MISCELLANEOUS DESCRIPTIONS AND NOTES ON PARASITIC HYMENOPTERA.

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Descriptions of eleven new species and one variety together with synonymical and distributional notes on several described species make up this paper. Species belonging to the families Braconidae, Chalcididae, Eurytomidae, Pteromalidae, Elasmidae, Eulophidae, Mymaridae, and Scelionidae are treated and these include representatives from Australia, Philippine Islands, Java, Mexico, United States, Cuba, Puerto Rico, St. Vincent, and Europe.

FAMILY BRACONIDAE.

Diaeretus oregmae, new species.

This species differs from *Diaeretus rapae* Curtis, as well as other species of the genus known to the writer, by having the antennae of the female 12-jointed and the joints of the flagellum unusually long, these being four or five times as long as broad. The ovipositor sheaths are unusually slender and slightly curved downward, resembling those of the genus *Trioxys*, but the abdomen is without the two curved processes at apex which constitute the main distinction between *Trioxys* and *Diaeretus*.

Female.—Length, 1.4 mm. Antennae as long as the insect, slender, 12-jointed; pedicel nearly as thick and about two-thirds as long as the scape; flagellar joints subequal, more slender than the pedicel, and each a little longer than the combined pedicel and scape. Head viewed from above as broad as the thorax at tegulae, about twice as broad as long; viewed from in front slightly broader than high; vertex and face very faintly sculptured, practically smooth; maxillary palpi short, 3-jointed; eyes nearly circular, distinctly hairy; ocelli forming an equilateral triangle, the postocellar line not over half as long as the ocellocular line; temples about half as broad as eyes, receding posteriorly; occipital carina delicate. Thorax ovoid; mesoscutum, scutellum, and mesopleura smooth, shining, parapsidal grooves effaced dorsally; scutellum small, nearly circular, margined laterally and apically by a delicate carina; propodeum declivous, distinctly areolated, with a very short median carina at base connecting with a very distinct and rather large four-sided diamond-shaped petiolar area, the costulae distinct and complete and forming with the marginal carina a large circum-

scribed area, on each side of the petiolar area; integument of propodeum practically smooth. Wing stigma rather short and broad; radius reaching about three-fourths of the distance to wing apex; metacarpus a little shorter than radius; basal vein well developed; medius, submedius, discoideus, and brachius indistinct, nearly effaced, the submedial and first brachial cells very poorly defined; other veins and cells absent; surface of wings including the basal cell rather closely ciliated; legs rather slender, the tibial spurs very short. Abdomen distinctly longer than the head and thorax, usually a little narrower than the thorax, practically smooth; first tergite very slender, distinctly a little narrower at apex than at base, tapering gradually from base to apex, about four times as long as broad at the middle, polished; second tergite triangular, smooth; following tergites collapsed, apparently smooth; ovipositor sheaths very slender, about two-thirds as long as hind basitarsus, curved slightly downward.

General color brownish-black or dark fuscous; scape, pedicel, first flagellar joint, and more or less of the second pale yellowish, rest of flagellum fuscous; vertex, frons, and temples dark fuscous; face, clypeus, cheeks, mandibles except apically, palpi, prothorax, legs including all coxae, and the first tergite beneath pale yellowish; mesoscutum and scutellum blackish or dark fuscous; mesopleura, metapleura, and propodeum lighter fuscous or brownish; abdomen dark brownish above, paler fuscous beneath; wings subhyaline, the veins and stigma fuscous.

Male unknown.

Type Locality.—Island of Panay, Philippines.

Type.—Cat. No. 43433, U. S. N. M.

Described from six female specimens (one holotype) said to have been taken ovipositing in *Oregma lanigera* Zehntner on sugar cane on the Island of Panay by A. W. Lopez.

Apanteles leucostigmus (Ashmead).

Fifteen specimens reared from *Eudamus proteus* Linnaeus at Santiago de las Vegas, Cuba, were recently received and identified by the writer. The species is now known to occur in St. Vincent, Puerto Rico, and Cuba.

FAMILY CHALCIDIDAE.

Antrocephalus stokesi (Crawford). (New combination).

Haltichella stokesi Crawford, Proc. U. S. Nat. Mus., vol. 41, 1911, p. 271.
Antrocephalus pomonellae Cameron, Proc. Linn. Soc. N. S. W., vol. 37, pt. 1, 1912, p. 200; Girault, Mem. Queensland Mus., vol. 3, 1915, p. 346 (new synonymy).

In the opinion of the writer, *Haltichella stokesi* Crawford and *Antrocephalus pomonellae* Cameron, both of which were described as parasites of *Carpocapsa pomonella* from New South Wales, are the same species. The types of *stokesi* are in the National collection and have been compared with Cameron's description

and also with specimens identified by A. A. Girault as *pomonellae* Cameron, the latter specimens reared from the codling moth in 1931 at Eastwood, New South Wales, by R. W. Burrell. Cameron pointed out the similarity in color of his species to that of Crawford, but since Crawford had placed his species in *Haltichella*, a genus with which Cameron's species did not agree, the latter concluded his species must be different. The types of *stokesi*, however, do not belong to *Haltichella*, since they have the hind femora finely serrated beneath, the frontal depression margined laterally by carinae which meet above the anterior ocellus, and the scutellum distinctly bidentate at apex. These characters as well as all others agree with the genus *Antrocephalus* and it is there that the species should be placed.

The species is somewhat variable in size and also in the color of the legs. Females examined ranged in length from 5.20 mm. to 3.40 mm. In two females, one of which is the holotype of *stokesi*, the legs, excepting the front coxae and the tarsal claws, are a clear red. In another female, however, only the middle and hind coxae, the hind femora, and the anterior and middle tarsi are clear red, the anterior and middle femora and tibiae and the hind tibiae and tarsi being piceous black with the apices of tibiae somewhat reddish. The legs of one male are considerably darker than those of the male type of *stokesi*, being entirely black except that the basal three-fourths of the hind femora are red.

FAMILY EURYTOMIDAE.

Eurytoma tylodermatis Ashmead.

Eurytoma tylodermatis Ashmead, Trans. Amer. Ent. Soc., vol. 23, 1896, p. 218.
Bruchophagus herrerae Ashmead, Psyche, vol. 9, 1902, p. 324 (new synonymy).

The type of *Bruchophagus herrerae*, a female from Coahuila, Mexico, reared from *Anthonomus grandis* Boheman, has been compared with the type of *Eurytoma tylodermatis* and, in the opinion of the writer, is the same species.

FAMILY PTEROMALIDAE.

Amblymerus verditer (Norton). (New combination).

Pteromalus verditer Norton, Trans. Amer. Ent. Soc., vol. 2, 1869, p. 327.
Nasonia tortricis Brues, Can. Ent., vol. 42, 1910, p. 259 (new synonymy).

In the opinion of the writer, *Pteromalus verditer* Norton and *Nasonia tortricis* Brues are the same species and belong in the genus *Amblymerus* Walker.

Pteromalus verditer was described from specimens reared from (*Lophyrus*) *Neodiprion abietis* (Harris) in Connecticut. In the United States National Museum collection are two females believed to be a part of the original type material. They agree with the description and bear the label "*Pteromalus verditer* Norton," perhaps in Norton's handwriting; also a small handwritten label "type." With these supposed types are two females reared from the larva of *Diprion simile* (Hartig), August 2, 1916, at New Haven, Connecticut, by M. P. Zappe; also one female reared from *Neodiprion abietis* at Glenboro, Manitoba, by R. D. Bird, August 3, 1926. The last mentioned specimen was identified by the writer, while the two from *D. simile* may have been named by J. C. Crawford.

Nasonia tortricis was described from specimens reared from (*Tortrix*) *Harmologa fumiferana* (Clemens), the spruce budworm, at Baskatong, Quebec. The type of this species has not been seen, but through the courtesy of Dr. C. T. Brues a broken paratype specimen has been examined. Eighteen females in the National collection, originally identified as *Nasonia tortricis* by J. C. Crawford and which were reared from the spruce budworm, August 9, 1912, at Pittsbury, New Hampshire, under Hopkins U. S. No. 11100b[2], have also been studied. These appear to the writer to be correctly identified. More recently the Bureau of Entomology has received from A. H. MacAndrews several specimens, reared from this same host at Westree, Ontario, August 15, 1928, which are without doubt the same species as the paratype and those named by Crawford.

A study of all the above-mentioned material shows no apparent differences between the parasite from the sawflies and that from the moth and, as already stated, I therefore believe *verditer* and *tortricis* are the same species.

The species bears very little resemblance to the genotype of *Nasonia* (which genus is a synonym of *Mormoniella* Ashmead).[1] It is excluded from *Mormoniella* (= *Nasonia*) at once by the wholly immargined occiput, by the quite differently shaped head, and by the fact that the antennae have three ring-joints instead of two. It conforms very closely to the characters of the genus *Amblymerus* Walker as represented by *Amblymerus amoenus* Walker, the types of which were seen and studied by the writer on the occasion of a visit to the British Museum.

[1]Gahan. Proc. U. S. Nat. Mus., vol. 71, Art. 4, p. 5.

FAMILY ELASMIDAE.

Elasmus maculatus Howard.

This species, previously reported from St. Vincent and Puerto Rico, occurs also in Cuba as shown by specimens received by the writer from S. C. Bruner, Santiago de las Vegas, reared as a secondary parasite of *Eudamus proteus* Linnaeus through *Apanteles leucostigmus* Ashmead.

Elasmus zehntneri Ferriere.

Elasmus zehntneri Ferriere, Bull. Ent. Research, vol. 20, 1930, p. 417.

Specimens reared by W. D. Pierce from *Topeutis intacta* Snellen at San Isidro, Occidental Negros, P. I., have been identified as this species by the writer. Mr. A. W. Lopez has also sent specimens of the species from La Carlota, Occidental Negros, reared by him from the same host, in August, 1930.

FAMILY APHELINIDAE.

Genus Tumidiscapus Girault.

The three known species of this genus may be distinguished by the following key:

1. Females 2
   Males 4
2. Ovipositor extending beyond apex of abdomen a distance slightly less than the length of hind basitarsus; third funicle joint as broad as long; length of body including ovipositor, 0.8 to 1.0 mm.; color nearly uniformly pale testaceous ..... **flavus** Girault
   Ovipositor extending beyond apex of abdomen a distance distinctly greater than the length of hind basitarsus; third funicle joint longer than broad; length of body including ovipositor more than 1 mm.; color not uniformly pale testaceous 3
3. Ovipositor extending beyond apex of abdomen a distance equal to first and second joints of hind tarsus combined, not nearly half as long as abdomen; general color fusco-testaceous, the abdomen usually somewhat darker than thorax; length of body including ovipositor about 1.5 mm ..... **orchelimumis**, new species
   Ovipositor extending beyond apex of abdomen a distance equal to first four joints of hind tarsus, nearly or quite half as long as abdomen; general color yellow, the abdomen scarcely darker than the thorax; length of body including ovipositor about 1.5 mm ..... **orthopterae** Gahan
4. Scape very broad, subquadrate, and uniformly testaceous ..... **orthopterae** Gahan
   Scape oval or elliptical, distinctly longer than broad 5
5. Scape uniformly testaceous; body nearly uniformly testaceous; wings hyaline ..... **flavus** Girault
   Scape with a blackish or dark fuscous area on lower apical margin; body fusco-testaceous; wings with a distinct fuscous tinge ..... **orchelimumis**, new species

Tumidiscapus orchelimumis, new species.

Tumidiscapus flavus Metcalf and Colby, Jour. Econ. Ent., vol. 23, 1930, p. 108 (not *flavus* Girault).

Female.—Length, including ovipositor, 1.5 mm.; length of forewing, 1.1 mm.; greatest width of forewing, 0.37 mm. General color fusco-testaceous, the head and thorax usually less strongly tinged with fuscous than the abdomen which is always fuscous laterally and sometimes mostly brownish; antennae fuscous and the legs very slightly infuscated; wings subhyaline with a very faint fuscous tinge.

Antennae 6-jointed; space nearly cylindrical; pedicel twice or a little more than twice as long as broad when viewed from the side; funicle 3-jointed; first joint about one and one-half times as long as broad, obliquely truncate at apex, the dorsal margin shorter than the ventral; second funicle joint nearly as long as pedicel, two and one-half to three times as long as broad; third funicle joint about one and one-half times as long as broad; club solid, about as long as the funicle and no thicker than the third funicle joint, its apex acute and slightly curved. Head transverse, the fronto-vertex granularly sculptured, rest of head apparently nearly smooth; eyes with very short inconspicuous pile; malar space rather long. Mesoscutum and scutellum slightly shining, with very fine shallow (almost granular) sculpture; parapsidal grooves deeply impressed; median groove on mesoscutum and scutellum very delicate, scutellum about as broad as long, with four setae; propodeum collapsed on either side of the middle leaving a sharp median ridge. Legs slender, the front tarsi distinctly longer than their tibiae, hind tarsi shorter than their tibiae. Forewings about three times as long as broad; marginal and submarginal veins nearly equal; stigmal short, very oblique; postmarginal absent; base of wing bare to apex of submarginal, beyond rather closely and finely ciliated but with a distinct hairless streak extending postero-proximad from the stigmal vein nearly to the posterior margin; longest marginal cilia approximately one-seventh as long as the greatest width of wing; hind wing with two rows of discal cilia along the anterior margin from apex of venation to apex of wing, the anterior row close to the margin and somewhat confused with the marginal fringe, remainder of discal ciliation about as in forewing; marginal cilia of hind wing not quite as long as breadth of wing. Abdomen conical, as broad as thorax at base and narrowing gradually to apex, approximately one and one-fourth times as long as head and thorax, the ovipositor sheaths extending beyond apex of abdomen a distance about equal to the length of first and second joints of hind tarsi combined.

Male.—Length, 0.9 mm.; length of forewing, 0.87 mm. Antennal scape broadly oval, about one-third longer than broad, compressed, with a large blackish area on the lower apical margin, the outer side of scape distinctly rugulose or reticulated; funicle somewhat shorter than in the female, its third joint not longer than broad, the second not over twice as long as broad. Abdomen not longer than the head and thorax, elliptical. Otherwise about as in the female.

Type Locality.—Anna, Illinois.

Type.—Cat. No. 43921, U. S. N. M.

Described from ten females and two males reared from eggs of *Orchelimum vulgare* Harris by C. L. Metcalf, April, 1929. The female holotype and five female paratypes are mounted on slides, the remaining specimens, including allotype, on card points.

This series of specimens was originally identified by the writer as *Tumidiscapus flavus* Girault for Metcalf and Colby, who published the record under that name in connection with the above-cited paper on the host insect. A reexamination of this material, the writer is sorry to say, shows it to represent apparently a different species, very similar to *flavus* but separable by the characters given in the foregoing key.

Four additional specimens reared from eggs of an unknown orthopteron at Carlisle, Pa., by E. J. Udine, January 29, 1931, and recorded in the U. S. Bureau of Entomology under Carlisle Laboratory Cage No. 7426, have been identified as this species but are not considered a part of the type material.

Prospaltella tristis (Zehntner).

Prospalta tristis Zehntner, Mededel. van het Proefstation Oost-Java, n. s. No. 29, 1896, pp. 11–12, pl., figs. 17–21.

Prospaltella tristis Mercet, Trab. del Mus. de Cien. Nat. de Madrid, No. 10, 1912, p. 215.

Aspidiotiphagus aleyrodis Ashmead, Proc. U. S. Nat. Mus., vol. 38, 1904, p. 139 (new synonymy).

Specimens reared from *Aleurodes bergi* Signoret on sugar cane at Passoeroean, Java, and believed to be a part of the original Zehntner material of *P. tristis* have been compared with the types of *Aspidiotiphagus aleyrodis* Ashmead which were reared from an aleyrodid on sugar cane at Manila, Philippine Islands. The two lots appear to the writer to be specifically identical.

A large number of specimens reared from an aleyrodid on sugar cane at Silay, Occidental Negros, P. I., by A. W. Lopez have been recently studied by the writer and identified as this species.

FAMILY EULOPHIDAE.

Tetrastichus oecanthivorus, new name.

Tetrastichus (Geniocerus) dispar Silvestri, Bol. Lab. Zool. Agri. Portici, vol. 14, 1920, p. 249 (not *T. dispar* Masi).

The *Tetrastichus dispar* described by Masi from the Seychelles Islands (Nov. Zool., vol. 24, 1917, p. 221) is evidently a different species from *Tetrastichus (Geniocerus) dispar* Silvestri, and the latter name is therefore a homonym regardless of whether *Geniocerus* is considered a good subgenus or a synonym of *Tetrastichus*. The specific name *oecanthivorus* is therefore proposed to replace *dispar* Silvestri.

The species is said to be parasitic in the eggs of *Oecanthus* in Italy and it is fully described and the parts figured in the above-cited publication.

Tetrastichus oecanthivorus variety **compar,** new variety.

Eleven specimens of a *Tetrastichus* reared from eggs of *Oecanthus* species collected at Carlisle, and Mount Holly Springs, Pa., by C. C. Hill and J. S. Pinckney were recently received through the Bureau of Entomology. These were found to agree almost exactly with the description of *Tetrastichus (Geniocerus) dispar* Silvestri =*oecanthivorus* Gahan (see above), and specimens of both sexes were sent to Dr. Silvestri at Portici, Italy, for comparison with the types. Dr. Silvestri made the comparison and in a letter reported that the only differences he was able to discover were a slight difference in size and the fact that the male scape of the American form is twice as long as broad, while in the Italian form it is less than twice as long as broad. He suggested that if these differences were constant the American form should be considered a new variety of *dispar* Silvestri.

In the series of specimens at hand there seems to be little or no variation with respect to the characters mentioned and accordingly the American form is given a varietal name as suggested. The writer is inclined to the opinion, however, that the acquisition of additional material may demonstrate that the two forms are inseparable.

Female.—Length, 1.8 mm. Shining metallic green; the scape, apical half or more of pedicel, all femora and tibiae, the first segment of the abdomen above and below except narrow lateral margins, and

more or less of the second segment pale yellowish or stramineous; the antennal flagellum black or brownish-black; all tarsi dark brown; wings hyaline, the venation pale.

Male.—Length, 1.45 mm. Metallic green; head for the most part, prepectus, tegulae, front and middle coxae, all femora, all tibiae, first segment of abdomen, and base of the second segment pale yellowish testaceous; tarsi brownish; scape and pedicel brownish testaceous, the flagellum darker; wings hyaline. In some specimens the vertex black or blackish.

The mesoscutum in both sexes is without a median groove, the parapsidal grooves and the two longitudinal furrows on the scutellum very distinct; propodeum with a slight median carina; sculpture of mesoscutum and scutellum very fine and shallow, of propodeum subobsolete. Other characters are as described and figured by Silvestri for *T. dispar*.

Type Localities.—Carlisle and Mt. Holly Springs, Pa.

Type.—Cat. No. 43916, U. S. N. M.

Described from eleven specimens (6 females and 5 males) reared from eggs of *Oecanthus* species by C. C. Hill and J. S. Pinckney. One male paratype and one female paratype are retained by Dr. Silvestri.

Tetrastichus pallidocinctus, new species.

Female.—Length, 0.92 mm. Aeneous black with a faint greenish tinge on head and thorax; the scape and pedicel pale testaceous; flagellum brownish testaceous; legs, including all coxae, white or very pale yellowish, the hind coxae more or less infuscated at base; basal one-third of abdomen pale above and beneath, the apical two-thirds black; wings hyaline, the venation pale.

Antennae weakly clavate; scape slender, a little longer than pedicel and first funicle joint combined; pedicel about twice as long as thick; funicle joints subequal or decreasing very slightly in length and increasing very slightly in thickness from first to third, the first as long or very nearly as long as the pedicel; ring-joints very minute; club 3-jointed, distinctly a little thicker than the third funicle joint and about as long as the second and third funicle joints together, the apical club joint conical and very small. Head a little broader than the thorax, weakly sculptured, eyes indistinctly hairy, malar space a little shorter than half the eye-height. Thorax with weak lineolate sculpture, the praescutum without a median groove and with no large punctures along the parapsidal grooves; scutellum with the two parallel grooves complete but very delicate; propodeum weakly shagreened, without median carina or lateral folds, the middle portion elevated into a slight ridge. Basal joint of anterior tarsus distinctly shorter than the second joint; middle and hind basitarsi very slightly shorter than the following joint. Forewing a little more than twice as long as broad; marginal and submarginal veins equal, the marginal about two and one-half

times as long as stigmal; submarginal with two erect bristles dorsally. Abdomen about as long as thorax, about twice as long as broad, not conical; ovipositor not exserted.

Male.—Length, 0.75 mm. Antennae about the same length as in female but not distinctly thickened toward apex, the scape thickened, about twice as long as broad, as long as the pedicel and two basal flagellar joints; funicle 4-jointed, the first joint shorter than the pedicel, subquadrate, second a little longer than the first but shorter than the pedicel, third and fourth each about like the second; club a little longer than the two preceding joints, 3-jointed, the apical joint conical and terminating in a short thick spine. Otherwise like the female except that the abdomen is smaller and more flattened.

Type Localities.—Jaronu and Portugalete, Cuba.

Type.—Cat. No. 43917, U. S. N. M.

Described from nine females and one male said to have been reared from pupae of a lepidopterous leaf miner in sugar cane by L. C. Scaramuzza under Tropical Plant Research Foundation Nos. 3874 and 3875. The host is being described as a new genus new species of Elachistidae by August Busck.

Tetrastichus oncideridis, new species.

Female.—Length, 1.8 mm. Nearly uniformly dark reddish-brown but with oral region, knees, apices of all tibiae narrowly, all tarsi, very narrow band at base of abdomen, and the last tergite yellowish; wings hyaline; antennae concolorous with the body. Head transverse, very weakly sculptured; antennae rather long, the three funicle joints subequal and each about twice as long as broad; club very slightly broader than the funicle and approximately as long as the two preceding joints together. Pronotum, mesoscutum, and scutelium with very fine shallow reticulation; praescutum about as broad anteriorly as long down the middle, with a distinct median longitudinal groove; scutellum slightly convex, about as broad as long, the two longitudinal grooves very distinct and rather close together, the sclerite between the grooves about as broad as the lateral sclerites; propodeum very short medially, without carinae and practically smooth although apparently with some very faint reticulations. Forewing more than twice as long as broad, the marginal vein slender, much longer than the submarginal and fully four times as long as the moderately long stigmal; postmarginal absent; the submarginal bears about four or five erect but not very large setae. Legs normal. Abdomen conic ovate, narrower than the thorax and about twice as long as the thorax, the ovipositor exserted a little more than the length of the last tergite.

Male.—Length, 1.6 mm. Black, more or less shining; antennae dark brown; a spot or line in front of ocelli sometimes yellowish; a narrow line on either side of mesoscutum bordering the anterior projection of the axillae also yellowish; trochanters, tibiae except a variable band beyond the middle, and tarsi pale yellow; wings hyaline. Antennae

longer than in the female, the funicle 4-jointed, the first funicle joint as broad as long, following three joints subequal and each about twice as long as broad, the funicle joints each furnished with a whorl of long hairs; club slightly longer than the two preceding joints together, not broader than funicle, 3-jointed, the joints each with long hairs similar to those of the funicle, the apical joint conical and terminating in a spine; sculpture of head and thorax as in the female. Abdomen not longer than thorax, and much narrower, the sides nearly parallel. Otherwise like the female.

Type Locality.—French Creek, W. Va.

Type.—Cat. No. 43918, U. S. N. M.

Described from five females (one type) and three males (one allotype) said to have been reared from *Oncideres cingulata* Say by F. E. Brooks under Quaintance Nos. 24323, 24327, 24328, 24329, and 24332.

Thripoctenus vinctus, new species.

Very similar to *T. brui* Vuillet but slightly smaller, with the second funicle joint globose, the wings somewhat narrower, and the abdomen mostly blackish with the base pale.

Female.—Length, 0.75 mm.; length of forewing in type, 0.50 mm., width of forewing in type, 0.16 mm. Head and thorax black and shining, apparently without sculpture; antennae and legs pale yellow, the middle and hind coxae infuscated, at least basally; wings hyaline; abdomen usually pale basally with the apical two-thirds blackish or fuscous. Head viewed from above transverse, about twice as broad as long, somewhat broader than thorax at tegulae; frons and vertex with numerous setae; eyes sparsely but distinctly hairy; antennal scape slender; pedicel ovate, thicker than either scape or funicle and nearly twice as long as thick; ring-joint very minute; first funicle joint slightly longer than broad, second nearly globose; club ovate, acuminate, about as thick as pedicel and about as long as the pedicel and first funicle joint combined, with one more or less distinct cross furrow at or a little before the middle, the joints otherwise fused; the two funicle joints with numerous moderately long hairs which are arranged in an apical and a basal whorl on each joint. Thorax nearly twice as long as broad; pronotum short, mostly concealed from above, the posterior margin with a row of setae; mesoscutum about one and one-half times as broad as long, the parapsidal grooves not sharply impressed, the praescutum with four setae and the scapulae with one each; axillae small, widely separated, and each with one weak seta; scutellum slightly broader than long and bearing a single pair of long setae; propodeum smooth, without carinae. Forewings rather small but extending beyond the apex of abdomen; the marginal vein much longer than submarginal; stigmal subsessile and about twice as long as the short postmarginal; submarginal vein with two long setae dorsally and one ventrally;

marginal vein with about seven long setae; surface of wing bare behind the submarginal vein, except for a single bristle near base of marginal vein, and with an extension of this bare area along the posterior margin reaching to a point about opposite the middle of marginal vein, this area limited anteriorly by a very distinct row of cilia which originates at the base of marginal and extends distally in a broad curve to the posterior margin of wing, the surface distad of this line closely and nearly uniformly ciliated; longest marginal cilia equal to nearly half the wing width; hind wing rather narrow, the longest marginal cilia much longer than the greatest wing breadth; discal cilia sparse especially so in the apex of wing where there is only a single row around the margin. Legs normal, the basal joint of each tarsus a little shorter than the apical joint. Abdomen ovate, about equal in length to head and thorax and as broad as the head, with a petiole which is a little broader than long; tergites apparently smooth, each with a transverse row of hairs before the apex, the row on second and third tergites interrupted at middle; ovipositor originating near middle of abdomen, ovipositor sheaths short and barely extended beyond apex of abdomen.

Male unknown.

Type Locality.—Laguna, Luzon, Philippine Islands.

Type.—Cat. No. 43919, U. S. N. M.

Described from eight female specimens received from D. T. Fullaway, and said to have been reared by Miss Irene Dobroscky from *Taeniothrips longistylus* Karny; also three females collected on the laboratory window at the College of Agriculture, Laguna.

Thripoctenus femoratus, new species.

Agrees with *T. vinctus* except that the forewings are longer and broader, the antennal club appears somewhat shorter, the abdomen is nearly uniformly blackish, and all of the coxae and femora are blackish. In the dark femora and coxae it differs from all of the described species except *nubilipennis* Williams and it differs at once from that species by the hyaline wings and pale tibiae as well as in the arrangement of the discal cilia on forewing and in antennal characters.

Female.—Length, 1 mm. Length of forewing, 0.60 mm., breadth of forewing, 0.23 mm. Black; antennae, trochanters, all tibiae and tarsi pale; all coxae and femora and the abdomen uniformly black or blackish; wings hyaline, the venation fuscous. Head and thorax apparently smooth and polished throughout. Antennal club ovate, barely longer than the two funicle joints combined, rounded at apex but with a short apical spine; funicle joints subequal, the second subglobose; forewing broader than in *vinctus*, without a seta on ventral side of submarginal in the type but with two on the dorsal side; the row of discal cilia running from base of marginal vein distally and

caudad to posterior margin of wing only slightly curved, nearly straight; longest marginal cilia of the hind wing shorter than the greatest width of wing; hind tibial spur conspicuous, about as long as basitarsus and slightly thickened. In other characters it agrees with the description of *vinctus*.

Male unknown.

Type Locality.—Laguna, Luzon, Philippine Islands.

Type.—Cat. No. 43920, U. S. N. M.

Described from one female specimen received from D. T. Fullaway and said to have been collected on bean flowers infested with *Taeniothrips longistylus* Karny. The type of this species is from the same locality and occurred along with *T. vinctus*. It may possibly be merely a variety of that species.

Chrysocharis pallipes (Gahan). (New combination).

Derostenus pallipes Gahan, Proc. U. S. Nat. Mus., vol. 53, 1917, p. 214.

This species is strictly congeneric with the following new species and is more properly placed in the genus *Chrysocharis*. The antennae are 10-jointed, consisting of scape, pedicel, three ring-joints, three funicle joints, and a 2-jointed club, the apical club joint terminating in a thick spine which is nearly as long as the joint itself. The first two ring-joints are very thin and lamellate, the third as broad as the base of first funicle joint, about twice as broad as long and structurally similar to the funicle joints, with a few long hairs and several sensory pores. This could more properly be considered a short funicle joint. In some other species of the genus it is more reduced but in all of the species represented in the National Museum collection it is obviously larger than the two true ring-joints, and bears a few sensory pores and hairs. The true funicle joints are all longer than broad, the first about twice as long as broad, the second and third a little shorter. The abdominal petiole is transverse and inconspicuous.

Chrysocharis cubensis, new species.

Very similar to *C. pallipes* (Gahan) but with distinctly finer and shallower reticulate sculpture and apparently with the malar space longer.

Female.—Length, 1 to 1.4 mm. Head, thorax, abdomen, and coxae bright shining green with coppery tints: front of head below the transverse groove strongly copper-colored; scape pale beneath, with a dorsal line and the apex fuscous, rest of antenna brownish-black;

eyes and ocelli reddish; legs except coxae white; tegulae pale; wings hyaline, with the venation dark brown; abdomen concolorous with the head and thorax. Head as broad as thorax; eyes large, conspicuously hairy; malar space about equal to the width of mandible at base; occiput finely sculptured; vertex nearly smooth, triangle below front ocellus and above the transverse groove as also the sides of frons below the groove rather strongly and finely punctate; bottom of antennal grooves smooth, the face and triangular raised area between antennae very weakly sculptured. Antennae very slightly thickened toward apex, 10-jointed; scape of nearly the same thickness throughout its whole length, about four times as long as broad; pedicel very little longer than broad; ring-joints three, the first and second very small, the third as broad as the funicle joint, about two and one-half times as broad as long and bearing several hairs similar to those on the funicle joints; funicle 3-jointed, the first not quite twice as long as broad, second a trifle shorter than first, third about one and one-half times as long as broad; club 2-jointed, very slightly thicker than the last funicle joint, the first a little longer and broader than the last funicle joint, apical joint conical and terminating in a spine or process which is about half as long as the body of the joint. Thorax about twice as long as broad; prothorax short, mostly concealed from above, weakly shagreened; mesoscutum shining, with nearly uniform weak reticulation, the parapsidal grooves represented by broad deep impressions extending the whole length of dorsum; scutellum nearly as long as mesoscutum, subconvex, very finely sculptured, the sculpture similar to that of the mesoscutum but a little finer and weaker, with a single pair of long pale setae a little behind the middle; propodeum smooth, without carinae or folds between the spiracles but with a distinct groove laterad of the spiracle. Legs with all tarsi shorter than their tibiae, the hind basitarsus not longer than the following joint, the hind coxae with its outer face very faintly sculptured. Wings about twice as broad as long, broadest very near the apex which is subtruncate; submarginal vein with two erect setae proximad of the break; marginal vein twice as long as submarginal; postmarginal twice as long as stigmal. Abdomen as long as thorax and about as broad, ovate, very weakly sculptured except base which is smooth; petiole short, transverse, apparently smooth, with an apical depression which is membranous and pale; ovipositor not exserted.

Male.—Length, 0.90 mm. Antennal scape distinctly but not greatly thickened, and somewhat darker than in the female; abdomen a little shorter than the thorax, metallic green at base and apex with the medial tergites bronzy-black. Otherwise like the female.

Type Localities.—Baragua and Jaronu, Cuba.

Type.—Cat. No. 43922, U. S. N. M.

Female holotype and one female paratype reared from an unidentified leaf miner in sugar cane at Baragua, by C. F. Stahl, in February, 1928, under Tropical Plant Research Foundation No. 3410; one female paratype reared by W. C. Loftin from the

same leaf miner at Baragua, July 21, 1930, under T. P. R. F. No. 5076; male allotype, one male paratype, and three female paratypes from sugar cane leaf miner at Jaronu, by L. C. Scaramuzza, July 14, 1930, under T. P. R. F. No. 3876; and three female paratypes reared from a lepidopteron which August Busck is describing as a new genus and new species of *Elachistidae* mining leaves of sugar cane at Santiago de las Vegas, Cuba, September 9, 1931, by Angel R. Otero under No. 9633a. It is probable that the host was the same species in each case.

Grotiusomyia nigricans (Howard).

Miotropis nigricans Howard, Jour. Linn. Soc. London Zool., vol. 25, 1894, p. 106.
Grotiusomyia nigricans Girault, Ent. News, vol. 29, 1918, p. 126.

Described originally by Howard from specimens collected in St. Vincent, West Indies, this species was subsequently recorded by Girault as having been reared from *Eudamus proteus* Linnaeus in the same island by F. Watts. The writer has identified as this species nine specimens from St. Vincent, reared from the lima bean leaf folder (*E. proteus*) by J. C. Hutson.

More recently three specimens of the same species were received from S. C. Bruner, of the Estacion Experimental Agronomica, Santiago de las Vegas, Cuba, with the statement that this species is apparently the most important parasite in Cuba of the lima bean leaf-tier, (*Lamprosema*) *Hedylepta indicata* Fabricius, and still more recently specimens were received through the Bureau of Plant Quarantine and Control Administration, collected at Rio Pedros, Puerto Rico, and said to have been reared from the same moth.

Pleurotropis Foerster.

Pseudacrias Girault, Arch. f. Naturg., Jahrg. 79, Abt. A, H. 6, 1913, p. 104 (new synonymy).

The genotype species of *Pseudacrias* (*P. micans* Girault) has not been seen by the writer, but in the National Museum collection are types of three species described by Girault in that genus and apparently agreeing with his generic description. All three of these species (viz., *P. carinatiscutum* Girault, *P. secundum* Girault, and *P. sexdentatus* Girault), in the opinion of the writer, belong in the genus *Pleurotropis*. Girault's description of the genus *Pseudacrias* offers no characters which will separate it from *Pleurotropis*, and the writer considers it to be a synonym.

Pleurotropis benefica Gahan.

Three specimens of *Pleurotropis* (a male and two females) reared February 17–25, 1930, from *Cephus pygmaeus*, collected in the vicinity of Cambridge, England, were recently received from W. R. Thompson, of the Farnham House Laboratory, Farnham Royal, Bucks, England. These specimens had been tentatively identified as *Pleurotropis benefica* Gahan by Dr. Ch. Ferriere, of the Imperial Bureau of Entomology, and were sent to the writer for verification of the determination. A comparison of them with the types of *P. benefica* leaves no room for doubt that the determination is correct.

Pleurotropis benefica was described from specimens reared by W. R. McConnell, C. C. Hill, and P. R. Myers, at Mount Holly Springs and Carlisle, Pennsylvania, from *Trachelus tabidus* Fabricius. The fact of its occurrence in Europe is very interesting and at once suggests the thought that it may be going under some other name there. *Pleurotropis nitifrons* Thomson (=*nitidifrons* of authors) is recorded in literature as a parasite of *Cephus infuscatus* in Europe by R. Forsius (Med. Soc. Faun. Flor. Fenn., 1915, p. 138) and a specimen reared by Forsius from *C. infuscatus* at Parna is in the U. S. National Museum collection, determined by J. C. Crawford as *P. nitifrons*. This specimen is extremely similar to *P. benefica*, but differs in that the middle and hind tarsi, except for the apical joint of each, are pale and the first funicle is scarcely longer than the second. All of the American specimens of *benefica* as well as those from England (twenty-one specimens in all) have the tarsi all black or very dark fuscous and the first funicle joint is much longer than the second. If Crawford's determination of *P. nitifrons* is correct (as it seems to me to be), then *P. benefica* and *P. nitifrons* are apparently not the same.

Again, the description of *P. nigritarsis* Thomson is extremely suggestive of *P. benefica* Gahan. This species is represented in the U. S. National Museum collection by one male reared from *Euplexia lucipara* Linnaeus by R. Forsius at Karislojo and determined by Crawford. This male has a much more slender flagellum than have males of *benefica*. The four funicle joints and the club are subequal in length, each about three times as long as thick, the first funicle joint not longer than the second, and the scape extends some distance above the front ocellus. In males of *benefica* the first funicle joint is distinctly longer

than the second, the second, third, and fourth joints are never more than twice as long as thick, and the scape does not extend beyond the front ocellus. It appears quite certain that the parasite of *Euplexia* and the types of *benefica* are different species.

Pleurotropis olethreutidis, new species.

Very similar to *sexdentatus* Girault but may be distinguished by the fact that the mesoscutum and scutellum are more weakly sculptured, the propodeum is perfectly smooth instead of very weakly shagreened medially, and the anterior aspect of head is less strongly copper-colored than is generally the case with *sexdentatus*. I am unable to separate the two very satisfactorily and *cubensis* may prove to be merely a geographical variant.

Female.—Length, 1.25 mm. Greenish above, mostly black beneath; vertex and anterior aspect of head with strong brassy tints; dorsum of thorax and propodeum green with brassy tints; legs brownish black, their coxae more or less metallic, and the three basal joints of tarsi pale; wings hyaline, venation dark brown; abdomen mostly black but with the basal two-thirds of second tergite metallic green. Vertex and frons weakly reticulated, the sides of frons below the transverse groove a little more strongly sculptured; cheeks and face below antennae about like the vertex; eyes with short sparse pile. Antennae short; ring-joints minute; funicle 3-jointed, the joints shortly pedunculate and of equal width; first funicle joint distinctly thicker than the pedicel and about as long as pedicel, about as long as broad; second and third joints a little broader than long; club 2-jointed, a little broader than the funicle joints, the first joint quadrate, the second conical and terminating in a spine which is nearly half as long as the body of the segment. Pronotum with the posterior dorsal portion short, smooth, and separated from the anterior declivous portion by a delicate transverse carina; mesoscutum more than twice as broad as long, weakly sculptured, the parapsidal grooves very delicate anteriorly and each terminating posteriorly in a shallow depression, the depressions sculptured like the rest of mesoscutum; scutellum very slightly longer than the mesoscutum, weakly reticulately sculptured, the reticulation a little more distant than that of mesoscutum; propodeum smooth and polished, with two delicate longitudinal carinae near the middle, the elevated median part of propodeum also carinately margined laterally and apically, the two areas thus inclosed each subquadrate. Forewing broadly rounded at apex, marginal vein longer than submarginal (about 11:14), stigmal short and subequal to the postmarginal; two erect bristles on the submarginal vein. Legs normal, the hind coxae wholly polished. Abdomen short ovate, very little longer than the thorax, nearly as broad as long; the petiole short, transverse, finely and closely punctate; second tergite broader at apex than long down

the middle, about equal in length to all of the following tergites combined, smooth basally with the apical one-third weakly shagreened as are all of the following tergites; ovipositor not exserted.

Type Locality.—Jaronu, Cuba.

Type.—Cat. No. 43923, U. S. N. M.

Described from twelve females reared from the pupa of an unidentified species of Olethreutidae infesting *Crotalaria* species, June 23, 1930, by L. C. Scaramuzza and received from the Tropical Plant Research Foundation under their No. 3840.

Horismenus eudami (Girault).

Pseudomphale eudami Girault, Ent. News, vol. 29, 1918, p. 130.

The original description of this species records it as a parasite of the larva of *Eudamus proteus* Linnaeus in the island of St. Vincent. The writer has recently received eleven specimens of the species reared in Cuba by S. C. Bruner from cocoons of *Apanteles leucostigmus* Ashmead which were in turn parasitic upon *E. proteus*. In all probability the specimens upon which the original description was based were also secondarily parasitic, as it is not believed probable that this species is both primary and secondary.

Cirrospilus ingenuus, new species.

Differs from all other species of the genus known to the writer by the uniform orange-yellow color.

Female.—Length, 1.25 to 1.40 mm. Pale orange-yellow, without any metallic markings; the antennal flagellum, a small transverse spot on occiput adjacent to point of attachment of head to prothorax, a transverse very narrow band on extreme anterior margin of pronotum at neck, a more or less definite transverse band basally on each of the second, third, fourth, and fifth dorsal tergites, and the exposed part of ovipositor sheaths brown to dark brown; wings hyaline, venation brownish-yellow; legs very slightly paler yellow than the thorax. Antennae inserted near the middle of head; funicle 2-jointed; the first funicle joint distinctly longer than the pedicel and longer than the second joint, about two and one-half times as long as thick; the second funicle joint about one and one-half times as long as thick; club very little thicker than the funicle and about equal to the funicle in length, 3-jointed, the joints not distinctly separated. Vertex faintly reticulated, rest of head nearly smooth. Pronotum, mesoscutum, scutellum, and propodeum very finely, almost granularly, sculptured; parapsidal grooves complete; scutellum with two very delicate grooved lines and with two pairs of setae; propodeum with a delicate median carina but without lateral folds. Forewing about two and one-half times as long as broad; the marginal vein much longer than submarginal and four

or more times as long as postmarginal; stigmal and postmarginal subequal. Legs slender; hind coxae sculptured on outer side. Abdomen about as long as head and thorax, as broad as thorax, pointed ovate, its surface very faintly sculptured except base of first tergite; ovipositor sheaths extending barely beyond apex of abdomen.

Male.—Length, 1.30 mm. Exactly similar to the female except that the abdomen is not longer than the thorax and is rounded at apex, and the brownish markings on head, pronotum, and abdomen are usually less distinct.

Type Locality.—Buitenzorg, Java.

Type.—Cat. No. 43924, U. S. N. M.

Described from two females and five males said to have been reared from *Phyllocnistis citrella* Stainton by Dr. A. Voute and received through the Institute for Plant Diseases of Java.

FAMILY MYMARIDAE.

Gonatoceros capitatus, new species.

A species very close to *G. brunneus* Girault, from which it may be distinguished, however, by the much paler vertex and frons, the perfectly hyaline wings, and by some very slight differences in the proportions of the antennal joints. The fifth funicle joint is slightly the longest funicle joint and the eighth funicle joint is distinctly shorter and a little narrower than the seventh in the female of the new species, while in *brunneus* the fifth joint is no longer than the seventh and the eighth is barely shorter and slightly thicker than the seventh joint. Also similar to *ornatus* Gahan, but differs in that the mesoscutum and scutellum are without white lines and the first four joints of the funicle in the female are equal or very nearly so.

Female.—Length, 0.70 mm. Sculpture not discernible in balsam mounted specimens; probably smooth. Antennae not as long as the body; radicle prominent, nearly half as long as the scape; scape, exclusive of the radicle, in lateral view straight dorsally, somewhat convex ventrally, about three times as long as broad; pedicel half as long as scape and twice as long as broad; first four funicle joints subequal, cylindrical, and each twice as long as broad; fifth funicle joint distinctly longer and thicker than the preceding joint and also longer and a little thicker than joint six; seventh funicle joint very nearly as long as joint five and distinctly a little longer and a little thicker than either the sixth or the eighth funicle joint, the eighth joint about one and one-half times as long as broad; club broader but less than twice as broad as the funicle, and very slightly longer than the three last funicle joints together.

Mesoscutum with the parapsidal grooves impressed; scutum and scutellum subequal in length; legs rather long and slender, the front pair with tarsi distinctly longer than their tibiae, the median and hind tarsi subequal in length to their tibiae; forewings long and rather broad, about three and one-half times as long as broad, without discal ciliation behind the venation; marginal cilia rather long but not equal to half the greatest wing width; marginal vein about six times as long as broad; hind wing narrow, the marginal cilia about three times as long as the breadth of wing. Abdomen about equal in length and breadth to the thorax, ovate, the ovipositor from origin to apex about equal in length to the hind tibia and not protruding beyond apex of abdomen. General color black, the vertex and frons brownish yellow and the abdominal sutures pale; antennae and legs black or brownish black, the tarsi pale; wings anteriorly hyaline.

Male.—Length, 0.70 mm. Antennae equal in length to the body; scape about twice as long as broad; pedicel about as long as broad; flagellar joints subequal in length and breadth, each about twice or a little more than twice as long as broad, the apical joints very slightly narrower than the basal ones. Otherwise like the female.

Type Locality.—Centerville, Utah.

Type.—Cat. No. 43941, U. S. N. M.

Described from ten specimens (4 females and 6 males) mounted on a single slide and said to have been reared from eggs of the beet leafhopper *Eutettix tenellus* Baker, August 28, 1928, by C. F. Henderson, at Centerville, Utah; two females and five males reared from eggs of the same leafhopper collected by C. F. Henderson at Santo Domingo, Lower California, Mexico; and one female reared from leafhopper eggs on red beets at Red Rock, Arizona, by Henderson.

Two additional specimens reared by Henderson from leafhopper eggs on *Atriplex* in July, 1928, at Nogales, Arizona, are believed to be this species but are not included in the type series because of certain differences in the female antennae, which are believed to be deformities. Five specimens reared by the same investigator from leafhopper eggs on Russian thistle at Nogales, Arizona, July, 1928, are very similar to *capitatus*, but are believed not to be the same.

FAMILY SCELIONIDAE.

Acoloides cubensis, new species.

This will run to *ochraceus* Ashmead in J. J. Kieffer's key (Das Tierreich, Scelionidae, vol. 48, 1916, p. 166) and also in Ashmead's key (Jour. Linn. Soc. Lond., vol. 25, 1894, p. 216).

It differs from the description of *ochraceus*, however, by having only the first and second tergites longitudinally striated, the eyes hairy, the third antennal joint nearly twice as long as thick, and the whole antennae nearly concolorous with the body. The type of *ochraceus* is in the British Museum, and the characters of the description have not been verified.

Female.—Length, 1.2 mm. Head, thorax, and abdomen uniformly brownish-yellow, the legs and antennae paler; wings very slightly fuscous. Antennae 7-jointed, situated at the clypeus; pedicel as long as three following joints together; first funicle joint about twice as long as broad, joints 2, 3, and 4 of the funicle as broad as long and moniliform; club large, nearly as long as funicle and pedicel together, and more than twice the width of pedicel. Head a little broader than thorax at tegulae, about three times as broad as long, viewed from in front a little broader than high; occiput perpendicular, forming with the vertex a sharp angle which is margined by a delicate carina; eyes short oval, distinctly hairy; lateral ocelli very near the eye margin and also close to occipital margin; frons, vertex, face, and cheeks with very fine granular sculpture, the frons immediately above the antennae slightly shining and with a delicate median carina extending from between the antennal bases a little more than half way to the front ocellus; malar groove distinct and nearly as long as the eye is high. Mesoscutum a little broader than long, without parapsidal grooves, and granularly sculptured like the head; scutellum broader at base than long, sculptured like the mesoscutum, and distinctly margined laterally and at apex; propodeum finely sculptured, with two parallel and very delicate longitudinal carinae near the middle. Wings fully developed, extending a little beyond apex of abdomen; marginal vein as broad as long; postmarginal absent; stigmal three or more times as long as marginal; discal ciliation nearly uniform and rather dense; marginal cilia moderately short; hind wing about half as broad as forewing, closely ciliated, and with the discal cilia equal in length to about half the width of wing. Legs not thickened, tibial spurs short. Abdomen as long as the head and thorax or a little longer, ovate, narrowed basally; first tergite longitudinally striated, about twice as broad as long; second tergite also striated except along lateral margins, its apex about twice as broad as apex of first; third tergite granularly sculptured, as broad as second, a little longer than the first and second combined, nearly quadrate, its sides nearly parallel; following tergites very short and sculptured like the third; ovipositor not visible.

Male unknown.

Type Locality.—Santiago de las Vegas, Cuba.

Type.—Cat. No. 43925, U. S. N. M.

Described from five female specimens received from Angel R. Otero, of the Estacion Experimental Agronomica, at Santiago de las Vegas, Cuba, and said to have been reared from the eggs of a spider belonging to the family Salticidae.

Telenomus podisi Ashmead.

Six specimens of this species have been reared at Santiago de las Vegas, Cuba, by S. C. Bruner from eggs of a pentatomid on lima bean. This is believed to be the first record of its occurrence in the West Indies.

Telenomus mesillae (Cockerell). (New combination).

Hadronotus mesillae Cockerell, Can. Ent., vol. 39, 1897, p. 25; Kieffer, Das Tierreich, Scelionidae, Lief. 48, 1926, p. 464.

Telenomus ashmeadi Morrill, Amer. Nat., vol. 41, 1907, p. 419, figs. 1b and 2 a and b; U. S. Dept. Agr. Bur. Ent. Bull. 64, pt. 1, 1907, p. 10, fig. 2 and pl. 1 (new synonymy).

The type of *Hadronotus mesillae* Cockerell, which is in the United States National Museum collection, is a male specimen reared from a hemipterous egg at Mesilla, New Mexico. It is not a *Hadronotus* but a *Telenomus*, and differs in no way from males of *T. ashmeadi* Morrill, the types of which were reared at Barstow, Texas, from eggs of *Pentatoma ligata* Say and *Thyanta custator* Fabr.

The species is a common parasite of pentatomid eggs in the southwestern states. Besides the above-mentioned type series, there are in the National collection specimens from Calexico, Calif., reared from eggs on cotton, V. V. Williams collector; Birds Landing, Calif., from eggs on wheat stubble, M. Marshall collector; and Maxwell, New Mexico, from eggs of *Pentatoma sayi* Stal, D. J. Caffrey collector.

THE PROBLEMS OF RELATIVE GROWTH, by JULIAN S. HUXLEY, pp. I-XX, 1-276, 104 text figures and graphs, 1931. *Published by The Dial Press, Inc.*, New York.

This is a book which will interest those entomologists, usually of the younger generation, who are well trained in biological mathematics. The author has been able to define mathematically some of the simpler laws of the relative growth in the parts of the individual. His discussion of the overgrown jaws in male Lucanid beetles and the enormous heads in some soldier ants touch on two problems that have puzzled entomologists. For the first time we find what appears to be a sound explanation of "orthogenetic series" of species. The book also brings us nearer to a satisfactory analysis of the factors involved in the evolution of social castes in insect societies. There are seven chapters as follows: I, Constant Differential Growth-Ratios; II, The Coefficient of Constant Growth-Partition; III, Growth-Centres and Growth-Gradients; IV, Growth-Gradients and Distribution of Growth-Potential in the Animal Body; V, Growth-Centres and Growth-Gradients in Accretionary Growth; VI, Heterogony, Growth-Gradients and Physiology; VII, Bearings of the Study of Relative Growth on Other Branches of Biology. The concluding chapter has the following interesting subheads: 1, Heterogony and Taxonomy; 2, Heterogony in Groups Higher than Species; 3, Heterogony and Evolution; 4, Heterogony and Comparative Physiology; 5, Relative Growth and Genetics; 6, Relative Growth, Embryology and Recapitulation.—C. H. K.