Walker, and this synonymy has been generally accepted. Although I have not seen Walker's type, I believe the synonymy to be correct.

Sciatheras trichotus Ratzeburg has been considered a synonym by most authors but Masi (Nov. Zool., vol. 24, p. 188, 1917) expresses the opinion that it may be different from *cornigera*. In 1927 I examined the type of *Sciatheras trichotus* in the Ratzeburg collection at the Förstliche Hochschule in Eberswalde, Germany, and made the following notes upon it:

Female.—Head thick, occiput margined; a prominent toothlike carina between bases of antennae; face concave below antennae, with two small prominences on each lateral margin of the excavation; antenna strongly clavate, flagellum gradually increasing in

thickness from base of funicle to club, the latter pointed-ovate; first funicular segment one and one-half times as long as broad, second and third about as long as broad, fourth to sixth more or less slightly broader than long; club apparently solid, a little longer than two preceding segments; mesonotum smooth, parapsidal grooves deeply impressed, axillae smooth; scutellum nearly flat, smooth, except for some very minute and obscure reticulations apically. Propodeum granularly rugulose, without carinae, folds, or spiracular sulci, and nearly horizontal. Abdomen as long as thorax or a little longer, slightly compressed, shortly petiolate; ovipositor not quite half as long as abdomen. Marginal vein of forewing nearly as long as submarginal, with a tuft of black hairs at juncture of the two veins; postmarginal and stigmal veins short and subequal.

Subsequently during a visit to the Hope Museum at Oxford, England, I saw the type of *Cerocephala cornigera* Westwood and compared it with the above notes. This type is a male. Except for sexual characters it agreed with the notes on the Ratzeburg type.

Under the name *C. cornigera* in the British Museum general collection I found one headless female, and in the British collection one male also agreeing with my notes on the types.

The U. S. National Museum collection contains one female and a male reared by H. L. Parker in April 1936, at Hyerès, France, from *Scolytus multistriatus* (Marshall) and identified by me as *C. cornigera*. The female agrees with my notes on the Ratzeburg type of *trichotus* as well as with the Ratzeburg description, and the male apparently differs from the type of *cornigera* only by having the thorax entirely dark ferruginous instead of more or less fuscous or blackish on the scutellum and propodeum. This difference is believed not to be of specific significance since in other related species there is known to be a similar variation in color.

There is but little doubt that *Choctospila elegans* Westwood and *Theocolax formiciformis* Westwood have both been confused with *Cerocephala cornigera* in the literature. As pointed out by Waterston [Rep. Grain Pests Committee, No. 9, p. 12, 1921], the records of this species as a parasite of stored grain pests almost certainly refer to *Choctospila elegans*. The record in Dours (Cat. Syn. Hym. France, p. 92, 1874) of *C. cornigera* from *Anobium pertinax* Fabricius very probably refers to *Theocolax formiciformis*. The listing of *cornigera* by Giraud and Laboulbène (Ann. Soc. Ent. France, ser. 5, vol. 7, p. 422, 1877) as a parasite

of Aphidae and of *Odynerus* sp. is quite certainly erroneous. The species apparently normally attacks scolytids of the genera *Leperisinus*, *Scolytus*, *Chaetoptelius*, and *Phloeotribus*. The most complete description of the species is that by Russo (Boll. Lab. Ent. Agr. Portici, vol. 2, pp. 206-215, figs. 105-110, 1938).

So far as known, *C. cornigera* is confined in its distribution to the European continent and the British Isles.

CEROCEPHALA ECCOPTOGASTRI Masi

Cerocephala eccoptogastri MASI, Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 9, pp. 189-193, fig. 7, 1921.

Judged by Masi's description and figure as well as by the indicated host this species is very likely a synonym of *C. cornigera* Westwood. The types are said to have been reared from *Eccoptogaster* (probably *rugulosus* Ratzeburg) taken at Bengasi, Cyrenaica.

The figure published by Gonzales Ceballos (Las tribus de los Himenópteros de España, p. 204, 1943) under the name *Cerocephala eccoptogastri* Ratzeburg does not agree completely with Masi's description and figure. The head appears longer and apparently has only one tooth, instead of two, on each lateral margin of the facial depression. If the drawing is accurate it probably represents a species different from *eccoptogastri*. Ceballos has evidently confused the specific name with that of *Pachyceras eccoptogastri* Ratzeburg, an insect quite different from the one he figures.

CEROCEPHALA DINODERI Gahan

PLATE 47, FIGURE 5

Cerocephala (*Parasciatheras*) *dinoderi* GAHAN, Philippine Journ. Sci., vol. 27, p. 100, 1925.

As was pointed out in the original description, *dinoderi* is apparently very similar to *caelebs* Masi. The former was described from a unique female and the latter from a unique male. Subsequent to the description of *dinoderi*, the C. F. Baker collection of Hymenoptera was acquired by the U. S. National Museum, and in it were seven specimens of this species, one of them a male.

This male apparently differs from the description of *caelebs* by having the antennal flagellum much less conspicuously hairy, the hairs being very sparse and short, none of them as long as the segment from which it arises. The antennal club is much less distinctly segmented than in Masi's illustration of the antenna of *caelebs*, the dividing furrow being very shallow and indistinct. The striations on the face are present but appear to be somewhat weaker than illustrated for *caelebs*. The head dorsally, pronotum

posteriorly, mesoscutum, axillae, scutellum, and gaster are dark piceous with violaceous or metallic tints on the head and mesoscutum. The remainder of head and thorax, propodeum for the most part, and the abdominal petiole are rufotestaceous, the coxae all whitish and the remainder of legs somewhat paler than the underside of thorax but darker than the coxae. The abdominal petiole is a little longer than the posterior coxa, paler at base and at apex than in the middle, cylindrical, and granulosely punctate. The antennae are about twice as long as the length of the head, not at all clavate, consisting of a subcylindrical scape, a pedicel not quite twice as long as broad, one strongly transverse ring joint, seven funicular segments, and a club which is indistinctly 2-segmented, no thicker than the funicle, and about equal in length to the two preceding funicular segments. Funicular segments 1 to 4 are subequal, each about as long as the pedicel and narrowed at base; segments 5 to 7 are very slightly shorter and more compact. The sensilla are rather coarse and extend the whole length of the segments.

Described originally from Mount Maquilang, Luzón, Philippine Islands, as a parasite of *Dinoderus minutus* (Fabricius), this species has since been received from Buitenzorg, Java, where it is said to have been reared from *Calandra oryzae* (Linnaeus) by R. Awibowo. Other specimens in the collection, without host records, are from Laguna and Los Baños, Philippine Islands, and Deli, Sumatra.

CEROCEPHALA CAELEBS Masi

Cerocephala (*Parasciatheras*) *caelebs* MASI, Nov. Zool., vol. 24, p. 189, figs. 45-48, 1917.

This species was described from one male specimen collected in the Seychelles Islands.

It apparently differs from *dinoderi* Gahan mainly in the more distinctly hairy antennal flagellum.

CEROCEPHALA AQUILA (Girault)

PLATE 48, FIGURE 2

Proamotura aquila GIRAULT, Insector Inscitiae Menstruus, vol. 8, p. 143, 1920.—DODD, Mem. Queensland Mus., vol. 9, p. 67, 1927.

Cerocephala aquila very closely resembles *dinoderi* but may be distinguished from that species, as well as all others, by the completely striated dorsum of the prothorax.

Head viewed from in front nearly circular; antennae inserted above lower extremities of eyes; face depressed medially, mostly smooth within the depression, and with a more or less distinct carina running down the middle; lateral margins of the facial depression with a broad, shallow, not very distinct incision oppo-

site the base of each antenna but without any distinct teeth or projections; laterad of the depression and below the antennae rather strongly striated; front above antennae, vertex, temples, and cheeks mostly smooth and polished; scrobicular grooves short and weakly reticulated, separated by a longitudinal carina which originates just below the anterior ocellus and which is flattened and produced to form a sharp prominence between the bases of the antennae. Antennae rather distinctly clavate in the female, filiform in the male. Pronotum dorsally finely and strongly longitudinally striated; mesoscutum and axillae perfectly smooth and polished, except in the grooves which are weakly foveolated; scutellum smooth medially but distinctly longitudinally striated laterally; propodeum rather strongly ruguloso-reticulate, occasionally with indications of a median carina but more often without. Abdominal petiole of female about half as long as posterior coxae, of male equal in length to hind coxae; gaster in both sexes smooth and shining, in female about as long as thorax, in male much shorter than thorax; basal segment of female gaster triangularly emarginate medially, of male not emarginate; ovipositor sheaths about as long as the petiole. Forewing in both sexes with marginal vein very nearly as long as submarginal; postmarginal vein slightly shorter than stigmal; discal cilia weak, marginal cilia moderately long; tuft of hairs at apex of submarginal vein strong. Color of head and thorax varying from mostly reddish brown to mostly yellowish testaceous, the gaster and ovipositor sheaths usually black or very dark brown; antennal club black, remainder of antenna and all legs concolorous with the head and thorax. Anterior wing with a small fuscous cross band at apex of submarginal vein, and a large one embracing the apical half of marginal vein and all of stigmal vein.

Girault described this species from specimens reared from beetle-infested twigs of *Mallotus philippinensis* collected at Brisbane, Australia. Dodd gave a more complete description and reported the species from two additional Australian localities. One specimen from Ayr, North Queensland, Australia, identified by Dodd, is now in the U. S. National Museum.

Besides this Australian specimen the National Museum now possesses the following material which I have identified as *aquila*: Two females from Sigatona, Fiji, "ex lyctid." R. A. Lever, coll., December 1942; one male from Mount Maquilung, Luzón, reared from *Dinoderus minutus* (Fabricius) in bamboo by C. F. Baker; one male from Los Baños, Luzón. "ex bostrichid on bamboo." reared by S. M. Candana; one male from Laguna, Luzón, collected

on laboratory window by D. T. Fullaway and I. Dobrosky; four females from Santiago de las Vegas, Cuba, reared from larvae of *D. minutus* by A. Otero, January 26, 1933, under Acc. No. 9802a; and a large series of specimens reared by E. A. Chapin from stems of *Arundinaria longifolia* (bamboo) infested with *Dinoderus minutus*, *Lyctus* sp., and two or three other species of Coleoptera, the bamboo stems having been discovered in storage in Hoboken, N. J., but said to have originally come from Mexico. Of the several species of Coleoptera reared from these stems, individuals of *Dinoderus minutus* were by far the most abundant and in all probability this species was the actual host of the parasite.

In view of the habit of this species of attacking larvae infesting bamboo, it seems likely that it will eventually be found to be much more widely distributed than the above few records show.

4. Genus THECOLAXIA Girault

Theocolaxia GIRAULT, Lèse Majesté, new Insecta, and robbery, p. 1, 1924.

Cratomus DODD (not Dalman), Trans. Royal Soc. South Australia, vol. 48, p. 170, 1924.

Proamotura (Girault) DODD (in part), Mem. Queensland Mus., vol. 9, p. 66, 1927.

Theocolaxia was described in a single page, privately published, pamphlet printed at Gympie, Australia. The genus is monobasic, with *T. lessingi* Girault as its type. The short generic description is as follows:

"*Theocolaxia* nov. (Spalangiinae). Antennae 9-jointed, club solid, larger. Wings as *Neosciatherus* as to shape, venation, fringes. Pronotum square, exceeding mesoscutum. Parapsides shorter than scutum, convex. Axillar sutures meeting cephalad. Scutellum plane. Propodeum rugulose, irregular median and lateral carinae. Petiole short, abdomen ovate, equal rest. ovipositor $\frac{3}{4}$ it. Jaws 4-dentate."

Earlier in the same year A. P. Dodd described two Australian species in the genus *Cratomus* Dalman, but in 1927 he discovered they did not belong in Dalman's genus and transferred both species to *Proamotura* Girault. In the latter paper he described one new species and two new varieties, redescribed *P. aquila* the genotype of *Proamotura*, and gave a key for separating the species. According to the descriptions, all three of the species erected by Dodd differ from *aquila* Girault by lacking the tuft of erect bristles at the apex of the submarginal vein. Absence of this tuft is the most striking character differentiating the genus *Theocolaxia* from *Cerocephala* of which *Proamotura* is here considered to be a synonym. Accordingly I have transferred the three species described by Dodd to *Theocolaxia* and placed *Proamotura aquila* Girault in *Cerocephala*.

Two North American species described by Ashmead in *Cerocephala* also lack the tuft of hairs on the forewing and seem to agree, except in one respect, with the generic characters given in the descriptions by both Girault and Dodd. The male antennae of the only Australian species of which the male was known were described by Dodd as being 11-segmented consisting of a scape, pedicel, one ring joint, seven funicular segments, and an apparently solid club. A specimen identified by Dodd as a variety of that species is in the U. S. National Museum, and it agrees with that description. In males of the single North American species of which this sex is known, the antennae are 10-segmented, consisting of scape, pedicel, six funicular segments, and a distinctly 2-segmented club. No ring segment is visible, and the seventh segment beyond the pedicel, while closely resembling a funicular segment, is obviously more closely united with the apical segment than with the preceding and forms a part of the club. The antennae of the females of this species apparently do not differ from those of females of the Australian species, and the difference in the one sex I do not believe to be of generic importance.

THEOCOLAXIA LESSINGI Girault

Theocolaxia lessingi GIRAULT, Lèse Majesté, new Insecta, and robbery, p. 1, 1924.

This species is known only from the original description which is as follows: "*T. lessingi* nov. Black, glabrous; knees, tibia 1 beneath, tips tibiae, petiole red. Coxa 3, basal $\frac{1}{3}$ ovipositor, white, also apex club. Antennae red save club, base pedicel, funicles 5-6. Fore wing with cross-stripe distal half marginal to apex stigmal, also a central spot off bend of submarginal. Funicle 1 equal pedicel. Sand dunes, Main Beach, Southport, May 5, 1924."

The type is probably in the Queensland Museum.

THEOCOLAXIA VIRIDINOTUM (Dodd), new combination

Cratomus viridinetum DODD, Trans. Royal Soc. South Australia, vol. 48, p. 171, 1924.

Proamotura viridinetum DODD, Mem. Queensland Mus., vol. 9, p. 72, 1927.

According to Dodd this species is distinguished from the other Australian species by the presence of only one fuscous band on the forewing.

It was described from Lord Howe Island, Australia.

THEOCOLAXIA INSULARIS (Dodd), new combination

Cratomus insularis DODD, Trans. Royal Soc. South Australia, vol. 48, p. 171, 1924.

Proamotura insularis (Dodd) DODD, Mem. Queensland Mus., vol. 9, p. 68, 1927.

Described from specimens said to have been reared from rotte wood, found on Lord Howe Island, Australia.

THECOLAXIA INSULARIS var. **GRANDIS** (Dodd), new combination

Proamotura insularis grandis DODD, Mem. Queensland Mus., vol. 9, pp. 64, 68, figs. 2, 3, 1927.

Both sexes of this variety were described from North Queensland, Australia, where they were collected on tree trunks.

One male paratype of this form was received from its author and is now in the National Museum collection. The antenna of this specimen is 11-segmented, the scape rather thick, pedicel slightly longer than broad, ring segment fully as long as broad and narrower than the following segment, funicle 7-segmented with all its segments about equal in width and diminishing slightly in length from first to last, the club solid but with slight indication of a cross furrow and about twice as long as but no wider than the preceding segment. The head has a broad elevation between the bases of the antennae, but this is not produced into a prominent tooth or spine as in most other species. The face is moderately convex and strongly striated, with only a very shallow groove running from each antennal fossa to the clypeus, the margins of these grooves rounded and without any sharp angles or protuberances. The scrobes are moderately deep with sharp lateral margins and extend very nearly to the anterior ocellus. The vertex is perfectly smooth but the frons between the scrobes and the eye margins is striated like the face. The area behind the eyes is sparsely covered with deep punctures. The whole dorsum of the thorax is polished, except that the parapsidal grooves are weakly foveolated and the axillar grooves strongly so. The propodeum is ruguloso-reticulate without distinct carinae. The abdominal petiole is cylindrical and distinctly longer than the hind coxae. The wings are ample, with the marginal vein distinctly much shorter than the submarginal, the postmarginal about as long as the stigmal.

The color is nearly uniformly black with a slight metallic tinge, the hind coxae, all tibiae and tarsi and the underside of abdomen more or less fuscotestaceous. The wings are hyaline with a fuscous band beneath the stigmal vein but without any indication of a band behind the apex of submarginal vein.

Dodd states that after comparing this form with typical *insularis*, no specific differences could be found. On account of the larger size (*insularis* 2.75 mm., *grandis* 4 to 4.75 mm.) and the darker wings, he thought it was advisable to separate this mainland form from the Lord Howe Island insect.

THECOLAXIA PERPULCHRA (Dodd), new combination

Proamotura perpulchra DODD, Mem. Queensland Mus., vol. 9, p. 70, 1927.

Described from one female collected at Mount Tambourine.

South Queensland, Australia. In Dodd's key to species, *perpulchra* is separated from *insularis* on the basis of a difference in the length of the abdominal petiole. This is said to be plainly longer than wide in *perpulchra* while females of *insularis* are said to have it transverse. The scutellum of *perpulchra* is said to be dull metallic green.

THEOCOLAXIA PERPULCHRA var. METALLICA (Dodd), new combination

Proamotura perpulchra metallica DODD, Mem. Queensland Mus., vol. 9, p. 71, 1927.

Described from collected specimens taken in Cairns district, North Queensland, Australia. According to Dodd this form is distinguished from typical *perpulchra* by its more extensive metallic coloration.

THEOCOLAXIA SCOLYTIVORA (Ashmead), new combination

PLATE 47, FIGURES 7, 7a

Cerocephala scolytivora (Ashmead MS.) RILEY and HOWARD, Insect Life, vol. 4, p. 122, 1891. (Nomen nudum.)

Cerocephala scolytivora ASHMEAD, Proc. Ent. Soc. Washington, vol. 3, p. 33, 1894.

This species was described from southern Florida as a parasite of the scolytid *Loganius ficus* Schwarz. The types are in the U. S. National Museum.

Female.—Length 1.8 mm. Head viewed from in front very slightly longer than broad, distinctly convex in outline dorsally and less strongly so below; antennae inserted very nearly on a line with ventral extremities of eyes; face below antennae distinctly concave, the depression sharply margined laterally; between bases of antennae is a strong protuberance which is flattened and delicately margined above and terminates in a sharp and slightly upturned point; margin of facial depression with a shallow incision laterad of base of antenna, the lower angle of this incision slightly prominent but not forming a distinct tooth; scrobes not extending to the front ocellus; ocelli in an obtuse triangle, ocellocular line about equal to distance between posterior ocelli; eyes not prominent, equal in length to approximately half the length of head. Vertex, upper part of frons, cheeks, and whole area behind eyes smooth and polished; frons laterad of scrobes and face laterad of the depression weakly rugulose; area within facial depression mostly smooth.

Antennae consisting of scape, pedicel, six funicular segments and club. Scape bottle-shaped, rather short, slender at base, rather abruptly thickened beyond basal one-third; pedicel slightly longer than broad; first funicular segment as long as pedicel and a little longer than broad, slightly longer than second; segments

2-6 subequal in length but successively increasing very slightly in width, the second about as broad as long and the sixth only a little broader than long; club indistinctly 3-segmented, ovate, and about equal in length to two preceding segments.

Thorax mostly smooth and polished, the neck of pronotum, mesopleura, and mesosternum weakly reticulated; pronotum longer than mesoscutum and as long as broad or a little longer; parapsidal grooves not foveolate; scutellum about as long as mesoscutum, nearly flat; axillae very nearly meeting; axillar grooves weakly foveolated and distinct but not deeply impressed; propodeum finely and shallowly reticulated, dull, without lateral folds or median carina. Anterior and posterior femora rather broad; middle femur more slender; posterior tibia with two slender, unequal calcaria. Anterior wing about three times as long as broad, nearly devoid of discal cilia, the marginal fringe moderately long; submarginal and marginal veins nearly equal, marginal about seven times as long as stigmal, postmarginal a little shorter than stigmal.

Abdomen nearly as long as head and thorax combined; petiole distinctly longer than broad, about two-thirds as long as posterior coxae, broader at base than at apex, flattened and smooth dorsally; gaster a little narrower than thorax, slightly compressed from the sides, smooth and polished, the first tergite the longest and deeply incised medially; ovipositor sheaths exerted approximately one-third the length of gaster and slightly compressed.

General color yellowish testaceous, the mesonotum slightly darker than the pronotum, the apical two-thirds of abdomen dorsally, dark brown; antenna nearly uniformly reddish testaceous, its club sometimes a little darker; legs generally very slightly paler than thorax, their coxae often more or less whitish; wings hyaline with a broad fuscous band behind apex of venation and a narrow indistinct one at apex of submarginal vein.

Male.—Length 1.5 mm. Almost exactly like the female except that the abdominal gaster in dried specimens is hardly longer than broad, compressed dorsoventrally and truncate at apex; petiole very nearly twice as long as broad; antennae scarcely distinguishable from those of female, its funicular segments a little more loosely articulated and the transverse groove setting off basal segment of club deeper and more distinct. Unlike the male of *insularis*, the male of *scolytivora* shows no visible ring segment in the antenna, the funicle is 6-segmented and the club distinctly 2-segmented.

Redescribed from the type series comprised of nine females and six males.

THEOCOLAXIA PITYOPHTHORI (Ashmead), new combination

PLATE 47, FIGURE 8

Cerocephala pityophthori (Ashmead MS.) RILEY and HOWARD, Insect Life, vol. 4, p. 123, 1891.

Cerocephala pityophthori ASHMEAD, Proc. Ent. Soc. Washington, vol. 3, p. 32, 1894.

Originally described from four specimens now in the National Museum collection and said to have been reared from *Pityophthorus consimilis* LeConte taken at Haw Creek, Fla.

Agrees with the description of *scolytivora* except in the following particulars:

Female.—Length 1.4 mm. Frons laterad of scrobes and face laterad of the depressed area below the antennae more weakly sculptured, nearly smooth; antenna with the basal segments of flagellum more slender, a little narrower than pedicel, the first and second funicular segments subequal, each about as long as broad and each a little shorter than pedicel; club about as long as three preceding segments combined. Anterior and posterior femora more slender. Marginal vein a little longer than submarginal. Abdomen about as long as thorax, the petiole only slightly broader at base than at apex, about twice as long as broad; ovipositor one-third to nearly one-half as long as gaster. General color reddish testaceous, the vertex, dorsum of thorax, and whole of gaster piceous and more or less strongly tinged with a metallic sheen; legs reddish piceous, with the anterior and posterior coxae whitish except basally; antenna reddish, the club and usually the last funicular segment piceous; wings hyaline with a broad fuscous band embracing the stigmal vein and about the apical two-fifths of marginal vein, but without a band at apex of submarginal vein; ovipositor yellowish basally, the apical half blackish.

Male unknown.

Redescribed from the four females comprising the type series, and two females from Durham, N. C., said to have been reared from *Thysanoes fimbricornis* LeConte, December 13, 1942, by C. L. Massey.

5. Genus PARALAESTHIA Cameron

Paralaesthia CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 110, pl. 5, fig. 15, 15a, b, c, and f, 1884.

This genus, with *P. mandibularis* Cameron as its only included species, is unknown to me except by Cameron's description and figures. It is apparently related to *Acerocephala* but differs, according to the description, by having the mandibles three-fourths as long as the head and bidentate at apex, by having "a

wide and deep furrow extending from behind the ocelli to the antennae and carinated in the middle, the keel running down to the centre." The marginal vein is said to be longer than the submarginal, and there is a tuft of hairs at the junction of the two veins.

Cameron's figures of the male and female apparently differ so widely in characters of the head as to raise a suspicion that they are not congeneric. The male should be considered the holotype.

Described from Panama.

6. Genus ACEROCEPHALA, new genus

Because of the differently shaped head, greatly elongated mandibles, and the absence of a tuft of hairs at the juncture of the submarginal and marginal veins of the forewing, it seems advisable to remove *Cerocephala atrovioleacea* Crawford from *Cerocephala* and erect a new genus for it. The new genus apparently resembles *Paralaesthia* Cameron, but if Cameron's description is accurate they may be readily separated by the characters used in the key. *Acerocephala* differs further by the absence of any groove or depression down the middle of the frons.

Female.—Head large, viewed from in front subrectangular, very slightly broader at mouth than at vertex, its dorsal line nearly straight, its ventral line (when the mandibles are closed) squarely truncate, its sides straight and diverging slightly below; face deeply impressed; lateral margins of facial depression rounded, without projections; clypeus not defined; labrum large, completely exposed; mandibles large, about one-third as long as the length of head, squarely truncate at apex and each with four subequal short teeth; eyes small, not prominent, obviously much less than half the length of head; ocelli in a slightly obtuse triangle; ocellocular line approximately equal to distance between posterior ocelli; scrobes deep anteriorly, shallower above, not reaching to anterior ocellus; between the antennae a high, narrow, dorsally flattened plate originating some distance below anterior ocellus and either abruptly truncated or gradually declivous from a point just below the antennal foveae. Antennae inserted distinctly below the ventral margins of eyes, 9-segmented; scape slender at base, becoming thicker in apical two-thirds, about four times as long as broad, not compressed; pedicel pyriform, about one and one-half times as long as broad; funicle 6-segmented, the segments all narrower at base than at apex, subequal in length but successively increasing in breadth; first funicular segment as long as or longer than broad and no longer than pedicel, sixth very slightly broader than long; club ovate, solid,

with very slight indication of one transverse groove, very slightly longer than last two funicular segments combined and a little thicker than preceding segment. Pronotum a little longer than broad, narrowed anteriorly into a distinct neck; mesoscutum broader and shorter than pronotum, about twice as broad as long; parapsidal grooves deep, complete, and not foveolate; scutellum about as long as mesoscutum, weakly convex; axillae just meeting; axillar furrow not or very weakly foveolated; propodeum not declivous, about half as long as scutellum, without either median carina or lateral folds and with very shallow spiracular sulci; mesopleuron with a very shallow, nonfoveolated, femoral impression; prepectus moderately large, triangular; anterior and posterior coxae large, subequal; middle coxae much smaller; anterior femora distinctly swollen, as large as or larger than posterior pair; posterior tibia with two slender, unequal calcaria. Abdomen about as long as thorax, somewhat compressed from the sides, distinctly petiolate; petiole broader at base than at apex, flattened and smooth dorsally; basal segment of gaster deeply, triangularly incised at apical middle; ovipositor sheaths exerted about one-fifth to one-third the length of gaster. Forewing about three times as long as broad; marginal vein longer than submarginal; stigmal vein approximately twice as long as broad; postmarginal weak and not longer than stigmal; discal cilia vestigial; marginal cilia short; juncture of marginal and submarginal veins with a small but distinct callous but without a tuft of bristles. Posterior wing about two-thirds as broad and six-sevenths as long as anterior wing.

Male.—Antenna resembling that of female but 10-segmented, the club distinctly 2-segmented and with slight indication of a second cross furrow; first funicular segment nearly as long as pedicel. Abdomen a little shorter than thorax, compressed dorsoventrally, subtruncate at apex, the apical segments retracted; petiole a little broader at base than at apex; basal segment of gaster not so deeply incised at apical middle as in female. Otherwise like female.

Type of the genus.—*Cerocephala atrovioleacea* Crawford.

ACEROCEPHALA ATROVIOLACEA (Crawford), new combination

PLATE 48, FIGURE 5

Cerocephala atrovioleacea CRAWFORD, Proc. U. S. Nat. Mus., vol. 45, p. 314, 1913.

Female.—Length about 3 mm. Black, tinged with purple on head, underside of thorax and abdomen; thorax above faintly tinged with green; narrow border around the mouth, mandibles,

scape, and pedicel rufotestaceous; flagellum black and shining; abdomen with the petiole more or less rufous, the gaster black slightly diluted with red basally; legs concolorous with thorax except all tarsi and more or less of anterior tibiae reddish testaceous. Wings hyaline, the forewing with a brownish transverse band embracing all of stigmal vein and approximately the apical two-fifths of marginal vein; venation brownish, the callus black.

Body mostly smooth and polished; head mostly smooth but with scrobal cavity, narrow border along each side of scrobes, and the sloping inner walls of facial depression weakly aciculated and ventral surface of head weakly reticulated; raised plate between antennae polished dorsally, narrowly wedge-shaped, broadest anteriorly, and abruptly perpendicularly truncate just below antennae; labrum squarely truncate at apex; scrobal grooves deep and extending more than half the distance from antennal foveae to anterior ocellus; neck of pronotum weakly reticulated; mesopleura reticulated; propodeum for the most part very finely transversely lineated, smooth posteriorly; abdominal petiole obviously a little longer than broad and a little broader at base than at apex; gaster entirely smooth and polished, not quite as long as thorax; ovipositor slightly exerted, never more than one-fifth as long as gaster.

Male.—Unknown.

Remarks.—Redescribed from the type series and two subsequently acquired specimens. The types were reared from a scolytid infesting cones of pinyon (*Pinus edulis*) at Las Vegas, N. Mex. The two more recently acquired specimens are labeled as having been reared from *Conophthorus edulis* Hopkins infesting cones of *Pinus edulis* at Ute Pass, Colo., and are recorded under Hopkins U. S. No. 9099e.

ACEROCEPHALA AENIGMA, new species

PLATE 47, FIGURES 6, 6a; PLATE 48, FIGURES 4, 4a

The specimens upon which this species is based were at first believed to represent merely a varietal form of *atroviolacea*. More careful examination of the few specimens available has shown certain apparently constant characters by which they differ from *atroviolacea*, however, and makes it appear necessary to treat them as a separate species.

Female.—Length 2.75 mm. Agreeing with the description of *atroviolacea* except in the following particulars: Body shining black with no suggestion of green on dorsum or elsewhere; pedicel and apex of scape piceous; aciculations on front of head stronger

and the sculptured area obviously more extensive, embracing most of the area between the eyes from a little below the anterior ocellus to oral margin but smooth along inner orbits; raised plate between antennae very faintly aciculated dorsally, narrowly elliptical anteriorly and not perpendicularly truncated but sloping gradually from just below antennae to oral margin; labrum broadly rounded anteriorly; scrobal grooves relatively shallow and extending upward a little less than half the distance from antennal foveae to anterior ocellus; neck of pronotum a little more strongly reticulated; petiole of abdomen a little broader than long and nearly twice as wide at base as at apex; ovipositor exerted approximately one-third the length of gaster.

Male.—Length 2.5 mm. Very similar to the female except antenna somewhat longer and abdomen squarely truncate at apex. Antenna with 10 distinct segments and with more or less indication of another division on the club; scape approximately four times as long as thick, somewhat thickened in apical half; pedicel longer than thick; funicle 6-segmented, the first segment very slightly shorter than pedicel, about one and one-half times as long as broad, following segments subequal to the first in length but successively increasing slightly in width, the fifth and sixth a little broader than long; club a little broader than last funicular segment and a little longer than two preceding segments combined, its first segment closely resembling a funicular segment but a little less distinctly set off from the following segment. Abdominal petiole about as broad as long, faintly sculptured and broader at base than at apex; basal segment of gaster apparently broadly but not deeply emarginate at apex.

Type locality.—Prineville, Oreg.

Type.—U.S.N.M. No. 57280.

Remarks.—Holotype female, allotype, and one female paratype labeled as having been reared from *Pinus ponderosa* at Prineville, Oreg., June 2, 1935, by W. J. Buckhorn under Hopkins U. S. No. 18977D; one female paratype from *Pinus ponderosa*, Hacamore, Calif., June 6, 1931, by K. A. Salman under Hopkins U. S. No. 20755D; and one female paratype from *Pinus coulteri*, Mount Laguna, Calif., November 1940, by D. DeLeon under Hopkins U. S. No. 32842D.

7. Genus NEOSCIATHERAS Masi

Neosciatheras MASI, Nov. Zool., vol. 24, pp. 189-192, figs. 49, 50, 1917.

Neosciatheras is unknown to me except by the description. The genotype, *N. laticeps*, described in the same paper as the genus, is based upon a single female collected in the Seychelles Islands.

The genus apparently differs from all others treated here, except *Sciatherellus* Masi, by having the head and thorax distinctly sculptured instead of mostly smooth and polished. From *Sciatherellus*, known only in the male sex, it may be distinguished by the characters used in the key.

The antennae are said to be clavate, inserted below the middle of face but a little above a line connecting the lower extremities of the eyes, 10-segmented, without a ring segment, the funicle 6-segmented and the club indistinctly 2-segmented. The head, viewed from in front, is nearly as broad as long, the eyes prominent, and the cheeks curved. The axillae are rugoso-sulcate, and the scutellum similarly but less strongly sculptured. The propodeum has a deep, semielliptical, transverse excavation basally. The forewing is without a tuft of hairs at the juncture of marginal and submarginal veins, the marginal vein is about eight times as long as the rather short stigmal vein, the stigmal knob is armed with a short tooth, and the postmarginal vein is a little shorter than the stigmal. The wing beyond the basal cell is said to be yellowish gray ("flavido-grisescens") with the transverse fascia behind the juncture of marginal and submarginal veins and the macula adjacent to the stigmal vein obscure, the apical margin pallid. The abdominal petiole is almost as long as the propodeum, cylindrical and finely striated, and the gaster is about as long as thorax, smooth and shining, its first segment not incised at dorsal margin. The ovipositor is exerted one-third the length of gaster.

8. Genus *SCIATHERELLUS* Masi

Sciatherellus MASI, Nov. Zool., vol. 24, pp. 189, 192, figs. 51, 52, 1917.

The type species, *S. oryctinus* Masi, described in the same paper as the genus, was based on a single male specimen collected in the Seychelles Islands.

This genus, like *Neosciatheras* Masi, apparently differs from the other genera in this group by having the mesonotum punctate. It differs from *Neosciatheras* according to the description by having the stigmal vein about one-fourth as long as the marginal, the stigmal knob only slightly developed and without a process, the postmarginal vein almost effaced, the antennae inserted a little above the middle of head, the scape extending above the level of vertex, the flagellum very long and not thickened, and the propodeum without a transverse fovea at base. The forewing is without a tuft of bristles at the juncture of marginal and submarginal veins and has two transverse fuscous bands. The head, viewed from in front, is a little broader than long, and the face is obliquely striate without projections.

SPECIES WRONGLY PLACED IN CEROCEPHALINAE

One species described in *Theocolax* is quite certainly not a cerocephaline but a eupelmid.

EUELMELLA CANADENSIS (Provancher), new combination

Theocolax canadensis PROVANCHER, Nat. Canad., vol. 14, p. 35, 1883; Faune entomologique du Canada, p. 809, 1887.

Cerocephala canadensis (Provancher) ASHMEAD, Proc. Ent. Soc. Washington, vol. 3, p. 33, 1894.

No representative of this species has been seen by me but the description of the thorax cannot apply to any cerocephaline and does agree quite well with some of the subapterous eupelmids. O. Peck, of the Canadian Department of Agriculture, informs me that he once examined the type of the species in the Provancher collection and concluded it was a eupelmid but did not place it generically. It is here referred tentatively to *Eupelmella* Masi but may eventually prove to belong in some other subapterous genus of the Eupelmidae.

Ashmead's translation of Provancher's description is incorrect with respect to the mesothorax. This is said to be longitudinally hollowed out, not "longitudinally aciculated" as stated by Ashmead.

REMARKS ON SOME GENERA EXCLUDED FROM CEROCEPHALINAE

The following genera, which at one time or another have been associated by some authors with *Cerocephala* in the Spalangiinae, are considered not to belong in Cerocephalinae:

Paraspalangia Ashmead (Mem. Carnegie Mus., vol. 1, p. 334, 1904) was included in a key to genera of Spalangiinae with a manuscript species, *P. annulipes* Ashmead, named as the genotype. The type of this species is in the National Museum collection, and it belongs in the Tetrastichinae. The type specimen was re-described by Girault (Ann. Ent. Soc. Amer., vol. 9, p. 303, 1916) under a new generic and specific name, *Stigmatotrastichus emersoni* Girault. The generic name *Stigmatotrastichus* Girault is a synonym of *Paraspalangia* Ashmead, and the specific name *emersoni* Girault a synonym of *annulipes* Ashmead. This synonymy was indicated in the list of type species of the genera of chalcid flies by Gahan and Fagan (U. S. Nat. Mus. Bull. 123, p. 137, 1923) but without indication of where the genus belonged in the classification.

Pegoscapus Cameron (Ann. Rep. Estación Central Agronómica Cuba, p. 275, 1906), assigned to the Spalangiinae by Cameron and included in the treatment of that group by Schmiedeknecht (Gen-

era insectorum, fasc. 97, pp. 385, 386, 1909), has not been seen by me, but is certainly a fig insect (Agaonidae) as stated by Waterston (Trans. Ent. Soc. London, 1920, p. 129).

Tricoryphus Foerster (Hymenoptera Studien, vol. 2, p. 46, 1856) was originally described without included species. Thomson (Hymenoptera Scandinaviae, vol. 4, p. 209, 1875) redescribed the genus and included *T. fasciatus* Thomson which is the genotype. Ashmead (Mem. Carnegie Mus., vol. 1, p. 392, 1904) treated the genus as a synonym of *Cerocephala*, but Masi (Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 9, p. 240, 1921) declared it to be a good genus. The U. S. National Museum collection possesses two female specimens from "Deutschland" identified by Foerster as *Tricoryphus* and bearing an unpublished Foersterian specific name. These specimens agree with Thomson's description of *Tricoryphus fasciatus*. In my opinion, based upon these specimens, the genus *Tricoryphus* is closely related to *Apterolelaps* Ashmead and *Spalangiolaelaps* Girault and should be referred to the subfamily Lelapinae.

Spalangiopelta Masi (Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 10, p. 30, 1922) is unknown to me except by the description. Masi states that it is intermediate between Asaphini and Spalangiini. The 13-segmented antenna with three distinct ring segments, the presence of the malar grooves, the unexcavated face, the subobsolete parapsidal grooves, the presence of a transverse groove on the scutellum, the distinctly sculptured thorax and the metallic green color seem to exclude it from close relationship with *Cerocephala*. I am unable to place it definitely.

EXPLANATION OF PLATES

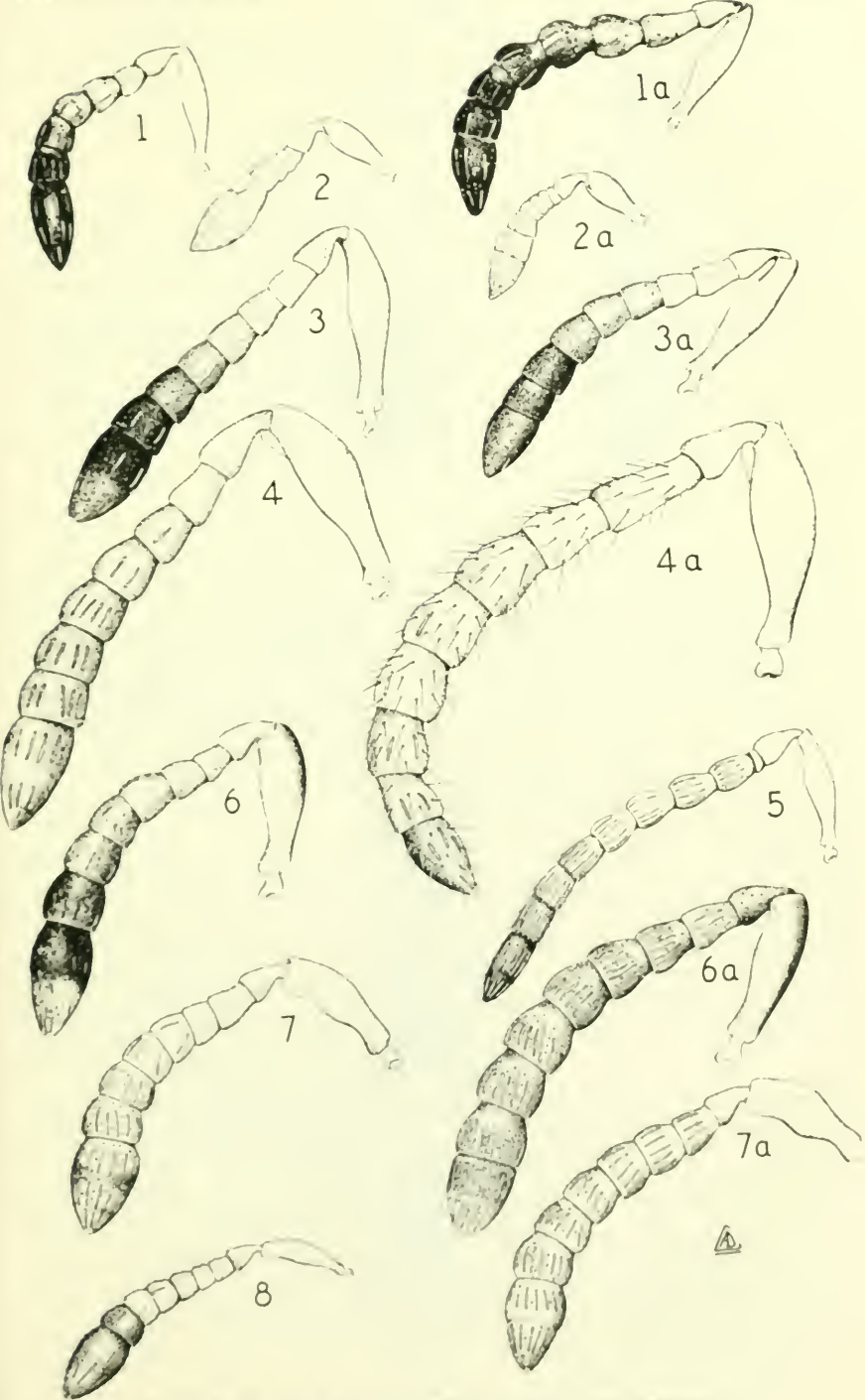
The drawings for the accompanying plates were made by Arthur Cushman, of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

PLATE 47

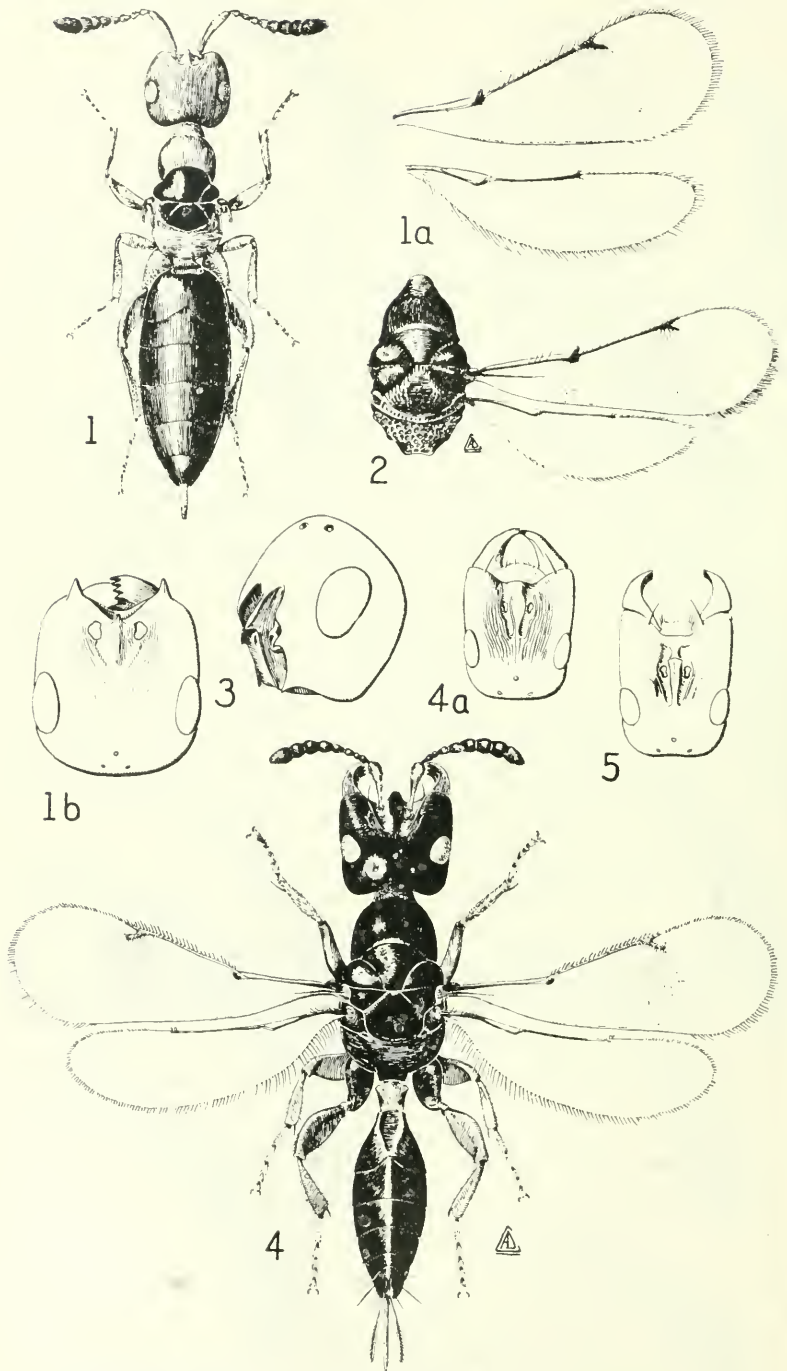
- 1-1a. *Choetospila elegans* Westwood: 1, Antenna of female; 1a, antenna of male.
- 2-2a. *Choetospila tabida*, new species: 2, Antenna of female; 2a, antenna of male.
- 3-3a. *Theocolax formiciformis* Westwood: 3, Antenna of female; 3a, antenna of male.
- 4-4a. *Cerocephala cornigera* Westwood: 4, Antenna of female; 4a, antenna of male.
5. *Cerocephala dinoderi* Gahan: Antenna of male.
- 6-6a. *Acercephala aenigma*, new genus and species: 6, Antenna of female; 6a, antenna of male.
- 7-7a. *Theocolaxia scolytivora* (Ashmead): 7, Antenna of female; 7a, antenna of male.
8. *Theocolaxia pityophthori* (Ashmead): Antenna of female.

PLATE 48

- 1-1b. *Theocolax formiciformis* Westwood: 1, Apterous female; 1a, anterior and posterior wings from female of alate form; 1b, head of female, anterior view.
2. *Cerocephala aquila* (Girault): Thorax and wings of female.
3. *Cerocephala cornigera* Westwood: Head of female in semiprofile.
- 4-4a. *Acercephala aenigma*, new genus and species: 4, Complete drawing of female; 4a, anterior view of head of female.
5. *Acercephala atroviolacea* (Crawford): Anterior view of head of female.



SPECIES OF CHOETOSPILA THECOLAX. CEROCEPHALA,
 ACEROCEPHALA, AND THECOLAXIA.
 FOR EXPLANATION SEE PAGE 376.



SPECIES OF THECOLAX, CEROCEPHALA, AND ACEROCEPHALA.
FOR EXPLANATION SEE PAGE 376.