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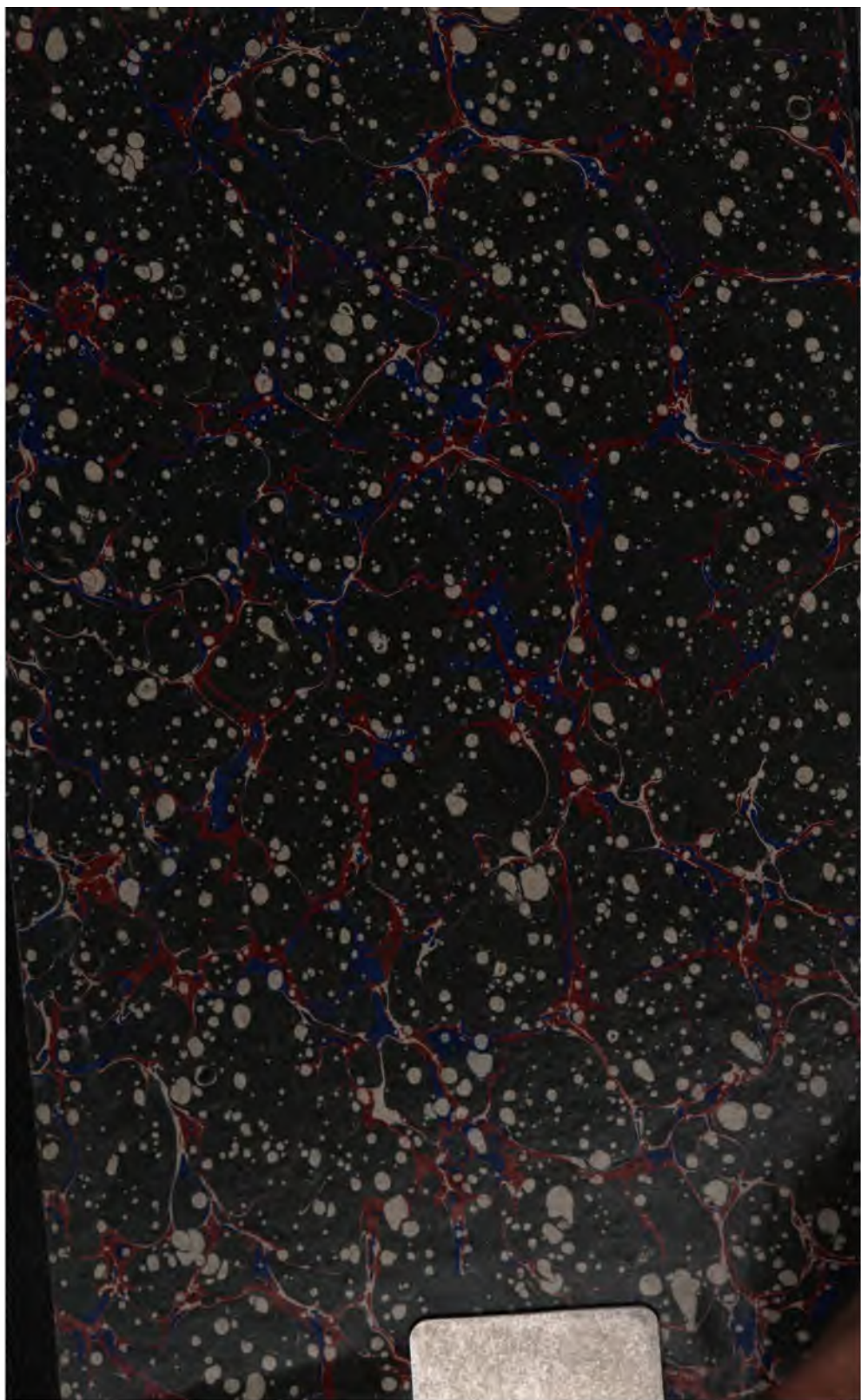
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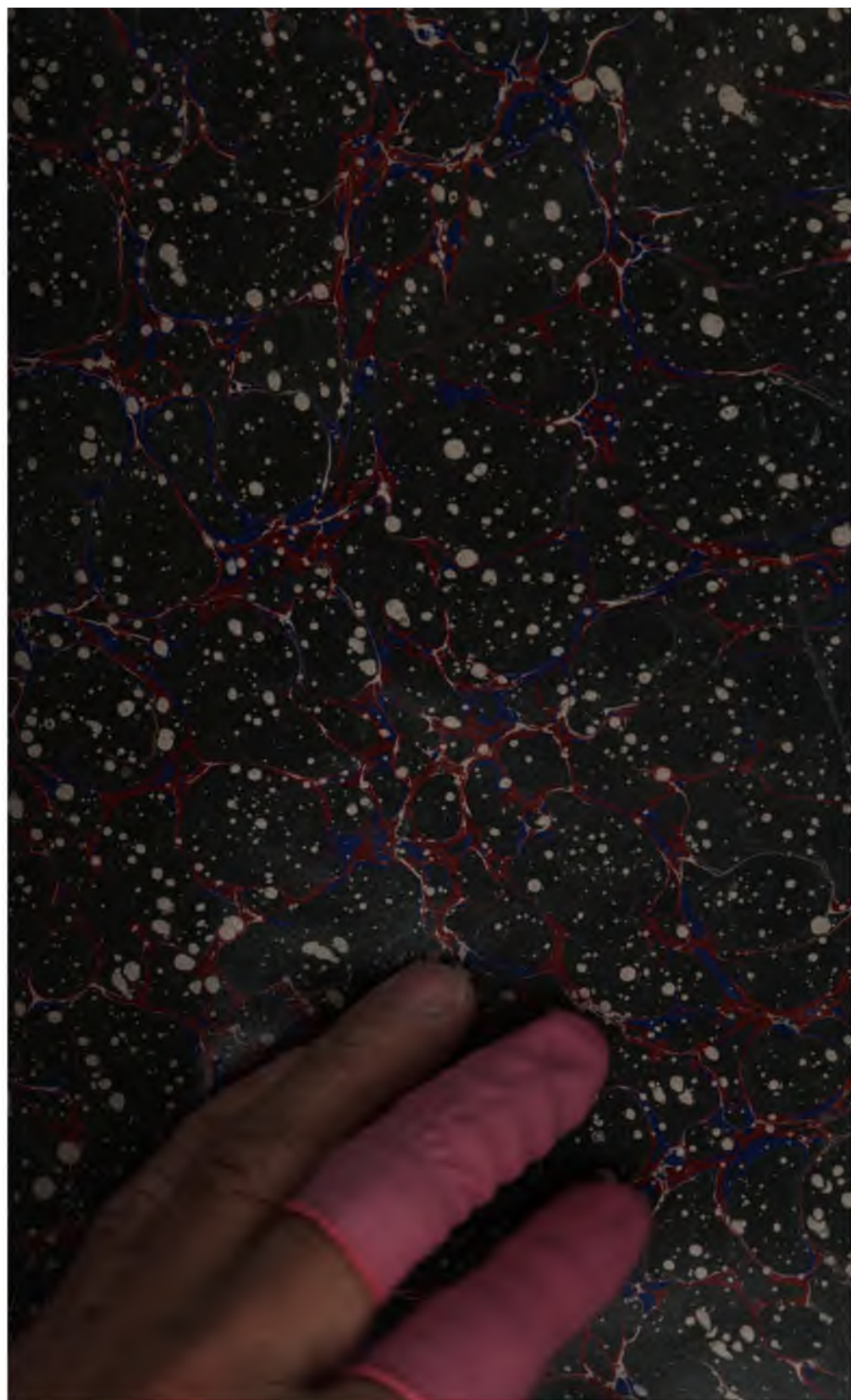
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JOURNAL
OF THE
NEW YORK
ENTOMOLOGICAL SOCIETY.

Devoted to Entomology in General.

Volume VII, 1899.

EDITED BY WM. BEUTENMÜLLER.

NEW YORK.
PUBLISHED BY THE SOCIETY,
QUARTERLY.
1899.

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JOURNAL
OF THE
New York Entomological Society.

Vol. VII.

MARCH, 1899.

No. 1.

**SYNOPSIS OF THE SPECIES OF ACMÆODERA OF
AMERICA, NORTH OF MEXICO.**

BY H. C. FALL.

It is safe to say that any synopsis of coleoptera, no matter how excellent, dating back twenty years and dealing with a genus or group of any considerable magnitude, is to-day inadequate for the arrangement of the material in any of our larger collections. Particularly is this true if the metropolis of the group lies west of the Mississippi valley. The skilled labor of many visiting and resident collectors has brought to light in this western country hundreds of new things, which after a vain effort to fasten to existing descriptions we have relegated to empty spaces and vacant corners, until in many of our boxes all semblance of order has disappeared.

It is the object of the present paper to give to a small number of these nondescripts a local habitation and a name; and while a complete revision of *Acmaeodera* is not yet greatly needed, the discoveries in the twenty years that have elapsed since Horn's paper appeared, have been sufficiently numerous it is thought, to warrant the following notes.

Though none of our species of *Acmaeodera* are above medium size, they are as a rule very pretty insects, and would doubtless share the popularity of the family to which they belong, were it not for a somewhat unusual amount of individual variation, which gives them the reputation of being a difficult lot to deal with. In his Notes on Buprestidæ,* Crotch said "—but I am entirely unable to discover any characters except the variable ones of color, sculpture and form; so that the limits of the species appear to be merely opinionative." Five

* Proc. Acad. Sc. Phil., 1873, p. 89.

years later Horn in his Revision of the species of *Acmaødera*,† after quoting Crotch, remarks that “possibly the following pages may show quite to the contrary.” The paper to a large extent fulfills the prediction, and with a few exceptions, the species prove—notwithstanding much variation—to be about as capable of definition as those of any other genus of like extent. The student, however, who attempts without some preparatory study to identify his specimens by means of the tables therein given, encounters several difficulties, the chief of which is the inexactness of the characters upon which the group divisions are based.

The tarsi in the great majority of species are said to be not longer than one-third the tibiæ, but in two species—*comata* and *alacris*—they are longer than half the tibiæ, and for this reason these two species are made to constitute the group Graciliformes. As a matter of fact, there is no species in our fauna with tarsi so short as described, and in only two—*subbalteata* and *opinabilis*, the latter unknown to Horn at time of writing—do they even approximate this condition; the great majority having the tarsi distinctly longer than half the tibiæ. This error, however, need cause little confusion, as *alacris* and *comata* are very peculiar species, separable quite as well by other characters.

The interpretation of the form of the anterior margin of the prosternum, upon which the larger groups are based may prove more difficult. Judging both from the figures and description, this primary division should be accomplished with ease and certainty, but it must be remembered that these figures are only conventional diagrams representing typical forms which are more or less completely connected by intermediates. The “Emarginatæ” while not the largest, may be regarded as a central group, characterized by the prosternum in front, being nearly straight or feebly emarginate from side to side and distinctly retracted so as to meet the flanks at some distance behind the front angles. In most species assigned to this group however, the margin is faintly trisinate and occasionally the prominence on either side of the middle becomes so well marked as to create a doubt as to whether the form in question should be referred to this or to the Sinuatæ group. If the front margin is less retracted than usual, approach is made to the Truncatæ, where it often happens that the sides of the prosternum more or less obviously fail to reach the front angles.

† Trans. Am. Ent. Soc., 1878, p. 2.

Notwithstanding that the form of the prosternum is thus in some measure unsatisfactory as a point of departure, a better has yet to be found and I shall continue the division into groups substantially as proposed by Horn, calling attention in the proper place to the ambiguous forms.

That modification of the last ventral segment variously described as the apical ridge, plate, crest or carina, is certainly of exceptional value in specific characterization. It may be thick or thin, broadly or narrowly rounded, truncate or angulate, with regular or irregular edge, but I have never in the hundreds of specimens examined discovered any variation in type within specific limits. It does vary somewhat in development in certain species and very rarely to such a degree as to be either well developed or quite lacking in the same species. This fact together with its apparent lack of coördination with other features of structure or facies, render it unfit for a means of primary division, though it was thus made use of by Leconte for the sixteen species treated in his revision of 1859.

Further experience shows that the yellow spot at the side of the thorax is much less constant than was supposed by Horn, there being at least nine species in which it may be either present or absent. External sexual characters seem to be almost lacking. The last ventral segment in the males of certain species has been observed to be shorter and more truncate at tip than in the female, but the difference is feeble and I have not attempted to investigate the extent or constancy of its occurrence. In certain small species of the Truncatæ (*tubulus* and allies) the claws in the males are provided with a distinctly longer, stouter tooth than in the females. I have not noticed a similar disparity elsewhere, but I am not prepared to say that it does not exist. The character has not been used at all in classification, and the student who has a sufficient series of specimens can, if he is curious, easily investigate for himself.

In distribution the genus is practically confined to the southwestern region. Aside from the two West Indian species—*cubacola* and *pulcherrima*, which have lately been found on the Florida Keys, three species only—*ornata*, *pulchella* and *culta*—are known from the region east of the Mississippi River; *variegata* extends its range into eastern Oregon; all other species hail from the territory embraced by the following States or Territories—Texas, New Mexico, Colorado, Utah, Arizona, Nevada and the Californias. At the time of Horn's revision

not more than ten species were known from Southern California, but careful collecting in recent years by Messrs. Coquillett, Van Dyke, Fenyès, Daggett, and the author, make it possible to say that fully thirty species, or nearly half the number in our entire fauna, are now known from the same region, and it is probable that further exploration will add to this total. In the notes following the tables reference will be made in the case of each species to the place of original description; for complete bibliography the student is referred to the revision of Dr. Horn. For a cabinet arrangement it would be better to follow the order in which the species are mentioned in the notes, rather than in the tables.

It only remains to express my grateful appreciation to the friends and correspondents for the generally hearty response to all calls for specimens or information. I have thus been privileged to study a far larger material than any previous student has been able to command, while the courtesies extended by the California Academy of Sciences, the American Entomological Society of Philadelphia, the Museum of Comparative Zoölogy at Cambridge and the National Museum have enabled me, by the examination of all the types of Leconte and Horn, to speak with more of authority than would otherwise have been possible. As might be expected, there remain in the material before me sundry specimens—mainly uniques—which I have left unplaced. The proper disposition of such as these, and the precise definition of the limits of the species in the neighborhood of *acuta* and *subbalteata* must be left to the wider view and larger experience of the future investigator.

The table given by Dr. Horn for the separation of the genus into groups, is, with some modification, given below:

Elytral intervals 3-5-7 costiform, Ac narrow, agriloid.....	2
Elytra with never more than a single interval distinctly costiform in more than basal half, usually entirely devoid of costæ, form broader, usually more or less depressed.....	I
1. Front margin of prosternum retracted, side not reaching the front angles.	
Prosternum trisinate in front	ACMÆODERÆ SINUATÆ.
Prosternum scarcely sinuate in front, the margin nearly straight or feebly arcuate from side to side.....	ACMÆODERÆ EMARGINATÆ.
Front margin of prosternum, not or very slightly retracted, usually straight	ACMÆODERÆ TRUNCATÆ.
Front margin of prosternum lobed at middle, sides attaining the angles	ACMÆODERÆ LOBATÆ.
2. Front margin of prosternum sinuate or lobed, tarsi unusually long	
	ACMÆODERÆ GRACILIFORMES.

ACMÆODERÆ SINUATÆ.

The members of this, the largest section of the genus, agree in having the front margin of the prosternum retracted and more or less prominent on either side of the middle. In *scapularis*, *pubiventris*, *lanata*, *fenyesi*, *recticollis*, *plagiaticauda*, *jocosa*, *coquilletti*, *miliaris*, and *sparsa*, the prominence is dentiform, and though not equally strong, is conspicuous in all. In *flavomarginata* the prosternum is broadly subangulate, and this angulation becomes more rounded and less advanced through *maculifera*, *amplicollis*, *disjuncta*, etc., until in *convicta*, *serena*, *tuta*, *hepburnii* and *quadriseriata* the margin becomes scarcely more than broadly undulate. It must be borne in mind that specimens occur in many species and are likely to in all, in which the sinuation is decidedly more or less marked than is usual in the species; therefore too much stress must not be laid upon this character when unsupported by others. The elytra in *cuprina* and *scapularis* exhibit a discal costa, quite strong in the former, less marked in the latter species; *flavomarginata*, some specimens of *fenyesi* and occasional individuals of other species show traces of this costa. The thoracic spot is so far as observed constant either in its presence or absence in all but two species—*scapularis* and *hepburnii*—in both of which the spot is rarely lacking. The tarsi are in all species more or less evidently longer than one-half the tibiæ. The apical ventral plate is more or less defined in all except *macra*, *scapularis* and *pulcherrima*, but is very small in *tuta*. The thirteen species tabulated by Horn have now increased to twenty-eight; they may be separated as follows:

- Thorax more or less distinctly wider than the elytra, side margin usually well defined, and visible (except in *clausa*, *robusta* and *convicta*) in its entire extent from above. 1
 Thorax not wider than the elytra, side margin very narrow, becoming inferior, at least posteriorly 9
1. Elytral punctures very coarse, nearly obliterating the intervals except the intra-humeral, which is costiform; color greenish bronze without ornamentation. **cuprina.**
- Elytral punctures finer, intervals distinct, body above ornate..... 2
2. Thoracic margin rather wide, distinctly reflexed..... 3
 Thoracic margin narrow, not reflexed 8
3. Reflexed margin suddenly narrowed and nearly obliterated just before the hind angles, marginal spot small, posterior..... **scapularis.**
 Reflexed margin a little narrowed before the hind angles which are produced outward in the form of an obtuse lobe..... **maculifera.**
 Reflexed margin equally broad throughout..... 4

4. Last ventral without apical plate, thoracic spot triangular, broader behind. 7
 Last ventral with distinct apical plate, thoracic spot elongate, parallel, extending
 in front of the middle 5
 Last ventral with apical plate, thorax without spot, surface lustre deep blue green,
 elytra ornate with small yellow spots **subcyanea.**
5. Elytra without discal markings, the ornamentation consisting of a yellow marginal
 band extending beyond the middle and two transverse bands before the apex red
 (rarely yellow) **flavomarginata.**
 Elytra with discal markings 6
6. Form very broad, surface lustre greenish, elytra with marginal and discal stripe
 reaching about to the middle, behind which there are several transverse fasciæ,
 all yellow **amplicolis.**
 Form very broad, surface without metallic lustre, markings much as in *amplicolis*,
 but the dorsal strip broken into spots; apical fasciæ reddish at sides. **disjuncta.**
 Form less broad, surface more or less bronzed, elytra without discal stripe.
 Prosternum coarsely rather densely punctate **opacula.**
 Prosternum finely sparsely punctate **amabilis.**
7. Thoracic margin rather narrow, marginal spot wider behind, surface bluish, elytra
 with transverse fasciæ **macra.**
8. Side margin of thorax only visible near the base when viewed from above.
 More robust; thorax with yellow spot at sides both above and beneath, elytra
 with three broad transverse bands interrupted at the suture and an apical spot;
 last ventral with feeble apical plate. **robusta.**
 Less robust; thorax, with yellow spot above only, last ventral with broad apical
 plate, **clausa.**
 Side margin of thorax visible in front when viewed from above; not robust,
 depressed, thorax with yellow spot at side, elytra with rather narrow fasciæ,
 apical ventral plate large **convicta.**
9. Thorax with yellow spot at side (except *quadriseriata*) 13
 Thorax unicolor. 10
10. Under surface, more especially the sides of the metasternum and abdomen abund-
 antly clothed with long whitish hairs.
 Second ventral segment rather more finely and distinctly more densely punctate
 at middle than the first; pubescence of abdomen dense, and except at
 sides recumbent.
 Elytra each with two yellow vittæ which are usually somewhat irregular,
 and occasionally broken up into numerous irregularly placed spots.
lanata.
 Elytra with bluish lustre, marked quite uniformly with larger spots as fol-
 lows: a spot at the middle of the base, sometimes wanting, two spots at
 the basal third, a fascia at middle, and three spots near the apex, some-
 times confluent **pubiventris.**
 First and second ventral segments similarly punctate at middle, hairs of
 under surface not recumbent]. **fenyesi.**
 Under surface much less conspicuously hairy 11

11. Maculation of elytra consisting of numerous very small spots. 12
 Maculation of elytra consisting of comparatively few much larger spots.
 Thorax scarcely twice as wide as long, sides parallel in basal half or three
 fourths **recticollis**.
 Thorax more than twice as wide as long, sides not parallel or but for a short
 distance in front of the base.
 Elytra with a conspicuous discal subbasal spot.
 Upper surface with coppery-bronze lustre (.42-.44 inch.) **plagiaticauda**.
 Upper surface black with faint bluish lustre (.28-.36 inch.) . **jocosa**.
 Elytra without discal spot, but with a lateral series of three or four spots, the
 median largest, the subhumeral small and often wanting. . . **coquilletti**.
12. Elytra strongly sinuate behind the humeri, as wide at apical two-fifths as at base,
 spots very numerous **millaris**.
 Elytra moderately sinuate behind the humeri, gradually narrower from base to
 apex.
 Spots more or less numerous, scattered. **sparsa**.
 Spots comparatively few and tending to coalesce in narrow transverse lines
 which do not reach the suture. **angelica**.
13. Last ventral without trace of double apical margin. **pulcherrima**.
 Last ventral with more or less distinct apical plate or crest.
 Apical plate wide, the free edge thin and broadly evenly rounded; elytra blue
 black with numerous yellow spots. **serena**.
 Apical plate similar in form but much smaller, surface bronzed.
 Robust more convex, elytra with broad fasciæ interrupted at suture: . **tuta**.
 Depressed, elytra with irregular markings. **hepburnii**.
 Apical crest thick, angulate posteriorly, size small. **quadriseriata**.

A. cuprina *Spin.*, Ann. Ent. Soc. Fr., 1838, p. 367.

No examples of this species so far as I am aware, have been reported from our territory, except the single one in the Leconte collection, which is said to be from Texas. There are specimens in the Horn collection from Mexico, and as remarked by that author, it is very doubtful if it should be retained in our list. The rows of very coarse punctures, so closely placed as to nearly obliterate the intervals (except the intra-humeral, which is quite strongly costiform nearly to the tip) give it an aspect which is only in some degree approximated by *scapularis* and *cubacola*, two other subtropical forms, occurring respectively at Cape San Lucas and in the Florida Keys. Length, 11.5 mm., .46 inch.

Habitat: Texas? Mexico.

A scapularis *Horn*, Proc. Cal. Acad. Sci., IV, p. 369, Pl. VIII, Fig. 6.

A large species, very strongly attenuate posteriorly, the markings nearly as in *flavosticta*. The sudden narrowing of the thoracic margin

immediately before the hind angles is a peculiar character which has not been noticed elsewhere. The last ventral is without apical plate. Length, 13 mm., .52 inch.

Habitat: Sierra El Chinche (Cape Region, Baja, Cal.).

A. flavomarginata Gray, An. King., I, p. 358, Pl. XXXI, Fig. 2.

A well known and easily recognizable species. The subapical bands are sometimes connected on the disk, giving the appearance of a broader band enclosing spots as described by Horn. The fifth elytral interval is feebly costiform. According to Horn the last ventral is "without trace of double margin or carina at tip." In nine of the ten examples before me, the carina is as distinct as is usual in the genus, and in the tenth is evident though feeble. The markings are occasionally entirely yellow. Length, 8-12.5 mm., .32-.50 inch.

Habitat: Southwestern Texas to southeastern California, and in Lower California (Cape San Lucas).

A. maculifera Horn, Proc. Cal. Acad. Sci., IV, p. 382, Pl. VIII, Fig. 5.

A large, very broad, and strongly depressed species, the elytra yellow with rounded black spots. The coloration is peculiar, and the formation of the hind angles of the thorax as described in the table has no parallel in our fauna and does not seem to have been fittingly described by Horn. The apical plate is strongly developed, broad, with free edge only feebly rounded. Length, 10.5-12 mm., .42-.48 inch.

Habitat: Texas, New Mexico (Las Cruces):

I have seen but two examples, the type from the former, and a specimen submitted by Mr. Wickham from the latter locality. This specimen was taken by Cockerell and bears the label "On *Bigelovia*, sp. Sept. 23."

A. subcyanea, sp. nov.

Closely agrees with the two following species in form and size. Black with very distinct blue-green lustre. Thorax without spot at sides, closely punctate, lateral margin a little less broad than in *ampliocollis*, but reflexed and visible throughout from above. The elytra have the discal punctures distinctly finer than in *ampliocollis* or *disjuncta* and are irregularly marked with small yellow spots, representing a discal and marginal series, which become confused behind the middle. Abdomen more finely and a little less closely punctate than

in *ampliocollis*, the apical plate well developed, broad with the free edge thin and subtruncate. Length, 11 mm., .44 inch.

Habitat: Arizona.

A single specimen in the Horn collection, evidently allied to *ampliocollis*, *disjuncta*, etc., by the broad depressed form and thoracic characters, but easily distinguished from all by the unspotted thorax, blue-green lustre and maculation of the elytra, which more nearly resembles *ornata* than any of the species with which it is structurally associated. In *subcyanea*, as is usual, the punctuation of the thorax increases in density from the middle to the lateral margin where it is more or less cribrate, but in those species with yellow marginal stripe it will be observed that the yellow area is generally distinctly less densely punctate than the adjacent surface.

A. *ampliocollis* Lec., Proc. Acad. Sc. Phil., 1866, p. 383.

A very easily recognized species, and one which varies but little in coloration judging from the one hundred or more specimens which have come before me. Length, 9-13 mm., .36-.52 inch.

Habitat: All specimens seen are from the southern portions of Arizona.

A. *disjuncta*, sp. nov.

Very similar in form, size and markings to *ampliocollis*, from which it differs as follows. The color is black without metallic lustre; the thorax exceeds the elytra slightly less in width, and is less closely punctate; the marginal elytral stripe in *ampliocollis* is here more or less broken, and the discal stripe is replaced by a series of three spots, the posterior sometimes connected with the margin; the apical fasciæ are more broken and are invariably red at the sides. The hairs of the upper surface, more especially of the thorax, are darker in color. The fifth interspace of the elytra is slightly but distinctly elevated in basal half in *ampliocollis*, not at all so in *disjuncta*. The under surface is not quite so strongly punctate, and is black, not greenish as in *ampliocollis*. Length, 9-12 mm., .36-.48 inch.

Habitat: Arizona.

Described from a series in the Horn collection, the larger of which were placed with *ampliocollis*, and the smaller with *opacula*. They are perfectly homogeneous and undoubtedly distinct from *ampliocollis*, and have a very different look from the type of *opaculus*, though it must be confessed that the status of this latter species is not very well defined.

A. opacula Lec., Proc. Acad. Sc. Phil., 1859, p. 69.

I have seen nothing just like the Leconte type, which however seems to have been collected in alcohol and has not, perhaps, quite its normal appearance. The specimens which Horn mentions from Arizona are quite surely distinct from the type, and are described above under the name *disjuncta*. The character given in the table for the separation of *opacula* and *amabilis* is the one given by Horn. This difference is evident enough in the types, but there is scarcely anything in the descriptions to support it, and I cannot think it of much value in itself. We must wait for more specimens. Length, 10.5 mm., .42 inch.

Habitat: Texas (El Paso).

A. amabilis Horn, Trans. Am. Ent. Soc., VII, p. 7, Pl. I, Fig. 3.

The relation of this species to *opacula* is alluded to above. As compared with *amplicollis* it is decidedly more slender, with the thorax less narrowed in front. The marginal thoracic stripe is very narrow; the apical ventral plate is strongly rounded or subangulate, with free edge inclined to be a little irregular. The markings do not vary much in the specimens before me and are well represented by Horn's figure. The apical band is always red in great part. Length, 8-11 mm., .32-.44 inch.

Habitat: New Mexico and Arizona.

Taken by Prof. Snow in some numbers in the Magdalena Mountains of New Mexico, and a considerable series has lately been received from southeastern Arizona by Mr. Daggett.

A. macra Horn, Trans. Am. Ent. Soc., VII, p. 8, Pl. I, Fig. 5.

As remarked by Horn, this species is more strongly arched when viewed in profile than any others except *alacris* and *comata*. It most nearly resembles *serena* in color, but that species is spotted (not fasciate), and with different thoracic margin. The apical plate is entirely wanting in all specimens seen, a character quite unusual in this section. Length, 7.5-11 mm., .30-.44 inch.

Habitat: Texas.

A. robusta Horn, Trans. Am. Ent. Soc., VII, p. 9, Pl. I, Fig. 7.

I have seen only the two specimens from which the description was drawn. The side margin of the thorax, visible only posteriorly when viewed from above, combined with the presence of the yellow spot on the inferior margin of the thorax distinguish the species from any

other in our fauna. The first named character is shared by *clausa*, and the last by *cubacola*. Length, 10-11 mm., .40-.44 inch.

Habitat: California (Owen's Valley).

A. clausa Horn, Proc. Cal. Acad. Sci., 1894, p. 374. Pl. VII, Fig. 3.

A pretty species, of medium size, and having no close allies. Its distinctive character lies in the fact that the side margin of the thorax is more clearly visible from above toward the base than in front, a reversal of the ordinary condition and noted elsewhere only in *robusta*. The elytra have more often a bluish rather than a bronze luster, as described by Horn, and the thorax is invariably a little wider at base than the elytra. I have, therefore, removed it from the neighborhood of *tuta* and *hepburnii*, with which it is associated in the description. The prosternal margin is feebly trisinate; the apical plate large, its free edge rather thin and evenly rounded. Length, 7.8-10 mm., .31-.40 inch.

Habitat: Cape region of Lower California.

A. convicta, sp. nov.

Moderately slender, depressed, distinctly bronzed, thoracic margin rather broadly yellow from apical fourth to base, the yellow spot a little broader behind. Elytra with four transverse fasciæ as follows: the first, subbasal, extending from the scutellar region obliquely outward and backward to margin; second, median, posteriorly curved; third, at apical third, oblique; fourth, subapical; the last two broken. In addition there is a minute spot beneath the humerus, a narrow marginal stripe between the first and second fasciæ, a small marginal spot between the second and third fasciæ and a small apical spot. Head rather deeply longitudinally impressed, vertical carina feeble. Thorax very slightly more than twice as long as wide, widest at basal two-fifths where it is very slightly wider than the elytra, moderately narrowed in front, side margin inferior except toward the apex, surface moderately closely but not densely punctate. Elytra feebly striate on the disk, more deeply at sides and tip, intervals uniseriately punctulate. Hairs of upper surface short, brownish. Beneath bronzed, abdomen with slight violaceous lustre, evenly, not very closely punctate and clothed with short gray hairs. Front margin of prosternum rather feebly trisinate; last ventral with wide apical plate, the free edge broadly evenly rounded; tarsi distinctly longer than half the tibiæ. Length, 8 mm., .32 inch.

Habitat: Arizona (Santa Rita Mts.). One specimen, collected by Mr. Wickham.

A. lanata Horn, Trans. Am. Ent. Soc., VIII, 1880, p. 148.

This species begins a series which as a rule are more convex than those that precede; they also lack the thoracic spot, the front margin of the prosternum is strongly toothed each side, and the apical ventral plate is thicker.

Lanata was described by Horn as related to *pubiventris*, but differing in abdominal sculpture and vestiture. On careful comparison I am unable to discover any material difference in the ventral punctuation of the two species, which is substantially as described of *lanata*. The first segment is sparsely finely punctate at middle, and quite densely at sides as is almost universally the case; the following segments are finely rather densely nearly evenly punctate throughout. The contrast between the punctuation of the first and second segments at middle is striking, and peculiar in this group. All the specimens of *pubiventris* in collections, so far as I know, were taken in Owen's Valley, Cal. They were apparently long immersed in alcohol, and the vestiture is almost entirely removed from the upper surface, and from the abdomen except at the sides. I have no doubt that fresh specimens would agree perfectly with *lanata* in this respect, as they certainly do in abdominal sculpture. The markings of *pubiventris* consist of rather large yellow (darkened by alcohol) spots, and are quite constant as described by Horn. *Lanata* is typically vittate, but a series from Utah and the desert regions of Southern California shows forms varying from regularly through irregularly vittate to confusedly maculate. In none of these are the size and disposition of the spots, nor is there present the well-defined bluish surface lustre of the latter (one example of *lanata* is very faintly bluish), but it may well be doubted if *pubiventris* is anything more than a local race of the more widely diffused *lanata*. Length, 7.5-10.5 mm., .30-.42 inch.

Habitat: Utah and desert regions of Southern California.

A. pubiventris Horn, Trans. Am. Ent. Soc., VII, p. 9, Pl. I, Fig. 7.

See remarks under the preceding species. Length, 8.5-10.5 mm., .34-.42 inch.

Habitat: California (Owen's Valley).

A. fenyesi, sp. nov.

Moderately stout, somewhat depressed, piceous, feebly bronzed, clothed with long, fine erect hair, which is usually fuscous (sometimes paler) above, and grayish-white beneath. Head feebly impressed, vertical carina indistinct. Thorax twice as wide as long, sides usually straight for a short distance before the base, then gradually rounded to apex; occasionally a little dilated before the base; lateral margin not visible from above except near the front angles; surface moderately strongly punctate, densely at sides, the punctures well separated at middle. Elytra with striæ of rather coarse punctures, intervals uniseriately punctulate, the fifth sometimes slightly elevated as far as, or even beyond the middle; maculation consisting of small

yellow or reddish yellow spots arranged in discal and lateral series of four or five each, the corresponding spots at and behind the middle sometimes confluent. Abdomen rather finely and sparsely punctate, clothed with long hair which is unusually dense and conspicuous toward the sides of the body. Front margin of the prosternum with a stout blunt tooth on either side. Last ventral with distinct apical plate which is rather thick and strongly narrowed or subangulate posteriorly. Length, 8-11 mm., .32-.44 inch.

Habitat: Various localities in southern California between the mountains and the coast.

The spots are usually very small and sometimes nearly wanting, but I do not remember to have seen a specimen in which they are entirely absent. The lower surface is more conspicuously hairy than in any other species except *lanata* and *pubiventris*, from either of which it is at once distinguished by the hairs of the ventral surface being erect and the form more depressed. Small specimens are greatly like *dolorosa* in general appearance, but the latter has a very different prosternum; on the other hand, large nearly immaculate specimens resemble *morbosa*, but this also is a species of the next group and is normally hairy beneath. *Fenyesi* is by no means rare and is doubtless represented in many collections. In local collections it has for some reason or other passed as *sparsa*, a non-related species which does not occur in California at all, and it is not unlikely that it has been sent east under this name. For many of the specimens before me I am indebted to the diligent collecting of my friend, Dr. Fenyés, of Pasadena, to whom I take great pleasure in dedicating the species.

A. *recticollis*, sp. nov.

Robust, parallel, feebly depressed, black without æneous lustre, clothed above and below with sparse short grayish hairs, thorax without markings, elytra maculate with yellow and red. Head not very densely punctate, feebly impressed, thorax distinctly less than twice as wide as long, sides parallel in basal half or three fourths, thence rounded to the apex; lateral margin visible from above only in front, surface moderately closely not coarsely punctate on the disk, more densely and coarsely at sides; impressions rather feeble. Elytra of same width as thorax, sides parallel to behind the middle, umbones not prominent, striæ not impressed on the disk, punctures moderate, intervals more strongly punctate than usual. The maculation may be described as two rows of spots, one discal and the other lateral, the median and post-median pairs of spots confluent. The discal series begins with a spot at the extreme base, the corresponding marginal spot being very small; the apical spots are more or less reddish. Prosternum with a prominent tooth each side of the middle; abdomen finely punctulate at middle, basal segment densely and more coarsely at sides as usual; last ventral with short thick angulate apical carina. Length, 10 mm., .40 inch.

Habitat: One example from Winslow, Arizona (Wickham), another in the Horn collection from New Mexico.

Nearest *plagiaticauda*, but differing somewhat in markings and distinctly in its different shaped and less transverse prothorax. *Recticollis*, *plagiaticauda*, *jocosa* and *coquilletti* form a group of rather closely allied species, agreeing well in the form of the prosternal margin and the character of the apical ventral plate. The two last are much smaller than the others and very constant in markings. Their separation by means of the tabular characters could not be difficult.

A. plagiaticauda Horn, Trans. Am. Ent. Soc., VII, p. 10, Pl. I, Fig. 8.

A large species, which is apparently rare. I have seen only three examples, viz., one specimen each in the cabinets of Leconte and Horn, the third collected by Coquillett in Los Angeles county, Cal., and differing from the type in that the spots are in part yellow instead of being entirely red. The prosternal cusps are very prominent, the apical ventral plate thick and acute behind with somewhat uneven outline. Length, 11 mm., .44 inch.

Habitat: California (Mariposa and Los Angeles counties).

A. jocosa, sp. nov.

Moderately robust, black, shining, without metallic lustre. Elytra each ornamented with a longitudinal series of four yellow spots; the first rather large, within and posterior to the umbone; the second median large, subtransverse reaching from the third or fourth stria to the lateral margin; the third smaller and nearer the suture, the fourth smallest, subapical. There is a red marginal spot at the apical third which may or may not be connected with the third discal spot. The head is densely punctured as usual, front moderately convex, vertex without carina. Thorax not wider than the elytra, twice as wide as long, sub-parallel to middle, thence moderately rounded to the apical angles, lateral margin not visible from above; disk very finely and sparsely, sides more coarsely and closely punctate. Elytra subparallel to apical third, umbone moderate, stria punctures not coarse, intervals nearly flat on the disk, uniseriately punctulate; erect hairs rather long, fuscous on the elytra, fuscous, mixed with cinereous toward the base, on the thorax. Prosternum trisinate with stout cusps, sparsely punctured at middle. Abdomen very finely sparsely punctulate at middle, a little more coarsely and closely at sides. Last segment with narrowly rounded rather thick apical plate. Length, 7-9 mm., .28-.36 inch.

Habitat: Foothills of the Sierras of southern California.

This species does not exhibit much variation; there may be a small spot external to the basal, and there is occasionally a very small apical marginal red spot, which is seldom present on both sides.

A. coquilletti, sp. nov.

Elongate, rather slender, scarcely depressed, black, strongly bronzed, clothed with rather long erect hairs, which on the upper surface are brownish throughout except for an intermixture of cinereous on the thorax. Elytra with three more or less transverse lateral spots, the anterior median in position and largest, the two others reddish externally; there is also occasionally a very small yellow subhumeral spot. Head densely punctate with a more or less evident vertical carina. Thorax not twice as wide as long, widest at base, sides feebly arcuate, moderately narrowed anteriorly; disk rather sparsely, sides closely punctate; lateral margin visible from above only in front. Elytra as wide as the base of the thorax, striæ not impressed on the disk, intervals flat, finely uniseriately punctate. Body beneath rather sparsely punctate, not much more closely at sides, sparsely clothed with moderately long grayish hair. Prosternum rather strongly sinuate in front; last ventral with rather thick apical plate which is narrowly rounded or subangulate posteriorly. Length, 7.5-8 mm., .30-.32 inch.

Habitat: California (Los Angeles county).

Described from a series of seven specimens taken by Mr. Coquillett, whose name I am pleased to use for the species.

A. miliaris Horn, Trans. Am. Ent. Soc., VII, p. 10, Pl. I, Fig. 9.

This and the following species are very closely allied, and the characters given for their separation in Horn's table are not reliable; in fact, the much more common *sparsa* has circulated extensively as *miliaris* and doubtless stands as such in many collections. There is, however, little doubt that the species are distinct, and the best distinguishing character is the form of the elytra as given in the table. In addition it may be said that the spots are more numerous in *miliaris*, the abdomen is more strongly punctate, the prosternal cusp is less strong, and the lateral impressions of the thorax are inclined to be less developed anteriorly. The apical plate is moderately thin and subacutely rounded in both *miliaris* and *sparsa*. Length, 8-10.5 mm., .32-.42 inch.

Habitat: I have seen only some seven or eight examples, all from Texas.

A. sparsa Horn, Trans. Am. Ent. Soc., VII, p. 11, Pl. I, Fig. 10.

For comparison with *miliaris* see remarks under that species. The type specimens came from Colorado and are rather more sparsely punctate and less spotted than those from New Mexico and Arizona. These latter area pparently *venusta* Waterh., judging from the figure in the Biologia. The apical marginal spots are more or less red as in *miliaris*, though not so mentioned by Horn in his description. Length, 8.5-12.3 mm., .34-.49 inch.

Habitat: Colorado (Colorado Springs), New Mexico (Magdalena Mts., Snow), Arizona (Fort Huachuca, Daggett), Utah (Fuchs).

A. angelica, sp. nov.

Moderately robust, shining, black not bronzed, clothed sparsely with fine erect hairs, which are fuscous above and grayish beneath. Elytra marked with four transverse series of small spots, yellow on the disk and usually reddish at the side, more or less coalescent into narrow transverse bands, which reach the margin but not the suture. The post-humeral spots are frequently nearly obsolete and never coalesce into a well defined band. Head densely punctate, vertical carina not distinct. Thorax not wider than the elytra, widest at base, sides feebly rounded, moderately narrowed from the base; margin visible in front from above; disk coarsely closely punctate at sides, more finely at the middle where the punctures are separated by their own diameter. Punctures of elytral striæ rather coarse, intervals rather narrow, flat on the disk, and uniseriately punctulate as usual. Body beneath bronzed, ventral segments rather uniformly not very closely punctate; last ventral with thick angulate apical crest; prosternum distinctly but not very strongly trisinuate. Length, 6.5-9 mm., .26-.36 inch.

Habitat: California (Los Angeles Co.).

More than thirty examples are before me, exhibiting a considerable amount of variation in form and punctuation of thorax and elytra. The thorax is in some examples a little widened before the base, but is not in any case wider than the elytra across the humeri. The antennæ are distinctly more slender in certain specimens which might be considered distinct were not intermediate forms present.

A. pulcherrima Duv., Ins. Cuba, 1857, p. 56.

Moderately depressed, black, thorax usually more or less æneous, elytra with slight bluish or greenish lustre. Hairs of upper surface pale, rather short and not very fine. Thorax with elongate orange spot at sides, elytra each with seven rounded orange colored spots arranged in two longitudinal rows, the apical spot forming a part of both discal and marginal series. Specimens will probably occur with the spots more or less confluent transversely. The last ventral is entirely without double apical margin. Length, 8 mm., .32 inch.

I have seen three examples labelled "Metacumbe Key, Fla." The identification of this species and *cubæcola* is due to the late Mr. Linell and I have not thought it necessary to verify the conclusions of so careful a student.

A. serena, sp. nov.

Form moderate, somewhat depressed, black, elytra very deep blue, very sparsely clothed above with short semi-erect pale hairs. Head not very densely punctate, a faint vertical carina. Thorax not wider than the elytra, nearly twice as broad as long,

narrowed from base to apex, side margin narrow, inferior behind; punctures on the disk rather fine, separated by more than their own diameters on the average, coarser and more closely placed laterally; impressions moderate, side margin narrowly yellow in basal three fourths. Elytra with numerous yellow spots of varying size and shape irregularly dispersed; base equal in width to the prothorax, gradually narrowed from base to apex, striæ moderate, impressed at sides and apex, intervals flat, each with a single series of fine punctures. Beneath clothed with rather sparse grayish hairs. Prosternum feebly trisinate in front; abdomen finely evenly not closely punctate, last ventral with large apical plate, the free edge thin and very broadly rounded. Length, 9-9.5 mm., .36-.38 inch.

Habitat: Arizona (Tucson).

Described from two specimens collected and communicated by Mr. Wickham. *Serena* resembles both *macra* and *clausa* quite closely. As compared with *macra* the thoracic margin is narrow and not visible throughout from above, the form is less arcuate when viewed in profile, the markings are more broken, and the apical ventral plate which is nearly wanting in *macra* is here strongly developed. From *clausa* it may be separated by the more sparsely punctured thorax, and the thoracic margin becoming inferior behind as is usual.

A. tuta Horn, Trans. Am. Ent. Soc., VII, p. 11, Pl. I, Fig. 11.

I have seen but four specimens of this species and these present no variation from the description and figure given by Horn. The prosternum is feebly trisinate, the apical ventral plate very narrow, nearly truncate with thin free edge. Length, 8-9.5 mm., .32-.38 inch.

Habitat: Utah and desert portions of California (Death Valley).

A. hepburnii Lec., Trans. Am. Phil. Soc., 1859, p. 254.

A species which there is no danger of mistaking for any other in this group, but which might easily be confused with *connexa*, *acuta* and *labyrinthica* of the following group. The prosternum while not at all strongly trisinate is sufficiently constant so to warrant its present position. The thorax varies very little in form, is never wider than the elytra, and is narrowed from base to apex, while in *acuta*, etc., the thorax is oftenest widest a little in front of the base, and frequently more or less distinctly wider than the elytra. Again, in these species the thoracic spot is rarely present and the side margin of the elytra beneath the humerus is always black in part; in *hepburnii* the thoracic spot is absent in only three of the forty-five specimens before me, and the elytral margin at the humerus is entirely yellow. The apical ventral plate is narrow, the free edge thin and broadly evenly rounded. Length, 8.7-12 mm., .35-.48 inch.

Habitat: A rather common species west of the California Sierras nearly throughout the length of the state.

A. quadriseriata, sp. nov.

Form cylindro-conic, feebly depressed, piceous, somewhat bronzed, clothed with fine erect blackish hairs. Head with fine vertical carina, punctures large, shallow, closely placed. Thorax twice as wide as long, widest at basal third, where the sides are strongly rounded, apex much narrower than base; surface not very closely punctate on the disk, more densely at sides; median and basal impressions rather feeble, lateral margin inferior posteriorly. Elytra wider than the thorax, sides sinuately narrowed to apical third, thence more rapidly to apex; punctures of striæ rather fine, intervals flat except at sides, uniseriately punctulate; each elytron marked with two longitudinal series of four or five elongate yellow spots, one discal the other lateral. Beneath more plainly bronzed, sparsely clothed with pale hairs; abdomen rather finely and sparsely punctate, last ventral with thick apical carina, the free edge more or less uneven and narrowly rounded. Length, 5.5-7 mm., .22-.28 inch.

Habitat: Twelve examples are before me, all from southern California (Los Angeles and Santa Barbara Counties).

The present species well illustrates the inexactness of the form of the prosternum as a basis for a natural group division. The form is here a little variable and may be nearly paralleled in any one of the three larger groups—Sinuatæ, Emarginatæ or Truncatæ. A strict interpretation would exclude it from the last, and I believe it may best be assigned to the Sinuatæ. It resembles very closely in color certain small forms of *acuta*, but is more pointed behind and with very different last ventral. The maculation is quite constant so far as seen.

ACMÆODERÆ EMARGINATÆ.

Attention has already been called to the fact that the front margin of the prosternum in this series is usually in some faint degree trisinate, and when this is more pronounced than usual, as it is likely to be in individuals of almost any species, a survey of both groups may be necessary for identification.

I have removed *mariposa* from the Truncatæ and placed it in the present series next to *dohrni*, with which it is very closely allied, if not actually identical. This course is justified by an examination of the prosternum, which is really retracted in all specimens seen, though in varying degree. The form of the prothorax seems less stable here than in either of the other groups, and the thoracic spot is less constant than elsewhere, its presence or absence being fortuitous in six of the ten species in which it occurs.

The nineteen species now recognized separate as follows:

- Thorax with lateral margin yellow in more than basal half.....8
 Thorax unicolorous or with only a small lateral yellow spot behind the middle....1
1. Last ventral with thick subapical crest which is subangulate at middle.....6
 Last ventral without apical crest (except rarely in *connexa*).....3
 Last ventral with thin apical plate which is not subangulate at middle (sometimes feebly developed or nearly obsolete in *acuta* and *labyrinthica*).....2
 2. Thoracic margin narrow, not reflexed, not or scarcely visible posteriorly from above.
 Surface bronzed without spots... **morbosa**.
 Surface bluish, elytra with scattered small yellow spots... **ornata**.
 Surface bronzed, elytra with yellow markings.
 Markings more constant, a lateral transverse spot at the middle of the elytra being most conspicuous; form depressed... **flavosticta**.
 Markings more intricate and very variable.
 Form narrower, less depressed, punctures of elytral striæ finer... **acuta**.
 Form broad, depressed, punctures of elytral striæ coarser.
labyrinthica.
 Form depressed, strongly narrowed posteriorly..... **cuneata**.
 Thoracic margin slightly reflexed, visible throughout from above; elytra with numerous small yellow spots, often intricately joined, sides at tip red. **rubronotata**.
 3. Thorax widest at base, form rather narrow, less flattened.....5
 Thorax more or less distinctly widest a little in front of the base, and usually slightly wider than the elytra; form broader and more flattened.....4
 Thorax widest at middle7
 4. Elytra with yellow markings on the disk.
 Form more slender and more gradually narrowed behind; thorax without lateral spot, yellow markings of the elytra irregularly longitudinally joined toward the base.... **connexa**.
 Form less slender, more parallel, and less gradually narrowed behind; elytra with three more or less irregular transverse bands not reaching the suture, and an apical spot..... **variegata**.
 Elytra with a few (mostly lateral) small orange red spots which show a tendency to coalesce transversely... **van dykei**.
 Elytra with three or four lateral yellow spots, that at the middle being largest.
prorsa.
 5. Bronzed, sides of thorax more strongly rounded, elytra with three reddish spots at the sides behind the middle, the middle one extending inward..... **dohrni**.
 Blue, sides of thorax less rounded, elytra with same markings **mariposa**.
 6. Piceous, faintly bronzed, elytra with a few inconspicuous yellow spots toward the sides..... **dolorosa**.
 Cupreous, elytra each with two apical marginal red spots **postica**.
 7. Sides of elytra entirely yellow, inner margin strongly indented, no discal markings..... **horni**.
 8. Outer interval of elytra acutely tuberculate behind the middle..... **daggetti**.
 Outer interval of elytra not tuberculate
 Thoracic margin reflexed, plainly visible throughout from above... **decipiens**.
 Thoracic margin narrow, not reflexed **scalaris**.

A. morbosa, sp. nov.

Moderately robust, somewhat depressed, elytra slightly, pronotum and under surface rather strongly bronzed, entirely without markings; erect hairs whitish beneath, dark and paler intermixed above. Head with indistinct vertical carina, thorax twice as broad as long, very slightly wider before the basal angles, moderately rounded and narrowed anteriorly, side margin posteriorly not visible from above; rather closely punctate, more densely at sides. Elytra as wide, or very nearly so, as the thorax, humeri not prominent, sides very slightly convergent to a little behind the middle, then more rapidly to apex; striæ and punctures moderate. Prosternum with front margin retracted and slightly but distinctly sinuate. Abdomen rather strongly but not closely punctate, last segment with very small apical plate. Length, 9 mm., .36 inch.

Habitat: Two examples, Los Angeles Co., California, collections of Dr. Fenyès and myself.

Structurally very close to *labyrinthica* and possibly an immaculate variety of that species, but in the many specimens of the latter that I have seen, there is no tendency whatever toward even a noticeable reduction of the yellow markings.

A. flavosticta Horn, Trans. Am. Ent. Soc., VII, p. 9, Pl. I, Fig. 6.

The thorax is said to be unicolored in the description and it is usually so in specimens from Lower California. In those from southern California the marginal spot is about as often present as absent. The apical ventral plate is thin with posterior edge nearly squarely truncate. Length, 7-10.3 mm., .28-.41 inch.

Habitat: The twenty-one examples before me range from Cape San Lucas as far north as Riverside, Cal. It was taken in some numbers in San Diego Co., by Mr. Coquillett, and is apparently a common species in the Peninsula.

A. acuta Lec., Trans. Am. Phil. Soc., Ser. 2, XI, p. 224.

Unquestionably distinct from *connexa* in my opinion, the doubts expressed by Horn arising from the including under this name the form which I have separated as *labyrinthica*. See remarks under *labyrinthica*. Length, 5-9 mm., .20-.36 inch.

Habitat: Our commonest Californian species, occurring nearly everywhere in the mountains and foothills from San Diego to Shasta. I have never seen typical examples from east of the Sierras, though it is not unlikely that it extends into Nevada in the Lake Tahoe region. Horn gives also Utah, but his specimens from that locality are *labyrinthica*.

A. labyrinthica, sp. nov.

This name is proposed for a form which is indiscriminately mixed with *connexa* and *acuta*, according to the size of the specimens or the taste of the individual. It may usually be separated at a glance from both by its stouter form and the more profuse and irregular markings of the elytra. Like *connexa* the form is strongly depressed, but is less gradually narrowed posteriorly and with more distinct bronze lustre. The thorax in *connexa* is usually conspicuously wider than the elytra and widest immediately before the base; in *labyrinthica* the thorax is less noticeably though usually slightly wider than the elytra with the broadest part a little less basal and with a more evident sinuation before the hind angles which are consequently a little less obtuse. The abdominal punctuation is a little less fine in *labyrinthica*, the last ventral shorter with the apical carina often very small, but rarely lacking. From *acuta*, *labyrinthica* differs by the flatter form and much coarser striae punctures. In both there is rarely a small yellow spot at the side of the thorax, but I have never seen this in *connexa*. In many specimens of *labyrinthica* the last ventral suture is broadly feebly sinuate or subangulate at the middle; not noticeably so in *acuta* or *connexa* in my experience.

Typical *connexa*, *labyrinthica* and *acuta*, and even after allowing for a considerable variation the great majority of specimens are such, are easily separable, but there are not lacking specimens which are very disconcerting. It is possible that these are only additional forms which indicate a single excessively variable species; it is, however, quite as likely that they are representatives of still other closely allied species and, perhaps, still more probable that we have to do with a complex combination of completely and incompletely differentiated forms which the presence of hybrids may render still more confusing. Whatever may be the true status, the separation of *labyrinthica*, either as a species or a subspecies, goes far toward relieving our series of *connexa* and *acuta* of that heterogeneous appearance which is nowhere better illustrated than in the Leconte and Horn collections. Length, 7.5-10.5 mm., .30-.42 inch.

Habitat: Inhabits nearly the same region in California as *acuta*, though I have not seen specimens from quite so far north, and also extends its range into Nevada and Utah.

A. cuneata, sp. nov.

Depressed, strongly narrowed behind. Head rather deeply, broadly impressed.

Thorax a little wider than the elytra, shaped nearly as in *connexa*, moderately coarsely closely punctate, unicolorous, a small indistinct spot in one example. Elytra intricately ornate with yellow, the markings much as in *labyrinthica*, but broader and less diffused. Sculpture of elytra and lower surface nearly as in *labyrinthica*. Length, 8-10 mm., .32-.40 inch.

Habitat: Southwestern Utah and Arizona (Rio Verdi and Tempe Desert).

Two specimens from the former locality in the Horn collection and others from Arizona in the collection of Dr. Griffith, to whom I am indebted for my representatives. *Cuneata* is nearest to, but apparently distinct from *labyrinthica*, from which it is difficult to separate it by description, though quite different in appearance. The strongly narrowed and pointed elytra are characteristic of all the specimens seen, and will, I think, make its recognition tolerably certain. From *connexa* it differs both in form and markings, and in the much deeper frontal impression. *Labyrinthica* occurs in the same region, but *connexa* has not yet been seen from either Utah or Arizona.

A. *connexa* Lec., Proc. Acad. Sc. Phil., 1859, p. 72.

For comparison with *acuta* and *labyrinthica*, see remarks under the last named species. The markings in *connexa* are tolerably constant, especially the oblique fascia at the apical third and the apical spot; the markings in the basal half of the elytra are confusedly joined, but are very rarely in any way connected with the posterior fascia. The apical ventral plate is nearly or quite lacking in most examples, but is occasionally well-defined though small. I have never seen a specimen with a thoracic spot. Length, 8-12.5 mm., .32-.50 inch.

Habitat: California and Nevada. A somewhat common species in the sierras of California, not reaching either the extreme northern or southern portions of the State so far as known.

A. *variegata* Lec., Proc. Acad. Sc. Phil., 1852, p. 67.

This species may be separated quite certainly from all others by the tabular differences. It is nearest *connexa*, but if typically marked may be at once distinguished by the transverse fasciæ. These fasciæ are, however, quite often much broken, in which case the stouter, more parallel form, coarser sculpture, with the thorax widest further in front of the base will make it recognizable. The thoracic spot is about as often absent as present, the thorax is usually not wider than the elytra, but is occasionally distinctly so. There is no apical ventral plate. Length, 7.75-10 mm., .31-.40 inch.

Habitat: Colorado, Utah, California (desert regions), Oregon (Hood River).

A. ornata *Fab.*, Syst. Ent., p. 220.

This common and widespread species is too well known to need any comment.

Habitat: Pennsylvania, Florida, Texas, Utah, Nevada.

37. **A. rubronotata** *Lap. & Gory*, Mon., I, p. 5, t. 1, f. 5.

According to the authors of the *Biologia*, the above name should be used for the species now standing on our list as *stellaris* Chev., which is believed to be quite a different thing. *Stellaris* Spin., is doubtfully placed as a synonym of *rubronotata*. This species is easily recognizable by Horn's description and figure. I have seen only the two examples in the Leconte collection. Length, 11.5 mm., .46 inch.

Habitat: Texas, along the Mexican border.

A. van dykei, sp. nov.

Form broad, depressed, color piceous with faint bronze lustre, clothed above with fine erect fuscous hairs; elytra maculate with small orange red spots which have a tendency to coalesce into four or five broken transverse bands, none of which reach the suture. Head with distinct vertical carina. Thorax more than twice as wide as long, widest a little before the base, sides strongly narrowed in front, margin more or less distinctly visible throughout from above; surface rather closely, moderately coarsely punctate, impressed as usual. Elytra a little narrower than the thorax, subtriangular, striæ moderately punctate, more coarsely at sides as usual; intervals flat on the disk, the third at base and the fifth to a greater extent more or less elevated. Body beneath bronzed, prosternum emarginate in front, abdomen usually sparsely finely punctate though somewhat variable; last ventral without trace of apical plate. Length, 9-12 mm., .36-.48 inch.

Habitat: Ten examples from Washington, California (Siskiyou, Alameda and Los Angeles Counties), Nevada and Utah—Collections of Van Dyke, Fuchs, Horn and Wickham.

I take pleasure in dedicating this species to my friend Dr. Edwin C. Van Dyke, whose collection of Californian *Acmaeodera* is the most extensive I have seen and has in its entirety been very kindly placed at my disposal.

A. prorsa, sp. nov.

Moderately robust, subtriangular, depressed, shining, bronzed, hairs of upper surface fine, moderately long and dark brown in color; of the under surface grayish white elytra marked with a series of four more or less transverse lateral yellow spots, that nearest the humerus small and often wanting. Head closely punctate, feebly impressed at middle, vertical carina indistinct. Thorax a little wider than the elytra,

more than twice as wide as long, widest before the base, where it is rather strongly rounded, thence narrowing in nearly straight line to apical angles; dorsal impressions moderate, surface rather closely punctate on the disk, more coarsely and densely at sides. Elytra narrowing gradually from base, disk flattened, striæ not impressed at the middle of the disk, but evidently so at the sides and tip; intervals with the usual series of fine punctures. Prosternum emarginate in front, the margin faintly sinuate; abdomen finely not closely punctate, last segment without trace of apical plate. Length, 6.5-11 mm., .26-.44 inch.

Habitat: California (Los Angeles and San Bernardino Counties).

Ten examples.

Some specimens, perhaps males, are less depressed and narrower, but otherwise there is very little variation observable. The style of maculation is very much like that in *coquilletti*, and the narrower forms look greatly like that species; the resemblance however is entirely superficial. The lateral margin of the thorax is more or less distinctly visible almost throughout from above.

A. dohrni Horn, Trans. Am. Ent. Soc., VII, p. 15, Pl. I, Fig. 21.

This species could scarcely be mistaken for any other though some specimens of *prorsa* in which the anterior marginal spot of the elytra is wanting, and the thorax less distinctly wider than the elytra than usual, are not very different in appearance. The spots in *dohrni* are however always reddish, and in *prorsa* never so. *Dohrni* is really much more closely allied to *mariposa* and it is doubtful if they are really distinct. Aside from color—bronzed in *dohrni* and blue in *mariposa*—the former is distinguished by the more transverse thorax with sides more strongly rounded and as wide or a little wider slightly in front of the base than at base, and the slightly stronger punctures of the elytral striæ. In typical *mariposa* of which I have seen but three examples the thorax is widest at base and the sides are but little rounded. These differences in thoracic outline are not more marked than in several other species and there is before me a specimen which both in color and in shape of thorax is an exact intermediate between typical *dohrni* and *mariposa*. Both forms are as yet too rare in collections to warrant a definite conclusion as to their relationship. Length, 8-9.3 mm., .32-.37 inch.

Habitat: Sierras of California from Los Angeles to Mariposa County.

A. mariposa Horn, Trans. Am. Ent. Soc., VII, p. 22, Pl. I, Fig. 35.

For reference to the transfer of this species from the Truncatæ to the Emarginatæ, see remarks prefatory to the present group. The

relation of *mariposa* to *dohrni* is alluded to under the latter species. The only specimens known to me are the type, and single examples in the collections of Messrs. Fuchs and Van Dyke. Length, 7-8.5 mm., .28-.34 inch.

Habitat: California (middle Sierras).

A. dolorosa, sp. nov.

Moderately depressed, black, erect hairs rather long, fine, fuscous, slightly intermixed with pale, especially towards the sides of the elytra; elytra marked with very small yellow spots which tend to arrange themselves in four transverse lines. The spots are always small, frequently nearly obsolete or in part wanting, and never coalescent into anything like a fascia. Head with fine vertical carina. Thorax twice as wide as long, widest at or a little before the base, not or scarcely wider than the elytra, lateral margin inferior posteriorly; surface closely rather coarsely punctate. Elytra gradually narrowed to apical third, striæ distinct except on basal half of disk, punctures rather coarse. Prosternum very feebly sinuate in front; abdomen sparsely punctate, erect hairs rather sparse and pale in color; last ventral with small apical plate. Length, 7-8.5 mm., .28-.34 inch.

Habitat: Thirteen examples are before me, all taken in Los Angeles County, Cal.

Dolorosa closely resembles the more feebly maculate specimens of *angelica*, but aside from prosternal difference, the general form is less parallel and more depressed, the sculpture coarser, the last ventral broader at apex, with the apical plate more broadly arcuate. The resemblance to small specimens of *fenyesei* is also quite close, but this latter may always be distinguished by the strongly toothed front margin of the prosternum, and the more hairy ventral surface.

A. postica, sp. nov.

Moderately robust, subcylindrical, scarcely depressed, coppery bronze, elytra each with two subapical marginal red spots. Erect hairs fuscous, mixed with grayish on the head, thorax, and towards the sides of the elytra. Head with vertical carina. Thorax not wider than the elytra, twice as wide as long, parallel in basal half, thence moderately rounded and narrowed to apex; lateral margin visible from above only in front; disk rather sparsely, sides densely punctate. Elytra parallel to apical third, striæ impressed only at sides and apex, punctures rather fine, intervals flat, uniseriately punctate. Front margin of prosternum nearly straight; abdomen finely sparsely punctate, last ventral with ill-defined apical crest. Length, 8 mm., .32 inch.

Habitat: California (Los Angeles Co.).

A single specimen collected by Mr. Coquillett and now in the National Museum collection.

A. horni, sp. nov.

Moderately depressed, black, prothorax and under surface slightly bronzed sparsely clothed above with fine dark erect hairs, beneath with pale hairs; elytra with

the sides yellow from base to apex, the inner margin of the yellow border sending projections to the fourth stria near the base, at the middle and at the apical third, that at the middle being broadest. Front feebly impressed, vertical carina indistinct. Thorax a little more than twice as wide as long, sides nearly evenly, rather strongly rounded from base to apex; widest at middle, where it is just perceptibly wider than the elytra; lateral margin visible from above except posteriorly; surface evenly not densely punctate on the disk, more coarsely and densely at the sides. Elytra nearly parallel in basal three-fifths, then acutely narrowed: stria punctures moderate, finer on the disk as usual, fifth interval somewhat elevated. Prosternal margin nearly straight in front; abdomen rather finely, closely punctate, the basal and terminal segments less closely at middle, and somewhat more coarsely; last ventral without apical plate. Length, 11 mm., .44 inch.

Habitat: Arizona. A single specimen in the Horn collection.

A. daggetti, sp. nov.

Form rather slender, elongate, feebly depressed, black with faint tinge of blue; erect hairs sparse, brownish, intermixed with paler at sides. Thorax with sides yellow in basal two thirds, elytra each with basal and apical spot, and about five intermediate more or less irregular transverse fasciæ, which do not reach the suture and are more or less confluent along the margin. Head closely punctate, deeply impressed, vertical carina distinct. Thorax scarcely twice as wide as long, widest a little behind the middle, sides broadly rounded, base not much wider than apex; surface rather closely evenly punctate, impressions moderate; lateral margin narrow, not distinctly visible posteriorly from above. Elytra not wider than the thorax, gradually feebly narrowed to apical third, stria punctures rather fine, intervals flat on the disk, convex at sides, the outer three each bearing in a little more than apical half a row of acute tubercles, which are most pronounced on the outer interval, and quite conceal the usual serration of the margin when viewed from above. Beneath clothed with rather sparse grayish hairs; prosternum emarginate in front, abdomen moderately finely, not densely punctate, last ventral with broad apical plate, its free edge thin and broadly evenly rounded. Length, 8-11 mm., .32-.44 inch.

Habitat: Arizona (Tucson and Fort Huachuca). Eight examples; collections of Daggett, Fuchs, and National Museum.

A very pretty and graceful species which I take pleasure in naming in honor of Mr. F. S. Daggett, to whom I am indebted for the specimens in my cabinet. The tuberculate elytral intervals readily distinguish it from any other species known to me.

A. decipiens Lec., Proc. Acad. Sc. Phil., 1866, p. 383.

At once known among the members of this group by the rather broad reflexed thoracic margin, which is plainly visible throughout from above. *Scalaris* is the only other species with the thoracic margin similarly visible, but it is here much narrower and not reflexed, while the form is stouter and the markings quite different. *Decipiens* resembles more closely *amabilis* and *opacula* of the Sinuata than any species

of the present group, and the prosternal characters are not so different as to prevent the confusion. *Decipiens* is however separable from these with certainty by the thorax being much less narrowed in front, and by the thinner, more broadly rounded or subtruncate ventral plate. The markings are also more irregular than in the species mentioned. Length, 7.5–10.5 mm., .30–.42 inch.

Habitat: New Mexico and Arizona.

The only specimens before me with definite locality label are from Fort Huachuca, southeastern Arizona, collection of Mr. Daggett.

A. scalaris *Mann.*, Bull. Mosc., 1837, VIII, p. 25.

A moderately large robust species, black, scarcely bronzed elytra each with a lateral and discal yellow stripe in basal half, and some more or less confused markings posteriorly. The figure and description of Horn are sufficient for the recognition of this species which does not seem to vary much. Length, 9.5–11 mm., .38–.44 inch.

Habitat: Texas, Arizona, New Mexico (Las Cruces, on *Verbesina encelioides*, Cockerell). Mannerheim's name is believed to apply to the insect afterward described by Gory as *mima* and must therefore supplant it on our list.

ACMÆODERÆ TRUNCATÆ.

It is not possible to more sharply define the limits of the present group than is done in the preliminary table, in which it is said to contain those species in which the front margin of the prosternum is not or but little retracted, and usually nearly straight. The proper interpretation of the prosternal characters requires so much familiarity with the range both of specific and individual variation, that members of the group at hand will be perhaps more surely recognized by their small size and narrow convex form than by any other characters. No species of this group is notably depressed, none are in the least costate, all except the first four and *cribricollis* are below medium size (.30 inch or less), the hairy vestiture is generally shorter and coarser than in preceding sections, and the thoracic impressions are reduced to little more than basal foveæ. *Mariposa* has been transferred to the Emarginatæ for reasons already given; on the other hand *stigmata* and *bivulnera* are placed here rather than in the Sinuatæ as indicated by Dr. Horn, since with the exception of the prosternum their general structure and facies is entirely in accord with typical Truncatæ. Nor is precedent lacking for such a course, inasmuch as *guttifera* and

versuta, both of which were placed in the *Truncatæ* by Horn, are nearly as aberrant in prosternal structure. These four species, with *opinabilis*, in which the prosternal margin is obviously sinuate and a little retracted are the only ones that need mention as being conspicuously irregular in this respect. The subapical ventral plate or crest is moderately thin and regular in *alicia*, *pulchella*, *obtusa* and *texana*, (doubtful in *consors*), and thick or lacking in the remaining species. I have used *tubulus* Fab., in place of *culta* Web., in deference to the authors of the *Catalogus* and *Biologia* who may be presumed to have a reason for giving priority to the former, though the works of both Fabricius and Weber bear the date 1801. The following table will probably suffice for the identification of most specimens :

- Antennæ with the fifth joint suddenly broader than the fourth, which is cylindrical. 1
 Antennæ gradually broader from the third joint, the fourth joint similar in form to the fifth. 9
1. Last ventral without subapical crest. 7
 Last ventral with more or less distinct subapical crest (feeble or absent in *opinabilis*) 2
2. Thorax without yellow marginal spot (except *opinabilis*). 3
 Thorax with yellow spot at sides.
 Sides of thorax narrowing from base to apex.
 Form narrower, hairs of upper surface nearly white. **alicia.** ✓
 Form stouter, hairs of upper surface brownish **pulchella.**
 Sides of thorax more strongly rounded, widest a little behind the middle. **obtusa.**
3. Thorax wider than the elytra, discal impressions as in preceding groups. **consors.**
 Thorax not wider than the elytra, discal impressions feeble. 4
4. Subapical crest of last ventral with thin edge, which is broadly evenly rounded. **texana.**
 Subapical crest of last ventral thick, more or less irregular. 5
- 5 Color blue, or blue green, elytra with red marginal spots. 6
6. Color piceous, more or less bronzed, elytra with yellow markings.
 Hind tarsi a little shorter than half the tibiæ, hairs of upper surface short, setiform.
 Front margin of prosternum straight, thorax without yellow marginal spot. **subbalteata.**
 Front margin of prosternum distinctly sinuate, thorax with yellow spot at sides **opinabilis.**
 Hind tarsi distinctly longer than half the tibiæ, hairs of upper surface fine and rather long **versuta.** ✓
6. Prosternum with a stout tooth each side the middle sinus. **stigmata.**
 Prosternum with a short broad lobe at middle which is broadly emarginate with rounded angles **bivulnera.**

7. Last three ventral segments densely finely punctate and clothed with long fine hairs which curve forward.....**guttifera.**
 Ventral segments normally punctate and pubescent.....8
8. Thorax densely cribrately punctate, size larger—.30 inch or more....**cribricollis.**
 Thorax more or less closely punctate but never cribrate at the middle; size never exceeding .30 inch, and usually much less.
 Elytra maculate.
 Larger, more pointed behind, clypeus very broadly emarginate.. **conoidea.**
 Smaller, less pointed behind, clypeus more deeply emarginate.
 Generally larger, more shining, elytral intervals wider, spots distinctly separated, front impressed.....**tubulus.**
 Smaller, less shining, elytral intervals narrower, spots always confluent, front convex.....**neglecta.**
 Elytra vittate.....**quadrivittata.**
6. Vestiture of under surface scale-like.....**insignis.**
 Vestiture of under surface hairy.....**gemina.**

A. consors *Horn*, Trans. Am. Ent. Soc., VII, p. 20, Pl. I, Fig. 30.

I have seen only the type in the Leconte collection and can add nothing to the original description. It is said to be distinguished from any in this group by the sculpture of the prothorax being like that of the preceding group. There is accordingly to the description a "short subapical ventral carina," but in the present condition of the type it is not sufficiently clearly visible to determine its character. Length, 7.5 mm., .30 inch.

Habitat: Texas.

A. pulchella *Herbst*, Col., IX, p. 211, Pl. CLIV, Fig. 6, a, b.

Our most widely distributed and best known species. Length, 5.5-10 mm., .22-.40 inch.

Habitat: Pennsylvania to Florida and westward to eastern California.

A specimen submitted by Professor Cockerell is labeled "Red Mesa, N. Mex., on *Opuntia*, June."

A. obtusa *Horn*, Trans. Am. Ent. Soc., VII, p. 19, Pl. I, Fig. 29.

Resembles some varieties of *pulchella*, but is more obtuse behind and with the thorax widest near the middle instead of at the base. There is also a well-defined greenish-blue surface lustre in place of the bronze of *pulchella*. The elytral fasciæ are sometimes completely broken up into small spots. Length, 8-10 mm., .32-.40 inch.

Habitat: Texas.

A. alicia, sp. nov.

Elongate, subcylindrical, black with faint tinge of blue, thorax with lateral mar-

gin yellow in basal two-thirds, elytra each with margin beneath the humerus, scutellar spot, and four transverse bands which extend from the side margin to the sutural interval, yellow. Head closely punctate, vertical carina distinct. Thorax rather less than twice as wide as long, moderately rounded and narrowed in front, side margin not visible from above, dorsal impressions feeble, the lateral terminating in punctiform basal foveæ; punctuation a little finer at the middle, but dense and nearly uniform throughout. Elytra as wide at base as the thorax, rather gradually narrowed to apex, striæ and punctures moderate, intervals with the usual series of punctures. Hairs of upper surface whitish, inclined backward on the elytra, and forward on the thorax. Prosternum truncate in front, sparsely punctate at middle; abdomen rather closely not coarsely punctate, the punctures nearly uniform in size and distribution; last ventral with distinct apical plate, the free edge thin and feebly arcuate. Length, 9.5 mm., .38 inch.

Habitat: California (Los Angeles Co.), Arizona.

A single specimen from the former locality in the National Museum collection was captured by Mr. Coquillett and has served as the basis of the above description. I have seen three others in the Horn collection (there placed with *decipiens*) from Arizona. The hind tarsi are unusually short, barely equalling one-half the tibiae.

A. texana Lec., Trans. Am. Phil. Soc., Ser. 2, Vol. XI, p. 228.

A small species of the same general aspect as *tubulus* and *neglecta*, but the hairs are fine and longer, and the ventral plate is thin and well-developed; the thorax is also less narrowed in front. Length, 6.5 mm., .26 inch.

Habitat: Texas.

I know of no examples except the single specimens in the Leconte and Horn cabinets.

A. subbalteata Lec., New Species, 1863, p. 82.

Known only by the unique type in the Leconte cabinet. I have seen two examples from New Mexico, which either belong here or to a closely allied species, but renewed comparison with the type would be necessary to decide the question. Length, 6 mm., .24 inch.

Habitat: Peninsula of California.

A. opinabilis, sp. nov.

Moderately convex, subopaque, the thorax less dull and slightly bronzed, elytra ornate with yellow, upper surface with short whitish suberect setæ which are coarser toward the apex. Head densely punctate, vertex carinate. Thorax scarcely twice as wide as long, sides arcuate and widest a little in front of the base; surface densely punctate, basal foveæ as in *culta*, sides with yellow spot. Elytra a trifle narrower than the thorax, gradually narrowed behind, punctures of striæ coarse, intervals rather narrower than the striæ. The maculation may be described as consisting of about four irregular transverse spots which tend to coalesce longitudinally. Abdomen

coarsely rather closely punctate, last ventral without or with a trace of a thick sub-apical carina. Prosternum sinuate in front and nearly attaining at the sides the anterior angles of the thorax. Hind tarsi barely as long as half the tibiae. Length, 6-7.5 mm., .24-.28 inch.

Habitat: Lower California (San Jose del Cabo).

Mixed with the typical specimens above described are smaller examples having the same general appearance but differing quite constantly in being more pointed behind, in lacking the thoracic spot, in the posternum being almost without trace of sinuation in front, and in the better developed carina of the last ventral. It will be noted that these differences are, except the first, precisely those used to distinguish *subbalteata* from *opinabilis*, but whether they are a variety of *opinabilis* or of *subbalteata*, or a new species, or whether all three are one, is a question for the future student to answer. The specimens before me were received from Mr. Fuchs and bear the label "*texana* teste Horn;" there must however be some mistake here, as the specimens in the Horn cabinet are not placed with *texana* nor does the latter name appear on the list of species from Lower California.

A. tubulus *Fab.*, Syst. El., II, p. 200; *culta* *Web.* Obs. Ent., I, p. 75.

No comment on this species seems necessary. It is closely allied to *neglecta*, but the tabular characters are, I think, sufficient to separate it. Length, 5-7.5 mm., .20-.30 inch.

Habitat: Eastern United States extending to Texas.

A. neglecta, sp. nov.

This name is proposed for a form occurring abundantly in Texas and heretofore considered merely a form of *tubulus*. The characters given for its separation in the table, viz.—generally smaller size, convex nearly unimpressed front, narrower elytral intervals, and confluent markings are so constant in the large series at hand that I am convinced of its distinctness. I have seen one specimen of *tubulus* from Texas, differing scarcely at all from the typical eastern form. Length, 4.2-5.6 mm., .17-.23 inch.

Habitat: Texas.

A. conoidea, sp. nov.

Convex, pointed behind, surface dull, clothed with short coarse setiform hairs; thorax unicolored, elytra with an irregular median yellow stripe formed by the coalescence of the usual spots. Head coarsely closely punctate, the punctures shallow; front feebly convex scarcely impressed at middle, vertical carina obsolete, cly-

peus very broadly emarginate. Thorax widest a little before the base, not wider than the elytra, sides moderately rounded, surface rather densely punctate, impressions nearly obsolete, the three basal foveæ as usual in the group. Elytra with moderately coarsely punctate striæ, intervals subequal in width to the striæ on the disk, the ninth and tenth wider. Beneath closely quite strongly punctate, abdomen somewhat shining and with greenish surface lustre; last ventral without apical crest. Prosternum with the front margin nearly straight from side to side. Length, 5.7-7.6 mm., .23-.30 inch.

Habitat: Arizona.

A small series in the Horn collection without more definite locality. The markings are much like those in *neglecta*, but the larger size, more pointed elytra and much more broadly emarginate clypeus will easily distinguish it from either *neglecta* or *tubulus* with which it must be associated. The unguis teeth are acute and nearly as long as the claw in the male, less acute and more basal in the female. In *neglecta* and more notably in *tubulus* the unguis teeth are blunt or even truncate at tip.

A. stigmata Horn, Proc. Cal. Acad. Sci., IV, p. 370, Pl. VII, Fig. 2.

Superficially not distinguishable from the next, which see for a statement of differences. Length, 5.8-8 mm., .23-.31 inch.

Habitat: Lower California (San Jose del Cabo), Arizona (Tucson).

A. bivulnera Horn, Proc. Cal. Acad. Sci., IV, p. 371.

Distinct by its color from everything else in our fauna except *stigmata*, from which it is separated, aside from prosternal characters, by the denser recumbent white hairs broadly clothing the sides of the metathorax and abdomen, and the abruptly denser punctuation of the abdomen beginning with the second segment. This last character has been noted previously in *pubiventris*, and again appears in *gibbula*. Length, 6.2-7.5 mm., .25-.30 inch.

Habitat: Arizona (Tucson).

A. versuta Horn, Trans. Am. Ent. Soc., VII, p. 21, Pl. I, Fig. 33.

The distinguishing characters of this species are the strongly rounded sides of the prothorax which is widest at the middle and a little sinuate before the hind angles; the strongly sinuate sides of the elytra; the vestiture, which is relatively longer and finer than in any other species of this group, and the sinuate prosternal margin, the middle sinus limited by more or less prominent cusps. The disparity in the punctuation of the ventral segments mentioned by Horn is scarcely at all appreciable in any of the five examples before me. Length, 6-6.5 mm., .24-.26 inch.

Habitat: California. The type from Mariposa, other examples from Los Angeles county.

An odd little species and apparently rare.

A. guttifera Lec., Proc. Acad. Sc. Phil., 1859, p. 72.

In the strongly sinuate sides of the elytra and shape of the prothorax this species closely resembles *versuta*; it is however distinctly larger and at once separable from this and every other species by the extraordinary ventral character mentioned in the table.

In the Leconte collection are three examples: the type from Fort Tejon, California, the other two from Arizona. The type has the prosternum noticeably retracted and with distinct prominences, the elytral striæ not impressed on the disk, the intervals uniseriately punctate, the vestiture of the upper surface consisting of moderately long fine erect hairs. In the Arizona examples both upper and under surface are clothed with broad plumose recumbent scales, the form is stouter, the striæ impressed throughout, intervals more or less convex, the sutural quite irregularly densely punctate, the second somewhat so and others having a tendency toward irregularity though apparently offering only a single series of punctures; the posternum less markedly sinuate in front, in one example nearly reaching the front angles, and in the other falling a little short; prothorax more densely punctate. These differences would seem amply sufficient for specific distinction, but the matter is complicated by the presence of a specimen collected at Big Springs, Texas, by Mr. Wickham, in which the vestiture is as nearly as possible intermediate between the two forms mentioned above, consisting of semirecumbent squamiform setæ which become hair-like on the prothorax and broader, more recumbent and plumose at the sides of the elytra; the form narrower than in the Arizona specimens, the prosternum more strongly sinuate than either and the elytral intervals with single series of punctures which are however somewhat irregular. It is not likely that the above forms represent three distinct species, at all events it would not be wise to attempt their definition without a much larger material than exists at present in collections. Length, 6.8-7 mm., .27-.28 inch.

Habitat: California (Fort Tejon—Leconte, Los Angeles County—Van Dyke), Arizona, Texas (Big Springs—Wickham).

A. cribricollis Horn, Proc. Cal. Acad. Sci., IV, p. 375, Pl. VII, Fig. 4.

The cribrate punctate thorax distinguishes this species from all ex-

cept *gemina*, and *cubæcola*; the former is much smaller and has different antennæ, and the latter is different in every respect. Following Horn's description I have placed *crabricollis* among those species having the last ventral unmodified, but a specimen in my collection which almost surely belongs here, has a well-defined thick sub-apical crest. Length, 8-10 mm., .32-.40 inch.

Habitat: Texas.

A. quadrivittata Horn, Trans. Am. Ent. Soc., VII, p. 23, Pl. I, Fig. 37.

Cannot be mistaken for anything else. The yellow vittæ are often so broad as to leave only the suture and a narrow stripe beginning at the humeral umbone dark. The thorax is always distinctly shining with the punctures on the disk well separated. Length, 4.5-5.5 mm., .18-.22 inch.

Habitat: Occurs from El Paso, Texas, to the Mojave Desert in California.

A. insignis Horn, Proc. Cal. Acad. Sci., IV, p. 377.

Our tiniest species. The type is the only specimen known. Length, 4 mm., .16 inch.

Habitat: Lower California (San Raymundo); on cactus.

A. gemina Horn, Trans. Am. Ent. Soc., VII, p. 23, Pl. I, Fig. 37; *nebulosa* Horn, Proc. Cal. Acad. Sci., IV, p. 376.

I have been quite unable to discover characters which will permit the retaining of *nebulosa* as distinct from *gemina*. The only differences mentioned by Horn are those of size and markings, both of which are of no value whatever, as is amply shown by the dozen or more examples which I have examined. Typical *gemina*—that form with sharply defined elytral vittæ—is exceptional; from this there is a gradual transition to the more common *nebulosa* form with elytra intricately maculate. There is a noticeable variation in the density and rugosity of the abdominal punctuation, but in all specimens, with a single exception, the surface of the basal segments is smooth and shining between the punctures, at least at the middle, becoming more rugulose and subopaque toward the apex. In the exception noted—a specimen taken by me on Mt. Tamalpais near San Francisco—the entire abdomen is alutaceo-rugulose and opaque. I prefer to consider this an extreme variation until further specimens appear. Length, 5-6.1 mm., .20-.25 inch.

Habitat: Occurs in California from Siskiyou to Los Angeles and San Bernardino Cos.

ACMEODERÆ LOBATÆ.

Two species are here added to *gibbula* which alone formerly constituted this group. They agree in having the prosternum more or less prominently lobed at middle, the sides reaching the front angles. They are not otherwise closely related, *cubæcola* indeed being decidedly aberrant.

They easily separate as follows:

Prosternal lobe less prominent, rounded, not emarginate; last ventral without apical crest. **cubæcola.**

Prosternal lobe more prominent, angulate at sides with the summit emarginate; last ventral with apical crest.

Elytra not carinate, not produced at apex, yellow spots much larger and less numerous, **gibbula.**

Elytra caudate, third and fifth elytral intervals subcarinate in basal half, yellow spots much smaller and more numerous. **griffithi.**

A. cubæcola Duv., Ins. Cuba, 1857, p. 57.

Depressed, opaque, rusty black, elytra variegated with yellow. Thorax wider than the elytra, very coarsely cribrately punctate, hind angles broadly yellow above, more narrowly beneath. Elytra with closely placed striæ of coarse rounded punctures, intervals narrow, not well defined. Beneath coarsely punctate, the abdomen less coarsely so toward the tip, the last ventral without crest. Prosternum with short, broad median lobe, truncate with rounded angles. Length, 6-7 mm., .25-28 inch.

Habitat: One example from the National Museum labelled Key Largo, Fla.; another kindly given me by Mr. Henry Wenzel is labeled simply "Fla.," but is doubtless also from one of the Keys.

This species even more than *cuprina* possesses a facies that stamps it at once as an interloper. In only one other species—*robusta*—is the margin of the thorax in part yellow beneath as well as above, and in no other are the punctures at the middle of the first abdominal segment coarser than at the sides and apex.

A. gibbula Lec., Proc. Acad. Sc. Phil., 1858, p. 69; *delumbis* Horn, Proc. Cal. Acad. Sci., IV, p. 378.

This species is generally well known and needs little comment. The punctuation of the thorax and abdomen varies somewhat in density, and the thorax is either unspotted or with two marginal spots. The ventral plate is truly apical, giving the appearance of a double margin; it is thin and nearly hyperbolic in outline. I have carefully compared the types of *delumbis* with a long series of *gibbula* and

have no hesitation in announcing the above synonymy. Length, 10-12 mm., .40-.48 inch.

Habitat: Desert regions of Southern California, Arizona, New Mexico (near Rincon, Cockerell), Peninsula of California (Cape region).

A. griffithi, sp. nov.

Broad, depressed, piceous, thorax slightly purplish bronzed, elytra with faint tinge of blue, maculate over their entire surface, with small yellow spots, and each with a series of about seven similar red spots extending from the umbone to the tip; the two or three apical spots tending to coalesce. Upper surface sparsely clothed with short erect blackish hairs, beneath with more abundant whitish hairs which are longer and denser at the sides, especially of the metasternum. Head closely deeply punctate, longitudinally broadly impressed. Thorax unicolored, twice as wide as long, sides regularly arcuately narrowed from base to apex; impressions broad and deep, surface closely punctate, side margin narrow, not visible behind from above. Elytra as wide at base as thorax, sinuately very feebly narrowed to beyond the middle, then strongly narrowed to the tips which are conjointly produced much after the manner of certain *Dicercas*; striæ impressed, with coarse deep rounded punctures, second, third and fifth intervals more convex, especially toward the base; fourth, sixth and seventh nearly obliterated by the approximation of the striæ; intervals with single series of distant fine punctures. Beneath densely but not very coarsely punctate throughout; prosternum produced in front in a subrectangular lobe which is feebly emarginate in front; last ventral with distinct subapical carina. Length, 13 mm., .52 inch.

Habitat: Arizona (Tempe Desert).

This fine species is dedicated with much pleasure to Dr. H. G. Griffith, of Philadelphia, to whose liberality I am indebted for this and other interesting additions to my cabinet.

ACMÆODERÆ GRACILIFORMES.

Two species, *alacris* and *comata*, were separated from all others by Dr. Horn on account of their unusually long slender tarsi. In *comata* the hind tarsi are subequal in length to the tibiæ and in *alacris* are much longer than half the tibiæ. These two species are furthermore peculiar by their very narrow form which is strongly arched above from head to tip and by the third, fifth and seventh elytral intervals being subcostiform. The following are the characters given by Dr. Horn for their separation.

Prosternum emarginate at middle and on each side angulate, alæ attaining the anterior angles. Thorax above unicolored. Abdomen more densely punctured at the sides with longer hair..... **comata.** ✓
 Prosternum squarely truncate beneath, alæ attaining the angles. Thorax above yellow at the sides. Abdomen very sparsely punctured..... **alacris.** ✓

A. comata *Lec.*, Proc. Acad. Sc. Phil., 1858, p. 70. Length, 9.5 mm., .38 inch.

Habitat: "One specimen from near Fort Yuma, California."

A. alacris *Horn*, Trans. Am. Ent. Soc., VII, p. 25, Pl. I, Fig. 40. Length, 9 mm., .36 inch.

Habitat: "One specimen given to Dr. Leconte by Dr. Sharp, of Scotland, collected by Mr. Hardy in the same region with the preceding."

I am not aware of the existence of any specimens of these species other than the types, and it is a little peculiar, if the above localities are correct, that one or the other should not have turned up again in all the collecting which has since been done in the same region.

NOTES ON SCOTOGRAMMA AND ONCOCNEMIS WITH DESCRIPTIONS OF NEW SPECIES.

BY JOHN B. SMITH, SC.D.

Oncocnemis barnesii, sp. nov.

Head and collar rich sienna brown. Thorax powdered with whitish and gray, darker posteriorly. Primaries ashen gray at the base, brown beyond the t. p. line. T. a. line black, single, broad, with an even and slight outcurve. T. p. line black, single, broad, the edges not sharply defined, almost upright. In the dusky portion of the wing beyond this line the veins are marked with black scales and there are black streaks in the interspace. There is a black terminal line, followed by a pale line at the base of the fringes. Ordinary spots entirely wanting. Secondaries whitish at base, shading to almost blackish at the fringes which themselves are white. Beneath whitish, a little powdery. Expanse, 1.50 inches = 37 mm.

Habitat: Yellowstone Park, Wyo., in August; Dr. Barnes.

A single female example of this very strongly marked species is at hand. There is nothing like it in the genus, and the two simple transverse black lines on the gray ground will suffice to identify it. It has something the appearance of *atrifasciata* without the dark median filling.

Oncocnemis melantho, sp. nov.

Ground color is a mottling of white, gray, black and ocher yellow. Head ocher yellow with some black scales intermingled. Collar yellow with a blackish central band. Thorax mottled, blackish and white, with the tip of the basal tuft yellowish.

Primaries with all the markings fragmentary. The extreme base of the wing is whitish to the black basal line. T. a. line obscurely geminate, the inner part very feebly marked. The outer portion of the line black, oblique to the submedian vein then with an abrupt outcurve. The basal space is black marked on the costa, then there is a whitish shade to the median vein; below this is an ocher yellow shade to the submedian vein which is black marked; below this point it is gray, shading outwardly to ocherous. T. p. line geminate, the outer portion obscure, except on the costa, inner line narrow, black, denticulate on the veins; as a whole with a moderate outcurve over the reniform and an almost equal incurve below. White scales follow the outer points of the line and the veins through the s. t. space are more or less white powdered. The median shade is broad, black and irregular, rather the best defined marking of the wing. The median space is yellowish through the center, grayish through the cell and white marked along the costa. The s. t. line is broken, irregular and marked principally by preceding or following dark shades. The most prominent black shading is on the costa. Another is about the middle of the s. t. space, but is strongly gray powdered. Another shade is on the internal margin and this is also powdered with gray. As a whole the s. t. space may be said to be ocher yellow, palest on the costa and mottled with gray and black scales. The terminal space is mostly gray, with black shadings in the interspaces. There is a broken black terminal line, the fringes are long, yellowish, cut with smoky on the interspaces. The claviform is indefinite, ocher yellow. The orbicular is almost round, just a little elongate, whitish, with a few gray central scales. The reniform is a broad lunule outlined by blackish scales, yellow, with a smoky center. Secondaries black at base and outwardly, with a pale straw yellow, central band in which the veins are black marked, and there is a black discal lunule. The fringes are white. Beneath creamy white; both wings with broad black outer margins. Primaries with a black discal spot and the indications of a median band on the costa. The secondaries have the median band fully developed. There is a discal spot, and beyond it indications of an extra median band, which is marked only on the veins. Expanse, 1.36 inches = 34 mm.

Habitat: Yosemite Valley, California.

A single specimen was received from Dr. H. G. Dyar, and is numbered 9615. It is a difficult creature to describe owing to the peculiar mottlings. The most prominent feature of the forewing is the black median shade and beyond this the blackish shading in the s. t. space which, however, is broken. It is quite probable that in other specimens the mottling may be somewhat differently distributed. The species belongs with *fasciata* and *pudorata* in which the secondaries are similar; but in the mottled primaries it is unique.

Oncocnemis pohono, sp. nov.

Ground color a dark smoky fuscous. Head and thorax without defined markings; but powdered by a few white scales. Primaries very even in color with the maculation very simply written. Basal line geminate, black. The included space with a very few white scales. T. a. line black, single, preceded by a few white

scales, with three unequal outcurves; the line as a whole only a little outwardly oblique. T. p. line single, black, followed by white scales, marked by little black points on the veins, very abruptly bent below the costa and then very evenly oblique to the hind margin; broken, however, by a feeble incurve below the center of the wing. The claviform is not visible in the specimen. The orbicular very small, round, marked only by an obscure black cirlet. Reniform very narrow, lunulate, defined by white scales which give rather a strong contrast. S. t. line irregularly diffuse below. There is a series of narrow black terminal lunules. Secondaries pale at base, becoming smoky outwardly, with an irregular pale line at the base of the fringes which are white tipped. Beneath powdery, ashen gray, the secondaries more whitish toward the base and with a dusky discal spot. Expanse, 1.28 inches = 32 mm.

Habitat: High Sierras, California.

A single male was received from Mr. H. G. Dyar, numbered 11138. The name is given at his suggestion and is the Indian term for the Bridal Veil Falls near which, as I understand it, the specimen was taken. The species is quite unlike any other referred to this genus, and this may not be its best place, eventually. It has, however, the essential characters of the genus to which I have referred it, and it is so well marked that its recognition should not be difficult. An accident has rendered the type defective; but all the wings are in good condition.

***Oncocnemis melalutea*, sp. nov.**

Ground color a powdery clay yellow. The powdering made up of gray with a few black scales. Head blackish in front. Collar with a black line at base and a white line just below the tip, which is gray. Patagiæ marked with gray scales. Primaries with all the markings present, the basal space and all beyond the t. p. line quite strongly gray powdered, leaving the comparatively clear median space somewhat in relief. Basal line geminate, blackish, the inner line best marked, reaching to the submedian interspace and inclosing a little area which is hardly powdery. T. a. line geminate, blackish, the outer portion of the line best defined; as a whole oblique, a little irregular, but hardly lunulate. T. p. line geminate, blackish brown, strongly outcurved over the cell and well incurved below. The outer portion of the line is absorbed in the dark color of the s. t. space, leaving on the veins a series of white dots that serve to emphasize the otherwise obscure marking. A median shade is traceable on the costa; but is hardly visible below that point. The s. t. line is marked by a series of white dots, which are very irregularly set and can hardly be said to have any connection between them. There is a broken blackish terminal line and the fringes are of the yellowish ground color cut with smoky at the interspaces. The claviform is small, of the ground color, outlined by a few smoky scales. Orbicular round or nearly so, paler than the ground color, outlined by smoky scales. The reniform is moderate in size, broad, somewhat kidney-shaped, paler than the ground color, with a dusky lunule, defined by slightly darker scales. Secondaries a glistening, yellowish white at the base, with a blackish outer border, before which is a trace of a blackish

line. The fringes are white beneath, both wings whitish toward the base, with a broad, smoky outer border; the secondaries in addition with a smoky extra-median line, a trace of which is also seen on the primaries. Expanse, 1.20 inches = 30 mm.

Habitat: Foothills near Denver, Colorado (Bruce).

The type is a female which has been in my possession for a long time awaiting the advent of a male. None has been received; but as the species seems very distinct I have given it a name. It may be associated with *homogena*, although it is much less sharply marked than that species.

Oncocnemis corusca, sp. nov.

Head, thorax and primaries blackish, more or less mixed with white scales. Head pale powdered, below the vertex more evenly blackish. Thorax without distinct tufting, the scales tipping collar and patagiae white. Primaries very dark to the t. p. line with the markings very obscurely marked; the vestiture a little glistening. Basal line marked with gray, and the extreme base of the wing is quite strongly powdered with similar scales. The t. a. line is hardly traceable; but its position is indicated by gray scales. T. p. line white, very obscurely marked to vein 4; but below that point easily traceable through the blackish ground color. S. t. line white, distinct only near the hind angle. The orbicular is small, round, defined by a whitish ring. Reniform moderate in size, kidney-shaped, whitish with a smoky curved line, and from this point begins a whitish powdering that obscures the outer margin of the reniform as well as the upper part of the t. p. line. There is a series of obscure dark terminal lunules. The abdomen is yellowish. Secondaries orange yellow, with a well-defined moderate black outer border; the fringes white. Beneath, primaries smoky, with a yellowish tinge, without obvious markings. Secondaries yellow, with a blackish outer border and a blackish shading in the costal region. Expanse, 1.08 inches = 27 mm.

Habitat: Los Angeles, California; Yosemite, California.

I have two male specimens of this species, one of them received from Mr. H. G. Dyar and numbered 9040, taken by Lemberg in the Yosemite Valley, the other taken by myself. The species differs obviously from the other yellow winged species of *Oncocnemis* by the obscure marking of the primaries and the somewhat glistening vestiture. In all the other species the markings are quite sharply defined.

Scotogramma *Smith*.

The species of this genus are increasing in number and several undescribed forms occur in collections. Five of these are in sufficient numbers to warrant description. Five species were recognized in 1889 and differentiated in Vol. XII, Proc. U. S. Nat. Mus., p. 462. Of these I knew the male of one species only. Three species have been since described, but the sexual characters have not been figured.

Males of eight species are now in hand and will be figured when opportunity serves. It will be noted that *phoca*, *uniformis*, *infuscata*, *luteola* and *discolor* agree very closely in general type while sufficiently dissimilar to avoid confusion. The harpes are all a little bent and in each case there are two corneous claspers; the inner longer and more dense in texture, the outer nearer the tip, lying under the other and much lighter in color.

The sketch of *submarina* on Pl. XXII, Fig. 17, Proc. U. S. Nat. Mus., XII, shows an essentially different structure in which both harpe and clasper are concerned. There is a distinct tendency toward some of the species of *Mamestra*; but indeed the other type finds almost equally close relatives in that genus.

The structures in *S. densa* and *S. megera* differ from the others in the widest possible way, while so closely alike that I was strongly inclined to consider the species identical on this character alone. Yet they differ so much in superficial appearance that I have risked a new name, particularly as the localities in which the two species were found are widely separated and thus far no great range of variation has been noted in the species. I have no males of the described *perplexa*, *concinna* and *umbrosa*, nor of *sedilis* and *conjugata* described in this paper. All these forms are related to each other more nearly than to any of the other species, and it is passing strange that females should be so much the more commonly found.

Scotogramma conjugata, sp. nov.

Ground color ashen gray powdered with smoky and blackish. Palpi reddish brown; the head darker brown in front. Collar with a central black line, below which it is smoky to the head, the tip being very pale gray. The patagiæ are crossed by an oblique black line and the posterior tuft is also black marked. Primaries with all the marking fairly visible. The basal space is grayer than the rest of the wing, and is rather larger than usual, because of the distance of the t. a. line from the base. The basal line is black, single, very distinct, outcurved between the veins and reaching the s. m. vein. T. a. line single, black, a little diffuse, evenly oblique to the s. m. interspace; then with a slight incurve to the inner margin. T. p. line blackish, single, lunulate, followed by rather feebly marked pale lunules, strongly bent over the cell and then rather deeply incurved below. A smoky shade on the costa marks the beginning of the s. t. line; but beyond this point it is lost in the uniform gray of the space beyond the t. p. line. There is a vague shading between the veins in the terminal space in one of the specimens before me. The orbicular is black-ringed and extends the full distance between the median lines, so that they are completely connected. As a whole the median space is a trifle darker than any other portion of the wing. The ordinary spots are grayish, incompletely outlined, of moderate size and

best marked by the black filling between them. There is a broken smoky line at the base of the fringes. Secondaries smoky fuscous with a vague trace of a median line. Beneath, fringes powdered; both wings with an outer line which is barely traceable on the fore wings; the hind wings with a discal spot. Expanse, 1.40 inches = 35 mm.

Habitat: Garfield County, Colo., 6,000 feet. (Bruce.)

I have two female specimens under examination and believe that I have seen others. The species is a very distinct one by the markings; the black-filled spaces between the ordinary spots and the connected median lines being quite characteristic. Unfortunately no male is at hand, and it is not impossible that the species may have to be transferred to *Mamestra*. The vestiture consists of flattened hair and in the poorer specimen of the two there is a distinct indication of abdominal tufts. The wing form, however, is of the usual type found in this genus and more triangular than in most species of *Mamestra*.

Scotogramma infuscata, sp. nov.

Ground color a very dark smoky yellow, strongly black powdered. Head and thorax a little more evenly smoky in color. Primaries with all the markings black and fairly distinct. Basal line distinct, single, black, twice toothed. T. a. line irregular, black, almost upright in general course, irregularly toothed to below the median vein and then with a strong inward tooth on the submedian vein. T. p. line black, lunulate, single, very nearly parallel with the outer margin. There is a somewhat indefinite, broad, smoky, median shade, which is bent over the reniform and below that point runs close to and parallel with the t. p. line. S. t. line marked by a smoky preceding shade in which are darker, almost blackish blotches, which emphasize this shade as against the very even and uniform terminal space. There is a broken terminal, dusky line and the fringes have also a dusky interline. Orbicular round, small, outlined by blackish scales. The reniform is vague, hardly traceable in fact in most of the specimens; but sometimes fairly evident as a narrow upright shading. Secondaries smoky fuscous, dusky outwardly, with a vague median line and a faintly marked discal lunule. The fringes are yellow. Beneath, very strongly powdered with yellow, with a well-marked smoky extra-median line, a broad outer margin and a discal lunule. Expanse, 1.25 to 1.45 inches = 23 to 36 mm.

Habitat: Colorado, Park County, 10,000 feet, July 9th; 13,000 feet, July 6th; Gibson Mountain, 12,500 feet.

One male and three females, all collected by Mr. Bruce. The insect has almost exactly the same markings that are found in the species previously described and the vestiture is also fine and hairy; but the colors are all very much darker and the insect has quite a different habitus. Mr. Bruce's number is 646.

Scotogramma discolor, sp. nov.

Ground color dull gray over a somewhat luteous base. Head and thorax much paler, the hair being quite distinctly yellowish and the anal tuft of the abdomen is also yellowish. Primaries with the basal space yellowish, owing to an admixture of

yellow hair with the vestiture. All the markings more or less obvious. Basal line distinct, single, blackish. T. a. line distinct, geminate, very irregular, as a whole nearly upright. The outer part of the line black, the inner gray. The line is somewhat irregularly toothed to below the median vein and then makes a deep incurve on the submedian vein. T. p. line lunulate, single, blackish, as a whole almost parallel with the outer margin. There is a fairly well marked median shade which is bent over the reniform and from that point runs close to and parallel with the t. p. line. Beyond this line the wing is smoother and more even in color; but is broken by a quadrate dusky patch on the costa, extending to the point usually occupied by the s. t. line. At about the middle there is another almost quadrate dusky shade, extending outwardly to about the same point, and on the inner margin there is a third smoky or dusky shade, outwardly marking what would be the termination of the s. t. line. A series of dusky lunules is at the base of the fringes and beyond them it is cut with dusky. The orbicular is round or nearly so, small, yellowish. The reniform is vague, marked by yellowish hair; but inferiorly darkened by the angle of the median shade. Secondaries smoky, whitish toward the base, especially along the costal margin and with a whitish shade beyond a dusky extra-median line. There is also a dusky discal lunule. Perhaps it would be better to describe these wings as whitish with a broad smoky outer band, a smoky extra-median line which sends in a somewhat dusky shade to the base, and a smoky discal lunule. The fringes are whitish. Beneath whitish powdery, with very distinct discal lunules on all wings, a dusky extra-median shade which is quite sharply limited outwardly and a dusky terminal space, which is particularly marked on the secondaries. On the primaries the fringes are distinctly checkered with smoky yellowish. Expanse, 1.20 inches = 30 mm.

Habitat: Park County, Colorado, 13,000 feet (Bruce).

A single male specimen from the U. S. National Museum is the type. The vestiture is hairy and the insect has the appearance of an *Anarta*. Indeed it may be one of the species described in this genus, and yet unknown to me; but the eyes are round and the species cannot therefore be properly placed in that genus. From the described species of *Scotogramma* this insect differs quite strongly by the mottled colors. It should find a place nearest to my *uniformis*.

Scotogramma sedilis, sp. nov.

Ground color smoky gray, more or less powdery. Head smoky, the palpi a little paler, collar tipped with blackish. The patagiæ with a black submargin and the basal tuft also marked with blackish. Primaries with all the markings more or less obscured by the powderings and incomplete. Basal line geminate, one part of the line black, the other smoky, the intervening space a little whitish powdered. The basal space is very broad, more even than the rest of the wing. T. a. line geminate, the outer portion fairly evident, smoky, strongly bent outwardly; the inner parts smoky and sometimes not traceable. T. p. line geminate, lunulate, the inner line narrow, blackish, the points on the veins being strongly marked: the outer line rather a shading which may be absent in some specimens, and with a tendency to a white powdering between the lunules of the inner line. As a whole the line is nearly parallel with the outer margin. S. t. line whitish or pale preceded by a black shading which be-

comes diffuse inwardly. It shows a tendency to break up into spots, especially toward the inner margin. There is a series of small terminal smoky lunules, and a yellowish line is at the base of the fringes. The claviform is small, black marked, and does not extend across the median space though this is very narrow. The ordinary spots are very imperfectly marked; the orbicular varying in shape, sometimes with a smoky center, sometimes entirely gray: the reniform upright or nearly so, not completely outlined in any specimen before me. As a whole the median shade is the darkest part of the wing and between the ordinary spot the shade is deepest of all, so that we have the appearance of a dusky median shade. Secondaries evenly smoky. Beneath smoky, powdery, with more or less obvious outer line and discal lunule. Expanse, 1.25-1.40 inches = 31-35 mm.

Habitat: Garfield County, Colo., 6,000 feet (Bruce).

Three female specimens are before me, two of them from the U. S. National Museum, and each different from the other. The markings are all obscured by the powdering, but as a whole the species very much resembles *conjugata* in color and wing form. It differs, however, by having a very strong s. t. line and by lacking the prominent claviform connecting the median lines in the other species. There is also considerable difference in the markings of the head and thorax, so that there does not seem to be any likelihood that the species will prove to be the same, though they are, I think, close allies.

Scotogramma megæra, sp. nov.

Ground color a powdery pale yellowish gray; body parts without markings. Primaries with all the ornamentation present; but very obscure and difficult to make out. The wings are almost uniformly powdered and the lines are scarcely darker than the powderings. The basal line is very vaguely indicated. T. a. line almost upright, geminate on the costa, with three strong outward angulations. T. p. line lunulate, evenly bent over the cell and then almost parallel with the outer margin. There is a vague paler shading that indicates an s. t. line, and a series of minute dusky terminal lunules, followed by dusky streaks across the fringes; also a vague trace of a median shade. The orbicular is absent in one specimen, marked by a dusky outline in another. The reniform is narrow, dusky, upright, hardly defined. Secondaries whitish at the base, becoming smoky outwardly, the fringes again being whitish. The veins are dark marked and there is a small discal lunule. Beneath the wings are whitish, a little powdered, becoming a little darker outwardly. Primaries with a discal lunule. Secondaries with a small dot. Expanse, 1.40 to 1.45 inches = 35 to 36 mm.

Habitat: Glenwood Springs, Colorado in July.

Dr. Barnes has sent me two specimens, male and female. The new species resembles *submarina* and *densa*, but is larger and paler than either. It is perhaps nearest to the former, but the markings are much less evident and the peculiar yellowish tinge is quite different from anything that I have ever seen in other specimens. The vestiture consists of flattened scales.

**SUPER-FAMILIES IN THE HYMENOPTERA AND
GENERIC SYNOPSES OF THE FAMILIES THYNNIDÆ,
MYRMOSIDÆ AND MUTILLIDÆ.**

BY WILLIAM H. ASHMEAD,

Assistant Curator, Department of Insects, U. S. National Museum.

The three families, Thynnidæ, Myrmosidæ and Mutillidæ have never been properly defined, or characterized, and their genera, at present, on account of the diversity between the sexes, and the difficulties attending their proper correlation, are in utter confusion, and often wrongly placed. This confusion is also due, to a certain extent, to a lack of sufficient study, and the careless and insufficient characterization of some of the species and genera by the original describers, so that until lately it has been impossible to bring them into anything like order.

This statement is well exemplified in Blake's description of the genus *Photopsis*. The genus is not only most carelessly and meagrely described, but the type of the genus is not mentioned; besides Blake has placed in it species that do not agree at all with his meagre description. I find placed in it, and in another genus characterized by him, representing females, representatives of no less than six distinct genera, some of which do not belong to the Mutillidæ at all, but to an allied family, characterized here under the name Myrmosidæ.

During the past two or three years I have devoted much time to the study of large series of the Mutillidæ, and the closely allied families, and have been able to correlate the sexes of most of the genera, either from specimens bred, taken *in coitu*, or from structural characters. The results of these studies I desire to present here succinctly, with the hope that it will help to clear up much of the existing confusion in these families, and thus make it easier sailing for other students.

The Hymenoptera may be conveniently separated into ten very natural superfamilies, and these again into minor families. In order that these may be recognized and to show the position that I believe the Thynnidæ, Myrmosidæ and Mutillidæ should occupy, I give below a table for distinguishing these superfamilies, and a table of the families of the Vespoidea, the superfamily to which they belong.

Attention is also called to the position assigned the Vespidæ, Eu-

menidæ, Masaridæ, Chrysididæ, Bethylidæ (part of the Proctotrypidæ, which I now consider a distinct family), Trigonalidæ, the new family Cõsilidæ, and to the separation of the families Myzinidæ and Tiphidæ, from the old family Scoliidæ. The superfamilies recognized may be thus distinguished :

Table of Superfamilies.

Suborder I. Heterophaga. Abdomen petiolate or subpetiolate, never broadly sessile ; larvæ apodous.

* Hypopygium entire and closely united with the pygidium, the sting or ovipositor when present always issuing from the tip of the abdomen.

a. Pronotum not extending back to the tegulæ.

b. Tarsi dilated or thickened ; pubescence of head and thorax feathery or plumose Superfamily I. **APOIDEA.**

b̄b. Tarsi slender, *not* dilated or thickened, pubescence of head and thorax simple, not plumose Superfamily II. **SPHEGOIDEA.**

aa. Pronotum extending back to the tegulæ, or the latter absent.

c. Trochanters always *one-jointed*.

d. Abdomen variable, rarely twice longer than the head and thorax united, most frequently much shorter ; hind tibiæ in ♀ neither inflated nor strongly constricted at base.

Petiole or first segment of abdomen simple, without a scale or node ; winged forms with well developed tegulæ.

Superfamily III. **VESPOIDEA.**

Petiole or first segment of abdomen composed of one or two scales or nodes ; winged forms without or with imperfectly formed tegulæ Superfamily IV. **FORMICOIDEA.**

dd. Abdomen in ♀ greatly elongated, several times longer than the head and thorax united, the segments constricted at sutures and flexible ; hind tibiæ inflated and strongly constricted at base ; abdomen in ♂ clavate. (pars) (Family Pelecinidæ)

Superfamily V. **PROCTOTRYPOIDEA.**

cc. Trochanters *two-jointed*.

Superfamily V. **PROCTOTRYPOIDEA.**

** Hypopygium divided or never united closely with the pygidium, the ovipositor issuing some distance before the tip of the abdomen ; *trochanters always two-jointed*.

d. Front wings always without a stigma, the marginal vein, if present, linear, never large or stigmated ; abdomen with the ventral segments hard and chitinous, without a fold.

e. Pronotum extending back to the tegulæ ; front wings with a marginal and a basal cell, either complete or incomplete ; antennæ straight, not elbowed Superfamily VI. **CYNIPOIDEA.**

ee. Pronotum not extending back to the tegulæ ; front wings with neither a marginal cell, nor a distinct basal cell, the latter, if at all indicated, usually poorly defined by hyaline veins, visible only by

transmitted light; hind wings without a basal cell; antennæ elbowed..... Superfamily VII. **CHALCIDOIDEA**.
dd. Front wings with a stigma, the marginal vein usually large or stigmated (rarely linear in some Alysids); abdomen with the ventral segments most frequently soft and membranous, with a fold (rarely hard and chitinous without a fold, Evaniidæ and Agriotypidæ); pronotum always extending back to the tegulæ.

Superfamily VIII. **ICHNEUMONOIDEA**.
 Suborder II. Phytophaga. Abdomen broadly sessile; larvæ with legs.
 Anterior tibiæ with only one apical spur..... Superfamily IX. **SIRICOIDEA**.
 Anterior tibiæ with two apical spurs. Superfamily X. **TENTHREDINOIDEA**.

SUPERFAMILY III. VESPOIDEA.

Table of Families.

- Abdomen either sessile or petiolate with the first ventral segment distinctly separated from the second by a more or less deep constriction or transverse furrow; legs most frequently fossorial..... 5
- Abdomen either sessile or petiolate, but with the second segment rarely separated from the first ventral by a strong constriction, or if constricted the legs are not fossorial, and the wings are usually folded in repose; in the former case the legs may be either fossorial or simple.
- Posterior legs short, the femora rarely reaching to or at least much beyond the middle of the abdomen; legs most frequently not fossorial..... 2
- Posterior legs long, the femora most frequently reaching to or beyond the tip of abdomen; tibiæ most frequently serrate or spinous, more rarely entirely without spines; middle tibiæ with two apical spurs.
- Family XXVI. **POMPILIDÆ**.
2. Wings not folded in repose..... 3
- Wings folded in repose.
- Middle tibiæ with two apical spurs; claws simple; sexes three, ♀ ♂ ♂
 Family XXVII. **VESPIDÆ**.
- Middle tibiæ with one or two apical spurs; claws with one or more teeth beneath; sexes two, ♂ ♀..... Family XXVIII. **EUMENIDÆ**.
3. Metathoracic angles usually acutely produced; scutellum large, flat, conical, or spined.
- Abdomen normal, with at least six distinct segments, the venter flat; antennæ usually strongly clavate, in ♀ knobbed at apex; scutellum very large, flat, species not metallic; antennæ 12-jointed..... Family XXIX. **MASARIDÆ**.
- Abdomen abnormal, with 3 to 5 visible segments, the terminal segments retractile, telescopic-like, the venter concave or flat; antennæ most frequently filiform, inserted close to anterior border of head, 13-jointed; scutellum convex, conical or spined; species metallic.... Family XXX. **CHRYSIDIDÆ**.
- Metathorax posteriorly truncate or rounded, rarely toothed; scutellum normal or in some wingless females entirely wanting; antennæ filiform, or sub-clavate; rarely flabellate in some males.
- Hind wings *with* a distinct venation and *without* anal lobes; females never apterous..... 4

Hind wings *without* distinct venation and always *with* an anal lobe; females often apterous; middle tibiæ with two apical spurs; antennæ 10-15-jointed.

Family XXXI. BETHYLIDÆ.

4. Middle tibiæ with two apical spurs, eyes normal, not emarginate within; antennæ 15-jointed or more, similar in both sexes.... Family XXXII. TRIGONALIDÆ.

Middle tibiæ with one apical spur; eyes reniform or emarginate within; antennæ in ♀ 12-, in ♂ 13-jointed..... Family XXXIII. SAPYRIDÆ.

5. Middle coxæ contiguous or nearly so..... 7
Middle coxæ distant, usually widely separated..... 6

6. Stigma in front wings not well developed, at the most only slightly developed, either very small or linear; eyes most frequently emarginate within; middle tibiæ with two apical spurs.

Pygidium in ♂ deeply emarginate at apex, the hypopygium terminating in a sharp thorn or aculeus which curves upwards and rests in the emargination of the pygidium; claws cleft..... Family XXXIV. MYZINIDÆ.

Pygidium in ♂ entire or at most with only a slight emargination, the hypopygium terminating in three spines; claws simple.

Family XXXV. SCOLIIDÆ.

Stigma in front wings well developed, ovate or subovate; eyes entire, not emarginate within; pygidium in ♂ entire, the hypopygium terminating in a sharp aculeus which curves upwards..... Family XXXVI. TIPHIIDÆ.

7. Females always apterous and most frequently, but not always without ocelli; eyes variable..... 9

Females always winged with ocelli; eyes large, always attaining the base of the mandibles..... 8

8. Abdomen sessile or subsessile, usually with a more or less distinct constriction between the dorsal segments 1 and 2; front wings with the stigma well developed, the marginal cell usually attaining the costa at apex (rarely is it rounded at apex with a slight space between, *Cosila* and allies); third wings usually without an anal lobe; the cubitus either interstitial or originating beyond the transverse median nervure very rarely originating a little before it; tibial spurs 1, 2, 2; tarsal joints normal; eyes entire; hypopygium entire, not ending in a spine or aculeus..... Family XXXVII. COSILIDÆ.

Abdomen longly petiolate; front wings with the stigma not well developed, the second recurrent nervure subobsolete; hind wings bilobed, the cubitus originating far beyond the transverse median nervure; tibial spurs very long, straight; tarsal joints 2-3 in ♀ dilated, deeply excised or lobed and filled with a membrane between the lobes; eyes emarginate within; ocelli very large; antennæ very long, filiform, the joints with a bristle-like spine at apex.

Family XXXVIII. RHOPALOSOMIDÆ.

9. Middle tibiæ with two apical spurs, rarely with one spur in some males.

Middle coxæ usually slightly separated by a triangular or bilobed projection of the mesosternum; females with the thorax divided into three parts, the pygidium usually subcompressed or otherwise formed, usually abnormal; hypopygium in males most frequently armed.

Family XXXIX. THYNNIDÆ.

Middle coxæ contiguous, not separated by a triangular or bilobed projection of the mesosternum, the latter being squarely truncate at apex.

Thorax in the females divided into two parts; pygidium normal; hypopygium in males produced into a sharp aculeus which curves upwards, or very rarely simple; hind wings *with* a distinct anal lobe, the cubitus originating from the apex of the submedian cell, interstitial with the transverse median nervure or rarely originating a little beyond it Family XL. MYRMOSIDÆ

Thorax in females undivided, all the parts being closely united or soldered together without visible sutures between; pygidium normal; hypopygium in males simple, unarmed, but the genital plate is armed with two slender straight spines which project more or less distinctly from the tip of the abdomen; hind wings *without* an anal lobe, the cubitus always originating far *before* the transverse median nervure. Family XLI. MUTILLIDÆ.

FAMILY XXXIX. THYNNIDÆ.

Table of Genera.

Females	9
Males	
Mandibles bidentate.	3
Mandibles tridentate.	
First transverse cubitus with an appendage or a spurious nervure which divides the first submarginal cell into two more or less distinct divisions.	2
First transverse cubitus without an appendage, the first submarginal cell not divided.	
Second submarginal cell receiving both recurrent nervures; maxillary palpi 6-jointed, labials 4-jointed.	Trachypterus <i>Guérin.</i>
Second submarginal cell receiving the first recurrent nervure, the second interstitial	Oncorhinus <i>Shuckard.</i>
2. Third submarginal cell larger than the second, the second and third each receiving a recurrent nervure; clypeus not prominent, with a slight triangular emargination, or impression anteriorly; mandibles with the apical tooth much longer than the two inner teeth; maxillary palpi 6-jointed, labials 4-jointed.	
	Telephoromyia <i>Guérin.</i>
3. Hypopygium at apex unarmed.	6
Hypopygium at apex dentate or with an aculeus.	
Labrum very slightly visible, usually entirely covered by the projecting clypeus, which is most frequently squarely or roundedly truncate anteriorly.	4
Labrum large, distinct and entirely uncovered.	
Labium bilobed; pygidium transverse, longitudinally striated, the hypopygium tridentate, the lateral teeth short; second recurrent nervure angularly bent at the middle; maxillary and labial palpi 4-jointed.	
	Agriomyia <i>Guérin.</i>
4. First transverse cubitus with an appendage.	5
First transverse cubitus without an appendage.	
Hypopygium ending in an aculeus.	
Clypeus anteriorly with a slight median sinus; first transverse cubitus distinct; maxillary palpi 5-jointed, labials 4-jointed.	Anthobosca <i>Guérin.</i>

- Clypeus anteriorly produced into a triangular tooth; first transverse cubitus wanting or evanescent, maxillary palpi 4-jointed. . . . **Methoca Latreille.**
- Hypopygium tridentate, the median tooth longer than the lateral.
- Clypeus anteriorly with a median emargination; maxillary and labial palpi very short, both 3-jointed; marginal cell truncate at apex. **Iswara Westw.**
- Clypeus anteriorly rounded not emarginate; maxillary palpi 4-jointed, labial palpi very short, 3-jointed; marginal cell acute at apex.
- (Type *I. Koebeli* ASHM.) **Iswaroides Ashm.**, g. n.
5. Hypopygium narrow, briefly dentate or trilobed at apex; clypeus ovate, subemarginate or with a triangular impression at apex; maxillary palpi 6-, labials 4-jointed **Elaphroptera Guérin.**
- Hypopygium not narrow, ending in three strong teeth, the middle tooth a little longer than the lateral.
- Clypeus produced and anteriorly rounded or sub-truncate; maxillary palpi 4 jointed **Ariphron Erichson.**
- Clypeus prominent, narrowed, at apex anteriorly bidentate. **Ornepetes Guérin.**
- Hypopygium produced into a distinct spine or with an aculeus.
- Metathorax neither short nor abruptly sloping from base to apex.
- Metathorax truncate behind, the angles acute; hypopygium small, hidden, but produced at apex into a long stout prong which curves upwards.
- Rhagaster Guérin.**
- Metathorax not truncate behind, a little longer than the mesonotum; hypopygium projecting and ending in a short aculeus, the pygidium transverse with some transverse rugæ toward the apex **Entelus Westw.**
- Metathorax very short, abruptly sloping from base to apex; hypopygium large, triangular and ending in a small spine which extends beyond the pygidium.
- Maxillary palpi 6-jointed, the joints not short, subequal; labials 4-jointed.
- Thynnus Fabr.**
- Maxillary palpi 6-jointed, joints 1-3 minute, 4-6 very long.
- Trachynomys Guérin.**
6. Third submarginal cell shorter than the second 8
- Third submarginal cell longer than the second.
- Mandibles narrow, curved, the teeth acute; abdomen oblong, subcylindrical, as long or longer than the head and thorax united 7
- Mandibles broad, the apical tooth large, obtuse; abdomen, oval, shorter than the thorax; claws cleft **Amblysona Westw.**
7. Hypopygium not prominent, obtuse at apex; clypeus somewhat produced, and anteriorly rounded, not excised; maxillary palpi 6-jointed, joints 1-3 united, about half as long as 4-6; labials 4-jointed, joint I not longer than 2-3 united.
- Anodontyra Westw.**
- Hypopygium somewhat prominent, narrow, truncate at apex; clypeus ovate, sub-excised or triangularly emarginate anteriorly; maxillary palpi 6-jointed, joint I short, the following subequal; labials 4-jointed, joint I shorter than 2-3 united.
- Elaphroptera Guérin.**
- Hypopygium broader, subtriangular or subquadrate, obtuse or truncate at apex.
- Clypeus strongly produced anteriorly, the apical margin truncate or slightly rounded; maxillary palpi 5-, labials 4-jointed. **Eirone Westw.**

Clypeus broadly truncate at apex; maxillary palpi 6-jointed, labials 4-jointed.

Zeleboria *Sassure*.

Clypeus not strongly produced anteriorly, the apex subemarginate or excised; maxillary palpi 6-jointed, joints 1-3 rather short, 4-6 long, subequal, 5 or 6 times longer than thick; labials 4-jointed, the first joint long, slender, about as long as 2-4 united. **Scotaena** *Klug*.

8. Clypeus not produced, excised anteriorly; maxillary palpi 6-jointed, joints 1-3 short, 4-6 very long; labials 4-jointed. **Aelurus** *Klug*.

9. Body rather stout, not elongate; metathorax very short, obliquely transversely compressed or sublamellar; pygidium abnormal, narrowed, compressed or deflexed; claws usually cleft or bifid, rarely simple. II

Body narrow, slender and elongate; abdomen cylindrical; thorax above flattened; metathorax elongate or at least not very short or sublamellar; pygidium normal; claws either simple or cleft.

Head without a sulcus or grooved line on temples behind the eyes; abdomen cylindrical. IO

Head quadrate with a sulcus or grooved line on temples behind the eyes; abdomen longer than the head and thorax united.

Claws simple; grooved line behind the eyes curved and not quite extending to the eyes; maxillary palpi 6-jointed, labials 4-jointed; first ventral segment simple. **Glyptometopa** *Ashm*.

Claws cleft; grooved line behind the eyes straight and extending from eye almost to the occiput; maxillary palpi 6-jointed, labials stout, 4-jointed; first ventral segment with a tooth beneath.

Rhagigaster *Guérin* = *Diamma* SAUSS. nec *Westw*.

10. Claws cleft.

Head seen from above rounded, not or scarcely longer than wide; eyes very large; ocelli present; mandibles 3- or 4-dentate; maxillary palpi 6-jointed, labials 4-jointed. **Trachypterus** *Guérin* = *Diamma* WESTW. ♀.

Head oblong, more than twice longer than wide; eyes minute; ocelli absent; mandibles bidentate at apex; maxillary and labial palpi both 4-jointed.

Elirone *Westwood*.

Claws simple.

Eyes minute; ocelli wanting; maxillary and labial palpi both 4-jointed.

Aelurus *Klug*.

Eyes large, oblong-oval; ocelli present; mandibles at apex bidentate, the lower tooth much the longer; maxillary palpi 4-jointed. **Methoca** *Latreille*.

11. Head seen from above triangular (similar to *Trigonopsis* Perty), without ocelli; pronotum quadrate; second dorsal abdominal segment with two transverse folds; eyes small, oval, reaching base of mandibles; clypeus very short, truncate anteriorly; mandibles simple, falcate; maxillary palpi 4-jointed, labials 3-jointed; claws cleft. . . . **Iswaroides** *Ashm*. (Type *I. koebelei* ASHM.) ♂ g. n.

Head large, quadrate, much wider than the thorax; anterior margin of mesonotum curved, the angles rounded; second dorsal abdominal segment smooth, without transverse folds or carinae; maxillary palpi 6-jointed; claws simple.

Arphron *Erichson*.

Head not especially large, subglobose, subquadrate, or narrowly transverse; anterior margin of mesonotum straight, the angles more or less acute; second dorsal abdominal segment with transverse folds or carinæ.

Pronotum obtrapezoidal.

Head subquadrate or subglobose; eyes oblong oval, the malar space distinct; mandibles broad and flat, obtuse at apex and with a longitudinal sulcus or groove above along the inner margin for two-thirds their length; clypeus with a high median ridge or carina; pygidium not very narrow, deflexed, and *longitudinally striated*, the hypopygium dilated at apex; claws cleft. **Thynnus** Fabr.

Head narrowly transverse, with two broad smooth furrows or impressions, extending from the base of each antenna to the vertex; eyes oval, the malar space wanting; mandibles not broad, falcate, acute at apex; clypeus transversely narrowed, without a median carina, and anteriorly rounded with a slight median emargination; pygidium strongly contracted at sides just before apex, the apex dilated and as seen from behind oval, above it is smooth, or *transversely striated*; claws cleft.

Agriomyia Guérin.

Head as seen from above subglobose, eyes small, oval, the malar space wanting; mandibles acuminate, but with a slight tooth within before apex; clypeus truncate with a slight triangular emargination anteriorly; basal abdominal segment with a strongly grooved circular furrow on each side; pygidium much narrowed, compressed before apex, with tufts of long hair on each side which curl over and meet above; hypopygium broadly dilated at apex.

Elaphroptera Guérin = *Anmodromus* GUÉRIN

Pronotum quadrate; eyes oval; mandibles subfalcate, acuminate; clypeus slightly produced without median carina; pygidium oval, not longitudinally striated; claws cleft. **Entelus** Westwood.

FAMILY XL. MYRMOSIDÆ.

Table of Genera.

Males 5

Females.

Ocelli wanting. 3

Ocelli present, distinct. 2

2. Thorax quadrangular, the pronotum as wide as the meso-metathorax, usually rugose punctate or coarsely punctate; maxillary palpi 6-, labials, 4-jointed.

Myrmosa Latreille.

Thorax not quadrangular, compressed at sides from the meso-thoracic angles, the pronotum very much narrowed; mandibles strongly excised beneath, with a projection before the emargination. (Type *Mutilla incerta* RADOWSKOWSKI.

Ephutomma Ashm. g. n.

3. Thorax in outline almost round; head quadrate; eyes very small, round; mandibles falcate; maxillary palpi 3-jointed; labial palpi 2-jointed.

Bradynobænus Spinola.

Thorax in outline not rounded.

Abdomen without a constriction between segments 2 and 3.....4

Abdomen with a strong constriction between segments 2 and 3.

Apterogyna Latreille.

4. Thorax quadrate, the sides from pronotum parallel; head very large, quadrate, wider than the thorax; mandibles long, bidentate at apex, sinuate or submarginated beneath; pygidium without a pygidial area..... **Brachycistis Fox.**

Thorax not quadrate, quite differently shaped.

Eyes oval, slightly sinuate on outer margin superiorly.

Abdomen sessile; pronotum transverse, a little wider than the meso-metanotum anteriorly but not wider than the same posteriorly, the sides being compressed just behind the pronotum..... **Milluta André.**

Eyes round or rounded.

Abdomen subpetiolate, the petiole enlarged towards apex with a strong constriction between it and the second segment; pronotum large, nearly obtrapezoidal and fully as wide or a little wider than the meso-metathorax.

(Type *M. peculiaris* CR.) **Typhoctes Ashm. g. n.**

Abdomen with a distinct, slender petiole; pronotum campanulate, much narrower than the meso-metathorax..... **Cyphotes Blake.**

5. Stigma and marginal cell distinct.....7

Stigma and marginal cell wanting.....6

Stigma present, narrow, elongate, the marginal cell wanting, front wings with only the median cell distinct; antennæ very long, filiform; abdomen ovate, with a very short petiole; pygidium tridentate at apex.

Bradynobæus Spinola (= Chestus SPINOLA).

6. Abdomen subpetiolate, with a strong constriction between the second and third segments; front wings with one very small submarginal cell and a median and a submedian cell; abdomen ending in an aculeus..... **Apterogyna Latreille.**

7. Abdomen ending in an aculeus which curves upwards; front wings with a short marginal cell.....8

Abdomen unarmed at apex, without an upward curved aculeus.

Front wings with three submarginal cells.

Marginal cell long, and with four submarginal cells, the second and third each receiving a recurrent nerve..... **Myrmosa Latreille.**

Marginal cell rather short, triangular, the second submarginal cell triangular, receiving the first recurrent nerve near the middle, the third submarginal cell hexagonal; eyes large, extending to base of mandibles with an emargination within..... **Ephutomma Ashm. g. n.**

8. Middle tibiæ with 2 apical spurs.....9

Middle tibiæ with 1 apical spur.

Front wings with three submarginal cells, the second and third each receiving a recurrent nerve; cubitus in hind wings interstitial or nearly, with the transverse median nerve; mesonotum with furrows.

Abdomen with a more or less distinct constriction between the first and second segments; scutellum rounded, subconvex; first recurrent nerve usually joining the second submarginal cell before the middle; mandibles tridentate..... **Brachycistis Fox.**

- Abdomen *without* a constriction between the first and second segments ; scutellum quadrate ; first recurrent nervure joining the second submarginal cell *beyond* the middle. **Milluta** *André*.
9. Front wings with three submarginal cells and two recurrent nervures. 10
 Front wings with two submarginal cells.
 Only one recurrent, which is received by the second submarginal cell.
Typhoctes *Ashm.* g. n. ♀
 Two recurrent nervures, both received by the second submarginal cell.
Cyphotes *Blake* (pars.)
10. Second submarginal cell receiving both recurrent nervures. . . **Cyphotes** *Blake*.

FAMILY XLI. MUTILLIDÆ.

The genera *Scaptodactyla* Burmeister and *Scaptopoda* Lynch-Arri-balzaga, are not included in the following table, since I have not been able to secure specimens, or to consult the descriptions ; the works in which these genera are described not being in the libraries in Washington and Philadelphia.

Table of Genera.

- Males. 15
 Females.
1. Abdomen petiolate or subpetiolate, or *with* a distinct constriction or furrow between the first and second segments. 8
 Abdomen sessile or subsessile, *without* a constriction or furrow between the first and second segments, the first segment uniting with the second its entire breadth. 2
2. Thorax obpyriform, or narrowed posteriorly, or strongly contracted medially at sides, as seen from above *often* hexagonal. 5
 Thorax quadrangular or cubiform, not narrowed posteriorly, rather abruptly or perpendicularly truncate behind, the dorsal profile straight, the lateral margins parallel or scarcely perceptibly curved inwardly medially ; head most frequently quadrate or subquadrate.
 Pygidium *without* a pygidial area. 3
 Pygidium *with* a pygidial area, or at least with elevated lateral margins. 4
3. Antennal foveæ bounded by a carina superiorly.
 Head large, quadrate, wider than the thorax ; eyes oval ; mandibles broadened towards apex, tridentate ; first joint of flagellum about twice as long as the second or as long as joints 2-3 united ; lateral margins of thorax parallel.
Myrmilla *Wesmael*.
 Head not so distinctly quadrate, more rounded, not wider than the thorax ; eyes ovate or oval ; mandibles not broadened towards apex, bidentate, the outer tooth the longer, acute ; first joint of flagellum longer than joints 2-3 united ; lateral margins of thorax slightly curved inwardly medially. . . **Ronisia** *Costa*.
4. Antennal foveæ *not* bounded by a carina superiorly. 7
 Antennal foveæ bounded by a carina superiorly.
 Head quadrate or subquadrate ; eyes moderately large, ovate, oval or elliptical, but never round.

Lateral margins of the metathoracic truncature normal, rarely denticulated ; anterior tarsi with a long, stiff tarsal comb.

Lateral margins of the thorax straight, parallel ; head large, quadrate, usually much wider than the thorax ; mandibles at apex tridentate, the outer tooth the longer, acute. **Mutilla** Linne.

Lateral margins of the thorax usually slightly curved inwardly medially, therefore not exactly parallel ; head subquadrate not or scarcely wider than the thorax ; mandibles simple, narrowed towards apex, dentate or at most with a slight tooth within before apex ; maxillary palpi long, 6-jointed, labials 5-jointed ; third joint of antennæ thicker toward apex, as long as joints 4-5 united.

(Type *M. dubitata* SMITH) **Timulla** Ashm.

Lateral margins of the metathoracic truncature dentate, or denticulated ; anterior tarsi with a short tarsal comb ; mandibles simple without a tooth within ; maxillary palpi long, 6-jointed, labials 4-jointed, joints 2-4 compressed, the second wider than long ; first joint of flagellum obconical, not longer than wide at apex. (Africa.)

(Type *O. abbotii* ASHM. ms.) **Odontomutilla** Ashm. g. n.

5. Antennal foveæ shallow, *not* bounded by a carina superiorly. 7

Antennal foveæ bounded by a distinct carina superiorly.

Eyes round, prominent, distant from base of mandibles. 6

Eyes prominent, oval, ovate, or elliptical.

Pygidium smooth, *without* a pygidial area ; thorax very elongate, more than thrice longer than wide, coarsely pitted or rugose, the anterior margin rounded, the lateral hind angles of the mesonotum produced outwardly into a triangular tooth ; second ventral segment with a median tooth ; head subquadrate, hardly as wide as the thorax, rounded behind ; mandibles edentate. (Africa.)

(Type *M. guineensis* FABR.) **Dolichomutilla** Ashm. g. n.

Pygidium with a pygidial area ; thorax scarcely twice as long as wide, unarmed, the sides more or less contracted medially, almost violin-shaped ; second ventral segment normal ; head large, quadrate, wider than the thorax, the hind angles acute, cheeks beneath armed with a strong tooth ; mandibles usually bidentate, rarely simple, the outer tooth much the longer.

Pseudomethoca Ashm.

6. Head quadrate or subquadrate, the hind angles rounded, not acute ; pygidial area distinct ; mandibles not excised beneath, simple, edentate or with a slight tooth within before apex.

Thorax elongate, nearly thrice as long as wide, very coarsely irregularly pitted or foveolated, the anterior margin squarely truncate, the angles acute or toothed ; lateral hind angles of mesonotum produced outwardly into a triangular tooth ; mandibles edentate ; maxillary palpi 6-jointed, the first two short ; labials 4-jointed, the third dilated, the last long, fusiform. (Australia.)

(Type *M. rugicollis* WESTW.) **Bothriomutilla** Ashm. g. n.

Thorax hardly twice as long as wide, as seen from above more or less hexagonal, unarmed.

Head quadrate or subquadrate; mandibles beneath entire, acuminate, edentate or with one or two small teeth within before apex; body most frequently bare or nearly bare, more rarely with a short dense pubescence, generally confined to the abdomen. **Nomiaphagus** *Ashm.* g. n.
 Head transverse; mandibles beneath with a sinus or emargination on basal one-fourth or third, apex acuminate with a slight tooth within before tip; body clothed with a dense pubescence.

(Type *S. anthophoræ* ASHM.) **Pyrrhomutilla** *Ashm.* g. n.

7. Thorax fully as wide as long, hexagonal; head subglobose, much narrower than the thorax; mandibles simple, acute at apex, edentate; maxillary palpi 5-jointed, labials 3-jointed (Australia) **Eurymutilla** *Ashm.* g. n.
 Thorax almost quadrangular, about $1\frac{1}{2}$ times as long as wide, or a little longer, only slightly narrower posteriorly than anteriorly; head transverse or subglobose; eyes somewhat rounded or very short oval; mandibles with an emargination beneath, pointed at apex, edentate; first joint of flagellum not or scarcely longer than wide, shorter or very little longer than the third; body almost bare.

Photopsis *Blake*

Thorax obpyriform, about twice as long as wide; head subquadrate or subglobose eyes short oval or rounded.

Mandibles excised beneath. **Tricholabiodes** *Radoszk.*

Mandibles not excised beneath. **Sphærophthalma** *Blake* (pars)

8. Thorax obpyriform, or at least always narrowed posteriorly, never quadrangular or cubical, often hexagonal or fiddle-shaped, the lateral margins not parallel, the dorsal profile most frequently arcuate or convexly rounded. 9
 Thorax quadrangular or cubiform, not narrowed posteriorly, usually abruptly or almost perpendicularly truncate behind, the dorsal profile straight or nearly, the lateral margins parallel or nearly, rarely with a slight inward curve medially.
 Head subquadrate; eyes oval, distant from base of mandibles; antennal foveæ bounded by a carina superiorly; mandibles simple, with a slight tooth within before apex; first joint of flagellum longer than joints 2-3 united; metathorax with a prominent median tooth or spine above. **Ronisia** *Costa.*
 9. Antennal foveæ deep, distinct, and bounded by a carina superiorly. 10
 Antennal foveæ rather shallow, *not* bounded by a carina superiorly. 11
 10. Head subquadrate, transverse or subglobose.

Eyes round, far from base of mandibles; mandibles not excised beneath, simple, edentate or with a slight tooth within before apex.

Sphærophthalma *Blake.*

Eyes short oval or round; mandibles sinuate or excised beneath with usually a small tooth within before apex. **Tricholabiodes** *Radoszk.* (pars)

11. Pygidium not smooth, often longitudinally striated or rugulose, and always with a distinct pygidial area 12
 Pygidium smooth, *without* a pygidial area.

Thorax only about twice as long as wide, unarmed; head subquadrate, not wider than the thorax; eyes short oval, nearly round, the malar space as long as the eye; mandibles with a tooth within before apex; first joint of flagellum obconical, longer than the second. **Stenomutilla** *André.*

12. Eyes round or rounded.....13
 Eyes ovate, oval, or elliptical ; mandibles not excised beneath.
 Head very large, quadrate, about twice as wide as the thorax, or very much wider, the hind angles sharp, or acute ; beneath armed with 4 teeth, two small ones at base of gula and two much larger ones, one on each cheek ; mandibles bidentate, the lower tooth much the longer.
 (Type *M. spinosa* Roed.) **Hoplomutilla** Ashm. g. n.
 Head quadrate or subquadrate, unarmed beneath, and not or rarely much wider than the thorax.
 Metathorax truncate behind, the spiracles linear ; mandibles with one or small teeth within before apex ; first joint of flagellum longer than the second.....**Dasylabris** Radoszkowski.
 Metathorax convexly rounded behind, the spiracles rounded or very short oval ; mandibles simple or at most with a slight tooth within some distance before the apex ; first joint of flagellum usually wider than long, smaller than the second.**Ephuta** Say.
 (Type *E. scrupea* SAY ♂) = *M. parvula* CR. ♀
13. Head globose or subglobose.
 Mandibles entire, not excised beneath, eyes small ; first joint of flagellum not much longer than thick.....**Cystomutilla** André.
 Mandibles strongly excised beneath, with a process or projection before the incision ; eyes distant from base of mandibles... **Tricholabiodes** Radoszk.
 Head quadrate, subquadrate or transverse.
 Mandibles *not* excised beneath14
 Mandibles, or at least the left mandible, excised beneath and usually with a process or projection before the incision.
 Thorax in profile arcuate ; eyes usually with a slight sinus on outer edge near apex. **Tricholabiodes** Radoszk.
14. Eyes extending to or nearly to the base of the mandible ; metathorax subtruncate ; the spiracles oval or elliptical ; mandibles subfalcate with a small tooth within, much before apex ; first joint of flagellum obconical, as long or longer than the second.....**Photopsis** Blake.
 Eyes distant from the base of the mandibles, a wide space between.
 Body very hairy ; mandibles simple, acuminate, edentate, or at the most with a slight tooth within before apex ; maxillary palpi 6-, labials 4-jointed, the second and third dilated ; first joint of flagellum as long as joints 2-3 united..... (Type *S. gorgons* BLAKE) **Dasymutilla** Ashm. g. n.
 Body bare or nearly bare, or at least not densely hairy ; mandibles simple, edentate, or with a light tooth within some distance before apex ; maxillary palpi 6-, labials 4-jointed..... **Sphærophthalma** Blake.
15. Winged.....16
 Wingless..... **Myrmilla** Wesm. cl.
16. Flagellum simple, filiform.....17
 Flagellum flabellate..... **Psammotherma** Latr.
17. Second submarginal cell receiving only one recurrent nervure, the second recurrent when present, received by the third submarginal cell.....18
 Second submarginal cell receiving both recurrent nervures.
 (Type *M. melicerta* SMITH) **Allomutilla** Ashm. g. n.

18. Eyes round, or short oval, *not* emarginate within. 22
 Eyes very large, occupying most of the sides of the head, *not* emarginate within,
 but *sinate* or emarginate on their *external* margin superiorly. 21
 Eyes long oval, or ovate, and always more or less deeply emarginate *within* at
 their apical third.

Front wings with two submarginal cells. 20
 Front wings with three submarginal cells, or the third at least partially formed,
 not entirely obliterated. 19

19. Metathoracic angles, normal, neither produced nor dentate; abdomen sessile or
 subsessile, the first segment not separated from the second by a constriction
 or furrow.

Scutellum conically or triangularly elevated; mesonotum with distinct furrows;
 mandibles bidentate; hypopygium margined at sides, emarginate at apex.
 (Africa.)

(Type *M. medon* SMITH) **Trogaspidia** *Ashm.* g. n.

Scutellum normal, at the most subconvex.

Mesonotum with distinct furrows or the furrows always indicated posteriorly;
 stigma usually well developed, but sometimes pale or open in the
 middle; scape normal.

Mandibles excised or sinuate beneath before the middle and usually
 with a process or projection before the incision; dorsal abdom-
 inal segments 3-6 without a median longitudinal carina.

Mandibles at apex tridentate; first joint of flagellum usually
 longer than the second. **Mutilla** *Linne.*

Mandibles at apex bidentate; first joint of flagellum not longer
 than the second. **Timulla** *Ashm.* g. n.

Mandibles simple, not excised beneath, at apex bidentate; dorsal ab-
 dominal segments 3-6, usually with a median longitudinal carina.

Ronisia *Costa.*

Mesonotum *without* distinct furrows; stigma not well developed; man-
 dibles normal, bidentate Scape bicarinate beneath; first and second
 joints of flagellum usually transverse or not longer than wide

Ephuta *Say.*

20. Metathorax with the upper hind angles produced into a tooth; mesonotum *with-*
out distinct furrows; scutellum large, flat, the hind angles produced into a tooth
 which curves inwardly. (Africa.) Type *O. abboti* ASHM.

Odontomutilla *Ashm.* g. n.

Metathorax normal; mesonotum *with* distinct furrows; scutellum normal, the post
 scutellum armed on each side with a small nearly vertical tooth or spine;
 stigma large, the marginal cell long. **Pseudophotopsis** *André.*

21. Post scutellum armed on each side with a small nearly vertical tooth.

Pseudophotopsis *André.*

Post scutellum unarmed; abdomen longly petiolated, the petiole subclavate;
 mesonotum *with* distinct furrows.

Front wings with three submarginal cells, the third sometimes incomplete or
 only partially formed; stigma small and indistinct or hyaline within;
 mandibles strongly excised beneath. **Tricholabiodes** *Radoszk.*

Front wings with three submarginal cells, the third cubital again divided into two nearly equal cells by a longitudinal vein originating from the middle of the second transverse cubital vein; mandibles excised beneath; eyes extending to the base of mandibles. (Asia.)

Alloneurion *Ashm.* g. n. (Type *A. kotepetica* RADOSZK.)

22. Abdomen petiolate or subpetiolate, or always with a constriction or furrow between the apex of the first and base of second segment.....26

Abdomen sessile or sub-sessile, without a constriction or furrow between the first and second segments, the apex of the first broadly sessile with the base of the second.

Front wings with three submarginal cells or the third is more or less partially formed, not entirely obliterated.....25

Front wings with only two submarginal cells, the third entirely obliterated. .23

23. Eyes oval; head quadrate, usually wider than the thorax.

Myrmilla *Wesmael.*

Eyes round; stigma well developed.....24

24. Mesonotum with well defined furrows, or with furrows distinct posteriorly.

Mandibles of an equal thickness to apex, where they are tridentate; beneath with a slight emargination before the middle; malar space short, but distinct. **Photopsis** *Blake* (pars.)

Mandibles more pointed toward apex, bi- or tridentate, but with the lower or outer tooth much the longer, acute; beneath sinuate or emarginate; malar space entirely wanting, the eyes extending to base of manibles.

Tricholabiodes *Radoszk.* (pars.)

Mesonotum without distinct furrows.

Head transverse, the temples very oblique; ocelli large; first joint of flagellum cylindrical, longer than wide, but still shorter than the second; second submarginal cell triangular; submedian cell much larger than the median.

(Type *P. nanus* ASHM.) **Micromutilla** *Ashm.* g. n.

Head quadrate, the hind angles acute; ocelli small; first joint of flagellum quadrate or hardly longer than thick; second submarginal cell pentagonal; submedian cell not longer than the median. **Pseudomethoca** *Ashm.*

25. Marginal cell rounded off at apex, not broadly truncate.

Head subquadrate, the ocelli small; mandibles toward apex broadened and tridentate, the outer tooth the longest, acute; mesonotal furrows wanting; first joint of flagellum scarcely longer than thick, much shorter than the second.....(Type *S. sanbornii* BLAKE) **Nomiæphagus** *Ashm.* g. n.

Head transverse, seen from above obtrapezoidal, the ocelli large; mandibles beneath with a sinus or an emargination, acuminate and with a tooth within before apex, mesonotal furrows distinct; first joint of flagellum twice as long as thick and as long as the second.

(Type *S. anthophoræ* ASHM.) **Pyrrhomutilla** *Ashm.* n. g.

Marginal cell broadly truncate at apex; mesonotum with distinct furrows; mandibles at apex bidentate, not excised beneath; second ventral segment more or less conically produced or elevated at basal middle.

Eurymutilla *Ashm.*

26. Second ventral segment *with* a small longitudinal impression on each side towards the middle, filled with a pubescence resembling dull black felt.

Stenomutilla *André*.

Second ventral segment *without* such impressions.

Front wing with two submarginal cells, the third entirely obliterated. 30

Front wings with three submarginal cells, or the third partially formed, not entirely obliterated. 27

27. Stigma more or less well developed, truncate or rounded at apex. 28

Stigma not well developed, minute.

Marginal cell rounded, not truncate at apex, the third submarginal cell along the radius very short, shorter than the second; mesonotum *with* distinct furrows on the posterior half or two-thirds, obliterated anteriorly.

Mandibles at apex tridentate; first joint of flagellum about half the length of the second **Dasylabris** *Radoszk.*

28. Stigma well developed, oblong oval, rounded at apex; *the marginal cell usually* short 29

Stigma not so large or well developed, obliquely truncate at apex or sublanceolate, often clear or open in the middle.

Marginal cell broadly truncate at apex.

Mesonotum *without* distinct furrows at the most with an indistinct furrow on the shoulders; third submarginal cell along the radius fully twice as long as the second, or even longer; pygidial area distinct.

Mandibles at apex broad, tridentate, with a slight sinus or emargination beneath nearly the middle.

Sphærophthalma *BLAKE* (Type *S. scava* *BLAKE*)

Mandibles toward apex more or less bluntly pointed with usually one tooth within before apex; body densely clothed with long hair.

Dasymutilla *ASHM.* g. n. (Type *S. gorgons* *BLAKE*)

29. Marginal cell rounded, not truncate at apex.

Mesonotum *with* four more or less distinct furrows.

Eyes extending to base of mandibles or nearly; ocelli large.

Mandibles not excised beneath, of an equal thickness to apex, where they are truncate and tridentate, the teeth nearly of an equal size.

Photopsis *Blake* (Type *P. imperialis* *BLAKE*)

Mandibles strongly excised or emarginate beneath from near the middle to apex and usually with a process or projection before the incision, bi- or tridentate, the teeth very unequal.

Tricholablodes *Radoszk.*

30. Stigma not well developed, indistinct; mesonotum *without* furrows; abdomen distinctly petiolate. **Dasylabris** *Radoszk.*

Stigma well developed; mesonotum *with* furrows; abdomen subpetiolate.

Head large, quadrate, armed beneath with four teeth, two at base of gula and a very large tooth or spine on each cheek beneath; ocelli small.

Hoplomutilla *Ashm.* g. n.

Head normal, unarmed, subquadrate or subglobose.

Ocelli not large, mandibles not excised beneath. **Cystomutilla** *André*.

Ocelli large, prominent; mandibles excised or sinuate beneath, at apex bidentate. **Photopsis** *Blake* (pars)

THE LIFE-HISTORIES OF THE NEW YORK SLUG-CATERpillARS.—XVIII.

PLATE I, FIGS. I-10.

By HARRISON G. DYAR, A.M., Ph.D.

Natada nasoni Grote.

- 1876—*Sisyrosea nasoni* GROTE, Can. Ent. VIII, 112.
1882—*Limacodes rude* HY. EDWARDS, Papilio, II, 12.
1887—*Perola daona* DRUCE, Biol. Cent.-Am., Lep. Het. I, 219; pl. 23, f. 11.
1892—*Sisyrosea nasoni* and *rude*, KIRBY, Cat. Lep. Het. I, 554.
1892—*Perola daona* KIRBY, Cat. Lep. Het. I, 532.
1894—*Sisyrosea nasoni* NEUMOEGEN & DYAR, JOURN. N. Y. ENT. SOC. II, 70.

LARVA.

- 1878—GLOVER, Ill. N. Am. Ent. pl. II, fig. 9.
1898—DYAR, Psyche, VIII, 173.
1898—BEUTENMÜLLER, Bull. Am. Mus. N. H. X, 395.

SPECIAL STRUCTURAL CHARACTERS.

Dorsal space broad, even, a very little narrowed at either end, widest centrally, though almost perfectly uniform, flat; lateral space broad, steep, almost perpendicular, straight, not concave nor flared at base, of uniform width, rounded, narrowed to the terminal joints 3 and 13; subventral space strongly retracted and so short that the lateral horns almost touch the leaf. Outline a parallelogram, slightly rounded, scarcely elliptical. Ridges slight, indicated by the horns. These are flexible in the subdorsal row, bent outward at will, normal in arrangement for the spined Eucleids, short, thick and rounded. The subdorsal horns extend at an angle of 45° when erected, those of joints 3 to 5 being larger than the rest except that of joint 13 which is longer and more slender. Lateral horns horizontal, those of joints 5 and 12 slender and longer than the subdorsals of the same segments, markedly shortened at the last moult. The spines on the horns are of the normal stinging type after stage I, but not very numerous, while the marginal ones are club-shaped and setiferous. Those on the large horns are stained with black pigment, some even banded black and white. In stage I the horns are surmounted by a central swollen-tipped seta and a series in a circle as in *Sisyrosea textula* on the anterior and posterior segments, but centrally reduced to three setæ of

equal length, with the others rudimentary at the base, or absent. Depressed spaces represented by whitish spots, distinct but unmodified at the surface of the skin; (1) paired and alternating with (2) in the dorsal space; (4) and (6) on the posterior half of the segment in the lateral space in an unpigmented area; (5) indistinguishable. The spiracle of joint 5 is above the line of the lateral horns. No caltropes or detachable spines are present. Skin at first wrinkled shagreened, later finely granular. This larva neatly connects *Sisyrosea textula* with the other spined Eucleids. The horns are of nearly equal length as in *S. textula*, but the three anterior ones are a little lengthened, while the subdorsal of joint 8 is not, thus foreshadowing the structure of *Sibine*. The general shape is that of the spined Eucleids, not specially flattened as in *S. textula*, though the lateral horns are longer than the subdorsals at one stage, indicating an affinity with *Sisyrosea* that is shown also in the wrinkled skin, the depressed spaces situated in posterior pigmentless areas separated by raised bars, the absence of caltropes, etc. The similarity is by far greatest in the early stages and the two larvæ continually diverge during ontogeny. Stage I is almost the same as in *S. textula*. Examples of the latter occur with the central horns partly degenerated as in *N. nasoni*. This condition is an evident approach to the three-spined horns of the higher member of the groups such as *Sibine*, *Euclea*, *Parasa*, etc.

AFFINITIES, HABITS, ETC.

This larva represents the oldest type of spined Eucleid, possessing true stinging spines, that is found in North America. The moth belongs to a wide-spread type. Species with exactly the same pattern of coloration occur in both India and Africa and one at least of them is congeneric with our species. I am not certain that it may not prove conspecific. *N. nasoni* occurs throughout the Southern States to Mexico. Mr. H. Druce has redescribed it from the latter country as *Perola daona* from Jalapa and Costa Rica. In New York State it finds its northern limit and has only a precarious foothold in the State. The occurrence is in a limited area through the hilly central portion of Long Island, including the towns of Ronkonkoma and Yaphank, where I have collected it. Southward it reappears at Plainfield, N. J., and further south is doubtless more wide-spread, although not often reported by collectors. It is not rare in the District of Columbia.

The moths emerge at the end of June and early in July. The emer-

gence takes place late in the afternoon or early evening, flight occurs early, pairing the same night and the eggs begin to be laid the following night. They are placed singly or in small groups on the under sides of the leaves. The larvæ are found usually several on the same plant on low shrubs or the lower limbs of trees of their food plants. The first stage may be found rarely as late as the first of August, and the first mature larvæ early in September. There is but a single brood in the year. The larvæ rest on the under sides of the leaves, colored green, without conspicuous marks. The stinging power of the spines is not great, and the subdorsal ones are bent down outwardly at maturity when not in use. There are eight larval stages, occasionally but seven by the omission of the normal stage III.

The sexes have different attitudes of rest. The ♀ moth sits with the body bent over the back, the wings closed beneath it and parallel to the twig, as is usual. The ♂ sits in the reverse position, the head hanging down, the body enclosed by the wings of which only the tips touch the twig. It holds loosely by the middle legs, which are partly extended, the other pairs being folded up. In this position the white dots at the bases of the forelegs and bases of antennæ are quite conspicuous. The ♀ does not exhibit the white dots, though possessing them.

CRITICISM OF PREVIOUS DESCRIPTIONS.

Glover gives a recognizable figure of the larva, life-size, but without identification. I have myself briefly referred to some of the characters in comparison with certain Australian forms.

DESCRIPTION OF THE SEVERAL STAGES IN DETAIL.

Egg. Elliptical, flat, very large, translucent whitish, shining; reticulations distinct, linear, irregularly quadrangular. Size, $2 \times 1.6 \times .1$ mm.

Stage I. (Plate I, fig. 1.) Head whitish, eye black; body elliptical, dorsal space broadest anteriorly, not narrower centrally; segments fairly well marked; skin smooth. A subdorsal and a lateral row of thick, horn-like prominences, eleven in the subdorsal row (joints 3 to 13), nine in the lateral row (joints 3, 4, 6 to 12); the subdorsals of joints 3, 4 and 13 large, well developed, of the structure of *Sisyrosea textula*, an apical seta and radiating crown around it, all with enlarged tips (Plate I, fig. 3). The central subdorsals, as well

as the laterals (except on joints 3 and 4) have essentially the same structure, but are smaller and the setæ are partly reduced or degenerate, three setæ of equal length, with very rudimentary ones around the bases of these. The subdorsal row stand nearly erect, the lateral ones are horizontal. Color whitish, a faint, more opaque yellowish tint centrally on joints 6 to 9. Length 1.1 mm. The larva does not feed.

Stage II. As in stage II of *Sisyrosea textula*; dorsal space not rounded at joint 3, even, subdorsal horns nearly erect. There are 7 to 10 spines on a horn, the apical one not setiferous. Segmental incisions rather well marked. No depressed spaces, the skin pitted-shagreened, finely reticulate, the lines catching the light under a high power. Color greenish white, immaculate. Length, 1.1 to 1.8 mm.

Stage III. As in the next stage, but without color. Horns subequal, the subdorsals a little longer than the laterals, the subdorsal of joint 13 rather large and directed backward; lower spines of lateral horns bulbous and setiferous, the rest stinging spines, black tipped. Skin finely reticulate, granular, irregular, without definite form to the sculpturing. All pale green, a square, yellowish patch centrally, seen by transparency. Length, 1.8–2.8 mm. In seven-stage larvæ the length reaches 3.9 mm.

Stage IV. Elliptical, rather square before and behind; dorsal space moderate, lateral space a little broader, subventral space retracted, small. Horns normal in number (subdorsals on 3 to 13, laterals 3, 4, 6 to 12) short, rather thick, all alike, forming a regular ellipse from side view, the subdorsals of joints 3, 4, 5 and 13 and laterals of 3 and 4 a trifle stouter than the others. Each horn has about 15 black-tipped spines arising from conical bases. Color green, a faint yellow subdorsal line on joints 3 to 13, the pair parallel, a narrow broken yellow dorsal line; addorsal spaces appear as white dots and a larger yellow dot on joint 9 anteriorly. Horns concolorous except the subdorsals of joints 3 to 5, which are bright red, especially 4 and 5 (Plate I, fig. 4). Skin densely flat or concave-granular, shagreened, the joining of the obscure granules appearing like a fine reticulum. Depressed spaces (1) and (2) represented by pale dots, (4) as slight hollows without differentiation of the surface. At end of stage a yellow bridge joins spaces (1) on joint 9. Length, 2.8 to 3.9 mm.

Stage V. Essentially as before. The subdorsal horns of 3, 4, 5

and 13 are a little larger than the others, those of joints 4 and 5 bright red, that of 3 as well as the laterals of 3 and 4, pale red; all the rest green. An obscure yellow line along the subdorsal ridge on joints 3 to 12 connects the horns in a series of lunate dashes; a dorsal row of segmental pale dots, largest on joint 11. Segmental incisures well marked in paler lines. Body green from the blood, brighter anteriorly. The addorsal depressed dots and the large lateral ones (4) are whitish. Horns short, rounded, not much tapering, well spined. Skin very finely densely clear granular, the granules much like those in the bottom of the depressed spaces of *H. flexuosa*.* Length, 3.7 to 6.0 mm.

Stage VI. Dorsal space moderately broad, even, flat or a little concave, only turning down at the ends; sides folded in above the lateral horns, concave, nearly perpendicular above; subventral space much contracted, the lateral horns touching the leaf. Subdorsal horns small, conical, projecting at an angle of 45° except those of joint 13, which project obliquely backward; 3 to 5 and 13 are a little the largest. Lateral horns distinctly longer than the subdorsals, bearing several swollen-tipped setiferous spines among the others. Clear leaf green, horns of joints 3 and 4 and the subdorsals of 5 and 13 red, 13 the palest; a narrow yellow subdorsal line; a geminate dorsal yellow line composed of a double series of lunate marks, which enclose the addorsal dots in the concavities and touch the paired dorsal dots with their apices (Plate I, fig. 5). This marking is faint on joints 3 and 13. On the sides, the reniform (4) and round (6) spots are whitish in a single large depressed area, cutting off the front of the segment as a dark green bar. The paired dorsal dot on joint 9 is now scarcely defined from the regular dorsal marking. Skin uniformly granular shagreened, the sides of the low granules radially corrugated to the base. Horns granular; spines of the red horns blacker than the others. No caltropes. Length, 6 to 9.3 mm.

Stage VII. Elongate, dorsum flat, sides not narrowed till the ends, the lateral horns almost touching the leaf. Bright green, the narrow, pale yellow subdorsal lines of joints 4 to 13, joined by a straight line

* The skin structure is practically the same in stages II to IV, showing under the microscope shining lines in small, dense, irregularly hexagonal reticulations, not revealing a very definite structure (Plate I, fig. 8). It is the same as in *S. textula*, but the reticulations are more regular, distinctly round, not elongate. In *S. textula* they are elongate, somewhat sinuate and more confused. After stage IV the larvae diverge, *nasoni* becoming granular.

between the horns of joint 4 enclosing a double pale waved line of nine loops around the paired dorsal dots, much as in the next stage (Plate I, fig. 6); a tiny single dot between the pairs of (1). Between the horns of joints 3 and 4 are six dots; a bar before the last pair. On the sides the white dots (4) and (6) are in large reniform pigmentless areas with a whitish bordering line. Horns all red tipped, the former red ones the brightest. Spines black and white, some banded, darkest on the largest horns. Skin very finely subconic, or pointed granular, not shagreened except slightly at the bases of the subdorsal horns above. No caltropes, but the spines of the latera horns are short and dense at base. Length, 9.3-13.5 mm.

Stage VIII. Shape as described, the side horns suddenly shortened to less than half their former length. They are now shorter than the subdorsals which become contractile on joints 4 to 12 and are bent outward, appressed to the sides. Subdorsal horns of 3 and lateral of 3 and 4 are small and short, the laterals of 6 to 12 green, broad and low, not as long as wide, with only a few short spines and some clubbed ones on the lower outer side. Subdorsals of joints 5 to 12 red, forming round cushions not as long as wide, bearing a tuft of banded or black-tipped spines at the apex; on joint 13 longer and tapering, pinkish red. Body green, well pigmented, apparently uniformly in both bars and spaces down to and surrounding the lateral horns. Depressed spaces (1), (2), (4) and (6) and the pattern of lines more distinct than before, pale whitish, the subdorsal line narrow, concolorous and uniform with the other lines (Plate I, fig. 6).

Depressed space (1) forms a long curved slit instead of paired dots as before, and there is a pale dot behind it. Skin nearly continuously conic, clear granular, horns, depressed spaces and all, the green pigment situated in the bases of the granules just as the red is in *Euclea indetermina*, absent in the light markings which are colored only by the blood. Spines with sharp black tip, shaft white, often banded, the degenerated ones clubbed (Plate I, fig. 9); some at the bases of the horns are very small. (Plate I, fig. 2.) Length, 13.5 to 18.3 mm. The color for pupation is only a slight paling. The larva still rests on the leaf for twenty-one hours, the horns dull red, erected. Finally it voids a little clear fluid and enters the ground to spin.

Cocoon. With the characters of the group, but thin, less firm in texture than usual and more blackish in color.

Food plants. Black oak, hickory, chestnut, beech and ironwood.

EXPLANATION OF PLATE I.

- Fig. 1. Larva, stage I, enlarged.
 " 2. Horns of last stage, enlarged; lateral horn above, subdorsal below.
 " 3. A single horn of stage I, enlarged (joint 3).
 " 4. Larva, stage IV, dorsal view.
 " 5. Pattern of dorsal marking, stage V.
 " 6. Mature larva, three-quarters view, enlarged.
 " 7. The same, front view.
 " 8. Skin sculpture, stage IV.
 " 9. Some of the spines enlarged.
 " 10. Moth of *Natada nasoni*.

LIFE-HISTORY OF DIPHTHERA FALLAX H.-S.

BY HARRISON G. DYAR.

This larva possesses the characters of the *Apatelæ*, having many-haired warts. The warts degenerate during ontogeny, becoming functionless. The nearest allies seem to be *Polygrammate hebraicum* and *Harrisimemna trisignata*.

Egg.—Circular, much flattened, domed, about 48 ribs, diminishing by confluence toward vertex, which is irregularly reticularly ribbed; ribs slightly fluted, the space smooth, finely punctate shagreened; no cross striæ; micropyle smooth. Waxy white, scarcely shiny, no marks; diameter, 1 mm.; height, 2 mm.

Stage I.—Head rounded, eye black, mouth brown, otherwise translucent, colorless; width, .25 mm. Body translucent, slightly whitish; segments convex; hairs white, spinulose, single, i to v present, i slightly blackish except on joint 11 which looks paler; hairs equal, quite distinct, iv above v; no subprimaries; feet normal.

Stage II.—Head slightly bilobed, colorless; width, 4 mm., warts almost in line transversely, iv nearly imperceptible; all with central hair and distinct crown of long hairs. Hairs pale, except the central one of warts i and ii which are black. Translucent green from the foot with faint traces of a white subdorsal line.

Stage III.—Head whitish green; width .75 mm. Body somewhat flattened, especially behind; head retracted at apex. Body clear green with narrow white subdorsal line and a broken dorsal one. Warts moderate, i and ii on joint 12 in a square; iv behind the upper edge of the spiracle, v just below, iv and v about equal, vi large. Hairs quite numerous, short, pale and black mixed, spinulose. Later all the warts are narrowly pale brown. Body narrowed behind.

Stage IV.—Head round, whitish green, a diffuse dark brown shade on the angles of the lobes; width 1.4 mm. Body short and hunched, thick, somewhat flat, anal feet spreading; clear green, warts i to v purplish brown, the dorsal and subdorsal lines narrow, broken, white. Hairs very short, fine, but numerous from all the warts, purplish brown mixed with pale. Warts i and ii about in line transversely, iv behind the spiracle, v very remote and below it, vi small, pale, somewhat hidden. Skin finely brown spinulose. Later all the warts i to vi became brown, a brown ring around spiracles. Wart ii on joints 2, 5, 8, 9 and 11 have slightly larger brown spots and these have a slight tendency to form a brown stripe.

Stage V.—Head rounded, green, wrinkly, black dotted on the angles of the lobes; width 2.4 mm. Body flattened, short and thick, smaller behind; feet normal, of good size. Warts nearly obsolete, not elevated; the hairs, though still numerous, very short and fine, minute, invisible without a lens, so that the larva looks hairless. Soft velvety green, the skin minutely spinulose; narrow dorsal and broader subdorsal pale lines, faint, not contrasting. All the wart areas faintly marked in velvety red-brown, the spiracles also and tips of feet. The most distinct spots are on the front edge of cervical shield, spiracle of joint 12 and a dorsal patch between the subdorsal lines on joint 13, which are here closely approximated. Hairs on head, anterior edge of joint 2 and anal plate coarser than elsewhere and rather distinct. Spiracles black. The larva narrows much behind and sits on the leaf stem which it fits admirably, the brown dorsal spot blending with the bark. With growth the brown spots fade, except at the ends and spiracles, and the warts appear as uncolored scars; all velvety green, soft, not opaque, quite smooth, the hairs as inconspicuous as the skin spinules. The only marking is the three narrow white lines. At the end of the stage the larva turns sordid waxy-red and leaves the plant.

Cocoon.—Bored in soft wood or a frail web in a crevice. The larva threw out some dust, but formed no balls of chips.

Pupa.—Smooth, slightly shining, the cases obscurely wrinkled, and abdominal segments slightly punctured anteriorly; normal for Noctuidæ. Cremaster low, four spines in a transverse row, stout, straight, directed obliquely upward; a slight ridge on cremaster below each spine.

Food plant. *Viburnum dentatum*. The larvæ occurred sparingly, solitary, in moist land at Southaven, L. I.

JOURNAL

OF THE

New York Entomological Society.

Vol. VII.

JUNE, 1899.

No. 2.

NOTE ON THE SECONDARY ABDOMINAL LEGS IN THE MEGALOPYGIDÆ.

PLATE II, FIGS. 1-3.

BY HARRISON G. DYAR.

I have contended that the additional pairs of abdominal legs present in Megalopygidæ on abdominal segments 2 and 7 are secondary structures, leading up to the form shown in the Eucleidæ. Recently in watching the progression of a larva of *M. opercularis* on a smooth glass surface, I observed that the parts of the feet bearing crotchets were not used, but a small disk on the anterior side of each foot was applied to the glass in the same way as the membranous feet of segments 2 and 7. There is no disk on the last segment. Thus the Megalopygidæ have two distinct sets of abdominal feet, the normal ones, with crotchets, on segments 3 to 6 and 10 and the secondary membranous ones, functioning more as sucking disks, on segments 2 to 7. The larvæ are adapted to walk both on rough surfaces with the hooked feet, or on smooth ones with the membranous disks. The structures which I mention have been detected by Burmeister and accurately described. He says that segments 2 and 7 have "un coussin rond aplati, qui ressemble à la plante d'un pied;" on segments 3 to 6 "il y a un second coussin plus grand, qui ressemble, à une véritable patte membraneuse provue d'une plante *sineuse* et d'une couronne de petits crochets cornés;" on segment 10 a normal foot "complètement conformée comme les quatre moyennes des six anneaux antérieurs mais *sans la petite plante accessoire* de celles-ci." I have italicized the important words. Fig. 1 shows the ventral aspect of the membranous foot of *M. opercularis* on abdominal segments 2 and 7; Fig. 2 the foot of segments 3 to 6 with the disk in front and the bent line of crotchets behind; Fig. 3 shows the normally formed foot of segment 10. I wish to emphasize this interpretation of these peculiar abdominal feet, as I believe that it shows very well the origin of the creeping disk of the Eucleidæ. *Me-*

galopyge differs from the Anthroceridæ and Pyromorphidæ only in the addition of the membranous pads to the ordinary feet. We have only to imagine the loss of the crochets and the extension of the pads till they touch each other, to give essentially the Eucleid structure.*

NOTE ON TWO HYDRÆCIA LARVÆ.

PLATE II, FIGS. 4-6.

BY HARRISON G. DYAR.

Mr. H. Bird has recently presented to the National Museum larvæ of *Hydræcia nitela* and *H. purpurifascia*. A remarkable difference is seen between them in the position of one tubercle on the seventh abdominal segment. The general rule in the Noctuidæ is to have tubercle iv on the seventh segment low down near tubercle v, and this position is seen in *H. nitela* (Plate II, Fig. 5) In *H. purpurifascia*, however, this tubercle has been moved upward to the upper corner of the spiracle as on the other segments (Plate II, Fig. 4). The *Hydræcia* larvæ are borers, and it is apparently requisite that such larvæ should protect the extremities and surround the spiracles by corneous shields. For this purpose all the tubercles are large and distinct, even the ordinarily obscure tubercle iiiia is plainly seen before the spiracle (compare the otherwise generalized *Hypena humuli* (Plate II, Fig. 6), which does not show iiiia). On most of the segments tubercle iv behind the spiracle, iii above it, iiiia before and v below form sufficient protection; but on the seventh abdominal segment there is a lack of protection behind, apparently in a place where it is most needed. It would appear that the two *Hydræcia* larvæ before me have independently attempted to correct this defect, and owing to some inherent difference of organization, have used different means to this end. *H. purpurifascia* has moved tubercle iv bodily upward into the place of greatest efficiency. *H. nitela*, on the other hand, has developed an additional small tubercle at the upper corner of the spiracle, which bears no seta. This little shield varies in size in different larvæ, its character being still not firmly fixed in the species. It would be interesting to examine the other species of *Hydræcia* in this respect.

* It is to be noted that there are no feet on the anal segment in the Eucleidæ. The suckers are on the first eight abdominal segments, the first and last not so well developed as the others. These (*i. e.*, on abdominal segments 1 and 8) are in excess of those present in *M. galopyge*, but their less degree of development favors the view of their recent acquisition.

A REVISION OF THE AMERICAN COCCINELLIDÆ.

BY THOS. L. CASEY.

The object of the following pages is to give a short outline or sketch of every species occurring within the limits of the United States accessible to me at the present time, and also to invite attention to certain features in the taxonomy of the family which do not seem to have been hitherto brought to notice. In an appendix a list of African species is given, containing quite a number of novelties, and the descriptions of certain new species from other parts of the world are also appended.

COCCINELLIDÆ.

The separation of this family into two parts based upon mandibular structure has never seemed entirely satisfactory to me; first, because of the difficulty of observing the character, causing the classification of Chapuis to be unpractical, and, secondly, because *Epilachna* and related genera are merely pubescent halysiids, slightly modified by reason of perverted food habits and attendant environments. Many of the Harpalini of the Carabidæ are known to be either wholly or partially phytophagous, but no one has proposed to divide the Carabidæ on these lines, and would scarcely do so even if a minute structural divergence in the mandibles existed, and it has never been demonstrated that the mandibular teeth serving as the basis of the Chapuisian classification are not found elsewhere in the family. The Epilachnini, in fact, resemble the Psylloborini in all external structures, including the long antennæ, a character of more importance than has apparently been conceded. In view of these facts I have not employed the classification of Chapuis in the following pages.

The latter author appeared also to be constantly striving to reduce the generic groups hitherto proposed, but this cannot be done with propriety, and many more will be needed, both of genera and tribes, before the taxonomy of the family can be made entirely clear. This is well shown by some small species which we had held to belong to the genus *Pentilia*, until Weise recently proved that they were in no way related, and separated them under the name *Smilia*; as a matter of fact they do not resemble *Pentilia* at all, and are much more closely allied

to *Scymnus*. Again, our representatives of *Cryptognatha* are likewise widely separated from the *Cryptognatha* of Mulsant, and form in reality one of the most isolated types of the family, the special character relating to the prosternum, which caused LeConte to associate them, being of subordinate value and liable to appear in any tribe; it exists, for instance, in *Stethorus* of the Scymnini, and in *Nipus* of the Cranophorini, though not the distinguishing feature of that remarkable type. In *Zagloba* of the Scymnillini it also tends to reappear. Again the genus *Rhysobius* is tribally distinct from *Scymnus* in the structure of the eyes, antennæ and epipleuræ.

The character relating to the anterior coxal cavities, announced by LeConte, is apparently of no significance even if wholly true, as it would bring together genera with no special affiliation otherwise, and the character made use of by Mulsant to separate Coccinellini from Cariini is of no value, there being no tribal difference between *Coccinella* and *Synonycha*, in spite of their general dissimilarity of habitus.

The abdomen is composed throughout of five segments, but the genital armature sometimes becomes distinct and assumes the form of a sixth segment. This character is very useful in the classification of the tribes related to Chilocorini, and of the compact Coccinellidæ having narrow epipleuræ, as will appear; it generally affects both sexes and is particularly developed in the Hyperaspini. The Hyperaspini of Chapuis include several distinct tribes, and those with but five ventral segments should be removed, the retractility of the legs and epipleural depressions not being tribal characters necessarily, but appearing in several tribes with the legs generally free.

The tarsi in this family are in reality 4-jointed, the third small and generally forming a rigidly anchylosed basal lobe of the last, but it is sometimes free or partially so. The second is lobed beneath, the lobe truncate at tip and hollowed on its upper surface, not bilobed as stated by Crotch (Rev. Cocc., p. 53).

In the following pages I have made use of all generic types, foreign and native, which have been accessible to me, and regret that my exotic material might not have been more extensive. Where names not belonging to the fauna of the United States are introduced they are preceded by an asterisk.

Crotch employs the name *affinis* Rand., for the species *venusta* and *notulata*, but in error, as *affinis*, of Randall, is simply a synonym of *Hyperaspis binotata* Say.

4

The family may be divided into numerous tribes, as follows: —

- Middle coxæ narrowly separated; body glabrous, elongate-oval, the epipleuræ moderately wide, horizontal; legs long, free, the femora extending beyond the sides of the body; abdomen with the genital or sixth segment visible in both sexes; head not deeply inserted, the prothorax strongly sinuate but not covering the eyes; epistoma, eyes and antennæ as in Coccinellini HIPPODAMIINI
- Middle coxæ widely separated; legs shorter, the femora generally not extending beyond the sides of the body; head deeply inserted, the pronotum covering a considerable part of the eyes except in certain rare cases such as *Selvadius*. 2
- 2—Eyes finely faceted. 3
- Eyes coarsely faceted; antennæ long, with the club loose; body pubescent; abdomen with the sixth segment visible in both sexes. 18
- 3—Epipleuræ wide, concave, strongly descending externally; body loosely articulated, generally rounded in form. 4
- Epipleuræ narrow, generally horizontal, flat or feebly concave; body compact, generally oval in form. 14
- 4—Fourth joint of the maxillary palpi securiform. 5
- Fourth joint narrow, elongate with circular section, finely acuminate at tip. 13
- 5—Epistoma narrowed from the base, sometimes expanded slightly at apex, the antennal fossæ more or less exposed 6
- Epistoma broadly dilated, concealing the antennæ and subdividing the eyes. 11
- 6—Legs free; antennæ more or less elongate; sixth ventral segment small but visible in both sexes. 7
- Legs retractile and lodged in moderately deep to shallow depressions; antennæ short; abdomen with five segments, the fifth longer, the sixth always invisible. 10
- 7—Upper surface of the body glabrous. 8
- Upper surface pubescent. 9
- 8—Epistoma more or less sinuate at apex and obliquely dentiform at the sides, the sinus generally more or less closed by a semi-corneous additional piece united to the front without visible suture; antennæ more or less approximate to the eyes, which are narrowly and rather deeply emarginate, the fossæ large, with distinctly overreaching superior ridge; prothorax deeply emarginate; body moderate to large in size. COCCINELLINI
- Epistoma narrower, truncate, without semi-corneous additional piece and not obliquely denticulate at the sides, the antennæ more frontal in insertion and more distant from the eyes, which are broadly and more feebly sinuate, the fossæ small, more exposed frontally and with very slight superior ridge; body smaller, with thinner integuments, the head small, the prothorax smaller, very feebly sinuate at apex, with broadly rounded apical angles; antennæ slender, with the last joint elongate. PSYLLBORINI
- 9—Antennæ long, with loosely articulated club, inserted within very small and completely exposed subfrontal foveæ remote from the eyes, nearly as in Psylloborini, the eyes not or only very feebly sinuato-truncate; epistoma truncate, not denticulate at the sides; prothorax deeply emarginate at apex; mandibles bifid at tip and denticulate within; body rounded or elongate-oval, the legs free.

EPILACHNINI

- 10—Epistoma feebly sinuate, with rounded lateral angles and coriaceous margin within the sinus, the sides sinuate above the moderate exposed antennal foveæ, the eyes deeply but very narrowly emarginated by the post-antennal canthus; mandibles simple and finely acuminate at tip; body rounded, very convex, the prothorax very deeply emarginate and formed as in Chilocorini *PENTILINI¹
- 11—Upper surface glabrous; body very convex or subcompressed, rounded, the abdomen with five segments, a small genital segment visible in the males; antennæ very short, more or less bent, the club with four connate joints; legs free or feebly retractile. CHILOCORINI
Upper surface pubescent; legs retractile within shallow depressions; antennæ very short, bent 12
- 12—Abdomen composed of six segments nearly as in Hyperaspini, the fifth short. *PLATYNASPINI
Abdomen composed of five segment, the fifth large and rounded, the sixth wholly invisible in both sexes; body very small, rounded. *TELSIMIINI
- 13—Body rounded or oval, very convex, pubescent or partially so; epistoma large but not dilated, broadly rounding from the base into the apex, which is feebly sinuate medially; eyes entire, the antennæ short and slender, straight, inserted in small exposed foveæ very close to the eyes; prosternum widely separating the coxæ, bicarinate, flat; abdomen composed of but five segments, the fifth large, rounded; basal node of the last tarsal joint free; legs retractile, the impressions feebly concave; prothorax deeply emarginate. *PHARINI
- 14—Abdomen composed of only five segments, the genital segment wholly obsolete in both sexes, the fifth segment large, ogival or rounded. 15
Abdomen with the sixth segment well developed and distinct in both sexes, the fifth shorter 16
- 15—Legs strongly retractile within deep concavities of the under surface; prosternum widely separating the coxæ, strongly deflexed at tip, forming a protection to the mouth in repose; eyes entire; antennæ with exposed insertion; body oval, moderately convex, glabrous or only partially pubescent. CENEINI
Legs free; prosternum flat, remotely separating the coxæ, the apex not deflexed or with feeble tendency thereto; antennal foveæ shallow, the eyes narrowly and deeply emarginate; body rounded or oval, moderately convex, pubescent or partially so. SCYMNILLINI
- 16—Body glabrous; epipleuræ generally slightly descending externally but relatively narrow; legs moderately retractile or free; eyes emarginate or entire.
HYPERASPINI
Body pubescent; epipleuræ generally flat and horizontal; legs always free. 17
- 17—Pronotum covering the head, rounded or feebly truncate in front; body oval or elongate-oval, moderately convex, subglabrous in *Nipus*. CRANOPHORINI
Pronotum deeply sinuate at apex and never produced; body oval or oblong-oval:
SCYMNINI
- 18—Prothorax narrowed anteriorly from the base; epipleuræ moderately wide and more or less concave, descending externally. RHYZOBIINI
Prothorax narrowed at base; body elongate; epipleuræ very narrow, flat and horizontal. COCCIDULINI

The Rhyzobiini are not marked with an asterisk as they have been to some extent acclimated in California; they are not however, as far as known, endemic.

HIPPODAMIINI.

The characters heretofore used to distinguish this tribe from the Coccinellini are of little or no value, as the sternal and ventral post-coxal plates or arcs are frequently both as distinct in the former as in the latter, but the ventral plates are always short, as in those Coccinellini allied to *Adalia*.

The Hippodamiini are not relatively very numerous and are almost essentially American. They may be distinguished at once from the Coccinellini by the elongate-oval form of the body, narrowly separated intermediate coxæ and the other characters given in the table. The frequently obsolete or ill-defined post-coxal lines are the obvious result of long disuse, as the legs are unusually developed for the present family and perfectly non-retractile. The genera before me may be distinguished as follows:—

- Tarsal claws simple, being evenly arcuate, slender and very acutely pointed, with a more or less slight bulbiform enlargement at base..... 2
- Tarsal claws acutely pointed, with a large quadrate basal tooth within, separated from the slender apical part by a deep acute fissure—a very usual structure in Coccinellidæ..... 6
- Tarsal claws slender, bifid within behind the apex, the two lobes unequal in length and both acutely pointed. 7
- 2—Sternal and ventral coxal plates both distinct; basal angles of the prothorax obtuse but distinct and not rounded..... 3
- Sternal plates distinct, the abdominal obsolete..... 4
- Sternal and ventral plates both completely obsolete..... 5
- 3—Body oval, the elytra maculate and strongly punctate; side margins all strongly and quite broadly reflexed..... **Anisosticta**
- Body elongate and subparallel, the elytra vittate and finely punctate; side margins very narrowly reflexed..... **Macronæmia**
- 4—Basal angles of the prothorax broadly rounded..... **Næmia**
- 5—Basal angles broadly rounded as in *Næmia*..... **Paranæmia**
- 6—Body nearly as in *Næmia*, the elytra and pronotum almost similarly ornamented; sternal and ventral plates both completely obsolete. **Megilla**
- 7—Base of the prothorax rounded in the middle; sternal and ventral plates variously developed or wanting..... **Hippodamia**

Another genus of our fauna,—*Ceratomegilla* of Crotch,—is unknown to me but is said to differ from *Megilla* in having the third joint of the antennæ dilated and triangular. *Eriopsis*, which is said to

occur here, differs from *Hippodamia* only in having the base of the prothorax sinuate at the middle. *Anisosticta* is represented within our confines by *bitriangularis* Say (= *multiguttata* Rand.), related to the European *19-punctata*, and still more closely to *strigata*, but distinct from either. *Macronæmia* (gen. nov.) has for its unique representative the *Coccinella episcopalis* of Kirby, assigned to *Næmia* by Mulsant. *Næmia* has for its type, and only species within the United States, the *Coccinella seriata* of Melsheimer (= *litigiosa* Muls.).

Paranæmia, gen. nov.

The type of this genus is the *Hippodamia vittigera*, of Mannerheim, assigned to *Næmia* by Mulsant. The specimens in my cabinet may be grouped in the two following closely allied species or perhaps subspecies:—

- Form short and broadly suboval, the prothorax twice as wide as long and broadly rounded at base; elytra rather shining and distinctly punctate. Length 4.8–5.2 mm.; width 2.9–3.0 mm. California. **vittigera** Mann. ✓
- Form more elongate but broad and subparallel, larger, though similarly ornamented with black, the prothorax much less than twice as wide as long and more strongly rounded at base; elytra strongly alutaceous and more finely and very much more sparsely punctate. Length 5.2–6.4 mm.; width 2.9–3.4 mm. Colorado and Arizona. **similis**, sp. nov.

Megilla Muls.

The type assumed by Mulsant is the *M. maculata*, of De Geer (Spec., p. 24), but this name was applied by its author to one of the large South American forms, which are in all probability specifically distinct from our familiar and very constant modification, and it is therefore proper to apply the name *fuscilabris* to the latter. The material before me indicates three species or subspecies as follows:—

- Head finely and feebly punctured; surface lustre alutaceous; pronotum narrowly reflexed at the sides 2
- Head strongly and closely punctured; lustre much more shining, the pronotum more broadly reflexed at the sides 3
- 2—Prothorax less than twice as wide as long. Length 4.7–6.2 mm.; width 2.7–3.4 mm. Delaware, North Carolina, Iowa, Arizona and California (Yuma).
fuscilabris Muls.
- Prothorax twice as wide as long; body larger and much more broadly oval. Length 5.2–7.2 mm.; width 3.0–4.0 mm. Texas (Brownsville). . . . **strenua**, sp. nov.
- 3—Body in form and size nearly as in *fuscilabris*, the ground color of the type yellowish, the discal transverse spot of the elytra posteriorly angulate; punctures of the elytra fine and rather close. Length 5.7 mm.; width 2.9 mm. Honduras. **medialis**, sp. nov.

These forms are all virtually similar in ornamentation to the common *fuscilabris*.

Hippodamia Chev.

The species of this genus are rather numerous, and constitute by far the larger part of the tribe; they are frequently closely allied among themselves and are common to the arctic and subarctic faunas of both hemispheres, although poorly represented in the palæarctic provinces. The sternal and ventral plates lose all value in a generic sense, and the *Adonia* of Mulsant, must consequently be suppressed, as suggested by Crotch. Sometimes, as in *parenthesis* and *apicalis*, both the sternal and ventral plates are distinct and as perfect as in *Anisosticta*. In *obliqua* and *convergens*, also, they are similar, though more feebly outlined. In *lecontei*, *quinquesignata*, with related species, and in the *sinuata* group, the sternal plates become obsolete or very indistinct, but the ventral are still complete or very nearly. In *glacialis* the sternal plates are completely obliterated and the ventral are only represented by an oblique and isolated external line, and finally in *tredecimpunctata*, the type of the genus, both plates become obsolete.

Hippodamia (Adonia) variegata of Goeze, (*constellata* Laich.), is a European species which is said to occur within the United States; this is probably an error, however, and it is omitted from the following table of the American species known to me by actual examples. The sternal and ventral plates are exactly as in *parenthesis* and *apicalis*, but in habitus and ornamentation it agrees with the majority of species much better than they:—

- Pronotum with a broad pale lateral border enclosing an isolated black dot or dot-like spur from the central black area, the latter without trace of the usual white discal diverging lines; elytra each very constantly with six rounded black dots, and also a small common scutellar spot; femora black, the tibiæ and tarsi pale throughout; claws rather thicker and more feebly arcuate than usual. Length 4.3–5.3 mm.; width 2.4–3.3 mm. Europe, Siberia and the United States. [*tibialis* Say] **13-punctata** Linn.
- Pronotum with a narrower white lateral margin which is intruded upon by a more or less pronounced angulation of the central black area, occasionally completely dividing the white area, in which case the white near the basal angles also frequently disappears; legs black throughout, the anterior sometimes in part pale, especially in those species with distinctly formed sternal and ventral plates. 2
- 2—Pronotum without trace of a median white spot at the basal margin; sternal and abdominal plates very variable in development. 3
- Pronotum with a white or whitish median spot at the basal margin; sternal and abdominal plates both distinct, the latter complete but short, extending to about the middle of the segment. 21

- 3—Elytra completely black, with two small and obsolescent transverse whitish spots at the basal margin and one on each elytron, larger and triangular, at the lateral margin and apical fourth. Length 6.0 mm.; width 4.0 mm. California to Vancouver Island. **moesta** Lec.
- Elytra red, with a transverse basal fascia of black, either complete and constant, or formed occasionally and in certain individuals by the coalescence of the small scutellar and two post-scutellar spots with the two humeral. 4
- Elytra never with a transverse basal fascia, the two post-scutellar points when present never coalescent with the scutellar spot, the latter always very small or obsolete; elytra frequently immaculate, generally very finely and inconspicuously punctured. 11
- Elytra never with a transverse basal band or post-scutellar spots, the scutellar spot larger and more or less elongate-oval or rhomboidal, sometimes involving almost the entire suture; discal and humeral spots tending to unite to form a black vitta; marginal white area of the pronotum narrow and subequal in width throughout, the diverging discal lines distinct, the outer post-median spot when disconnected always small, the inner large. 17
- 4—Subapical black spot of the elytra constantly large and distinct; body generally more broadly oval. 5
- Subapical black spot constantly wanting or extremely rudimentary; body generally more narrowly oval; lateral angulation of the pronotal black area pronounced, the white margin very broad anteriorly, frequently interrupted in the middle, the basal part sometimes obsolete as in typical *extensa*. 8
- 5—Lateral angulation of the black pronotal area strong, frequently dividing the white marginal area, the apical and basal parts of the latter wider, the basal becoming obsolete in typical examples of *signata*; body larger and more broadly oval, the pronotal punctures very fine and not close-set. 6
- Lateral angulation of the central black area very obtuse, the marginal white area narrow throughout but entire. 7
- 6—Basal band of the elytra broad, very constant and almost equally wide throughout, obtusely truncate at its lateral limits on the callus and angularly involving the scutellum; post-median black spot large, somewhat obliquely transverse, straight, even, extending nearer to the side margin than the suture. Length 6.2 mm.; width 4.0 mm. Colorado, Lake Superior and Hudson Bay [*mulanti* Lec.]. **signata** Kirby
- Basal band of the elytra rarely entire and then very irregular, the scutellar and post-scutellar points generally coalescent, forming a trilobed star, which is generally isolated from the humeral spots; post-median black spot transversely arcuate or sinuate, evidently formed by the amalgamation of two transverse spots, the sub-sutural slightly the more basal. Length 4.9-6.0 mm.; width 3.2-4.0 mm. New Mexico, Colorado, Utah and Oregon. **lecontei** Muls.
- 7—Pronotum more strongly and quite densely punctate; basal band of the elytra strongly developed and entire, the humeral dilatation well marked; post-median spot composite, consisting of a large, outwardly and anteriorly oblique spot, united behind its anterior limit, with a smaller external, inwardly and anteriorly oblique spot; subapical spot transversely oval, with an internal posterior angulation; body smaller. Length 4.7 mm.; width 2.9 mm. Canadian Rocky Mts. **puncticollis**, sp. nov.

- 8—Pronotum closely punctulate; basal band of the elytra equally broad throughout, with a scutellar angulation as in *5-signata*; post-median spot broad, slightly oblique and oval, the subapical wholly obsolete; surface of the elytra strongly alutaceous and rugulose; body small and more depressed. Length 4.5 mm.; width 2.7 mm. Colorado.....**dispar**, sp. nov.
- Pronotum minutely and sparsely punctulate, more convex and polished; basal band of the elytra crescentiform, acuminate at the callus, with an anterior scutellar angulation; elytra polished9
- 9—Elytra undulato-rugulose externally and toward apex, without trace of black spots behind the basal band. Length 5.1 mm.; width 3.1 mm. California (Alameda).....**extensa** Muis.
- Elytra smooth throughout.....10
- 10—Elytra closely punctate; post-median feebly oblique line narrow and composed of two slightly confluent transverse spots; subapical spot of *5-signata* and allies visible as a minute and feeble point. Length 4.75 mm.; width 3.1 mm. California?.....**subsimitis**, sp. nov.
- Elytra sparsely punctate, the post-median spot almost transverse, narrow and subentire, the subsutural part not more basal—as it evidently is in *subsimitis*—the subapical spot completely obsolete; surface very highly polished throughout. Length 5.8 mm.; width 3.6 mm. Wyoming—Mr. Wickham...**vernix**; sp. nov.
- 11—Pale lateral margin of the pronotum wider anteriorly and posteriorly, the angular extension of the black area strongly marked.....12
- Pale margin narrower and much less unequal in width from apex to base, the angular extension of the black area more obtuse; diverging discal pale spots distinct; elytra each with six black spots nearly as in *13-punctata*, the three posterior generally more developed and constant, the lustre faintly alutaceous.....16
- 12—Subapical spot of the elytra large, constant and conspicuous, the two post-median spots large and obliquely coalescent; anterior spots always wanting, the scutellum alone black; body large and rather broadly oval. Length 5.9–7.0 mm.; width 3.75–4.7 mm. New Jersey and Indiana.....**glacialis** Fabr.
- Subapical spot of the elytra invariably wanting.....13
- 13—Elytra very feebly alutaceous, being distinctly microreticulate under sufficient amplifying power.....14
- Elytra very highly polished and rather more distinctly, though not more closely, punctate, the punctures rather more impressed, the interspaces devoid of distinct microreticulation.....15
- 14—Form broadly oval, the elytra wholly devoid of black spots, excepting a small scutellar sutural dash; pronotum frequently devoid of diverging discal pale spots. Length 5.2–6.6 mm.; width 3.6–4.5 mm. Coast regions of California from San Diego to Sonoma [*punctulata* Lec.].....**ambigua** Lec.
- Form narrowly oval, the elytra generally with a small subsutural transverse spot behind the middle which is sometimes joined to another external and more posterior, frequently wholly immaculate or with only a small scutellar dash and, rarely, exhibiting very minute post-scutellar points; scutellum always black; discal diverging lines of the pronotum always very fully developed, sometimes coalescing anteriorly with the lateral pale area. Length 4.2–5.0 mm.; width 2.5–3.5 mm. California (Sonoma Co.).....**obliqua**, sp. nov.

- 15—Form rather short and broadly oval, the prothorax relatively small, with largely developed pale diverging discal spots; elytra wholly immaculate, the scutellum alone dark. Length 4.7 mm.; width 2.8 mm. California (Monterey Co.)
politissima, sp. nov.
- 16—Three posterior spots of each elytron invariably isolated among themselves. Length 4.6–6.4 mm.; width 2.7–4.4 mm. New Jersey to California (Sonoma Co.), Texas (Brownsville) [*obsoleta* Cr.].....**convergens** Guér.
- Three posterior spots much larger and coalescent; humeral spot distinct, the two at basal fourth equal and extremely minute, the two post-median very large and slightly coalescent, the subapical also large and joined to the inner—not the outer as usual—of the post-median spots by a short straight vitta parallel to the suture. Length 5.2 mm.; width 3.2 mm. California (Sonoma Co.)..**juucta**, sp. nov.
- 17—Scutellar spot shorter and broad, abruptly terminating at or before basal third. 18 Scutellar spot narrower and elongate..... 19
- 18—Elytra opaque, finely rugose and minutely punctate, each with a black vitta from the callus abruptly ending in a bifurcation at three-fifths from the base, the inner branch not truncate opposite the suture, also with a detached transversely triangular subapical spot; pronotum polished, minutely punctate. Length 5.1 mm.; width 3.0 mm. California (Lake Co.)..... **crotchi**, sp. nov.
- Elytra more convex, nearly smooth, shining though feebly alutaceous and more distinctly, though not strongly, punctate; elytra each with a very irregular continuous vitta from the callus to apical sixth or seventh, the vitta strongly constricted just behind the callus, then much dilated inwardly just behind the middle, this part presenting a very broad rectilinearly truncate face opposite and close to the suture, also slightly dilated externally at three-fifths from the base, thence curving in almost regular arc, becoming transverse, and ending at a short distance from the suture at a considerable distance from the apex, this apical part probably being isolated in less fully developed specimens. Length 4.9 mm.; width 3.0 mm. Vancouver Island..... **complex**, sp. nov.
- 19—The scutellar spot extending to about basal third; elytra more elongate and more acutely rounded behind, the spots four in number, one at the callus, one larger and anteriorly angulate slightly post-median, another, very small and more external, at three-fifths, and the fourth transverse, rather small, submedian, and at apical fifth or sixth, the first and second of these doubtless frequently connected. Length 5.6 mm.; width 3.2 mm. Colorado.....**spuria** Lec.
- The scutellar spot very elongate, extending to apical fourth or fifth, with a slight rhomboidal enlargement near the base. 20
- 20—Elytral spots generally not greatly tending to confluence; inner post-median sometimes uniting with the spot on the callus to form the usual broad vitta, the subapical always isolated and distant from the apical angles; lustre of the elytra generally dull, but with the surface almost smooth, the punctures fine, but distinct and rather close-set. Length 5.0 mm.; width 3.1 mm. New Mexico (Fort Wingate)..... **americana** Cr.
- Elytral spots all confluent, forming a broad and nearly even straight vitta from the callus to within a very short distance of the apical angles, slightly angulate externally behind the middle, and thence moderately oblique nearly to the sutural angle, the entire design nearly as in *Paranomia vittigera*; lustre of the elytra

- alutaceous, the punctuation sparse and almost obsolete. Length 4.5 mm.; width 2.7 mm. California (Sonoma Co.).....**trivittata**, sp. nov.
- 21—Subapical arcuate spot of the elytra not attaining the suture or apical angles. Length 3.8-5.0 mm.; width 2.3-3.2 mm. New Jersey to Puget Sound [*tridens* Kirby; *lunatomaculata* Mots.].....**parenthesis** Say
- Subapical arcuate spot flexed posteriorly and inwardly, attaining the suture and apical angles; body smaller and more distinctly punctate. Length 3.7-4.75 mm.; width 2.25-2.6 mm. Nevada and California (valley of the Truckee River).
- apicalis**, sp. nov.

Of the described species not included above, *15-maculata*, of Mulsant, has a scutellar dash and generally six spots on each elytron, the anterior juxtasutural dilated and apparently formed of two; it is said by Crotch to occur in Missouri and may be inserted after *convergens*; *leporina* Muls., has a subbasal band from one callus to the other and the elytra each two black spots, the anterior transverse and almost triangular, the posterior smaller, obtriangular and joined to the anterior; it is described from California and may be placed after *vernix*. *Sinuata*, of Mulsant, has the elytral suture black for three-fourths and the elytra each a vitta from the callus for five-sixths the length, almost semi-circularly curved in its posterior half and dilated opposite the suture near the anterior limit of the arcuate portion; its dimensions are said to be 5.9×3.3 mm., which is larger than any of the allied species known to me; it belongs near *trivittata* in the table; *interrogans* is placed as a synonym of *sinuata* by Crotch. Finally, *oregonensis*, of Crotch, is similar to *spuria*, but lacks the discal white spots of the pronotum and *falcigera* is allied to *trivittata*, but is also devoid of the discal diverging lines.

The sexual characters are well marked, the anterior and middle tarsi being distinctly dilated and the abdomen emarginate at apex in the males. *Extensa*, *subs similis* and *vernix*, together with *leporina* Muls., may all be subspecies of the last, but I have no means of stating this with certitude. *Mæsta* is said to be a variety of *lecontei* by Crotch, but in my opinion there is no reason for this assumption, as there is no individual known to me which can be considered a connective bond, my series of both being quite homogeneous; the elytra in *mæsta* are more elongate and more pointed behind than in *lecontei*. The last two species of the table are almost generically distinct from the others.

Eriopsis connexa Germ., of our lists, is a South American species which is said by Crotch to occur also in California and Vancouver

Island, but is not recorded from Mexico or any other intervening region. It should be removed from the lists, as there is almost certainly some error of identification or locality.

COCCINELLINI.

This is by far the most extensive tribe of the family, containing also the largest species and is the most difficult to treat taxonomically, because of the slight amount of structural variety and the evidently great number of groups, which must be accorded generic rank because of habitus or summation of minor characteristics. Type of ornamentation has not been regarded as a generic character hitherto, but is in reality one of the most important, especially that of the pronotum. All of our numerous species of *Coccinella*, for instance, have precisely the same type of pronotal ornamentation and this is true also of *Adalia*, *Cycloneda*, *Anatis*, and all others which comprise enough specific forms to admit of generalization. Where two forms exist, therefore, which seem to belong to different generic types but which do not differ structurally to any decisive extent, I have regarded the general scheme of pronotal ornamentation, and, to a less degree, that of the elytra, as the deciding criterion.

In the following table all the genera accessible to me are included, the exotic ones having an asterisk affixed:—

- Metacoxal lines arcuate or feebly angulate, continuous, not quite entire, the plates distinctly shorter than the first ventral segment; body oval (Subtribe ADALIAE)..2
 Metacoxal lines curving outward to the sides of the body along the first suture, the included area frequently divided by an oblique line, which may or may not join the curve posteriorly; body rounded, rarely oval or suboblong. 5
 2—Tarsal claws simple, long and well developed; body broadly oval, distinctly punctured, pale, maculate with black spots, the scutellum moderate in size; antennæ moderately short, with a rather broadly obtriangular compressed 3-jointed club; metacoxal lines arcuate, the plates slightly shorter than the segment; basal node of the last tarsal joint partially free. Palearctic **Bulæa*
 Tarsal claws with a large subquadrate basal tooth; antennæ slightly longer, with an obtriangular and more closely connate club, the last joint as wide as long. 3
 3—Scutellum very small and equilaterally triangular; body distinctly punctate; prosternal process not distinctly bicarinate. Subarctic of both hemispheres. *Adalia*
 Scutellum slightly larger, acutely pointed and longer than wide. Austral Africa. . . 4
 4—Body oval, subimpunctate; prosternal process not evidently bicarinate.
**Liodalia*
 Body more rounded, finely punctate; prosternal process very narrow, with two strong parallel carinæ extending almost to the apex. **Isora*

- 5—Tarsal claws with a large subquadrate internal tooth at base.....6
 Tarsal claws cleft within.....21
- 6—Scutellum very minute; body small, rounded, pale with black spots, the metacoxal plates without an oblique dividing line; prosternal process very narrow, strongly bicarinate to apical third or fourth; antennæ with a narrow, obtriangular club, the last joint rather longer than wide; claws slender, the basal tooth but slightly developed transversely. Africa.....***Micraspis**
 Scutellum not extremely minute or punctiform; basal tooth of the claws large and conspicuous.....7
- 7—Epistoma truncate or subtruncate at the apex of the coriaceous or semi-corneous margin (Subtribe COCCINELLÆ).....8
 Epistoma deeply sinuate. (Subtribe CYDONIÆ).....18
- 8—Metacoxal plate divided by an oblique line joining the bounding arc at about its middle point, forming an angulate inner plate.....9
 Metacoxal plate not or only partially divided, the oblique line either wholly obsolete or feeble, or, when more distinct, not joining the boundary curve posteriorly..14
- 9—Oblique line meeting the bounding curve at a point which is but little beyond the middle of the segment; body oval, rather depressed, with coarse and unequal punctuation, the side margins abruptly but very finely reflexed; prosternal process concave along the axial line; mesosternum with a very small, circularly rounded median notch; antennal club large, obtriangular, compact, the last joint nearly as long as wide and obliquely truncate.....**Agrabia**
 Oblique line meeting the bounding curve at or very near the hind margin of the segment.....10
- 10—Mesosternum transversely truncate anteriorly; body strongly convex, oval, more or less finely and equally punctate, the side margins very finely reflexed; pronotum solidly black, with a more or less subquadrate pale spot at the apical angles; hind angles rather narrowly rounded.....**Coccinella**
 Mesosternum broadly sinuate at the anterior margin; side margins more broadly reflexed.....11
- 11—Pronotum solidly black, with broad pale side margins; body oval, rather strongly convex, the elytra sometimes having a transverse subapical plica; punctures fine and subequal. Palæarctic.....***Ptychanotis**
 Pronotum variegated throughout its extent with black and pale markings, or pale with small black spots.....12
- 12—Body globularly convex and very broadly rounded, minutely and equally punctate, the pronotum pale with small black points, the elytra with transverse series of spots on a pale ground, or, by extension, of pale spots on a dark ground; prosternum with two fine carinæ converging anteriorly and extending slightly beyond the middle. Africa.....***Stictoleis**
 Body moderately convex or somewhat depressed, oval in form; pronotum pale, variegated with black.....13
- 13—Elytral punctures strong and unequal; prosternum not bicarinate.
Neoharmonia
 Elytral punctures finer and equal; prosternum with two fine approximate carinæ, converging slightly in front and extending to about the middle of the length. Africa.
 ***Cænopia**

- 14—Elytral punctures very minute and inconspicuous, equal; side margins distinctly reflexed.....15
 Elytral punctures strong, conspicuous and more or less unequal.....16
 15—Mesosternum truncate anteriorly; body broadly rounded and very convex; pronotum black with pale lateral markings, the elytra immaculate as in *Cenopia*; metacoxal plates very rarely with a distinct trace of the dividing line.

Cycloneda

- Mesosternum broadly and rather feebly sinuate; body as in *Cycloneda* and similarly punctulate, but having a feeble longitudinal submarginal furrow somewhat as in *Chilocorus*, disappearing behind the middle and particularly pronounced in the black forms; ornamentation dimorphous; oblique line of the metacoxal plates distinct but not united with the bounding curve posteriorly.....**Olla**
 Mesosternum truncate but with a very small, shallow and circularly rounded median notch; body broadly rounded but rather depressed; pronotum pale, variegated with black, the elytra pale, usually with black vittæ. Africa.....***Verania**
 16—Mesosternum truncate, with a very minute shallow rounded notch at the middle as in *Verania*; body oblong-oval, moderately convex; pronotum pale, variegated with black markings, the elytra pale, with an irregular dark design.

Cleis

- Mesosternum broadly and deeply sinuate; body more or less broadly oval, moderately convex.....17
 17—Prosternal process narrow, strongly bicarinate; pronotum with two large subquadrate black spots, narrowly and rectilinearly separated; elytra spotted with black, or dark with pale spots.....**Ansicalvia**
 Prosternal process broad, strongly convex in a transverse direction and prominent at the apical margin; pronotum black, with pale lateral or sublateral and basal areas, the elytra generally pale with black spots or immaculate; body large in size.....**Anatis**
 18—Hypomera with a well-marked but shallow rounded antennal depression; pronotum ornamented almost exactly as in *Coccinella*; body moderate in size, very broadly rounded.....19
 Hypomera without an antennal depression; body more broadly oval, the pronotum nearly as in *Anatis*.....20
 19—Antennæ inserted very close to the eyes, the latter broadly and feebly sinuated by the large antennal cavity; epistoma without a semi-corneous margin at the bottom of the sinus; body moderately convex, the elytra pale with black vittæ. South Africa. (Type *f. lineata*.).....***Cydonia**
 Antennæ not quite so close to the eyes, which are more deeply and narrowly sinuated by the post-antennal canthus; epistoma with the usual semi-corneous apical margin at the bottom of the sinus; body strongly convex, the elytra black, irregularly ornamented with large red areas. Africa. (Type *lunatus*.)

***Chellomenes**

- 20—Antennæ and eyes as in *Cydonia*; epistoma with a narrow coriaceous apical margin at the bottom of the sinus; elytra very finely punctulate, black, ornamented with large irregular red blotches; sides gradually less declivous to the edge, which is not reflexed or thickened; prosternum narrowly excavated along the median line to beyond the middle. Siberia. (Type *hexaspilota*.)...***Ithone**

21—Body very broadly rounded, minutely punctulate, the elytra very broadly explanate at the sides, the edge not thickened, pale, spotted with black, the epipleuræ very broad, continuing to the sutural angles, with a large deep impression internally at about basal third; prosternum transversely convex along the median line, not bicarinate; metacoxal plates as in *Cycloneda*; epistoma feebly emarginate, with coriaceous margin, the sides strongly dentate; antennæ and eyes as in *Cydonia*. Asia and East Indies. (Subtribe *SYNONYCHÆ*.) * **Synonymcha**

Body oval, rather strongly convex, minutely punctulate; epistoma obliquely denticulate at the sides, the extreme margin subtruncate; antennæ and eyes as in *Coccinella*; pronotum ornamented nearly as in *Anatis*, the apex less deeply sinuate and the apical angles less pronounced; elytra pale, or ornamented with irregular or interrupted dark vittæ, the side margins very narrowly reflexed, with the edge thickened, the epipleuræ narrower and simple; metacoxal plates as in *Cycloneda*; prosternum feebly convex along the median line. (Subtribe *MYSLÆ*.)

Neomysia

Adalia Muls.

The type of this genus is the *Coccinella bipunctata* of Linné, which is now distributed very widely over the world through commerce. The species before me are as follows:—

Elytra without transverse series of spots; metacoxal plates rounded or parabolic; elytral punctures fine. 2

Elytra with transverse series of spots or transverse bands; metacoxal plates frequently somewhat angular postero-externally; pronotum pale, with an M-shaped black design and a submarginal black spot. 3

2—Elytra red, each with a rounded or oval black spot at the centre of the disk; pronotum with a broad M-shaped median black design, the broad pale margins immaculate; metacoxal plates rounded, extending but slightly beyond the middle of the segment. Length 3.8–5.2 mm.; width 2.9–3.9 mm. United States (except Pacific Coast) **bipunctata** Linn.

Elytra red throughout and immaculate, the reflexed lateral margins usually yellowish; pronotum with M-shaped design and a black point at the centre of the broad yellow margin; metacoxal plates rounded, extending nearly to apical fourth of the segment. Length 3.2–4.3 mm.; width 2.3–3.2 mm. California.

melanopleura Lec.

Elytra black with fine yellow side margins, each with a large oblong yellow spot at the humerus and another, smaller and rounded, at three-fifths and close to the suture; pronotum black with narrow apical and side margins pale; metacoxal plates parabolic, extending nearly to apical third. Length 3.9–4.6 mm.; width 2.8–3.25 mm. Utah to California (Siskiyou Co.) **humeralis** Say

3—Submarginal black spot of the pronotum rounded and isolated, or only connected to the black design by a narrow isthmus. 4

Submarginal black spot broadly amalgamated with the central black design, forming a parallel-sided lateral extension of the latter; elytra reddish-yellow with black bands. 5

- 4—Elytra red, coarsely punctured, each with two small black points arranged transversely a little before the middle, the outer one on the median line and not quite so basal; metacoxal plates evenly parabolic, extending nearly to apical fourth. Length 4.8 mm.; width 3.6 mm. Nebraska **ophthalmica** Muls.
- Elytra pale reddish-yellow, rather feebly punctured, each with a small oblique black dash from the scutellum and two small subbasal spots, the inner the larger and both oblique and uniting on the humeral callus, also with three widely isolated black spots in a transverse line just before the middle, the inner more basal and the outer very close to the margin, and two, very small, on a transverse line at apical fourth, very near the margin and at inner third; metacoxal plates extending nearly to apical fourth, obtusely angulate postero-externally. Length 4.5 mm.; width 3.0 mm. California (Sonoma Co.) **ovipennis**, sp. nov.
- Elytra reddish-yellow, rather sparsely and moderately strongly punctate, each with a longitudinal posteriorly pointed dash at each side of the suture from the base, and two subbasal spots generally disconnected, the outer more basal and on the callus, also with a transverse series of three rather large spots just before the middle, the outer two generally connected, and two at apical fourth nearly as large, the outer slightly more apical, transverse and very close to the margin; metacoxal plates rounded though a little more narrowly so postero-externally, extending nearly to apical fourth. Length 3.9-4.6 mm.; width 2.8-3.5 mm. Colorado **annectans** Cr.
- 5—Elytra coarsely and closely punctured, each with a transverse basal spot acuminate externally and extending from the suture to inner third, and a large triangular subbasal spot involving the callus, also with a transverse uneven band near the middle of the length, not interrupted at the suture, extending to lateral ninth or tenth, the outer two-thirds straight and transverse, the inner third more basal and posteriorly oblique toward the suture, and a transverse, somewhat bilobed spot at apical fourth, equidistant from the suture and margin; metacoxal plates but slightly angulated, extending fully to apical fourth. Length 4.0 mm.; width 3.1 mm. New Mexico (Las Vegas) **transversalis**, sp. nov.
- Elytra coarsely but rather less closely punctured, completely devoid of any trace of basal or subbasal black spots, each with an irregular transverse band just before the middle, extending from inner sixth to outer third, and a small rounded spot in the same line at outer fourth or fifth, also with an uneven transverse spot at apical fourth, extending from inner fifth or sixth very nearly to the margin; metacoxal plates parabolic, extending to apical third. Length 3.8 mm.; width 2.7 mm. Colorado **ornatella**, sp. nov.

Humeralis is said to be a variety of *bipunctata* by Crotch, and is even omitted entirely from the Henshaw list, but my ample series of each is perfectly homogeneous and without trace of any evidence of relationship, the only variation from the normal being a small red point in one example just behind the middle and near the side margin; it is smaller and more narrowly oval than *bipunctata*, has a differently formed metacoxal plate, and inhabits a different geographical region. The last five species of the table are related closely to *frigida*, but they

are distinct among themselves and therefore probably not mere varietal forms of that species. *Annectans* is quite unaccountably placed in *Coccinella* by Crotch. *Ludovicæ* of Mulsant, cannot be identified and has a different type of pronotal ornamentation from any noted in the table. The *Coccinella disjuncta* of Randall, is evidently an *Adalia*, allied to *frigida*, but I have not been able to identify it; it must resemble *ornatella* very closely.

Agrabia, gen. nov.

The species given below, together perhaps with the Mexican *viridipennis* Muls., is the only known representative of this genus, which resembles *Adalia* in the oval, moderately convex form of the body. The side margins are exceedingly narrowly and finely reflexed:—

Oval, moderately convex, pale rufo-testaceous throughout above and beneath, except the elytra which are bright blue, sometimes with a feeble greenish tinge, the side-margins very narrowly testaceous from the humeral angles to apical fourths, where the pale margin is inwardly dilated, forming an elongate, internally arcuate spot, which narrows and disappears completely very near the sutural angles; punctures strong and rather close-set, somewhat unequal. Length 5.5 mm.; width 3.9 mm. New Mexico**cyanoptera** Muls.

The description of Crotch is very inexact, especially in regard to the antennæ, which are not unusually short for the Coccinellini, and the mesosternum, also in stating that the body is "subhemispherical."

Coccinella Linn.

This genus is still a receptacle for many discordant elements; *venusta*, which is assigned to it by Crotch (Trans. Am. Ent. Soc., 1873), is the type of a distinct genus, named *Neoharmonia* in the table, and, in the "Revision," *picta* belongs to *Cleis* and not to *Harmonia*, where it was subsequently placed, and *cyanoptera* to *Agrabia* and not to *Harmonia*. Even as restricted in the present essay, however, the genus is still a large one and our species may be conveniently separated as follows:—

- Elytra without trace of a basal fascia, the spot on the callus wanting or moderately developed; body large, usually broadly oval or elliptic.....2
- Elytra with a transverse subbasal fascia, sometimes disintegrating; body large, strongly convex and broadly oval.....11
- Elytra with a transverse subbasal fascia, sometimes disintegrating into three spots; body smaller and generally more narrowly oval, polished; pronotum with the apical margin and a subquadrate externally broader spot at each apical angle pale in color.....12

- Elytra with a broad subbasal fascia, not quite attaining the side margins, broadly sinuate medially at its posterior margin and deeply emarginate at each side at base by two triangular pale areas; body very small, narrowly elliptic. 13
- 2—Scutellar spot small and oblong or rhomboidal. 3
- Scutellar spot large, transversely suboval or elliptical, the subhumeral always wanting; suture never black. 8
- 3—Pronotum distinctly margined with yellowish-white along the apical margin; each elytron with four spots, no one of which is ever altogether wanting, that on the callus and the post-humeral small, the medio-juxtasutural and subapical large; suture finely black. 4
- Pronotum without a pale apical margin toward the middle. 5
- 4—Elytral spots well developed, the juxtasutural rounded or oval and subequal to the subapical, the subhumeral and post-humeral sometimes connected by a fine line extending from the outer side of the former to the inner side of the latter, which rarely shows also a tendency to extend forward externally in a fine line; under surface and legs black, the meso- and met-epimera white. Length 5.5-6.7 mm.; width 4.2-5.0 mm. New York, New Jersey, Virginia, Indiana and Iowa.

9-notata *Hbst.*

- Elytral spots very small and feebly developed, the subhumeral and post-humeral reduced to small points, the juxtasutural transversely linear and much smaller than the transverse subapical, which is the largest; coloration as in *9-notata*, the body smaller. Length 4.7-6.3 mm.; width 3.8-5.0 mm. New Mexico (Fort Wingate), Arizona (Cañon of the Colorado River) and Colorado.

degener, sp. nov.

- 5—Elytral suture not at all darker in color; body broadly oval, strongly convex, the pronotum black with a subquadrate pale spot at each apical angle, the punctures fine and unusually close-set, giving a feebly alutaceous lustre; elytra immaculate, except a small black scutellar spot flanked at each side by a paler spot at the basal margin, the punctures fine and rather close-set, becoming quite strong laterally; abdominal plates strongly defined, broadly ogival in form internally. Length 5.8 mm.; width 4.5 mm. Nevada (Reno). **nevadica**, sp. nov.
- Elytral suture darker in color but extremely finely so, the scutellar spot, when well developed, sharply rhomboidal; elytral punctures very fine, sparse, the elytra frequently immaculate. 6
- Elytral suture broadly black from the rhomboidal scutellar spot to the apex, toward which the vitta is noticeably broader. 7
- 6—Base of the prothorax very strongly arcuate, the sides scarcely more than two-thirds as long as the median length, the apical angles very obtuse and broadly rounded, with the pale spot large, transverse, somewhat prolonged and sharply angulate at its inner posterior limit; elytra with spots nearly as in *9-notata*, but smaller, the median discal rather more transverse, and the subhumeral frequently wanting. Length 6.4 mm.; width 4.7 mm. Utah. **prolongata** *Cr.*
- Base of the prothorax very broadly arcuate, the sides but slightly shorter than the median length; apical angles more prominent and narrowly rounded, the pale spot small and subquadrate; elytra generally wholly immaculate, but in rare instances when spots are present they are rounded and disposed nearly as in *9-no-*

- tata*. Length 5.2-6.2 mm.; width 3.9-4.7 mm. California (Coast regions from Sonoma to San Diego) [*franciscana* Muls.].....**californica** Mann.
- 7—Body more narrowly oval than usual in this group and very much less convex, the pronotum finely but strongly and closely punctured, with the pale spot at the apical angles small and subquadrate; elytra with an even oblique band just before the middle, terminating at equal distances from the suture and margin, and also with a short transverse spot at apical fourth or fifth; subhumeral spot completely obsolete, the punctures rather strong and close-set. Length 5.7 mm.; width 4.1 mm. Colorado.....**suturalis**, sp. nov.
- 8—Pronotum polished, the minute punctures well separated, the pale spot at the apical angles moderate in size and subquadrate; elytra each with a long oblique spot just before the middle and another shorter near the apex.....9
- Pronotum strongly alutaceous, the minute punctures deep and close-set, the pale spot at the apical angles large, extending to basal third.10
- 9—Submedian oblique fascia broad, entire and very conspicuous; pronotum evenly convex toward the sides. Length 6.0 mm.; width 4.6 mm. Vancouver Island [*laustris* Lec.].....**monticola** Muls.
- Submedian oblique fascia tending to disintegrate into an outer smaller and inner and larger spot; body more broadly oval, polished, strongly punctured toward the sides of the elytra, the impression along the side margin of the pronotum extending arcuately inward just before the middle, disappearing at some distance from the edge; inner part of the abdominal plates acutely angulate behind. Length 6.4 mm.; width 5.0 mm. California.....**impressa**, sp. nov.
- 10—Body oval, very strongly convex, the elytra dull, finely and feebly punctate, each with a transverse spot at the middle as in *5-notata*, and a small rounded spot near the margin and somewhat more anterior, the two sometimes subindented, the subapical transverse spot nearer the margin than the suture. Length 6.7 mm.; width 5.2 mm. New Mexico.....**alutacea** sp. nov.
- 11—Elytral punctures rather strong, moderately close and conspicuous, finer toward the suture; besides the common subbasal fascia, each elytron has a transverse spot from the center of the disk to inner fifth, and a similar or rather wider transverse spot near the apex; submarginal spot before the middle extremely rare; suture always pale; pronotum with a subquadrate pale spot at each apical angle. Length 5.8-7.5 mm.; width 4.5-5.8 mm. Colorado, Utah, Wyoming, Montana and northward, and probably also northern California; [*transversostriata* Cr. nec Fald., *nugatoria* Muls.].....**5-notata** Kirby
- 12—Elytra with a broad subbasal fascia, equally wide throughout and but little prone to disintegration, each also with a broad oblique fascia at the middle and another near the apex; punctures strong and close-set. Length 4.9 mm.; width 3.75 mm. Rhode Island and Wisconsin [*trifasciata* Cr. nec Linn.].....**perplexa** Muls.
- Elytra with a narrower and more irregular subbasal fascia tending to disintegrate into three spots, and each also with two oblique bands as in *perplexa* but narrower and frequently altogether obsolete, the punctures fine, sparse and feeble. Length 4.0-5.2 mm.; width 2.9-3.8 mm. California (northern and middle coast regions); [*harida* Lec.].....**juliana** Muls.
- Elytra with a small and evenly equilatero-triangular black scutellar spot widely de-

tached from the subhumeral spots, which are well developed, and each also with the two oblique bands of the preceding species, which are here rather narrow; body more narrowly oval, the elytra sparsely but more strongly punctured. Length 4.5 mm.; width 3.2 mm. California (Siskiyou Co).

eugenii Muls.

13—Body strongly convex, the pronotum with a transverse pale spot at each anterior angle extending narrowly across the median parts of the apical margin; elytra rather strongly punctured, each with a large irregular transverse discal spot at apical third in addition to the broad basal fascia. Length 4.1 mm.; width 2.9 mm. Lake Superior [*tirbyi* Cr.]. *tricuspis* Kirby

Perplexa, juliana and *eugenii* are related to *trifasciata*, but are all distinguishable at once by the form of the white apical area of the pronotum, which is expanded into a larger transverse spot in the American forms, but only narrowly and nearer the edge in the European. *Californica* is in no wise related to *5-notata* or *transversoguttata* as stated by Crotch and others, the occurrence of the very rare spotted examples showing that it is more closely allied to *9-notata*. *Quinque-notata* is certainly distinct enough from *transversoguttata* to be entitled to specific rank, and the variety *transversalis* seems to be identical with *nugatoria*; at any rate the name must disappear as it is preoccupied by Fabricius. *Difficilis* Crotch, I have failed to identify; it appears to resemble *prolongata* completely and may be synonymous. *Subversa* Lec., is probably allied closely to *degener*, but the author states "elytris distincte et subtiliter punctulatis, scutello nigro, et præcipue macula obliqua ad medium nigra notatis," which will not agree, as the most conspicuous spot in *degener* is the subapical; Crotch states that it is a variety of *trifasciata*, and that the elytra are spotless. Mulsant describes *eugenii* as being subhemispherical; this would be very inexact for the example before me, which seems to be typical in every other way; the appearance of the spots indicates that they never coalesce to form the subbasal fascia of *perplexa* and *juliana*.

Neoharmonia, gen. nov.

The genus *Harmonia* is not considered sufficiently distinct by European authors, and Crotch, while admitting the name to the American lists, assigned to it a number of species belonging to several different genera, no one of which appears to be a true *Harmonia*. The *Harmonia* of Mulsant is also composed of numerous dissimilar elements. In view of this confusion of judgment, it seems best to separate our two species as a distinct genus, allied to *Harmonia*, but differing apparently in the more widely reflexed side margins. The

form and ornamentation of the body, more broadly reflexed side margins, more depressed surface and emarginate mesosternum are all departures from *Coccinella*, to which these species have been attached, and the two genera are not even closely allied. The genus *Neoharmonia* probably includes also the Mexican *ampla* Muls., which I have not been able to examine. Our two species are the following:—

Broadly rounded, feebly convex, relatively strongly and unequally punctate; head black, yellow along the eyes; pronotum pale, with a large oblique fascia of black at each side extending from near the sides to the scutellum, gradually narrowing inwardly and departing slightly from the basal margin externally, also with two approximate median spots before the middle, which are sometimes united with the basal fasciæ at about their medial points; scutellum black; elytra pale yellow or reddish, each with two large subquadrate subbasal black spots and one still larger just before the middle, subtriangular and near the margin, also a large subquadrate spot near the margin at apical fourth, extending to inner third, where it is united with a common sutural vitta extending from near the apex to just behind the middle, also with a rounded spot just before the middle and near the suture, prolonged internally obliquely forward meeting—but not quite amalgamating with—its duplicate of the other elytron at the suture some distance behind the scutellum, forming two oblique inverted commas; under surface and legs blackish. Length 6.0 mm.; width 4.7–5.0 mm. Indiana; [*notulata* var. A Muls.] . . . **venusta** Mel h.

Similar in form to *venusta* but smaller and less strongly and less unequally punctured, black above, the elytra with violaceous reflection, the pronotum with a rather wide oblique pale border, becoming very narrow basally and extending very finely along the apex, with a small medial dilatation; elytra each with a transverse pale fascia extending from inner third or two-fifths to and enveloping the margin, its posterior limit transverse and feebly sinuate, especially toward the margin, its anterior limit deeply sinuate, forming two acute points, one on the margin and one on the medial line, the inner flank of the inner point straight and oblique; legs black; epipleuræ with the outer edge black toward base. Length 5.0 mm.; width 4.0 mm. Louisiana; [*notulata* var. B Muls.] **notulata** Muls.

These two species seem to be amply distinct and not varietal forms of one—at least no intermediate forms are known. This may however be another case of dimorphism.

Cycloneda *Crotch.*

The type of this genus is the *Coccinella sanguinea* of Linné, described from Surinam. *Sanguinea* is therefore in all probability specifically different from any of our forms, and it is not included in the table given below. The species are all very closely allied; they have the elytra pale red or yellow or black and immaculate, those with spotted elytra belonging to other genera. The metacoxal plates generally have no trace of the oblique dividing line, but in *hondurasica*

there is a short but well developed line, which fails to attain the bounding curve by a long distance. The body is rounded or oval, very convex, minutely and obsoletely punctulate, with the side margins of the elytra quite broadly reflexed, the gutter extending around the outer and anterior parts of the humeral callus as in *Neoharmonia*, and the edge strongly and abruptly thickened; the gutter is always more strongly, closely and subrugosely punctured toward base. The species before me may be outlined as follows:—

- Pronotum black, with a narrow pale side margin extending with equal width posteriorly and internally along the base, terminating abruptly at about lateral sixth and sometimes extending more narrowly along the median parts of the apex, also with an isolated small pale spot at the middle of the length and lateral fourth. . . . 2
- Pronotum as in the preceding section, except that the apical margin is always broadly pale, with a posterior medial spur in both sexes, and the sublateral pale spot is always united to the pale apex and sometimes also to the basal pale border, isolating a large black spot; body smaller. 6
- Pronotum completely black. 7
- 2—Body broadly oval but distinctly longer than wide, the marginal bead of the elytra not or only slightly darker. 3
- Body extremely dilated, very nearly as wide as long, the marginal bead distinctly black. 5
- 3—Metacoxal plates with a distinct but short disconnected oblique line; body rather more convex; female without a white apical pronotal margin at the middle. Length 5.6 mm.; width 4.6 mm. Honduras. **hondurasica**, sp. nov.
- Metacoxal plates devoid of any trace of an oblique line 4
- 4—Elytra generally luteo-flavate, without distinct paler spaces at the sides of the scutellum; pronotum of the female generally with the apical margin narrowly pale, usually subinterrupted at the middle and not posteriorly spurred. Length 5.7–6.0 mm.; width 4.7–5.0 mm. Florida. **immaculata** Fabr.
- Elytra deep and bright scarlet, with a short transverse basal paler spot at each side of the scutellum which is black as usual; pronotum relatively narrower than in *immaculata* and rather more strongly rounded at the base, the median length relatively greater when compared with the sides, having a narrow apical margin with narrow parallel posterior prolongation pale in the male, the female interruptedly margined with paler and without a medial spur. Length 4.4–5.8 mm.; width 3.7–4.8 mm. Texas (Brownsville), and California (San Diego and Los Angeles) **rubripennis**, sp. nov.
- 5—Body nearly as in the preceding but with the isolated pale spots of the pronotum smaller, the apical margin rather broadly pale in the male, with a parallel medial spur extending rather beyond the middle; in the female the apical edge is wholly devoid of a pale margin, the pale border ending abruptly at the eyes. Length 4.5–5.5 mm.; width 4.2–4.0 mm. Bahama Islands (Egg Island)—Mr. Wickham. **limbiter**, sp. nov.
- 6—Sublateral spur from the pale apical margin never joining the basal pale area, the medial spur of the pale apex short and triangular and not parallel as in the

preceding species; body more elongate-oval, the elytra luteo-flavate, with more narrowly reflexed margins, which are always paler. Length 4.0–5.0 mm.; width 3.5–4.0 mm. New York, Pennsylvania, Indiana and Iowa. **munda** Say
 Sublateral spur longer, frequently joining the basal pale border; medial spur long and narrow, gradually acuminate and extending to or beyond the middle of the disk; body smaller and rather more rounded, the elytra generally bright scarlet in color and with almost completely obsolete punctures, occasionally yellow, and, in a northern example, with more distinct punctuation. Length 3.8–4.7 mm.; width 2.9–3.4 mm. California (Sta. Cruz to Siskiyou Co.), Washington State, British Columbia and Idaho (Cœur d'Alène) **polita**, sp. nov.
 7—Body broadly rounded and rather less convex, shining, deep black throughout above and beneath, the sides of the prothorax rather less arcuate, and the basal angles more narrowly rounded; elytral punctures much larger and more distinct than usual but sparse. Length 4.3 mm.; width 3.5 mm. Locality not recorded.

ater, sp. nov.

Ater is widely divergent, both in coloration and to some extent in punctuation and form of the prothorax, but seems to be assignable to *Cycloneda*. The unique type was discovered in the Levette cabinet but had no label attached.

Olla, gen. nov.

In this dimorphic genus the ventral plates are almost as completely divided by an oblique line as in *Coccinella*, but the line does not quite form a junction with the posterior bounding curve; in view of the close similarity of the body with *Cycloneda*, therefore, I have placed the genus at this point of the series rather than near *Coccinella*, with which it has little or no affinity. The following species represents the pale forms with spotted dorsal surface, more numerous in Mexico:—

Broadly oval and strongly convex, very finely and obsoletely punctulate, the side margins as in *Cycloneda*; upper surface pale brownish-yellow, the head pale and immaculate; pronotum with a basal black spot at two-fifths from the middle and a short transverse spot before the scutellum, also with two posteriorly converging black spots at the centre and a narrow elongate spot on the median line joining the ante-scutellar spot, and, at lateral eighth and basal third, a small rounded spot; scutellum black in the male; elytra each with a subbasal transverse series of four small black spots, a medial series of three spots, the inner the largest and transversely crescentiform and, at apical fourth near the margin, another small rounded black spot; under surface and legs pale. Length 4.25–5.25 mm.; width 3.4–4.0 mm. Indiana, Texas (Brownsville and El Paso), Arizona and California (Sta. Cruz and San Francisco) **abdominalis** Say

The large series before me exhibits an extremely small amount of variation, which, considering its extended geographical range, is very remarkable. The male has the fifth ventral truncate, becoming very feebly sinuate toward the middle, with the edge there slightly concave;

the female has the fifth segment a little longer and very broadly ogival at apex.

The following black species were said by Crotch to form a simple variety of *abdominalis*. My series of *abdominalis*, as before stated, and of two of the species given below, are quite extended, and I am unable to detect any noteworthy variation of any kind, even in the outline of the spots, the constancy of form and ornamentation being in fact one of the most remarkable instances of the kind known to me; these series are each made up of males and females. Although I do not remember to have ever taken the black with the pale spotted form in California, where the latter is abundant, it should, however, be noted as a suspicious fact that several of the localities yielding *abdominalis* in my series are common also to the black species given below. It is, therefore, possible that we may have here a case of dimorphism, and the same may be true of *Adalia humeralis* and *bipunctata*, and of *Hippodamia divergens*, or allied species, and *mæsta*, but in the absence of intermediate forms any consanguinity in these very puzzling cases can only be proved by systematic biological observation. I might prefer rather to consider these perfectly constant and well-established aberrations of color—and, to some extent, of accompanying structure as well, such as the more finely reflexed side margins in the black forms,—more as protective adaptations to slightly changed environments. Of these black forms we have, at any rate, three quite well-defined variations, as follows:—

Body very broadly rounded, the head pale, sometimes more or less nubilate with piceous, the pronotum black, without a well-defined pale apical margin, but with a small central spur, the side margins obliquely pale, the pale area either curving narrowly around the basal angles or disappearing before reaching the base, its oblique inner boundary nearly straight and but slightly uneven; elytra minutely punctulate, gradually rather more distinctly toward the sides, which are but narrowly though strongly reflexed, with the edge beaded, each with a large transverse and irregular spot before the middle, which is emarginate internally at apex and externally at base; under surface, epipleuræ and legs black; meso- and met-episterna, hypomera, tarsi and abdomen pale. Length 4.2–4.9 mm.; width 3.5–4.2 mm. Texas (Brownsville and El Paso), Arizona and California (Los Angeles and San Francisco)..... **plagiata**, sp. nov.

Body as in the preceding but larger and similarly colored, except that the apical margin of the pronotum is narrowly pale with the medial spur distinct and the oblique inner boundary of the lateral pale area more distinctly spurred at its middle point; elytral pale spot before the middle smaller, triangular and feebly oblique, the outer side truncate, the inner angle narrowly rounded. Length 5.0–5.7 mm.; width 4.5–4.8 mm. Florida..... **sobrina**, sp. nov.

Body narrower and oval, more strongly convex, the pronotum similarly colored but without a pale apical margin or medial spur, the oblique lateral spot not reaching the base in the type, but with a minute detached spot at the basal angles; elytra with a large pale spot having a straight transverse base, from the extremities of which anteriorly the outline is evenly semi-circular. Length 4.8 mm., width 3.75 mm. New Mexico (Las Vegas)..... **fenestralls**, sp. nov.

One of these species was described by Mulsant under the name *binotata* Say (= *affinis* Rand.), which belongs to *Hyperaspis*, and the *oculata* of Fabricius, to which they were referred by Crotch, is described as having a large rounded pale spot at each side of the pronotum, and must therefore apply to some other species, possibly of *Neda*.

Cleis Muls.

The species which I have ventured to assign to this genus are rather small in size and have a distinctly oblong-oval form, with irregular elytral ornamentation. Those before me may be recognized by the following characters:—

Pronotum with three spots forming a central posteriorly pointed triangle, the posterior the smallest and elongate-oval, the anterior each with a small spot attached antero-externally, also with a larger irregular basal spot at the middle of each side and another subtriangular at the middle and lateral eighth, some or all of the spots generally united, forming an irregular design with a large M-shaped central figure; scutellum black; elytra a little longer than wide, somewhat broadly ogival at apex, distinctly but not very unequally punctate, pale in color with a piceous-black design, the most conspicuous feature of which is a longitudinal and slightly oblique vitta from the callus to apical fifth, the two united transversely across the suture behind and at basal two-fifths, and with a subcontiguous spot externally at the posterior limit; in the most developed form the entire elytra are black, with a pale border dilated internally at the middle, a large discal spot behind the middle and a basal fascia irregularly dilated; in the paler forms the dark fascia at two-fifths is broken up and all the lines much reduced in width; under surface and legs pale reddish-brown, the prosternum, hypomera, median parts of the meso- and metasterna, epipleuræ and entire parapleuræ of the hind body pale yellowish-white. Length 4.0–5.0 mm.; width 3.0–3.5 mm. Massachusetts, New Jersey and Wisconsin (Bayfield); [*oncinata* Melsh., *contexta* Muls.]..... **picta** Rand.

Pronotum similar, except that the sublateral spot is feebler and usually disintegrated; body similar in form and with but slightly feebler punctures but smaller and with the dark design of the elytra paler in color and less developed, the external spot near the posterior extremity of the vitta frequently prolonged irregularly to the side margin. Length 3.7–3.9 mm.; width 2.6–2.9 mm. California (Alameda and Siskiyou Cos.)..... **minor**, sp. nov.

Pronotum similar but relatively smaller and with the black design more irregular, with a few black points at the middle of each side of the apex in addition;

elytral design less developed, consisting of a fine straight vitta from the callus to the middle at apical fourth, where it is slightly dilated internally, each also with a small elongate dark spot near the vitta internally at two-fifths, and another at three-fifths from the base at the lateral margin and remote from the vitta. Length 4.0 mm.; width 3.0 mm. Hudson Bay..... *hudsonica*, sp. nov.

The last of these is quite distinct from the other two in the more depressed form and in the displacement of the small postero-external spot with reference to the dark vitta; it also has the suture finely black throughout.

Anisocalvia Crotch.

The type of this genus is the European *14-guttata*, which is erroneously referred to *Harmonia* in our lists; it is more narrowly oblong than any of our species and has the upper surface brownish-orange in color, the elytra with fourteen small rounded paler yellow spots. The pronotum has a longitudinal impression along the sides, close to, but independent of, the concave margin caused by the reflexed edge. The body is evenly oval, moderately convex, with rather narrowly reflexed side-margins, becoming broader around the base of the callus; the punctures are coarse and unequal and the mesosternum quite deeply sinuate, the prosternum bilineate. Our species may be distinguished as follows:—

- Elytra black, or black with pale spots..... 2
 Elytra pale, with eleven large rounded or oval black spots, of which three are on the suture, the one at the apex transverse 3
 2—Body in the female black, the pronotum but little more than twice as wide as long, black with a narrow apical and lateral margin and median line pale, the sides feebly convergent, rounding and more convergent at apex; elytra black throughout, with the reflexed side-margin pale; beneath black, the epipleuræ pale. Length 5.3 mm.; width 4.3 mm. New York (Adirondack Mts.); [*similis* Naud., *Allyna* Rand.] *cardtsce* Rand.
 Body in the female less broadly oval, black, the pronotum with a narrow apical and lateral margin and a fine median line not attaining the base pale; sides rather strongly convergent, evenly and broadly arcuate from base to apex, the disk distinctly more than twice as wide as long, strongly, moderately closely punctured; elytra black, with a fine side margin, toward apex only, paler, and a rounded discal pale spot near the suture and two-thirds from the base; femora black; epipleuræ piceous black, the abdomen pale around the entire limb; in the male the body is similar, the pronotum similarly colored, but the elytra have fourteen pale spots, that near the suture and apical third being the largest and with its postero-external margin nubilate, the legs and epipleuræ pale throughout, the latter slightly black opposite the back areas of the upper surface, the abdomen pale, clouded with blackish toward the middle and base. Length 5.2 mm.; width 4.0 mm. British Columbia *victoriana*, sp. nov.

3—Body evenly elliptical, pale yellowish in color, the pronotum black with apical and lateral margins and entire median line pale, the black area joining the basal margin at the middle of each side; punctures strong and quite close-set; sides evenly convergent, broadly and evenly arcuate; elytra longer than wide, rather narrowly rounded behind, the spots large, separated generally by about one-half their widths; epipleuræ, limb of the abdomen, tibiæ and tarsi pale. Length 5.2 mm; width 3.9 mm. British Columbia..... **12-maculata** Gebl.

Body similar but smaller and rather more broadly oval, with the prothorax relatively smaller and having the sides very much more strongly convergent, the basal angles more broadly rounded and the punctures finer and sparser; coloration similar, except that the elytral spots are relatively much larger and only very narrowly separated, the two transversely placed at the middle, generally confluent. Length 4.0 mm.; width 3.2 mm. Hudson Bay..... **elliptica**, sp. nov.

The form named *hesperica* by Crotch, is not included above and must be regarded as a manuscript name. If any modification whatever of a species is worthy of a distinctive name, it is worthy also of a description better than this: "Ventral segments and metasternum almost smooth—Arizona," which is not even of comparative worth, as these parts in the *similis*, described immediately above under the name of *14-guttata*, are not alluded to at all in regard to their sculpture.

Anatis Muls.

These are large, broadly oval or rounded and convex species, with rather coarse unequal punctuation and deeply sinuate mesosternum. The prosternum is rather broad between the coxæ, and is transversely convex along the median line throughout, terminating at apex in a conspicuous prominence. The antennæ are moderately developed in proportion to the size of the body, and the prothorax is less transverse than usual. The American species are as follows, *ocellata* being introduced for comparison:—

Body oval or subrhomboidal, the pronotum black with broadly pale side-margins and a black marginal spot extending from the basal angles to about two-fifths, angularly oblique internally but never attaining the central black area, the sides of which are feebly convergent, rectilinear but emarginate at the middle, also with two approximate pale basal spots at the middle.....2

Body broadly subrhomboidal, the pronotum black with a broad yellow vitta extending from base to apex, parallel and slightly distant from the side margin, which it joins at the apical angles, also with two very minute pale points near the basal margin at the middle.....3

2—Elytra evenly oval, distinctly longer than wide, the side-margins black, the submarginal spot at two-fifths, elongate-oval and not laterally extended, the substernal spot of the same range elongate; basal pale spots of the pronotum subquadrate, not united at base; pale apical margin transverse, finely interrupted at the middle. Length 8.5 mm.; width 6.3 mm. Europe..... ***ocellata** Linn.

1. *Flutina* very broadly rounded or subrhomboidal, scarcely as long as wide, the sides gently convex, the anterior margin with the margin, the spots not well defined, the external at base and the anterior portion of the lateral margin with punctures generally; basal spots of the pronotum small, the spots of the pronotum united at base, the pale apical margin of the pronotum interrupted in the middle; Length 6.5-8.7 mm.; width 5.5-6.5 mm. (New Jersey, Indiana, Iowa and Arizona)..... **15-punctata** *Oliv.*

2. *Flutina* very broadly rounded, approximately dilated at two-fifths, rather longer than wide; outer marginal spot at two-fifths geminate, the outer part enveloping the margin, spots of the pronotum with the fine thickened edge slightly darker; spots all surrounded by a broad pale border, the ground tint red-brown; basal spots of the pronotum small, the spots large, angulate antero-externally, united at base; pale apical margin ~~transverse and entire~~, not interrupted but rather broader at the middle; Length 8.7-10.0 mm.; width 6.8-7.4 mm. Indiana, Wisconsin (Bayfield), and Idaho (Carut d'Alene)..... **small Say**

Flutina decidedly rhomboidal, scarcely as long as wide, strongly dilated at two-fifths, where there is a small marginal spot; remainder immaculate or with faint vestiges of one or two of the spots of the preceding species, the punctures much smaller and nearly equal; basal spots of the pronotum large, much extended antero-externally, uniting with the lateral pale area and broadly united at base; pale apical margin transverse, not interrupted but rather wider at the middle. Length 8.4 mm.; width 6.9 mm. California (Siskiyou Co.)..... **rathvoni** *Lec.*

3. *Flutina* very broadly rounded or subrhomboidal, slightly more dilated at two-fifths, scarcely as long as wide, the punctures strong but rather less coarse and more nearly equal than in *15-punctata*, bright brownish-red or ochre, without trace of maculation but having the entire limb deep black, the border clearly defined and scarcely occupying the entire reflexed portion, broadening a little at two-fifths; pronotum scarcely three fourths wider than long, broadly, feebly convex, deeply impressed just within the lateral margins, rather finely and not closely punctate; head black, entire legs and under surface black, the epipleurae black in external and red in internal half of their width from base to apex. Length 8.7-10.0 mm.; width 6.8 mm. New Mexico: Fort Wingate..... **lecontei**, sp. nov.

It can be readily observed that *15-punctata* is not even closely related to the European *15-punctata* of Mulsant. I have not seen the latter, but it is the same as *small Say*. *lecontei* somewhat resembles the Mexican *15-punctata*, but I cannot see that it differs essentially from the European *15-punctata*, the antennae which is observed to be shorter than the pronotum, and the epipleurae shorter than the pronotum, being the only differences.

NOTES ON THE

Flutina *15-punctata* is a common species, which more broadly than the European *15-punctata* is known to encompass the range of the European *15-punctata*, and this is the

confirmed somewhat by the antennæ, which are rather long, slender, with very feebly dilated 3-jointed club having somewhat elongate and loosely connected joints. The anterior coxæ are not unusually widely separated, and the prosternum is not prominent at the middle of the apex; the mesosternum is broadly sinuate. The genus seems to differ from *Mysia*, the type of which is *oblongoguttata*, in the more narrowly reflexed margins, very fine punctuation and polished surface; it has but little affinity with *Anatis*. Our species are the following:—

Pronotum without a well-defined discal darker area..... 2

Pronotum with a large trapezoidal median dark area, which is well defined externally.. 3

2—Pronotum pale yellow, with a feeble red-brown clouded basal spot at lateral fourth and a small nubilata V-shaped spot just before the middle on the median line, also with a feeble disintegrated discal cloud near each side; elytra yellow, each with three fine incomplete and interrupted subequidistant longitudinal vittæ of pale red-brown Length 7.0 mm.; width 5.7 mm. New Mexico (Fort Wingate) **interrupta**, sp. nov.

Pronotum pale yellowish-brown, without maculation, except a feeble trace of the two basal clouded spots of the preceding; elytra similar in color, with three very feeble incomplete nubilata vittæ on each, the two inner uniting near the apex and broader, the outer narrow and almost completely obsolete. Length 6.7 mm.; with 5.4 mm. California..... **horni** Cr.

3—Elytra uniformly pale yellow-brown, sometimes slightly paler along the base and externally, rarely with feeble trace of two brown vittæ uniting near the apex at the middle of the width; pronotum in the male black, with broad yellow side margins, obliquely subrectilinear internally, inclosing a detached central black spot and with barely a trace of a small pale spot before the scutellum, the apex rather broadly yellow in a straight line slightly broader at the middle; female similar but with the dark area pale brown with clouded blackish lateral edges, the pale apex not dilated at the middle. Length 6.4–7.2 mm.; width 4.9–5.5 mm. Canada, New Jersey, Indiana and Texas (Galveston); [*notans* Rand.].

puffata Say

Elytra pale, with broad irregular longitudinal markings..... 4

4—Pronotum black, obliquely yellow in outer fifth, the pale margin inclosing a small internally angulate black spot just behind the middle and equidistant from the margin and central black area, which is bordered broadly with yellow at apex, the margin dilated posteriorly along the median line for a short distance, also with a small pale bifurcate spot before the scutellum; elytra pale, with a broad black subsutural vitta from the base for three-fifths, uniting broadly at base with a short broad median vitta, which extends one-fifth, with a triangular black spot in the same line just before the middle and continued again as a broad vitta from three-fourths to seven-eighths, the posterior extremity being in line with the subsutural vitta, also with a narrow external vitta from one-third to three-fourths; suture finely black throughout, a whitish basal spot at each side of the scutellum; under surface and legs black. Length 6.6 mm.; width 5.3 mm. Lake Superior.

randalli, sp. nov.

Pronotum black in a broad trapezoidal median region, separated from the apical margin by a very fine nubilous pale border not prolonged posteriorly at the middle, and having, at each side behind the middle, a small lateral spur not extending more than half way to the side margin, without trace of a pale spot before the scutellum; elytra much longer than wide, with an inner broad black vitta to nearly two-thirds from inner third of the base, its posterior extremity subunited with a slight dilation of the fine black sutural margin, the latter dilated near the base, also with a broad vitta along the median line not united with the inner vitta basally, extending unbroken from the base at outer two-fifths nearly to the apex, angularly dilated within at the middle, and a fine external vitta from basal to apical third or more; legs black. Length 6.3 mm.; width 4.5 mm. Colorado. *montana*, sp. nov.

These species are all evenly oval and strongly convex, and vary much less in size individually than is usual in this family. *Subvittata* of Mulsant, I have failed to recognize; the description of the pronotal ornamentation will not apply, even approximately, to any form described above.

PSYLLBORINI.

In the structure of the front, the Psyllborini are evidently intermediate between the Coccinellini and Epilachnini. The two following genera are very closely related to each other, and inhabit the eastern and western hemispheres respectively. The surface of the head is pubescent in both. The body is small in size, convex, the pronotum small, diaphanous at the edges and broadly reflexed at the sides; body pale in color, spotted with a darker tint above; mesosternum truncate, the claws with a large quadrate tooth internally at base. The two genera before me may be characterized as follows:—

Elytra more broadly reflexed at the sides; scutellum well developed.....* *Thea*
Elytra very narrowly reflexed at the sides, the scutellum minute..... *Psyllobora*

In almost every other character these two genera are so nearly similar, that it might scarcely be conducive to taxonomic convenience to maintain them distinct. Still, there are certain peculiarities in the types of ornamentation that render them easily-separable at first sight. The genera *Halysia* and *Neohalysia* are composed of larger species, which also belong to the Psyllborini.

Psyllobora Chev.

A large genus, of which but a small proportion of species have yet been described. As in many other genera, the same general scheme of arrangement of the elytral spots is common to many species, and the material of our fauna has never been critically examined. The

species in my cabinet inhabiting the United States may be readily identified as follows :—

- Elytra without common sutural spots, the sutural margin pale.....2
- Elytra with two common sutural spots at one-third and two-thirds from the base, the sutural margin narrowly black throughout.....10
- 2—Elytral spots uniform in color throughout.....3
- Elytral spots unequal in intensity of coloration among themselves.....9
- 3—Middle of the three subbasal spots broadly confluent with the small spot on the callus, forming a single spot. Atlantic regions.....4
- Middle spot narrowly united with the external basal spot, the latter semi-detached or well defined by a deep strangulation; elytral punctures minute and sparse. Pacific coast regions.....8
- 4—Each elytron with nine spots, some of which are more or less confluent among themselves, the outer basal considered as having disappeared by fusion; punctures distinct.....5
- Each elytron with a large discal reniform spot, the punctures minute and sparse.....7
- 5—Form broadly oval, the elytral spots black.....6
- Form narrowly oval, the elytral spots brown in color; pronotum faintly punctulate, the ante-scutellar spot distinct; elytra much longer than wide, quite strongly but not closely punctured, each with two large subequal and approximate basal spots, the inner more oblique, the outer rounded, also with two equal subsutural spots, slightly elongate-oval, at basal third and near apical fourth, three submarginal at two-fifths, three-fourths and subapical, increasing in size posteriorly, a large discal median spot fused with a smaller one in the same line at two-thirds, the central spot equal in size to the subapical. Length 2.15 mm.; width 1.4 mm. Iowa (Keokuk)..... **obsoleta**, sp. nov.
- 6—Pronotum finely but distinctly punctate, the ante-scutellar spot small but distinct; elytra strongly and very closely punctured, the spots well developed and occupying together as much area as the pale interspaces, arranged as in *obsoleta*, but with the outer basal much larger and more prolonged posteriorly, and the subapical much smaller, oblique and subdivided into two small equal spots, the two discal confluent spots similarly united to the subsutural and submarginal spots near two-thirds. Length 2.1–2.7 mm.; width 1.6–2.0 mm. Rhode Island, New Jersey, Iowa and Wisconsin..... **20-maculata** Say
- Pronotum subimpunctate, the ante-scutellar spot obsolete; elytra as in the preceding, barely as long as wide, distinctly but much less closely punctured, the spots occupying nearly the same relative positions but very much smaller, the pale area in excess, the spots all isolated, the submarginal at a much greater distance from the edge, the outer basal smaller and not prolonged posteriorly, the subapical quadrate. Length 1.9 mm.; width 1.5 mm. Florida (Palm Beach).
parvinotata, sp. nov.
- 7—Body very small, rounded, with very minute sparse punctures; pronotum subimpunctate, the five spots present but pale brown in color; elytra very pale yellowish-white, with brown markings consisting, on each, of two subbasal spots, the outer the larger and with a lobe on the callus, a small faint subsutural cloud at one-third, a large bilobed discal spot extending from basal third to apical fifth,

- prolonged and acuminate antero-externally and a large bilobed and less well-defined subapical spot. Length 1.6 mm.; width 1.3 mm. Texas (Brownsville)—Mr. Wickham..... renifer, sp. nov.*
- 8—Similar in form and size to *zo-maculata*; pronotum impunctate, the five spots smaller and somewhat clouded; elytra as long as wide, narrowly rounded at apex. the punctures extremely minute. sparse and not impressed, the spots black and well defined, nearly coincident in position with those of *zo-maculata*, but with the outer basal subdetached, the submarginal at one-third very small, anterior subbasal much more elongate and the oblique subapical more nearly subdivided and in the form of a dumb-bell. Length 2.7 mm.; width 2.0 mm. Idaho (Cœur d'Alène) **borealis**, sp. nov.
- Similar to *zo-maculata* but rather more broadly rounded, smaller than *borealis* and with the elytral punctures impressed though minute and sparse; elytral markings as in *borealis* but pale brown in color, the subapical completely divided, forming two small rounded and widely separated spots. Length 2.2 mm.; width 1.75 mm. California (Siskiyou Co.) **separata**, sp. nov.
- 9—Body broadly oval; pronotum subimpunctate, the five spots more or less nubilate, the two anterior transversely triangular; elytra about as long as wide, with rather fine but impressed sparse punctures, pale in color, with spots arranged as in *zo-maculata* but pale suffused brown in color, except the inner basal and the two submarginal at one-third and two-thirds from the base, which are well developed, particularly the anterior, which three spots are blackish in color; subapical spot very faint but usually completely divided. Length 1.9–2.6 mm.; width 1.4–1.9 mm. California (coast regions from San Diego to Humboldt Co.) **tædata** Lec.
- Body broadly oval and similar in punctuation and ornamentation to *tædata*, except that the pronotal spots are so faint as to be scarcely traceable and the anterior of the two darker submarginal spots of the elytra almost completely obsolete, the two subbasal nearly equal in depth of coloration, and that the outer—which is perfectly simple and elongate-oval in *tædata*, uniting generally with the central spots—is here abbreviated and isolated and united to a distinct semi-detached spot on the callus. Length 2.6 mm.; width 1.9 mm. California.
- deficiens**, sp. nov.
- 10—Much more narrowly oval than *zo-maculata* but similar in size, and with the five pronotal spots similarly placed and large, except the ante-scutellar, which is very small and punctiform; elytra much longer than wide, white in color, very minutely, sparsely punctulate, the punctures not impressed, the markings deep black and abruptly defined, consisting, besides the sutural marks, of eight spots on each: two basal, the outer irregular and obliquely prolonged postero-externally parallel to the margin for a short distance, one large and triangular, nearer the suture than the margin at two-fifths, one small submarginal at one-third, another larger at three fourths obliquely united to a small spot behind the discal, and two isolated subapical, the inner the larger. Length 2.7 mm.; width 1.8 mm. Florida (Dry Tortugas) **nana** *Muls.*

The form of the outer basal spot of the elytra seems to be a valuable character, and the large series before me show that most of the

others employed in the table are sufficiently constant to afford specific criteria.

EPILACHNINI.

A very extensive tribe, especially in the tropics of the western hemisphere, but of which only two or three species occur within the United States. It is probable that the great genus *Epilachna* may be subdivided for convenience, as there is a remarkable variety in form, sculpture and style of ornamentation among its species.

Epilachna Chev.

The two species known to me may be defined as follows:—

Body very broadly oval, shining, pale orange-yellow, the punctures rather coarse, deep, unequal and moderately close; pubescence short, moderately abundant; head immaculate, the pronotum pale, with an apical and basal black spot on the median line, the basal the larger, and one at each side just behind the middle near the margin; elytra each with two elongate-oval sutural spots just behind the middle and at basal fifth, the posterior much the larger, also with two submarginal in range with the two subsutural, a median subbasal very small, a central subequal to the posterior submarginal, and a large subquadrate subapical spot; metasternum blackish; legs pale. Length 7.2–8.0 mm.; width 6.0–6.6 mm. Eastern United States..... **borealis** Fabr.

Body more narrowly oval and distinctly smaller, duller in lustre, densely pubescent and very closely, unequally punctured, pale yellowish-brown in color, the head and pronotum without spots; each elytron with three very small subbasal spots, the median less basal, and three in a transverse range just before the middle, scarcely larger than the subbasal, the median a little larger, and two near apical fourth, as small as the subbasal, placed near inner fourth and outer third; under surface and legs pale throughout. Length 6.4–7.0 mm.; width 5.0–5.5 mm. Sonoran regions..... **corrupta** Muls.

Mexicana Guér., is said to occur within the United States, but I have seen no examples from this country; the upper surface is black throughout, the elytra each with six large rounded pale spots in two equilateral triangles; my specimens, from Guerrero, have the legs pale, the femora black except at apex, in fact colored exactly as in *defecta*, from Honduras. *Defecta* is, however, a shorter and more broadly ovular species, with less pronounced dilatation at basal fourth of the elytra. The metacoxal plates in *Epilachna*, are arcuate but not quite entire, and are always much shorter than the first segment.

PENTILIINI.

This tribe includes the genera *Pentilia*, *Cryptognatha* and probably *Bura* of South America and the West Indies, *Lotis* and *Xestolotis* of

Africa and *Sticholotis* of Asia. They are rounded, subglobular insects of small or moderate size, recalling Chilocorini in general appearance, but with the formation of the front nearly as in Coccinellini. The minute species of the United States, which we have heretofore designated by the name *Cryptognatha*, because of prosternal structure, together with *Æneis*, belong to another taxonomic division of the family characterized by a more compact body and narrow epipleuræ. *Xestolotis* will be characterized in an appendix to the present paper.

It is possible that *Menoscelis* and *Thalassu* may also form either a part of this tribe or a special tribe closely related, but I have seen no examples.

CHILOCORINI.

The genera of this tribe have quite a different general habitus from those of the Coccinellini, being still more strongly convex and even subcompressed, with the outer part of the epipleuræ still more steeply descending; the prevailing type of ornamentation, also, is different, being black with pale spots, while in the latter it is usually pale with black spots. Besides the radically different structure of the epistoma, the antennæ diverge widely from those of the preceding tribes, except some of the Pentiliini, being very short, compact and narrowly clavate. The three American genera represented before me are the following:—

- Tibie obtusely dentate externally near the base; pronotum pubescent toward the sides, with a double marginal line laterally at the base; posterior legs moderately retractile, the abdomen and epipleuræ concave for the femora **Chilocorus**
- Tibie not dentate externally; pronotum not pubescent toward the side margins, with the double marginal line at the sides of the base not evident; in *Axion*, however, with the edge impressed near the sides of the base, forming a closer junction with the edges of the elytra **2**
- 2—Posterior legs strongly retractile, epipleuræ and base of the abdomen deeply concave for the femora; body large, extremely convex or subcompressed and very minutely punctulate **Axion**
- Posterior legs not retractile, the abdomen and epipleuræ not concave behind the coxæ; body small, usually with more distinct punctation; ornamentation variable.

Exochomus

In *Chilocorus* and *Axion* the upper surface is deep black, the combined elytra having two or three red spots; the former occurs on both sides of the continent but *Axion* seems to be peculiarly characteristic of the Southern fauna.

Chilocorus *Lev.*

In this genus the species have a remarkable superficial community

of habitus, and are consequently difficult to define; they are generally larger than in *Exochomus*, but smaller than in *Axion*. Those before me may be identified as follows:—

Sterna black, the abdomen red, generally black toward the middle of the base. . . . 2
 Sterna in great part red, the prosternum alone black; abdomen red throughout, the legs black as usual; prothorax more narrowly rounded at the sides; body deep black above. 4

2—Elytral spot small, rounded; body black above, very broadly oval, the elytral punctures generally stronger and becoming quite coarse toward the margins; head distinctly pubescent. Length 4.4–5.0 mm.; width 3.8–4.3 mm. Vermont, New York, Pennsylvania, Indiana and Iowa. **bivulnerus** Muls.

Elytral spot more or less evidently larger and always transverse, the head less conspicuously pubescent; elytral punctures finer 3

3—Broadly oval and less compressed, black with distinct bluish reflection; sides of the pronotum but little more than a third as long as the median line; elytral spot large, transversely oval, extending from basal fifth to the middle and from inner fifth or sixth to outer fourth. Length 4.2–4.8 mm.; width 3.4–3.8 mm. California. **orbis**, sp. nov.

Narrowly oval and more pointed behind, smaller and narrower than *bivulnerus*, compresso-convex, deep black above without metallic reflection; sides of the pronotum fully two-fifths as long as the median line; elytral spot distinctly variable in size, but as an average extending from rather more than basal fourth to a little before the middle and from inner to outer third or fourth. Length 3.7–4.75 mm.; width 3.0–3.8 mm. California (San Francisco) to Washington State.

fraternus Lec.

4—More broadly oval; pronotum deeply impressed apically near the angles in the male, with the edge there rufescent; elytral spot more uneven in outline, generally extending from basal fourth to the middle and from inner fifth or sixth to outer fourth or fifth. Length 5.0 mm.; width 4.5 mm. Honduras.

cacti Linn.

Narrowly oval and more compressed, the pronotum in the male not, or only very feebly and indefinitely, impressed apically near the angles, with the edges there not at all paler; elytral spot more evenly outlined, generally extending from basal fifth to the middle and from inner fifth or sixth to outer fourth; punctures very fine, becoming slightly larger toward the margins. Length 4.4–4.6 mm; width 3.75 mm. California (San Diego). **confusor**, sp. nov.

The longitudinal impression on the flanks of the elytra are analogous to those previously noted in *Olla*, of the Coccinellini.

Axion Muls.

These species are the largest of the tribe and are colored nearly as in *Chilocorus*, but with a greater development of the red spot. The surface of the elytra is almost completely impunctate; the pronotum is feebly punctate near the side margins, and the apical margin near the

angles is always more or less pale. The four species in my cabinet may be separated by the following characters:—

Elytra together with two large obliquely oval red spots, the side margins not at all thickened; abdomen black. Sonoran regions..... 2

Elytra with three smaller red spots one of which is sutural, the edges with a strongly thickened bead; abdomen red throughout. Atlantic regions..... 4

2—Elytra quite broadly reflexo-explanate at the sides; upper surface strongly shining; body large, broadly rounded behind in both sexes, the male with the elytral spot rather small, but slightly oval, extending from basal fifth or sixth to the middle and from inner third or fourth to outer fourth or fifth, the spot in the female larger, extending from very near the base at outer two-thirds to the middle and from inner fourth to outer sixth or seventh near the humeri. Length 6.0–6.7 mm.; width 5.2–5.75 mm. Arizona; [*texanum* Lec.].

plagiatum *Oliv.*

Elytra very narrowly, and but slightly, less declivous toward the edges, the body smaller..... 3

3—Body broadly rounded behind, alutaceous in lustre, the elytral spot in the female rather small in size, rounded, with the anterior outline oblique and emarginate, extending from basal sixth to the middle and from inner two-fifths to outer fourth; abdomen and legs black as in *plagiatum*. Length 5.3 mm.; width 4.6 mm. New Mexico (Las Vegas)..... **alutaceum**, sp. nov.

Body pointed and ogival behind, the elytra polished, the spot similar in the sexes and very large, obliquely and broadly oval, extending from the basal margin—which it very narrowly attains or virtually attains at outer two-fifths—to three-fifths of the length and from inner fifth or sixth to outer eighth, where the outline is parallel to the side margin for a considerable distance. Length 5.3–5.7 mm.; width 4.6–5.1 mm. California (Los Angeles) and Arizona..... **pleurale** Lec.

4—Body very broadly oval and compresso-convex, the upper surface strongly shining, the pronotum more alutaceous, with the entire apical margin very finely and indefinitely paler; elytra very broadly ogival at tip, each with a small parallel-sided red spot extending, parallel to the side-margin, from the base at outer two-thirds for one-fifth the length, and also with a small oval red spot on the suture at apical third; legs black. Length 6.6 mm.; width 5.6 mm. Rhode Island.

tripustulatum *DeG.*

Tripustulatum does not seem to be at all abundant, and my cabinet contains only the single specimen taken some twenty years ago. *Pilatei* of Mulsant, because of its red abdomen, is almost surely specifically different from *plagiatum*; it is said to be from Texas but I have not seen a representative.

Exochomus *Redt.*

The metacoxal plates are rounded as usual, but they are not complete as stated by Crotch, the bounding arc not quite attaining the basal margin of the first segment. The species are rather numerous, and are much smaller and generally less convex than in the preceding

genera, only rarely exhibiting any trace of lateral compression. The punctuation is very minute or subobsolete, but in *marginipennis* becomes quite distinct though sparse. The species before me may be outlined as follows:—

Body strongly compresso-convex as in *Chilocorus*, the anterior tibiæ more dilated and arcuately sublamine externally; body rounded, deep black above, the under surface and legs throughout testaceous; head slightly rufescent at the apical margin; pronotum with the edge slightly rufescent at the apical angles; elytra minutely punctulate, more distinctly toward the margins, which are evenly declivous to the edge and not at all reflexed, with a very fine marginal bead, each with an elongate-oval red spot on the median line, extending two-fifths from the base, with its margins rather nubilate. Length 3.7-3.9 mm.; width 3.0-3.2 mm. Arizona.....

arizonicus, sp. nov.

Body evenly and less strongly convex, not at all compressed, the anterior tibiæ nearly straight externally and not laminate, the elytral margins narrowly but abruptly reflexed, and with a more distinct marginal bead.....2

2—Pronotum black throughout; body oval; elytra black, with a large humeral and small discal posterior spot pale, the marginal bead black.....3

Pronotum black throughout; body rounded, more convex, the elytra pale with black spots and marginal bead black.....4

Pronotum black, nubilously pale at the sides or at the apical edges near the angles; body rounded or oval, moderately convex, the elytra with a black design, the side margins always pale.....5

3—Elytra polished or feebly alutaceous, obsoletely punctulate, the pale humeral spot parallel with the side margin, about twice as long as wide, without tendency to prolongations along the basal or lateral margins, the discal spot rounded, clearly defined, situated at apical fourth and inner third; under surface and legs black, the epipleuræ pale except behind the middle. Length 2.8-3.8 mm.; width 2.3-3.0 mm. California (San Francisco to Humboldt Co.).

californicus, sp. nov.

Var. A—Similar but with the elytra strongly alutaceous, and with the humeral spot extending narrowly along the margin for a short distance posteriorly but not along the base. San Francisco.

Elytra polished, very minutely punctulate, black, the pale humeral spot more sinuate within and more angular internally at its posterior limit, continued along the margin with broadly sinuate internal outline and gradually narrowing, becoming extinct at a point opposite the discal spot, also extended narrowly along the basal margin very nearly to the scutellum; discal spot subtriangular, at posterior fourth or fifth and much nearer the suture than the margin. Length 3.0-3.3 mm.; width 2.2-2.7 mm. Indiana?.....

ovoides, sp. nov.

Elytra polished, minutely and sparsely but somewhat more distinctly punctulate, the humeral spot oblong and about twice as long as wide, as in the two preceding somewhat prominent within at its posterior limit, abruptly narrowed and continued along the lateral and basal margins as in *ovoides* but more broadly at the base, the discal spot subtriangular, at the same position but continued forward

narrowly becoming nubilously extinct two-fifths from the base; under surface and legs as in the preceding. Length 3.15-3.3 mm.; width 2.4-2.6 mm. Nevada.

desertorum, sp. nov.

- 4—Body broadly rounded, polished, minutely, very obsolete punctulate; head and pronotum black throughout; elytra pale orange, the sutural, basal and external margins extremely finely black, with a common transverse spot across the suture at the apex; each also with two very small rounded black spots, the anterior on the callus, the posterior slightly larger and near apical third nearly on the median line; under surface and legs black, the epipleuræ pale, edged externally and finely with black. Length 3.3-4.0 mm.; width 2.8-3.4 mm. Texas (El Paso).

högel *Corh.*

- 5—Elytra very finely but evidently punctulate, entirely pale, each with a transversely oval black spot near the apex, approaching the suture rather nearer than the external margin; head and pronotum pale in the male, the latter with a median dark cloud toward base, black in the female with the pronotum broadly and nubilously pale at the sides; legs pale or so in great part. Length 2.6-2.9 mm.; width 2.0-2.4 mm. Texas (Austin); [*guexi* Lec.].....**childreni** *Muls.*

Elytra pale, with two broad transverse fasciæ of black..... 6

Elytra black on the disk; body in general more broadly rounded; punctures very minute and sparse..... 9

- 6—Anterior fascia not attaining the base and always separated from the posterior; elytral punctures extremely minute and subobsolete..... 7

Anterior fascia broadly attaining the base and broadly united with the posterior fascia at the median line of each elytron; punctures sparse and fine but very distinct... 8

- 7—Body broadly oval, almost rounded and larger, the sides of the pronotum broadly and nubilously pale in both sexes, the head blackish in the female; thoracic margins very strongly convergent. Length 2.8-3.3 mm.; width 2.5-2.9 mm. Texas (Brownsville)—Mr. Wickham.....**latiusculus**, sp. nov.

Body more narrowly oval, the head and pronotum black, apparently in both sexes, the apical angles only nubilously and not very markedly pale, the thoracic sides much less convergent from base to apex. Length 2.4-2.9 mm.; width 1.8-2.1 mm. Southern California (Pasadena, Los Angeles and San Diego).

fasciatus, sp. nov.

- 8—Body not very broadly oval; head and pronotum black, the apical angles of the latter distinctly pale in color; elytra black, with a rounded or oval pale spot at each side of the scutellum and a common, transversely rhombiform spot on the suture at three-fifths, extending laterally as if to narrowly unite with the median projection of the pale margin, which extends from the base very nearly to the apex and broadly bisinuate within, not tending to spread along the basal margin. Length 2.5-2.8 mm.; width 1.9-2.2 mm. Tennessee and Florida [*pratextatus* *Muls.*].....**marginipennis** *Lec.*

- 9—Head and pronotum black, the apical angles of the latter nubilously paler; elytra black, with a broad pale margin extending, with its inner margin parallel, to nearly three-fifths, there obliquely and abruptly narrowed and continued narrowly almost to the apical angles; body smaller and much more broadly rounded than in *marginipennis*, with less obvious punctuation. Length 2.2 mm.; width 1.8 mm. Texas (El Paso).....**subrotundus**, sp. nov.

Head, pronotum and elytra deep black throughout; under surface and legs also black, the tarsi picescent. Length 2.9 mm.; width 2.4 mm. New Mexico.

æthiops Bland

The Mexican *contristatus* is said to be distinct from *childreni* by Gorham, being larger, more compresso-convex and with the elytra immaculate. *Marginipennis* was described by the elder LeConte, and, to distinguish the two authors, I would suggest that the contracted name of the latter be printed "LeC." that of the younger LeConte remaining "Lec."

Ovoideus and *desertorum* of the table, are in all probability subspecies of *californicus*, but my material is not sufficient to decide at present, and the forms from *childreni* to *æthiops* may be regarded as derivatives of the *marginipennis* type, but in my opinion specifically distinct.

PLATYNASPINI.

The species of this tribe somewhat recall the Chilocorini in form, but are always pubescent. The body is oval, convex but not compressed, generally black with small pale spots above, the legs retractile within shallow depressions. The abdomen differs from that of the preceding tribe in having the sixth segment distinct, the fifth being as short as the fourth, and the metacoxal arcs also differ, being nearly as in the Coccinellini, the bounding curve extending rapidly to the apical margin. The antennæ are very short, and the fourth joint of the maxillary palpi strongly securiform. The species are all foreign to the American continents and are only moderately numerous.

TELSIMIINI.

This tribe is necessary for two very small species, having a structure of the epistoma and eyes similar to that of the Platynaspini, and with a convex, pubescent body, but having the maxillary palpi somewhat as in Pharini though stouter, the fourth joint being conical, with the apex obliquely truncate. The abdomen differs from that of the preceding tribe in being purely five-segmented, as in Pharini, the fifth longer and strongly rounded. The metacoxal arcs curve outward, becoming rectilinear and parallel to the apical margin at a point between the middle and apex of the segment, and attain the sides of the body. The epipleuræ are rather wide and descend strongly externally, and the legs are moderately retractile. The scutellum is very small and the eyes are finely faceted and pointed antero-internally. The anterior margin of the prothorax is broadly angulate at the middle of

the emargination. The types are African and will be described in an appendix to the present paper under the generic name *Telsimia*.

PHARINI.

In this remarkable tribe the abdomen consists of five segments, the fifth long and strongly rounded, and the metacoxal arcs curve rapidly to the apex of the first segment, which they follow externally. The legs are only feebly retractile, the impressions being very shallow and the tarsi are elongate and generally rather compressed, with the basal node of the third joint more or less free. The fourth joint of the maxillary palpi is slender, gradually drawn out to a finely acuminate point, and the antennæ are moderate in length, straight, with the club narrow. The epistoma is sinuato-truncate at apex and extends only to the eyes, which are not emarginated by it, but which have a very minute notch as in *Scymnillini*. The prosternum is flat, rather widely separates the coxæ and has two parallel entire and widely separated carinæ. The two genera before me belong to the old world fauna and are as follows:—

Body pubescent above, the epipleuræ descending externally.***Pharus**.
 Body subglabrous, the epipleuræ wide but horizontal.***Pharopsis**.

Species of both these genera will be alluded to in the appendix. Although the palpal structure is remarkably aberrant in this tribe, there is no necessity at all for considering it a distinct section of the family, as is proposed in the catalogue of Heyden, Reitter and Weise, and the palpi of the preceding tribe are to some extent intermediate. In fact this character is no more unusual than the dilated clypeus of *Chilocorini*, and the peculiar form of the fourth palpal joint is evidently due to extreme obliquity of truncature, seen in a transition stage in *Nesalotis*. *Pharopsis* appears to be distinct from any of the African genera recently proposed by Weise.

CENINI.

The genus *Cenis* of Mulsant, so far from being identical with *Cryptognatha*, in reality belongs to a different division of the family because of the narrow and subhorizontal epipleuræ. Our small species hitherto placed in *Cenis* by LeConte, and *Cryptognatha* by Crotch and Horn, really constitute a different genus because of the less convex median parts of the upper surface, sculpture and structure of the antecubital legs. In fact the indications point to several genera

among these small obscure forms. As a guess, the species from *auriculata* to *athiops* (Crotch—Rev. Cocc., p. 206), may be assigned to *Cryptognatha*, those from *reedi* to *nigrans* to *Æneis*, and *pusilla* and *puncticollis* to the new genus described below. The Ceylon species *flavescens*, *nigritula* and *lateralis* probably constitute another distinct genus. The species of *Æneini* are either wholly or in great part glabrous, and are all among the most minute members of the family.

Delphastus, gen. nov.

In some respects this genus is allied to *Smilia*, although so different in prosternal structure and retractility of the legs; the upper surface, for example, has rather long, stiff and very remotely scattered erect setæ, corresponding to the very short and microscopic erect hairs of that genus; the pronotum has an oblique line at the apical angles, closer to the margin than in *Smilia*, and finally the antennal foveæ are at the apex of very deep lateral emarginations of the front, rather remote from the eyes, which latter are entire. Were it not for the radically different structure of the abdomen, *Smilia* could therefore enter the present tribe quite as well as the Scymnini, the deflexion of the prosternum not being in general an essentially tribal character, any more than the crural impression of the epipleuræ. In the Coccinellidæ tribal characters must be determined from the general structure of the body, rather than from any special modifications, and, considering all points, it seems to me that *Smilia* should either constitute a distinct tribe just before Hyperaspini, or else enter the Scymnini.

In *Delphastus* the body is very broadly oblong-oval and only moderately convex, highly polished, subglabrous and subimpunctate, the antennæ well developed, with a compressed elliptical club, the coxæ all very remotely separated, the epipleuræ narrow, horizontal and feebly concave, the anterior femora greatly dilated, so that in repose the under side of the prothorax may present an almost unbroken surface from side to side, the anterior tibiæ and tarsi being completely concealed beneath the expanded femora lying deeply within the prosternal depressions; the meso-crural excavation is very deep and abruptly limited, and extends to the outer margin of the epipleuræ. The tarsi are long and slender, and may be flexed upon the tibiæ in repose, but are not received in grooves; the posterior tibiæ are, however, slightly expanded and broadly subangular externally. The claws are small, slender and abruptly bent behind the middle with an internal swelling at

base. The abdomen appears to be similar in structure in the sexes, the fifth segment ogival and longer than the three preceding combined. The prothorax is as wide as the elytra or very nearly, short and transverse, with the fine intromarginal line receding from the edge at the apical, as well as the basal, angles, and the scutellum is well developed and a little longer than wide. Our species may be defined as follows:—

- Elytra black throughout.....2
 Elytra castaneous 3
 Elytra and entire body pale testaceous.....4
 2—Head and sides of the pronotum pale in the male, entirely black in the female; legs red, the femora sometimes picescent; head and pronotum finely, sparsely punctate. Length 1.3–1.4 mm.; width 1.0–1.1 mm. Pennsylvania, North Carolina (Ashville) and Texas (Austin).....**pusillus** Lec.
 Var. A—Similar but slightly larger and with the punctures of the pronotum more distinct; body and legs black. Southern States....**puncticollis** Lec.
 Head pale in the male, the pronotum black throughout, with distinct but sparse punctation; legs red. Length 1.15–1.3 mm.; width 0.85–1.0 mm. California (southern) and Arizona (Tuçson).....**sonoricus**, sp. nov.
 3—Castaneous; middle of the prothorax and a narrow space at the base of the elytra piceous; head and legs yellow; pronotum with a few scattered punctures near the middle. Length [1.5 mm]. Sta. Catalina Island, coast of Southern California.....**catalinæ** Horn
 4—Similar to *pusillus* in form but very small and entirely testaceous. Length [0.8 mm]. Florida (Sand Point).....**pallidus** Lec.

I have seen no representative of *puncticollis*, *catalinæ* or *pallidus*. It is quite possible that the first may be a perfectly distinct species, as the length is given .07 inch by LeConte.

SCYMNILLINI.

In abdominal structure this tribe, which in some respects may be allied to the Orталиini, resembles the preceding and departs widely from the Hyperaspini or Scymnini; the ogival fifth segment is, however, shorter than in Ceneini, and is generally but little longer than the two preceding together, perfectly similar in the sexes, except that the fifth segment is more broadly rounded and a little shorter in the male. The body is oval, small to very minute in size, more or less pubescent or setulose, with the head strongly deflexed and deeply inserted in the prothorax, the latter obviously narrower than the elytra, abruptly so in *Zagloba*, deeply emarginate at apex, with narrowly reflexed side margins, the base feebly lobed before the scutellum, which is moderate in devel-

opment and subequilateral. The eyes are well developed, with their inner sides nearly straight and parallel, and having a narrow deep anterior emargination, the antennæ very short but apparently of eleven joints, inserted very close to the eyes, exposed at base, the clypeus narrowed and feebly sinuato-truncate. The fourth joint of the maxillary palpi is securiform throughout. The anterior coxæ are remotely separated, with the prosternum flat and devoid of carinæ, the apex feebly deflexed in some species of *Zagloba*, but not enough to afford protection to the trophi. The legs are perfectly free, the epipleuræ narrow and flat and devoid of any trace of impression, even the basal pit of *Scymnus* being rudimentary. The tibiæ are slender and can be folded back into a feeble femoral depression, the tarsi well developed and free, and the claws slender and apparently simple. The genera and species are few in number as thus far discovered. The genera may be defined as follows:—

- Metacoxal arcs small and short, semi-circular and either entire or failing to attain the base externally; body coarsely pubescent..... **Zagloba**
- Metacoxal arcs curving outward at a slight distance from the suture, and almost attaining the sides of the body, nearly as in the subgenus *Scymnobius*; body smaller in size and subglabrous..... **Scymnillus**

These genera are both represented in the more southern parts of the United States from the Atlantic to the Pacific.

Zagloba, gen. nov.

The body is broadly rounded or oval, and clothed rather plentifully above with moderately long erect or semi-erect bristling whitish hairs, which, on the elytra, stream irregularly, forming partial vortex-like arrangements of the pubescence. The species are rather few in number and are invariably mixed up in cabinets with *Scymnus*, from which they differ radically in abdominal structure. Their departure from *Scymnus* was recognized by Dr. Horn, but that author, neglecting to observe the abdomen, placed the only species thus far described in *Cephaloscymnus*, with which it has no real affinity, and no resemblance, except a slight similarity in the form of the eyes and prothorax. Our species known to me are as follows:—

- Metacoxal arcs entire, joining the base of the first segment..... 2
- Metacoxal arcs not attaining the base of the first segment externally; body broadly rounded. Atlantic regions..... 6
- 2—Body very broadly rounded; prosternum slightly deflexed at apex. California.... 3
- Body narrowly oval or oblong-oval, the prosternum perfectly flat and less remotely separating the coxæ. Atlantic regions..... 5

3—Metacoxal arcs extending to the middle of the segment, black, the elytra slightly piceous, each with two large nubilous pale areas; prothorax short and transverse, abruptly and distinctly narrower than the elytra, the sides feebly convergent and nearly straight to beyond the middle; elytra finely, sparsely, somewhat unequally punctulate, one-half wider than the prothorax. Length 1.7 mm.; width 1.25 mm. California (Sta. Cruz Mts). **ornata** Horn

Metacoxal arcs extending distinctly beyond the middle; elytral sculpture similar. 4

4—Prothorax only slightly and not very abruptly narrower than the elytra, the sides strongly convergent and evenly, strongly arcuate from base to apex; elytra oval, but little more than a third wider than the prothorax and rather longer than wide in the female, shorter in the male, piceous, each with two large nubilous pale areas. Length 1.6–1.8 mm.; width 1.25 mm. California (exact locality not recorded). **laticollis**, sp. nov.

Prothorax abruptly very much narrower than the base of the elytra, much smaller than in *laticollis*, the sides rather strongly convergent and nearly straight to the middle when broadly rounded; elytra pale testaceous, with a large basal subquadrate brown area on the suture which is emarginate at each side, at least two-thirds wider than the prothorax. Length 1.7 mm.; width 1.3 mm. California (Sonoma Co.) **orbipennis**, sp. nov.

Elytra oval, moderately convex, the stiff whitish pubescence of the upper surface very conspicuous; head and prothorax throughout pale rufo-testaceous, the elytra black; legs and abdomen testaceous, the latter blackish toward base; eyes black, not at all covered by the pronotum; prothorax only slightly and not very abruptly narrower than the elytra, the sides feebly convergent and arcuate, the apex much less deeply emarginate than in the preceding species; elytra longer than wide, rather narrowly rounded behind, finely, not densely and somewhat unequally punctate; metacoxal plates extending far beyond the middle. Length 1.5 mm.; width 0.9 mm. Florida (near Palm Beach). **bicolor**, sp. nov.

6—Very broadly rounded, moderately convex; head and prothorax testaceous, the latter broadly and nubilously blackish toward the middle, abruptly and conspicuously narrower than the elytra, with the sides feebly convergent, rounded at apex, the latter deeply emarginate; elytra black, shining, scarcely visibly punctulate, not as long as wide, rather narrowly rounded at tip; under surface piceous or paler, the legs testaceous; metacoxal arcs extending but slightly beyond the middle. Length 1.35–1.6 mm.; width 1.05–1.2 mm. Texas (Brownsville)—Mr. Wickham. **hystrix**, sp. nov.

Scymnillus Horn.

The members of this genus are all small, and number among them some of the most minute of the Coccinellidæ. The surface is apparently glabrous, but minute hairs can generally be discovered on the head or pronotum, and the elytra usually have some very small, erect and widely scattered setæ. The epistoma is very short before the antennæ. The three species before me may be thus outlined:—

Body oval, black, the abdomen piceous toward the edges, the legs blackish; head and pronotum quite strongly and closely punctured throughout, each puncture bearing a very short but distinct subdecumbent hair, short, transverse, the sides almost continuous, strongly convergent, evenly and moderately arcuate, the apical emargination moderately deep; elytra fully as long as wide, polished, glabrous, ogival at apex, minutely but distinctly, sparsely punctate, the humeral callus quite pronounced. Length 1.0-1.45 mm.; width 0.75-1.0 mm. California.

aterrimus Horn

Body very broadly rounded, minute and subglobular. 2

2—Piceous-brown, the median parts of the pronotum and sternum of the hind body more darkly shaded; legs pale; head minutely, sparsely punctate, each puncture with a short and inconspicuous hair; pronotum minutely, sparsely punctulate, subglabrous except near the abruptly reflexed lateral edges, where the hairs are erect, stiff and bristling, very much narrower than the elytra but with the sides almost continuous; elytra almost circular, glabrous and subimpunctate, about as long as wide. Length 0.85 mm.; width 0.72 mm. Bahama Islands (Eleuthera).

lateralis, sp. nov.

Black throughout, the legs not paler; body very broadly rounded, the head and pronotum finely but rather strongly, moderately closely punctulate, the former very feebly pubescent, the latter subglabrous, with a very few microscopic hairs, especially toward the sides, the latter nearly continuous, very strongly convergent, with the margin very minutely reflexed; elytra minutely but distinctly, sparsely punctulate, not as long as wide, extremely obtusely ogival at tip, glabrous. Length 0.78 mm.; width 0.65 mm. Bahama Islands (Eleuthera)—Mr. Wickham. **eleutherae**, sp. nov.

HYPERASPINI.

Besides the genera defined below, it is probable that *Tiphysa* and *Hinda*, distinguished by the elongate scutellum, can also legitimately enter this tribe, which is closely related to the Scymnini, but recognizable at a glance by the perfectly glabrous upper surface. The scutellum in all the genera mentioned below is well developed and equilatero-triangular. As a special peculiarity of this tribe, although evident to a generally less degree in Scymnini, it should be stated that the genital segment is greatly developed in both sexes, assuming almost perfectly the appearance of a true sixth segment in form and sculpture, and is more conspicuously developed than in any other tribe of the family—in the genus *Smilia*, however, which is somewhat aberrant among the Scymnini, forming a connecting link with the present tribe—in some respects, the genital segment is equally well developed, and it is also very strongly developed in the South African *Cranophorus*. In the males of *Hyperaspis* and probably *Helesius*, there is no visible segment beyond the sixth, but in *Brachyacantha* and *Hyperaspidium*,

there is a second supplementary segment in that sex. Although seven segments can thus be counted in the males and six in the females, there is no difficulty whatever in perceiving that the true abdominal segments terminate, as in all other tribes, with the fifth, and that the one or two additional are parts of the genital armature, and what might be termed pseudo-segments.

In the Hyperaspini, the fourth joint of the maxillary palpi is always strongly securiform, the eyes well developed and very finely faceted, the antennæ short and 11-jointed, and the legs rather short and stout, with the anterior tibiæ modified according to the genus. The anterior coxæ are narrowly or moderately separated, and the prosternum flat. The metacoxal plates are largely developed, attaining the first suture or very nearly, and frequently extend along the latter for some distance, then curved strongly forward but apparently never quite attaining the base externally. The genera are few in number, and those before me may be readily separated as follows:—

- Epipleuræ foveate for the tips of the hind femora 2
 Epipleuræ completely devoid of foveæ, narrow and flat 4
 2—Eyes with a small anterior emargination; anterior tibiæ not dilated beyond the middle but with an acute external edge, spinose externally at about basal two-fifths, without external apical plate but with an oblique double edge from the spine to the apex; tarsal claws with a large internal, pointed or subquadrate tooth at base; body very convex; epipleuræ very narrow, more or less horizontal; ornamentation well defined; prosternum not bicarinate. **Brachyacantha**
 Eyes entire; anterior tibiæ with an external plate delimited by an oblique cariniform line at apex; epipleuræ narrow but generally slightly descending externally; prosternum bicarinate between the coxæ; anterior tibiæ not spinose. 3
 3—Anterior tibiæ slender, the apical plate never more than feebly oblique toward the tip; claws with an internal quadrate tooth at base which is slightly variable in size; upper surface with clearly defined ornamentation [*Cleothesa* Muls., *Oxynychus* Lec.] **Hyperaspis**
 Anterior tibiæ thickened externally, especially beyond the middle, the apical plate very oblique toward the tip; claws simple, arcuate and slender; body with suffused coloration **Helesius**
 4—Anterior femora slender, without an apical external plate; tarsal claws simple, arcuate and slender; prosternum feebly bicarinate; ornamentation generally well defined **Hyperaspidius**

All of these genera, except *Helesius*, which is Sonoran, are widely distributed throughout the United States.

Brachyacantha Chev.

Next to *Hyperaspis*, this is the most abundant genus of the tribe,

and presents the same difficulties in regard to discrimination of the species. The male sexual characters of the abdomen are, however, much more pronounced and are frequently very valuable in defining closely related forms. The forms which seem to merit distinctive names may be defined as follows:—

- Elytra pale at base, or each with a pale spot near the middle of the basal margin. . . 2
 Elytra never conspicuously pale or maculate at base, except sometimes at the humeral angles. 12
- 2—Elytra each with five clearly defined and isolated pale spots, two basal, two in a transverse line very near the middle and one subapical, the humeral constant in both sexes. 3
 Elytra with the basal and lateral margin pale, and each with a discal pale spot. . . . 8
 Elytra black, with a basal and subapical pale spot but without a spot near the centre. 9
 Elytra pale, each with two black spots, one anterior and one posterior. 11
- 3—Spots generally separated from each other longitudinally by more than their own dimensions. 4
 Spots relatively larger, whitish, separated by their own diameter or less. 7
- 4—Basal spot almost fully circular, only slightly truncated by the basal margin; body small, elongate-oval, piceous-brown in color; head and subquadrate sides of the pronotum flavate in the female; elytra finely but strongly, sparsely punctate, polished, the spots nearly equal, moderately large, the subapical largest and the humeral smallest; under surface piceous; legs pale throughout. Length 1.9–2.1 mm.; width 1.3–1.45 mm. Indiana. **stellata**, sp. nov.
 Basal spot never much more than semi-circular, broadly truncated by the basal margin. 5
- 5—Male with the two median lobes of the basal black area of the pronotum narrowly rounded 6
 Male with the two median lobes broadly and rectilinearly truncate, the dividing spur of the apical pale margin short and very minute or obsolete, body more broadly oval than in *ursina* and more variable in size, finely punctulate; spots small, variable in size and form among themselves, the subapical usually the most conspicuous. Length 2.1–3.6 mm.; width 1.6–2.75 mm. North Carolina (Asheville). **congruens**, sp. nov.
- 6—Black area of the pronotum in the male more extended, its two approximate median lobes approaching rather close to the apical margin; elytral spots, except the humeral, well developed and subequal in size; body elongate-oval. Length 2.75–3.75 mm.; width 2.0–2.7 mm. Massachusetts, New York, Pennsylvania and Indiana. **ursina** Fabr.
- Black area less developed, the apex broadly pale even before the median lobes; elytral spots smaller and very unequal, the two median much smaller than the basal or apical; body smaller, with the punctures much less fine and notably sparser. Length 1.8–2.3 mm.; width 1.2–1.6 mm. Pennsylvania and Maryland. **10-pustulata** Melsh.

- 7—Form elliptical, the spots, excepting the humeral, subequal in width and isolated at about their own diameters or a little less; head and subquadrate side spot of the pronotum pale in the female, the surface finely, rather closely punctate and fully three-fourths longer along the median line than at the sides; elytra finely, sparsely punctate, piceous-black; legs pale. Length 2.7 mm.; width 2.0 mm. Texas (Brownsville)—Mr. Wickham.....**testudo**, sp. nov.
- Form very broadly rounded, the basal spot of the elytra broader than the discal and with a tendency to join the latter; spots all very large and relatively narrowly separated; pronotum in the male one-half longer at the middle than at the sides, broadly pale anteriorly, the two median lobes of the black area not much advanced and broadly rounded; punctures fine and sparse; under surface black, the abdomen piceous; legs pale throughout. Length 2.5 mm.; width 2.1 mm. Texas (Dallas).....**bolli** Cr.
- 8—Oblong-oval, black, the head and oblique sides of the pronotum angularly lobed within at the middle, pale in the female, the apical margin also very narrowly pale, the prothorax two-thirds longer at the middle than at the sides, finely, sparsely punctate; elytra with a narrow rufo-flavate margin from the scutellum to the sides, narrowest at outer two-fifths, the lateral margin obliquely pale at the humeri, the pale side margin extremely narrow at basal fourth, then dilated to outer fourth at the middle opposite the discal pale spot, then narrowed at apical fourth, thence gradually expanded and extending transversely to within two-thirds of its apical width of the suture, receding somewhat from the side margin as in the *fimbriolata* group of *Hyperaspis*; punctures fine but strong, moderately sparse, closer near the base; under surface black throughout, the femora blackish, paler at apex. Length 4.1 mm.; width 3.0 mm. Colorado (Beaver Brook—6000 feet elevation).....**illustris**, sp. nov.
- 9—Elytra with the median marginal spot; basal, marginal and subapical very nearly equal in size, rufo-flavate, the humeral spot wanting at least in the female; head and pronotal sides broadly pale in that sex, the apical margin very narrowly; upper surface black, polished, finely, sparsely punctate. Length 2.8 mm.; width 2.0 mm. Georgia.....**flavifrons** Muls.
- Elytra without either of the median spots..... 10
- 10—Broadly rounded, polished, finely, rather sparsely punctate; male with the head yellow, the prothorax pale with a basal black area extending to lateral eighth or ninth of the base, approximately bilobed in the middle, extending to apical fourth or fifth; basal spot of the elytra more than semi-circular, the subapical slightly larger, the humeral spot oblique; female with the head black, the front nubilously paler in V-shaped design, the pronotum black throughout, except a very narrow margin about the apical angles; elytra similarly maculate, except that the humeral spot is wanting. Length 3.2-3.6 mm.; width 2.5-2.75 mm. Massachusetts and Indiana; [*confusa* Muls. ♂, *quadripunctata* Melsh. ♀ and *diversa* Muls. ♀].....**basalis** Melsh.
- Less broadly rounded and much smaller; head and tips of the apical pronotal angles piceous in the female, the remainder black, finely not closely punctate; elytra with a rufo-flavate pale area at base, extending rather beyond basal third from the lateral margin nearly to the scutellum, truncate behind, rounded and receding

somewhat from the basal margin internally, the subapical spot oval, adjoining the limb and distant nearly half its width from the suture. Length 2.4 mm.; width 1.8 mm. Florida **querceti** *Schz.*

11—Narrowly oval, finely, not closely punctulate, with flavate pale areas; male with the head pale, the pronotum black, with a very narrow pale apical margin perfectly even in width but gradually wider from the eyes and extending to the basal angles, the black area with a feeble angular extension at apical third; scutellum black; elytra pale, the suture more or less broadly black from a short distance behind the scutellum, narrowest just behind the middle, extending at apex anteriorly along the sides very narrowly to about apical third, also with a triangular black spot involving the callus and another, rounded but posteriorly sinuate, behind apical third at outer third of the width; under surface black throughout. Length 3.2 mm.; width 2.2 mm. Kansas **albifrons** *Soy*

Narrowly oval, with flavate pale areas anteriorly, reddish on the elytra, finely, not closely punctulate; male with the head pale, the pronotum black in a basal area between the basal angles, the anterior margin of which curves evenly from the basal angles to anterior third at lateral two-fifths, then feebly sinuate and then extending forward in two rounded lobes separated by a narrow deep fissure to apical fifth or sixth; scutellum black; elytra pale, the suture more or less broadly black from the scutellum to the apex, narrowly at the scutellum and for a short distance just behind the middle, the external marginal bead also black, becoming broader at the apex and joining the sutural black area; anterior black spot obliquely oval, sending off a nubilous connecting isthmus to the sutural black area, the posterior spot smaller, at apical and outer third; under surface black throughout, the posterior femora in great part black, the intermediate less so. Length 3.7 mm.; width 2.4 mm. California (Sta. Monica).

pacifica, sp. nov.

12—Elytra each with two transversely confluent pale spots before the middle and a subapical spot 13

Elytra each with three small, widely isolated pale spots 15

13—The confluent pale spots very nearly separated; male with a pale oblique humeral spot which is absent in the female; head pale in the male, the pronotum pale, with a large and abruptly defined median black area from the base to apical fifth or sixth, deeply emarginate at each side; female with the head pale, sometimes narrowly darker at the edges, the pronotum similarly colored, the margins of the black area less sharply defined as usual and extending nearly to the apical margin. Length 2.9–3.7 mm.; width 2.1–2.8 mm. Texas (Brownsville)—Mr. Wickham **decora**, sp. nov.

The spots very broadly confluent, forming a fascia slightly emarginate on both sides. 14

14—The fascia a third as wide as the length of the elytra, broadening within, broadly truncate opposite the suture; subapical spot very large, extending along the limb, the marginal bead black; head in the female pale throughout, the pronotum very broadly and intero-angulately pale at the sides. Length 5.2 mm.; width 3.6 mm. Kansas **socialis**, sp. nov.

The fascia not more than a fourth or fifth as wide as the length of the elytra, the sexes perfectly similar throughout in coloration; head black, with a very large pale

area, the pronotum black, with an angulate lateral pale spot; elytral fascia parallel-sided and slightly oblique externally, the subapical spot oval and slightly distant from the limb; male with the abdomen impressed along the middle toward tip and with the third segment medially bicuspid as usual in this group. Length 4.2-4.75 mm.; width 2.8-3.2 mm. Arizona.....**dentipes** Fabr.

- 15—Body very much smaller; male with the head and pronotum pale yellowish-white, the latter with a basal black area extending to lateral fifth or sixth, the median part feebly bilobed and extending to apical fourth or fifth; elytral spots small, at the margin slightly behind basal third, near the apex and further from the suture than limb, and at basal third and inner two-fifths; under surface black, the legs rather slender and pale; sexual characters feeble. Length 2.5 mm.; width 1.75 mm. Rhode Island.....**indubitabilis** Cr.

Lepida is not represented in the material before me and *bistripustulata* (= *erythrocephala*) is represented by *decora* of the table; the second is allied to *dentipes* but in the typical form has the two ante-median spots separated, the inner the larger. The species from *stellata* to *bolli* are more or less close derivatives of the *ursina* type and those from *socialis* to *dentipes*, probably including *tau* and *quadrillum*, which I have not examined, may be considered as subspecies of the *dentipes* type, but in each case the peculiarities of form, size or ornamentation hold good through extended series. In fact, as in many other parts of the Coccinellidæ, we may have a succession of what can only be regarded as distinct forms, with all the fixed characteristics of species, having an identical general scheme of ornamentation. This is evident also in many other parts of the Coleoptera as in *Cicindela*, *Omophron* and *Heterocerus*. Ornamentation may become in other words as important a generic structural character as any other special modification. In the present tribe there is even an intergeneric similarity or parallelism of ornamentation, as shown in *B. decempustulata* and *Hyperaspis troglodytes*, which can scarcely be mutually distinguished superficially, and the same is well known in *Chilocorus* and *Exochomus*, showing that ornamentation in the Coccinellidæ has been evolved for a useful purpose and that it should form a correspondingly important criterion in classification.

Hyperaspis Chev.

The tarsal claws seem to vary gradually and between somewhat narrow limits in this genus, being occasionally almost simple, but I do not find this character to be of much importance in classification and have therefore not employed it at all. The comparative definition of the species is difficult, as there is little or no structural variety and the

two sexes frequently differ in coloration. In adopting type of coloration as a primary taxonomic character however, this is restricted below to the patterns of the elytra, as sexual divergencies in ornamentation are almost exclusively confined to the head and prothorax, which are very often in part pale in the male and entirely black in the female. In fact this seems to be the only possible means of distinguishing the males from the females, as the external structure of the abdominal apex is very nearly similar in the two sexes. The species are numerous and those known to me may be distinguished as follows:—

Body very broadly rounded and strongly convex2
 Body elongate-oval or oblong-oval and frequently more depressed.....15
 2—Elytra black, with a pale red margin not attaining the sutural angles and with which a rounded discal spot is broadly confluent a little behind the middle; elytra strongly and moderately closely punctured. Length 3.0 mm. Illinois.

bolteri *Lec.*

Elytra black, with three marginal or submarginal pale spots.....3
 Elytra black, with a short marginal vitta from the humeral angle, a submarginal oval or rounded spot near the apex and another at or near the middle and near inner third of the width, the latter obsolete in var. *omissa*.....4
 Elytra black, with a single marginal or submarginal spot far behind the middle or near the apex.....7
 Elytra black, with two marginal or submarginal pale spots, the anterior of which is not basal.....8
 Elytra black, without marginal or submarginal spots but with a single spot near or behind the centre of the disk.....10

3—Black, shining, finely but distinctly punctate, the pronotum closely, the elytra rather sparsely; head black, the pronotum with a quadrate lateral spot almost as wide as long; elytra with a humeral marginal vitta between two and three times as long as wide in less than basal third, an internally rounded marginal spot just behind the middle, a rounded subapical spot equidistant from the margin and suture and a spot on the disk at basal two-fifths and inner third or fourth, which is rounded but with its anterior edge broadly sinuate; legs black, the tibiæ and tarsi pale, the posterior tibiæ blackish; sides of the abdomen narrowly reddish. Length 2.8 mm.; width 2.2 mm. Arizona.....**8-notata**, sp. nov.

Black, shining, the pronotum finely and not very closely punctulate, the elytra more strongly and quite sparsely punctate; head pale, the basal third black; pronotum with a very narrow parallel pale side margin; elytra with a very small narrow humeral, and a slightly larger but narrow and parallel post-median, yellow spot, and a large subapical spot nearer the margin than the suture, also with a small elongate-oval spot just before the middle and at inner two-fifths; legs pale piceous, the hind thighs darker; abdomen not visibly pale at the sides. Length 2.15 mm.; width 1.55 mm. Nevada (Reno).....**notatula**, sp. nov.

4—Humeral vitta very narrow and inwardly prolonged along the base for a short distance, terminating posteriorly just before the middle; male with the head and a

narrow parallel side margin and very fine apical margin of the pronotum yellow, the female with the head and pronotum black throughout, the latter very finely but rather closely punctate; elytra very finely and rather sparsely punctured; abdomen black throughout; legs black, the anterior tibiae and tarsi pale. Length 2.7-3.2 mm.; width 2.0-2.35 mm. Montana (western)—Mr. Wickham.

montanica, sp. nov.

Humeral vitta broad, not inflexed along the basal margin, the pale spots generally deep red. 5

5—Male with the head and a triangular marginal spot and very fine apical margin of the pronotum pale, the female with the head and pronotum black, the latter with a narrower triangular marginal spot pale, the apical margin not at all paler; humeral vitta terminating at basal two-fifths; abdomen margined with testaceous throughout; legs in great part pale. Length 3.2-3.4 mm.; width 2.35-2.6 mm. Arizona.

pinguis, sp. nov.

Male with the head and a narrow parallel lateral margin and more or less fine apical margin of the pronotum pale, the female with the head and pronotum throughout black; humeral vitta extending to the middle. 6

6—Form very short and broad, the apical pale pronotal margin of the male very distinct, about half as wide as the lateral pale border; elytral punctures sparse and fine but distinct, the discal pale spot at the middle of the length; eyes blackish. Length 2.6-3.0 mm.; width 2.15-2.4 mm. Texas (El Paso). **lateralis**, *Muls.*

Var. A—Similar to *lateralis* in form, size and disposition of markings, except that the discal spot near the middle is wholly obsolete. Arizona (Grand Cañon of the Colorado)—Dr. Prudden. **omissa**, n. var.

Form less dilated, the pronotal apex exceeding finely pale in the male, the elytral punctures extremely minute and still sparser, the discal spot slightly in front of the middle; eyes bright green. Length 2.8 mm.; width 2.2 mm. California (San Diego). **laevipennis**, sp. nov.

7—Elytra each with a rounded subapical spot three times further from the suture than from the margin, the spot rather large, circular and reddish; pronotum finely but distinctly, rather sparsely punctured, having a wide internally rounded marginal spot in both sexes, the head pale in the male and black in the female; elytra quite strongly and not closely punctured; legs black. Length 2.7-2.9 mm.; width 2.1-2.25 mm. New York (Adirondacks) and Indiana [*guexi* Muls.] **bigeminata** *Rand.*

Elytra each with a smaller and generally yellowish irregularly rounded pale spot near the apex, twice as far from the suture as from the margin, and also a larger deep red rounded spot just before the middle and a little nearer the margin than the suture; head and prothorax black throughout in the female; punctures smaller than in *bimotata*; the prothorax more transverse. Length 2.7 mm.; width 2.1 mm. Northern Atlantic States **signata** *Ol v.*

Elytra each with a very small rounded disco-marginal spot at posterior third of the edge, and another similar in the same transverse line at inner third at posterior fifth viewed vertically, also with a much larger rounded spot just before the middle and just visibly nearer the margin than the suture, the spots deep red and the exterior of the two posterior frequently almost obsolete; pronotum with a

moderately wide internally rounded yellow marginal spot, the head apparently black in both sexes. Length 2.0-2.7 mm.; width 1.6-2.0 mm. Rhode Island, Pennsylvania, North Carolina (Asheville) and Indiana—also a specimen from Las Vegas, New Mexico, which represents a slight variety (*trinifer* n. v.), still more broadly oval, with yellow elytral spots, the two posterior but little smaller than the anterior..... **proba** Say

Elytra each with a large elongate pale spot along the margin, extending from a little behind the middle to apical fifth or sixth of the edge, internally rounded in outline, the apical edge narrowly picescent thence to the sutural angle, also with a large oval spot, slightly longer than wide, just before the middle at inner two-fifths; pronotum black, with a very broad internally rounded marginal pale spot and narrow pale apical margin; head entirely pale; pale areas very pale straw color throughout; legs throughout and posterior half of the abdomen pale, the latter dusky toward the middle. Length 2.15 mm.; width 1.7 mm. Texas (Brownsville)..... **rotunda**, sp. nov.

8—Elytra with a parallel marginal vitta extending from basal fifth to three-fifths of the length and more than twice as long as wide, also with a large and rounded but antero-laterally sinuato-truncate spot near the apex, equidistant from margin and suture, and a large oval and feebly oblique spot at basal third, less than half as far from the suture as from the margin; head pale; pronotum with a very broad and internally angulate pale margin and a narrow pale apical margin joining the lateral pale areas, the latter yellowish-white throughout; punctures moderately distinct; under surface black throughout, the legs in great part pale. Length 2.2 mm.; width 1.6 mm. Texas (Brownsville)—Mr. Wickham.

gemma, sp. nov.

Elytra without a marginal vitta but with a rounded pale spot at or near the middle.. 9

9—Marginal pale spot just before the middle; each elytron also with another similar in size near the apex and very near the edge, less than half as far therefrom as from the suture, also with a slightly larger rounded spot a little before the middle and half its width from the suture; head pale; pronotum black, with a broad marginal spot as wide as long, broadly rounded internally, the apex not at all pale; punctures quite deep and strong but only moderately close-set; under surface of the hind body black, the abdomen pale at the limb throughout; legs very pale throughout; ornamentation yellowish-white. Length 1.8-2.1 mm.; width 1.4-1.6 mm. Texas (Brownsville)—Mr. Wickham. **medialis**, sp. nov.

Marginal pale spot slightly behind the middle small, each elytron also with a still smaller transversely oval subapical spot, almost as far from the margin as from the suture, and a small rounded discal spot, distinctly before the middle and slightly nearer the suture than the margin; head pale; pronotum with a narrow pale lateral margin slightly narrowed to the base, the inner margin straight; apex not pale, the pale areas reddish-yellow; punctures fine; under surface black, the abdomen paler at the edges, broadly behind; legs in great part piceous. Length 2.3 mm.; width 1.8 mm. Arizona (Benson)—Mr. Dunn.

triangulum, sp. nov.

10—Discal spot of each elytron irregular in form, red, extending from basal fourth to apical fifth and from inner to outer fourth of the width, obliquely truncate an-

teriorly, subparallel for less than half its length, then rapidly and rectilinearly narrowed to a blunt point; head black; pronotum black, with a moderately wide yellow side margin longer than wide and broadly rounded internally, the apex not pale; punctures very fine but rather close-set; under surface black; anterior tibiae and tarsi pale. Length 3.0 mm; width 2.2 mm. Florida (Jacksonville).

regalis, sp. nov.

Discal spot circular or oval in form. 11

11—The spot situated slightly before the middle of the length 12

The spot circular, moderate in size and situated more or less distinctly behind the middle 14

12—The spot obliquely oval from the base outwardly. 13

The spot rather small, circular or very nearly; head and pronotum black throughout in the female, the latter margined at tip and sides with yellow in the male, finely but strongly, rather closely punctured, the elytral punctures strong and sparser, the spot before the middle and rather nearer the margin than the suture, red in color. Length 2.0–3.8 mm.; width 1.7–3.1 mm. New Hampshire, Pennsylvania, Maryland, Indiana and Wisconsin; [*signata* Lec. nec Oliv., *normata* Say, *affinis* Rand. and *leucopsis* Mels.] **binotata** Say

13—The spot extending from basal two-fifths and inner two-fifths to apical three-fifths and outer five-sevenths; pronotum of the female with a subparallel yellow margin. Length "3.3 mm.; width 2.6 mm." L'Amérique septentrionale—Dejean. **inedita** Muls.

The spot extending from basal fourth and inner third to three-fifths of the length and outer third, red in color; head and pronotum of the female entirely black throughout; punctures very fine and inconspicuous, moderately sparse; under surface black. Length 2.3 mm.; width 1.9 mm. Texas (Austin).

bicentralis, sp. nov.

14—The spot just visibly behind the middle and equidistant from the suture and margin; male with the head pale, the pronotum black, with a narrow apical and broad lateral margin pale, the latter feebly arcuate internally, the female with the head and pronotum black, the latter having a pale, internally rounded side margin, as wide as that of the male; punctures fine but strong and close-set; legs pale, the femora blackish; ornamentation yellowish-white in color. Length 1.9 mm.; width 1.45 mm. Texas (Brownsville)—Mr. Wickham.

globula, sp. nov.

The spot just before apical third and distinctly nearer the margin than the suture; head pale, the pronotum black, with narrow apex and broad side margin pale, the latter rather wider than long and internally rounded; punctures rather fine but strong, moderately sparse; legs red throughout; ornamentation dark yellow in color. Length 2.5–3.2 mm.; width 1.9–2.5 mm. Texas (Brownsville)—Mr. Wickham **wickhami**, sp. nov.

15—Elytra without a discal spot near the middle. 16

Elytra with a discal spot at or near the middle 33

Elytra with a discal vitta which is occasionally more or less obsolete, and, in *simulans* altogether wanting, the elytra being black without indication of subapical pale spot; sides of the pronotum narrowly pale. 38

- 16—Elytra with a pale marginal vitta which is sometimes abbreviated or resolved into three spots, of which only the middle one remains in several instances..... 17
 Elytra without a marginal vitta or median marginal spot but with a subapical pale spot..... 27
- 17—Elytra without ornamentation, other than a circular spot very slightly behind the middle and adjoining the side margin..... 18
 Elytra without ornamentation, other than a basal marginal vitta extending to slightly behind the middle..... 19
 Elytra each with three widely separated marginal or submarginal spots 20
 Elytra with an internally sinuate marginal vitta, extending from the base to distinctly behind the middle, and, in addition, with a large transversely oval subapical spot..... 21
 Elytra with a continuous or subcontinuous marginal vitta, bisinuate within and not attaining the sutural angle..... 22
- 18—Lateral spot larger, yellow, nearly two-fifths as wide as the elytron; pronotum of the female black, with a very narrow faint pale streak at the margin anteriorly, finely, sparsely punctate, the sides moderately convergent; head nearly as wide as an elytron, black. Length 2.5 mm.; width 1.8 mm. California (Siskiyou Co.).
osculans Lec.
- Lateral spot very small and reddish, scarcely more than a sixth as wide as the elytron; pronotum of the female black throughout, strongly and closely punctate, the sides strongly convergent; head black, very much narrower than an elytron; head of the male pale, the side margin of the pronotum also narrowly pale from the apex to basal third. Length 1.75-2.3 mm.; width 1.5-1.7 mm. Texas (El Paso).
pleuralis, sp. nov.
- 19—Marginal vitta extending from very near the basal margin for two-thirds the length, much dilated internally and with rounded outline in its posterior two-thirds, the dilated part emitting a slender transverse spur extending to inner third of the width; elytral punctures fine and sparse but rather strong; head and pronotum black throughout in the female. Length 2.6 mm.; width 1.8 mm. California (San Diego)..... **tænolata** Lec.
- Marginal vitta beginning at about its own width from the basal margin and continuing to apical two-fifths, only feebly dilated internally with rounded outline posteriorly; elytral punctures minute and sparse; head and pronotum black throughout in the female; body more narrowly oval than in *tænolata*. Length 2.4 mm.; width 1.65 mm. Nevada (Reno)..... **nevadica**, sp. nov.
- 20—Basal spot rounded, not quite enveloping the basal margin, prolonged posteriorly for a short distance by a rapidly and acutely acuminate spur which is medial with reference to the spot and not marginal; second spot at the middle larger and semi-circular internally; subapical spot smaller than the medial, transversely oval, slightly nearer the limb than the suture but quite distant from both; punctures sparse and fine; head and pronotum black throughout in the female. Length 2.2-2.35 mm.; width 1.65 mm. California (Alameda).
psyche, sp. nov.
- 21—Marginal vitta extending from very near the base to apical third, gradually narrowed from its base for two-thirds its length and then expanded with rounded

- internal outline; subapical spot rather large, transversely oval, very close to the limb and about twice as far from the suture; punctures fine and sparse but rather strong; head and pronotum black throughout in the female. Length 2.6 mm.; width 1.8 mm. California (Siskiyou Co.)..... **dissoluta** Cr.
- 22—Apical extremity of the marginal vitta not anteriorly extended; head and narrow apical and lateral margin of the pronotum pale in the male..... 23
- Apical extremity of the vitta greatly expanded, truncate along the suture and prolonged anteriorly for some distance..... 26
- 23—Posterior of the two internal sinuosities rounded and forming an angle which is more than right, the vitta varying but little in width throughout its length.... 24
- Posterior internal sinus angulate and right or less in extent, the vitta rather broad and more irregular in width..... 25
- 24—Marginal vitta wide, deflecting but very narrowly from edge posteriorly. Length 2.0-2.7 mm.; width 1.4-1.9 mm. Colorado, Texas, Arizona and California [*rufomarginata* Muls.]..... **fimbriolata** *Melsk.*
- Marginal vitta narrow, deflecting widely from the edge posteriorly; body smaller and more narrowly oval. Length 1.8 mm.; width 1.25 mm. California (San Diego).
limballa, sp. nov.
- 25—Median part of the vitta moderately arcuate internally, the apical part generally not tending to separate as a spot, but in one male the apical part is wholly detached as a subapical spot, and, in another male, the median part emits a broad angulate spur extending transversely to inner two-fifths, nearly as in *teniata*; body more broadly oval than in *fimbriolata* or *teniata*, and with a smaller, more rapidly narrowed prothorax. Length 2.0-2.5 mm.; width 1.4-1.9 mm. Arizona (Grand Cañon of the Colorado)—Dr. Prudden..... **cincta** *Lec.*
- Median part of the vitta strongly but evenly rounded internally, the apical part much narrower, departing more from the edge than in *cincta* and always semi-detached; body smaller and more narrowly oval than in *cincta*. Length 1.9-2.0 mm.; width 1.3 mm. California (Humboldt Co.)..... **nupta**, sp. nov.
- 26—Larger, evenly elliptical, the marginal vitta reddish, rather broad, only feebly dilated internally at the middle but strongly at its sutural termination, the internal sinuosities rounded; posterior part deflecting but narrowly from the edge; punctures strong; head and pronotum black throughout in the female. Length 2.6-2.75 mm.; width 1.8-1.95 mm. Dakota—Mr. Wickham.
inflexa, sp. nov.
- 27—Upper surface moderately convex, the elytral punctures more or less fine and sparse..... 28
- Upper surface depressed, the elytral punctures strong and close-set..... 32
- 28—Subapical spot bright yellow and sharply defined..... 29
- Subapical spot very small, darker or obscure yellow and with nubilate outline... 31
- 29—Body elongate-subelliptical, the prothorax more transverse and less narrowed from base to apex, the sides narrowly yellow in the female with rounded inner outline; subapical spot of the elytra large, triangular and outwardly pointed, its margin parallel and close to the limb. Length 2.9 mm.; width 1.8 mm. California (locality not indicated)..... **elliptica**, sp. nov.
- Var. A—Body equally or even more distinctly elongate-elliptical, the narrow yellow margin at the sides of the pronotum in the female narrower, parallel,

- not quite attaining the base and with its inner outline nearly straight; subapical spot small, transversely and evenly oval, remote from the limb and nearly twice as far from the suture. Length 2.65 mm.; width 1.65 mm. California (Mendocino Co.).....**angustula**, var. nov.
- Body more briefly oval, with more arcuate sides; subapical spot transversely oval; size smaller..... 30
- 30—Subapical spot large, its antero-lateral outline irregular, approaching close to the limb anteriorly; head yellow in the male as usual, the pronotum narrowly yellow at the sides in both sexes; elytral punctures fine and sparse. Length 2.3-2.75 mm.; width 1.6-2.0 mm. California (Siskiyou Co.).....**postica** Lec.
- Subapical spot small, evenly and transversely oval, parallel to the limb and but slightly less distant therefrom than from the suture; size smaller; coloration of the head and prothorax similar; elytral punctures fine but much stronger and a little closer. Length 1.8-2.0 mm.; width 1.2-1.35 mm. California (Humboldt and Siskiyou Cos.),.....**oculaticauda**, sp. nov.
- 31—Obtusely oval, the head pale in the male but sinuately black at base, the pronotum black with a narrow parallel pale side-margin; elytra sparsely and very finely punctate, the subapical spot small, transversely oval, twice as wide as long, remote from the limb and one-half further from the suture; legs piceous-brown. Length 2.0 mm.; width 1.4 mm. California (Placer Co.)...**effeta**, sp. nov.
- 32—Evenly elliptical, subdepressed; sides of the pronotum in the female narrowly yellow, with somewhat irregular and nubilate inner outline; elytra black, strongly punctate, with feeble nubilous marginal pale streak at the humeral angles and a very small, transversely oval, obscure yellowish and nubilous subapical spot remote from the limb and still more distant from the suture; under surface piceous. Length 2.3 mm.; width 1.6 mm. California (Alameda).
subdepressa, sp. nov.
- 33—Elytra with a pale spot very near the basal margin and inner third..... 34
- Elytra without a subbasal pale spot, the subcentral spot generally more or less elongate-oval..... 35
- 34—Punctures of the elytra fine; head and a narrow lateral and apical margin of the pronotum pale in the male; elytra with a humeral and a median elongate marginal spot and another, transversely oval and subapical, also with an elongate spot just behind the middle and nearer the suture than the margin. Length 2.5 mm.; width 1.7 mm. Massachusetts and Lake Superior.....**disconotata** Muls.
- Punctures of the elytra rather coarse and deeply impressed, somewhat sparser; ornamentation somewhat similar to the preceding, except the spots are less elongate and the subcentral one rounded; size smaller. Length 2.2 mm.; width 1.55 mm. Rhode Island; [*discreta* Lec.].....**troglydotes** Muls.
- 35—Elytra with a narrow, internally sinuate marginal pale vitta extending two-thirds to three-fourths from the base, the vitta frequently wholly wanting..... 36
- Elytra with an entire marginal vitta, internally bisinuate, not extending quite to the suture and which is never wanting but sometimes resolved by individual variation into three separate spots..... 37
- 36—Subapical spot smaller and slightly elongate-subquadrate, less distant from the suture than from the limb; discal spot at basal third almost equidistant from suture and margin, the punctures fine and rather close-set; head and pronotal

- apex narrowly, and sides more broadly with angulate inner outline at the middle, pale in the male. Length 2.65 mm.; width 1.8 mm. Massachusetts; [*venustula* Muls., *jucunda* || Lec. and *lecontei* Cr.]..... **lugubris** Rand.
- Subapical spot larger, slightly transverse, much nearer the limb than the suture; discal spot but slightly before the middle and somewhat nearer the suture than the margin; punctures not coarse but strongly impressed, moderately sparse; head and a narrow parallel pronotal side-margin pale in the male, the female having the pronotal sides similar to the male but with the head black. Length 1.9-2.7 mm.; width 1.3-1.8 mm. California (Los Angeles to Sonoma Co.); [*horni* Crotch and *elegans* Gorh. nec Muls.]..... **4-oculata** Mos.
- 37—Marginal pale vitta broader, deeply bisinuate within; size larger. Length 2.0-2.7 mm.; width 1.4-1.8 mm. Rhode Island, New York, Pennsylvania, Indiana, Iowa and Wisconsin; [*elegans* Muls., *maculifera* Melsh. and *guttifera* Weise]..... **undulata** Sey
- Marginal pale vitta narrow and very feebly bisinuate within; size much smaller, the pronotum more alutaceous, with the apex and side margin similarly pale in the male. Length 1.6 mm.; width 1.0 mm. Florida..... **paludicola** Schs.
- 38—Elytra with a well-marked and constant, internally and feebly bisinuate pale margin, not quite extending to the suture, and a generally constant discal vitta, extending from very near the basal margin near the middle obliquely toward the sutural angle.....39
- Elytra without a well-defined and continuous marginal pale vitta, the discal vitta wholly obsolete or only distinct posteriorly.....40
- 39—Discal vitta joining the marginal near the sutural angles; body larger and less narrowly oval. Length 2.3-2.6 mm.; width 1.6-1.75 mm. California (San Francisco)..... **annexa** Lec.
- Discal vitta not joining the marginal but separated therefrom near the sutural angles by a space not as wide as its own width; elytra more obtusely subtruncate at tip. Length 2.2 mm.; width 1.35 mm. Kansas..... **4-vittata** Lec.
- 40—Elytra with remnants of the discal vitta behind the middle, sometimes with three narrow and feeble marginal spots, the margin frequently black throughout; body more depressed. Length 2.1 mm.; width 1.4 mm. Lake Superior; [*consimilis* Lec.—*Oxymychnus*]..... **moerens** Lec.
- Elytra wholly without pale markings of any kind, except a narrow suffused humeral streak at the margin; prothorax relatively more elongate along the median line. Length 2.1 mm.; width 1.5 mm. Arizona..... **simulans**, sp. nov.

I have been unable to examine any exponents of *cruentata*, *lewisi*, *tædata*, *gemina*, *pratensis*, *punctata*, *tristis* or *floridana*, following the order of the most recent table of LeConte (Trans. Am. Ent. Soc., VIII, 1880, p. 186), but in assigning them to places in the above table would venture to place the first immediately after *tæniata*, *lewisi* and *pratensis* after *pleuralis*, *tædata* after *regalis*, *gemina* after *proba*, *punctata* after *paludicola* and *tristis* after *effeta*, with which it is evidently very closely related. *Floridana* cannot be identified.

In the above arrangement it is evident that the species from *montanica* to *lævipennis* are close derivatives of the *lateralis* type, that those from *tæniata* to *inflexa* are close, and those from *elliptica* to *subdepressa*, but slightly less close, derivatives of the *fimbriolata* type, and further, that those from *disconotata* to *paludicola*, and then from *annexa* to *simulans*, are also more or less closely related to the same type. Most of the others are rather isolated in relationship, except, perhaps, *signata* and *binotata*, which may possibly be varietal forms of one type, but I have no evidence to prove this and have never seen a series from any one locality which contained the two forms intermingled. There is before me a large series of *binotata* collected in Indiana, not one of which has a vestige of the subapical spot, and my only representative of *signata* was taken in a wholly different region.

Although it is possible that many of the forms in the table above may prove to be more properly subspecies of a few type forms, which could only be definitely determined by future collecting and careful investigation, they are at least apparently worthy of distinctive names for future reference, and that is all that can be positively affirmed at present; anything else would, in the absence of evidence, be mere speculation and individual opinion. The genus is an extremely difficult one so far as the differentiation of species is concerned.

Helesius, gen. nov.

The two species for which this generic group seems to be desirable, differ from *Hyperaspis* in having the anterior tibiæ thickened externally, and in having a suffused coloration, devoid of any trace of the abruptly defined pale areas of that genus. They may be defined as follows:—

Form oval, strongly convex, moderately shining, the head and prothorax rufo-piceous, the latter gradually black toward the middle, finely but distinctly, rather closely punctulate, more closely so toward the sides, the length at the middle nearly one-half greater than at the sides, the base evenly rounded in circular arc; elytra barely as long as wide, the sides continuous with those of the prothorax, evenly rounded behind, very minutely, sparsely and obsoletely punctulate, black throughout; under surface piceous, the legs rufo-piceous. Length 2.7 mm.; width 1.8 mm. Texas (Brownsville)—Mr. Wickham.....**nubilans**, sp. nov.

Form oblong-oval and less convex, shining, the pronotum alutaceous in one sex, the head and prothorax rufous, the latter minutely punctulate, more strongly and closely toward the sides, the latter nearly three-fourths as long as the median length, the base broadly rounded or subparabolic; elytra longer than wide, the sides feebly arcuate, the base not quite as wide as the base of the prothorax, the apex very obtusely rounded, black or paler, minutely and sparsely but distinctly punctulate; under surface and legs pale. Length 2.3 mm.; width 1.4 mm. Colorado (Florissant).....**nigripennis** Lec.

The latter of these species was described as a *Scymnus* by its author, under the supposition probably that the pubescence had been accidentally removed; the example before me is slightly smaller than the type.

Hyperaspidium Crotch.

This is an aberrant genus in the present tribe, in having the elytral epipleuræ devoid of depressions for the posterior femora, although in every other feature it is perfectly normal. The type of ornamentation differs from anything observed in *Hyperaspis* or *Brachyacantha*, and the species are much smaller as a rule. The absence of epipleural foveæ shows that the presence or absence of this character is not so important in itself as it has been assumed to be, and that it is not necessarily a tribal character at all; this is shown also in the Chilocorini, and the same statement can be made regarding the structure of the tarsal claws. The epipleural depression in the Hyperaspini never assumes the form of an abruptly excavated pit, as it does in some ptnids and to some extent in *Delphastus*. The species are few in number and may be defined as follows:—

Elytra with a pale discal vitta not joining the marginal pale area.....2
Elytra with the discal vitta entirely wanting.....3
Elytra with the discal and marginal vitta largely united, leaving merely an elongate

black spot from the callus.....4

Elytra completely pale.....5

Elytra black, with suffused humeral and subapical pale markings.....6

♂—Head and pronotum pale in the male, the latter with the basal margin to lateral fourth and two median dashes, converging posteriorly and united with the dark basal area, piecous-black, black in the female, with a narrow lateral margin of the pronotum pale; elytra in both sexes fully as long as wide, oblong, subtruncate, finely, rather sparsely punctate, with a pale yellowish-white basal margin, continued along the sides and apex very nearly to the sutural angle, receding slightly from the edge at apex, and also with its inner basal limit continued posteriorly as a rather broad, sharply defined vitta to or very slightly beyond apical third, receding visibly from the suture from a point slightly behind the scutellum. Length 1.0-2.2 mm; width 1.25-1.4 mm. Texas (El Paso); [*ratigera* Lec.].

trimaculatus Linn.

Head and pronotum piecous in the female, the side margin of the latter very narrowly pale and rather indistinct toward base; elytra scarcely as long as wide, subquadrate, with convex sides and subtruncate apex, blackish, finely but strongly, sparsely punctate, with a basal and marginal pale area nearly as in the preceding species, but with the subapical vitta nearly straight, almost parallel throughout to the suture and extending posteriorly to apical fifth; legs pale. Length 1.0 mm; width 1.1 mm. California (Camden Cal.).

comparatus, sp. nov.

Head and pronotum of the male pale yellowish-white, the latter with a black anteriorly sinuate basal margin extending to lateral sixth; elytra oblong, longer than wide, obtusely subtruncate at tip, with pale vitta and lateral and basal margins nearly as in the two preceding species, except that the basal margin is almost interrupted at outer third by the black vitta, the pale vitta parallel and very close to the suture, as wide as the black vitta or wider, obtusely acuminate at apical fifth; punctures very fine and rather close-set; body much narrower than in the preceding. Length 1.6 mm.; width 0.8 mm. New Mexico (Las Cruces)—Mr. Cockerell..... **ingenitus**, sp. nov.

Head and pronotum of the male pale flavate throughout, the latter suffused with reddish toward base, of the female dark rufo-piceous, the pronotum blackish toward base and with a narrow side-margin, extending inward slightly at apex, pale; elytra in both sexes black, finely, rather sparsely punctate, oblong, very broadly rounded at tip, with a narrow pale basal and lateral margin terminating near the sutural angles, as in the preceding species but narrower and more deeply sinuate around the base of the callus, and also sinuate at apical fourth, the pale vitta forming merely an elongate discal spot just behind the middle in the female, and extending from basal two-fifths to apical third in the male, the elytra in the latter barely as long as wide, rather longer in the female; body much larger. Length 2.65–2.8 mm.; width 1.4–1.75 mm. Colorado (Colorado Springs)—Mr. Wickham..... **insignis**, sp. nov.

3—Elytra entirely black, with a narrow pale margin along the base and down the sides as far as the middle; front of the head and apical margin of the pronotum irregularly yellow in the male. Length [2.0 mm.]. California. **arcuatus** Lec.

4—Broadly oblong-oval, broadly rounded behind, finely punctate, the head and pronotum black in the female, the latter with a narrow parallel pale side-margin; elytra about as long as wide, pale flavate, the suture broadly black, the vitta constricted slightly just behind the scutellum and strongly at the apical angles, each with an elongate triangular black dash involving the callus and extending from the basal margin at outer third for two-fifths. Length 2.1 mm.; width 1.4 mm. Florida..... **militaris** Lec.

5—Body oblong, subtruncate behind, pale luteo-flavate throughout above and beneath, except the head, which is piceous; prothorax only slightly wider than the head, very feebly sinuate at apex, the latter only very slightly narrower than the base, the sides feebly arcuate, the punctures very fine; elytra slightly longer than wide, finely but rather strongly, moderately sparsely punctate. Length 1.9 mm.; width 1.3 mm. Massachusetts (Mt. Tom)..... **transfugatus**, sp. nov.

6—Body almost evenly oval, only slightly obtuse at apex, the sides strongly arcuate, dark piceo-castaneous throughout, the legs scarcely paler, the head nebulously paler toward the apex; the pronotum very narrowly flavate at the sides toward apex, finely punctulate; elytra but slightly wider than the prothorax, about as long as wide, finely and sparsely but distinctly punctate, the humeral angles, extending more or less briefly along the edge posteriorly, and two subapical spots arranged subtransversely and frequently coalescent, pale flavate. Length 1.4–1.6 mm.; width 0.85–1.0 mm. California (Monterey)..... **conspiratus**, sp. nov.

CRANOPHORINI.

The remarkable development of the pronotum over the head, with the complete obliteration of the anterior thoracic emargination, so characteristic of the family, is probably due to environments essentially similar to those of *Sacium*, where the structure is similar and points to a true affinity between these genera, confirming the relationship between the Coccinellidæ and Corylophidæ, which is well known to exist. The body is narrowly oval, usually rather pointed behind, the abdomen with the genital segment large and well developed, generally with a terminal seventh segment in the males, the metacoxal arcs entire in *Cranophorus* but extremely short. The metacoxæ are widely separated, the anterior very narrowly for the family, the scutellum rather small, the palpi securiform, the maxillæ moderately short, with the joints of the club well defined and very loose, and the legs are perfectly free. The three genera to me may be thus defined:—

- 1—Pronotum narrow, parallel or fusiform and 3-jointed; body small or minute. 2
 2—Pronotum gradually inflated and 5-jointed. 3
 3—Pronotum evenly rounded in circular arc at apex, the cephalic opening beneath horizontal, the prosternum convex in the middle, not at all deflexed; fifth ventral segment not much longer than the fourth; epipleuræ gradually dilated toward base but relatively narrow even at the widest part and horizontal or feebly descending externally; tarsal claws cleft within beyond the middle and also with an internal basal enlargement; body distinctly pubescent. ***Cranophorus**
 4—Pronotum truncate at the middle of the apex, the cephalic opening inclined upward posteriorly, the mouth protected in part by the prosternum, which is very strongly deflexed, flat, with strongly arcuate apex; fifth ventral very much longer than the fourth, the sixth less developed; epipleuræ not dilated, very narrow, flat, but little wider than the met-episternum; tarsal claws small, apparently merely enlarged within at base; body minute and subglabrous. **Nipus**
 5—Body larger; metacoxal arcs complete and about two-thirds as long as the segment.

***Oryssomus**

Cranophorus is South African and several new forms will be described in the appendix to the present paper. *Oryssomus* is South American, and *Nipus* is Californian and perhaps Sonoran.

Nipus, gen. nov.

The two species of this genus at present known may be defined as follows:—

Body elongate-oval, the elytra gradually obtusely pointed behind, black, the pronotum nebulously pale and broadly impresso-explanate at the sides, especially toward

apex, one-half wider than long, the sides continuing the curvature of the elytra, impunctate, alutaceous, the pubescence more visible toward the sides; elytra one-half longer than wide, rapidly narrowed from slightly behind the middle, finely but rather strongly, somewhat unequally and very sparsely punctate, each with a large oval central red spot, which is nebulously defined; pubescence very inconspicuous. Length 1.2 mm.; width 0.7 mm. California (Los Angeles).

biplagiatus, sp. nov.

Body narrowly and evenly elliptical, rounded behind, black or piceous-black, the under surface and legs rufescent, the elytra not maculate; pronotum slightly pubescent and paler laterally in the impressed area, two-thirds wider than long, impunctate, alutaceous, the sides rather more arcuate than the contiguous limb of the elytra, the latter nearly one-half longer than wide, rather coarsely, deeply and not very sparsely punctate, the hairs erect and microscopic. Length 0.85 mm.; width 0.55 mm. California (Sonoma Co.)..... **niger**, sp. nov.

Both the above species have the elytral suture finely margined, except toward base.

SCYMNINI.

The numerous small species of this tribe may be distinguished at once by the distinct pubescence, there being but one genus in which the body becomes virtually glabrous throughout the dorsal surface. The antennæ are short and the eyes entire or subentire, and the posterior legs are always free. The genera may be defined as follows:—

- Antennæ free, rapidly descending along the sides of the head before the eyes in repose, the front not dilated; head and maxillary palpi moderate in size, the metasternum not foveate; anterior coxæ moderately separated; antennæ apparently 11-jointed..... 2
- Antennæ resting in repose upon wide dilatations of the front under the antennal foveæ and before the eyes, apparently 9-jointed, with a narrow solid 4-jointed club; head large; anterior coxæ very widely separated, the prosternum flat and not carinate..... 6
- 2—Pronotum with a fine oblique line at the apical angles, the body apparently glabrous, each puncture of the upper surface bearing an extremely minute erect hair, only visible under considerable enlargement with oblique illumination; antennæ inserted in very deep narrow emarginations at the sides of the front, strongly bent, the last three joints forming a compressed club; last joint of the maxillary palpi narrow, the apex narrowly oblique; clypeus narrow and rather long; prosternum short, flat, with two abbreviated parallel carinæ, the apical margin abruptly deflexed for a short distance, but not enough to afford protection to the mouth; metacoxal arcs joining the apical margin of the first segment near the sides of the abdomen; tarsal claws simple; body oval, convex, the elytra more or less pointed at apex, the eyes small..... **Smilia**
- Pronotum without an oblique line near the apical angles; body always distinctly pubescent; tarsal claws cleft within..... 3

- 3—Clypeus extremely short before the rather large and well-developed eyes, truncate with rounded angles, the antennæ inserted under its sides adjoining the eyes, straight, the club small, with the three joints equal in length; prosternum transversely convex, not carinate, broadly and gradually deflexed, forming a protection to the mouth in repose; metacoxal arcs complete, the first suture nearly obliterated at the middle; tarsal claws cleft at the middle..... **Stethorus**
- Clypeus prolonged for a considerable distance before the eyes, the sides converging, the antennæ inserted in very small shallow emarginations just before the eyes.. 4
- 4—Last joint of the maxillary palpi narrow, obliquely pointed at tip; antennæ bent, with the club well developed, the head very small, with well-developed eyes; prothorax much narrower than the elytra; prosternum rather narrowly separating the coxæ, with two short feeble carinæ, gradually and feebly deflexed toward apex but not affording protection to the mouth; metacoxal plates entire, .. **Didion**
- Last joint of the palpi large and normally securiform; antennæ with the club moderate; prosternum flat, not at all deflexed toward tip, generally bicarinate..... 5
- 5—Head exerted and moderately deflexed, the eyes small and not attaining the anterior margin of the prothorax, which is parallel at the sides; antennæ well-developed and straight; prosternum flat, with two distant parallel and entire carinæ; metacoxal arcs short, widely incomplete, not extending to the first suture; body parallel and straight at the sides..... **Selvadius**
- Head inserted within the prothorax, the eyes well developed and partially covered; antennæ shorter and bent; body more or less oval, the prothorax narrowed in front, the prosternum and metacoxal arcs varying subgenerically..... **Scymnus**
- 6—Metasternum with a large circular and densely pubescent pit near each lateral margin; body oblong-oval, rather depressed, pubescent; metacoxal plates entire; eyes oval, entire or virtually so, somewhat prominent and barely attaining the prothorax; maxillary palpi very long; first two tarsal joints short, the last long, the claws well developed and simple..... **Cephaloscymnus**

These genera are all very widely distributed, except *Didion* and *Selvadius*, which are founded upon local types. *Cephaloscymnus* is a remarkably aberrant and specialized form, but its general affinity with *Scymnus* is sufficiently evident.

Smilla Weise.

These are small, apparently glabrous species, formally assigned to *Pentilia*; they inhabit the entire territory of the United States. Those thus far discovered may be identified as follows:—

- Elytra uniform in coloration throughout, the suture finely and distinctly margined... 2
- Elytra bicolored, each having a large oval red spot; sutural margin "not distinct".....6
- 2—Head transverse, the clypeus broader and shorter, rapidly expanding before the antennal sinus.....3
- Head but little wider than long and perfectly flat throughout, the clypeus narrower and more prolonged, only very feebly expanding before the antennæ; species very minute, black, the pronotum minutely reticulate and alutaceous but not distinctly punctured.....5

- 3—Body castaneous in color throughout, rather more broadly oval, shining, the elytra rather strongly, moderately closely punctate. Length 1.1 mm.; width 0.75 mm. Michigan (Marquette).....**marginata** Lec.
- Body black throughout, the under surface and legs more piceous in *atronitens*.....4
- 4—Pronotum minutely but strongly reticulate and alutaceous; elytra finely but rather strongly, sparsely and somewhat unevenly punctate. Length 0.8–1.0 mm.; width 0.6–0.7 mm. Pennsylvania to Texas (Brownsville).....**misella** Lec.
- Pronotum perfectly devoid of minute reticulation and highly polished throughout like the elytra, finely punctulate, the sides almost continuous; elytra distinctly longer than wide, gradually narrowed behind, the punctures extremely minute but deep, even and relatively sparse; size much larger. Length 1.15–1.3 mm.; width 0.8–0.9 mm. California (Siskiyou Co.).....**atronitens**, sp. nov.
- 5—Narrowly oval, the prothorax as wide as the base of the elytra, the sides nearly continuous; elytra narrowed behind from far before the middle, finely and not very conspicuously punctured. Length 0.85 mm.; width 0.55 mm. Texas.
- minuta**, sp. nov.
- More broadly oval, the prothorax much narrower than the elytra, with the sides distinctly discontinuous; elytra but little longer than wide, more rapidly narrowed behind from a point which is but little before the middle, the punctures strong, deep and rather close-set, much more conspicuous than in *minuta*. Length 0.8 mm.; width 0.65 mm. California.....**planiceps**, sp. nov.
- 6—Spots oval, narrowly separated at the suture; pronotum not distinctly punctate.
- coccidivora** Ashm.

Ovalis, said by Dr. Horn to be the same as *felschei* Weise, is omitted from the table, as I have not seen a specimen; the suture is said by Dr. Horn to have the marginal stria not evident, but this is not borne out by the description of LeConte, or by the other species; it is brown in color, 0.8 mm. in length and inhabits Florida. It is quite possible that *coccidivora* may differ generically, but not having an example before me I am unable to decide.

Stethorus *Weise*.

The species of this genus are as small as in *Smilia*, but differ very greatly structurally; they differ from *Scymnus* in the formation of the front of the head and prosternum. The genital segment is as large and conspicuous as in the Hyperaspini. *Stethorus* is probably cosmopolitan and the species are rather difficult to distinguish among themselves. The following table contains all that are known to me at present, those from Europe and Africa being introduced for the sake of completeness:—

- Metacoxal plates short and very broad, never extending much beyond the middle of the segment**.....2
- Metacoxal plates narrow and strongly rounded, much longer, approaching closely to the hind margin of the segment; species more minute as a rule**.....6

- 2—Legs pale and bright flavo-testaceous, the femora black with the apex distinctly and conspicuously pale; sides of the prothorax nearly continuous and strongly converging.....3
- Legs piceo-fuscous, the femora blackish; body similar in form to the preceding....5
- 3—Metacoxal plates shorter, frequently extending much less than half way to the suture; elytral punctures moderately close-set, quite strong and distinct, the pubescence short. Length 1.2 mm.; width 0.8 mm. Europe; [*minus* Payk.].
* *punctillum* Weise
- Metacoxal plates less transverse, extending to or beyond the middle, varying somewhat according to the sex of the individual; body somewhat smaller, with shorter and more transverse prothorax and less conspicuous elytral punctures but longer pubescence.....4
- 4—Elytral punctures fine but strong and quite sparse. Length 1.0-1.2 mm.; width 0.75-0.9 mm. Lake Superior to Pennsylvania and Delaware, North Carolina and Kansas.....*punctum* Lec.
- Elytral punctures finer, feeble and less sparse; prothorax slightly more transverse, the body a little more oblong-oval but otherwise extremely similar. Length 1.15 mm.; width 0.8 mm. Cape of Good Hope (Cape Town).
* *jejunus*, sp. nov.
- 5—Elytra very distinctly longer than wide, finely but strongly, sparsely punctured, the pubescence moderately long, recurved as usual. Length 1.0-1.3 mm.; width 0.75-0.9 mm. California (Humboldt, Sonoma and Sta. Cruz Cos.).
picipes, sp. nov.
- Elytra not obviously longer than wide; body smaller and more broadly oval, the prothorax shorter and more transverse; elytral punctures stronger and more close-set. Length 0.9 mm.; width 0.75 mm. California (Siskiyou Co.).
brevis, sp. nov.
- 6—Legs pale rufo-testaceous throughout; body evenly oval; elytral punctures very small and sparse, the pubescence moderately long, recurved as usual. Length 0.9 mm.; width 0.72 mm. Florida (Haulover near Jupiter Inlet).. *utilis* Horn
- Legs pale testaceous, the femora black except at apex; body narrower, more elongate and more oblong, with much less arcuate sides; prothorax transverse, with the sides continuous as in *utilis* but rather less arcuate; elytral punctures stronger and less sparse, the pubescence nearly similar but somewhat fuscous in color. Length 0.95 mm.; width 0.7 mm. Texas (Columbus)....*atomus*, sp. nov.

Punctum and *picipes* are both abundant, and the difference in the coloration of the legs, noted in the table, appears to be constant; in *picipes* the form is a trifle more elongate and more narrowly oval; *jejunus*, five specimens of which were taken by the writer about sixteen years ago, resembles *punctum* so closely that the two could scarcely be distinguished unless examined in series. *Gilvifrons* Müll., which is associated with *punctillum* in the European catalogues, I have not seen, but the genus *Stethorus*, which is there considered a subgenus of *Scymnus*, is in no wise to be so regarded; it is a perfectly valid genus.

Didion, gen. nov.

This genus resembles *Scymnus* in most of its structural features, but differs in its narrow prothorax with rapidly converging sides, small, deeply inserted but feebly inclined head, with narrowly oval eyes and flat surface, in the feebly deflexed prosternum, and especially the narrow and obliquely pointed last joint of the maxillary palpi. The pubescence is rather abundant but very short and decumbent. Individuals appear to be very rare, and the genus is confined as far as known to the Upper California *Sequoia* belts. The two species represented before me may be defined as follows from the female only:—

Metacoxal plates more narrowly rounded, extending extremely near to the suture, black throughout, the legs piceous; body oval, convex, moderately shining, the head finely, sparsely punctate, the eyes widely separated; prothorax not quite twice as wide as long, about two-thirds as wide as the elytra, the sides strongly convergent and evenly but very feebly arcuate throughout, the punctures very minute and inconspicuous; elytra much longer than wide, evenly rounded at apex, finely but strongly, rather closely punctate. Length 1.6 mm.; width 0.95 mm. California (north of San Francisco).....**longulum**, sp. nov.

Metacoxal plates distant from the suture by a third or fourth of their own length; in coloration and sculpture nearly similar to *longulum*, the pubescence slightly longer, the body much smaller, the prothorax rather more than twice as wide as long, with the sides much less convergent but more strongly arcuate and notably more discontinuous with those of the elytra, the latter more broadly and obtusely rounded behind, much longer than wide. Length 1.25 mm.; width 0.8 mm. California (Sonoma Co.).....**parviceps**, sp. nov.

These species are both represented by single examples thus far, but very recently Dr. Blaisdell has sent me a male from Calaveras Co., which appears to be identical with *parviceps*.

Selvadius, gen. nov.

Differs remarkably from *Scymnus* in its narrow parallel body, exerted, feebly inclined and transversely orbicular head, small eyes and longer straight antennæ. The maxillary palpi are larger than usual in *Scymnus*, thick, with the last joint strongly securiform. The single type may be described as follows:—

Body narrowly oblong, rather feebly convex, moderately shining, piceous-brown in color, with the legs, palpi and antennæ yellow; punctures fine but strong and close-set throughout, those of the elytra larger but shallower than those of the pronotum; pubescence short, fine and decumbent; head relatively well developed in size, feebly convex, the eyes small, convex, oval, entirely exposed before the prothorax and entire, the vertex very broad between them; antennæ nearly as long as the head, 11-jointed, the second joint subglobular, three to five sub-

equal, narrower, elongate and cylindric, six and seven shorter, the latter a little broader toward tip, eight to eleven forming the usual narrowly oval compact club, the eleventh joint short and somewhat spongy-pubescent; prothorax but little more than twice as wide as long, the sides parallel and straight, rounding and slightly convergent at apex; elytra but little wider than the prothorax, much longer than wide, obtusely and broadly subtruncate at tip; mesocoxal arc not attaining the episternal suture, the metasternal curving outward and very short, attaining apical fourth of the segment; genital segment distinct and well developed. Length 1.4 mm.; width 0.65 mm. Arizona (Tuçson).....**rectus**, sp. nov.

The type was taken by the writer some years ago, but no note relative to habits can be found; if my memory serves however, it was taken while sorting riparial detritus.

Scymnus *Kug.*

This is one of the largest genera of American Coleoptera. The species possess a remarkable uniformity of appearance, the body being oval or oblong-oval and always pubescent throughout, with the legs almost completely free, the anterior alone being somewhat contractile, with an attendant depression or well-defined pit at the base of the epipleuræ for the tip of the femur. The prosternal ridges are important, on some occasions, in discriminating species which may be closely allied otherwise. The postcoxal plates or arcs of the first ventral segment serve as sharply defined criteria in grouping the species, but the several sections can scarcely be regarded as distinct genera.

The species have been almost completely neglected in the United States, as far as systematic work is concerned, and the recent revision of Dr. Horn (Tr. Am. Ent. Soc., XXII, p. 81) had no further aim than an exposition of the groups, into which the genus can be advantageously divided, together with the publication of a few of the more strikingly distinct species. The latter are very difficult to discriminate in many parts of the series, and especially in the small and obscure forms of the Pacific coast and Arizona. I am not at all confident that my interpretations may be entirely correct, but it can be said at least that the total number of species here recorded will be increased rather than diminished in the future. I have been accumulating a large material during many years, with the object of monographing the genus, and all localities are tolerably well represented. The following table may assist in identification, but actual comparison will be necessary in many cases:—

Abdominal lines arcuate throughout, curving forward externally.....2

Abdominal lines extending outward externally parallel to the edge of the segment and at a slight distance therefrom; prosternum relatively slightly wider between the coxæ, flat and wholly devoid of carinæ; genital or "sixth" ventral segment unusually developed. (*Scymnobius* sg. n.).....71

Abdominal lines gradually curving into the first suture externally and forming a part thereof; prosternum scarcely as wide between the coxæ as in *Scymnobius*, but always rather flat and finely but strongly bicarinate, the carinæ straight, widely separated and gradually converging; eyes occasionally with a very small and feeble emargination. (*Diomus* Muls.).....79

2—Abdominal plates entire, the bounding arc extending to the basal margin of the first segment; prosternum rather narrow and convex between the coxæ, with two strong and well-developed carinæ, which are but rarely abbreviated in front. (*Pullus* Muls.).....3

Abdominal plates incomplete externally, the bounding arc not attaining the basal margin; prosternum somewhat variable between the coxæ, the carinæ always present but frequently abbreviated in front and more feebly developed than in *Pullus*. (*Scymnus* in sp.).....64

3—The carinæ entire or subentire.....4

The carinæ greatly abbreviated, attaining about the middle of the prosternum; abdominal plates very small, broader in *nanus*; prothorax varying in form....63

4—Abdominal plates large and long, attaining the apical margin of the first segment; prosternal carinæ arcuate, most narrowly separated well behind the apex; body oblong-oval, about one-half longer than wide, evenly pale flavo-testaceous above, the head and under surface piceous-black; last ventral segment and legs pale; head and pronotum very finely and remotely punctulate, the latter less remotely and rather more visibly toward the sides, strongly transverse, with the sides strongly convergent, broadly and evenly arcuate, almost continuous with the outline of the elytra, the latter finely, evenly and sparsely punctate, the hairs laid longitudinally and evenly almost throughout; under surface strongly and closely punctured, the abdomen more finely and less closely, the plates polished and almost impunctate throughout. Length 2.3 mm.; width 1.5 mm. Colorado.

flavescens, sp. nov.

Abdominal plates normal, always shorter than the segment; prosternal carinæ generally straight but sometimes bent outward through a short distance from the apex.....5

5—Elytra uniform in coloration on the disk, not considering the apex.....6

Elytra bicolored on the disk, the pale areas either clearly defined and constant spots or nubilate and variable.....57

6—Elytra entirely pale in color; prosternal carinæ entire, feebly converging throughout.....7

Elytra black, with the common apex more or less broadly pale, the anterior margin of the pale area biarcuate and generally very well defined.....8

Elytra black, with the apex not paler or more or less finely so, in which case the anterior limiting line of the pale area is usually quite well defined but transverse or not biarcuate.....16

- 7—Somewhat narrowly and evenly oval, very pale throughout, except beneath, where the body is black, the hypomera, epipleuræ, tip of the abdomen and legs pale; prothorax but little more than twice as wide as long, the sides rather strongly convergent and evenly arcuate, the punctures scarcely visible; elytra quite closely punctate, the punctures very minute, with larger punctures which tend to lineal arrangement intermingled toward base. Length 1.3–1.6 mm.; width 0.9–1.1 mm. California and Arizona..... **pallens** Lec.
- Broadly oval and more convex, shining, dark rufo-testaceous, the pronotum slightly clouded toward the middle and base; elytral suture very finely piceous; body beneath and legs pale, except the post-sterna, parapleuræ and abdomen which are black, the latter pale at tip; head and broad sides of the pronotum paler than the elytra, the prothorax short, nearly three times as wide as long, with moderately converging and feebly arcuate sides, which are not continuous with those of the elytra, the punctures sparse and very minute, closer and distinct toward the apical angles; elytra finely but distinctly, evenly and rather sparsely punctured; under surface closely punctate, the ventral plates distant from the hind margin of the segment by two-fifths of their own length; legs rather slender. Length 1.6 mm.; width 1.2 mm. Colorado..... **nugator**, sp. nov.
- 8—Form very broadly oval, the elytra not at all longer than wide..... 9
- Form more narrowly oval, the elytra longer than wide..... 11
- 9—Prothorax entirely orange yellow, a little more than twice as wide as long, the sides evenly arcuate and subcontinuous with those of the elytra, the latter finely but distinctly, not very densely punctate, the pale apical area advancing to apical two-fifths at the sides and beyond apical fourth on the suture; abdomen and legs throughout pale. Length 1.6 mm.; width 1.1 mm. Florida (Indian River).
semiruber Horn
- Prothorax partly or completely black in color and more transverse..... 10
- 10—Apex of the fifth ventral segment very broadly and feebly sinuato-truncate in the male; pale area of the elytra very constant, extending to about apical sixth or seventh. Length 2.1–2.3 mm.; width 1.6 mm. North Carolina, Texas and Arizona; [*astutus* Muls.]..... **creperus** Muls.
- Var. A—Nearly similar to *creperus* but more broadly oval, with a larger thoracic black area and with the apical red area of the elytra smaller, less transverse and more strongly biarcuate at its anterior margin. Length 2.4 mm.; width 1.8 mm. Middle States..... **fraternus** Lec.
- Apex of the fifth ventral deeply and evenly sinuate in circular arc with well-defined and somewhat prominent, though obtuse, lateral limits; red area of the elytra extending through apical third to two-fifths; punctuation distinct and rather sparse; pronotum red at the sides, more narrowly toward base. Length 2.2–2.4 mm.; width 1.6–1.7 mm. Florida and Indiana..... **hemorrhous** Lec.
- Var. A—Similar to *hemorrhous* but with the red of the elytra extending well beyond the middle. Length 2.2 mm.; width 1.5 mm. Kansas.
divisus, var. nov.
- Var. B—Similar to *hemorrhous* but larger, the pronotum completely black and more densely and distinctly punctured toward the sides; apical red area similar; female only observed. Length 2.7 mm.; width 1.8 mm. Canada.
laurenticus, var. nov.

Var. C.—Similar in form, punctuation and sexual characters to *hemorrhous*, the upper surface entirely black with feeble æneous lustre, the sides of the pronotum and apex of the elytra appearing very faintly red in a strong light in areas similar in position and extent to those of *hemorrhous*, the pubescence rather finer and less conspicuous; legs almost black throughout. Length 2.2 mm.; width 1.6 mm. Texas (Columbus).....**subæneus**, var. nov.

11—Red area of the elytra extending forward to about the middle, its bounding line somewhat feebly defined; body oval, shining, black, the abdomen black throughout; legs pale, with the femora infuscate; prothorax but little more than twice as wide as long, the sides almost continuous, evenly and moderately arcuate and strongly convergent; punctures fine and equal throughout, very sparse and but slightly more close-set toward the sides, the latter broadly and indefinitely pale; elytra finely but strongly and closely punctured. Length 2.25 mm.; width 1.5 mm. Wyoming.....**postpinctus**, sp. nov.

Red area of the elytra not extending much beyond apical third; species much smaller.....12

12—Red area sharply defined; elytra oval, finely but distinctly and closely punctate.....13

Red area not well defined, its boundaries nubilate; elytra more coarsely and sparsely punctate, gradually narrowed behind from near the humeri.....15

13—Pronotum rufous, with a parabolic median black area extending from the base almost to the apex, two and one-half times as wide as long, the sides rather strongly convergent, feebly and evenly arcuate and almost continuous; elytra closely punctured, the red area not extending further at the sides than at the suture, ending, along the median line of each, slightly beyond apical third; legs and abdomen red, the latter black toward base, the male having a transverse fovea in the apical margin of the fifth segment, the first not modified in the middle and punctured throughout. Length 1.75 mm.; width 1.25 mm. Texas (Columbus).....**texanus**, sp. nov.

Pronotum black, rufous at the sides or apical angles.....14

14—More broadly oval, the pale area at the sides of the pronotum abruptly defined and not extending to the basal angles; pale area of the elytra extending to apical third, its most anterior point at outer third; abdomen black, with the last three segments pale; legs pale throughout; male sexual characters as in *texanus*, the fifth segment less truncate, with the fovea smaller. Length 1.7 mm.; width 1.1 mm. Kansas.....**rubricauda**, sp. nov.

Very narrowly oval and more pointed behind, the lateral pale area of the pronotum more extended and indefinitely limited internally; pale area of the elytra nearly similar in form to that of *rubricauda* but smaller, not extending quite to apical third. Length 1.7 mm.; width 1.0 mm. Pennsylvania (near Philadelphia).
chromopyga, sp. nov.

15—Small and very narrowly suboval, shining, black, the sides of the pronotum abruptly but very narrowly pale, the pale area scarcely extending to the basal angles; prothorax distinctly narrower than the elytra, the sides not continuous, moderately convergent and moderately though evenly arcuate, the punctures very fine and somewhat close-set toward the sides; elytra rather prominently rounded at the humeri, the pubescence fine and rather sparse, the pale apex extending

- scarcely beyond apical fourth; under surface black, the abdomen pale at tip; legs pale, the hind femora slightly infusate toward base. Length 1.5 mm.; width 0.9 mm., Rhode Island (Boston Neck).....**canterius**, sp. nov.
- 16—Pronotum entirely pale in color.....17
- Pronotum pale, with a median parabolic black spot at base, which is normal in the males throughout but much extended in the female of *marginicollis*, where it involves all the disk except the apical angles and a fine apical margin.....18
- Pronotum black, with pale side-margins or apical angles.....28
- Pronotum black throughout; elytra with the fine marginal bead at apex paler, becoming wider in *renoicus*.....43
- 17—Prothorax subequal in width to the base of the elytra, the latter about as long as wide, finely and quite closely punctured, the apical margin extremely narrowly reddish. Length 1.5-1.9 mm.; width 1.0-1.3 mm. North Carolina (Asheville) and Alabama.....**cervicalis** *Muls.*
- Prothorax at base abruptly narrower than the elytra, the sides discontinuous in curvature, strongly convergent, rather strongly and almost evenly arcuate; disk minutely, sparsely punctulate scarcely more distinctly toward the sides, twice as wide as long; elytra distinctly longer than wide, rather strongly and somewhat sparsely punctured, the apical margin very narrowly red; legs red throughout. Length 1.8-1.9 mm.; width 1.15 mm. Kansas.....**kausanus**, sp. nov.
- 18—Surface polished, the pronotum evidently punctate, the punctures of the elytra more or less coarse and distinct.....19
- Surface alutaceous and minutely granulo-reticulate, the pronotum impunctate except the scars of fallen hairs; elytral punctures very minute; pronotal black spot small and basal.....27
- 19—Pronotal punctures equal in size throughout the disk; male modifications at the middle of the first ventral segment generally pronounced.....20
- Pronotal punctures unequal, coarser, more close-set and more conspicuous toward the middle of the disk—contrary to the general rule—and finer and sparser laterally; male modifications of the first ventral less pronounced; legs red throughout.. 22
- 20—Pronotal punctures very small and sparse throughout; male with a tubercle in the middle near the apical margin of the first ventral, the coloration of the pronotum different in the two sexes, the male having a small transverse black spot at the middle of the basal margin, the female having that somite black, with pale apical angles and fine apical margin; legs black or blackish throughout. Length 1.6-2.0 mm.; width 1.1-1.4 mm., California (coast regions from Humboldt to San Diego and Calaveras Co.); [*californicus* Boh.].....**marginicollis** *Munn.*
- Pronotal punctures fine but distinct, more close-set toward the sides, sparser toward the middle; larger species from the Mississippi Valley and Great Lakes, broadly oval in form.....21
- 21—Male with a small shallow rounded pit at the middle of the apical margin of the first segment, the fifth with a small deep and rounded median sinuation; sides of the prothorax very strongly convergent and broadly arcuate, continuous with those of the elytra, the latter rather coarsely and sparsely punctured, with the apical margin very narrowly and feebly rufous; legs red throughout. Length 1.9-2.3 mm.; width 1.5-1.7 mm. Lake Superior.....**consobrinus** *Zec.*

Male with a large, elongate, acutely triangular, feebly impressed, polished and glabrous median area of the first ventral, defined by finer and denser pubescence, the fifth with a larger but rather more broadly rounded median sinus ; prothorax two and one-half times as wide as long, the sides continuous in curvature, strongly convergent, broadly and evenly arcuate, the punctures very distinct and less sparse throughout than in *consobrinus* ; elytra quite coarsely and somewhat closely punctured, the apical margin only extremely narrowly rufescent ; legs rather short, red throughout. Length 2.3 mm. ; width 1.75 mm., Iowa (Keokuk).

lowensis, sp. nov.

Male with a shorter, broader and entirely unimpressed median area at the apex of the first segment, the adjoining punctuation finer and closer, the fifth segment very short and transverse, truncate at apex but not at all sinuate, the surface with a strong transverse and anteriorly rounded impression-bevel toward apex in median third or fourth ; sides of the prothorax almost continuous, strongly convergent and broadly, evenly arcuate, the punctures very small, sparse and inconspicuous, scarcely closer toward the sides ; elytra not very coarsely but strongly, evenly and quite sparsely punctate, the apical margin very finely testaceous ; legs red throughout. Length 2.2 mm. ; width 1.7 mm. Mississippi (Natchez).

natchezianus, sp. nov.

22—Elytra with a wider red apical margin, this being equal in width to a fourth or fifth of the length of the prothorax..... 23

Elytra only very narrowly rufous at the apical edge..... 25

23—First ventral of the male with a large median area at apex which is glabrous and impunctate, but not impressed or defined by particularly dense pubescence ; fifth segment very broadly and just visibly sinuato-truncate at apex, the sinuous portion with a very feebly convex bevel ; prothorax but little more than twice as wide as long, sparsely punctulate, the sides continuous, moderately convergent and evenly arcuate ; elytra quite coarsely and closely, but not densely punctate. Length 1.85 mm. ; width 1.35 mm. Alabama..... **caudalis** Lec.

First ventral of the male virtually unmodified and punctured almost throughout, the fifth broadly and much more decidedly sinuate and beveled at apex ; black spot of the pronotum small, not extending much beyond the middle..... 24

24—Sides of the prothorax continuous, strongly convergent, broadly and evenly arcuate, the elytral punctures rather small but strong and quite sparse ; body smaller and more narrowly oval, highly polished, the pubescence rather coarse and sparse, easily denuded. Length 1.8 mm. ; width 1.25 mm. Texas (Columbus)..... **medionotans**, sp. nov.

Sides of the prothorax not quite continuous with those of the elytra, very much less convergent, broadly and evenly arcuate ; elytral punctures coarser and more close-set but not dense ; body more broadly oval. Length 1.9-2.0 mm. ; width 1.35-1.6 mm. Texas (Brownsville and Galveston)... **subtropicus**, sp. nov.

25—Black discal spot of the pronotum very small, not extending beyond the middle, the punctures very sparse ; species very small, oblong-oval, the sides of the prothorax continuous but only moderately convergent, feebly arcuate ; elytral punctures strong, rather coarse and sparse, the pubescence whitish and coarse. Length 1.5 mm. ; width 1.0 mm. Florida (Palm Beach)—Mr. F. Kinzel.

kinzeli, sp. nov.

Black discal spot large, extending to the apical margin or very nearly, the elytral punctures distinct but not coarse and rather close-set; pubescence coarse. . . . 26

26—Form more elongate-oval, the prothorax very conspicuously punctured toward the middle, the sides not quite continuous with those of the elytra, only moderately convergent but more distinctly and evenly arcuate; elytra fully as long as wide; legs red. Length 2.2 mm.; width 1.5 mm. Indiana; [*socer* Lec].

collaris *Melsh.*

Form short and very broadly oval, the prothorax rather sparsely punctate even toward the middle, the sides almost continuous with those of the elytra, strongly convergent but only feebly, evenly arcuate; elytra not quite as long as wide; legs red. Length 1.9–2.2 mm.; width 1.5–1.65 mm. Arizona (Pinal Mts.)—Mr. Wickham, (Grand Cañon of the Colorado)—Dr. T. Mitchell Prudden, (near the southern boundary)—Mr. Morrison. **horni** *Gorh.*

Form short and broadly oval, the size smaller; prothorax smaller and more transverse, the sides not quite continuous with those of the elytra, only moderately convergent, evenly and moderately arcuate; punctures sparse throughout, very small, feeble and inconspicuous in the middle and gradually almost wholly obsolete toward the sides; elytra distinctly shorter than wide; legs red, the hind femora infuscate toward base. Length 1.8 mm.; width 1.4 mm. New Mexico (Albuquerque)—Mr. Cockerell. **cockerelli**, sp. nov.

27—Rather narrowly oval and moderately convex, black, the prosternum, tip of abdomen, legs throughout, head and pronotum pale testaceous, the latter with the sides almost continuous, strongly convergent, evenly and feebly arcuate, the disk with a small parabolic basal spot occupying median third of the base and extending to the middle and varying but slightly in excess; elytra with the extreme apical edge paler. Length 1.8–2.0 mm.; width 1.1–1.3 mm. Utah (south-western)—Mr. Weidt. **uteanus**, sp. nov.

Somewhat narrowly oval, larger than *uteanus* but almost similar throughout in coloration and sculpture, the prothorax equally short and transverse but with the sides less convergent, feebly, evenly arcuate and not quite continuous; elytra more elongate, the metacoxal plate more broadly rounded; legs darker rufous throughout. Length 2.0 mm.; width 1.3 mm. Indiana. **rhesus**, sp. nov.

28—Species of the Atlantic regions. 29

Species of the Sonoran and Pacific regions. 32

29—Elytra with a rather broad and well-defined red apex extending to apical seventh or eighth, its anterior margin transverse, tending to slight prolongation along the lateral edges, black, the abdomen red, blackish toward base; head red, blackish basally; pronotum broadly and rather abruptly at the sides and legs throughout, testaceous; prothorax two and two-fifths times as wide as long, the sides very discontinuous with those of the elytra, only feebly convergent, arcuate at apex, becoming straight posteriorly, the disk finely but strongly punctate, the punctures sparse and inconspicuous at the middle, becoming coarser and unusually close-set toward the sides; elytra rather strongly, somewhat coarsely but not densely punctured. Length 2.6 mm.; width 1.8 mm. Indiana; [*chatchas* Muls.].

fastigiatus *Muls.*

Elytra black, with the extreme apical margin or beaded edge alone paler. 30

30—Pronotum black or blackish, broadly but gradually and indefinitely paler toward the sides; head and legs uniform in color throughout but testaceous to blackish; tip of abdomen narrowly red; prothorax moderately transverse, the sides strongly convergent, almost evenly and moderately arcuate throughout and almost perfectly continuous with those of the elytra, the punctures fine and rather sparse, closer and quite conspicuous toward the sides; elytra quite coarsely but evenly and rather sparsely punctured, the pubescence moderately coarse and conspicuous. Length 2.2–2.4 mm.; width 1.6–1.8 mm. Pennsylvania (near Philadelphia); [*puncticollis* Horn nec Lec.]..... **indutus**, sp. nov.

Pronotum black, with the apical angles alone pale, the pale color but very seldom extending to the basal angles; head red; sides of the prothorax distinctly discontinuous, more or less feebly convergent and evenly and moderately arcuate throughout; body broadly oval..... 31

31—Larger species; legs red, the femora all more or less blackish toward base; pronotal punctures very fine, close toward the sides but not conspicuous; elytral punctures not coarse but strong and quite sparse, the pubescence rather fine. Length 2.0 mm.; width 1.55 mm. Rhode Island (Boston Neck).

agricola, sp. nov.

Small species; legs red throughout; pronotum shorter and more transverse, very minutely, sparsely and scarcely visibly punctate, the punctures still sparse and scarcely larger toward the sides; elytra barely as long as wide, polished, rather finely but strongly and still more sparsely punctate, the pubescence sparser and coarser. Length 1.5 mm.; width 1.1 mm. North Carolina (Asheville).

innocens, sp. nov.

32—Legs black throughout, the tarsi alone sometimes pale..... 33

Legs red, the hind femora black throughout or with the tip alone paler..... 34

Legs red, the hind femora slightly blackish at the base; body broadly oval..... 35

Legs uniform and clear red throughout..... 36

33—Sides of the pronotum obliquely and abruptly pale, the pale area scarcely extending to the basal angles; body large, convex and very broadly oval, shining, black; head pale in the male, black in the female; tarsi not evidently paler; prothorax relatively small, two and three-fifths times as wide as long, the sides strongly discontinuous, very moderately convergent, evenly and rather strongly arcuate; punctures fine, sparse in the middle, broadly close-set toward the sides; elytra not quite as long as wide, not very coarsely but strongly, evenly and not very closely punctured, the apical reflexed edge alone pale; male with the first ventral obliquely bituberosa at the middle near the apex, the fifth very broadly and feebly sinuate. Length 2.4 mm.; width 1.7 mm. California (Truckee)..... **solidus**, sp. nov.

Pronotum almost black throughout, the apical angles alone feebly and gradually picescent; body smaller and much more narrowly oval; legs black, the tarsi red; sides of the prothorax evidently discontinuous, rather strongly convergent, evenly and somewhat feebly arcuate, the punctures very minute, sparse, becoming very close toward the sides; elytra distinctly longer than wide, the apical edge scarcely at all paler, the punctures not very coarse but strong and unusually dense. Length 1.9 mm.; width 1.3 mm. Nevada (Reno).

desertorum, sp. nov.

34—Prosternal carinæ widely separated at base, straight and strongly convergent to apical third, thence parallel and well separated to the apical margin; body broadly oval, shining, black, the pronotum gradually pale testaceous toward the apical angles, short, the sides almost perfectly continuous, strongly convergent, evenly and moderately arcuate; punctures minute and inconspicuous, slightly closer toward the sides; elytra scarcely as long as wide, the apical margin very finely testaceous; punctures fine but strong, not very close-set. Length 1.75–1.9 mm.; width 1.3–1.4 mm. Arizona (Yuma) **apacheanus**, sp. nov.

Prosternal carinæ straight and feebly convergent throughout, becoming almost obliterated in basal half; body narrowly oval, the pronotum gradually testaceous toward the apical angles, less transverse and relatively larger than in *apacheanus*, the sides of the body being less arcuate; sides almost continuous, rather strongly convergent and evenly, somewhat feebly arcuate; punctures minute and inconspicuous; elytra nearly a fourth longer than wide, pale at the apical margin, quite coarsely and conspicuously, but not very closely punctured, the pubescence coarse. Length 1.9 mm.; width 1.25 mm. Colorado . . . **monticola**, sp. nov.

Prosternal carinæ very strong, gradually convergent and feebly arcuate throughout, moderately separated at the apical margin; body broadly oval, the pronotum gradually testaceous toward the apical angles, only moderately transverse, the sides evidently discontinuous, moderately convergent, evenly, moderately arcuate, the punctures equal in size throughout, rather fine and sparse, but little closer toward the sides; elytra slightly longer than wide, evenly rounded in semicircle behind; punctures not very coarse but strong and somewhat close-set; pubescence coarse, pale, somewhat abundant and conspicuous; legs pale rufo-testaceous, the middle femora at base and the posterior to far beyond the middle black. Length 2.2 mm.; width 1.55 mm. Utah (southwestern)—Mr. Weidt . . . **aridus**, sp. nov.

35—Pronotum almost entirely black, becoming testaceous only at the extreme apical angles, the surface almost completely impunctate, the base broadly angulate, the sides almost continuous, strongly convergent and feebly, evenly arcuate; elytra scarcely as long as wide, the sides feebly arcuate, the apex very broadly obtuse, with the reflexed bead pale, the punctures sparse, very fine toward the suture, fine but much stronger and more close-set externally. Length 1.8–1.95 mm.; width 1.3–1.45 mm. California (Monterey and Sonoma Cos.).

luctuosus, sp. nov.

Pronotum black, not very abruptly and obliquely pale at the sides, broadly in front, very narrowly at the basal angles, the base almost transverse, lobed in the middle, the sides strongly discontinuous, moderately convergent, evenly and distinctly arcuate, the punctures fine but distinct, sparse, becoming close-set at the sides; elytra scarcely as long as wide, evenly oval, with the apical bead alone pale, the punctures somewhat coarse, deep, even and sparse throughout. Length 1.9–2.2 mm.; width 1.4–1.7 mm. California (Siskiyou, Humboldt and Sta. Cruz Cos.).

humboldti, sp. nov.

Pronotum black, abruptly and moderately broadly pale at the sides in a parallel area almost equally wide at apex and base, the basal margin feebly bioblique, lobed at the middle, the sides continuous but with a slight reëntering angle, strongly convergent, evenly and distinctly arcuate; punctures minute, sparse and inconspicuous; elytra short, very obtusely rounded, somewhat alutaceous, the punc-

- tures fine, feeble, moderately close-set, even and slightly asperulate, the pubescence rather short and closely laid; male with a small glabrous subdepressed and narrowly triangular area at the apex of the first ventral, surrounded by denser vestiture. Length 1.9-2.1 mm.; width 1.45-1.7 mm. California (Sonoma Co.).....**sonomæ**, sp. nov.
- 36—Pronotum broadly but obliquely red at the sides, the pale area very narrow at the basal angles; form broadly oval. 37
- Pronotum feebly and almost invisibly piceous to pale testaceous at the extreme apical angles only; elytra with the apical reflexed bead paler, slightly wider in *jacinto*. 40
- 37—Elytra with a narrow but distinct band of testaceous at the apical margin. 38
- Elytra with the mere apical reflexed bead red, the paler tint scarcely extending further 39
- 38—Male with the fifth ventral segment broadly truncate toward the middle, the surface only feebly convex-beveled for a short distance at the middle; first segment unmodified and punctured throughout; prosternal carinæ widely separated at the apical margin; prothorax rather small, short and transverse, very finely though distinctly, almost evenly punctured, the sides not quite continuous, rather feebly convergent and evenly, moderately arcuate; elytra finely though distinctly, moderately closely punctured, polished and smooth. Length 1.6-1.8 mm.; width 1.2-1.3. Arizona (Benson and the Gila Valley)—One specimen, from San Diego, is much smaller and has the fifth ventral shorter and more broadly rounded in the female but does not otherwise differ.....**gilæ**, sp. nov.
- Male with the fifth ventral broadly, feebly sinuate, the surface strongly beveled in the middle, the first segment with an elongate impunctate area at the middle of the apex; prosternal carinæ narrowly separated at the apical margin; body similar to *gilæ* in form and sculpture, the sides of the prothorax more nearly continuous with those of the elytra and more convergent, and the base more oblique at each side. Length 1.8 mm.; width 1.3 mm. Utah (southwestern)—Mr. Weidt.
- deciplens**, sp. nov.
- 39—Form less broadly oval, the prothorax relatively smaller, with the sides evidently discontinuous, moderately convergent, evenly and rather feebly arcuate, finely punctured, rather closely toward the sides; elytra distinctly longer than wide, quite coarsely but not very closely punctured, the pubescence coarse, ashly and conspicuous. Length 2.25 mm.; width 1.6 mm. Colorado (Garland)—Mr. Schwarz.....**garlandicus**, sp. nov.
- Form very broadly oval, the prothorax relatively larger, the sides almost continuous with those of the elytra, strongly convergent, evenly but feebly arcuate, the punctures fine but strong, sparse, becoming notably close-set and distinct broadly toward the sides; elytra not longer than wide, rather coarsely and strongly but not very closely punctate, the pubescence rather short, fine, more decumbent and not very conspicuous. Length 2.2 mm.; width 1.7 mm. California (Mokelumne Hill, Calaveras Co.)—Dr. Blaisdell.....**blaisdelli**, sp. nov.
- 40—Form rather narrowly oval, the elytra opaque and finely rugulose, finely, closely and asperulately punctate, the pubescence rather short and decumbent; prothorax strongly transverse, as wide at base as the base of the elytra but with a feeble re-entering angle, smooth, polished, extremely minutely and sparsely punctulate, the sides rather strongly convergent, evenly and distinctly arcuate. Length 1.6 mm.; width 1.15 mm. California (Sonoma Co.).....**advena**, sp. nov.

- Form broadly oval, the elytra smooth and polished. 41
- 41—Prothorax short, about two and one-half times as wide as long; head wholly or partly red. 42
- Prothorax about twice as wide as the median length, the base strongly oblique at each side, the sides evidently discontinuous, only moderately convergent, evenly and feebly arcuate, the punctures minute and sparse; elytra strongly and closely punctate. Length 2.0 mm.; width 1.5 mm. California (Sonoma Co.).
- extricatus**, sp. nov.
- 42—Sides of the prothorax evidently discontinuous, feebly convergent, evenly and feebly arcuate, the punctures strong and close-set in the middle, becoming finer and sparser toward the sides; elytra evenly, finely but strongly, moderately closely punctured, the pubescence fine, infusate and only moderately conspicuous. Length 1.6–1.9 mm.; width 1.15–1.4 mm. California (Monterey to Sonoma). **ardelio** Horn
- Sides of the prothorax nearly continuous, strongly convergent, evenly and distinctly arcuate, the punctures nearly as in *ardelio* but sparser throughout; elytra finely but strongly, sparsely punctured, the pubescence rather coarse and distinct; male with a feebly impressed, elongate-oval area at the middle of the apex of the first ventral, the fifth broadly sinuato-truncate and impressed, the characters nearly as in *extricatus* throughout. Length 1.75–1.8 mm.; width 1.3–1.4 mm. California (San Diego). **jacobianus**, sp. nov.
- Sides of the prothorax strongly discontinuous, very feebly convergent, evenly and feebly arcuate, the surface punctured nearly as in *jacobianus*; elytra notably wider than the prothorax, rounded, finely but strongly, rather sparsely punctate, the apical margin red for a distance equal to about a fifth the length of the prothorax; male with a very small, wholly unimpressed and feebly defined glabrous area at the middle of the apex of the first ventral, the fifth broadly sinuato-truncate and impressed; pubescence of the upper surface coarse and conspicuous. Length 1.6 mm.; width 1.2 mm. California (San Diego). **jacinto**, sp. nov.
- 43—Species of the Atlantic regions. 44
- Species of the Pacific and Sonoran regions, *lacustris* and *abbreviatus* extending to the eastward as far as Lake Superior. 45
- 44—Broadly oval, strongly convex, shining, black throughout, the legs uniformly colored but varying from pale testaceous to blackish; pubescence rather coarse; prothorax relatively rather small, finely but strongly, sparsely punctured, very closely near the sides, the sides discontinuous, strongly convergent, evenly and strongly arcuate; elytra quite coarsely, strongly and sparsely punctured. Length 1.6–2.3 mm.; width 1.15–1.7 mm. Atlantic States (from Massachusetts to North Carolina and Alabama). **tenebrosus** Muls.
- Narrowly oval, shining, black, the legs bright red; prothorax relatively larger, the punctures extremely minute, sparse and subobsolete, becoming quite large but only moderately close-set near the sides, the latter almost continuous with those of the elytra, strongly convergent and rather feebly, evenly arcuate; elytra distinctly longer than wide, the punctures quite coarse, strong and somewhat sparse, the pubescence coarse and conspicuous. Length 1.9 mm.; width 1.3 mm. Indiana. **compar**, sp. nov.

- 45—Narrowly oval, small, black throughout, the apical angles of the prothorax perhaps becoming paler in some examples; legs pale testaceous throughout; prothorax small, much narrower than the elytra, the sides very discontinuous, only moderately convergent and straight, becoming feebly arcuate at the apex; punctures sparse and scarcely visible throughout, really larger toward the middle but excessively feeble and shallow and variolate as usual; elytra somewhat strongly narrowed behind and evenly rounded from near the humeri, the apex rather narrowly rounded; punctures fine, only moderately close, the pubescence rather short but coarse, ashy and distinct. Length 1.5 mm.; width 1.0 mm. Arizona—Mr. Wickham.....**infans**, sp. nov.
- Broadly oval and much larger, strongly convex, smooth and shining.....46
- 46—Legs black throughout, the tarsi pale; body oval, convex, the sides of the prothorax almost continuous, strongly convergent, evenly and distinctly arcuate, the punctures quite coarse, not very close-set, as large as those of the elytra or larger, becoming gradually very fine, sparse and obsolescent toward the sides; elytra a little longer than wide, moderately obtuse behind, not very coarsely but strongly, moderately sparsely punctured, more minutely toward the suture, the pubescence rather long and coarse; under surface deep black throughout. Length 2.1 mm.; width 1.5 mm. Utah (southwestern)—Mr. Weidt.....**weddti**, sp. nov.
- Legs red, the hind femora black, testaceous toward apex.....47
- Legs red, the hind femora black at the extreme base.....55
- Legs bright and uniform rufo-testaceous throughout.....56
- 47—Hind femora testaceous only well beyond the middle.....48
- Hind femora becoming testaceous in about apical half.....53
- 48—Tip of the elytra pale testaceous in a border which is about a fifth or sixth as wide as the length of the prothorax, the latter relatively small, short and strongly transverse, the sides evidently discontinuous, rather feebly convergent, evenly and somewhat strongly arcuate, the punctures minute and inconspicuous; elytra scarcely longer than wide, rather narrowly rounded behind, finely but strongly, evenly and not very closely punctured, the pubescence ashy-white, rather short and somewhat abundant; tip of abdomen pale, the hind femora very gradually pale apically. Length 1.9 mm.; width 1.35 mm. Nevada (Reno).
- renoicus**, sp. nov.
- Tip of the elytra only paler along the fine reflexed marginal bead; hind femora pale at apex only.....49
- 49—Head pale toward the clypeal margin in both sexes but more broadly in the male.....50
- Head deep black throughout to the margin of the clypeus, at least in the female...51
- 50—Sides of the prothorax nearly continuous, strongly convergent, evenly and strongly arcuate, the punctures slightly closer and more evident toward the sides, fine but distinct throughout; elytra rather coarsely, strongly, evenly and sparsely punctured; abdomen not pale at apex, the fifth segment of the male broadly sinuato-truncate, the surface deeply impressed in a transverse, posteriorly arcuate and well-defined concave bevel, the first with an elongate triangular glabrous area at the middle, defined by fine dense punctures. Length 2.2 mm.; width 1.6 mm. Lake Superior; [var. ? *nigrivestis* Muls. New Orleans, La.].....**lacustris** Lec.

- 34—Prosternal carinae widely separated at base, straight and strongly convergent to apical third, thence parallel and well separated to the apical margin; body broadly oval, shining, black, the pronotum gradually pale testaceous toward the apical angles, short, the sides almost perfectly continuous, strongly convergent, evenly and moderately arcuate; punctures minute and inconspicuous, slightly closer toward the sides; elytra scarcely as long as wide, the apical margin very finely testaceous; punctures fine but strong, not very close-set. Length 1.75–1.9 mm.; width 1.3–1.4 mm. Arizona (Yuma) **apacheanus**, sp. nov.
- Prosternal carinae straight and feebly convergent throughout, becoming almost obliterated in basal half; body narrowly oval, the pronotum gradually testaceous toward the apical angles, less transverse and relatively larger than in *apacheanus*, the sides of the body being less arcuate; sides almost continuous, rather strongly convergent and evenly, somewhat feebly arcuate; punctures minute and inconspicuous; elytra nearly a fourth longer than wide, pale at the apical margin, quite coarsely and conspicuously, but not very closely punctured, the pubescence coarse. Length 1.9 mm.; width 1.25 mm. Colorado **monticola**, sp. nov.
- Prosternal carinae very strong, gradually convergent and feebly arcuate throughout, moderately separated at the apical margin; body broadly oval, the pronotum gradually testaceous toward the apical angles, only moderately transverse, the sides evidently discontinuous, moderately convergent, evenly, moderately arcuate, the punctures equal in size throughout, rather fine and sparse, but little closer toward the sides; elytra slightly longer than wide, evenly rounded in semicircle behind; punctures not very coarse but strong and somewhat close-set; pubescence coarse, pale, somewhat abundant and conspicuous; legs pale rufo-testaceous, the middle femora at base and the posterior to far beyond the middle black. Length 2.2 mm.; width 1.55 mm. Utah (southwestern)—Mr. Weidt **aridus**, sp. nov.
- 35—Pronotum almost entirely black, becoming testaceous only at the extreme apical angles, the surface almost completely impunctate, the base broadly angulate, the sides almost continuous, strongly convergent and feebly, evenly arcuate; elytra scarcely as long as wide, the sides feebly arcuate, the apex very broadly obtuse, with the reflexed bead pale, the punctures sparse, very fine toward the suture, fine but much stronger and more close-set externally. Length 1.8–1.95 mm.; width 1.3–1.45 mm. California (Monterey and Sonoma Cos.) **luctuosus**, sp. nov.
- Pronotum black, not very abruptly and obliquely pale at the sides, broadly in front, very narrowly at the basal angles, the base almost transverse, lobed in the middle, the sides strongly discontinuous, moderately convergent, evenly and distinctly arcuate, the punctures fine but distinct, sparse, becoming close-set at the sides; elytra scarcely as long as wide, evenly oval, with the apical bead alone pale, the punctures somewhat coarse, deep, even and sparse throughout. Length 1.9–2.2 mm.; width 1.4–1.7 mm. California (Siskiyou, Humboldt and Sta. Cruz Cos.) **humboldtii**, sp. nov.
- Pronotum black, abruptly and moderately broadly pale at the sides in a parallel area almost equally wide at apex and base, the basal margin feebly bioblique, lobed at the middle, the sides continuous but with a slight reëntering angle, strongly convergent, evenly and distinctly arcuate; punctures minute, sparse and inconspicuous; elytra short, very obtusely rounded, somewhat alutaceous, the punc-

- tures fine, feeble, moderately close-set, even and slightly asperulate, the pubescence rather short and closely laid; male with a small glabrous subdepressed and narrowly triangular area at the apex of the first ventral, surrounded by denser vestiture. Length 1.9-2.1 mm.; width 1.45-1.7 mm. California (Sonoma Co.).....**sonomæ**, sp. nov.
- 36—Pronotum broadly but obliquely red at the sides, the pale area very narrow at the basal angles; form broadly oval. 37
- Pronotum feebly and almost invisibly piceous to pale testaceous at the extreme apical angles only; elytra with the apical reflexed bead paler, slightly wider in *jacinto*.. 40
- 37—Elytra with a narrow but distinct band of testaceous at the apical margin. 38
- Elytra with the mere apical reflexed bead red, the paler tint scarcely extending further 39
- 38—Male with the fifth ventral segment broadly truncate toward the middle, the surface only feebly convex-beveled for a short distance at the middle; first segment unmodified and punctured throughout; prosternal carinæ widely separated at the apical margin; prothorax rather small, short and transverse, very finely though distinctly, almost evenly punctured, the sides not quite continuous, rather feebly convergent and evenly, moderately arcuate; elytra finely though distinctly, moderately closely punctured, polished and smooth. Length 1.6-1.8 mm.; width 1.2-1.3. Arizona (Benson and the Gila Valley)—One specimen, from San Diego, is much smaller and has the fifth ventral shorter and more broadly rounded in the female but does not otherwise differ.....**gilæ**, sp. nov.
- Male with the fifth ventral broadly, feebly sinuate, the surface strongly beveled in the middle, the first segment with an elongate impunctate area at the middle of the apex; prosternal carinæ narrowly separated at the apical margin; body similar to *gilæ* in form and sculpture, the sides of the prothorax more nearly continuous with those of the elytra and more convergent, and the base more oblique at each side. Length 1.8 mm.; width 1.3 mm. Utah (southwestern)—Mr. Weidt.
- deciptens**, sp. nov.
- 39—Form less broadly oval, the prothorax relatively smaller, with the sides evidently discontinuous, moderately convergent, evenly and rather feebly arcuate, finely punctured, rather closely toward the sides; elytra distinctly longer than wide, quite coarsely but not very closely punctured, the pubescence coarse, ashy and conspicuous. Length 2.25 mm.; width 1.6 mm. Colorado (Garland)—Mr. Schwarz.....**garlandicus**, sp. nov.
- Form very broadly oval, the prothorax relatively larger, the sides almost continuous with those of the elytra, strongly convergent, evenly but feebly arcuate, the punctures fine but strong, sparse, becoming notably close-set and distinct broadly toward the sides; -elytra not longer than wide, rather coarsely and strongly but not very closely punctate, the pubescence rather short, fine, more decumbent and not very conspicuous. Length 2.2 mm.; width 1.7 mm. California (Mokelumne Hill, Calaveras Co.)—Dr. Blaisdell.....**blaisdellii**, sp. nov.
- 40—Form rather narrowly oval, the elytra opaque and finely rugulose, finely, closely and asperulately punctate, the pubescence rather short and decumbent; prothorax strongly transverse, as wide at base as the base of the elytra but with a feeble re-entering angle, smooth, polished, extremely minutely and sparsely punctulate, the sides rather strongly convergent, evenly and distinctly arcuate. Length 1.6 mm.; width 1.15 mm. California (Sonoma Co.).....**advena**, sp. nov.

- sides at the base and having its apex on the suture at apical seventh or eighth, sometimes enveloping the entire base and extending posteriorly along the sides behind the middle; under surface black, the legs dusky-testaceous, with the femora darker. Length 1.8–2.0 mm.; width 1.3–1.4 mm. Louisiana, Texas and Arizona (Tuçson).....**cinctus** Lec.
- Elytral punctures fine, strong and very close-set; upper surface testaceous, the pronotum with a broad parabolic and rather poorly defined black spot, extending to about apical fourth; sides slightly discontinuous, the punctures minute and inconspicuous, very close broadly toward the sides; elytra with a black sutural vitta, sinuously expanding toward base, where it does not extend laterally much beyond the middle of each, finely attenuate posteriorly and not attaining the apex; under surface and legs as in *cinctus*. Length 1.8–2.0 mm.; width 1.2–1.4 mm. California (Sta. Barbara); [*suturalis* || Lec.].....**lecontei** Cr.
- 61—Head testaceous, the pronotum black, with the apical margin narrowly, and apical angles more broadly, indefinitely pale, short and transverse, the sides strongly discontinuous, feebly convergent, evenly and moderately arcuate, the punctures fine but strong and very close-set throughout; elytra dark rufo-testaceous, with sutural black vitta gradually expanding to the base and a nubilata lateral area not attaining base or apex, varying thence to entirely black, with a narrow oblique red discal streak on each closely approaching the suture posteriorly; punctures fine, strong, even and extremely close-set; pubescence rather long, coarse and conspicuous; under surface black, the legs slender, testaceous, the femora black with the extreme tip red; male with the fifth ventral less feebly sinuate at apex than in *lecontei*. Length 1.8–1.9 mm.; width 1.1–1.25 mm. California (Sonoma Co.)**sarpedon**, sp. nov.
- 62—Body broadly oval, each elytron with a distinctly defined discal red spot just before the middle, the spot obliquely subrhomboidal in form; pronotum pale at the apical angles, the sides continuous and strongly convergent, arcuate; elytra sparsely punctate, the pubescence coarse and distinct. Length 2.5 mm.; width 1.7 mm. California.....**pacificus** Cr.
- Body broadly oval, each elytron with a more elongate oblique red spot before the middle of the disk, the spot nearly attaining the suture; pronotum entirely black. Length [2.5 mm]. New Mexico.....**strabus** Horn
- Body narrowly oblong-oval and much smaller, the elytra pale testaceous, with the suture narrowly blackish, the dark tint extending nubilously along the basal margin to the sides and sometimes prolonged backward along the latter for some distance, the punctures not very close; prothorax much smaller, distinctly narrower than the elytra, the sides strongly discontinuous, feebly convergent and feebly arcuate, black, gradually paler toward the apical angles; under surface and legs black, the ventral plate distant from the segmental apex by half of its own length. Length 1.6–1.9 mm.; width 0.8–1.1 mm. California (Lake Tahoe, Truckee and Monterey).....**coniferarum** Cr.
- 63—Very narrow and elongate-oval, polished, black, each elytron with a large triangular red spot at the centre of the disk; under surface and legs black, the trochanters and tarsi paler; prothorax unusually feebly transverse, scarcely twice as wide as long, the sides obviously discontinuous, feebly convergent and nearly straight, becoming feebly arcuate at apex; punctures remote and almost obsolete; elytra

fully a third longer than wide, rather narrowly obtuse behind, the punctures sparse and rather strong; pubescence coarse; male with the fifth ventral evenly sinuate at tip, the surface narrowly beveled along the sinus, the first gradually glabrous toward the middle. Length 1.5 mm.; width 0.8 mm. Pennsylvania.

punctatus Say

Much more broadly oval, the body smaller, less polished, black throughout, the pronotum feebly picescent at the apical angles, not more than three-fifths as wide as the elytra, scarcely more than twice as wide as long, the sides quite strongly convergent, very discontinuous and almost straight, the punctures very minute and inconspicuous; elytra but little longer than wide, obtusely rounded at apex, very finely, rather feebly, evenly but not closely punctured, the pubescence rather short and fine, not very conspicuous; legs rufo-piceous; ventral plates approaching the hind margin of the segment by a third or fourth of their own length but rather narrow and strongly rounded. Length 1.25-1.35 mm.; width 0.8-0.95 mm. Nevada (Reno)..... **occludus**, sp. nov.

Evenly and not very broadly oval, black, the frontal margin, mouth, apical angles of the pronotum and legs throughout pale; marginal bead of the elytra at apex also testaceous; prothorax nearly as wide as the elytra, finely, not densely and evenly punctate, the sides almost perfectly continuous, strongly convergent and feebly arcuate; elytra distinctly longer than wide, rather finely but strongly, evenly and not closely punctate, the pubescence moderately long, cinereous and distinct; metacoxal plate approaching extremely close to the suture, broadly rounded; male with the fifth ventral broadly trapezoidal and sinuato-truncate, the edge narrowly beaded and the surface just anteriorly more convex. Length 1.5 mm.; width 0.95 mm. New Mexico..... **nanus Lec.**

64—Upper surface black, each elytron with a large oval red spot on the median line of the disk just before the middle; form very broadly oval, the head and pronotum black throughout, the latter finely, strongly and closely punctate; elytra rather coarsely, evenly and moderately closely punctate, not pale at apex, the pubescence coarse; under surface black throughout, the legs fusco-testaceous, the femora black. Length 2.5 mm.; width 1.85 mm. Texas; [Tennessee and Louisiana—Horn.]..... **circumspectus Horn**

Upper surface black, the prothorax bicolored; elytra without discal pale spot.... 65
Upper surface pale flavo-testaceous to piceous-black; sides of the prothorax discontinuous..... 69

65—Elytra distinctly and somewhat broadly margined with red at the apical margin, oval, polished, the head and prothorax generally pale, the latter broadly black toward the middle and base, sometimes black throughout, the sides not quite continuous, rather strongly convergent and evenly, moderately arcuate, the punctures generally distinct but not very dense; elytra coarsely and sparsely punctate, the pubescence coarse, rather long, ashy and conspicuous; legs pale to blackish in color. Length 1.8-2.7 mm.; width 1.3-1.9 mm. New York, Delaware, Mississippi, Texas, Indiana, Illinois and Iowa..... **americanus Muls.**

Elytra not red at tip, or only extremely finely so, the punctures very much smaller and more close-set, the body more narrowly oval; vestiture rather short and decumbent, cinereous..... 66

- 66—Pronotum black, sometimes with the sides paler, minutely, sparsely and inconspicuously punctulate, the sides not quite continuous, moderately convergent, and rather strongly arcuate; elytra black, finely but very clearly, evenly not very closely punctate; legs red. Length 1.9 mm.; width 1.4 mm.
 gon—Mr. Wickham..... **caurius** Horn
 im pale testaceous, with a parabolic and frequently somewhat ill-defined median dark spot at the base, extending almost to the apical margin, the sides subcon-
 us with those of the elytra, convergent and rather strongly arcuate, the sur-
 face minutely reticulate and distinctly alutaceous, the punctures extremely small,
 sparse and inconspicuous; elytral punctures small, rather feeble; legs red
 throughout 67
- 67—Abdominal lines only partially interrupted all, approaching very close to
 the hind margin of the segment, as app the two following also; male
 with the fifth ventral segment broadly sinu cate, feebly impressed and very
 inconspicuously pubescent along the sinua tion. Length 1.7 mm.; width
 1.15 mm. Nevada (Reno)..... **innocuus**, sp. nov.
- Abdominal lines distinctly interrupted externally. usual in the present group... 68
- 68—Male with the fifth ventral segment very fee uate at apex but conspicuously
 clothed with coarse, dense, erect and subfl pubescence. Length 1.9-2.1
 mm.; width 1.3-1.5 mm. Indiana—Ca ette..... **rusticus**, sp. nov.
- Male with the fifth ventral short and broadly tr but scarcely at all sinuate, the
 edge with a short and steep bevel and clothe fine inconspicuous pubescence.
 Length 1.8-2.0 mm.; width 1.25-1.5 mm. ifornia (Sonoma Co.).
aluticollis, sp. nov.
- 69—Elytral punctures rather coarse and sparse tho only moderately deep... 70
 Elytral punctures fine and close-set; body smaller and more narrowly oval uniform
 piceous-black above or paler, with the pronotum still paler toward the apical
 angles; prothorax relatively small, moderately transverse, much narrower than
 the elytra, the sides moderately convergent and feebly arcuate, the punctuation
 close but very fine; elytra longer than wide, not very obtuse at tip, feebly black-
 ish toward the suture and side-margin in some of the paler forms, the pubescence
 short, abundant and rather coarse. Length 1.75-1.9 mm.; width 1.0-1.2 mm.
 California (Monterey to Humboldt Co.)..... **difficilis**, sp. nov.
- 70—Upper surface pale rufo-flavate, polished, immaculate, the pubescence rather short,
 sparse, moderately coarse; prothorax much narrower than the elytra, minutely,
 not very closely punctate, the sides only moderately convergent and more or less
 feebly arcuate; elytra about as long as wide. Length 1.7-2.5 mm.; width
 1.0-1.75 mm. British Columbia to northern California..... **phelpsi** Cr.
- Upper surface pale luteo-flavate, the elytra with small irregular blotches or dashes of
 black, the pronotum frequently blackish except at the sides, strongly transverse;
 elytral punctures binary, as in *phelpsi*, the larger sometimes tending to linear ar-
 rangement toward the suture and base; post-mesocoxal line generally entire but
 sometimes more or less abbreviated, in one specimen only extending two-thirds the
 distance to the episternal suture. Length 1.8-2.25 mm.; width 1.15-1.6 mm.
 California (Humboldt to Los Angeles)..... **nebulosus** Lec.
- 71—Elytra black, each with a single sharply defined rounded discal pale spot... 72

- Elytra black, each with two sharply defined oval spots, or a design formed by an amalgamation of such spots.....73
- Elytra black or piceous, with irregular paler design or maculation.....75
- Elytra pale, or sometimes pale with the suture or margins dusky..... 77
- 72—Prothorax entirely testaceous, each elytron with a very large circular red spot just behind the middle, the apex not paler; pubescence rather coarse, cinereous and conspicuous, the punctures very fine and not very dense; legs flavo-testaceous, Length 1.25 mm.; width 0.85 mm. Florida (Dry Tortugas)..**bivulnerus** *Horn*
- Prothorax entirely black, the head red or black; legs testaceous, the femora black, especially the posterior; elytra each with a smaller spot near apical third; body moderately large and stout, the sides of the prothorax nearly continuous with those of the elytra; elytral punctures rather small, the pubescence coarse, rather abundant and conspicuous. Length 1.9 mm; width 1.3. Pennsylvania.
- flavifrons** *Melsh.*
- Var. A—Much smaller and generally somewhat more narrowly oval, the elytral punctures relatively rather larger, the pubescence not quite so conspicuous. Length 1.4–1.6 mm.; width 0.95–1.1 mm. Pennsylvania, New Jersey, Delaware and Georgia.....**biculatus** *Muls.*
- 73—Spots of the elytra narrowly but clearly separated, oval. Length 2.0 mm.; width 1.2 mm. Lake Superior.....**ornatus** *Lec.*
- Spots of the elytra broadly coalescent, forming an elongate, bilaterally sinuate discal maculation.....74
- 74—Larger species and more broadly oval, the abdomen strongly and rather closely punctured at the sides of the first segment, the epipleuræ scarcely attaining the middle of the side-margin of the second segment, the arrangement of the punctures at the sides of the first segment indicating derivation from a form having complete ventral plates, with the bounding line bending abruptly to the front very near them argin; prothorax black throughout, minutely and rather closely punctate, the sides not quite continuous with those of the elytra, strongly convergent, evenly and strongly arcuate; elytra much longer than wide, rather strongly rounded at apex, finely but deeply, moderately closely and somewhat irregularly punctate; legs red, the femora blackish. Length 2.15 mm.; width 1.35 mm. Massachusetts.....**sanguioifer**, sp. nov.
- Small and narrowly oval but similar to the preceding in form, the abdomen finely and sparsely punctate over the post-coxal areas, the lines curved forward at their extreme limit but not much prolonged, the epipleuræ attaining the apex of the second segment, black, the elytral spot less defined than in *sanguinifer*; the punctures rather sparser and the apex more narrowly rounded. Length 1.65 mm.; width 0.8–0.9 mm. Colorado (Rocky Mts.).....**naviculatus**, sp. nov.
- 75—Black throughout, broadly oval, the legs piceous, each elytron with two transverse discal spots which are almost, or completely, divided each into two very small pale spots, the outer of which are the more linear and oblique; punctures fine and very close-set, the pubescence rather coarse, cinereous and conspicuous but easily denuded. Length 1.8 mm.; width 1.2 mm. California.

guttulatus *Lec.*

Piceous-black, narrowly oval, the legs dark testaceous throughout, each elytron with a transverse reniform pale spot just behind apical third, and also paler toward the

- Sides of the prothorax not quite continuous, less convergent, evenly and feebly arcuate; punctuation similar; elytra shorter, not quite as long as wide, very obtuse at apex, the punctures even, rather fine but strong and quite sparse; pubescence coarse, yellowish-cinereous in color and conspicuous; male characters nearly as in *lacustris*, the fifth segment more feebly impresso-beveled and the glabrous area of the first less defined. Length 2.0–2.15 mm.; width 1.5–1.65 mm. California (Lake Tahoe)..... **tahoensis**, sp. nov.
- 51—Pronotum impunctate at any part, the sides continuous with those of the elytra, strongly convergent, evenly and rather strongly arcuate; elytra distinctly longer than wide, rather strongly but not closely punctate, the vestiture somewhat whitish, coarse, not very abundant but rather conspicuous. Length 2.15 mm.; width 1.5 mm. Utah (southwestern)—Mr. Weidt **subsimilis**, sp. nov.
- Pronotum distinctly but finely punctate, the punctures somewhat larger and more or less close-set toward the sides, the latter not quite continuous with those of the elytra, less strongly convergent, subevenly and moderately arcuate. 52
- 52—Elytra scarcely as long as wide, strongly, evenly but unusual y sparsely punctured, the pubescence long, coarse, not dense but very conspicuous, yellowish-white in color. Length 2.1 mm.; width 1.6 mm. Utah (southwestern)—Mr. Weidt. **mormon**, sp. nov.
- Elytra fully as long as wide, somewhat less obtuse behind, rather strongly, evenly punctate, the punctures moderately close-set, the pubescence shorter, finer, darker in color, more decumbent and rather less conspicuous though more abundant. Length 2.1–2.2 mm.; width 1.6 mm. California (Mokelumne Hill, Calaveras Co.)—Dr. Blaisdell; (Dunsmuir, Siskiyou Co.)—Mr. Wickham. **calaveras**, sp. nov.
- 53—Head pale at the clypeal margin, more broadly in the male. 54
- Head black throughout; body large, very broadly oval, the prothorax much narrower than the elytra, the sides strongly discontinuous, feebly convergent, evenly and strongly arcuate, the punctures fine and not conspicuous; elytra about as long as wide, rather coarsely, strongly and closely punctured, the pubescence fine, short, decumbent, rather abundant but dark in color and inconspicuous; under surface densely punctate. Length 2.5 mm.; width 1.8 mm. California (Siskiyou Co.) **saginat**us, sp. nov.
- 54—Large, strongly convex, polished, the prothorax moderate in size, much narrower than the elytra, the sides strongly discontinuous, moderately convergent, evenly and moderately arcuate, the punctures fine and sparse, closer toward the sides; elytra as long as wide, not very coarsely but deeply, evenly and rather sparsely punctured, the pubescence moderately long and coarse but dark in color and rather sparse; male with a concave median glabrous area, defined by fine dense piliferous punctures, at the apex of the first ventral, the fifth broadly sinuato-truncate and medially impressed as usual. Length 2.4 mm.; width 1.8 mm. California (probably near San Francisco) **strenuus**, sp. nov.
- Smaller, equally convex and polished, less broadly oval, the prothorax shorter and more transverse, the sides strongly discontinuous, rather feebly convergent, evenly and somewhat strongly arcuate, the punctures fine, rather sparse, even, more close-set toward the sides; elytra a little longer than wide, evenly, almost semicircularly rounded behind, not very coarsely but deeply, evenly and rather sparsely punct-

- Elytra black or piceous, each with two pale spots. 81
- Elytra black throughout, the apex broadly pale in fourth or fifth, the pale area divided by the rather broadly black suture to the apical angles; body very small, broadly oval, the head, prothorax and legs throughout pale testaceous; prothorax short and transverse, finely punctulate, the sides nearly continuous, strongly convergent and arcuate; elytra barely as long as wide, very finely, evenly and not densely punctate, the pubescence short but pale and coarse. Length 1.2 mm.; width 0.85 mm. Locality not indicated. **dichrous** *Muls.*
- Elytra black, with a broad apical red area which is not divided by the suture; legs red throughout. 83
- Elytra black or brown throughout, the apex not, or only very narrowly, paler. 84
- Elytra pale, with a black spot or design. 86
- 81—Form very narrowly oblong and parallel, black, shining, the legs pale; pronotum pale, infuscate toward the middle; punctures fine and sparse, the pubescence short, suberect and quite conspicuous; elytra each with two large pale spots, the anterior at basal third the larger, extending somewhat obliquely and becoming subattenuate toward the humeral callus, the posterior at apical fourth and obliquely suboval. Length 1.6 mm.; width 0.9 mm. Florida (Enterprise) and Louisiana. **4-tæniatus** *Lec.*
- Form broadly oval 82
- 82—Prothorax black, faintly piceous toward the apical angles, the sides nearly continuous, strongly convergent and feebly arcuate; elytra longer than wide, finely and not very closely punctate, each with a moderate subquadrate spot just before the middle, nearer the suture than the side, and another, smaller and reniform, in the same line at apical fourth; apex scarcely paler; pubescence rather coarse and distinct. Length 1.7 mm.; width 1.15 mm. Pennsylvania.
- myrmedon** *Muls.*
- Prothorax pale rufo-testaceous throughout; head and legs similar in coloration, the hind femora blackish, except at tip; abdomen pale, blackish toward base; body stout, oblong-oval; prothorax short and transverse, finely but distinctly, rather closely punctate, the sides slightly discontinuous, moderately convergent, evenly and strongly arcuate; elytra subquadrate, as long as wide, very obtuse at apex, black, finely but strongly, evenly and not very closely punctured, each with a very oblique pale line from anterior two-fifths and inner third to and enveloping the entire humeri, subdivided near its middle point, and a transverse broader spot at apical fourth or fifth, narrowly and equally distant from the suture and side margin, the apex very narrowly pale; pubescence coarse, suberect and distinct. Length 1.7 mm.; width 1.2 mm. North Carolina (Asheville).
- adulans**, sp. nov.
- Prothorax yellow, darker in front of the scutellum; elytra piceous, a narrow apical border and two spots, one small and rounded in front of the middle, nearer the suture than the side, and the other transverse and slightly sinuous, at apical third, touching the side but not the suture [not so drawn in the figure], pale; legs yellow. Length [1.25–1.5 mm]. Southern New Jersey. **liebecki** *Horn*
- 83—Prothorax black, with the apex narrowly, and the apical angles more broadly, testaceous, the sides not quite continuous, moderately convergent and broadly

- arcuate, the punctures fine but strong and moderately close-set; elytra distinctly longer than wide, finely but strongly, not very closely punctate; pubescence coarse and distinct. Length 1.3-1.8 mm.; width 0.9-1.25 mm. New York to Texas and Iowa; [*femoralis* Lec.].....**terminatus** Say
- Prothorax flavo-testaceous, with a broad parabolic basal spot of black not extending to the apex, the sides strongly discontinuous, feebly convergent, evenly and strongly arcuate, the punctures fine, strong and very close-set; elytra broadly oval, not longer than wide, with the apical fourth abruptly pale, the punctures strong but very small, finer and closer than in *terminatus*, the pubescence rather short and fine, darker in color and less conspicuous. Length 1.7 mm.; width 1.25 mm. Texas (Austin).....**partitus**, sp. nov.
- 84—Form broadly oval, the elytra not longer than wide, black, shining, the pubescence coarse, suberect, cinereous and conspicuous; head, legs and pronotum pale testaceous, the latter slightly infusate before the scutellum, the sides continuous, strongly convergent, evenly and rather feebly arcuate; elytra minutely, sparsely punctulate, the apical margin narrowly and indefinitely pale, the scutellum black. Length 1.25 mm.; width 0.9 mm. Texas (Columbus)....**houstoni**, sp. nov.
- 85—Form broadly oval, the elytra distinctly longer than wide; head and legs pale, the pronotum narrowly paler at apex, almost imperceptibly so in *brunnescens*; sides of prothorax continuous but a little more arcuate than those of the elytra, rather strongly convergent.....**brunnescens**, sp. nov.
- 86—Pronotum pale flavo-testaceous, gradually infusate in the middle toward base, finely but rather strongly and closely punctulate; elytra black, shining, rather strongly and somewhat closely punctate, the pubescence cinereous, only moderate in length and coarseness. Length 1.2-1.3 mm.; width 0.8-0.85 mm. North Carolina (Asheville),**appalacheus**, sp. nov.
- Pronotum pale flavo-testaceous throughout, the elytra very pale brown, sometimes slightly darker and picescent in a large triangular nubilous basal region on the suture, rather sparsely and very finely punctate, the pubescence quite long, coarse suberect, bristling and conspicuous; under surface blackish-piceous, the abdomen paler. Length 1.3-1.6 mm.; width 0.9-1.05 mm. Texas (Brownsville)—Mr. Wickham.....**brunneacens**, sp. nov.
- 87—Oval, much longer than wide, shining, pale flavo-testaceous throughout above and beneath, the legs still paler; head and pronotum subimpunctate, the latter short, the sides continuous but more arcuate, moderately convergent; elytra distinctly elongate, minutely, sparsely punctate, with a slightly transverse common sutural spot at apical third, which is feebly arcuate anteriorly and semicircular behind; pubescence only moderate in length. Length 1.3 mm.; width 0.88 mm. Florida. **stigma**, sp. nov.
- 88—Oval, minute, not much longer than wide, very pale albido-flavate, the legs very pale; sterna of the hind body, and sometimes the median basal parts of the abdomen, black; pronotum short and very transverse, scarcely punctulate, the sides not quite continuous, feebly arcuate and moderately convergent, pale, with a short transverse black spot before the scutellum; elytra scarcely as long as wide, pale, with a sharply defined deep black design, consisting of a large common basal spot semicircularly rounded behind, continued narrowly along the basal margin,

- flexed posteriorly at the humeri and continuing narrowly along the side-margin to the middle, the large basal spot also connected by a short sutural isthmus with a small rounded common sutural spot just behind the middle; pubescence long, coarse and bristling. Length 0.9-1.0 mm.; width 0.65-0.75 mm. Bahamas (Eleuthera and Egg Islands)—Mr. Wickham..... **bahamicus** sp. nov.
- Oblong, much longer than wide, very pale luteo-flavate, the pronotum less pale than the elytra but uniform throughout and without a median basal spot, much less transverse than in *bahamicus*; sides somewhat discontinuous, feebly convergent, evenly and feebly arcuate, the punctures minute but visible and rather close-set; elytra evidently longer than wide, nearly straight at the sides, very obtuse at apex, finely but strongly, somewhat closely punctate, the darker design piceous-black and less abruptly defined than in *bahamicus*, consisting of a large subtriangular common basal spot, somewhat prolonged in a fine acuminate line at each side of the suture, but not united to the rounded common sutural spot at apical two-fifths; flanks infuscate at the middle and again at the external apical arcuation; pubescence rather short and inconspicuous. Length 1.15 mm.; width 0.78 mm. Bahamas (Egg Island)..... **putus**, sp. nov.
- 87—Larger species, broadly oblong-oval, pale and uniform luteo-flavate throughout, the abdomen piceous at the middle of the base; pronotum finely punctulate, the sides almost continuous but a little more arcuate, strongly convergent; elytra a little longer than wide, parallel, very obtusely but circularly rounded behind, finely but strongly, rather closely punctate, the suture with a parallel nubilous piceous vitta from the base to rather behind the middle; pubescence coarse and moderately short. Length 1.55 mm.; width 1.05 mm. Kansas... **dulcis**, sp. nov.
- Smaller and more narrowly oval, the elytra not darker on the suture..... 88
- 88—Elytra about as long as wide, not narrowed behind except toward tip..... 89
- Elytra longer than wide, narrowed behind from near basal third; prothorax well developed, only moderately transverse, scarcely perceptibly punctulate, the sides continuous with those of the elytra but rather more arcuate, moderately convergent; elytra rather narrowly subtruncate at tip, finely but distinctly and rather closely punctate, the pubescence very short and subdecumbent. Length 1.1-1.2 mm.; width 0.65-0.7 mm. Michigan and Illinois..... **seger**, sp. nov.
- 89—Prothorax minutely punctulate, the sides continuous with those of the elytra, rather strongly convergent and very feebly arcuate; elytra finely and quite closely punctate, the pubescence very short, abundant and subdecumbent. Length 1.1-1.3 mm.; width 0.75-0.8 mm. California (Alameda Co.)..... **debilis** Lec.
- Prothorax relatively smaller and more convex, impunctate, the sides evidently discontinuous, feebly convergent, evenly and rather strongly arcuate; elytra distinctly and somewhat abruptly wider than the prothorax, obtusely rounded or subtruncate at tip, with somewhat coarse but very shallow and sparse punctures, the pubescence longer, sparser and more erect than in *debilis*, but still quite short. Length 1.1 mm.; width 0.68 mm. Florida..... **pusio**, sp. nov.

In the subgenus *Scymnobius* the prosternum is wholly devoid of carinæ, but there is frequently a fine short groove following the margin of each acetabulum; this is a very well-marked group of

species, and may prove to have full generic value. In *Diomus* the prosternal carinæ are as distinctive and characteristic a feature as in *Pullus* or *Scymnus* proper, and they are by no means obsolete as stated by Dr. Horn; they are, however, finer and less visible under low powers of amplification. In this group, which is indeed almost entitled to generic rank, the first ventral suture is generally more obliterated toward the middle than in the others. The separation of *Scymnodes* Blackb., from *Scymnus*, upon this character, would not be warranted even if the line of demarkation could be distinctly drawn. In the old world, *Scymnus* proper seems to be about as abundant as *Pullus*, but in America the disparity in numbers is very great, the former being relatively very feebly represented.

Scymnus punctum of LeConte, which is closely allied to the European *punctillum*, belongs to the genus *Stethorus* of Weise, very distinct on account of the deflexed prosternum; it is in no way related to *nanus*, with which it is compared by Dr. Horn.

The following species are omitted from the table because of uncertainty regarding their true position.

- S. brullei* Muls.—Oval-oblong; elytra black, each with a rounded red spot in apical third. Length 3.1 mm.; width 1.5 mm. Florida. May be placed before *hemorrhous* but the proportional elongation is much greater.
- S. puncticollis* Lec.—Broadly oval, black, the head and prothorax finely and densely punctured, the latter with a small yellow spot at the apical angles; elytra densely punctate, with a narrow testaceous apical margin; legs pale, the femora piceous. Length 2.25 mm. Upper Mississippi. May be placed just before *agricola* in the table.
- S. abbreviatus* Lec.—Black throughout, the legs rufo-piceous; prothorax sparsely punctured, densely toward the sides; elytra densely and coarsely punctured, the metacoxal plates three-fifths as long as the segment. Length 2.1 mm. Lake Superior (Eagle Harbor). To be placed immediately after *weidti* in the table.
- S. febilis* Horn—May be inserted just before *nubes* in the table
- S. opaculus* Horn—May be placed just after *circumspectus*.
- S. bisignatus* Horn—To be inserted immediately after *bivulnerus*.
- S. amabilis* Lec.—To be placed just before *guttulatus*.
- S. xanthaspis* Muls.—Should appear immediately before *houstoni*.
- S. icteratus* and *cyanescens* of Mulsant, cannot be placed, and the *atramentarius* and *infuscatus* of Boheman, cannot be certainly identified.

Cephaloscymnus *Crotch.*

The two species thus far discovered are mutually closely allied, but differ in color and sculpture. The *Cephaloscymnus ornatus* of Horn,

is in no way related, but belongs to the Scymnillini, where it forms the type of a new and rather isolated genus. The color of the body is uniform and black or piceous.

Black, the elytra sparsely punctured. Maryland and South Carolina.

zimmermanni *Crotch*

Brownish or piceous; elytra more coarsely and quite closely punctured. Southern California and Arizona. **occidentalis** *Horn*

These species are of an oblong-oval form and 1.5–2.0 mm. in length. They may be recognized at once by the very large head and deeply emarginate prothorax, the sides of which are discontinuous with those of the elytra.

RHYZOBIINI.

The insects of this tribe are of a regularly oval, moderately convex form and are clothed throughout with more or less fine semi-erect pubescence, as in Scymnini. They are not, however, closely allied to that tribe, as they possess wider, moderately descending and internally margined epipleuræ, long and slender antennæ, with loosely connected serrate 3-jointed club, entire or subentire and coarsely faceted eyes and entire metacoxal plates, always shorter than the segment, and, in the two genera defined below, the prosternum is flat, moderately or widely separating the coxæ and with two strong entire converging carinæ. The abdomen has six segments, the sixth very small, the maxillary palpi normally securiform and the legs perfectly free. The prothorax is very feebly and evenly sinuate at apex, with broadly rounded angles as in *Psylloborini*. The tarsal claws are well developed, evenly arcuate and slender, with a moderate subquadrate dilatation internally at base, but in the males the anterior and intermediate are thick and bifid, thus forming an exception to the entire family as far as known. The genera before me may be defined as follows:—

Epistoma transversely truncate and simple at apex; hypomera nearly simple; prosternal carinæ arcuate, diverging widely at base, coalescent at apex; metacoxal plates very short. ***Rhyzobius**

Epistoma deeply emarginate, the bottom of the sinus transverse and having a membranous margin; hypomera with a narrow deep groove extending, parallel to the side margin, from the apex nearly to the middle, the prosternal carinæ straight, not coalescent at apex; metacoxal plates much larger, extending almost to the apex of the segment. **Lindorus**

The definition of *Rhyzobius*,—the original spelling of which I agree with Wollaston in following,—is taken from the South African *trimeni* *Csy*.

- sides at the base and having its apex on the suture at apical seventh or eighth, sometimes enveloping the entire base and extending posteriorly along the sides behind the middle; under surface black, the legs dusky-testaceous, with the femora darker. Length 1.8-2.0 mm.; width 1.3-1.4 mm. Louisiana, Texas and Arizona (Tuçson).....**cinctus** Lec.
- Elytral punctures fine, strong and very close-set; upper surface testaceous, the pronotum with a broad parabolic and rather poorly defined black spot, extending to about apical fourth; sides slightly discontinuous, the punctures minute and inconspicuous, very close broadly toward the sides; elytra with a black sutural vitta, sinuously expanding toward base, where it does not extend laterally much beyond the middle of each, finely attenuate posteriorly and not attaining the apex; under surface and legs as in *cinctus*. Length 1.8-2.0 mm.; width 1.2-1.4 mm. California (Sta. Barbara); [*suturalis* || Lec.].....**lecontei** Cr.
- 61—Head testaceous, the pronotum black, with the apical margin narrowly, and apical angles more broadly, indefinitely pale, short and transverse, the sides strongly discontinuous, feebly convergent, evenly and moderately arcuate, the punctures fine but strong and very close-set throughout; elytra dark rufo-testaceous, with sutural black vitta gradually expanding to the base and a nubilata lateral area not attaining base or apex, varying thence to entirely black, with a narrow oblique red discal streak on each closely approaching the suture posteriorly; punctures fine, strong, even and extremely close-set; pubescence rather long, coarse and conspicuous; under surface black, the legs slender, testaceous, the femora black with the extreme tip red; male with the fifth ventral less feebly sinuate at apex than in *lecontei*. Length 1.8-1.9 mm.; width 1.1-1.25 mm. California (Sonoma Co.).....**sarpedon**, sp. nov.
- 62—Body broadly oval, each elytron with a distinctly defined discal red spot just before the middle, the spot obliquely subrhomboidal in form; pronotum pale at the apical angles, the sides continuous and strongly convergent, arcuate; elytra sparsely punctate, the pubescence coarse and distinct. Length 2.5 mm.; width 1.7 mm. California.....**pacificus** Cr.
- Body broadly oval, each elytron with a more elongate oblique red spot before the middle of the disk, the spot nearly attaining the suture; pronotum entirely black. Length [2.5 mm]. New Mexico.....**strabus** Horn
- Body narrowly oblong-oval and much smaller, the elytra pale testaceous, with the suture narrowly blackish, the dark tint extending nubilously along the basal margin to the sides and sometimes prolonged backward along the latter for some distance, the punctures not very close; prothorax much smaller, distinctly narrower than the elytra, the sides strongly discontinuous, feebly convergent and feebly arcuate, black, gradually paler toward the apical angles; under surface and legs black, the ventral plate distant from the segmental apex by half of its own length. Length 1.6-1.9 mm.; width 0.8-1.1 mm. California (Lake Tahoe, Truckee and Monterey).....**coniferarum** Cr.
- 63—Very narrow and elongate-oval, polished, black, each elytron with a large triangular red spot at the centre of the disk; under surface and legs black, the trochanters and tarsi paler; prothorax unusually feebly transverse, scarcely twice as wide as long, the sides obviously discontinuous, feebly convergent and nearly straight, becoming feebly arcuate at apex; punctures remote and almost obsolete; elytra

fully a third longer than wide, rather narrowly obtuse behind, the punctures sparse and rather strong; pubescence coarse; male with the fifth ventral evenly sinuate at tip, the surface narrowly beveled along the sinus, the first gradually glabrous toward the middle. Length 1.5 mm.; width 0.8 mm. Pennsylvania.

punctatus Say

Much more broadly oval, the body smaller, less polished, black throughout, the pronotum feebly picescent at the apical angles, not more than three-fifths as wide as the elytra, scarcely more than twice as wide as long, the sides quite strongly convergent, very discontinuous and almost straight, the punctures very minute and inconspicuous; elytra but little longer than wide, obtusely rounded at apex, very finely, rather feebly, evenly but not closely punctured, the pubescence rather short and fine, not very conspicuous; legs rufo-piceous; ventral plates approaching the hind margin of the segment by a third or fourth of their own length but rather narrow and strongly rounded. Length 1.25-1.35 mm.; width 0.8-0.95 mm. Nevada (Reno).....**occiduus**, sp. nov.

Evenly and not very broadly oval, black, the frontal margin, mouth, apical angles of the pronotum and legs throughout pale; marginal bead of the elytra at apex also testaceous; prothorax nearly as wide as the elytra, finely, not densely and evenly punctate, the sides almost perfectly continuous, strongly convergent and feebly arcuate; elytra distinctly longer than wide, rather finely but strongly, evenly and not closely punctate, the pubescence moderately long, cinereous and distinct; metacoxal plate approaching extremely close to the suture, broadly rounded; male with the fifth ventral broadly trapezoidal and sinuato-truncate, the edge narrowly beaded and the surface just anteriorly more convex. Length 1.5 mm.; width 0.95 mm. New Mexico.....**nanus Lec.**

64—Upper surface black, each elytron with a large oval red spot on the median line of the disk just before the middle; form very broadly oval, the head and pronotum black throughout, the latter finely, strongly and closely punctate; elytra rather coarsely, evenly and moderately closely punctate, not pale at apex, the pubescence coarse; under surface black throughout, the legs fusco-testaceous, the femora black. Length 2.5 mm.; width 1.85 mm. Texas; [Tennessee and Louisiana—Horn.].....**circumspectus Horn**

Upper surface black, the prothorax bicolored; elytra without discal pale spot.... 65
Upper surface pale flavo-testaceous to piceous-black; sides of the prothorax discontinuous..... 69

65—Elytra distinctly and somewhat broadly margined with red at the apical margin, oval, polished, the head and prothorax generally pale, the latter broadly black toward the middle and base, sometimes black throughout, the sides not quite continuous, rather strongly convergent and evenly, moderately arcuate, the punctures generally distinct but not very dense; elytra coarsely and sparsely punctate, the pubescence coarse, rather long, ashy and conspicuous; legs pale to blackish in color. Length 1.8-2.7 mm.; width 1.3-1.9 mm. New York, Delaware, Mississippi, Texas, Indiana, Illinois and Iowa.....**americanus Muls.**

Elytra not red at tip, or only extremely finely so, the punctures very much smaller and more close-set, the body more narrowly oval; vestiture rather short and decumbent, cinereous.....66

Epilachna occidentalis Crotch.—Liberia (Mt. Coffee).

Epilachna peringueyi, sp. nov.—Ovate, the elytra subprominently rounded and widest at basal fifth, black throughout, the epipleuræ pale, margined externally with black, the elytra minutely, not densely punctate, with larger, widely scattered punctures intermingled, black, each with three large subconfluent spots in apical half, two smaller spots in a transverse line at two-fifths, the external of which is broadly confluent with a lunate basal spot extending almost to the scutellum; head and pronotum without pale spots at any point. Length 5.8 mm.; width 4.7 mm. Cape Town. Belongs near *infirmata*.

Chnootriba erythromela Widem.—Cape Town.

Chnootriba assimilis Muls.—Liberia (Mt. Coffee).

Chnootriba curriei, sp. nov.—Similar to *assimilis*, but shorter and more broadly oval, with the fine punctures of the elytra much sparser and the coarse punctures very much larger, the surface more convex and more shining; subhumeral spot rounded; median band—composed of two spots—much less oblique, almost transverse. Length 5.4 mm.; width 3.9 mm. Liberia (Mt. Coffee). Named in honor of Mr. R. P. Currie.

neglecta Muls.—Broadly rounded, polished, black above; pronotum finely punctulate toward the sides, the apical angles pale; elytra each with large orange spots on the median line, the anterior the larger and extending from one-sixth to two-fifths and from inner fourth to outer third, the posterior from two-thirds to five-sixths and from inner fifth or sixth to outer two-thirds; limb feebly rufescent; punctures fine and not close-set; under surface and legs testaceous, the sterna and median basal parts of the abdomen darker. Length 2.0–2.2 mm.; width 1.8–2.0 mm. Cape Town. The elytral spots are a little larger than indicated by Mulsant.

Lotis distincta, sp. nov.—Similar to *neglecta* in form but alutaceous and with still more minute and obsolete punctures, black throughout above, each elytron with two spots in the same position but smaller, not more than a fifth as wide as the elytron, the posterior elongate-oval; punctures gradually becoming distinct toward the sides; surface with obscure and very obsolete impressed longitudinal striiform lines toward the suture; under surface and legs black throughout, the epipleuræ piceous. Length 2.3 mm.; width 2.1 mm. Cape Town.

Lotis stigmatica, sp. nov.—Slightly smaller and more narrowly rounded behind, polished, black above, with a feeble greenish reflection, the elytral punctures small and sparse but distinct, the spots similarly placed but very small, the anterior rounded, about a seventh as wide as the elytron, the posterior very small, circular, with rather nubilous outline; under surface and legs black throughout, the epipleuræ piceous. Length 1.75–2.1 mm.; width 1.6–1.9 mm. Wellington.

Lotis nigerrima, sp. nov.—Similar to *stigmatica* in form, size and sculpture, but deep black above, polished and without trace of elytral spots; under surface black, the legs and abdomen picescent; epipleuræ pale testaceous, margined with black externally. Length 2.1 mm.; width 1.9 mm. Wellington. Much larger than *nigritula* Cr., and with more distinct punctures.

Xestolotis (gen. nov.) *stictica*, sp. nov.—Almost circular, very convex, pol-

ished, black, the head, pronotum and suffused limb of the elytra dark piceo-rufous; under surface piceous, the legs, palpi and antennæ pale testaceous; pronotum and elytra strongly and equally punctate, the former closely, the latter sparsely and without trace of impressed lines at any part. Length 1.8 mm.; width 1.7 mm. Liberia (Mt. Coffee). Taken in abundance by Mr. Cook.

The genus *Xestolotis* is similar to *Lotis* in the structure of the front, but has the clypeal margin more broadly truncate and only very feebly sinuate; the eyes are not emarginate and the antennæ are rather well developed, with the club flattened, compact and elongate-oval; the fourth joint of the maxillary palpi is very obliquely securiform, the free apex somewhat prolonged and finely acuminate. The coxæ are all widely separated, the tarsi well developed and subcompressed, and the claws simple, becoming arcuately thickened internally toward base. The abdomen is composed of five segments; the metacoxal plates attain the segmental apex toward the sides and are concave. The fifth ventral is longer than the preceding, as in all genera with true five-segmented abdomen, and, in all my representatives, the tip of the abdomen is deflexed, this being apparently a normal condition. The epipleuræ are uneven and subfoveolate, the met-episterna remarkably divided at a point opposite the extremity of the straight mesocoxal line, and the third tarsal joint is evidently free. It may be distinguished from *Sticholotis* (*punctata*) by the characters of the epipleuræ and met-episterna, as well as by the more finely faceted and entire eyes, which, in *Sticholotis*, are nearly as coarsely granulated as in the rhyzobiids and slightly emarginated by the post-antennal parts of the front.

Chilocorus cooki, sp. nov.—Broadly rounded, polished; head, pronotum, entire under surface and legs pale brownish-testaceous; elytra black, a large oval basal spot on the suture of the same color as the anterior parts, extending, at the basal margin, two-fifths from the suture, and, on the latter, slightly beyond the middle; punctures minute and sparse, each surrounded by a fine irregular ring of extremely minute punctulation; epipleuræ piceous-black, testaceous inwardly. Length 5.4 mm.; width 4.8 mm. Liberia (Mt. Coffee). Named in honor of Mr. O. F. Cook.

Exochomus versutus *Muls.*—Wellington.

Exochomus flavipes *Thunb.*—Wellington.

Platynaspis capicola *Crotch.*—Wellington.

Telsimia (gen. nov.) **tetrasticta**, sp. nov.—Broadly elliptical, evenly and moderately convex, shining, finely but strongly, sparsely impresso-punctate, clothed rather sparsely throughout with somewhat long suberect and ashy pubescence, black, the legs but slightly picescent; each elytron with two rounded testar

spots nearly as in *Lotis*, both near inner third and at two-fifths and three-fourths from the base respectively; flanks regularly declivous to the edge, which is reflexo-beaded. Length 1.5-1.6 mm.; width 1.25 mm. Wellington. Differs from the following in its larger size and maculate elytra.

inornata, sp. nov.—Broadly rounded, strongly somewhat compresso-convex, shining, strongly, closely punctate, the pubescence rather short, ashy, suberect and moderately abundant; elytra without ornamentation, the edge slightly more thickly reflexo-beaded than in *tetrasticta*; metacoxal arcs more apical but still far from the apex of the segment, the tarsi more slender, with the basal joint more elongate. Length 1.1 mm.; width 0.9 mm. Liberia (Mt. Coffee).

The genus *Telsimia* has been sufficiently characterized in the body of the present paper under the head of *Telsimiini*.

us 6-guttatus Gyll.—Wellington.

us inaequalis, sp. nov.—Similar to *6-guttatus* but more oblong and less rounded, with the prothorax relatively narrower, more rounded at the sides and more strongly and closely punctured; elytra with the spot at the middle fourth very much smaller than the other two, and not subequal as in *6-guttatus*; under surface and legs black throughout. Length 2.4 mm.; width 1.8 mm. Cape Town.

(gen. nov.) *subglaber*, sp. nov.—Broadly oval, very strongly convex, shining throughout above and beneath, the legs not paler, minutely but evidently punctate, the elytra sparsely so, polished and glabrous; head and pronotum duller, strongly microreticulate and clothed with very short, rather sparse, decumbent and inconspicuous silvery-gray hairs; basal joint of the tarsi elongate, the claws simple and strongly arcuate. Length 1.45 mm.; width 1.2 mm. Wellington.

This genus has been defined previously in the present paper, under the head of *Pharini*.

Hyperaspis felixi Muls.—Wellington.

Hyperaspis newcombi, sp. nov.—Elongate, suboblong-oval, moderately convex, polished, black throughout above and beneath, the head, except at the basal margin, and the sides of the pronotum in a parallel area nearly twice as long as wide with the inner outline feebly bisinuate, orange-yellow; elytra with a rounded marginal pale spot at apical sixth of the length; anterior legs pale, the two posterior pairs black. Length 2.7 mm.; width 1.8 mm. Wellington. Named in honor of Prof. Simon Newcomb. Differs from *mercki* in the form of the subapical spot of the elytra, which is here much smaller and separated throughout its extent from the margin by the fine black bead, becoming only slightly more distant posteriorly; it is separated from the suture by rather more than its own width.

Cranophorus notatulus Muls.—Wellington. The male has the fifth segment broadly sinuato-truncate, with a small suberect liguliform tooth at the middle of the apical edge, the sixth angularly emarginate, with the surrounding surface deeply impressed, and, through the emargination, a small seventh segment can be discerned.

Cranophorus 4-notatus *Muls.*—Cape Town.

Cranophorus trapezium, sp. nov.—Similar to *4-notatus* but more broadly oval, shining, moderately pubescent, finely, rather closely punctate, deep black above, the pronotum pale and diaphanous at the apical margin, more broadly laterally, the pale margin extending only to the middle of the length; elytra each with two small rounded pale spots, nearly equal in size, near one-third and two-thirds from the base and both at about two-fifths from the suture; under surface and legs black; male with the fifth ventral feebly sinuate, not denticulate, the sixth sinuato-truncate and broadly impressed. Length 1.7 mm.; width 1.1 mm. Wellington. Abundant.

Cranophorus parvulus, sp. nov.—Similar to the preceding but much smaller, the elytra more finely, sparsely and obsoletely punctate and more truncate at tip, the two spots of each elytron extremely small and nearly on the median line; male with the fifth segment truncate and not modified, the sixth perfectly flat, broadly subtruncate at apex, with a very minute angulate median notch. Length 1.15–1.25 mm.; width 0.75–0.85 mm. Wellington. A single pair.

Stethorus jejunus *Csy.* (Ante, p. 136)—Cape Town.

Scymnus (Scymnus) morelleti *Muls.*—Wellington.

Scymnus (Scymnus) capicola, sp. nov.—Broadly oval, black, the elytral apices narrowly margined with red; abdomen black, the apical margin paler; legs testaceous throughout; head rufo-piceous in the male, black in the female, the pronotum black throughout in both sexes, finely but strongly, not closely punctate, the sides nearly continuous, strongly convergent and moderately arcuate; elytra as long as wide, rounded behind, punctured nearly like the pronotum but less finely; under surface dull, very densely punctate throughout, more finely on the abdomen. Length 1.7–2.0 mm.; width 1.2–1.5 mm. Wellington. The male has the fifth ventral broadly, feebly sinuate at the middle of the apex but not notably impressed.

Scymnus (Scymnus) monroviæ, sp. nov.—Broadly oval, moderately pubescent, finely but strongly, somewhat closely punctate; head black, the pronotum black with the apex nubilously pale toward the sides, the latter strongly convergent, feebly arcuate and rather discontinuous; elytra black, the apical margin narrowly and nubilously pale, each with a rather large, obliquely oval discal red spot just before the middle; under surface blackish, dull, very densely but finely punctate, the abdominal apex slightly paler; legs pale testaceous, the femora somewhat infusate except toward tip. Length 1.75 mm.; width 1.25 mm. Liberia (Mt. Coffee). A single female.

Scymnus (Nephus) angustus, sp. nov.—Very narrowly oval, about twice as long as wide, moderately convex, minutely and very closely punctate, black, the elytra testaceous, with the suture and side-margin in basal three-fifths blackish, the dark areas broadening toward base and becoming coalescent; under surface and legs piceous or blackish, the knees and tibiæ somewhat paler. Length 1.6 mm.; width 0.8 mm. Wellington.

Rhyzobius trimeni, sp. nov.—Oval, moderately convex, the pubescence ashy, moderately long and abundant; body black, the tarsi and abdominal limb broadly throughout pale; pronotum with the apex at and near the angles pale, the sides reflexed, strongly convergent, evenly, rather strongly arcuate and dis-

continuous, the base finely margined; elytra finely but distinctly, sparsely punctate, each with two rather small rounded pale spots, the anterior, slightly the larger, near one-fourth and very slightly nearer the suture than the margin, the posterior not quite at three-fourths and near inner third or two-fifths; abdomen finely, not densely punctulate. Length 2.6-3.0 mm.; width 1.8-2.15 mm. Wellington. Named in honor of Mr. Roland Trimen. The basal angles of the prothorax are slightly more than right, and are not at all rounded but not prominent, the base being oblique and straight from the scutellum to the sides.

II.

present opportunity is taken to describe a few new members of from regions beyond the United States.

collis, sp. nov.—Ovate, very convex, polished, the pubescence moderately dense; head and pronotum black throughout, the elytra densely punctate, broadly concave and reflexed at the sides, two-fifths as wide as long, distinctly narrower than either elytron, the sides feebly convergent; scutellum blackish, a little longer than wide; elytra a little longer than wide, widest at basal third or fourth, where they are broadly rounded to the base and gradually less strongly, becoming more pointed, to the apex, which is ogival, pale rufo-testaceous in color, the margins evenly throughout, a small rounded spot on each at the inner two-fifths, and another in the same range near the margin and suture black; sculpture sparse, consisting of very coarse deep punctures, with others, small and feebly impressed, intermingled, the surface subrugose; under surface, epipleuræ and legs throughout black. Length 9.6 mm.; width 8.0 mm. Bolivia.

Some time after this description had been written I received a second Bolivian specimen, agreeing exactly with the type, from Mr. Fruhstorfer, under the name "*rufipennis*." I have been unable to find this name in the literature of the subject, and Mr. Fruhstorfer informs me that he also is unable to recall its origin.

Nephaspis* (gen. nov.) *gorhami, sp. nov.—Oval, moderately convex, finely, closely punctate, finely, evenly and abundantly pubescent, the hairs all directed longitudinally on the elytra; head, pronotum, prosternum, legs and abdominal apex and sides pale testaceous; elytra piceous-black. Length 1.2 mm.; width 0.85 mm. Colombia (Panama).

Nephaspis brunnea, sp. nov.—Similar but more narrowly oval, the minute punctures sparser, the surface more polished, the pubescence similar and subdecumbent but sparser; body dark piceous-brown throughout, the head, prosternum, legs and abdomen toward tip testaceous; sterna closely and more coarsely punctured. Length 1.2 mm.; width 0.8 mm. Colombia (Panama).

The genus *Nephaspis* is remarkable, among those allied to *Scymnus*—and in fact the entire family,—in the structure of the proster-

num; this widely separates the coxæ, which are obliquely conical and decumbent upon the surface separating them, the latter being thus obliquely biconcave, the elevated part reduced to a mere cusp point anteriorly, the coxæ being subcontiguous at their apices. The sterna of the hind body are very convex, and the mesosternum is abruptly terminated anteriorly by a deep vertical wall. The coxal arcs are nearly as in the subgenus *Nephus*, but the tarsal claws are long, feebly arcuate, extremely slender and perfectly simple. The epipleuræ are extremely narrow, and extend scarcely behind the middle, and the two basal joints of the antennæ are large and compressed, the remainder very small and slender; the palpi are normally securiform. The eyes are simple and almost entire and are well developed, the clypeus deeply sinuate. The prothorax is as wide at base as the elytra and, in repose, heads rest upon the body in such a way as to conceal all anterior to the mesosternum. The abdomen has six segments as in *Scymnus*, the first as long as the next three combined. The genus will form a distinct tribe in the neighborhood of *Scymnini*.

Zagloba beaumonti, sp. nov.—Broadly oval, shining, finely, rather sparsely punctate and somewhat sparsely clothed with long stiff ashy-yellow hairs, unevenly directed and suberect; body pale brownish-testaceous in color throughout, the legs more flavate; sides of the prothorax moderately convergent, very feebly arcuate and distinctly discontinuous with those of the elytra. Length 1.5 mm.; width 1.1 mm. Colombia (Panama)—Mr. J. Beaumont, to whom I am indebted also for the two species described above.

This species has the metacoxal arcs incomplete and formed as in the subgenus *Scymnus*, the emargination of the eyes normal and the prosternum wide and flat between the coxæ, not carinate but tumid or beaded laterally along the acetabula; the tarsal claws are strongly arcuate, and have a large quadrate internal tooth at base.

NEW AFRICAN SESIIDÆ.

BY WM. BEUTENMÜLLER.

Sesia gabuna, sp. nov.

♂. Head and antennæ black; collar black above, white at sides and beneath; palpi black above and at tip, yellowish-white beneath. Thorax black with a greenish reflection, a yellow line on each patagia and a yellow transverse mark on the posterior end. Beneath with a golden yellow patch on each side. Abdomen blue-black with a golden yellow ring on the posterior edge of the 2, 3, 4, 6 and 7 segments and a yellow line on each side from the base meeting the first ring. Anal tuft blue-black, narrowly edged with yellow on each side. Legs blue-black, anterior coxæ white on each end; tarsi yellowish on one side. Fore wings transparent bordered with violet black, outer border very broad; transverse mark rather prominent. Hind wings transparent with a narrow violet black outer border. Fore wings beneath as above but with silvery rays between the veins in outer border. Expanse, 20 mm.

♀. Larger and more robust than the male, with rings on abdomen white and with a white ring at base on hind tibiæ. Anal tuft entirely black. Expanse, 25 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♂, 4 ♀.

Allied to *Sesia basiformis* (*lustrans* Grote).

Sesia africana, sp. nov.

Head, thorax and abdomen above metallic green-black. Abdomen beneath whitish. Collar very slightly orange above; palpi beneath pure white; anterior and hind pair of coxæ pure white. Legs green-black, middle and hind pair with white annulations. Fore wings green-black with three small transparent spaces, basal one linear, the one in cell oval, and the one beyond the transverse mark largest and rounded. Hind wings transparent with very narrow outer border. Antennæ long, black. Expanse, 26 and 34 mm.

Habitat: Valley of the Ogowé River, French Congo. 2 ♀ ♀.
Coll. W. J. Holland.

Easily recognized by its uniform color and by the three transparent spaces on the fore wings. It evidently comes near the European *scolieformis*, but has no anal tuft; this may have been worn off.

Sesia festiva, sp. nov.

Head black with a minute orange spot at the base of the antennæ, which are black above and brown beneath. Collar golden orange above, white beneath. Palpi white beneath, black above. Thorax brilliant orange red, except in the middle above brownish-black. Abdomen violet black with a white ring on the 4th, 6th and 7th segments. Anal tuft violet black, slightly white in the middle beneath. Legs violet with white tufts; anterior coxæ white. Wings transparent with narrow violet black borders and transverse mark. Hind wings transparent, border very narrow. Wings beneath as above. Expanse, 18 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♂. Coll. W. J. Holland.

May be known by the golden orange red thorax and violet abdomen.

Sesia albiventris, sp. nov.

Head black above, front white; palpi white, tip black. Antennæ black; thorax black, white on each side beneath; patagia tipped with white posteriorly. Abdomen black with a metallic green reflection and a narrow white ring on the 4th segment; last segment edged with white, anal tuft black; underside of abdomen white on the 3d, 4th, and 5th segments. Legs black, annulated with white, middle femora and anterior coxæ white. Fore wings violet black with a basal transparent streak and a small spot composed of white scales beyond the middle. Hind wings transparent, border and fringes violet black. Wings beneath as above. Expanse, 11 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♂. Coll. W. J. Holland.

Sesia olenda, sp. nov.

Wholly bronzy violet-black above and below, except the fore coxæ, ringlets on legs and palpi white; last joint of palpi black. Fore wings with a very small rounded transparent mark in the cell and a large transparent area beyond the transverse mark. Expanse, 15 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♀. Coll. W. J. Holland.

Sesia nyanga, sp. nov.

Head, thorax and abdomen above and below bronzy black, except the last two segments beneath white. Anal tuft bronzy black. Fore wings largely transparent, borders and transverse mark very narrow, black; similar beneath with the costa yellowish. Legs black, middle coxæ white. Expanse, 17 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♀. Coll. W. J. Holland.

Sesia nuba, sp. nov.

Head black, front white on each side; antennæ black, ferruginous beneath; palpi with loose hairs, black, white at tip. Thorax and abdomen bronzy black, the latter with a pale, dirty yellowish band on the 2d, 4th, and two last segments, encircling the body; legs black with white ringlets, hind pairs with loose black hairs; fore coxæ white. Fore wings transparent, borders and transverse mark, moderately broad, bronzy black. Hind wings transparent, border narrow, bronzy-black. Expanse, 14 mm.

Habitat: Valley of the Ogowé River, French Congo. 2 ♂♂. Coll. W. J. Holland.

One example differs by having the last four segments of the abdomen ringed; the transverse mark on fore wings orange outside, a little

orange on inside of outer border and the patagia finely lined with brown. The hind tibiae and tarsi are clothed with rather long hair.

Sesia limba, sp. nov.

Head brown-black, face pale orange-yellow; palpi orange; antennae black above, brown beneath; thorax brown-black with indication of a fine orange stripe along the patagia. Abdomen brown-black with a broad yellow band on the 2d and 4th segments above, brown beneath. Legs orange, femora brown. Fore wings with veins small, the outer one round, border and transverse mark broad and dark; rayed with a little orange between the veins on outer part, along inner margin in the basal transparent area. Underside similar to the above. Hind wings transparent with narrow brown margin. Expanse, 20 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♀. Coll. W. J. Holland.

Related to *S. mellinipennis*.

Sesia ins, sp. nov.

Head brown-black; palpi orange; antennae black. Underside of abdomen, thorax and legs brown; thorax and abdomen above blue-black, the former with a transverse orange line posteriorly, the latter with an orange ring on 2d segment and 4th and 6th segments. Anal tuft blue-black. Fore wings orange, basal half and outer margin blue-black. In the orange field are two very small opalescent spots, and a similar one on the outer margin but is a little larger than the rest. Hind wings transparent, outer margin gradually narrowing as it reaches the hind angle, bronzy brown marked with orange inside. Fore wings beneath golden orange, outer part brown-black, spots repeated. Hind wings as above. Expanse, 13 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♂. Coll. W. J. Holland. May be easily known by the orange fore wings with three opalescent spots.

Sesia tropica, sp. nov.

Head black; palpi, thorax posteriorly, legs and abdomen above wholly orange; anal tuft blue-black, beneath golden yellow. Thorax anteriorly black. Antennae brown-black with a white patch before the tip. Fore wings orange, outer part and fringes brown; costa narrowly brown; in the cell is a small triangular space, and an oblong one beyond the transverse mark. Hind wings transparent, border narrow, brown. Fore wings beneath golden yellow at base, gradually becoming brown. Expanse, 13 mm.

Habitat: Valley of the Ogowé River, French Congo. 1 ♀. Coll. W. J. Holland.

THE MEGALOPYGID GENUS *TROSIA*, WITH DESCRIPTION OF A NEW SPECIES.

BY HARRISON G. DYAR.

Genus *Trosia* Hübner.

- 1822—*Trosia* HÜBNER, Verz. bek. Schmett. 196.
 1855—*Sciathos* WALKER, Cat. Brit. Mus. III, 752.
 1856—*Edebessa* WALKER, Cat. Brit. Mus. VII, 1755.
 1874—*Isochroma* FELDER, Reise Novara, Lep. IV, pl. 83.

Kirby calls this genus *Sciathos* in the catalogue, omitting Hübner's term. Druce and others also neglect *Trosia*, perhaps from a prejudice against the Verzeichniss names. In the following, species succeeded by a dash are unknown to me, except by description and are referred to this genus on the authority of the authors quoted.

SYNOPSIS OF SPECIES.

Thorax and abdomen discolorous, thorax in part white, abdomen bright red.

Thorax without black marks.

Costa broadly red; wings in part pure white, at least in a stripe next the red margin.....1. ***tricolora*** Fab.

Costa very narrowly red; wings without any pure white.

2. ***obsolescens*** Dyar

Thorax with a black band in front and on each side.3. ***purens*** Walk.

Thorax and abdomen concolorous, abdomen not bright red.

Costal margin red; a transverse row of black dots.4. ***diamas*** Cram.

Fore wings without marks, uniformly ochraceous.....5. ***ribbei*** Druce.

1. ***T. tricolora*** Fab.

- 1787—*Bombyx tricolora* FABRICIUS, Mant. Ins. II, 114.
 1790—*Bombyx punctigera* STOLL, Pap. Exot. suppl. pl. 34, fig. 1 (nec Linn.).
 1822—*Trosia tricolora* HÜBNER, Verz. bek. Schmett. 196.
 1855—*Sciathos punctiger* WALKER, Cat. Brit. Mus. 752.
 1856—*Sciathos punctiger* WALKER, Cat. Brit. Mus. VII, 1711.
 1874—*Isochroma fallax* FELDER, Reise Novara, pl. 83, figs. 18, 19.
 1887—*Sciathos punctigera* DRUCE, Biol. Cent.-Am. Lep. I, 212.
 1892—*Sciathos punctigera* KIRBY, Cat. Lep. Het. I, 540.

Kirby makes this the *punctigera* of Linnæus (Syst. Nat., 509, no. 67), but the description does not coincide in the least with this species, either in structure, color or habitat.

2. ***T. obsolescens***, sp. nov.

Head white in front, red on the vertex behind the antennæ and shading to red below

on the palpi. Thorax white above with six clusters of red hairs; abdomen red, white at tip. Fore wings uniformly pale ochreous, almost white, appearing pinkish from the scales below; costa very narrowly red at base, dark ochre at apical portion. A bright row of eight small black spots between the veins beyond the middle of the wing, the sixth spot between veins 4 and 5, the seventh opposite the discal cross-vein and the eighth between vein 6 and the stalk of veins 7 to 10. Hind wings red-fringe ochreous. Below both wings as secondaries above; body largely white; coxae and femora red above, tibiae and tarsi ringed with black. Expanse, 27 mm.

Nearly allied to *T. tricolora* Fab., which is however an inhabitant of the tropical regions, whereas this comes from the Mexican plateau.

One male, Nogales, Koebele collector, August 15, 1898, U. S. Nat. Mus., type no. 4104. Nogales is a town on the border line between Arizona and Mexico.

4. *T. purens* Walk.

1856—*Edeessa purens* WALKER, Cat. Brit. Mus. VII, 1755.

—*Sciathos purens* KIRBY, Cat. Lep. Het. I, 540.

F. Hampson has kindly examined Walker's types of the species for me and the generic characters correspond with *Trosia*.

7. *T. dimas* Cram. —

1775—*Bombyx dimas* CRAMER, Pap. Exot. I, pl. 59 C.

1822—*Trosia dimas* HÜBNER, Verz. bek. Schmett. 196.

1854—*Chrysaugæ dimas* WALKER, Cat. Brit. Mus. II, 375.

1892—*Idalus* (?) *dimas* KIRBY, Cat. Lep. Het. I, 198.

1894—*Sciathos dimas* DOGNIN, Lep. Loja. 173.

1897—*Sciathos dimas* DRUCE, Biol. Cent.-Am., Lep. Het., II, 440.

5. *T. ribbei* Druce. —

1898—*Sciathos ribbei* DRUCE, Biol. Cent.-Am. Lep. Het. II, 441, pl. 88, fig. 1.

NEW SPECIES OF SYNTOMIDÆ.

BY HARRISON G. DYAR.

Pseudapinconoma elegans Auriv. var. *currii*, var. nov.

Under side of thorax entirely crimson, legs white, femora and basal half of hind tibiae crimson above; abdomen bluish gray, segmental black bands linear, the basal segments with orange hair and the lateral tufts orange; a dorsal series of crimson dots. Wings as in *elegans*, but the hyaline patches between veins 2 and 6 large and diffuse, reaching nearly to the termen, with ill defined outer border.

Two males, Mt. Coffee, Liberia (R. P. Currie). U. S. Nat. Mus., type no. 4247.

Cosmosoma sicula, sp. nov.

Black, pectus, frons and abdomen with metallic blue patches, the latter in subdorsal and lateral series. Wings hyaline, veins black, an orange red streak below costa and above internal margin, the former reaching three-fourths to apex, the latter almost reaching tornus; a small orange red patch at base above vein 1; outer margin black, very broad at apex but widening gradually and regularly; a narrow black bar at end of cell and the space between veins 2 and 3 up to cell filled in with black, powdered with red scales as well as the extreme base of the space between veins 3 and 4; a small red spot near end of vein 2 below. Hind wings with black border, broad on the outer margin. Tegulæ and patagia with orange red scales.

One male, Venezuela. Expanse, 27 mm. U. S. Nat. Mus., type no. 4248.

Allied to *C. festivum* and *C. centrale*, next to which it comes in Hampson's tables.

Cosmosoma perfenestratum, sp. nov.

Head black, frons and vertex with metallic blue; antennæ black; thorax orange red, black below; legs with patches of blue; abdomen black with dorsal red stripe not reaching base or extremity and subdorsal series of metallic blue spots. Wings hyaline, the veins and margins black; fore wing with orange red basal patch and streaks below costa and above internal margin running nearly to termen; an orange red discal patch cut by the black veins; an orange red patch filling in the space between veins 2 and 4, but not completely; terminal band very wide at apex, almost wholly orange red, only the veins and extreme margin black, expanding at tornus and joining the patch between veins 2 to 4. Hind wing with some red at base, the terminal band black, expanding at apex and tornus, edged within by red scales.

One male received from Staudinger and Haas as "*Læmocharis fenestrata*." U. S. Nat. Mus., type no. 4244.

This falls in Hampson's table between *C. achemon* and *C. hypocheilus*.

Eriphioides ustulata *Feld.* var. **columbina**, var. nov.

Differs from *ustulata* in having a large discal orange patch on the under side of fore wings, powdery and diffuse and cut by the black veins. The fore coxæ are white.

One male, received from Staudinger and Haas as "*Autochloris columbina*." U. S. Nat. Mus., type no. 4245.

Cyanopepla melinda, sp. nov.

Black, thorax and abdomen strongly shot with metallic blue green, also on the head, palpi and legs and forming a dorsal band and segmental rings on the abdomen; coxæ, tibæ, tarsi and venter of abdomen powdered with white. Fore wings with a metallic blue dot at base of costa and a streak in submedian interspace; a crimson fascia from within end of cell to tornus at vein 1, not reaching costal edge or margin;

a smaller oblique spot between veins 5 and 7. Hind wings with the basal two-thirds shot with metallic blue; a rounded submarginal crimson spot between veins 2 and 4, cut by the black vein 3. Expanse, 41 mm.
 10 males, Petropolis, Brazil (F. G. Foetterle). U. S. Nat. Mus., type no. 4246.

PROCEEDINGS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.

MEETING OF OCTOBER 18, 1898.

Held at the American Museum of Natural History.

In absence of the President and Vice-President, Mr. Chas. Palm was elected chairman *pro tem*. Twelve members present.

Mr. Beutenmuller proposed Mrs. W. H. Browning for active membership.

Mr. Beutenmuller spoke on his collecting trip to Florida in July last and stated that he was fully satisfied with the results. About two thousand specimens of *beetles* were taken, amongst which were *Dyschirius schaumii*, *Holopeltis larvalis*, *Chrysomela marginipennis*, *Elater sturmii*, *Polycesta*, sp., *Actenodes auronotata*, *Chrysomela*, *Oedionychus ulkei*, *Oxacis tenuata*, *Heleps viridimicans*, *Formicomus* (?), and many other good species: A large gray Katydid *Cyrtophyllus* sp. *concauus* was also taken as well as many species of other insects. After a general discussion, adjournment.

MEETING OF NOVEMBER 1, 1898.

Held at the American Museum of Natural History.

President Love in the chair. Ten members present.

Mrs. W. H. Browning was elected a member of the Society. Mr. Rabe proposed Mr. Chas. Wunder, for active membership.

Mr. Davis spoke on *Cicindela consentanea*, which was taken at Manchester, N. J. He thought that it was a valid species and not a variety of *sexguttata*.

Mr. Schaeffer read a paper on *Dineutes*. He called attention to the variability of the apices of the male elytra of *D. hornii*, which are described as rounded, but a large series shows all intergrades from the rounded to projected apices of the female elytra.

Mr. Zabriskie exhibited under the microscope a transverse section of the elytron of *Cyllene robinia*, showing faded portion, also a few scales which retained their color. He spoke on coloration of insects and stated that dermal coloration will invariably remain, while hypodermal color will more or less fade after death. He further stated that the brightness of living insects depends greatly upon their emotion.

Mr. Davis stated that he succeeded in preserving the color of gold-fish with a mixture of Epsom Salt and Formaline, while he failed to preserve the color of some insects with this mixture. Dr. Love stated that a 2% solution of Formaline is sufficient for preserving, but cannot be recommended as the Formaline will evaporate and nothing but water will remain.

Mr. Beutenmuller exhibited a curious aberration of *Pyrameis huntera* and Dr. Love showed a melanic form of *Argynnis aphrodite*.

After a general discussion, adjournment.

JOURNAL
OF THE
New York Entomological Society.

Vol. VII.

SEPTEMBER, 1899.

No. 2.

NOTES ON TRYPETIDÆ WITH DESCRIPTIONS
OF NEW SPECIES.

BY R. W. DOANE.

Since the publication of Loew's Monograph of the Trypetidæ of North America in 1873 several new species have been described by various authors. For the reception of some of these species new genera have been erected. Others very obviously belong to some of the already established genera, but in order to include these new forms the definitions of these genera have needed more or less modification. Thus we find in this group, as in every other, that no matter how carefully they may be worked up at any time, in the course of a few years a revision of the work becomes very desirable. Until such a revision shall be made the true location of some of the forms already described and several of those described herewith cannot be definitely determined. In describing the new species that have come before me in the past year I have erected no new genera, choosing rather to place them in genera already established, and to which they seem more or less closely related, leaving the determination of their true location until the time when the family shall be revised.

In an article on "A New Trypetid" in Ento. News, Vol. IX, No. 3, I set forth my reasons for believing that the segment usually referred to as the ovipositor in this family is really the last abdominal segment, and in drawing up the description of *R. ribicola* referred to it as such. Further study of the group gives additional evidence in support of this view, but in order to avoid confusion I have in the following descriptions followed the usual custom and referred to this segment as the ovipositor.

I have to thank Professor J. M. Aldrich, of the University of Idaho; Mr. Trevor Kincaid, of the University of Washington, and

Professor V. L. Kellogg, of Stanford University, for kindly placing their collections of Trypetidæ at my disposal while preparing the present paper.

***Acidia fratria* Loew.**

Several specimens reared on *Heracleum* from Almota, Wash., others collected at Pullman, Wash. In the single female in this lot the ovipositor is black, whereas Loew describes his specimens as having this segment yellow. In comparing these specimens with Thompson's description of *liogaster* there seems to be little doubt but that *liogaster* and *fratria* are the same species as Loew suspected. The black ovipositor also lends much weight to the supposition that this may be the same as *T. heraclei* Linn. The coloring of the body and the depth of the coloring of the wings is subject to considerable variation.

***Epochra canadensis* Loew.**

Quite abundant over the state and of considerable economic importance as the larvæ attack both currants and gooseberries.

***Straussia longipennis* Wied.**

I have many specimens before me from widely different localities, which seemingly might be distributed among seven or eight different varieties, but there is such an integration of forms that it is almost if not quite impossible to fix the limit of any group. I have seen no specimens from this state.

***Spilographa electa* Say.** A single male from Tennessee.

***Spilographa setosa*, sp. nov.** (Pl. III, Fig. 1).

♂ ♀. Head and its appendages, thorax, legs and abdomen wholly yellow. Front of medium width; bristles brownish black; third joint of antennæ slightly concave on upper side, anterior corner rather sharp; face with moderately deep furrows; oral margin not at all projecting; proboscis and palpi short. Thorax with very short brownish black pile; besides the two black spots on the metanotum there is a small black spot just back of the base of the wing usually concealed by the aulets. Posterior femora with a few weak brownish bristles near the tip on upper side; the short weak cilia of the posterior tibia are also brownish. Abdomen with brownish black pile and a few bristles of the same color; ovipositor conical of same color and about as long or a little longer than the preceding segment.

Wings hyaline, yellowish toward base and with brown cross-bands. The first of these, which is broken and more or less indistinct, extends from the humeral cross-vein quite across the anal cell, the posterior corner of which is much produced; the second cross-band extends from the stigma across the anterior cross-vein and about half way across the third posterior cell, not reaching the posterior margin; the third

cross-band is more oblique, beginning just before the tip of the second vein and extending across the posterior cross-vein it reaches the posterior margin of the wing just back of the tip of the fifth vein, where it is usually broader, fading out gradually as it nears the second cross-band; completely united with the third cross-band anteriorly and seaming the tip of the wing is another band reaching a little beyond the tip of the fourth vein; between the second and third cross-bands and parallel with the latter is a narrow band reaching from the costa to the third vein; the whole of the anal and second basal cells and the bases of the first basal and sub-marginal cells show a distinct yellowish tinge; veins yellowish; first and third with rather stout bristles, latter with very few, one or two of which are beyond the anterior cross-vein. Length, ♂ 5 mm.; ♀ 6 to 7 mm. Nine males, four females.

Habitat: Wash., Ida., Mich., S. D., Minn.

I have before me quite a large series of this species which seems to be subject to little variation, although in a single female the abdomen is much darker, almost brownish, and the third cross-band is interrupted at the third vein.

Differs from *T. flavonotata* Macq., which it most closely resembles in having no trace of lighter markings on thorax; dark instead of light cilia on hind tibia; in having bristles on posterior femora and the black spot behind the wings, etc.

***Œdicarena diffusa* Snow.**

The length of the ovipositor is subject to some variation, sometimes being fully as long as the three preceding segments taken together.

Habitat: Wash., S. D., Colo.

***Plagiotoma obliqua* Say.** Illinois, Iowa.

***Trypeta palposa* Loew.** Minnesota, Iowa.

***Trypeta occidentalis* Snow.**

It may be well to add to the description of this species that the color is light grayish yellow, lighter than *T. palposa*; fifth segment of male with a black spot on each posterior corner. In some specimens the band seaming the tip of the wing is not united anteriorly with the third cross-band, but separated from it by a narrow hyaline space.

Habitat: Wash., Ida., Colo., S. D.

***Trypeta straminea*, sp. nov.** (Pl. III, Fig. 2).

♂. ♀. Yellow; head brighter yellow; front rather broad; bristles brownish black; postorbital bristles whitish; antennæ yellow; third joint rather short broad, rounded; arista yellowish at base, darker towards tip; palpi broad, rather large, with

small black bristles. The black on the dorsum of the thorax is partially concealed by whitish pollen and whitish yellow pile; the posterior pair of the four dorsal bristles is situated in the yellow rectangular area in front of the scutellum and arise from large black dots, the anterior pair arising from smaller dots is situated along the anterior margin of this area; metanotum, a spot back of the base of the wing, a spot at the base of the halteres, and another above the posterior coxæ, black; legs wholly yellow, tarsi slightly darker. Abdomen wholly yellow with the following black spots on the male: two on the anterior margin of the second segment near the middle; four on the anterior margin of the third, fourth and fifth segments, two of which are median and two lateral; two on the posterior lateral margin of the fifth segment. Female with the black spots as in the male with the addition of the four borne on the sixth segment, but with none on the posterior lateral margin of the fifth; ovipositor reddish yellow, black at extreme tip, flattened, longer than the three preceding segments taken together; pile of abdomen whitish yellow; bristles black.

Wings rather long and narrow; whitish hyaline with a brownish yellow picture which extends along the costal border from the base of the wing to the tip of the first vein; the first portion reaches posteriorly as far as the sixth vein, covering the basal cross-veins and leaving only the basal portion of the second basal cell and a small spot at the extreme base of the sub-marginal cell, hyaline; the second portion of this picture extends posteriorly only to the third vein; the band arising at the tip of the first vein and extending over the anterior cross-vein fades out about the middle of the third posterior cell; the second band, however, which arises on the costa some distance before the tip of the second vein and extends across the posterior cross-vein reaches almost, if not quite, to the posterior margin of the wing; seaming the tip of the wing and connected along the costal border with the second cross-band is another band reaching a little beyond the tip of the fourth vein. All these bands are edged with darker brown; veins yellowish or brownish; first with bristles; third with three or four bristles at the point where the second vein branches from it. Along the posterior border of the wing and in a large triangular spot in the first and second posterior cells the whitish hyaline is replaced by a much darker hyaline. Length, ♂ 4.5 mm.; ♀ 5 to 6 mm. Sixteen males, six females.

Habitat: Washington.

Different from *T. occidentalis*, which it must closely resemble, in the following particulars: Smaller, dark reddish yellow instead of lighter yellow; pile on thorax and abdomen not so long or dense; wings comparatively narrower. I have a large series of both species before me and find these differences to be constant with no intermediate form.

***Edaspis anthracina*, sp. nov. (Pl. III, Fig. 3).**

♀. Deep shining black; front rather broad; yellowish brown with a median narrow dark brown line running forward from the dark brown ocellar triangle to meet a crescent shaped line of the same color which extends transversely across the middle of the front; beside the usual bristles on the vertex and front which are black, the head is furnished with short, bristle-like or stubble-like white hairs of which there is

a postorbital row and a single row arranged between the frontal bristles and the eyes, and others scattered over various parts of the head; face and cheeks grayish white, slightly infuscated under the eyes; oral opening small; proboscis and palpi short; antennæ honey yellow; the black arista slightly incrassated at base. Thorax shining black with short white stubble-like pile and a few black bristles; the tumid scutellum concolorous, with four black bristles; the shining black metanotum has, under the swelling lying immediately under the scutellum, a cross-band of white pollen. Abdomen shining black; second segment with short white pile posteriorly; third and fourth segments with white pile anteriorly and with black pile medianly and posteriorly; fifth and sixth segments wholly with white pile; ovipositor flattened, much elongated, nearly as long as all the preceding taken together, wholly shining black with very short black pile. Coxæ and femora, except the tips of the latter, black; trochanter, tip of femora, tibia and tarsi reddish yellow; front femora on under side with a few black bristles. Wings whitish hyaline, rather broad and with three broad dark brown cross-bands and a sub-triangular basal spot; extreme base of wing whitish with a faint tinge of yellow; a dark brown, almost blackish brown, triangular spot extending from the costa across the basis of the basal cells to the axillary incision; the first two cross-bands are connected anteriorly but posterior of the third vein they are separated by a hyaline space slightly narrower than the second cross-band; the first cross-band is widest posteriorly where it spreads on toward the base of the wing, filling about two-thirds of the axillary corner; the third cross-band is separated from the second by a hyaline space which is about twice as broad posteriorly as anteriorly; it borders the apex of the wing far beyond the tip of the fourth vein, but, as it does not quite touch the margin at all points, it leaves a small sub-triangular hyaline spot just before the tip of the second vein and a narrow hyaline space between the tips of the second and third veins upon the dark brown cross-bands between the stigma and the hyaline space separating the first and second cross-bands, is a rather broad light brown spot which bends downward along the middle of the second cross-band across the small cross-vein and reaches the fourth longitudinal vein; there is also a light brown spot in the third cross-band, extending from near the costa quite to or slightly beyond the third vein; also a small round light spot in the second cross-band in the discal cell; veins brownish; first with bristles; cross-veins very approximate and perpendicular. Length, ♀ 5 mm. Two females.

Habitat: Idaho, Michigan.

This species differs from *O. atra*, which it most closely resembles, in having the ovipositor flattened instead of conical, the first and second cross-bands not so divergent, the second and third cross-bands more widely separated, no stripes on the thorax, etc.

Rhagoletis pomonella *Walsh*.

Habitat: Mass., Colo., S. D. Not known to occur in Washington.

Rhagoletis ribicola *Doane* (Pl. III, Fig. 4). Destructive throughout the State.

Habitat: Washington, Idaho.

Rhagoletis caurina, sp. nov. (Pl. III, Fig. 5).

♀. Black; head and its appendages yellow; front darker, rather broad, not narrowed anteriorly; bristles black; oral opening rather large; margins only slightly projecting; proboscis and palpi moderately long; dorsal side of third joint of antennæ only slightly concave, anterior corner rounded; arista black; occiput black; thorax black, sparsely dusted with whitish pollen and with thick short black pile; scutellum for the most part yellow, black at sides, with four black bristles; legs for the most part reddish yellow; coxæ, a spot at base of femora and the fourth and fifth tarsal joints black; the spot at base of femora sometimes forms a more or less complete band and the third tarsal joint is sometimes also darker. Abdomen shining black with thick, short, black pile; ovipositor shining black, thickened, a little longer than the three preceding segments taken together. Wings with a brown picture consisting of short bands and dots, arranged as follows: a narrow band running from the first to the sixth vein; a broader band beginning at the second vein and running across the anterior margin; a short band beginning in the costa and ending abruptly on the third vein; a band filling the tip of the sub-marginal cell; a short band beginning on the second vein, a band covering the tip of the fifth vein about the middle of the length of the discal cell. Length, 3.5 mm. One female.

Habitat: Oregon.

Although the picture on the wings of this species differs greatly from any of its co-generators, the general structure and coloring of the body is so like that of other *Rhagoletis* that I do not hesitate to assign it to this genus.

Aciura insecta Loew. Jamaica, W. I.

Aciura ferruginea, sp. nov. (Pl. III, Fig. 6).

Head and its appendages yellow; front rather broad hardly narrowed anteriorly; bristles reddish brown; third joint of antennæ rounded at tip; arista yellow at base, darker towards tip; palpi and proboscis long. Thorax cinerous, covered with a thick, short, reddish pile; scutellum yellowish along the posterior margin, with two bristles; legs wholly yellow; front femora with rather long yellow hairs below. Wings dark brown, yellowish at base with the following spots whitish hyaline: Two in costal cell; two in marginal cell beyond the tip of first vein, the second extending quite across the sub-marginal cell; two in the second posterior cell; three in the third posterior cell, the middle one of these being smallest and not reaching the margin as do the others; a round one in the first basal cell opposite the stigma and a similar one in the discal cell beyond the anterior cross-vein. In the region of the anterior cross-vein the dark brown of the wing is variegated with a somewhat yellowish irregular spot; a very much smaller but similarly colored spot also occurring in the stigma; first and third veins bristly, latter with only a few weak ones.

Habitat: Washington.

A single specimen in which the abdomen is missing, but the reddish pile of the thorax, the yellow on the posterior margin of the scutellum and the characteristic markings of the wings make it easily recognizable.

***Aciura nigricornis*, sp. nov.** (Pl. III, Fig. 7).

Wholly reddish yellow; front broad, the lateral portions remarkably produced, each side bearing three large spines and two bristles; the anterior pair of spines is the largest and more curved; the posterior pair shortest and straight; a single pair of the black vertical bristles very long and stout; face somewhat flattened and receding; oral opening large; proboscis and palpi short but prominent; antennæ reaching about to the middle of the face; third joint rounded; arista black, yellowish toward base; thorax with short black pile and black bristles, with a small black spot just above the base of the wings; the broad somewhat tumid scutellum with two strong black bristles; legs wholly reddish yellow; front femora slightly incrassated and with a few weak bristles below. Wings rather broad, rounded, dark brown; the extreme base, the axillary corner and the following spots whitish hyaline: one in the costal cell extending from the costa to the third vein; two just beyond the tip of the first vein, the first extending posteriorly a little more than half way across the sub-marginal cell, the second reaching entirely across this cell; a large somewhat triangular incision in the second posterior cell and a much narrower one in the third posterior cell; a round spot in the first posterior cell in front of the posterior cross-vein; another in the discal cell almost behind the anterior cross-vein and another in the first basal cell below the stigma. The hyaline in the axillary corner extends into the third posterior cell and reaches the fifth vein at one point; first and third veins with bristles.

Habitat: Pennsylvania.

I possess only a single specimen of this interesting species and unfortunately the abdomen is missing. The picture of the wings and the two bristled scutellum show a close relation to the genus *Aciura*, but the larger size, the broader wing and the remarkably developed front with its strong spines and bristles would seem to furnish sufficient character for the erection of a new genus. This, however, I hesitate to do until I have examined more specimens.

***Acrotænia otopappi*, sp. nov.** (Pl. III, Fig. 8).

♀. Yellowish; with very thick white pile; head whitish yellow; front with a brownish tinge; a single pair of frontal bristles white, others brownish; face whitish, deeply excavated; oral openings not very large, margins but slightly projecting; proboscis and palpi short; antennæ darker yellow; third joint rounded; arista brown; the black on the dorsum of thorax almost wholly concealed by the very thick white pollen and the short pile; with three indistinct brownish lines; scutellum yellow with four brown bristles; metanotum black with thick white pollen; legs wholly light yellow; abdomen blackish; the posterior margin of each segment and an interrupted

median line yellowish; ovipositor flattened, reddish yellow, blackish at base and tip, a little longer than the three preceding segments. Wings very broad and rounded; the picture for the most part light brown, but the portion between the second vein and the margin much darker brown; the first of the hyaline incisions in the second posterior cell extends nearly half way across the first posterior cell, the second hardly reaches beyond the fourth vein; a rather large hyaline spot a little before, and another somewhat larger one just beyond the tip of the second vein. The remaining portion of the wing is covered with a multitude of small hyaline spots, those in the apical half much smaller than those in the basal half, many of which coalesce; distal half of second vein sinuous; first and third veins bristly. Length, ♀ 4.5 mm.

A single female found dead in the head of a dried specimen of *Otopappus acuminatus* from Mexico.

Eutreta diana O. S.

Habitat: Nebraska, Washington. Those from Washington reared from galls on *Artemisia tridentata*.

Eutreta sparsa Wied.

♂ show considerable variation in the picture of the wings. One from South Dakota, male, is a typical specimen. Those from Pennsylvania have the wings somewhat narrower and the rather dim pellicular drops extend to the costa anteriorly, resembling closely Mr. Snow's figure in Kans. Univ. Quart., Pl. VI, Fig. 10. The single specimen from Pennsylvania, a male, is much smaller and has narrower wings.

Habitat: Colo., S. D., Cal., Pa.

Eutreta nora, sp. nov. (Pl. III, Fig. 9).

♀. Brown; head and its appendages and legs yellow; front very broad, more reddish yellow medianly and with each of the three black bristles on either side arising from a small dot; face slightly hollowed out; mouth opening large, edge projecting; proboscis short; palpi short and broad; third joint of antennæ short, broad, slightly concave above, anterior corner rather sharp; arista brown with a very short pubescence. Thorax grayish brown with blackish piliferous spots and fuscus streaks; the short, sparse pile is reddish; scutellum somewhat yellowish with a broad median fuscus band and a rather large fuscus spot at the bases of the bristles; the four bristles of the scutellum, as well as those of the thorax, black; metanotum black with grayish pollen latterly. Abdomen dark velvety brown, with a narrow median longitudinal grayish line; pile white; ovipositor, except a reddish lateral spot, shining black, flattened, about as long as the four preceding segments taken together. Wings broad, round, black, covered with numerous white round dots which vary considerably in size, the largest ones being found in the marginal cell and second and third posterior cells; interspersed among the whitish hyaline dots are many small yellowish spots; posterior cross-vein very much curved; the bristles on the third vein are short and

weak, but extend far beyond the anterior cross-vein. On one wing in the single specimen before me, there are two short spurious veins extending from the costa into the marginal cell, on the other wing only one of these veins is present. We cannot consider them as being of any taxonomic importance. Length, ♀ 5 mm. One female.

Habitat: Idaho.

Eutreta aurantiaca, sp. nov. (Pl. III, Fig. 10).

♀. Black; the broad, flattened front yellowish brown with black bristles, those nearest the vertex having small black dots at their bases; face more whitish, broad, flattened, slightly receding; oral opening large; margin not produced; antennæ yellow; third joint slightly concave above, anterior corner sharp; arista yellow at base, brownish toward tip; occiput black. Thorax black with reddish pollen and thick reddish pile; scutellum shining black with a small yellowish spot on each side posteriorly; the four black bristles as well as those of the thorax and vertex tipped with yellow or white; metanotum shining black; legs reddish yellow; femora with a black spot a little beyond the middle on the ventral side. Abdomen shining black; each segment, except the first, with three yellow spots; pile for the most part black, but along the posterior margin of the second segment and in the region of the yellow spots it is golden yellow; ovipositor shining black, flattened, very short, about as long as the preceding segment. Wings rather broad, rounded at apex, dark brown with whitish hyaline spots somewhat equally distributed over the whole surface of the wing, being largest along the anterior and posterior margins, those in the basal portions are somewhat infuscated, usually with a yellowish tinge; first and third veins with bristles. Length, 24 mm. One female.

Habitat: Washington.

Carphotricha culta Wied.

I have before me a number of specimens all of which I believe belong to this species, but which may be easily separated into three groups; the first of these contains forms which are undoubtedly *T. culta* Wied., differing in no respect from Loew's figure and description. The second group contains smaller, lighter-colored forms which I would unhesitatingly identify as *T. cultaris* Coq., were it not for the fact that I find intermediate forms. The typical members of this group have only one brown ray between the apices of second and third veins, others have only a slight trace of a second ray, still others have a complete second ray; the length of the last segment of the abdomen varies, so this character is useless; the only constant difference I can find is the absence of the darkish spots in the second posterior cell, but in the first group containing typical *culta* I find some specimens in which this spot is nearly or quite wanting. The third group contains specimens slightly larger and darker than typical *culta* but with three brown rays between apices of second and third vein and a

triangular spot between the apices of third and fourth vein, the base of the triangle resting on the margin of the wing; but again between these extreme forms I find intergradations, some with only two rays and a trace of a third, others with two complete rays and a third almost complete, etc. The second and third groups might be considered as distinct varieties, but certainly not distinct species.

Habitat: Wash., Oregon, Ida., S. D., Fla.

***Eurosta solidaginis* Fitch.**

I have a large series of this species from widely different localities, showing considerable differences in the picture on the wing and the g of the body.

Habitat: Wash., Ida., S. D., Minn., Nebr., N. H.

***Eurosta comma* Wied.**

♂ male, the hyaline space at the tip of the sixth vein is than in Loew's figure (Mon. III, Tab. XI, fig. 2).

***Eurosta reticulata* Snow. Colo., S. D., Minn.**

***Eurosta conspurcata*, sp. nov. (Pl. IV, Fig. 1).**

♂ male, brown; front very broad, brownish yellow; face whitish, somewhat hollowed out, mouth opening large, edge projecting; antennae light yellow, third joint shorter; tarsi yellowish darker toward tip; bristles of the head, thorax and the four bristles of the scutellum, black; thorax broad, very convex with short reddish and black pile; metanotum black except on the sides which are reddish brown; legs reddish yellow, femora darker; front femora much darker, slightly incrassated, with black bristles beneath; abdomen quite broad, brown with thick short black pile; posterior margin of segments lighter; wings rather broad rounded, brown with large round or roundish whitish hyaline spots and smaller yellowish spots. In the third posterior cell several of the hyaline spots are united so as to appear as a single large hyaline space; in the second posterior cell three or four, and in the first posterior cell three, of the spots are thus united. Beside these, the following spots also occur: Two or three in the costal cell before the tip of the auxiliary vein; three in the marginal cell, two of which are just beyond the tip of the first vein, the third a little before the tip of the second vein; four in the sub-marginal cell, three near the tip, the other over the anterior cross-vein; one in the first basal cell below the stigma; one in the discal cell below the anterior cross-vein, and a few other smaller ones over the posterior portion of the wing. There are two spots on the stigma, one yellowish, the other nearly hyaline. Beside the yellowish dots in the middle portion of the wing there is a small yellowish area in the region of the anterior cross-vein; in the first posterior cell is a somewhat darker shining spot which at an oblique view shows much darker. The first and third veins bristly. Length, ♂ 5 mm. One male.

Habitat: Washington, New Hampshire, New Jersey.

The picture of the wing resembles that of *E. reticulata* Snow, but

the hyaline spots and spaces are larger and somewhat differently arranged, and there are not as many small yellow spots.

Eurosta aterrima, sp. nov. (Pl. IV, Fig. 2).

♀. Dull black; head and its appendages, scutellum, pleura and legs yellow; front remarkably broad, more brownish yellow; bristles black; face lighter, excavated; oral opening large, margins projecting; proboscis and palpi short; antennæ short, third joint rounded, nearly as broad as long, arista brown, yellowish at base; thorax with short sparse white pile and black bristles; the four bristles of the scutellum black; posterior femora with an inconspicuous black spot on under side near the base; abdomen wholly dull black with short sparse white pile; ovipositor flattened, black, reddish brown latterly, a little longer than the preceding segment. Wings with a brown picture, the basal portion of the wing, a broad deep irregular incision reaching from the posterior margin to the third vein and the following spots whitish hyaline: one on the costa just before the stigma reaching as far back as the second vein; four in the marginal cell beyond the tip of the first vein; first and second small, third and fourth large; a large one in the sub-marginal cell; two larger ones in the first posterior cell and a large indentation in the second posterior cell reaching from the posterior margin to the fourth vein; the six spots last named forming an irregular hyaline band across the wings. The other hyaline spots which are much smaller are scattered over various parts of the wings, but are confined for the most part to that portion beyond the hyaline cross-band. Beside these hyaline dots the brown picture is marked by numerous small yellowish brown spots which are most numerous in the middle portions of the wing along the second vein. The stigma is darker and marked by two yellowish spots. In the first of the hyaline indentations arising from the posterior margin are four or five small isolated brown spots; in the second indentation only one such spot. Length, 5 mm. One female.

Habitat: Colorado.

Neaspilota brunneostigmata, sp. nov. (Pl. IV, Fig. 3).

♂. ♀. Light yellow; the grayish black on the dorsum of the thorax almost concealed by the thick pollen and pile; head and its appendages yellow, front rather broad slightly narrowed anteriorly; face lighter yellow somewhat hollowed out; oral opening rather large, margin slightly projecting; proboscis and palpi prominent, palpi quite long and narrow; antennæ darker yellow; arista yellow, darker toward the tip; the black on the cephalic aspect of the thorax is not covered with white pollen and appears as a shining black round dot; scutellum yellow; the four bristles, as well as the others of the thorax and head, brownish; metanotum black, yellow at the sides and for the most part covered with gray pollen; legs yellow; tarsi, especially the last segment, darker; wings hyaline; veins yellowish, the stigma, the costal vein, the anterior and posterior cross-veins, and the tips of veins two, three and four, brown; first vein only with bristles. Abdomen yellow, sometimes brownish with short, thick, white pile; ovipositor reddish yellow as long or longer than the three preceding segments taken together. Length, ♂ 3 to 4 mm., ♀ 3 to 7 mm. Three males, two females.

May easily be separated from *T. alba* Loew, and *T. signifer* Coq.

by the stigma being wholly brown and from *T. albidipennis* by the coloring of the body. The great difference in the size of the two females is somewhat remarkable, but they are alike in every other particular.

Ictericaria seriata Loew.—New Jersey, Illinois.

Ensina humilis Loew.—Jamaica, Kans., S. D., Ia., Tenn., Miss., Ill.

Tephritis finalis Loew.—Washington (reared from the heads of various *Compositæ*), Ida., S. D., Colo., Cal., N. M.

Tephritis variabilis, sp. nov. (Pl. IV, Fig. 4).

♂. ♀ Cinerous; head cinerous; front brownish except at sides and with two ferruginous stripes; face only slightly hollowed out; mouth opening large, margins slightly projecting; palpi rather large, whitish; proboscis long, yellow, geniculate; antennæ light brown, arista brown; postorbital bristles and a single pair of the frontal bristles white, others black; occiput and ocellar triangle black; thorax, cinerous with short whitish pile and five ferruginous stripes; the three median ones anteriorly; also a small ferruginous spot on the humeri; scutellum with two ferruginous stripes; the four bristles of the scutellum, as well as those of the thorax, black and arise from minute black spots; coxæ and femora, except the tips of the tibiae, cinerous; tibiae and tarsi reddish yellow. Abdomen cinerous with two rather broad ferruginous stripes; ovipositor wholly shining black, flattened, about as long as the three preceding segments taken together. Wings with a brownish reticulation which is subject to considerable variation; the stigma and the region between the first and fourth veins usually much darker and containing only small or medium sized drops; usually four, but often only three, hyaline drops in the marginal cell beyond the tip of the first vein; over the entire wing there are numerous smaller drops interspersed among the larger ones, the latter often confluent in the discal and third posterior cells; the round spot in the stigma is yellowish; basal portion of some of the veins sometimes with a yellowish tinge; first only with bristles. Length, ♂ 3 to 4 mm., ♀ 3 to 5 mm.

Habitat: Washington, Oregon.

I have before me a large series of specimens which I believe to belong to this same species, although the coloring and size of the body and the reticulation of the wings is subject to considerable variation. In some specimens all the parts described above are black and the ferruginous stripes hardly or not all visible, but this I take it is due to various stages of desiccation, as I find all stages between these and the well-marked forms. The six specimens from Oregon are much larger and the ovipositor is as long as all the preceding segments taken together; these may prove to be distinct, but as yet I can find no characters constant enough to separate them.

Tephritis fucata Fabr.—Jamaica, Florida.

Tephritis albiceps Loew.—New Jersey.

Tephritis murina, sp. nov. (Pl. IV, Fig. 5).

♂. ♀. Grayish; head whitish; front lemon yellow narrowly whitish on sides; mouth opening rather large, margins somewhat projecting; palpi and proboscis long, the former whitish, the latter yellowish and geniculate; antennæ yellow; arista brown; postorbital and a single pair of frontal bristles yellowish white, others black; occiput for the most part black; thorax grayish with yellowish white pile; posterior half of scutellum yellowish; bristles black; legs wholly reddish yellow; front femora of one of the males with a short narrow brown stripe on side. Abdomen of female somewhat narrowed, grayish, with rather long thick white pile; ovipositor wholly shining black with very fine reddish pile, flattened, as long or longer than the four preceding segments taken together. Wings rather narrow with a guttate brown reticulation; basal portions nearly without markings; the dark brown stigma with a round sub-hyaline spot; the hyaline spots for the most part large and quite round, nearly confluent except in basal and posterior portions of the wing; few small hyaline dots interspersed among the larger ones in the apical portion of the wing; third vein with a few widely separated bristles. Length, ♂ 4 mm., ♀ 4.5 to 5 mm. Three males, three females.

Habitat: Washington.

The reticulation of the wings closely resembles that of *T. albiceps*, but the larger size of this species, together with the absence of black markings on the abdomen, the greater length of the ovipositor, etc., makes it easy to distinguish the two species.

Tephritis webbii, sp. nov. (Pl. IV, Fig. 6).

♀. Black; head yellowish; front darker, rather broad; face hollowed out; mouth opening large with its edges projecting; first and second joints of antennæ yellowish, third joint brown; arista brown, lighter toward base; some of the postorbital bristles white; other bristles of the head as well as those of the thorax and scutellum black. Thorax with brownish pollen and short white pile above and whitish pollen below; legs brownish yellow, thickly beset with short black hairs; femora somewhat darker, front femora with a few black bristles below and a few white hairs above. Abdomen blackish, almost slate color, thickly beset with short black pile, a few black bristles and some white pile; ovipositor, except for two yellowish spots on lateral margins, shining black, flattened, not quite as long as the two preceding segments taken together. Wings uniformly slate color with whitish hyaline spots; these are largest along the apical and posterior margins, where they are often confluent; in the middle portions of the wing are several smaller round hyaline spots; basal portions with little of the gray markings; stigma black; first vein with bristles. Length, ♀ 5 mm. Two females.

Habitat: Idaho, Minnesota.

A single specimen from Minnesota is much lighter, the abdomen

showing a reddish tinge and the picture of the wing being more brownish.

Tephritis californica, sp. nov. (Pl. IV, Fig. 7).

♀. Head and its appendages, legs, humeri, a line running from humeri to base of wings and the scutellum, except the black median portion, yellow; front rather broad somewhat narrowed anteriorly; postorbital bristles and a single pair of frontal bristles yellow, other bristles of the head as well as those of the thorax and scutellum dark brown, almost black; third joint of antennæ rounded; arista brownish, yellowish at base. Thorax black with yellow pollen and short yellow pile. Abdomen brown with very thick rather long yellow pile; ovipositor flattened; black except a lateral reddish or yellowish spot on either side, not quite as long as the two preceding segments taken together; bristles on the posterior margin of sixth segment brown. Wings rather broad with a yellowish or brownish tinge; with a brown reticulation indistinct in basal portions, but forming two irregular cross-bands in the distal portions, one near the middle and the other toward the apex of the wing; the first of these is narrower and runs from the costa across the stigma and the two cross-veins and reaches the posterior margin at the tip of the fifth vein; the second, which extends across the apical portion of the wing, emits three rays; the first, which is narrower and rather broken, reaches the anterior margin between the tip of the first vein and the cross-band itself; the second, which is also narrow, reaches the margin at the tip of the third vein; the third reaches the margin at the tip of the fourth vein, where it widens somewhat; both of the cross-bands are everywhere marked with mostly roundish hyaline or sub-hyaline dots, third vein with only a few bristles. Length, 5 mm. One female.

Habitat: California.

Tephritis rufipennis, sp. nov. (Pl. IV, Fig. 8).

♂. Brown; head and its appendages, legs and a spot on the humeri yellow; front rather broad, slightly narrowed anteriorly; postorbital bristles and a single pair of the frontal bristles yellow; other bristles of the head as well as those of the thorax and scutellum dark brown, almost black; third joint of antennæ rounded; arista brown, yellowish at base. Thorax almost black with thick short yellow pile; humeri and sometimes a narrow line running from humeri to base of wing yellow; metanotum prominent, black faintly dusted with grayish pollen; legs and feet dark yellow beset with many short black hairs and some yellow ones; femora sometimes slightly darker. Abdomen brown with thick yellowish pile. Wings rather broad with a yellowish tinge; two wide brown reticulated cross-bands, the first near the middle, the second toward the apex; the first begins on the costa, crosses the stigma and, constantly growing wider posteriorly, crosses both the cross-veins and reaches entirely to the posterior margin; a rather broad spur branches off in the region of the fifth vein, filling the base of the third posterior cell and part of the axillary corner of the wing, but not reaching the posterior margin; the second band beginning in the costa at the tip of the second vein and ending in the posterior margin of the second posterior cell is separated from the first anteriorly by a somewhat triangular hyaline space, the apex of the triangle resting on the fourth vein; sometimes, however, the hyaline space does

not quite reach the fourth vein, in which case the two cross-bands are connected along this vein; these bands are everywhere marked with hyaline or sub-hyaline mostly roundish dots of various sizes; besides these bands there is also a small dot on the anterior margin midway between the anterior ends of the bands, and another at, or just beyond, the tip of the fourth vein; veins yellowish, except where crossed by the cross-bands where they are brown; first and third with bristles. Length, ♂ 4 mm. Two males.

Habitat: California.

***Euaresta æqualis* Loew.**

Snow's notes (Kan. Univ. Quat., Vol. II, No. 3, p. 171) are confirmed by my specimens.

Habitat: Wash., Cal., Ida., Ill., Pa.

***Euaresta festiva* Loew.** South Dakota.

***Euaresta tricolor*, sp. nov.** (Pl. IV, Fig. 9).

♂. ♀. Yellow; head and its appendages, bristles, pile and feet also yellow; front broad not narrowed anteriorly; face somewhat receding with two distinct grooves for the reception of the antennæ; cheeks broad; oral margin not projecting; proboscis short, palpi rather long; antennæ not reaching to the middle of the face; third joint rounded; arista incrossated at the base. Dorsum of thorax with a very light brownish pollen; scutellum with four bristles. Abdomen with rather long yellow pile and a few bristles; ovipositor flattened, about as long as the two preceding segments taken together. The basal portions of the wings, with a yellowish tinge; distal half dark brown anteriorly, light brown posteriorly; the dark coloring does not reach as far posteriorly as the fourth vein except in the tip of the wing, where it reaches to or a little beyond this vein; the following whitish hyaline spots occur: two just beyond the stigma, the first reaching nearly to the third vein, the second reaching only a little beyond the second vein; one in the sub-marginal cell just below the tip of the second vein; two in the first posterior cell, the inner one over the posterior cross vein; four in the second posterior cell; one in the first basal cell; two in the discal cell; six or seven in the third posterior cell and one or two in the anal corner of the wing; as the shading on the wing fades out posteriorly the hyaline dots behind the fifth vein are less conspicuous; stigma for the most part brown, basal portion yellowish; first and third veins with bristles. Length, ♂ 6.5 mm., ♀ 7.5 mm. One male, one female.

Habitat: South Dakota.

The reticulated wing picture of this species reminds one more of *Tephritis* than of *Euaresta*, but the general structure and coloring of the body and the bristly third vein seems to show a closer relationship to the latter genus.

***Euaresta tapestis* Coq.** Colorado.

***Euaresta bella* Loew.** Tenn., S. D., N. Y., Neb., Ia., Mich.

Euaresta bellula Snow. California.

Euaresta pura Loew. Massachusetts.

Urellia abstersa Loew. S. D., Ia., Minn., N. M.

Urellia pacifica, sp. nov. (Pl. IV, Fig. 10).

♂. ♀. Brown; front yellow or brownish yellow; face lighter yellow; mouth opening rather large; proboscis short; palpi short but rather prominent; antennæ yellow, short, third joint but little longer than broad; arista brown, yellowish at base; ground color of the thorax and the scutellum black, but so thickly covered with a brown pollen as to make it appear light brown in color; pile whitish, short, rather sparse; humeri and usually a spot in front of base of wing yellowish; scutellum with two strong and two weak brownish bristles; legs dark reddish yellow. Abdomen somewhat darker, the whitish pile a little longer and thicker than on the thorax; ovipositor shining black, also with whitish pile, flattened, about as long as the two preceding segments taken together. Wings whitish hyaline, distal two-thirds, a brown picture which emits eleven rays; the first is very broad and runs from the cross-vein across the stigma to the costa, the second is short and narrow to the costa midway between tips of the first and second veins; the third is short and contains a small hyaline dot just beyond the tip of the second vein; the fourth and fifth end upon the tips of the third and fourth veins; the sixth and seventh cross the second posterior cell; the eighth follows the posterior cross-vein; the ninth, tenth and eleventh, which are less distinct, cross the third posterior cell, the ninth sometimes reaching the posterior margin; a large hyaline drop in the first posterior cell just in front of the posterior cross-vein and sometimes smaller drops on other portions of the picture; stigma yellowish in extreme apex; first vein only with bristles. Length, ♂ 2.5 to 3 mm., ♀ 3 to 3.5 mm. Two males, seven females.

Urellia aldrichii, sp. nov. (Pl. IV, Fig. 11).

♂. ♀. Gray; head and its appendages yellow; front with a brownish tinge; slightly narrowed anteriorly; face lighter, excavated; oral opening large; margin projecting; palpi rather long; proboscis short; antennæ short, third joint rounded, but little longer than broad; arista brown, yellowish at base; bristles of front and vertex brown. Thorax gray; humeri and pleura yellowish; scutellum with four bristles narrowly margined with yellow and yellow on under side; metanotum black with whitish pollen; legs wholly reddish yellow; the white pile on abdomen longer and thicker than that on the thorax; ovipositor black with a little pile, broad, flattened, but little longer than the preceding segment. Wings whitish hyaline, the brown picture resembling somewhat *Urella pacifica* with the following differences: Lighter brown; the first broad ray originates some distance before the anterior cross-veins; the ninth, tenth and eleventh rays are less distinct; the hyaline spaces are more numerous and larger; the picture is darker on the stigma and along the veins; the first and third with bristles. Length, ♂ 3 mm., ♀ 3.5 to 4 mm. Five males, four females.

Habitat: South Dakota.

EXPLANATION TO PLATES.

PLATE III.

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|---|--|
| 1. <i>Spilographa setosa</i> , sp. nov. | 6. <i>Aciura ferruginea</i> , sp. nov. |
| 2. <i>Trypeta straminea</i> , sp. nov. | 7. <i>Aciura nigricornis</i> , sp. nov. |
| 3. <i>Edaspis anthracina</i> , sp. nov. | 8. <i>Acrotania otopappi</i> , sp. nov. |
| 4. <i>Rhagoletis ribicola</i> DOANE. | 9. <i>Eutreta nora</i> , sp. nov. |
| 5. <i>Rhagoletis caurina</i> , sp. nov. | 10. <i>Eutreta aurantiaca</i> , sp. nov. |

PLATE IV.

- | | |
|---|--|
| 1. <i>Eurosta conspurcata</i> , sp. nov. | 7. <i>Tephritis californica</i> , sp. nov. |
| 2. <i>Eurosta aterrima</i> , sp. nov. | 8. <i>Tephritis rufipennis</i> , sp. nov. |
| 3. <i>Neaspilota brunneostigmata</i> , sp. nov. | 9. <i>Euaresta tricolor</i> , sp. nov. |
| 4. <i>Tephritis variabilis</i> , sp. nov. | 10. <i>Urellia pacifica</i> , sp. nov. |
| 5. <i>Tephritis murina</i> , sp. nov. | 11. <i>Urellia aldrichii</i> , sp. nov. |
| 6. <i>Tephritis webbii</i> , sp. nov. | |

**THE SMYNTHURIDÆ OF LONG ISLAND,
NEW YORK.**

BY NATHAN BANKS.

Among the Thysanura the Sminthuridæ are doubtless the most interesting group. Higher developed and more handsomely marked than their fellows they more readily attract attention and study. Their habits are various. Some live on stagnant water, several on living healthy plants, most upon decaying vegetation, many on fungi, some among ants, a few in caves, and others among moss. Like most of the Collembola they are quiet until disturbed, when, by the aid of the powerful spring or furcula, they make a great jump, nearly always followed by several other leaps of less extent. Their structure affords several good points for classification and discrimination of species, most prominent of which are the antennæ and furcula. The two common garden species, *S. arvalis* and *S. hortensis*, are of some economic importance.

The spring-tails with a short body constitute the family Sminthuridæ. Lubbock separated certain forms from them under the name of Papiidæ, but to my mind without just cause. Early in the history of these insects they were arranged by Bourlet in two genera, *Smin-*

thurus and *Dicyrtoma*. But Bourlet did not see clearly the structure of the antennæ of *Dicyrtoma*, which he stated to be eight jointed. He was misled, doubtless by poor magnifiers, to consider the slight swellings on the second and third joints to represent the terminations of so many joints. Lubbock, unable to see through Bourlet's mistake, erected a new genus, *Papirius*, for precisely similar forms. Since Bourlet's name for these forms has the priority I believe it should be used in spite of his mistake in generic description. Yet to my mind it was a mistake so natural, and so easily explained, that there was no excuse for not accepting Bourlet's name. *Smynturus* is readily, and I believe naturally, divisible into two groups; one having the fourth joint of the antennæ long and slender, and with at least fifteen annulations; the other group with the last joint of antennæ shorter and with less than ten annulations. The former group comprises the larger

The differences which separate these two groups are evidently of great value as separate them from *Dicyrtoma*, yet I think it is well to use at least subgeneric names to designate these groups.

One of *Smynturus* (*S. fuscus*) belongs to the first group, and must be retained for these species in case of a division;

I propose to give the subgeneric name of *Bourletiella* to the latter group in honor of him who first seriously investigated these interesting forms. *S. hortensis* Fitch shall serve as its type.

The following list of species which the writer has taken at or near Sea Cliff, Long Island, cannot be considered complete, as other groups often attracted more attention. Yet it is larger, doubtless, than can be made of many localities; and will serve, I hope, to induce others interested in these tiny insects to list the species of their own regions.

Our two genera may be separated by the following table:

Antennæ elbowed between third and fourth joints, the fourth joint longer than any of the others, no tubercles on the dorsum of abdomen.....	Smynturus.
Antennæ elbowed between the second and third joints, the fourth (or apical) joint shorter than the second, which is very long, often a pair of tubercles on dorsum.	Dicyrtoma.

Smynturus Latr.

- | | |
|--|------------------|
| 1—Fourth joint of antennæ long and slender, with at least 15 annulations (<i>Smynturus</i> proper)..... | 2 |
| Fourth joint of antennæ shorter, with less than ten annulations (<i>Bourletiella</i>)..... | 7 |
| 2—Dentes with spines each side, greenish species..... | spinatus. |
| Dentes without spines each side..... | 3 |

- 3—Wholly black (except between eyes) legs jet black. **nigripes**.
 Not wholly black, legs paler 4
 4—Legs pale, with black marks, no silvery marks on sides of abdomen **sylvestris**.
 Legs without dark marks. 5
 5—Some silvery spots on sides of abdomen, legs pale. **argenteornatus**.
 No silvery spots. 6
 6—A pale area above on dorsum, legs pale. **dorsalis**.
 No pale area above, legs brown. **fraternus**,
 7—Body furnished with clavate hairs above. **clavatus**.
 Only simple hairs on body. 8
 8—A horn or spine each side near anal tubercle; pale, marked with black.
macgillivrayi.
 No such horn or spine. 9
 9—Black, with pale between eyes. **hortensis**.
 Not black. 10
 10—White or yellowish, with dark antennæ. **arvalis**.
 Not all pale, marked with dark stripes on dorsum of abdomen. **elegans**.

Smynthurus spinatus *Mac Gill*.

A few specimens taken on stagnant water.

Smynthurus nigripes, sp. nov.

Black; head black, paler between eyes; basal joint of antennæ blackish, rest pale, fourth a trifle darker; abdomen black above and below; legs black, except pale claws; furcula black, except pale mucrones. Head broad, large; antennæ with basal joint short, second twice as long, third scarcely one-fourth longer than second, slightly curved, and above at curve is a stiff bristle, fourth longer than rest of antennæ, slightly curved, with about 16 or 18 annulations; abdomen broader behind than in front, sub-truncate behind, anal tubercle large; furcula moderate, dentes three and one-half times as long as broad at base, below with some hairs, mucrones moderate, fine, slender distinctly serrate below; abdomen with many long pale hairs above. Length. 1.4 mm.

In woods on rotten logs, Sea Cliff, N. Y. Known by its uniform black color.

Smynthurus sylvestris, sp. nov.

Pale; head often darker on sides, and some dark spots in front, and many between eyes, and a row along occipital margin; antennæ pale, basal joint darker; legs pale, a dark band or mark on femora and three on tibiæ, one at base, one at middle, and one before tip; abdomen thickly mottled with black, brown, and purplish markings above, becoming most dense on the lower sides, a rather large black submedian spot each side behind middle; anal tubercle above with a median black spot; beneath abdomen is pale, with a few purplish blotches each side; furcula pale, dentes darker on base. Antennæ of moderate length, basal joint a little longer than broad, second twice as long as first, third once and one-half as long as second, fourth nearly as long as the rest together, with about 18 annulations; abdomen rather long, hairy above;

furcula of moderate length, dentes nearly four times as long as broad at base, with hairs beneath, mucrones about one-third the length of dentes, serrate below, tip down-curved. Length, 2 mm.

Among dead leaves in woods, Sea Cliff, N. Y. Known by banded legs, and mottled abdomen.

***Smynthurus argenteornatus*, sp. nov.**

Pale; head with various pale brown markings, but obscure, more prominent between antennæ, and one larger near each eye: antennæ pale, dark on apical joint; legs pale, the tibiæ sometimes brownish; abdomen pale on base, darker on apical half, often the distinction very marked; the basal part, however, has brown marks and lines; on each side are about six silvery white spots or patches, venter pale, ana-tubercle when fully marked shows a pale round spot each side above; furcula pale, dentes rather darker. Antennæ of moderate length, basal joint a little longer than wide, second not twice as long, third nearly twice the length of second, fourth longer than others together, with about 18 annulations; abdomen of usual shape, not elongated behind, hairy above; furcula moderate, dentes fully three times as long

at base, a few hairs below, mucrones about one-third the length of the dentes, r, serrate below, and down-curved at tip. Length, 1.8 mm.

woods, on ground, Sea Cliff, N. Y. Differs from *S. sylvestris* r, unbanded legs, silvery spots on sides, and longer third of antennæ. There is a form which I take to be but a variety of this species, variety *albescens*. Pale whitish or greenish, eyes black, antennæ dark except basal joint, silvery spots on sides show in fresh specimens. Does not differ in structure from the type, except possibly a slightly shorter third joint of antennæ. It occurs only in a moss (*Polytrichum commune*).

***Smynthurus dorsalis*, sp. nov.**

Head pale, faintly lined with reddish, sometimes showing a more distinct reddish band connecting bases of antennæ, eyes black; antennæ pale on basal joints, last joint dark; abdomen pale yellowish, but with many fine blackish marks on sides becoming closer behind and extending farther on dorsum till they meet somewhat before tip, where it is black; this leaves a pale broad dorsal mark, (rather sharply outlined behind, but not in front, anal tubercle dark; legs and furcula pale, venter pale, dark marks on basal part. Head rather large; antennæ arise directly in front of eyes, first joint nearly one-half as long as second; third is one-half longer than second, fourth longer than second and third together, at first simple, then with 18 annulations; legs short; abdomen nearly twice as long as broad, with scattered hairs above, more numerous behind and on anal tubercle; furcula short, manubrium short, dentes nearly twice as long, tapering, with a few hairs below, mucrones short, about one-third the length of dentes, covered at tip, serrate below. Length, 1.5 mm.

In woods, Sea Cliff, N. Y. Recognized by pale dorsal area.

Smynthurus fraternus, sp. nov.

Head pale, dark on face, but shading into pale above; antennæ pale; legs dark brown, rather purplish; abdomen dark brown, slightly purplish, venter darker on base, light on apical half, furcula dark. Very similar to *S. nigripes* in general appearance and structure, but it is larger, the abdomen longer and the sides more parallel, the color more purplish, the head pale above and pale on apical half of venter. The structural characters are practically the same as *S. nigripes*; but the species, side by side, appear to be different.

Sea Cliff, N. Y.

Smynthurus clavatus *Banks*.

Easily known by the clavate hairs on dorsum; it occurs on rotten logs.

Smynthurus macgillivrayi *Banks*.

This species was swept from grass on a high hill (Harbor Hill) at Roslyn, Long Island. The pair of small horns easily separate it from all other species.

Smynthurus hortensis *Fitch*.

This is abundant on garden vegetables, and also in lawns.

Smynthurus arvalis *Fitch*.

Common in fields, and also on garden vegetables.

Smynthurus elegans *Fitch*.

Rare, on sandy ground. A form has dark stripes connected, and a spot behind on each side separate from the stripes.

Genus **Dicyrtoma** *Bourl.*

Abdomen maculate. **guttata.**

Abdomen not maculate **unicolor.**

Dicyrtoma guttata *Say*.

Papirius marmoratus Pack.

A few specimens of this handsome species which I believe is the same as Say's.

Dicyrtoma unicolor *Harvey*.

Papirius unicolor Harvey.

Papirius purpurascens MacGill.

Rather common in woods among dead leaves; it appears to agree exactly with Harvey's figure and description. Two specimens smaller and darker are scarcely more than a variety.

NEW NORTH AMERICAN TETTIGINÆ.—III.

BY ALBERT P. MORSE.

Paratettix hesperus, sp. nov.

Vertex narrower than eye; crown of head between eyes nearly twice as long as its middle breadth, distinctly narrowed in front; profile of face similar to that of *cucullatus*; facial costa narrowly forked but rather widely open below; eyes smaller and less protuberant. Pronotum granulose, similar in texture to that of *cucullatus*, but with the humeral angles less pronounced, giving a narrower and more convex appearance to the shoulders; the hind process passes the hind femora from 2.5 to 4 mm., and the wings pass the process 1 to 2 mm. Tegmina narrow, acuminate at apex. Fore and middle femora rather slender with upper margin convex, lower margin nearly straight but slightly sinuate at distal third. First joint of hind tarsi slightly ^{longer} than the remaining two together; pulvilli rounded beneath, the proximal two y pointed at tip and together about equal in length to the third.

Color rather uniform, ranging from rufous or ash gray to black, but frequently the hind femora and lower third of sides of pronotum pale.

Total length: ♂, 12-14; ♀, 14-16. Pronotum: ♂, 10.3-11.8; ♀, 12-14.5. Body: ♂, 7.5-9; ♀, 9-11. H. fem.: ♂, 5-6; ♀, 6-7.5 mm.

Similar to *P. cucullatus* in size and form but more nearly related to *P. astecus*.

The types consist of 276 ♂♂ and ♀♀ taken by me at Glendale, Or., Sept. 9, 1897. I found it also at Ashland, Corvallis, Drain, and Philomath, Or., Sept. 7-15, Ahwanee, Calif., Aug. 15; I have also seen specimens from the Dalles, Or., Wickham (Bruner), Sonoma and Marin Co., Calif., Osten Sacken (S. H. Scudder), and the following from the Leland Stanford Jr. University collection: Santa Cruz Mts., Aug. 3; Palo Alto, May 10, 12, Aug. 3; Mt. Hamilton, May 13, 14—in all 303 adults. Nymphs were common at Glendale on Sept. 9.

This species appears to be locally plentiful on the stony margins of rivers and streams in western Oregon and the Transition Zone of at least the northern part of California.

Paratettix toltecus extensus, new form.

This is a dimorphic form of *P. toltecus* distinguished by the possession of fully developed wings and pronotum of normal size, and may be recognized by the characters of that species.

Total length: ♂, 11.5-13.5; ♀, 12-14.5. Pronotum: ♂, 8.7-10; ♀, 8.5-11.5. Body: ♂, 7-9; ♀, 9-11. H. fem.: ♂, 5-6; ♀, 5.5-6.5 mm. The pronotum passes the hind femora about 1 mm. and the wings pass the pronotum from 2 to 3 mm.

One ♀, Arizona (Cornell Univ.), and 18 ♂♂, 20 ♀♀, from the following localities in California: Ahwanee, Colton, Sacramento, San Bernardino, and Tulare, July 15 to Aug. 27, usually in company with typical *toltecus*.

Merotettix, gen. nov.

Posterior sinus of lateral lobes of pronotum shallow, in the type the caudal margin of upper lobe about one-half as long as the ventral margin. Frontal costa of face narrowly forked, the branches straight and evenly divergent. Body relatively compressed in the type, the humeral angles very obtuse, and shoulders narrow. The type is *M. pristinus*, described below.

This genus is intermediate between *Paratettix* Bolivar and *Neotettix* Hancock. It is more nearly related to the latter in the shallowness of the posterior sinus of the lateral lobes of the pronotum and general form, but differs from it especially in the structure of the frontal costa of the face and slender form of body.

Merotettix pristinus, sp. nov.

Vertex resembling that of *Paratettix rugosus* but narrower, its front margin equal in width to an eye or slightly less, somewhat convex, projecting very little in advance of the eyes, narrowly sulcate on each side of the mid-carina at its union with the frontal costa; the crown between eyes broadly and shallowly sulcate on each side of high median ridge, rapidly widening backward from the middle of the eyes. Face in profile quite retreating below antennæ, the frontal costa roundly protuberant, scarcely sinuate above; forks of the costa straight, slightly and evenly divergent.

Pronotum scabrous or rugose; disk nearly flat, slightly elevated in front of shoulders, the front margin truncate; mid-carina distinct throughout, highest and almost sub-cristate midway between front margin and shoulders, undulate behind; lateral carinæ distinct, their anterior portions converging behind; shoulders narrow and with very obtuse humeral angles; hind process with straight sides, acute, sometimes deflected apex, about reaching posterior knees. Posterior sinus of lateral lobes very shallow, the caudal margin of the upper lobe less than half as long as the ventral margin. Wings two-thirds or three-fourths as long as the pronotal process, but apparently abortive. Fore and middle femora slender with entire or slightly sinuate margins; hind femora only moderately stout, much less so than in *Neotettix*. Hind tarsi with first joint distinctly longer than succeeding ones united, pulvilli straight or rounded below, acutely pointed, the third nearly as long as the others combined.

Body: ♂, 6.5-7.5; ♀, 8-9. Pronotum: ♂, 6-7; ♀, 7.7-9. H. fem.: ♂, 4.5-5; ♀, 6 mm.

Four ♂♂, four ♀♀ (mostly in poor condition) San Domingo, M. A. Frazer (S. H. Scudder).

In the form of the vertex (except width) and facial costa and the rugosity of pronotum this species resembles *Paratettix rugosus*, but is

readily separated from it by the narrow shoulders and shallow posterior lateral sinus.

Tettix tentatus, sp. nov.

Stout, with the general appearance of a large *Nomotettix*, to which genus this species and *T. acadicus* are apparently allied by the frequently shallow form of the tegminal sinus. Vertex resembling that of *T. granulatus*, more than twice the width of an eye, much advanced in front of eyes and obtuse-angled, the carina not at all or barely projecting; crown with the sides excavate opposite the anterior middle portion of eyes and slightly broadened anteriorly, rather flat, sulcate anteriorly on each side of the moderately developed carina, convex posteriorly, without occipital mammillæ. The face in profile is very similar to that of *Nom. parvus* but is less deeply excavate opposite the eyes. Pronotum rather sharply tectiform; the mid-carina high, sub-compressed, in profile convex opposite shoulders, horizontal or a little upturned posteriorly; anterior margin very obtuse-angled, nearly truncate; hind process barely or considerably passing hind femora, its sides nearly straight; wings equalling or slightly passing the pronotum.

Measurements. Total: ♂, 10.3; ♀, 11.4-14.5. Pronotum: ♂, 9.3; ♀, 10.5-12. H. fem.: ♂, 5.6; ♀, 6-6.6. Width of shoulders: ♂, 3; ♀, 3.5. Ant. III: ♂, 3; ♀, 2.5-3. Pron. passes H. fem.: .3-2.5 mm.

ribed from 1 ♂, 5 ♀ ♀. 1 ♀, Oregon (Scudder); 1 ♀, Laggan, Dean (Scudder); 1 ♀, Green River, Wyo., Garman (M. C. Z.); 1 ♀, Laggan, Wickham (Bruner); 1 ♂, 1 ♀, Tennessee Pass, Colo. (Bruner).

This species resembles *T. acadicus* but may be distinguished from it by the angulate (instead of toothed) vertex in dorsal view and the flatter face in profile, the frontal costa being less protuberant opposite lower part of eyes. These two species are apparently on the borderland of the genus, presenting characters allying them to *Nomotettix*. *Tentatus* was first distinguished four years ago, from three specimens; three additional specimens, representing both sexes, coming to hand, I have now no hesitation in describing it.

Tettix hancocki, sp. nov.

Allied to *T. ornatus* from which it differs in its more robust form with wider and generally more projecting vertex, slightly more prominent mid-carina, in the generally more abruptly forked and wider facial costa, and notably in the enlarged middle femora; the expanded portion of the latter in the male is nearly or quite one-half as broad as long (in *ornatus* seldom more than one-third), in the female the difference is less noticeable. The humeral angles of the pronotum are more pronounced and the mid-carina is a little more elevated in its anterior portion. Dimorphism in wing- and pronotum-length occurs, the specimens (and sexes) before me (19 ♂ ♂, 27 ♀ ♀), being about equally divided between the two forms, with a few of intermediate character. For the short-winged form the trinomial *T. h. abbreviatus* may be used.

Measurements. Total: ♂, 8.3-12.4; ♀, 9-13. Pron.: ♂, 8.2-11; ♀, 8-12. H. fem.: ♂, 5-5.5; ♀, 5.5-6. Width of shoulders: ♂, 2.6-3; ♀, 2.8-3.5. Antenna: 3-3.5. In long-winged examples the pronotum and wings pass the hind femora from 3 to 4 mm.

The types consist of 14 ♂ ♂, 14 ♀ ♀, from Ames, Iowa, received from E. D. Ball, taken from April 18 to Sept. 27, chiefly in April and May. I also refer to this species specimens now before me from Montreal, from Prince Arthur, Sudbury, Toronto, DeGrassi Pt., Ont., from the North Red River, Englewood, S. D., Lincoln, Neb., Ind., and Moline, Ill. Named in honor of Dr. J. L. Hancock, in deference to his critical study of this group of locusts.

Tettix crassus, sp. nov.

A variable and very perplexing form of the *ornatus* group, closely related to and seemingly intermediate between typical *ornatus*, *hancocki*, and *academicus*. It is distinguished from *ornatus* by the more robust form with wider shoulders, wider and more projecting vertex, and less prominent eyes; it lacks the enlarged middle femora of *hancocki*, which it otherwise resembles closely; the form of the body is shorter and more depressed, the humeral angles more pronounced, the vertex less projecting, and the tegminal sinus less frequently shallow than in typical *academicus*.

I refer to this form with some hesitation 18 ♂ ♂, 23 ♀ ♀, from Colorado, as follows: 14 ♂ ♂, 12 ♀ ♀, (Scudder), 4 ♂ ♂, 5 ♀ ♀, (Henshaw), all of Morrison's collecting; 1 ♀, Denver (Scudder), 1 ♀, Poudre Riv. (Bruner), 4 ♀ ♀, C. P. Gillette (Morse).

I cannot close without reiterating what I have said before, in the hope of impressing upon collectors the desirability of securing considerable series of specimens from each locality. This is a matter of the utmost importance; in fact, a necessity to the acquisition of an adequate knowledge of the group in consequence of the wide individual variability and close specific resemblance among its members. To Mr. E. D. Ball I am indebted for an opportunity to study an excellent lot of material from Iowa, including several species in considerable series, an opportunity which has enabled me to distinguish and characterize one of the species described above.

LIFE-HISTORY OF A EUROPEAN SLUG CATER-
PILLAR, COCHLIDION AVELLANA.

PLATE V.

BY HARRISON G. DYAR, A.M., PH.D.

Cochlidion avellana Linn.

1758. *Tortrix avellana* LINNÆUS, Syst. Nat. I, 531.
 1761. *Tortrix avellana* LINNÆUS, Faun. Suec. 334.
 1767. *Bombyx limacodes* HUFNAGEL, Berl. Mag. III, 402, 425.
 1777. *Bombyx sulphurea* FABRICIUS, Gen. Ins. 279.
 1780. *Phalæna limax* BORKHAUSEN, Eur. Schmett. III, 449.
 1784. *Bombyx limacodes* ESPER, Schmett. III, 140, pl. 26, figs. 3 to 9.
 1787. *Bombyx buso* FABRICIUS, Mant. Ins. II, 121.
 1787. *Bombyx testudo* FABRICIUS, Mant. Ins. II, 121.
 1794. *Phalæna funalis* DONOVAN, Brit. Ins. III, 76.
 1801. *Bombyx asella* ESPER, Schmett. III (1) 36, pl. 85, fig. 4.
 1803. *Tortrix testudinana* HÜBNER, Eur. Schmett. Tortr. figs. 164. 165.
 1806. *Cochlidion testudo* HÜBNER, Tentamen, 2.
 1809. *Apoda testudo* HAWORTH, Lep. Brit., II, 137.
 1822. *Limacodes testudo* GODART, Lep. France, IV, 279, pl. 28, figs. 1, 2.
 1825. *Limacodes testudo* LATREILLE, Fam. Nat. 474.
 1829. *Limacodes testudo* STEPHENS, III, Brit. Ent. Haust. II, 86.
 1830. *Tortrix testudinana* TREITSCHKE, Schmett. Eur. VIII, 14.
 1855. *Limacodes testudo* WALKER, Cat. Brit. Mus. V, 1145.
 1858. *Limacodes testudo* RAMBUR, Cat. Lep. And. 340, note.
 1871. *Heterogenea limacodes* STAUDINGER, Cat. Lep. Eur., 62.
 1892. *Apoda avellana* KIRBY, Cat. Lep. Het. I, 552.
 1896. *Apoda limacodes* GROTE, Syst. Nord. Schmett.

LARVA.

1776. SCHIFFERMILLER, Syst. Verz. Wiener Geg. pl. 18, fig. 17.
 1787. FABRICIUS, Mant. Ins. II, 121.
 1800. SEPP, Nederland. Ins. II, 15.
 1810. HÜBNER, Samml. Eur. Schmett. VI, 6a.
 1835. TREITSCHKE, Schmett. Eur. VIII, 15.
 1861. WILDE, Syst. beschr. Raup. 70.
 1886. BUCKLER, Larv. Brit. Moths, III, 53.
 1893. HOFMANN, Raup. Gross Schmett. Eur. pl. 18, fig. 17, end plate, fig. 35.
 1894. CHAPMAN, Tr. Ent. Soc. Lond. 345, pl. VII, figs. 14 to 20.

SPECIAL STRUCTURAL CHARACTERS.

Dorsal space broad, narrowing slightly toward the extremities, ending behind in the quadrate, slightly notched joint 13; not strongly

arched. Lateral space broad, oblique, slightly concave, narrowing a little toward the extremities. Subventral space very small, contracted. Subdorsal ridge at first prominent, finally smooth, not elevated. Lateral and subventral ridges moderately prominent, approximate, the lateral at first tubercular, later smooth. Warts single haired; in stage I the subdorsal now bears two spines on joints 3 and 13, a single spine with short branch about the middle on joints 4 to 12, leaning in alternating directions; later the warts are represented by tubercles bearing two setæ on subdorsal ridge and on the central thoracic wart, one seta on lateral ridge; in the last stage obliterated. Subventral setæ rudimentary, but persistent. Depressed areas moderately well developed, rather small, rounded, slightly sunken, not very sharply defined, smooth. The series (1) to (8) are present. Skin at first smooth, later covered with papillose granules which become converted into round granules with irregular divided crests or numerous thick spinules and in the last stage with dense, round, clear granules of unequal size. After the last molt the larva becomes very smooth but there is no distinct change in coloration, the ancestral yellowish green persisting. The larva is marked like the leaves, adapted to escape observation.

AFFINITIES, HABITS, ETC.

This larva is allied to *C. y-inversa* Pack. as pointed out by Miss Morton and myself (Journ. N. Y. Ent. Soc., III, 152), but it differs in some interesting particulars that I did not suspect from the examination of my former material. It is in several respects more generalized. The color remains yellowish green nearly to the end, not becoming suffused with white pigment as in *y-inversa*; the outline of the lateral ridge is slightly waved; there is frequently a red border to the transverse yellow line on joint 3 and the granules before the last stage have irregular crests. In all these characters the larva departs from *y-inversa* and approaches *Heterogenea*. There is no dorsal red patch, as is characteristic in that genus, yet there is a distinct tendency to the production of red color in the edge of the collar and the dark dots of the subdorsal line. The condition of the granules is especially interesting, for it explains the origin of the "fur" of *Heterogenea*, by the splitting up of the apex of a papillose granule into short thick spines which become borne on the crest of the granule and may easily be imagined further modified into the "fur" structure by becoming slender and more attenuated. The larva belongs to the group of palæ-

arctic smooth Eucleids which extends through northern Europe, Asia and America, reaching to the mountainous parts of India and in America even southward to the tropics in the case of one species.* *C. avellana* is European, but its nearest ally is the North American species above referred to (*y-inversa*). In certain respects the American *Lithacodes fasciola* is also a closely allied larva.

The eggs are laid singly, the larvæ feed on the backs of the leaves and have a single brood in the year, all apparently as in the allied forms. As I have no experience with the larva in a wild state, I will not enter further into this subject, but refer to the European literature. The material from which this life history was worked out was obtained from Staudinger and Haas, of Dresden, Germany.

CRITICISM OF PREVIOUS DESCRIPTIONS.

The early figures are more or less successful attempts at reproducing the general appearance of the full grown larva, natural size. Dr. Chapman gives some very full and interesting observations on Stage I, especially in regard to the evagination of the spines on hatching, and an accurate enlarged figure. This evagination occurs in all the larvæ that have the primitive first stage. I think it can be shown that the setæ of the evaginated tubercles are absent and that it is the spine-like tubercle that is thus modified.† Setæ iv and v are true setæ and are not evaginated, besides being much slenderer and different in appearance from these stiff spines. The supposition that the spines are tubercles also explains the coalescence of the subdorsal ones (i and ii) into a single organ which is far advanced in this species, but goes even further in *Packardia* and reaches the maximum in *Phobetron*.

I have already referred (Journ. N. Y. Ent. Soc., III, 152, note) to Dr. Chapman's mistake in considering the apparent dislocation of the subdorsal tubercles as evidence that they represented two rows as in *Eriocephala*, and to my disagreement with the generalization he has made. Stage I, in these Cochlidiæ, is only a primitive first stage with tubercles i to v present, arranged as in the highest "micro" type, but further modified by the absence of setæ on tubercles i to iii, the

* *Lithacodes fasciola*. See Schaus, Proc. Zool. Soc. Lond., 1896, 650 and Walker, Tr. Ent. Soc. Lond., 1862, 82, said to be from "South America."

† In the Notodontians that have hypertrophied tubercles only the primitive setæ are present at birth and the "horns" grow out much as in the Cochlidiæ, but here the true setæ are present and appear on or near the apices of the horns.

enlargement of these tubercles into spines and the alternation of the subdorsal warts on the successive strong and weak segments.* I do not think that Dr. Chapman would have reached any other conclusion if he had had as extensive a fauna in the family as is present in America. The English species consist of only two members of the palæarctic group without any of the others, and it is not surprising that from these only he should have been misled, especially as the homology of the tubercles of the Cochlidions is decidedly involved.

DESCRIPTION OF THE SEVERAL STAGES IN DETAIL.

Egg.—Elliptical, flat as usual, clear, translucent whitish with transparent rim; reticulations obscure; size 1.1 × .8 × .1 mm. Duration six days.

Stage I. (Plate V, Fig. 1.) Head slightly testaceous, eye black, mouth brown; cervical shield blackish brown, covering the head when it is retracted. Body thick, truncate before, narrowed and rounded behind; dorsal and lateral spaces moderate, flat; subventral space retracted. Tubercles large, round, the spines arranged as in the other species of *Cochlidion*, the short limbs of the forked subdorsals (joints 4 to 12) forming a short prominence on the shaft (Plate V, Fig. 2) as in *y-inversa*, not as long as in *biguttata*. The subdorsals of joints 5, 7, 9 and 11 lean outwardly. Spaces a little hollowed intersegmentally both dorsally and laterally. Color whitish, after feeding, becoming pale green from the blood, smooth, shining. Subdorsal ridge white, the lateral ridge less distinctly so; setæ pale with dusky tips. The cervical shield pigment is less than in *C. biguttata*. Length, 1.0 to 1.5 mm.

Stage II. (Plate V, Fig. 4)—Elliptical, truncate, narrowing behind, widest through joints 4 and 5. Dorsal and lateral spaces broad, narrowed at the ends, gradually so posteriorly; sub-ventral space retracted. Ridges prominent, with rounded tubercles, two long black tipped setæ on subdorsal ridge and at middle of joints 3 and 4, one seta on the lateral ridge on joints 3 to 12, normal. Skin remotely finely granular with pale secondary spines on the tubercles, the spines bluntly tipped. The subdorsal setæ still show some of the alternation of stage I, those of joints 5, 7, 9 and 11 leaning outward, but all bear two setæ. Pale green, subdorsal ridge whitish, a black shade under joint 2 at the cervical shield. Length, 1.5 to 2.4 mm.

* I owe the suggestion of strong and weak segments to Dr. Chapman's work on *Acronycta*.

EXPLANATION OF PLATE V.

- Fig. 1. Larva, stage I, side view, $\times 60$.
 Fig. 2. One of the branched horns (subdorsal tubercles of joints 4 to 12), enlarged.
 Fig. 3. Rear view of the larva, stage I, showing the setæ of the last two segments.
 Fig. 4. Larva, stage II, side view, $\times 40$.
 Fig. 5. One of the lateral tubercles more enlarged, showing setæ and granules.
 Fig. 6. A lateral tubercle, stage III, much enlarged.
 Fig. 7. A subdorsal tubercle of the same stage.
 Fig. 8. A lateral depressed space (4) with skin granules, stage V.
 Fig. 9. The same, some of the granules more enlarged.
 Fig. 10. Skin granules of stage VI, enlarged.
 Fig. 11. Mature larva, stage VII, dorsal view, $\times 5$.
 Fig. 12. Skin granules of stage VII, enlarged.
 Fig. 13. Moth of *Cochlidion avellana*.

A NEW GENUS OF COCHLIDIONIDÆ FROM VIRGINIA.

BY HARRISON G. DYAR.

Isochætes, gen. nov.

Male antennæ shortly bipectinate to the tips, the pectinations longest centrally. Palpi upturned, not reaching the vertex, yet nearly so, evenly, smoothly scaled, third joint distinct, three times as long as wide. Legs slender, front and hind ones sparsely hairy, middle legs densely tufted on tibia and two basal tarsal joints; middle and hind legs with long apical spurs. Venation as in *Phobetron*; primaries with veins 2 and 3 separate, 7 from apex of cell, 8 to 10 stalked, veins all present; secondaries with 6 and 7 stalked, 8 anastomosing with cell to near middle; costa convex; pattern of markings as in *Phobetron*.

1. *beutenmülleri* Hy. *Edw.*

Male warm ochraceous; thorax and fore wings marked ill-definedly with light brown and dark purplish brown. Hind wings blackish, fringe and abdomen dull ochereous. The pattern of markings recalls that of the female *Phobetron pithecium*. The ochereous ground color is shaded with pale purplish; a brown, dentate t. a. line on inner half of wing and a short basal streak; a curved t. p. shaded band, traversed by a small U-shaped mark resting on veins 3 and 5, the open end of this mark and two dots on the fringe opposite the lower limb of the U, dark pu. 1 c b . wn.

One male, Alexander County, Virginia. Differs from the ♀ type in lacking all the dark purple brown shades. The ♀ has also four spurs on the hind tibiæ but otherwise agrees.

Larva.—This is the insect figured by Glover, (Ill. No. Am. Cont., Pl. 11, Fig. 1; Pl. 20, Fig. 40) and referred to by me in some detail (Proc. Ent. Soc. Wash., iv, 300).

The larva occurs sparingly in the vicinity of Washington, D. C., and has been known for a long time to the entomologists of the Department of Agriculture, but has not before been raised to maturity. There are some colored figures of the larva among the notes left by Dr. Riley and I have copied a description written by Mr. Pergande. Last season, with the kind assistance of Mr. Schwarz and Mr. Ashmead, I succeeded in getting a few larvæ from which the above described male moth was bred.

The larva has the arrangement of tubercles of *Phobetron* and only differs in their special modification. The subdorsal horns are of equal length, the lateral ones though covered by the subdorsals are rather long and slender and the whole larva is of a clear, pale green like glass, covered with the clear, spinulose hairs. Found on beech and oak.

ON THE EARLY STAGES OF SOME CALIFORNIA LEPIDOPTERA.

By D. W. COQUILLET.

Hydroecia angelica Smith.

The larvæ live singly in the stems of *Psoralea macrostachya*, sometimes causing the tops of the infested plants to die, but never killing the entire plant. Before pupating the larva gnaws a hole to the bark, but never or very seldom through it, then retires several (sometimes as much as eight) inches below this hole and closes the burrow both above and below itself, pupating within the cavity thus formed. The main burrow usually extends to, but never into the roots. The chrysalis is of the usual form, robust, polished, dark reddish brown and terminates behind in two diverging points; length, 22 mm. Eight of the

chrysalids and one empty chrysalis-skin was found Sept. 12, 1882, near Anaheim, Cal. The moths issued from Sept. 20 to Oct. 9. Larvæ and chrysalids were also found on Aug. 6, 1893, at Los Angeles, Cal., and the moths issued from Aug. 16 to 31.

Gloveria medusa *Strecker.*

Body mottled light and dark gray, a broad light gray dorsal stripe having a dark central line and showing lighter, more whitish spots situated on the anterior end of the middle segments; body very thickly covered with long black and shorter black and white hairs springing from the skin and not from warts; head clothed with hairs like the body, black, opaque, rough, a white median line extending from the vertex to the clypeus, where it divides and passes down along each edge of the latter; labrum white; spiracles very narrow, yellowish, ringed with black; venter colored like upper part of body; length, 80 mm. Found one June 29, 1890, crawling upon the ground near Newhall, Cal. Pupated July 26, in a very thin gray silken cocoon through which the chrysalis is plainly visible. Chrysalis of the usual form, dark brown, thinly covered with quite long yellowish hairs excepting on the antennæ, leg and wing-cases; ends posteriorly in a broad transversely flattened process which is thickly covered with short hooked spines; length, 38 mm. Moth issued Aug. 24.

Nola involuta *Dyar.*

The description recently given as *N. minuscula* Zell (JOURN. N. Y. ENT. SOC., VI, 249) should be credited to this species (JOURN. N. Y. ENT. SOC., VI, 42).

Arthrochlora februalis *Grote.*

Resembles *Pyrophila pyramidoides*. Body green, a white dorsal and stigmatal line and a narrower, broken, more yellowish subdorsal line; on the posterior part of segment 10 this subdorsal line bends upward, almost crossing the following segment and nearly reaching the dorsal line; posterior end of body tapering rapidly to the anal legs, causing segment 11 to appear slightly humped; piliferous spots white, each giving rise to a short hair; spiracles pale brownish, faintly ringed with black; stigmatal line bordered above with pinkish on the anterior part of the body; 16 legs, each marked with pinkish; venter deep green, unmarked; cervical shield not apparent; head bluish green, the mouth-parts marked with black and reddish;

length, 30 mm. Found one June 1, 1890, on a wild plum tree (*Prunus ilicifolia*), in San Diego Co., Cal. A few days later it fastened several leaves together with a few silken threads but did not spin a perfect cocoon. It pupated June 7th and the moth issued April 9th of the following year.

***Lycæna exilis* Boisd.**

Body flattened below, convex above, green, granulated, and covered with a short, sparse, whitish pubescence; head very small, wholly retractile, brownish black; 16 legs, very small; length, 6 mm. Found two August 4, 1887, near Los Angeles, Cal. One pupated August 8th and the butterfly issued August 14th.

***Lycæna amyntula* Boisd.**

Body green, a blackish dorsal and less distinct subdorsal stripe, a faint black spot in the subdorsal space on segments 4 to 10; two faint pinkish stigmatal stripes; head shining black, wholly retractile; length, 12 mm. Found two in seed pods of *Astragalus crotalaria* early in April, 1887, near Riverside, Cal. One of them pupated April 22d and the butterfly issued May 6th.

***Pamphila phylæus* Drury.**

Body olive green, tinged with pink, and covered with small black granulations; a subdorsal row of larger, polished, brown piliferous spots; first segment broadly bordered behind with brownish black, reaching from one spiracle to the other, and divided by whitish dorsal line; other segments marked with a black dorsal line; spiracles light gray, ringed with black; head covered with small rounded elevations, brownish black, the groove on upper part of face bordered with light gray, reaching from apex of head to the clypeus, the latter bordered each side with a light gray line reaching from apex half way to base; near middle of clypeus are two vertical light gray dashes and outside of each lower corner is a light gray spot; in certain lights the ground color of the face appears to be light olive gray, spotted and dotted with brown; length, 22 mm. Found two under a stone near Los Angeles, Cal., October 22, 1888. One pupated November 2d and the butterfly issued on the 24th of the same month.

***Nisoniades funeralis* Scudd.-Burg.**

Body gray, thickly covered with raised whitish dots; a white subdorsal line which sometimes contains a yellow spot near the suture of

the segments; spiracles wholly whitish; head concave on
 down, marked irregularly with darker brown, a row of three
 spots on each side of the face and an additional one on
 the head; posterior part of head where it joins the body
 which color is interrupted above; length, 21 mm.
 May 8, 1887, near Los Angeles, Cal., living singly in a
 on *Hosackia glabra*. One pupated May 14th and the
 and June 4th.

ON THE SEVENTEEN-YEAR CICADA.

BY BENJAMIN LANDER.

I had exceptional opportunities in 1894 to study the habits
 of the seventeen-year Cicada, I sent from time to time the results of
 observations to the late Professor Lintner, then the State Entomol-
 ogist at Albany, who requested me to watch for "left overs," as he
 called them—belated ones likely to appear in 1895 and 1896. In
 both those years I noticed a few in the woods back of Nyack. Last
 year I was not so fortunate, but I heard of two specimens that were
 seen in the pupa state.

It will no doubt be interesting to those who have specially studied
 the Cicada to learn that during the last summer there were great num-
 bers seen and heard in the woods and orchards about Nyack; even in
 the village streets. So many, in fact, that in some places in the
 woods their peculiar note could be heard almost continuously. On
 one tree back of my house I counted nine pupa-cases.

It is not at all likely that these were "left overs" from the great
 Hudson River Valley brood of 1894. It seems altogether likely that
 they were a part of brood XVII, of 1898, which are recorded as hav-
 ing appeared in the counties of Westchester and Richmond of this
 state, and in Essex County, New Jersey. If so, this is probably the
 first note of their occurrence in Rockland County, N. Y.

On June 10th, while visiting a piece of woods where the Cicadas
 appeared in vast numbers in 1894, I could hear them in every direc-
 tion, but what was of far more interest to me, I saw the ruins of four

of their singular mud structures capping their burrows; one of them fairly well preserved as to shape, but badly washed. Probably a more extended search would have revealed others, though few could have stood the long rains.

Early in April, 1894, I discovered several widely extended areas thickly studded with sun-baked mud Cicada huts, three or four inches high, built in extension of the burrows at the surface of the ground; the first account of which was published in the *New York Times*. Subsequently I offered in the *Scientific American* a theory as to the cause of the phenomenon and a more extended notice in this journal for March, 1895.

I had observed that the huts were weather-worn as if from rain. It was evident that they had been built in March, which I remembered was an unusually warm month. Inquiries at the weather station in New York showed that that month had been the hottest March of which there was any record.

It seemed probable that the builders of the huts had been prematurely stirred to activity by the phenomenal warmth, but the colder weather that followed prompted them to close their burrows with mud caps to await a more propitious season or full maturity to cast their pupa-cases and emerge in their imago state.

Of course there was some special reason for the close aggregation of such vast numbers of huts in more or less well-defined limits. Investigation showed that in all the hut areas I discovered the soil was thinly overlying a rocky foundation, either near quarries or on top of the rocky hills, and on the Palisades, worn down by glacial action. Some areas had been recently burned over, exposing the soil to the full heat of the sun.

It seemed probable, therefore, that the abnormal heat of March and the fact that the hut-builders were in shallow burrows were the causes that had impelled the insects to prematurely open their burrows which they subsequently closed with mud caps. Of course any pupa that happened to be near the surface, no matter how deep the soil beneath it, would be like affected.

This brief summary is for the purpose of accentuating the fact that the finding of Cicada huts in 1898 under exactly the same circumstances goes far towards demonstrating the truth of the theory.

March of 1898 was very warm; the weather bureau at New York reports that the mean temperature was but $\frac{1}{4}$ of one degree lower than

of 1894, which was the hottest month of March on record. The arch of 1898 was, like that of 1894, followed by a long season of mild and wet weather. Moreover, the huts found last summer were on the areas where they occurred in 1894. In shallow soil over rocks on the hill top.

SPECIES OF LITHOSUDÆ FROM TROPICAL
AMERICA.

BY WILLIAM H. CHAUS.

magniplaga, sp. nov.

Head and thorax light yellow, palpi brown. Abdomen brown above, and underneath yellow; legs yellow. Primaries above with a large brown spot, leaving the base, costal margin narrowly, apex, and outer margin yellow; a cluster of blackish scales on inner margin and at inner angle, otherwise yellow; a cluster of blackish scales on the inner margin near the angle. Underneath the spot is replaced by brownish shadings and the hairs in cell are blackish brown. Secondaries above at the base, somewhat tinged with yellow outwardly; the outer margin brownish, except at apex; underneath yellowish with the fringe on outer margin brownish. Expanse, 17 mm.

Habitat: São Paulo, S. E. Brazil.

Pronola diffusa, sp. nov.

Body creamy white. Primaries above creamy white, the inner margin and outer portion of the wing clouded with grayish brown, leaving the apex, outer margin, and a spot in the cell creamy white. Underneath pale yellowish with a broad brown spot extending from the inner margin near the angle and not reaching the costa. Secondaries yellowish white. Expanse, 16 mm.

Habitat: Peru.

Eugonosia angulifer, sp. nov.

Entirely pale yellowish red, the primaries with all the margins finely black, and a fine black line extending from the inner margin at a third from the base to the end of the cell where it forms an angle and then descends to the outer margin at the end of vein two; a few blackish scales extend from the angle itself to the costal margin. Expanse, 22 mm.

Habitat: Castro, Parana.

Talara rufa, sp. nov.

Head and thorax brownish. Abdomen deep yellow with a brown subdorsal line. Primaries above reddish yellow, thickly irrorated with lilacine brown scales, espe-

cially at the apex and along the outer margin; terminal line, and large blotches on the fringe, dark gray; traces of a fine sub-terminal line. Underneath reddish yellow, the base and costal margin heavily shaded, with gray. Secondaries reddish yellow. Expanse, 20 mm.

Habitat: Castro, Parana.

Rhodographa phæoplaga, sp. nov.

Head and thorax orange red, abdomen yellowish. Primaries with a large brown space edged with crimson, except on the inner margin, and leaving the base of the wing, costal margin, apex and outer margin bright yellow; a terminal row of small crimson spots. Underneath the brown spot is replaced by crimson. Secondaries reddish above, yellowish underneath. Fringes yellow. Expanse, 17 mm.

Habitat: São Paulo, S. E. Brazil.

Mæpha ditrigona, sp. nov.

Palpi reddish; frons black. Collar yellow. Thorax yellow with a large dorsal gray spot; abdomen yellow; legs yellow, black at the joints. Primaries bronze, streaked with yellow on the basal half, especially above the inner margin. Just beyond the middle of the wing two triangular yellow spots, one on the costal, the other on the inner margin, and nearly touching; both spots edged with dark violet bronze; costa and inner margin shaded with violet bronze; the fringe gray, darker at its base. Secondaries yellow, with an apical black spot narrowing to the center of the outer margin. Expanse, 18 mm.

Habitat: Nova Friburgo, Brazil.

Prepiella pexicera, sp. nov.

Head and collar yellowish, the latter with two dark gray spots. Abdomen pink above, yellowish below. Primaries yellowish, the veins on the basal and outer portions streaked with black, and confined by two transverse lines, outwardly oblique from the costa and parallel, then angled, the inner line below the cells receding towards the base on the inner margin, the outer line angled beyond the cells and then curving to the inner angle; the two lines connected on the median vein by a blackish streak above which is a carmine spot. Underneath the median space is pink instead of yellow. Secondaries pink with a small black spot at the apex. Expanse, 12 mm.

Habitat: Aroa, Venezuela.

Hæmatomis uniformis, sp. nov.

Body dark gray; base of patagia and anal hairs roseate. Primaries dark gray. Secondaries whitish towards the base and disk, otherwise gray, darkest at the apex. Expanse, 20 mm.

Habitat: Oaxaca, Mexico.

Parablavia xanthura, sp. nov.

Body dark brown. Collar and anal segment yellow. Primaries gray, the costa yellowish with a dark streak on the extreme margin at base. Secondaries dull black. Expanse, 21 mm.

Habitat: Castro, Parana.

Xantholopha purpurascens, sp. nov.

Palpi, collar and back of head orange, otherwise body dull greenish brown; the segments circled with orange. Primaries dark purplish black. Secondaries dull faintly tinged with green. Expanse, 26 mm.

Habitat: Castro, Parana.

rostola molybdipera, sp. nov.

♂, thorax and primaries dark greenish black, slightly iridescent; the veins darker. Abdomen and secondaries dull brownish black. Expanse, 17 mm.

Habitat: Jalapa, Mexico.

Agylla obliquisigna, sp. nov.

Head and thorax light brown, the palpi edged with a dark velvety brown. Abdomen dull yellowish. Primaries above yellowish white; the costa finely and apically tinged with yellow; the inner margin broadly shaded with brown, and at two-fifths from the base an inwardly oblique brown band reaching the median at vein 2. Secondaries whitish. The primaries underneath are brownish gray, the margins yellowish. Expanse, 30 mm.

Habitat: U. S. Colombia.

Agylla nubens, sp. nov.

Head and thorax dark silvery gray; a yellowish line behind the head. Abdomen and legs yellow. Primaries silvery white; the costa finely yellowish; the inner margin broadly dark gray. Secondaries white; some yellow hairs on the inner margin. Primaries underneath smoky gray; the costal margin yellow; a white streak in and beyond the cell. The ♀ has the dark shade on inner margin of primaries somewhat narrower. Expanse, 35 mm.

Habitat: Jalapa, Mexico.

Agylla barbipalpia, sp. nov.

Palpi brown. Head and thorax gray, the collar finely edged with paler scales. Abdomen brownish white. Primaries above creamy white, the costa finely yellow; the inner margin broadly dull gray. Underneath yellowish brown, the outer third suffused with gray. Secondaries white. Expanse, 33 mm.

Habitat: Castro, Parana.

Agylla polysemata, sp. nov.

♂. Head and thorax light gray. Abdomen whitish gray. Primaries silvery white, faintly tinged with grey on the inner margin; underneath the fold below cell containing long yellow hairs. Secondaries silvery white; the basal tuft yellowish, containing a streak of white hairs, and contiguous to it outwardly is a small cluster of black scales. The ♀ has no tufts of scales and the primaries are narrower. Expanse, ♂ 34 mm.; ♀ 37 mm.

Habitat: Nova Friburgo, Castro, Parana.

Cyclosticta discata, sp. nov.

♂. Body brownish yellow. Primaries above yellowish white, the inner margin faintly clouded with brownish; the costal margin yellow; underneath purer white with a patch of chrome yellow velvety scales at the end of the cell. Secondaries white, faintly tinged with yellow above. Expanse, 24 mm.

Habitat: Rio Janeiro.

Mintopola braziliensis, sp. nov.

Head and thorax light reddish brown. Abdomen grayish. Primaries above pale creamy brown, with darker shadings beyond the cell and on either side of vein 2. Underneath light brown, the base of costa darker. Secondaries yellowish white. Underneath with an orange patch at base of inner margin. Expanse, 25 mm.

Habitat: Nova Friburgo, Brazil.

Thyone melanocera, sp. nov.

Antennæ black; palpi brownish. Head, collar and patagia white. Thorax and abdomen yellowish white. Wings above white, the primaries heavily scaled. Underneath the primaries are faintly suffused with yellow. Expanse, 21 mm.

Habitat: Trinidad, B. W. I.

Nyctosia coccinea, sp. nov.

Head and thorax blue black. Abdomen brownish black. Primaries dull dark olive green. Secondaries crimson, the costal margin narrowly and the fringe black. Expanse, 35 mm.

Habitat: City of Mexico.

Ræselia medioscripta, sp. nov.

Head and thorax silver gray. Abdomen yellowish; legs darker gray. Primaries silvery gray; the basal third of costa blackish; a median black band slightly curved and starting from a broader spot on costa; a fine transverse outer line, curved beyond cell and nearly contiguous to median band below vein 3; a faint subterminal and terminal darker gray shade. Secondaries grayish white with a darker terminal line. Expanse, 20 mm.

Habitat: Orizaba, Mexico.

NEW GENERA AND SPECIES OF DEXIDÆ.

BY D. W. COQUILLET, WASHINGTON, D. C.

At the time of the publication of Osten Sacken's Catalogue of the described *Diptera* of this country, no family was in greater disorder than the Dexidæ, the major portion of which were listed under the old genus *Dexia*, a genus which does not occur in our fauna so far as I am aware. Of these catalogued species, *Dexia analis* Say, *pedestris* Walk., and *pristis* Walk.; *Melanophora diabroticæ* Shimer, and *nigripes* Desv.; Walker's three species of *Illigeria*, and *Microphthalma nigra* Macq., are treated in my "Revision of the Tachinidæ" (Bull. No. 7, Technical series, U. S. Dept. of Agr., Div. of Entom.; Oct., 1897). The remaining species from this region, together with those described subsequently and in the present paper, are listed below. The synonymy, except where otherwise stated, is by the writer; names of genera and species unknown to me are preceded by a mark of interrogation (?). References to the descriptions of the genera and species catalogued by Osten Sacken are omitted.

Megerlea rufocaudata Bigot, if my identification is correct, belongs to the Sarcophagid genus, *Sarcophilodes*.

The receipt of a specimen of *Dexiosoma longifacies* Rond., from Brauer and Bergenstamm, of Vienna, Austria, proves that this is a synonym of *Microphthalma disjuncta* Wied., and the statement of the above authors that *Dexiosoma* is a synonym of *Microphthalma* is evidently correct.

DESCRIPTIONS OF NEW FORMS.

Megaparia opaca, sp. nov.

Male and female. Black, the two basal joints of antennæ, palpi, apex of proboscis, apices of femora, tibiae and base of tarsi, yellow, lower half of head brown. Front of male at narrowest point one-third as wide as, in the female almost twice as wide as either eye, the sides and those of the face covered with stout black bristles, two orbital bristles in the female, wanting in the male; antennæ not reaching one-third of distance from their base to the oral margin, the second and third joints sub-equal in length, longest hairs of arista twice as long as its diameter at its base; vibrissæ inserted near the middle of the face, cheeks in the male two-thirds as broad as, in the female as broad as, the eye-height; head in profile nearly elliptical, over twice as high as long, face considerably retreating below, a low carina in the middle of the depression, eyes bare, proboscis rather slender, the portion beyond the basal

articulation less than one-fifth as long as height of head, labella very small. Body opaque gray pruinose, thorax marked with four indistinct black vittæ, bearing four postsutural dorso-central and three sternopleural macrochætæ, hairs of abdomen depressed, the last three segments bearing discal and marginal macrochætæ. Wings grayish hyaline, the veins bordered with brownish, most distinct in the female, third vein bearing three or four bristles near its base, veins otherwise bare, costal spine longer than the small cross vein, the latter noticeably before the middle of the discal cell, fourth vein strongly curved backward at the bend, the latter V-formed. Calypteres gray. Hind tibæ not ciliate, pulvilli of male greatly elongate. Length, 10 to 11 mm.

Jackson, Fla. A specimen of each sex collected by Mrs. A. T. Slosson. Type No. 4117, U. S. Nat. Museum.

Phasiops flava, gen. et. sp. nov.

Male and female. Yellow, the frontal vitta of female yellowish brown, the hairs and bristles black. Front in the male at the narrowest point not wider than width of lowest ocellus, frontal vitta obliterated on nearly the upper half, front of female slightly wider than either eye, frontal bristles descending to base of antennæ, four pairs of orbital bristles in the female, wanting in the male; antennæ not reaching to middle of face, the third joint one and one-half times as long as the second, longest hairs of arista about twice as long as its greatest diameter at its base; face considerably retreating below, the sides bare, the median carina very high; vibrissæ inserted more than the length of the second antennal joint above the front edge of the oral margin, two or three bristles above each, facial ridges arcuate, rather remote at the vibrissæ; cheeks of male two-fifths, of female two-thirds as broad as the eye-height, eyes bare, proboscis rather slender, the portion beyond the basal articulation less than one-fourth as long as height of head, labella small, palpi nearly linear and rather short. Body subopaque, thinly gray pruinose, thorax bearing four pairs of postsutural dorso-central and two or three sternopleural macrochætæ, second and third segments of abdomen with marginal ones, hypopygium of male exerted and curved under the abdomen. Wings hyaline, those of the female strongly tinged with yellowish, veins bare, posterior crossvein nearly midway between the small and the bend of the fourth vein, the latter arcuate, apical cell open, ending close to the extreme wing-tip; calypteres yellow. Hind tibæ not ciliate, pulvilli of male greatly elongate. Length, 7 to 9 mm.

Caldwell, New Jersey. A specimen of each sex collected by Mr. C. W. Johnson, whose generous donations have greatly enriched the collection of Diptera of the National Museum. Type No. 4118, U. S. Nat. Museum. An unusually short and robust form.

Atelogossa cinerea, gen. et sp. nov.

Male. Front less than one-fourth as wide as either eye, frontal bristles descending almost to base of antennæ, no orbital bristles, antennæ reaching halfway to the oral margin, the third joint almost twice as long as the second, longest hairs of arista twice as long as its greatest diameter at its base, head only slightly shorter at the

vibrissæ than at base of antennæ, median carina of face very high and broad, vibrissæ inserted more than the length of the second joint of the antennæ above the front edge of the oral margin, two or three bristles above each, facial ridges arcuate, remote at the vibrissæ, sides of the face bare, cheeks slightly more than one-third as wide the eye-height, eyes bare, proboscis rather slender, less than half as long as height of head, labella small, palpi wanting. Body subopaque, thinly gray pruinose, thorax marked with five black vittæ, bearing four pairs of postsutural dorso-central macrochætæ, second and third segments of abdomen with marginal but no discal ones. Wings hyaline, third vein bearing one or two bristles near the base, veins elsewhere bare, posterior cross-vein a short distance beyond middle between the small and the bend of the fourth vein, the latter arcuate, destitute of an appendage, apical cell open, ending a short distance before the extreme wing-tip, calypteres gray. Hind tibæ not ciliate, pulvilli greatly elongated. Length, 7 mm.

Waldoboro, Maine. A single specimen collected by Mr. J. H. Lovell. Type No. 4119, U. S. Nat. Museum. Has much the form of the common house-fly.

Metadexia tricolor, gen. et sp. nov.

Male and female. Black, the antennæ, at least basally, palpi, labella and abdomen yellowish, first segment of abdomen largely or wholly, a dorsal vitta on the second and third, sometimes the bases of these segments, or their apices and the base of the fourth and the under side from the base to beyond the middle of the third segment, black or brown, femora and tibæ sometimes partly or wholly yellow, scutellum tinged with reddish. Front of male one-fourth, of the female almost as wide as either eye, two pairs of orbital bristles in the female, wanting in the male, frontal bristles descending almost to base of antennæ, head at the vibrissæ noticeably shorter than at base of antennæ, epistoma produced forward, sides of face bare, white pruinose, facial ridges nearly straight, strongly diverging below, vibrissæ widely separated, inserted slightly above the front edge of the oral margin, two or three short bristles above each median carina of face very low; antennæ reaching from two-thirds to three-fourths of distance to the oral margin, the third joint from one and one-half to two and one-half times as long as the second, hairs of arista nearly three times as long as its greatest diameter at the base, cheeks over one-third as broad as the eye-height, proboscis rather robust, half as long as height of head, labella rather large, palpi well developed. Thorax opaque, gray pruinose, marked with four black vittæ, bearing four postsutural dorso-central and two sternopleural macrochætæ. Abdomen shining, bases of the segments white pruinose, each segment bearing marginal macrochætæ and in the male the last three segments with discal ones. Wings hyaline, the veins bordered with brownish, most distinct in the female, first vein bearing several bristles near its middle, the third bristly at least one-third of distance to the small crossvein, posterior crossvein beyond the middle of the distance from the small to the bend of the fourth vein, the latter almost rectangular and destitute of an appendage, apical cell open, ending some distance in front of the extreme wing-tip; calypteres white. Hind tibæ not ciliate, pulvilli of male very elongate. Length, 6 to 9 mm.

Shreveport (June 12, 1891; F. W. Mally); and Opelousas (April, 1897; G. R. Pilate), La.; Lawrence, Kan. (J. M. Aldrich); and St. Augustine, N. Mex. (T. D. A. Cockerell). Three males and three females. Type No. 4120, U. S. Nat. Museum. A rather slender and elongated form.

***Chætona bicolor*, sp. nov.**

Male. Black, the first two joints of antennæ, palpi, apex of proboscis, femora except bases of first two pairs, tibiæ and abdomen yellow, base of first segment of abdomen, extending across the segment in the middle of the dorsum, also the narrow apex of each segment, brown. Front at narrowest part scarcely wider than the lowest ocellus, the frontal vitta obliterated for a short distance, frontal bristles descending to base of antennæ, no orbital bristles, antennæ nearly reaching the oral margin, the third joint three times as long as the second, longest hairs of arista over twice as long as its greatest diameter at the base, sides of face bare, no median carina, cheeks less than one-seventh as wide as the eye-height, proboscis almost half as long as height of head, rather robust, labella rather large. Thorax subopaque, thinly gray pruinose, marked with five indistinct black vittæ, bearing three prosutural dorsocentral and two sternopleural macrochætæ. Abdomen polished, very thinly gray pruinose, each segment bearing a marginal row of short macrochætæ, the last two also with discal ones. Wings hyaline, tinged with yellow at the base and along the veins, the latter bare, small crossvein at the middle of the discal cell, calypteres yellow. Length, 7 mm.

White Mts., N. H. A single specimen collected by the late H. K. Morrison. Type No. 4121, U. S. Nat. Museum.

***Chætona nitens*, sp. nov.**

Female. Black, the labella yellowish. Front two-thirds as wide as either eye, frontal bristles descending below middle of second antennal joint, two pairs of orbital bristles, antennæ reaching the oral margin, the third joint very strongly pubescent, four times as long as the third, longest hairs of arista only slightly longer than its greatest diameter at the base, sides of face bare, extremely narrow, no median carina, facial ridges straight, diverging below, vibrissæ near the oral margin, one or two bristles above each, cheeks scarcely one-tenth as broad as the eye-height, proboscis about one-fourth as long as height of head, very robust, labella unusually large. Thorax polished, the sides anteriorly and the pleura white pruinose, three postsutural dorsocentral and two sternopleural macrochætæ. Abdomen polished, the front angles of the last three segments white pruinose, these segments bearing only marginal macrochætæ. Wings distinctly smoky on the costal half, the remainder nearly pure hyaline, third vein bearing one or two bristles near the base, veins elsewhere bare, small crossvein at middle of discal cell, hind crossvein midway between the small and bend of fourth vein, the latter arcuate, apical cell open, ending at the extreme wing-tip; calypteres whitish. Length, 3.5 mm.

Franconia, N. H. A single specimen collected by Mrs. A. T. Slosson. Type No. 4122, U. S. Nat. Museum.

Chaetona spinosa, sp. nov.

Male. Differs from the above description of *nitens* as follows: Sides of second segment of abdomen, hind corners of the first and front corners of the third segment, yellow. Front one-fifth as wide as either eye, frontal bristles descending to insert on of antennæ, no orbital bristles, antennæ reaching three-fourths of distance to oral margin, the third joint short pubescent, two and one-half times as long as the second, cheeks one-seventh as broad as the eye-height. Thorax white pruinose along the suture and with two subdorsal vittæ in front of it. Abdomen white pruinose at bases of the second and third segments, the last three segments bearing discal macrochaetæ. Length, 5.5 mm.

Pennsylvania. A single specimen. Type No. 4123, U. S. Nat. Museum.

Chaetona grisea, sp. nov.

Male. Differs from *nitens* as follows: Base of antennæ and the palpi yellow. Front less than twice as wide as the lowest ocellus, frontal bristles descending to insertion of antennæ, no orbital bristles, antennæ reaching three-fifths of distance to the oral margin, the third joint bare, nearly twice as long as the second, longest hairs of arista three times as long as its greatest diameter, sides of face bearing a few bristly hairs on the upper half, facial ridges rather strongly arcuate. Thorax, scutellum and abdomen subopaque, gray pruinose. Length, 6 mm.

Georgia. A single specimen. Type No. 4124, U. S. Nat. Museum.

WHIRLIGIG-BEETLES TAKING A SUN-BATH.

BY WILLIAM T. DAVIS.

Walking along the banks of the Pequannock River in Passaic County, New Jersey, on the 30th day of May, the writer noticed one of the very common assemblages of whirligig-beetles swimming about among the twigs of a tree branch that lay in the water. Upon drawing nearer it was discovered that three of the beetles had climbed up the branch several inches above the water, and were evidently enjoying a sun-bath, in the same manner that turtles do under similar circumstances. Like turtles, also, they slipped off of the branch into the water, but they allowed one to approach quite close before taking alarm. Several specimens from the assemblage were captured, all of them proving to be *Dincaetes discolor*. Entertaining accounts are given of the habits of whirligig-beetles in various entomological text-books, but the sun bath custom does not appear to be mentioned.

JOURNAL

OF THE

New York Entomological Society.

Vol. VII.

DECEMBER, 1899.

No. 4.

NEW NOCTUIDS AND NOTES.

BY JOHN B. SMITH, Sc.D.

Cobalos, gen. nov.

Eyes naked, without lashes or lateral fringes, hemispherical. Head of good size, but retracted; front flat, broad, palpi short, not exceeding middle of front, terminal joint small, a little oblique. Tongue strong. Antennæ in the ♂ lengthily bipectinated, in the ♀ simple. Thorax sub-quadrate, rather short, collar and patagiæ defined, vestiture somewhat loose, divergent, composed of scaly hair, forming no obvious anterior tuftings and but a loose though well-marked basal tuft. Abdomen exceeding the anal angle in both sexes, conic in the ♀, a small dorsal tuft on the basal segment, else untufted. Legs well developed, tibia without claws or spines, spurs of middle and posterior pair moderate in length, vestiture of under side fine woolly. Wings moderate; primaries abruptly widened on inner margin. Costa and outer margin oblique, the former a little depressed at middle, apex acute.

The genus is Hadeniform, allied to *Hyppa* and *Valeria*; with loose, more hairy vestiture and slighter build than either, the wing-form, retracted broad head and very lengthily pectinated antennæ being further characteristic. The insect has more the appearance of *Eucoptocnemis* than anything else, but the tibiæ are not spinose.

Cobalos angelicus, sp. nov.

Ground color light fawn brown with gray or white shadings or powderings. Head and thorax without definite maculation. Primaries with the median space somewhat more even, deeper brown than the rest of the wing, s. t. space and apex bluish white. Basal line marked on the costa only. T. a. line geminate, narrow, brown, the inner line vague, included space more or less white filled, not well marked, more or less broken, widely outcurved, inwardly dentate on the veins. T. p. line geminate, narrow, brown, the outer portion less obvious, only a little irregular, not much curved over cell and very decidedly incurved in the sub-median interspace, included space white. S. t. line irregular, yellowish, defined by the brown terminal space except at apex, and partly by a brown s. t. shade which fills the s. t. space on costa, then breaks and starts again, broadening gradually to the hind margin where it is almost half the space. On veins 3 and 4 white rays accompany an indentation of

the s. t. line almost to the outer margin. A series of blackish terminal lunules at the base of the broad fringes. Claviform outlined in brown, concolorous, moderate in size, a somewhat darker shading extending across the median space at this point. Orbicular oblong, oblique, somewhat irregular, hardly defined, more or less powdered with bluish white. Reniform moderate or rather small, narrowly kidney-shaped, very narrowly and incompletely ringed with brown, annulate with bluish white, more or less whitish powdered superiorly and a little dark shaded inferiorly, neither of the spots at all prominent. Secondaries in the male whitish with an indefinite smoky outer margin, in the ♀ darker throughout, and with a yellowish tinge. Beneath whitish, powdery, ♀ darker, more smoky, primaries more powdered than secondaries, both wings with a vague discal spot. Expanse, 32-35 mm. = 1.28-1.40 inches.

Habitat: Los Angeles, California.

Three examples, 1 ♂, 2 ♀ ♀; the ♂ from Mr. Coquillett (Coll. U. S. N. M.), the others of uncertain source. The species is quite distinctive in appearance, the pale s. t. space, with its distinct W mark somewhat recalling *Mamestra liquida*. But the naked eyes and lengthily pectinated ♂ antennæ dispel the illusion at once.

Cobalos franciscanus, sp. nov.

Ground color rich fawn brown without contrasts except in the s. t. space of primaries. Head and thorax concolorous. Primaries with the median space somewhat deeper in tint, the t. p. line prominently white-shaded below vein 3. Basal line not obvious. T. a. line vague, brown, apparently simple, as a whole upright or a little outcurved, a small outward angle in the sub-median interspace. T. p. line brown, geminate on costa, else single, crenulate and outcurved over the cell, then even, with a regular incurve to vein 1, where it has a little outward tooth. S. t. space in costal region of ground color, below that paler along the t. p. line until, below vein 4, the latter is white shaded, the shade broadest in the sub-median interspace and forming the most prominent ornamental feature. Outwardly the space shades into a reddish brown border to the s. t. line which is narrow, pale, irregular and very poorly defined. On vein 3 a pale ray extends almost to the outer margin cutting through and not indenting the s. t. line. There is a series of brown terminal lunules, and the fringes have a pale line at base. None of the usual spots are defined. Claviform and orbicular are scarcely even indicated, reniform traceable in narrow, incomplete outline and by a dusky filling. Secondaries uniform smoky brown, a darker terminal line at the base of the paler fringes. Beneath very pale reddish gray powdery, primaries with a discal spot and a feeble reproduction of the t. p. line of upper side, secondaries with a dusky discal spot and no outer line. Expanse, 28 mm. = 1.12 inches.

Habitat: San Francisco County, California, a single ♂ specimen only, with the vestiture a little marred in spreading. This is a smaller species than *angelicus* with proportionately shorter, broader wings, more robust thorax, shorter antennæ, tho equally pectinated and decidedly darker colors. The maculation is practically all lost except for the pale shading in the s. t. space and the prominent white margin

to the t. p. line. The single pale ray on vein 3 gives the species a unique character that should make its recognition easy.

Stretchia Hy. Edw.

S. pulchella Harv.—The male of this species was unknown to me in 1889 and it was not until recently that I identified two male specimens taken by Mr. Bruce in Colorado as belonging here. They are decidedly unlike the type, which I compared in the Edwards collection in that they lack that sharp contrast in color which justified the name *pulchella*, but in essential details of maculation they are alike. A characteristic feature is the almost quadrate orbicular which is slightly oblique, and another the peg-like projections from the t. p. line on the veins.

In male characters the species resembles *erythrolita*, as it does indeed in other features, but there is considerable difference in detail.

S. addenda Smith.—This species, described by me as a *Tæniocampa* proves more satisfactorily referred to *Stretchia*, not only by wing form but in the structure of the male genitalia. These are similar to those of *pulchella* but much heavier and more compact, as a comparison of figures will show. It is probable that *addenda* and *pulchella* can be confused, though the former has no contrasts of any kind on any specimen seen by me. It seems likely however that the latter may vary in the direction of uniformity and in such cases there may be a close resemblance to *addenda*. More material of both forms is needed to clear the situation satisfactorily.

***Tæniocampa flaviannula*, sp. nov.**

Ground color a rather light fawn brown, more or less powdered with blackish scales. The vestiture of the head and thorax is fine loose and a little divergent, a trifle darker and more grayish than the primaries. The palpi are very short, black at the sides and scarcely reach the front. Primaries with all the markings obscured; but in most specimens fairly traceable. The most prominent feature being the unusually large, broadly oval reniform which is ringed with yellow, the spot itself being sometimes a little darker than the rest of the wing. In some specimens the basal line is indicated by black dots and in one example it is geminate. It may, however, be entirely wanting. The t. a. line is generally represented by a series of black dots on the veins; but these may be entirely wanting, and on the other hand the line may become complete and even geminate. In the latter instance the line is seen to be a little irregular between the veins; but as a whole it is upright or only a little out-curved. There is a median shade line from near the middle of the costa, outwardly bent so as to cross the lower part of the reniform, then forming almost a right angle and a little oblique inwardly to the inner margin. This shade also may be entirely

absent. The t. p. line in all my specimens is a series of black dots on the veins. It originates over the reniform, is strongly bent outwardly over it and then runs very evenly oblique and inward to the hinder margin, which it reaches very close to the median shade. The s. t. line is marked by a powdery preceding shade and when most obvious shows a fairly well marked "w," a little below the middle of its course; but this line also may be entirely absent. There is a series of dots between the veins a little within the outer margin. Fringes are concolorous and with only a bare trace of a paler line at the base. The orbicular is moderate in size, a little elongate, ringed with yellowish; but this also may be entirely absent. The reniform has been already described, and this is present in all the specimens that I have seen. The secondaries are smoky and powdery, with a distinct discal lunule and a blackish terminal line. Beneath, both wings are reddish gray, powdered with a black discal spot and a more or less complete extra median line. Expanse, 1.50 to 1.75 inches = 37 to 44 mm.

Habitat: Glenwood Springs, Colorado, in March and April.

I have four males and one female under examination. All the males are from Dr. Wm. Barnes, one of them labelled April 20th. The only female was received from Mr. David Bruce and bears his number, 438. The antennæ in the male are lengthily pectinated, and the insect belongs in appearance and wing form with *alia*. None of the specimens have all the markings present and one specimen has practically no markings except the somewhat indistinct reniform and vaguely shaded s. t. line. The single female has the primaries apparently a little broader and the s. t. line at the base marked; but this may be an individual character and not so in that sex generally. This most obvious character is the shape of the reniform.

***Tæniocampa reliqua*, sp. nov.**

Ground color a deep, somewhat rusty red brown. The scales of the front are tipped with gray, as are also those forming the indefinite tuft on the posterior part of the thorax. Basal line marked by a few black scales, and there are also a few black scales in the basal space below the median vein. T. a. line fairly distinct, obsolete geminate. The outer portion of the line formed of black scales which are preceded and emphasized by a few white scales. The inner line is marked on the costa only and is rather a discal shading than a line. As a whole, the line is upright; but is outwardly bent in the interspaces. T. p. line very dark brown, deepened by a few black scales, as a whole evenly bisinuate and nearly upright, followed by white scales which make this feature the most prominent part of the wing. The s. t. line is yellowish, narrow, even, continuous, followed by a series of brown points in a somewhat gray-powdered terminal space. The fringes are long, a little paler than the ground color; but broadly cut by the darkest wing color on the veins. The ordinary spots are vague and are present rather as paler, undefined blotches. The orbicular large and elongate. The reniform somewhat lunate. There is an undefined deeper brown median shade. Secondaries reddish gray, the fringes a little more pinkish. The veins are dusky marked and there is a feeble dusky lunule. Beneath, the wings

are reddish powdery, with the disc a little smoky. The secondaries have an outer blackish line and a fairly distinct discal spot. *Expanse*, 1 inch=25 mm.

Habitat: Park County, Colorado; 10,000 feet. Bruce.

The type is a unique female from the collection of the U. S. National Museum, and it is therefore impossible to say to which section the insect belongs. It has, however, the appearance and some of the characters of *trifascia*, and may be associated with that species for the present. It is a small species with stumpy wings and the mottlings of red brown with the white scales on the median lines give it rather a distinctive appearance.

***Xylomiges pallidior*, sp. nov.**

Ground color white, flecked with black and smoky scales; lines and dots black, shading smoky. Head with a black frontal line. Collar with a broad black central line. Thorax with a few patagial scales black tipped and a black margin at the base of primaries. Abdomen cream yellow. Primaries with a black basal streak, reaching to the t. a. line. Basal line indicated by a white break in the smoky shading of the costa. T. a. line fragmentary and marked chiefly by the endings of the maculation that usually starts or terminates there, on the costa and internal margin by a smoky shade. T. p. line marked by the geminate spots on the costa, is then single, smoky over the cell, black, linear and denticulate on veins 2, 3, 4, smoky, broken and linear to the hind margin. S. t. line consists of a series of interspatial, somewhat elongate black spots, the third from the angle a little out of line and nearer the margin, dividing the series into two groups. Median shade prominent, from costa outwardly oblique along the upper margin of the orbicular, forming an acute angle on the median vein, smoky to the end of the claviform and filling the space below vein 1 to the t. a. line. Claviform concolorous, very large and broad, extending almost across the median space, the outline black. Orbicular white, incompletely black bordered, irregular, elongate, oblique, very large, extending to the end of the cell in the form of a loop along the median vein. Reniform indicated by an obscure smoky lunule, but not at all outlined. There is a series of black terminal dots, beyond which is a smoke line through the fringe. Vague smoky shadings are along the costa and internal margins and slight darkenings in the s. t. and terminal spaces. Secondaries white, with a large, half round discal spot a venular median line and a narrow terminal line, black. Beneath white, primaries powdery along the costa: a common venular extra-median line and a discal spot, small on primaries, large on secondaries, black. *Expanse*, 28 mm. = 1.52 inches.

Habitat: New Westminster, British Columbia (Fletcher).

One female only, in fine condition. The insect is, in markings, an exaggerated *simplex* with white instead of gray ground color and without the shadings of the older species. This white color on which the huge claviform and orbicular spots are outlined in black will serve to identify the species; the other prominent character being the broad oblique costal portion of the median shade.

Xylina Ochs.

The following descriptions in this genus are presented in advance of a systematic treatment of the genus at large and to permit the distribution of material before the publication of the revision, which may be somewhat delayed.

Xylina torrida, sp. nov.

Ground color bluish gray. Antennæ white basally, else brown. Head with a black line across the middle of the front, the vertex usually a little smoky. Collar, as a rule, paler than ground color, sometimes whitish, usually with a reddish flush toward a sub-apical black line, which in some examples is almost obsolete. Thorax more or less white powdered, not definitely marked, patagiæ black edged at the base of the wings. Abdomen with a reddish flush in well preserved specimens. Primaries more or less powdered with smoky or blackish scales, varying the tint and often clouding the median space. Basal line geminate, blackish, marked through the costal cell only. A black longitudinal line extends from the base through the s. m. interspace half way to the t. a. line and is then obliquely extended by a black or blackish shade to the costa within the origin of the t. a. line. The space included in this boundary at the base of the wing is whitish or much paler than the rest of the wing, further emphasized by a rusty shading just above the black streak. T. a. line geminate, black, the outer portion most sharply defined, outcurved in the interspaces and quite sharply toothed inwardly on the veins, as a whole a little outwardly oblique. T. p. line lunulate, geminate, outer line smoky, indefinite and quite even, lines black, often disconnected and tending to obsolescence: as a whole the line is outwardly exerted over the reniform and almost upright below that point. S. t. line marked by a series of triangular black, preceding spots, except at the costa where a smoky shade precedes it. This series of spots is in a way the most prominent and certainly the most constant feature of the wing. A series of terminal spots which are not at the extreme edge of the wing and which are elongate though not connected into a line. A more or less diffuse median shade, almost or quite filling the space between the ordinary spots, parallel with and close to t. p. line below the reniform. Claviform black ringed and sometimes almost black filled, small, pointed, not reaching the middle of the median space. Orbicular upright, oval, of good size, as pale as any other part of the wing, black ringed except superiorly; below the median vein there is attached to it a smaller, less prominent, sub-orbicular, which is usually smoky centered and may become entirely obscured. Reniform large, upright, oval, only a little kidney-shaped, black ringed, centered with smoky in which is a reddish shading. The veins are more or less smoky. Secondaries smoky with a reddish tinge, sometimes quite pale. Beneath with a reddish flush, powdery, both wings with an outer smoky line and round discal spot. Expanse, 40-46 mm. = 1.60-1.80 inches.

Habitat: Pullman, Washington, October, March and April (C. V. Piper); Garfield Co., Colorado, 4000 feet (Bruce); N. W. British Columbia (Ottolengui); Soda Springs, California, October 16th (Hy Edwards).

In all ten specimens are before me, varying only in the relative distinctness of the maculation. In one example everything is clear cut and every line and shade recognizable at a glance; in another all save the s. t. line and the ordinary spots is obscured, and between these extremes the others range.

The species resembles *tepida* most nearly in type of maculation; but it is much larger and the more obscure examples remind one of the *antennata* type. The male characters are distinctive and confirm the superficial points of distinctness from other species.

***Xylina dentilinea* sp. nov.**

Ground color a dirty ashen gray with an admixture of smoky shadings. Head brownish in front, a black line rising on each side at the base of the antennæ and extending obliquely to the middle of the collar on each side. This line is margined inferiorly by a reddish shading and superiorly by whitish scales. The thoracic crest is a little smoky and is not well marked, the tuft being loose and diffuse. Primaries with the markings fairly evident. The basal line is marked by a blackish lunule across the costal space. The t. a. line is geminate, black, the inner line more brownish and hardly visible. The intervening space lighter gray. In course the line forms one large outward tooth in the middle of the submedian interspace. On the internal vein it forms an angle from which the line extends outward to the middle of the internal margin. The t. p. line is broken, not complete in any specimen before me, black followed by a whitish or gray shading which is lost opposite the cell. As a whole the line seems to be rather abruptly bent over the cell, it becomes more distinct below that point and is rather strongly incurved in the submedian interspace where it is usually connected with the outward tooth from the t. a. line. The s. t. line is irregular, broken, indicated principally by shades and dashes and characteristically marked by a roundish spot in the submedian interspace, which precedes it and beyond which an oblique dash crosses vein two to the upper margin. This mark is present in all the specimens and if the wings be turned so that the apex is upward the mark has the appearance of an exclamation point, the dot being separated from the stem by the s. t. line. There is a series of small black terminal lunules, which may become united into a terminal line. The fringes are pale with darker interlines. The ordinary spots are not well defined in any specimen and their shape can hardly be described. Both the orbicular and reniform are marked by blackish dots. In some specimens there is a fairly obvious median shade which is best marked on the costa and internal margin. Secondaries whitish at base, becoming blackish towards the apex. The veins are strongly dark lined. Beneath the primaries smoky, the secondaries smoky along the costal margin, the apex and part of the outer margin. Expanse, 1.30 to 1.52 inches = 32 to 38 mm.

Habitat: Senator, Arizona, Dr. Kunze. Denver, Colo., at light, Mr. Bruce. Garfield Co., Colo., Mr. Bruce. Fort Collins, Professor Gillette.

Six specimens representing both sexes are before me. The refer-

ence of this species to *Xylina* is not quite satisfactory: the wings are more pointed, more triangular and with a more even outer margin than in the normal form. The character of the secondaries also is a little defined, the wings being proportionately smaller and more triangular than in the typical forms. The thoracic crest is very imperfectly marked and the abdomen is longer and more cylindrical in both sexes.

***Xylina pomona*, sp. nov.**

Ground color a dirty bluish gray with a slight admixture of red. Head a little darkest between the antennæ; collar inferiorly with a reddish tinge, a black line just above the center emphasized by a surmounting series of whitish scales. The thoracic crest is not prominent; but both of my specimens are a trifle imperfect in the thoracic vestiture. The primaries are irregularly mottled with smoky brown and none of the markings are distinct. The t. a. line is geminate, the defining lines black, the very narrow included space a little paler gray. It is very strongly zigzagged, forming long teeth in the interspaces. The t. p. line is not sufficiently evident to be described in either of the specimens before me. The s. t. line is broken and consists of a series of sagittate black spots which are outwardly marked by reddish or whitish scales. Just below the apex is a dusky terminal shade that emphasizes the line at that point. There is a series of blackish terminal marks on the veins and an appearance of pale terminal lunules. The ordinary spots are vaguely traceable. The orbicular is a little paler than the ground color, without defining line; but with four black dots arranged almost in a square. The reniform is large, a little dilated inferiorly, yellowish brown centered and the lower margin marked with blackish scales. Secondaries silky, reddish gray with a discal lunule. Beneath with reddish tinge, powdery, somewhat smoky gray, both wings with an outer line and a discal spot. Expanse, 1.35 to 1.55 inches=34 to 39 mm.

Habitat: Alameda County, California, in July, larva on apple, Koebele. Olympia, Washington.

I have a male and female, the former from Washington, the latter belonging to the National Museum, from California. The species is somewhat obscure and a little off type for the genus. The primaries are a trifle more pointed and less parallel than is usual, while the thoracic crest is less marked. Yet this appearance may be in part due to the fact that neither of the specimens is in very good condition.

***Xylina longior*, sp. nov.**

Ground color a bright bluish ash gray with a more or less obvious admixture of reddish. Head with black scales between the antennæ and the front also blackish or smoky. Collar with a distinct reddish shade crowned by a short blackish line, above which the scales are white-tipped at the base of the prominent crest. The thorax has some reddish scales intermingled, and there is a distinct black line at the sides of

the patagiæ covering the base of the wings. The primaries are in most cases quite distinctly marked. There is a blackish basal streak which extends below the median vein and reaches a little beyond the inner fourth of the wing. The tendency of this streak is to become lost. The t. a. line when present is very narrow, black, but shaded with smoky and emphasized by a few preceding white scales. It is strongly bent outwardly, irregular in the interspaces and forms an acute tooth at the middle of the submedian interspace, where it touches a short and prominent black dash. It is then bent inward, so that it reaches the internal vein just about as far from the base as is the inception of the line on the costa. The tendency of this line is also to disappear and to leave only a black streak extending from the internal vein about one-fourth from base to the middle of the submedian interspace. This portion of the line is distinctly present in all the specimens seen by me. The t. p. line is not complete in any specimen. It is traceable in one example as a lighter shading through the darker powderings in the costal region. It is marked by black points below the cell and by blackish scales which connect it with the short black dash already described as attached to the tooth of the t. a. line. Below that point it is not traceable in any specimen. The s. t. line is indicated only by two oblique triangular blackish or brown shades. The first of these starts from a blackish point between veins 4 and 5 and reaches the external margin just below the apex. The second of these shades is more brownish and starts from a point below vein 2, reaching the external margin just below vein 4. The ordinary spots, at least the reniform, are traceable in most cases. The orbicular is large, oval, oblique and is outlined by a few paler scales. The reniform is large, broad, a little constricted in the center, extending inward inferiorly, so that it touches and may become connected below to the orbicular. It is marked inferiorly by a reddish shading and is outlined by whitish scales, which at the latter margin are preceded and followed by a black shade that makes this part of the wing characteristic. All the veins are somewhat marked by black scales. The secondaries are smoky brown, the fringes a little paler and with a pinkish tinge. Beneath smoky gray, powdery, the disc a little darker, both wings with discal spots. Expanse, 1.56 to 1.80 inches=39 to 45 mm.

Habitat: Glenwood Springs, Colo., March 10th, 27th, April 10th, October. Dr. Barnes.

There are five specimens under examination, both sexes being represented. No two specimens are quite alike, yet that they belong together is easily seen. In the best marked examples the characteristic appearance is given by the blackish basal dash, by the very prominent oblique portion of the t. a. line, by the blackish inferior margin of the reniform surmounted by a brownish red shade and by the upper of the two triangular shades marking the s. t. line. As to size, the largest specimen happens to be a male.

Xylina itata, sp. nov.

Ground color a dull ashen gray with very fine blackish powderings. All the markings obscured. Head and thorax without ornamentation. The thoracic crest prominent. Primaries with the markings extremely vague, in one specimen showing

only a smoky median shade, which is brightest on the costa, is bent at the end of the cell and is a little emphasized by a short blackish dash in the submedian interspace. In the best marked specimen the ground color is a little brighter. T. a. line is traceable, very narrow, black, irregular, strongly bent outward, so that at the submedian interspace it forms a sharp tooth whose apex is about at the middle of the wing. Above that point it is outcurved between the veins; below that point it makes a long inward angulation and is hardly traceable below the internal vein: a few whitish scales may emphasize this blackish line. The t. p. line is brownish, very slender, barely traceable over the cell where it is crenulate, a little better marked below that point, becoming black in the submedian interspace where a short black dash connects it with the t. a. line. The median shade is broad on the costa filling the outer part of the median space, narrowing toward the middle of the wing and less evident toward the inner margin. The s. t. line is marked by two triangular dusky shades, the first of which leaves the apex clear, and has its point at a black spot which almost touches the t. p. line between veins 4 and 5. The second of these comes to a point at a blackish spot which is just below vein 2. The ordinary spots are just traceable, the orbicular is elongate, oval, of the gray ground color, vaguely outlined in brown. The reniform is upright, rather narrow, with a blackish point inferiorly, the outline a trifle paler than the surrounding tint. The fringes have a pale interline. Secondaries a somewhat silky brownish gray, the veins a trifle more dusky and a vaguely marked discal spot. There is a smoky terminal line at the base of the whitish fringes. Beneath, smoky gray, powdery, the secondaries with a small discal spot. Expanse, 1.40 to 1.50 inches = 35 to 37 mm.

Habitat: Colorado, Bruce. Glenwood Springs, Col., April 30th. Dr. Barnes.

There are two female specimens before me at this time; but I have seen others that are like them. The specimen from Mr. Bruce has the markings indicated just sufficiently to enable them to be described. The specimen from Dr. Barnes, though good, is a little flown and only the dusky median shade seems apparent. The secondaries have a distinct excavation on the outer margin below the apex.

Eucalyptera pectinicornis, sp. nov.

Ground color a dirty clay yellow, more or less powdered with black. Head and thorax without markings, the sides of the palpi more brownish. Primaries with the median space a little more heavily powdered than the rest of the wing, giving it a darker shade. No trace of a basal line is observed in the specimens before me. T. a. line single, blackish, rather close to the base, a little irregular; but as a whole with an even outcurve. It is rather well defined inwardly; but tends to become diffuse outwardly. T. p. line single, blackish, tolerably well defined outwardly, a little diffuse inwardly. It is oblique to the subcostal, then bends rather abruptly outward over the cell and is afterward a little incurved; but as a whole nearly oblique to the inner margin. It is followed by a series of lunules of the ground color which are almost indistinguishable, except for the fact that their points indent the t. p. line, the lunules being outcurved. From this point the s. t. space becomes black powdered to

the s. t. line, which is rather even, broken and marked only by the black shading which terminates at this point. In some cases it is scarcely marked at all, in others fairly defined, always best in the costal region. There is a series of small black terminal lunules in the interspaces. The orbicular is reduced to a black point which is visible in all the specimens. The reniform is marked by a few black scales, followed by fewer pale scales, altogether indefinite. Secondaries uniform, smoky clay yellow, with a darker scalloped line at the base of the fringes. Beneath almost uniformly clay yellow, in some specimens with a trace of an outer line and a discal lunule. Expanse, 1.10-1.50 inches = 27-37 mm.

Habitat: Phœnix, Arizona.

I have five specimens, two males and three females, from Dr. Barnes; all more or less dilapidated, but sufficiently good to make the species easily recognizable. One specimen indicates that the female may in good examples have a dense tuft of scales at the tip of the abdomen. The antennæ of the male are quite lengthily pectinated; the branches very slender, tipped by an unusually long bristle and lengthily ciliated at the sides. In wing form the primaries resemble *bipunctata*, except that the apex is distinctly better marked, a little acute, while there is a slight cutting below the apex, so that the latter seems a little pointed. The middle of the outer margin is correspondingly a little produced. In the structure of the palpi the insect agrees with *Scolecocampa* and *Eucalyptera*. This is the first species belonging to this genus from the Southwest, and thus far we have no indications as to its habits.

Epizeuxis suffusalis, sp. nov.

Ground color a dull brownish yellow, overlaid by sooty brown scales which allow the paler ground to become visible only on the lines in the ordinary spots or where the covering scales are defective. Head and thorax without obvious markings. Abdomen more gray, a little powdery. Primaries with all the markings obscure. T. a. line diffuse, of the ground color, more or less obliterated by the overlaying scales, outwardly bent on the subcostal and below the median vein, as a whole almost upright. T. p. line equally obscure, very irregular, best marked on the costa, only a little outcurved. In the male the s. t. line is marked by the yellowish ground, and a somewhat darker preceding shade; in the female a few pale scales indicate the line. A series of connected black terminal lunules followed by a narrow pale line at the base of the fringes, which are interlined with pale near the tip. Orbicular small, round, obscurely yellow, not defined. Reniform moderate in size, kidney-shaped, not well defined, ochreous, with a few central brown scales. Secondaries paler, smoky, whitish toward the costal margin, crossed by three wavy brown lines, each of which is followed by a paler shade. A black, followed by a narrow pale terminal line. Beneath powdery, smoky, primaries with the reniform and orbicular marked with black dots, an extra-median bisinuate dusky line, a vague pale s. t. line and a series of black, connected terminal marks. Secondaries with a blackish discal spot and the lines of the upper side feebly reproduced. Expanse, .96-1.04 inches = 24-26 mm.

Habitat: Santa Rita Mts., Ariz., June 16, 19, E. A. Schwarz.

One male and one female only, the latter the larger and much the more obscure. While we have here a representation of all the markings found in the common eastern forms, all are very much obscured and the s. t. line is hardly defined at all. The femoral structure of the male is as in the other species; the antennæ are furnished with tufts of long hair and are apparently without the longer single bristles found in the other species. In the female the usual single bristles are obvious.

THE LIFE-HISTORIES OF THE NEW YORK SLUG CATERpillARS.—(*Conclusion.*)

PLATES VI—VIII.

BY HARRISON G. DYAR, A.M., PH.D.

The life-histories of all the Eucleids* of New York listed by me (JOUR. N. Y. ENT. SOC., III, 145, 146) have now been made known with the exception of the little larva recorded as *T. testacea*. I have never seen this larva myself, and included it on Miss Morton's authority. It is, however, not *T. testacea* as Miss Morton thought, for I have raised that moth freely from other larvæ (JOUR. N. Y. ENT. SOC., VI, 151). From what Miss Morton tells me, I think that she had before her the larva of Reakirt's *Kronæa minuta*. This is the only record of this species that I know of since Reakirt's time (1864); but this would seem to prove it a true inhabitant of New York. It is so rare that I doubt whether I shall find it in sufficient numbers to obtain the life history, and therefore I close this series, for the present, without it, assuming it to belong to "type 7" of the revised table given below.

* I find it necessary to revert to the old name *Cochlidiidæ* for this family. The consensus of opinion among lepidopterists is averse to Kirby's date of 1810? to Hübner's Tentamen, preferring 1806, and I have concluded to accept this correction. This has the effect of changing the genus *Apoda* Haw. to *Cochlidion* Hübn. The family name founded on this genus is, therefore, again valid and antedates *Eucleidæ* which was used by Comstock, Neumoegen and Dyar on the basis of the old name being invalid.

Another species which has not been worked out and which is of somewhat doubtful value is *Packardia albipunctata*. I included this with some doubt, as a synonym of *P. geminata* (JOUR. N. Y. ENT. SOC., VI, pp. 1 and 3); but Miss Morton told me last summer that she was now able to distinguish the larvæ and that the moths fly at different hours of the night. It is therefore probable that we have in the form a true species, though closely allied to *P. geminata*. I have not been able to obtain it in recent years, though formerly it occurred to me at Rhinebeck, N. Y.

Besides these, two other species may occur in New York, at least occasionally. Mr. Beutenmüller tells me that he remembers to have seen a specimen of *Apota rectilinea* which was taken close to New York City and *Monoleuca semifascia* has occurred at Morris Plains, N. J. (Papilio, III, 25), which is so near to New York as to make it probable that it may occur there also. These two species are essentially southern in their distribution and New York is probably their extreme limit, if not normally beyond their limit. Therefore I shall not delay this article for them; but I hope to return to them later, and will do so if I should be so fortunate as to secure the larvæ. At the most, New York State will have twenty-one or twenty-two species of Eucleidæ, the larvæ of eighteen of which have now been made known in all their stages in this series of articles. The three species not yet known are included in the genealogical tree in their probable positions, but are not represented as attached to the main stem. (Plate VI, Fig. 6, *i*, *t* and *q*.)

SUMMARY OF STRUCTURAL CHARACTERS.

The eggs of all our species are alike, elliptical, flat and very thin, colorless and reticulated, except *Phobetron pithecium*, which differs in being circular and brown. Some of the eggs are yellow or almost orange color, but *Phobetron* is the darkest. They hatch in periods varying from seven to ten days, rarely fifteen days. The larvæ comprise several structural types whose relations may be briefly defined by the following

REVISED SYNOPTIC TABLE.

Section 1. (Tropic hairy Eucleids).—Larvæ hairy; subventral space somewhat reduced; tubercles produced into horn like appendages, fleshy and more or less deciduous, bearing many setæ; spiracle on joint 5 higher up than the others and the tubercle above it

absent; three tubercles on the mesothoracic segment. Primitive first stage present: tubercles I and II completely united.

Type 1.—Three tubercles on last two thoracic segments; subdorsal horns of joints 4 to 12 functional, the rest and the lateral horns reduced; horns deciduous.

Horns irregular at maturity; setæ of many kinds; color dead-leaf brown.

Phobetron pithecium.

Horns regular at maturity; setæ of several kinds; color green.* (Plate VI, fig. 6 D, upper.) **Isochaetes beutenmulleri.**

Type 1a.—Only two tubercles on the last thoracic segment; subdorsal horns of joints 3 to 13 functional, the laterals reduced to hairless papillæ; horns not normally deciduous, but detachable.

Horns regular at maturity; setæ of several kinds; color green with red marks.* (Plate VI, fig. 6 D, lower.) **Alarodia slossonia.**

Section 2. (Tropic spined Eucleids.)—Larvæ spiny; subventral space reduced; tubercles horn-like, firmly attached and never deciduous, of varying length, bearing stinging spinules; spiracle on joint 5 moved upward, the lateral tubercle of this joint absent; only two tubercles on the thoracic segments. No primitive first stage; the horns with several non-spinous setæ in stage I.

Type 2.—More than three setæ on the horns in stage I or on some of them; horns subequal, short; no detachable spinules at maturity.

Shape normal; subdorsal horns bent outward, but erectile; skin granular at maturity; green, horns red tipped, dorsum and sides marked with irregular yellow lines..... **Nadata nasoni.**

Shape flattened, dorsal space reduced; subdorsal horns shortened, slender, non-functional; skin marked with wavy ridges; green with yellow subdorsal lines and a few small red dots centrally **Sisyrosea textula.**

Type 3.—Only three setæ on each horn in stage I; subdorsal horns prominent, distinctly unequal; detachable spinules, at least the "caltrops" always present at maturity.

Horn of joint 8 longer than the adjoining ones in stage I and often throughout all the stages.

Without patches of detachable spines between the terminal horns.

Subdorsal horns of joint 13 separate; horns normal.

Red or yellow with purple and white lines.

Euclea indeterminata.

Green, subdorsal band yellow; dorsum with a broad purple band, irregularly five times widened; terminal horns short.

Adoneta spinuloides.

Green, subdorsal band yellow; dorsum with a broad purple band, irregularly five times widened; terminal horns long. (Plate VI, fig. 6 R.)†

* This species does not occur in New York.

† Supposed to be *Monoleuca semifascia*.

Subdorsal horns of joint 13 conjoined to form a pointed tail, often produced; largest subdorsal horns erectile.

Body humped in front; dead-leaf brown with a red patch posteriorly..... **Euclea chloris.**

With detachable spines between the terminal horns in small pointed clusters.

Slightly flattened, green or purplish, variously marked with shades of red or yellow. The larvæ tend to hide by day...**Euclea delphinii.**

Horn of joint 8 not longer than the adjoining ones in stage I, those of joints 6 to 10 reduced, often obsolete; terminal detachable spinules fully developed, present in large flat patches.

Horns of joints 5 and 11 long; purple with a large green mark, white edged, squarely truncate before and with a central saddle-like spot. (Plate VI, fig. 3.)..... **Sibine stimulea.***

Section 3. (Tropic smooth Eucleids.)—Smooth larvæ; dorsal space broader than the lateral one, subventral space little reduced. Tubercles not produced, single setæ by degeneration after stage I, rudimentary; spiracles in line. No primitive first stage, the tubercles represented by small two-haired warts in stage I; no tubercles absent.

Type 4.—Lateral space absent, the two ridges conjoined, the sides formed by the large subventral area.

Depressed spaces large, plate-like, the skin granules scaled.

Green, more or less spotted with brown and yellow.

Prolimacodes scapha.

Section 4. (Palæarctic smooth Eucleids.)—Smooth larvæ; dorsal and lateral spaces subequal, subventral space reduced; tubercles not produced; setæ single by degeneration, rudimentary; spiracles in line. A primitive first stage with tubercles I and II united more or less perfectly.

Type 5.—Depressed spaces small, not sharp; spines i and ii of unequal length in stage I, one reduced to a small knob on the other; joint 13 rounded quadrate; skin granules produced into secondary spines in the early stages; no dorsal red marks.

Yellowish green, no bordering dark shade to the yellow subdorsal line. Head green in stage I; skin granular shagreened beside the usual spinose granules.

Lithacodes fasciola.

Whitish green at maturity, a dark line bordering the subdorsal line; head with a black patch behind in stage I; skin smooth except for the ordinary granules.

No transverse band on joint 3; subdorsal and subventral lines free.

Cochlidion biguttata.

A transverse yellow band on joint 3 in front, joining the subventral lines.

Whitish green, subdorsal lines edged within by a blackish green

* See Can. Ent., XXIX, 77, for a table of other larvæ of this group.

broken line; skin granules single pointed. **Cochlidion y-inversa.**

Yellowish green, only slightly whitening at the end of the last stage; edge of subdorsal line red; skin granules with a crown of points till the last stage*..... **Cochlidion avellana.**

Type 6.—Depressed spaces small; tubercles i and ii almost completely united in stage I, the resulting single spine short; joint 13 produced into a pointed tail. Skin granular, not spinose nor crested at any stage; no dorsal red marks.

Well pigmented, whitish green, subdorsal line straight **Packardia geminata.**

Poorly pigmented, yellowish green; subdorsal line wavy. **Packardia elegans.**

Type 7.—Depressed spaces large, sharp; spines i and ii in stage I of about equal length, united at base, forming a Y-shaped structure; tail quadrate; skin granules not spinose; larvæ marked with red dorsally.

Skin granules with a crown of minute spines before the last stage; joint 3 with a transverse yellow band in front; dorsal red mark very small.

Anterior edge of joint 3 smooth, rounded; red mark a round spot.

Heterogenea shurtleffii.†

Joint 3 with a pair of yellow prominences in front; red mark a cross.

Kronæa minuta.‡

Skin granules more or less papillose in the early stages, not crested; no transverse yellow line on joint 3.

Dorsal red mark large, reaching the lateral margin; setæ rudimentary but persistent.

Dorsal mark twice widened, symmetrical antero-posteriorly.

Tortricidia testacea.

Dorsal mark widened, but more so posteriorly, forming a pair of excava-
tions on the sides..... **Tortricidia pallida.**

Dorsal red mark moderate, not reaching beyond the middle of the sides; setæ absent after stage I..... **Tortricidia flexuosa.**

The cocoons and pupæ of the New York species present no marked differential characters in most cases. There is a difference in size, sometimes in color and the presence or absence of an outer veil. But many of the species are inseparable.

THE ORIGINAL EUCLID LARVA.

A generalization of the eighteen species just worked out gives the following result: Elliptical, subcylindrical, not greatly flattened, the abdominal feet absent, replaced by a creeping disk with suckers on joints 5 to 11, possibly a small one on joint 12. Joint 2 without warts and retracted partially under joint 3, but forming a hood when

* This species does not occur in New York. (European.) JOURN. N. Y. ENT. SOC., VII, 202.

† The European *H. cruciata* apparently differs from this in having the red mark very large, much as in *Tortricidia testacea*.

‡ Not seen. The characters are inferential from Reakirt's description.

the head is extended. On the thorax three warts; on the abdomen two on each segment with a third rudimentary subventral row reduced to two setæ (iv and v); subprimary tubercles, as well as vii and viii lost. Warts not produced, bearing hairs only after stage I, not degenerate; no stinging spines or at least these not predominant. A primitive first stage present, the tubercles i and ii united at base to form a Y-shaped structure. Spiracles in line, normal. Warts all present. Depressed spaces not present, but represented by their glandular centers at least as far as those numbered (1), (2), (4), (5) and (6); (1) paired and double on all the segments. No secondary hairs. Skin minutely spinulose or possibly finely granular. There is some evidence that the color was green, as both our present lowest species on the two sides of the tree are green. But since the above characterization fits so exactly (except for the feet) some of our sparsely haired *Megalopygidæ* and the whole *Zygæno-Pyromorphid* group in general, I should rather expect the coloration to have been like theirs, yellow with black, red or white marks.

Concerning the origin of this generalized *Eucleid*, it is clearly from the *Megalopygidæ* or their ancestors. The *Megalopygidæ* retain the abdominal feet, but they also have pads on joints 6 to 11, and it is these pads, extended to joint 5 and possibly 12, which I think are the homologues of the *Eucleid* suckers. In other respects, excluding the necessary reduction of the subventral hair structures in the *Eucleid*, there is absolutely no difference between my generalized *Eucleid* and the *Megalopygid* type.

CONSTRUCTION OF THE GENEALOGICAL TREE.

The larvæ divide at once into two groups, the "smooth" and the "spined," separated not only by the differences between the tendency to atrophy of the warts on the one side and hypertrophy on the other, but by the peculiar structure of joint 5 in the spined group. This represents a dichotomous division in the line of descent, and our genealogical tree will start forked (Plate VI, Fig. 6, *B* and *a*). The spined *Eucleids* separate into sections 1 and 2 of the revised table given above, all those on the branch F being furnished with true stinging spines and no longer feeding in stage I, which retains the ancestral setæ in reduced number. Branch G comprises this stock, but J includes those which possess detachable spinules and correspond to "type 3" of the table. Branch C is clearly the oldest, because

these species alone of the spined Eucleids retain the middle thoracic wart and possess a primitive first stage, all as in the smooth Eucleids (branch a. At F it is probable that bright "warning" colors became prominent along with the development of true stinging spines. At present these are well retained only in two species, *Euclea indeterminata* and *Sibine stimulea*, and these two are the only ones that are strongly urticating to the touch.

The smooth Eucleids present the two very different types described in sections 3 and 4 of the table. The first is represented by but a single species in our territory, and no other is at present well known to me. Consequently I cannot decide positively which are the specific and which the congenital characters in this phylum, the more so as our species is highly specialized. Yet it is most important, for it retains warts in its first stage, thus showing that the smooth Eucleids are descended from wart-bearing ancestors. The other group (Fig. 6, c) is well represented. In this the primitive first stage is retained and the warts are completely cut out at the passage between stages I and II, which thus represents a much greater phylogenetic interval than in the otherwise more specialized *Prolimacodes scapha*. Branch c again divides at d and e on the characters of types 5 and 7 of the table. Branch e retains the forked spines of stage I, but develops the depressed spaces well; branch d specializes in stage I by the partial loss of spine ii, but retains the small, and more primitive depressed spaces. The two branches are thus about equal, representing a secondary dichotomy. The smaller branches separate on the minor characters of the sculpturing of the skin and are more fully described in the explanation of the plate below. The present will suffice to illustrate how the tree was constructed. The heights to which the specific stems are drawn shows my idea of the relative degrees of specialization.

TECHNIQUE OF LARVA RAISING.

My experience in this family may be of use to others, especially as the group is considered a difficult one. I have had the valuable assistance of Miss Emily L. Morton in first starting these studies. Although she was obliged to abandon the plan of joint authorship after the first two articles, yet the whole series is dependent upon the impetus which she gave it at first. Latterly I have been assisted by Mrs. Knopf with the drawings.

The process of finding the Eucleid larvæ differs somewhat from the usual one. In the majority of cases it is not a question of searching on a given food plant at a given season. Only two species are to be so found, *Apoda biguttata*, feeding on oak and *A. y-inversa* on hickory. Most of the species have several, or an indefinite number of food plants. The question is one of locality; first the general locality where the species occurs and next the particular position in regard to distances from the ground and conditions of light and shade. These I have tried to give under each species in the descriptions. It is scarcely ever worth while to look on rough or downy leaved trees. The Eucleids principally frequent smooth, glabrous leaves of trees and shrubs. The tree probably most attacked is the black or red oak (*Quercus coccinea*) and nearly all our species may be found on it, *A. y-inversa* of course excepted. The season of the year is here less important than usual, as the Eucleids cover a long period in their larval state. I find the month of July the best collecting season. The larvæ are then numerous, not having been devoured by their many enemies, and their small size at this time gives opportunity to observe the earlier stages. Also this season makes certain no loss of the early species, like *Tortricidia testacea*, which are often all gone at the end of August and at the same time secures at least some of the late species like *T. pallida*. I recommend the search for the eggs. Though they are probably the most difficult objects to find on the leaves with which we have to do, by a little practice it is quite possible to get them successfully. The appearance of the eggs is that of shining elliptical spots of moisture, rather than that of any ordinary lepidopterous egg. When the eggs are found the great advantage has been secured of obtaining all the life history without the trouble of rearing moths for mating. However, if mating is necessary, or becomes desirable for other reasons, a number of larvæ must be obtained. This is almost always possible, early enough in the season, by continuing the search in the same or similar locations to that where the first larvæ were found. I have found from fifteen to thirty larvæ sufficient, because the individuals of a species, if kept under proper conditions, emerge nearly simultaneously. These conditions are plenty of moisture and natural cold. I have found satisfaction in an ordinary flower pot, three-fourths full of earth in which the cocoons are placed, and covered with moss and leaves, protected by a cloth and wire screen. This is sunk in the ground to the level of the top of the pot and left out of doors from

November to the following May, when it is placed in a convenient situation, best still out of doors, but covered by a wire cage a foot high to leave the moths room to spread. I have two such cages which fit the top of the flower pot, so that one can be removed containing the emerged moths and replaced by the empty one. The treatment must be different for *Heterogenea shurtleffii*. This species normally spins in the cracks of the bark and if the cocoons are put in the flower pot they all perish. I have succeeded with a short log fastened in a wooden box with a screen top. The larvæ were allowed to spin on the log and the whole left out of doors over winter. The moths must be mated the next night after emergence; they emerge in the day time or early evening. The females of one species (*Packardia geminata*) will last two or three days and mate normally after this time, but most females begin to fly after the first night and are useless. The species of *Phobetron* and *Calybia* may be mated even after they have begun to lay infertile eggs; but the larvæ from them, even if they hatch, fail to eat or die in the earliest stages. Therefore if a male does not emerge on the same day as the female, it is necessary to attract a wild male. My mating cage is cubical, about one foot high, of green wire screen except the bottom and back, which are of wood. The back contains a large vertically hinged door, in which is a circular hole about four inches in diameter, closed by a slide. The door is used to place the female in the cage; it is large enough to admit the screen from the flower pot. The cage is then left in the woods where the moths are known to be, with the back towards a tree or some other shadow, the front facing the wind and the slide open. I leave it thus all night. As the moths fly toward the light the female does not pass out through the slide, yet the male finds access, perceiving the odor of the female which passes from the back of the cage with the wind. The male is also retained in the cage, even if the pair separate before morning. I find this method easier and I believe quite as satisfactory as sitting up with or without a lamp to catch the males to insert in the cage (See Ent. News, III, 3). The female may be removed from the cage on the following evening and placed in a glass jelly tumbler with tight fitting tin top with one or more leaves. The eggs will be readily deposited over the leaves and glass. In raising the larvæ the following points are to be noted: The eggs must be kept slightly moist, as by keeping the tumbler in which they are laid closed, with a drop of water now and then if the leaves tend to dry. When the larvæ hatch

the leaves are no longer fit to eat and the larvæ must be at once transferred to fresh leaves with a moist camel's hair brush, as they will not walk to the leaves themselves. The jar containing the larvæ should be cleaned every day, but the leaves will keep from three to six days if the conditions of moisture are properly attended to. When a little grown, the larvæ will move themselves to the fresh leaves. The Eucleid larvæ are hardy, and if attended to properly and not unduly crowded, grow up nicely in closed jars. Some patience is required, as their period of growth usually takes two months. In raising large numbers of one species it will be found useful to place them on the growing tree, covered with a large bag of cheese cloth. This method is often attended with great loss from the accidental inclusion of parasites, chiefly the predaceous *Hemiptera*, which as eggs easily escape observation. I have lost a whole bag full of larvæ from placing them in a bad location where the heat was too intense. Therefore I do not recommend the method except for numbers of larvæ too large to handle in tumblers.

GENERIC REVISION OF THE NORTH AMERICAN EUCLEIDS
(COCHLIDIIDÆ).

Assuming my genealogical tree to represent the actual phylogeny of the Cochliidiidæ, we may prepare a generic revision of the family, using as primary characters those imaginal ones that correspond to the large branches of the tree, and as secondary ones those corresponding to the smaller branches. This will serve also to test the relative phylogenetic value of the ordinary generic characters as used in this family. Beginning with those that prove the more fundamental, we have :

The character is gained once in phylogeny.

1. The antennæ of the male were originally pectinated to the tip. In branch *a* they have become simple ; in branch B they remain pectinate, but at branch J the pectinations are restricted to the basal portion, the tips becoming simple.

2. The labial palpi* may have been originally short and porrect, but exceeding the frontal tuft. At branch *a* the character is exaggerated, at least never lessened ; but at branch C they are shortened, not reaching beyond the frontal tuft.

* Not including *Isoc hætes*, which adds another exception in both palpi and tibial spurs.

3. The weak discal vein (Media) dividing the cell is forked at tip, the fork forming the closure of the cell, short and open. At branch J it becomes long and closed without, more or less distinctly, by a cross vein.

4. The fore wings have twelve veins, but at stem O-R vein 8 has disappeared.

The character is gained twice in phylogeny.

1. The palpi* may have been short and porrect, not reaching vertex of head. At branch *a* they become elongated, upturned, reaching vertex of head, or extending above it in branch *m* (coincident with the loss of the pectination of antennæ); but at *g* they are shortened again, not reaching vertex of head and porrect. Branch B retains the primitive short palpi, except at I, where there is a slight lengthening with upturning, but not so as to approach vertex of head.

2. Vein 6 of hind wings arose from the cross vein of cell, separate from vein 8. At branch B vein 6 becomes coincident with 7 at origin or stalked with it; also at branch *b*. Branch *c* retains the primitive character.

The character is gained thrice in phylogeny.

1. Vein 7 of the fore wings arose from the cell, remote from the stalk of 8 and 9. It has become united with this stalk, either arising from its base or at a varying distance along the stalk in branches C, I and J. Branches *b* and *c* retain the primitive character.

2. The hind tibiæ* had two pairs of spurs, at the middle and end of the tibiæ respectively. The middle pair of these has been lost at branches I, J and *g*.

The character is gained six times in phylogeny.

Vein 10 of fore wings arose from the cell, before the origin of the stalk of veins 8 and 9. It has become coincident with this stalk for varying distances at branches Q, M-N, I, C, *b* and *f*. This character seems too flexible to be of use in generic definition.

SYNOPSIS OF GENERA.

Male antennæ pectinate at least in part.

Palpi, long, upturned nearly to vertex.....**Ischoætēs.**†

* Not including *Ischoætēs*, which adds another exception in both palpi and tibial spurs.

† This genus was unknown to me when this article was prepared and has been inserted in the proof. The larva belongs definitely to the *Phobetron* group (Tropic hairy Eucleids), yet the imago contradicts the character that I had selected as defining

- Palpi short, not reaching beyond frontal tuft.
 Head sunken.....**Phobetron**.
 Head subprominent.....**Alarodia**.
 Palpi longer, reaching distinctly beyond frontal tuft, not to vertex.
 Media of fore wings short-forked and open ; male antennæ pectinated to tip.
 Vein 7 of fore wings from cell ; four spurs on hind tibæ.....**Natada**.
 Vein 7 stalked ; two spurs on hind tibæ.....**Sisyrosea**.
 Media of fore wings long-forked and more or less distinctly closed by a cross
 vein ; male antennæ simple towards the tip ; two spurs on hind tibæ.
 Interior margin of fore wings straight.
 Fore wings with all veins present.
 Vein 10 usually from the cell.....**Parasa**.
 Vein 10 stalked.....**Euclea**.
 Fore wing with eleven veins (vein 8 absent).
 Exterior margin of fore wings entire.....**Monoleuca**.
 Exterior margin slightly excavate below apex.....**Adoneta**.
 Interior margin of fore wings sinuate ; excavated before anal angle,
Sibine.
 Male antennæ simple.
 Vein 6 of hind wings stalked with 7.....**Prolimacodes**.
 Vein 6 of hind wings from the cell.
 Palpi reaching vertex of head.
 Costa nearly straight ; fore wing rather square at apex ; vein 10 from
 the cell.....**Cochlidion**.
 Fore wing broader, more rounded ; costa arched ; vein 10 from the
 cell.....**Packardia**.
 Fore wing more pointed, costa arched, vein 10 usually stalked.
Tortricidia.
 Palpi reaching above vertex of head.....**Lithacodes**.
 Palpi not reaching over half way to vertex of head : only two spurs on hind
 tibæ.....**Heterogenea**.

Genus **Phobetron** *Hübner*.

1816. *Phobetron* HUBNER, Verz. bek. Schmett. 398.
 1841. *Ecnomidea* WESTWOOD, Nat. Lib. Exot. Moths, 183.
 1855. *Euryda* HERRICH-SCHÄFFER, Ausser. Schmett. I, 7.
 1855. *Nemeta* WALKER, Cat. Brit. Mus. IV, 968.
 1864. *Phobetrum* PACKARD, Proc. Ent. Soc. Phil. III, 340.
 1892. *Phobetrum* KIRBY, Cat. Lep. Het. I, 535.
 1894. *Phobetron* NEUMÖEGEN AND DYAR, Journ. N. Y. Ent. Soc. II, 66.
 Type, *pithecium* Abb. & Smith.

Species : *pithecium* Abb. & Sm. (New York slug caterpillars, V).

this group, and at the moment of writing I am not able to supply another. It is curious that from imaginal characters the lower members of the Tropic Spined Eucleids (*Natada* and *Sisyrosea*) seem almost strictly referable to the preceding group (Tropic hairy Eucleids).

Genus *Isochætes* Dyar.

1899. *Isochætes*, DYAR, Journ. N. Y. Ent. Soc. VII, 208.

Type and species, *beutenmülleri* Hy. Ed.

Genus *Alarodia* Möschler.

1865. *Phyrne* GROTE, Proc. Ent. Soc. Phil. V, 246.

1886. *Alarodia* MÖSCHLER, Abh. Senek. Ges. XIV, 3 Heft, 35.

1892. *Calybia* KIRBY, Cat. Lep. Het. I, 446.

1893. *Eupoeya* PACKARD, Ent. News, IV, 169.

1897. *Calybia* DYAR, Journ. N. Y. Ent. Soc. V, 121.

Type, *nana* Möschl.

Möschler describes the palpi of *Alarodia* as "dunn," which is not as explicit as could be desired; otherwise his description fits the forms heretofore grouped as *Calybia*. I have not seen *nana* in nature, but think I am correct in the present reference, especially as the pattern of coloration of *nana* fits in well here.

Species: *slossoniæ* Pack. (Journ. N. Y. Ent. Soc., Sept., 1897, and Sept., 1898).

Genus *Natada* Walker.

1855. *Natada* WALKER, Cat. Brit. Mus. V, 1108.

1858. *Phlossia* WALKER, Cat. Brit. Mus. XV, 1673.

1892. *Natada* KIRBY, Cap. Lep. Het. I, 541.

1892. *Natada* HAMPSON, Moths of India, I, 380.

Type, *rufescens* WALK.

Species: *nasoni* Grote. (New York slug caterpillars, XVIII.)

Genus *Sisyrosea* Grote.

1864. *Isa* PACKARD, Proc. Ent. Soc. Phil. III, 347.

1876. *Sisyrosea* GROTE, Can. Ent. VIII, 112.

1891. *Isa* DYAR, Ent. News, II, 156

1892. *Sosiosa* KIRBY, Cat. Lep. Het. I, 551.

1894. *Sisyrosea* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 66.

Type, *textula* H.-S.

Species: *textula* H.-S. (New York slug caterpillars, VI.)

Genus *Euclea* Hübn.

1816. *Euclea* HÜBNER, Verz. bek. Schmett., 149.

1854. *Neæra* HERRICH-SCHÄFFER, Samml. Ausser. Schmett. I, fig. 176.

1859. *Parasa* MOORE, Cat. Lep. E. I. Co. 413.

1860. *Nochelia* CLEMENS, Proc. Acad. Nat. Sci. Phil. XII, 159.

1864. *Callochloa* PACKARD, Proc. Ent. Soc. Phil. III, 339.

1892. *Euclea* KIRBY, Cat. Lep. Het. I, 547.

1892. *Parasa* HAMPSON, Moths of India, I, 387.

1894. *Euclea* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 66.

Type, *cippus* CRAM.

I have not seen this type in nature. The characters are taken from the apparently very closely allied *delphinii*. I have shown above that the origin of vein ten of fore-wings is not a good generic character; hence it seems necessary to unite *Euclea* with *Parasa*. *Euclea* is the higher form with more rounded wings and reduced green markings, but the characters intergrade and the two series do not seem sharply separable. The larva of our *Parasa chloris* is unusually specialized. Indian species of *Parasa* retain the older type of larva.

Species: *delphinii* Bd. (New York slug caterpillars, X), *nanina* Dyar,* *incisa* Harv., *indetermina* Bd. (New York slug caterpillars, IX), *chloris* H.-S. (New York slug caterpillars, XI).

Genus *Monoleuca* Grt. & Rob.

1869. *Monoleuca* GROTE & ROBINSON, Trans. Am. Ent. Soc. II, 187.

1894. *Monoleuca* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 69.

Type, *semifascia* WALK.

Species: *subdentosa* Dyar, *semifascia* Walk., *sulfurea* Grote, *obliqua* Hy. Edw.

Genus *Adoneta* Clem.

1860. *Adoneta* CLEMENS, Proc. Acad. Nat. Sci. Phil. XII, 158.

1864. || *Cyclopteryx* PACKARD, Proc. Ent. Soc. Phil. III, 344.

1894. *Adoneta* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 69.

Type, *spinuloides* H.-S.

Species: *spinuloides* H.-S. (New York Slug Caterpillars, VIII), ? *leucosigma* Pack., ? *pygmaea* Grt. & Rob.

Genus *Sibine* H.-S.

1855. *Sibine* HERRICH-SCHÄFFER, Ausser. Schmett. I, 7.

1855. || *Nyssia* WALKER, Cat. Brit. Mus. V, 1132.

1860. *Empretia* CLEMENS, Proc. Acad. Nat. Sci. Phil. XII, 158.

1866. *Eupalia* WALKER, Cat. Brit. Mus. XXXV, 1927.

1878. || *Streblota* BERG, Ann. Soc. Argent. V, 177.

1878. *Neomiresa* BUTLER, Trans. Ent. Soc. Lond. 74.

1887. *Eupalia* DRUCE, Biol. Cent.-Am. Lep. I, 217.

1892. *Sibine* KIRBY, Cat. Lep. Het. I, 539.

1894. *Sibine* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 72.

Type, *nesea* STOLL.

Species: *stimulea* Clem. (New York Slug Caterpillars, II).

* There is already a *Euclea nana* of Herrich-Schäffer, a species of *Iacosomidæ*. This is not the *Euclea* of Hübner, and Kirby makes the species a synonym of *Pamea albistriga* Walk.; but the name has existed, so I change the name of my species.

Genus *Prolimacodes* Schaus.

1896. *Prolimacodes* SCHAU, Journ. N. Y. Ent. Soc. IV, 56.

Type, *triangulifera* Schaus.

Mr. Schaus separated the type generically from *scapha* on the position of vein 10 of fore-wings, which I have shown above to be a valueless distinction. It so happens that Mr. Schaus' fortunately chosen and appropriate name may be retained. I had noticed that Möschler's description of *Eulimacodes* contradicted *scapha* in important characters. Recently Mr. Schaus has kindly loaned me considerable carefully named material that proves Möschler's genus a synonym of *Semyra* Walk, thus leaving the *scapha* type unnamed.

Species: *scapha* Harris (New York slug caterpillars, IV), *trigona* Hy. Edw.

Genus *Cochlidion* Hübn.

1806. *Cochlidion* HÜBNER, Tentamen, 2.

1809. *Apoda* HAWORTH, Lep. Brit. II, 137.

1816. *Chelonias* HÜBNER, Verz. bek. Schmett. 398.

1825. *Limacodes* LATREILLE, Fam. Nat. 474.

1877. *Phrixolepia* BUTLER, Ann. Nat. Hist. (4) XX, 475.

1892. *Apoda* KIRBY, Cat. Lep. Het. I, 552.

1895. *Apoda* MEYRICK, Hand. Brit. Lep. 451.

Type, *avellana* Linn.

Species: *biguttata* Pack. (New York Slug Caterpillars, XII), *rectilinea* Grt. & Rob., *y-inversa* Pack. (New York slug caterpillars, I).

Genus *Packardia* Grt. & Rob.

1864. || *Cyrtosia* PACKARD, Proc. Ent. Soc. Phil. III, 342.

1866. *Packardia* GROTE & ROBINSON, Ann. Lyc. N. H. N. Y. VIII, 373.

1894. *Packardia* NEUMOESEN & DYAR, Journ. N. Y. Ent. Soc. II, 76.

Type, *elegans* Pack.

Species: *elegans* Pack. (New York Slug Caterpillars, XIV), *geminata* Pack. (New York Slug Caterpillars, XIII). ? *albipunctata* Pack.

Genus *Tortricidia* Pack.

1864. *Tortricidia* PACKARD, Proc. Ent. Soc. Phil. III, 345.

1892. *Ceratonema* HAMPSON, Moths of India, I, 393.

1894. *Tortricidia* NEUMOESEN & DYAR, Journ. N. Y. Ent. Soc. II, 75.

Type, *testacea* Pack.

Species: *testacea* Pack. (New York Slug Caterpillars, XVI), *pallida* H.-S. (New York Slug Caterpillars, III), *flexuosa* Grote (New York Slug Caterpillars, XV), *graefii* Pack, *fiskeana* Dyar.

Genus **Lithacodes** Pack.

1864. *Lithacodes* PACKARD, Proc. Ent. Soc. Phil. III, 345.
1892. *Lithacodes* KIRBY, Cat. Lep. Het. I, 555.
1894. *Tortricidia* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 75.
Type, *fasciola* H.-S.

This name is given from a resemblance to the Noctuid genus *Lithacodia* Hübn., hence is not preoccupied by it.

Species: *fasciola* H.-S. (New York Slug Caterpillars, VII).

Genus **Heterogenea** Knoch.

1793. *Heterogenea* KNOCH, Beitr. Ins. III, 60.
1829. *Heterogenea* STEPHENS, Ill. Brit. Ent. Haust. II, 84.
1864. ? *Kronæa* REAKIRT, Proc. Ent. Soc. Phil. III, 441.
1871. *Heterogenea* STAUDINGER, Cat. Lep. Eur. 62.
1892. *Heterogenea* KIRBY, Cat. Lep. Het. I, 556.
1894. *Heterogenea* NEUMOEGEN & DYAR, Journ. N. Y. Ent. Soc. II, 74.
Type *cruciata* Knoch.

I have not seen *Kronæa minuta* in nature and Reakirt's description is not fully reliable. It must, therefore, remain doubtfully placed till more specimens occur. It seems nearest to this genus.

Species: *shurtleffii* Pack. (New York Slug Caterpillars XVII),
? *minuta* Reak.

CONSIDERATIONS SUGGESTED BY GEOGRAPHICAL DISTRIBUTION.

It is impossible to go into this subject fully at present as none of the exotic species are known in all of their stages, so I am not sure of the exact extent of the groups. However a few suggestive points appear.

The best marked group of Eucleids, geographically, is that which I have called the "palæarctic smooth Eucleids" (Psyche, VIII, 172). They are distributed in northern North America, Europe and Asia, reaching northern India. Only one species reaches South America (*Lithacodes fasciola*), but this is not a southern species, strictly speaking, for it extends as far north as any species of the family. The species of *Apoda* recorded in Kirby's catalogue from South Africa, East Indies and South America probably do not belong to this group. All of them about which there is any recent information have proved to belong in other genera. This group of Eucleids seems correlated with the former arctic continent which extended across the Atlantic, from the Jurassic to the Eocene times and was always more or less distinctly separated from the equatorial land (see Plates VII-VIII).*

* I am indebted to Professors H. F. Osborn and G. Van Ingen, of Columbia University, for information in the preparation of these maps.

The three other main groups of Eucleids seem all to have originated in the equatorial land. The problem of their distribution is less simple than that of the first group; especially the colonization of Australia offers difficulties. It would appear that these groups, and, indeed, the family itself arose in South America, or the continental mass that connected South America and Africa as late as the Jurassic (see Plates VII–VIII). But I cannot infer anything very definite. This may be largely due to the extent of our ignorance of the southern species. The Megalopygidæ, which are practically the ancestors of the Cochliidiidæ, still inhabit South America, and, according to Aurivillius, Africa also, which lends support to this view. To put the origin of the family back to the Triassic, when there may have been a continuous continental mass reaching Australia (Plates VII–VIII), would seem to give the family too early an origin, considering its highly specialized larva and the condition of the flora of that period. No fossils are known in the family, which precludes exact investigations on that basis.

EXPLANATION OF PLATE VI.

- Fig. 1. *Cochlidion y-inversa*, mature larva, dorsal view, enlarged.
2. The same, last stage, but before the larva has whitened much.
 3. *Sibine stimulea*, mature larva, three-quarters view, enlarged.
 4. Venation of *Cochlidion y-inversa*, illustrating the short-forked discal vein.
 5. Venation of *Euclea indetermina*, illustrating the long-forked discal vein.
 6. Genealogical tree of the New York Slug Caterpillars.
- A. The main stem represents the generalized larva described above. It has three rows of scarcely produced hairy warts, representing $i + ii$, iii and $iv + v$ of abdomen, the lower row rudimentary, and $ia + ib$, $iii + iib$ and iv on thorax, all three functional. A primitive first stage present, the setæ of the functional warts single, and modified so as to be represented by thick spines, which are everted on hatching; ia and ib of joint 4, i and ii of joints 5 to 12 are coalesced at base. Setæ of iv and v normal, fine, small, not everted. Paired glandular dots representing the larger depressed spaces. Weak segments 5, 7, 9 and 11, shown by the less degree of erection of the spines. Skin with minute secondary spinules. Feeds in stage I. Food plants various smooth leaves.
- B. The warts remain functional and are produced (hypertrophied) especially the subdorsal row; the lateral wart of the weak segment 5 is lost, its spiracle moved up. Setæ i and ii of stage I become completely united, forming a single spine.
- C. The warts become succulent and easily detached, clothed with differently modified hairs. Skin spinules converted into short secondary hairs. Depressed spaces reduced, obsolete.

- D.** The points of origin of the green *Probetron* allies which do not occur in New York.
- E.** *Phobetron pithecium*. Warts irregular, lateral row reduced, deciduous. The short horns correspond to the weak segments. Tertiary hairs replace the wart hairs, which are reduced to the primitive setæ. Color brown, like a dead leaf. Rests on top of the leaf.
- F.** The main stem of the spined Eucleids. Primitive first stage lost and the ability to eat in stage I also lost. First stage with horn-like warts, bearing several soft setæ. Middle wart lost on both thoracic segments. Weak segments not distinguishable. After stage I horns covered with stinging spines formed of the modified setæ. Glandular dots of depressed spaces retained, but feebly developed, the dorsal row double only on joints 3-4 and 4-5. Bright colors developed, red and yellow.
- G.** The lower group of spined Eucleids. Horns equal or but very slightly irregular; no detachable spinules. Stage I retains more than three setæ on the horns, at least at the extremities. Characters as in stem F, but the bright colors degenerate.
- H.** *Natada nasoni*. Square, horns reduced, the subdorsal row bent outward and the spines appressed to the body, but capable of erection. Skin finely granular. Color green, the horns red, the yellow lines forming a complicated pattern.
- I.** *Sisyrosea textula*. Flattened, horns degenerate, the subdorsal row reduced. Skin marked with curious waved ridges. Color green, horns not red except at the anterior edge.
- J.** Warts of stage I with three hairs only; horns irregular, the irregularity not dependent upon the weak segments; subdorsal row not shortened. Patches of "caltrope" spinules are present on the lateral horns.
- K.** *Sibine stimulea*. Subdorsal horn of joint 8 not longer than those of 6 to 10. Red color absent, the yellow largely replaced by green, forming a peculiar pattern on the purple ground.
- L.** The subdorsal horn of joint 8 not so much reduced as the others.
- M.** *Euclea indetermina*. Skin spinules converted into granules. Bright colors retained.
- N.** *Euclea delphinii*. Warts somewhat reduced; ancestral colors partly replaced by purplish and green. Skin spinules converted into granules. Terminal detachable spines present.
- O.** *Adoneta spinuloides*. Warts considerably reduced; ancestral colors mostly retained, but modified for concealment. Skin granular. Terminal horns short.
- P.** *Parasa chloris*. Warts much reduced, the larger subdorsal horns bent inward over the back, erectile; the posterior pair of horns joined,

and produced into a pointed tail. Anterior portion of body humped up. Ancestral colors replaced by a protective brown, relieved by a fiery patch posteriorly. Skin spinules converted into granules only along the subventral edge.

- Q.** *Monoleuca semifascia* is somewhere in this position; the larva is unknown.
- R.** Origin of a larva not yet bred. Terminal horns long; shape elongate, not humped. Coloration as in *Adoneta spinuloides*, but the five purple patches about equal in size.
- a.** The main stem of the smooth Eucleids. Differs from stem A in the tendency to reduction of the warts and increased development of the depressed spaces. Skin granular. Color green.
- b.** *Prolimacodes scapha*. Lateral space obliterated, a high ridge formed by the union of subdorsal and lateral ridges. Primitive first stage absent; small warts present in stage I, afterward only the primitive setæ, the warts obsolete. Depressed spaces developed into plate-like structures, the granules resembling overlapping scales. Depressed spaces (9) and (10) added. Color green, variegated with yellow and brown.
- c.** The main stem of the palearctic Eucleids. Warts absent, the normal primitive setæ present after stage I. The modified primitive first stage retained with the subdorsal Y-shaped spines. Glandular dots of depressed spaces (1) united into a single center, the spaces (1) to (8) moderately developed. Skin granules somewhat spinose.
- d.** One limb of the Y-shaped spines of stage I reduced to a slight prominence. Depressed spaces moderate only; no red marks in the dorsal space.
- e.** The Y-shaped spines retained in stage I. Depressed spaces enlarged, deep, sharp edged, reducing the intervening surface to a series of latticed ridges. A red dorsal patch.
- f.** Skin granules discreet or subpapillose, simple.
- g.** Skin granules divided, forming a tuft of spines on the apex of each, simple in the last stage.
- h.** *Heterogenea shurtleffi*. A transverse yellow line on joint 3. Outline smooth in the last stage.
- i.** *Kronæa minuta*, its probable position.
- j.** *Tortricidia flexuosa*. Granules never papillose; setæ practically absent at first molt. Dorsal red mark moderate.
- k.** Granules subpapillose, setæ small, but distinct for several stages; red mark large. *T. testacea* and *T. pallida* differ only in the shape of the mark.
- l.** Skin granules still produced into spines.
- m.** *Lithacodes fasciola*. Skin shagreened granular besides the ancestral spines. Subdorsal yellow lines joined in front.

- n. A patch of black pigment under the cervical shield in stage I. Whitish green, the yellow subdorsal line edged by a dark shade.
- o. *Cochlidion biguttata* with the ancestral characters. Food oak.
- p. *Cochlidion y-inversa*. A yellow line crosses joint 3 to join the sub-ventral lines. Food hickory.
- q. The short limb of the Y-shaped spine of stage I still more reduced than in branch d. One seta of the middle thoracic wart is lost. Joint 13 produced with a pointed tail in the last stage. Skin granules discreet, not spinous.
- r. *Packardia geminata*. Whitish green, well pigmented.
- s. *Packardia elegans*. Skin granules more numerous; yellowish green, slightly pigmented; subdorsal line wavy.
- t. *Apoda rectilinea*, its probable position, the larva being unknown.

EXPLANATION OF PLATES VII-VIII.

Six maps showing the probable distribution of land and water in the Present, Eocene, Upper Cretaceous, Lower Cretaceous, Jurassic and Triassic periods respectively.

DESCRIPTION OF THE MATURE LARVA OF *ACRONYCTA CONNECTA*.

PLATE II, FIG. 7.

By HARRISON G. DYAR.

The description quoted in the Proceedings U. S. National Museum, XXXI, 116 is insufficient in regard to the hair structures, and has led me to place the larva wrongly in the table. It should fall in larval section II, next to *vinnula*.

Acronycta connecta Grt. *Larva*.—Head bilobed, rounded, whitish in the sutures, most of the surface dull black, shining only at the apices of the lobes; setæ white, rather long; width 3 mm. Body with low warts, scarcely at all elevated; i with a black hair and several very small ones, ii to iv, single haired, v and vi, many haired, but diffuse and confused with the rather numerous pale secondary sub-ventral hairs. Leg plates scarcely cornified, hairy; anal plate not cornified; cervical shield bisected, concolorous with the body except for a black line that edges the inner portions of the two halves and runs a little way along the anterior edge. Body greenish white, purplish on the dorsum. A broad orange subdorsal line almost enclosing wart ii, reaching from the cervical shield to anus. Warts i and ii small, round, black; spiracles black; feet pale; no other marks.

Food-plant.—Willow. Collected by Mr. Aug. Busck at Washington, D. C., Oct. 2.

DESCRIPTIONS OF AND NOTES ON SOME NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BEUTENMULLER.

Thecla ilavia, sp. nov.

Male: Upperside brown, with a large fulvous patch beyond the middle of the fore wings and a similar, but smaller, patch on the hind wing towards the anal angle. Fringes whitish. Underside uniform, rather pale clay brown, giving the wings a faded appearance. Across the fore wing is a broken darker brown transverse line, edged with whitish outwardly. A similar line crosses the hind wings, but somewhat darker, and forming a broken W above the anal angle. At the anal angle is a blue scaled lunule, preceded and followed by a small orange spot marked with black. Female, same as the male. Expanse, male, 24 mm.; female, 24-26 mm.

Habitat: Texas (2 males and 2 females).

Closely allied to *Thecla autolytus*, but differs from this species by having only a single transverse line on the underside of both wings. In *autolytus* there are two sharply defined transverse lines on each wing. It also differs by being very much paler on the underside, and as the whole has a decided faded appearance.

Sesia marica, sp. nov.

Head black, palpi bright orange; collar black, edged in front with orange. Antennæ black. Thorax black, with a conspicuous orange stripe on each side, on the patagia, meeting a transverse band on the posterior edge. Thorax beneath, with a large orange patch on each side. Abdomen brown-black, with an orange band on the posterior edge of the second, fourth, sixth and seventh segments. Middle and hind femora brown-black; tibia and tarsi orange, the former with a black band near the end; anterior coxæ and femora brown-black inside, orange outside; tibiæ and tarsi orange. Anal tuft black above, orange beneath. Fore wings transparent, costal margin black, fringes brown; inner margin orange. Basal transparent area long, with the median vein black, continued as a violet streak to the hind angle. Transverse mark orange red. Outer transverse area rather large, rounded, veins black, orange between them at the outer part of wing. Hind wings with the costa narrowly orange, outer margin very narrowly brown-black, fringes concolorous. Fore wings beneath, washed with golden orange along the costa and inner margin to the transverse mark, otherwise similar to the above. Hind wings beneath, same as above. Expanse, 25 mm.

Habitat: Punta Gorda, Florida.

Type, Coll. Am. Mus. Nat. Hist.

This elegant species may be readily known by the conspicuous orange stripes and transverse band on the thorax, the orange red transverse mark on the fore wings, and by the orange rays between

the veins. It is allied to *Sesia texana*. Described from a perfect male collected by Mrs. A. T. Slosson.

***Sesia seminole*, sp. nov.**

Male: Head and antennæ brown-black; palpi and collar in front, pale orange. Thorax brown-black, with a narrow orange line on the patagia and a transverse line of the same color posteriorly. Abdomen brown-black, with a somewhat metallic reflection in certain light; at the posterior end of the second, fourth and last segment is a narrow orange-yellow band. Anal tuft black, slightly orange at the middle, beneath. Middle and hind femora blackish, tibiæ violet, with an orange band at the middle. Tarsi orange inside, violaceous outside. Fore wings narrow, transparent area present but not characteristic; costal margin brown-black, outer part of wing with the veins heavily marked with brown-black, with narrow rays of orange between, fringes brown-black; inner margin scaled with orange; transverse mark conspicuous, orange red, transparent space beyond, small and round. Hind wings transparent, a small orange mark at upper end of cell, margin and fringes violaceous. Under side of fore-wings washed with golden orange. Expanse, 17 mm.

Female: Similar to the male in color and markings of body and legs. Fore wings broader, with the outer margin less oblique. Basal transparent area filled with orange, broken by the dark median vein; outer transparent area filled with orange between the dark veins. The dark parts of the wings have a decided violet reflection, much more so than in the male. Transverse mark orange, marked with black at the inner part. The margin of the hind wing is also violet. Expanse, 15-18 mm.

Habitat: Lake Worth, Florida.

Collected by Mrs. A. T. Slosson. Types Coll. Am. Mus. Nat. Hist.

***Memythrus Newman*.**

Memythrus NEWMAN, *Sphinx vespiformis*, an Essay, 1832; Ent. Mag. Vol. I, 1832, p. 47.

Sciapteron STAUDINGER, *Sesii Agri. Berolinensis*, 1854, p. 43; Stett. Ent. Zeit. Vol. XVII, 1856, p. 195.

Newman in his essay on *Sphinx vespiformis*, erected the genus *Memythrus* for this species. It is the same insect we know at present in European lists as *tabaniformis* for which Staudinger proposed the generic name *Sciapteron*. The name *Memythrus* has priority and therefore must be used.

***Paranthrene pepsidiformis Hübner*.**

Doubleday in a letter to Harris (Harris' Correspondence, 1869, p. 161) stated that this insect is the same as *Ægeria exitiosa*. I have examined the work of Hübner (Zutr. Exot. Schmett., 1825, p. 32, Figs. 533 and 534) and find that his *pepsidiformis* is the female of

Sanninoidea exitiosa. The figures are good and cannot be mistaken for anything else.

Calasesia, gen. nov.

Palpi upturned with appressed scales and reaching top of head; third joint long, slender. Antennæ thickened at apical half to a slender club, simple. Legs scaled; hind legs with small tufts at end of tibiæ above; no tarsal tufts. Body tapering to a point; anal tuft slight, straight. Fore-wings with 11 veins; 2-11 free from cell; 5 absent; 7-8 not stalked; 12 from base. Hind wings with vein 2 from cell; 3 just before end; 5 from middle; vein retreating, 6-7. Type, *Pyrrhotenia coccinea*.

Calasesia coccinea Beuten.

Pyrrhotenia coccinea BEUTENMULLER, Jour. N. Y. Ent. Soc. Vol. VI, 1898, p. 241.

This species was wrongly placed by me in the genus *Pyrrhotenia*, but after examination of the type find that it is structurally different from that genus. It comes near *Paranthrene* of Europe and *Zenodoxus* of North America.

Sesia asilipennis Wilson.

Boisduval in the Suites à Buffon, Nat. Hist. Lepid. Het. I, 1874, p. 391, credits himself as being the author of this species and refers to Guerin-Meneville, Regne Animal, pl. 84, figure 3. The date of this volume is 1844, and unless Boisduval described this species somewhere else, previous to 1835, Wilson must be credited as being the author. He gives a good uncolored figure of the male of *Sesia asilipennis* in his Treatise, Ins. Gen. and Syst. Encyclop. Brit. 1835, Pl. CCXXXVI, fig. 12. It is the same insect described as *Tarsa bombyciformis*, by Walker, *Trochilium vespipenne*, by Herrick-Schäffer, from China, and *Trochilium denudatum* by Harris. The synonymy now stands as follows:

Tarsa asilipennis Wilson.

Sesia asilipennis WILSON, Treat. Ins. Gen. & Syst. Encyl. Brit. 1835, Pl. CCXXXVI, fig. 12.

Trochilium denudatum HARRIS, Am. Jour. Sc. & Arts, Vol. XXXVI, 1839, p. 310.

Trochilium vespipenne, HERRICH-SCHAEFFER, Aussereurop. Schmett. 1850-58, p. 57, fig. 217.

Tarsa bombyciformis WALKER, Cat. Lep. B. Mus. pt. VIII, 1856, p. 61.

NEW RECORDS OF COCCIDÆ.

BY T. D. A. COCKERELL.

The following records add considerably to the known range of a number of species, while for others new food plants are indicated. Through the agency of man, Coccidæ are being spread far and wide, and it is becoming an urgent necessity to investigate their natural and artificial distribution more thoroughly than we have hitherto done.

Eriococcus quercus (*Comst.*).—Guanajuato, Mexico, on an undetermined tree or shrub. Coll. Dr. A. Dugès. New to Mexico. The fourth antennal segment is, in most of the Mexican examples, longer than in those from Florida.

Ceroplastodes niveus (*Ckll.*).—Aguas Calientes, Mexico, Jan. 5, 1891. Coll. Prof. H. Osborn. Com. W. Newell. Known hitherto only for the original types collected in 1893 at Montezuma.

Lecanium imbricatum *Ckll.*.—Fillmore Cañon, Organ Mts., New Mexico. Coll. Ckll. on *Acacia*. New to New Mexico, and to the Upper Sonoran Zone.

Lecanium quercitronis *Fitch.*.—N. Syn. *Kermoides*, Tyrrell. Soledad Cañon, Organ Mts., Aug. 12, 1897, on oak. Coll. J. D. Tinsley. This extends its known range in the Rocky Mts. considerably to the south.

Lecanium armeniacum *Craw.*.—Guanajuato, Mexico, on peach. Coll. Dr. A. Dugès and Dr. Jesus Aleman. The scales are just like *L. persicæ*; but the antennæ, sometimes with 7, sometimes with 8 segments, do not agree in the proportions of the segments with those of *persicæ*. I had regarded the insect as a form of *L. persicæ*, but Mr. Pergande protested that it must rather be *armeniaceum*; and on further consideration, I must agree with him. It is new to Mexico.

Vinsonia stellifera (*Westw.*).—On an orchid from Central America, brought by rail to Los Angeles. Com. Alex. Craw, Jan., 1898. New to Central America.

Comstockiella sabalis (*Comst.*), var.—Guadalupe Island, off the coast of Lower California, on fruits of the palm *Erythea edulis* S. Wats. Div. Entom., U. S. Dep. Agric., no. 4933. Dried ♀ ochreous, but when boiled in KHO becoming purplish or even crimson. The largest

and most cephalad lateral bristles (a pair on each side) of the pygidial area are much larger than those figured by Comstock for *sabalis*, being enough to reach the level of the hind end of the insect. Circumgenital glands: caudolaterals, 10 to 13; mediolaterals, 7 to 8; cephalolaterals 5 to 6. Scales as in *sabalis*. This is the second coccid recorded from Guadalupe I., the other being *Aspidistus rapax* Comst. (Howard, Yearbook Dept. Agric. for 1894, p. 262). No coccid is yet known from the mainland of Lower California.

Aspidistia biclavis (Comst.) and **Aspidistus personatus** Comst.—Both species on the skin of an orange from Colima, Mexico, collected by Mr. Craw in the course of his horticultural quarantine work at San Francisco. I was surprised to see *personatus* on an orange; there was only one scale, but it was unmistakable. I had never seen *biclavis* on an orange before; it commonly occurs on the bark.

Aspidistia furfurus Fitch.—Hurley, S. Dakota, "rapidly spread on certain varieties" of apple trees. Coll. Laura A. Alderman.

Parlatoria parlatorioides (Comst.).—Guanajuato, Mexico, in quantity on peach. Coll. Dr. Jesus Aleman. The food-plant is new, and quite surprising. The specimens represent a slight variety, with the median lobes broad and low, and five groups of circumgenital glands; median of 2, cephalolaterals 11, caudolaterals 9 to 10.

Parlatoria theæ var. **viridis** Ckll.—On stems of "*Ilex pedunculata*" (no doubt *Ilex pedunculosa* Miq.) from Japan, quarantined by Mr. Craw at San Francisco. The ♀ has a curious purple color, except the mouth parts and lobes, which are yellowish-brown. The purple turns to green directly the KHO touches it.

Palatoria proteus var. **crotonis** (Ckll.).—On *Croton*, I presume under glass, Columbus, Ohio, March, 1896. Coll. Bogue. New to the U. S.

Aspidistus forbesi W. G. Johns.—On peach, Auburn, Alabama, Coll. Baker. On *Prunus*, Lake City, Florida, Coll. Quaintance. On *Acer pseudoplatanus*, Reading, Mass., Feb. 24, 1898, a form with paler and rather larger scales. Coll. Kirkland, Com. Cooley. This species is evidently widely distributed.

Aspidistus tenebricosus Comst.—In quantity on bark of apple, Auburn, Alabama, Coll. Baker. A new locality and food-plant.

Aspidistus scutiformis *Ckll.*—On a *Citrus* fruit from Acapulco, Mexico. Com. Craw, who quarantined it at San Francisco.

Aspidistus dictyospermi *Morgan.*—On *Pandanus* in greenhouse, Santa Fé, New Mexico. Coll. Ckll. On *Areca lutescens* in greenhouse, Columbus, Ohio. Coll. J. S. Hine. Also found at Columbus in 1896 by Prof. Bogue.

NOTES AND DESCRIPTIONS OF TRYPETIDÆ.

BY D. W. COQUILLET.

In the Wiener Entomol. Zeitung for 1882, page 192, Osten Sacken states in substance that *Trypeta*, Meigen, 1803, is a synonym of *Trupanea* Guettard, 1756, and of Schrank, 1798. Guettard used the term in a popular sense, and did not refer to any previously described species, nor did he give specific names to any of the species of which he wrote. His paper, therefore, must be regarded as a popular one, which does not in the least affect our binomial nomenclature. Moreover, it appeared two years earlier than the tenth edition of Linne's Systema Naturæ, which the majority of naturalists have adopted as the starting point of our nomenclature.

As to *Trupanea* Schrank, Osten Sacken overlooked the fact that this genus appeared in the *third* volume of that author's work, which was published in the year 1803, the same year in which *Trypeta* appeared. In a case of this kind, later writers are at liberty to choose either of the two names; and since *Trypeta* has been very generally adopted in the past, there is no good reason for not following this course.

At the time of treating of our Trypetidæ, Dr. Loew separated them into smaller groups which he sometimes referred to as genera but quite as often as subgenera, and as subgenera they are listed in the Osten Sacken catalogue. By changing some of the species, however, the greater part of the groups proposed by Loew are well worthy of being considered as valid genera.

Acrotaxa Loew, is a synonym of *Anastrepha* Schiner, as given in the Osten Sacken catalogue; but the African genus *Leptoxyda*, or *Leptoxys* Macquart, which is also given as a synonym, evidently is not the same genus, owing to the course of the fourth vein. The

species *amabilis* belongs to the preceding genus, *Hexacheta*, instead of to *Anastrepha*, under which it is placed in the catalogue.

***uncinata*, sp. nov.**

Yellow, the abdomen largely brownish red, two spots on the metanotum, one on each side of the second abdominal segment and the ovipositor black, the hairs, bristles and antennal arista except its base, also black. Front, except the narrow lateral margins, reddish yellow, slightly longer than wide, face strongly retreating at the oral margin, antennæ three-fourths as long as the face, the third joint nearly twice as long as wide, rounded at the apex; body polished, scutellum bearing four bristles; ovipositor convex, scarcely longer than the preceding abdominal segment; wings yellow, dark brown and hyaline; the brown forms a spot on the humeral crossvein, a larger one covering the stigma, a small one in base of third posterior cell, the latter in its apex extending upward along the hind crossvein, finally a broad border along the wing from a short distance beyond apex of first vein to beyond apex of the fourth; an elongate, whitish hyaline spot in middle of costal cell, another beyond middle of the first basal, one beyond apex of first vein extending to the third just beyond the small crossvein, a large one filling middle of first and second posterior cells, encroaching on the submarginal and almost crossing the discal between the small and hind crossveins; axillary angle and middle of third posterior cell also hyaline; third vein bristly over almost its entire length, small crossvein near last third of discal cell; length, 5 mm.

Habitat: Ft. Wrangle, Alaska.

A female specimen collected by Prof. H. F. Wickham. Type No. 4396, U. S. National Museum.

Acidia fausta and *suavis* belong to *Rhagoletis*; the small crossvein is near or before the middle of the discal cell.

***Epochra rubida*, sp. nov.**

Yellow, the front, except its lateral margins, and the body reddish yellow, metanotum very thinly pruinose with grayish and marked with five indistinct darker vittæ, body otherwise polished, the hairs and bristles black; face almost straight, slightly produced at the oral margin; third antennal joint rounded at the apex, scutellum bearing four bristles; ovipositor convex, scarcely longer than preceding segment of abdomen; wings hyaline, marked with five yellowish or brown crossbands; the first begins at the humeral crossvein and extends to the anal cell where it is connected with the second band; the latter begins on the stigma and extends to the apex of the anal cell; the third band begins a short distance beyond apex of first vein, passes over the small crossvein and almost reaches the hind margin of the wing slightly beyond apex of sixth vein; the fourth band begins a short distance before tip of second vein and passes over the hind crossvein; the fifth band begins at the costal end of the fourth and borders the wing to slightly beyond apex of fourth vein; third vein bristly to slightly beyond the small crossvein, the latter noticeably beyond middle of discal cell; length, 5 mm.

Habitat: Colorado.

Seven males and four females. Type No. 4397, U. S. National Museum.

Edicarena diffusa Snow belongs to *Straussia*.

Zonosema basiolum Osten Sacken, and *Spilographa setosa* Doane are synonyms of *flavonotata* Macquart. The latter and *electa* Say belong to *Zonosema*.

***Zonosema vittigera*, sp. nov.**

Head yellow, face slightly convex, only slightly projecting at the oral margin, third antennal joint produced into a sharp point at the outer apical angle; thorax polished, dark yellow, metanotum marked with three whitish yellow vittæ, the median one tapering to a point anteriorly, the lateral ones each marked with a broad black vitta interrupted at the suture; a narrow black vitta extends from humerus to wing, a black spot back of each wing; pleura whitish yellow on upper edge and with a similar colored vitta near the middle, above this a black vitta which does not extend on the front part of pleura, a black spot in front of middle coxæ; scutellum light yellow, its base brown and black, a black dot at each lower front angle; metanotum black, the upper corners yellowish; abdomen polished yellow, a black spot on each side of the fourth segment in the male, fifth in the female, ovipositor not longer than the last abdominal segment; legs yellow; bristles, including those fringing the hind tibiæ, black; wings hyaline, marked with four brown bands and a costal spot between the two median bands extending to the third vein; the first band extends from humeral crossvein to middle of last section of sixth vein, wing basally from this band, except behind sixth vein, yellowish; the second band begins at the stigma and passes over the small crossvein, almost reaching the wing-margin midway between apices of the fifth and sixth veins; the third band starts from just before apex of second vein and passes over the hind crossvein; the fourth band begins at costal end of the third band and borders the wing to slightly beyond tip of fourth vein; third vein bristly nearly to its apex, small crossvein at middle of discal cell; length, 5 to 6 mm.

Habitat: Eagle Pass, Texas (J. Cram), and Las Cruces and Mesilla, N. Mex. (T. D. A. Cockerell). Two males and two females. Type No. 4398, U. S. National Museum.

***Spilographa maculosa*, sp. nov.**

Light reddish yellow, face and cheeks grayish pruinose, a light yellow vitta on upper edge of pleura; face greatly retreating below, third joint of antennæ rounded at the apex, scutellum bearing four bristles; ovipositor flattened, slightly longer than the preceding abdominal segment; wings hyaline, an indistinct brownish band extends from forking of the second and third veins to apex of anal cell, a brown band, which is sometimes interrupted in the submarginal and discal cells, runs from the stigma over the small crossvein and stops midway between the fifth vein and the hind margin of the wing, hind crossvein and apex of fifth vein bordered with brown, a brown costal spot midway between apices of the first and second veins extending slightly below the second vein, broad apex of wing, usually from slightly before apex of second vein to slightly beyond apex of the fourth, brown; third vein bristly nearly to its apex, small crossvein noticeably before middle of discal cell; length, 4 to 5 mm.

Habitat: Colorado. Two males and two females. Type No. 4399, U. S. National Museum.

Trypeta straminea Doane is a synonym of *occidentalis* Snow. *Neaspilota veronicæ* Loew belongs to *Trypeta*.

***Trypeta notata*, sp. nov.**

Head and its members yellow, its hairs and bristles, and those of the entire insect also yellow; body black, the thorax and scutellum opaque, densely gray pruinose, scutellum bearing only two bristles, ovipositor convex, as long as the last two abdominal segments; legs yellow; wings hyaline, stigma, a costal dot nearly midway between it and apex of second vein, the extreme apex of marginal cell, a border to the cell and hind crossveins, and a dot on the third vein above the latter, yellowish; third vein bare, small crossvein near second third of the discal cell; length,

Habitat: Albuquerque, N. Mex. Two females received from Prof. L. Bruner. Type No. 4400, U. S. National Museum.

***Trypeta undosa*, sp. nov.**

Head and its members yellow, third joint of antennæ rounded at the apex. Thorax yellow, metanotum black, thinly gray pruinose, a vitta each side of the middle with a broad lateral margin, yellow, a black spot back of each wing; scutellum bearing four bristles, a black spot at its apex; metanotum black, the sides yellow, the lomen yellow, each segment marked with four black spots, ovipositor as long as the last three abdominal segments; legs yellow; wings yellowish, the base almost to apex of auxiliary vein yellowish except middle of front portion of second basal cell and behind the sixth vein; a yellowish band margined with brown starts at the costal portion of this spot, filling the stigma and extending over the small crossvein, stops halfway between the fifth vein and the wing-margin; a similar band begins a short distance beyond this one and extends over the hind crossvein to the wing-margin; from the costal end of this band another proceeds along the edge of the wing to slightly beyond apex of fourth vein; third vein bare, small crossvein slightly beyond middle of discal cell; length, 5 mm.

Habitat: Colorado.

A single female collected by Mr. C. F. Baker. Type No. 4401, U. S. National Museum.

***Ædaspis setigera*, sp. nov.**

Head and its members yellow, the occiput, except the sides, black; body polished black, thorax bearing three pairs of dorso-central bristles, the anterior pair inserted in front of the suture, ovipositor convex, slightly longer than the last three abdominal segments; legs yellow, the femora, except their apices, dark brown; wings hyaline, a black basal spot extending slightly beyond the humeral crossvein, and three brown bands connected at the costa, except sometimes the last one; the first is the broadest and extends transversely to the hind margin of the wing just before tip of sixth vein; the second band extends obliquely over both crossveins and reaches the hind margin of the wing at apex of the fifth vein, the hyaline spot between

this and the preceding land is in the form of a broad triangle; the last band borders the wing from near the stigma to beyond apex of the fourth vein, and is narrowly separated from the costa at least between apices of the second and third veins; third vein bare, small crossvein near the fourth fifth of the discal cell; length, 3 to 5 mm.

Habitat: Bristol, R. I. (Burgess); Va. (T. Pergande); Ga. (Morrison); Kirkwood, Mo. (Miss M. E. Murtfeldt), and Baldwin, Kan. (C. S. Parmenter). Six males and seven females. Type No. 4402, U. S. National Museum.

***Aciura opaca*, sp. nov.**

Head and its members yellow, center of occiput grayish black, hairs and bristles of entire insect yellow; body black, the thorax and scutellum opaque, densely grayish pruinose, scutellum bearing only two bristles; ovipositor somewhat flattened, only slightly longer than the preceding abdominal segment; legs yellow, the femora except the apices blackish brown; wings at base nearly to base of discal cell hyaline, the remainder brown and hyaline; an elongate hyaline spot in first basal cell just beyond its middle, a hyaline band extends from costa nearly midway between apices of first and second veins and almost reaches the fifth vein, passing between the small and hind crossveins; an oblique hyaline spot in last third of first posterior cell almost in contact with a smaller one below the fourth vein; a triangular hyaline spot almost crossing the second posterior cell near its base, finally a large hyaline spot in middle of third posterior cell, communicating along the wing-margin with one in the axillary cell which in turn is in contact with the hyaline at base of wing; third vein bare, small crossvein noticeably beyond middle of discal cell; length, 4 mm.

Habitat: Elko, Nev. A single female specimen. Type No. 4403, U. S. National Museum.

***Aciura limata*, sp. nov.**

Reddish yellow, the abdomen and bristles black; body polished, scutellum bearing four bristles, ovipositor convex, about as long as the preceding abdominal segment; wings brown and hyaline, the base yellowish; a large hyaline spot near middle of costal cell, a sub-triangular one just beyond apex of first vein, reaching the third vein a short distance before the small crossvein, another a short distance beyond it, extending nearly halfway across the first posterior cell a short distance beyond the small crossvein, one at apex of fourth vein extending almost to second vein a short distance before its apex, one near middle of second posterior cell extending from the wing-margin across the first posterior cell almost parallel with the preceding spot, a small spot in discal cell on the fifth vein a short distance from the hind crossvein, a large one in third posterior cell beginning at tip of sixth vein and extending, attenuated and interrupted, obliquely to the one in the costal cell; axillary cell hyaline; third vein bare, small crossvein noticeably beyond middle of discal cell; length, 4.5 mm.

Habitat: New Bedford, Mass.

A single female specimen collected by Dr. Garry De N. Hough. Type No. 4404, U. S. Nat. Museum.

Aciura lutea, sp. nov.

Yellow, body polished, scutellum bearing only two bristles, ovipositor very convex, almost as long as the last three abdominal segments; wings brown and hyaline, two subquadrate hyaline spots in costal cell between humeral crossvein and apex of auxiliary vein, a subtriangular one just beyond end of first vein not extending below the second vein, and one a short distance beyond it which almost reaches the third vein, a rounded one just beyond the second third of first basal cell and a similar one in discal cell along the fourth vein just beyond the small crossvein, the middle of the second and third posterior cells, occupying about half the area of these cells, a small spot just before the apex of the fifth vein, a rounded one in front edge of the axillary cell, hyaline; broad hind margin of this cell grayish hyaline; third vein bristly at its base, small crossvein near the third fourth of the discal cell; length, 5 mm.

Habitat: Pareth, Utah.

A single female, received from A. L. Siler. Type No. 4405, U. S. Nat. Museum.

Carphotriche culta differs in too many respects from the type species to be retained in the same genus, and I have, therefore, made it the type of a new genus, as follows:

Paracantha, gen. nov.

Upper half of front bearing a row of three whitish setæ nearly midway between the regular frontal row and the median line of the front, face in profile strongly concave, the oral margin considerably produced forward, scutellum not swollen, bearing four macrochactæ and three pairs of nearly erect yellow setæ a short distance inside of the margins; fourth vein not curved forward at its apex, small crossvein near the second third of the discal cell.

Eurosta conspurcata Doane is a synonym of *reticulata* Snow.

Trypeta aurifera Thomson, and *Ensina humilis* Loew, are synonyms of *Acinia picciola* Bigot; the latter belongs to *Tephritis*.

Euaresta æqualis Loew also belongs to *Tephritis*.

Tephritis nora Doane is a synonym of *platyptera* Loew.

T. affinis Snow is a synonym of *finalis* Loew; and *T. obscuripennis* Snow is a synonym of *Trypeta genalis* Thomson, which belongs to *Tephritis*.

Eutreta aurantiaca Doane, and *E. tricolor* Doane, also belong to *Tephritis*.

Tephritis tenebrosa, sp. nov.

Head and its members yellow, the occiput grayish black, the two pairs of bristles in front of the inner vertical ones, and those fringing the occiput, white, the other bristles black; body black, opaque gray pruinose, the hairs white, bristles of thorax and scutellum black, those of the abdomen white, scutellum bearing four bristles, last three abdominal segments each marked with a dorsal pair of blackish spots; legs

yellow, the femora, except their apices, dark brown; wings dark brown, the base hyaline, including the costal and marginal cells to apex of auxiliary vein except a costal dot near middle of the former, the first basal cell to apex of the second basal cell, also the whole of the latter and of the anal cell; a hyaline spot just beyond apex of first vein extending to the third slightly beyond the small crossvein, a rounded spot just beyond this in the marginal cell, a smaller one on lower side of third vein just before the hind crossvein, three small marginal ones in the second posterior cell and a larger one along the fourth vein shortly beyond the hind crossvein, three marginal and about six discal spots in the third posterior cell, the hind margin and two spots along the sixth vein in the axillary cell, two in the discal along the fifth vein of which one is near the middle and the other which is about four times as large is toward the base; third vein bare, small crossvein noticeably beyond middle of discal cell; length, 3 mm.

Habitat: Custer Co., Col. A male specimen collected by Professor T. D. A. Cockerell. Type No. 4406, U. S. Nat. Museum.

***Euaresta munda*, sp. nov.**

Head and its members yellow, center of occiput grayish black, face not projecting forward at the oral margin, antennæ scarcely reaching halfway to the oral margin; body black, thorax and scutellum opaque, densely gray pruinose, the hairs yellow, bristles brown, scutellum bearing two bristles; abdomen polished, its hairs black, ovipositor slightly convex, nearly as long as the last three segments of the abdomen; legs black, tarsi yellow, front tibiæ yellowish brown; wings dark brown, the following spots hyaline: two in costal cell, three between apices of first and second veins, the last two spots extending halfway across the submarginal cell, two between apices of second and third veins, the second extending into the first posterior cell, one in extreme apex of this cell, three between apices of fourth and fifth veins, the second almost crossing the cell, the last one extending into the first posterior cell, three between apices of fifth and sixth veins, two on front side of sixth vein of which one is beyond the middle of its last section and the other contiguous to the anal cell, three marginal and one discal in the axillary cell, one in front part of discal cell midway between the small and hind crossveins, finally one in posterior part of first basal cell opposite middle of discal cell; third vein bare, small crossveins near second third of discal cell; length, 3 mm.

Habitat: Elko, Nev.

A single female specimen. Type, No. 4407, U. S. Nat. Museum.

***Euaresta mundula*, sp. nov.**

Differs from the above description of *munda* only as follows: Pleura reddish brown, apex of scutellum yellow, legs yellow, none of the hyaline spots between apices of first and second veins extend into the submarginal cell, only two in axillary cell, none in the discal; length, 3 mm.

Habitat: Pareas, Utah.

A male specimen collected by Mr. A. L. Siler. Type No. 4408, U. S. Nat. Museum.

Trypeta acutangula Thomson is a synonym of *Urellia abstersa* Loew. The latter belongs to *Euaresta*.

Tephritis californica Doane and *Urellia pacifica* Doane are synonyms of *Euaresta araneosa* Coquillett.

Tephritis webbii Doane and *Urellia aldrichii* Doane, belong to

Urellia actinobola Loew and *solaris* Loew, are synonyms of *Trypeta mevarna* Walker, which is a true *Urellia*.

***Urellia stigmatica*, sp. nov.**

Head and its members yellow, center of occiput grayish black, third joint of antennae rounded at the apex; body black, opaque, densely gray pruinose, the bristles black, scutellum bearing four strong bristles, ovipositor flattened, as the last two abdominal segments; legs yellow, middle femora devoid of bristles on the under side; wings hyaline, a large black spot toward the apex, containing two small hyaline spots, one just beyond apex of second vein, the others on front side of fourth vein almost above the hind crossvein, and sending nine rays towards the wing-margin, all of which reach it except the two which cross the discal cell, the first ray, which is very much broader than any of the others, extends obliquely to the region of the small crossvein to the stigma which it fills excepting the front corner, and also fills apex of first basal cell to middle of discal cell; the second ray crosses the marginal cell midway between apices of the first and second basal cells, the third and fourth rays extend to the apices of the third and fourth veins, the following two rays cross the discal cell, the first one borders the hind crossvein, the remaining two rays cross the discal cell, the first stopping a short distance from the wing-margin, the second to the center of the third posterior cell; third vein bare; length,

4 mm.

Habitat: Colorado. A specimen of each sex. Type No. 4409, U. S. Nat. Museum.

***Urellia bisetosa*, sp. nov.**

Differs from the above description of *stigmatica* as follows: Third joint of antennae very oblique at apex, the front corner rounded, scutellum bearing only two bristles, ovipositor longer than the last three segments of the abdomen, black spot of wings sends out only eight rays, only one crossing the discal cell and this one stops at the fifth vein, the ray which in the preceding species extends to the center of the third posterior cell, is wanting in the present species; length, 4 mm.

Habitat: Las Cruces, N. Mexico (T. D. A. Cockerell), and Marysvale, Utah (M. E. Jones). A specimen of each sex.

Type No. 4410, U. S. Nat. Museum.

***Urellia nigricornis*, sp. nov.**

Differs from *stigmatica* as follows: Third joint of antennae black, very oblique at its apex, scutellum bearing only two bristles, middle femora each bearing two or three long bristles on the under side just beyond the middle, no hyaline spot near apex of second vein, the black spot of wings sends out only six rays, none of which go to apex of the fourth vein nor cross the discal cell; the ray extending to the stigma is in the form of a subquadrate spot, two of its sides being nearly perpendicular to the

costa, and the hyaline space between it and the next ray is also almost quadrangular and nearly as large as the first ray ; the latter is almost separated from the brown of the small crossvein, the first basal cell being hyaline along its hind edge almost to its extreme apex ; length, 3 mm.

Habitat : Colorado. A single male collected by Mr. C. F. Baker. Type No. 4411, U. S. Nat. Museum.

Urellia radifera, sp. nov.

Differs from *stigmatica* as follows : Third joint of antennæ slightly oblique at the apex, scutellum bearing only two bristles, middle femora each bearing several bristles on the under side beyond the middle, black spot of wings sends out only four rays none of which extend to the stigma nor to apices of third and fourth veins, and none cross the discal cell, stigma yellowish hyaline ; length, 2.5 mm.

Habitat : Tucson, Ariz. A male specimen collected April 21, 1897, by the late Mr. H. G. Hubbard. Type No. 4412, U. S. Nat. Museum.

As the table of genera given in Williston's manual is somewhat defective (*Epochra* is placed in the section in which the distal portion of the wing has two hyaline indentations of which the posterior one is in the second posterior cell, while none of the species are marked in this manner, and *Eutreta* is located in the group having the face spotted, although four of the five known species have it wholly unspotted), I subjoin a new table of the genera of this country north of Mexico. Three of the genera, *Cedicarena*, *Acidogona* and *Xenochata*, are known to me only by the descriptions and figures :

- 1. Small crossvein noticeably beyond middle of discal cell..... 6
 Small crossvein near or before middle of this cell..... 2
- 2. First vein not abruptly curved backward near its apex, stigma much longer than wide..... 3
 First vein near its apex abruptly bent backward parallel with apical portion of the auxiliary, stigma subquadrate, as wide as long..... **Stenopa**
- 3. Third vein bristly at least almost to small crossveins..... 4
 Third vein bare **Rhagoletis**
- 4. Last section of third vein strongly bowed upward..... 5
 Last section of third vein straight **Cedicarena**
- 5. Apex of antennæ produced in the form of a sharp tooth at the lower front angle **Zonosema**
 Apex of antennæ rounded..... **Spilograpta**
- 6. Scutellum not swollen, its upper surface nearly flat..... 8
 Scutellum strongly swollen, wings banded..... 7
- 7. Upper side of scutellum strongly convex, third vein bare **Cedaspis**
 Upper side of scutellum almost flat, third vein bristly..... **Peronyma**
- 8. Front and scutellum destitute of yellowish spines in addition to the usual bristles 9

- Front bearing three pairs of yellowish spines between the rows of frontal bristles, scutellum with three pairs of similar spines.....**Paracantha**
1. Front bearing four or five pairs of bristles, at most, four bristles on the scutellum.....10
2. Front bearing six bristles on the scutellum, front very broad.....**Xenochæta**
3. Wings unusually short and broad, black, thickly dotted with white or yellowish, the apex partly or wholly hyaline, the margins destitute of large hyaline indentations.....**Eutreta**
4. Wings unusually narrow, yellowish, thickly covered with small brown spots, the disk destitute of pure hyaline spots, the margins partly brown and destitute of large hyaline indentations.....**Icterica**
5. Wings neither unusually broad nor narrow, not marked like the above.....11
6. Wings are hyaline except sometimes in the stigma.....**Neaspilota**
7. The wings are almost or wholly hyaline except a brownish spot toward the apex which sends out several rays.....**Urellia**
8. Wings not marked like these.....12
9. Brown on disk of wings containing many hyaline or yellowish dots or spots.....13
10. Brown, containing only a few hyaline spots, the margins with several large hyaline indentations.....16
11. Wings in the form of bands or spots which do not contain hyaline or dots or spots.....18
12. Wider than broad, not unusually broad.....15
13. Longer than broad.....14
14. Front of wings with large hyaline indentations usually composed of several.....**Eurosta**
- Margins destitute of such indentations.....**Acidogona**
15. Apex of first posterior cell broadly hyaline, at most with narrow brown border to the two veins.....**Euaresta**
16. Apex of this cell brown, or only a small portion hyaline.....**Tephritis**
16. Face retreating at the oral margin.....17
- Face not retreating, usually produced forward.....**Aciura**
17. Cheeks posteriorly more than one-fourth as wide as the eye-height, under side of head strongly convex.....**Straussia**
- Cheeks less than one-sixth as wide as the eye-height, under side of the head horizontal.....**Acidia**
18. Third vein bristly at least almost to the small crossvein.....19
- Third vein at most bristly at its extreme base.....**Trypeta**
19. Crossbands on disk of wings very oblique.....**Plagiotoma**
- Crossbands almost or quite perpendicular.....**Epocha**

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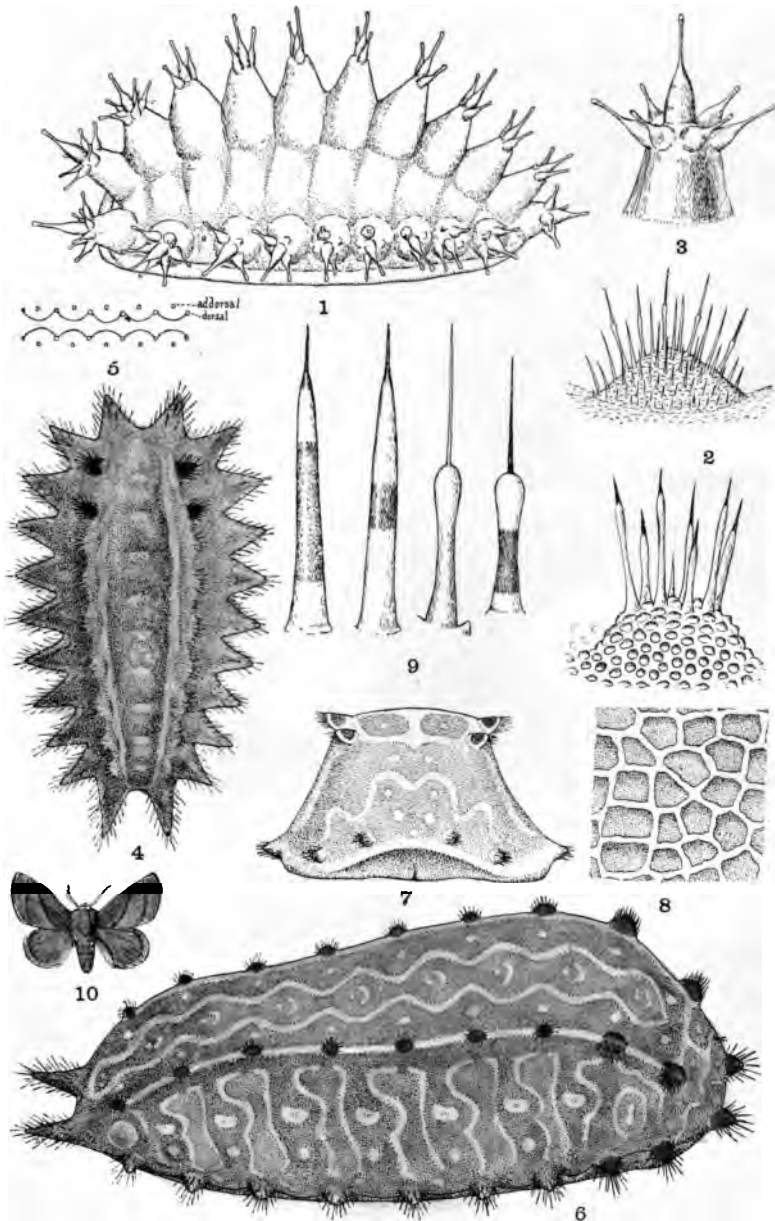
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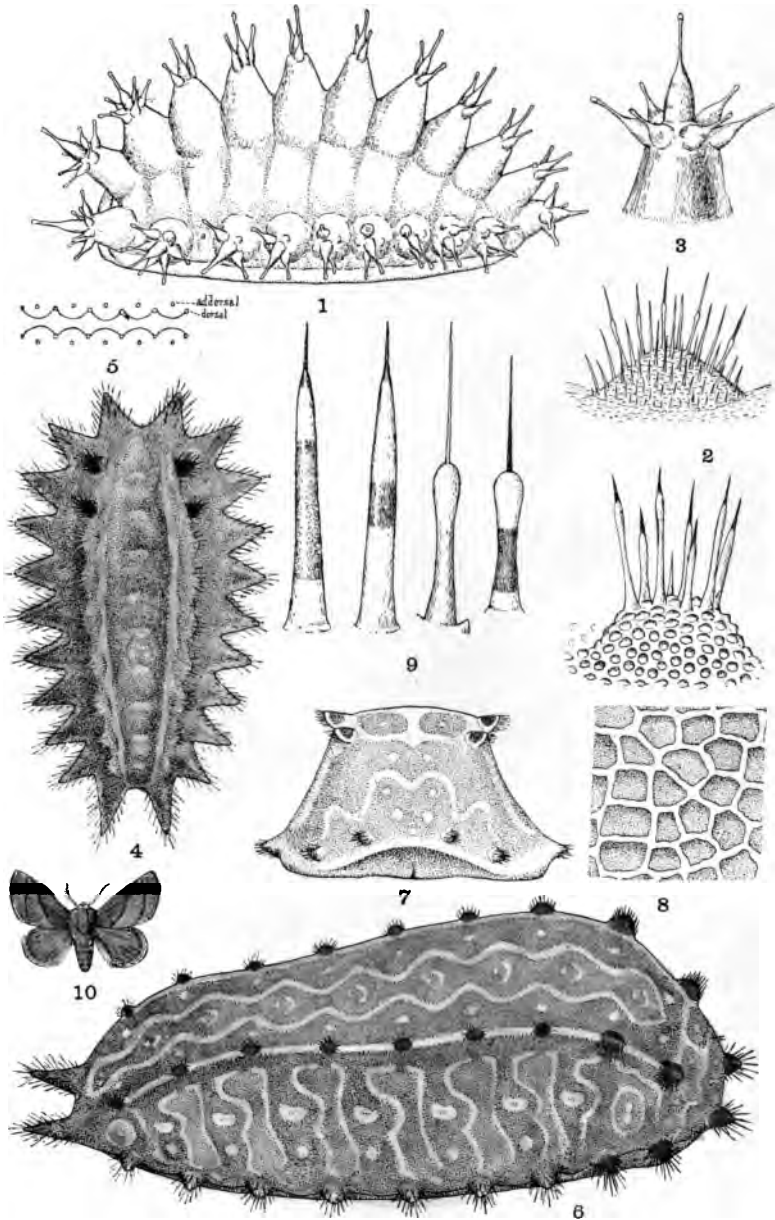
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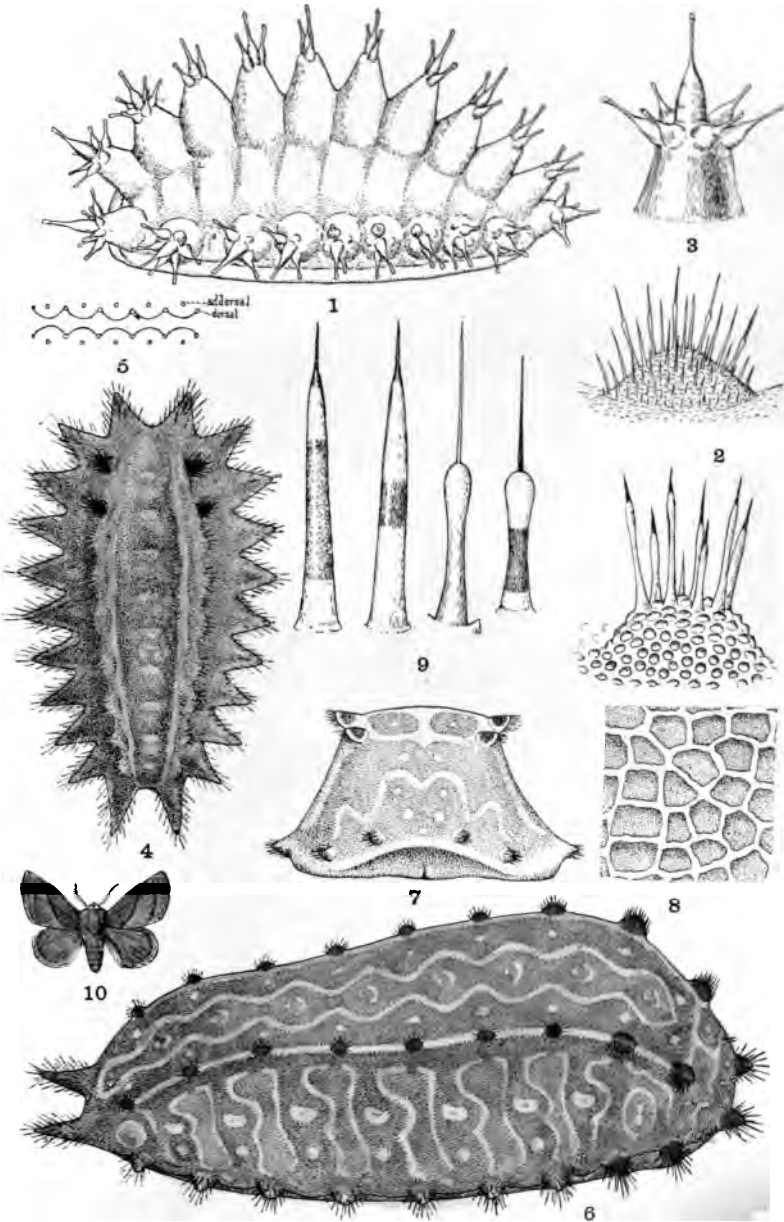


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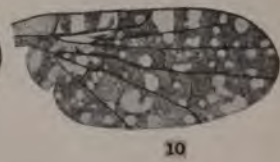
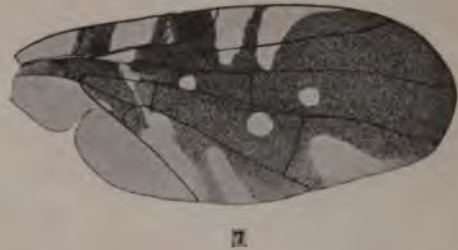
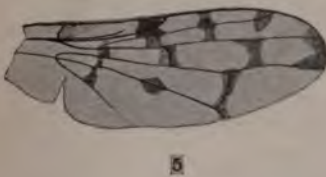
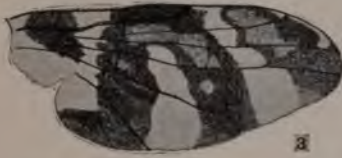
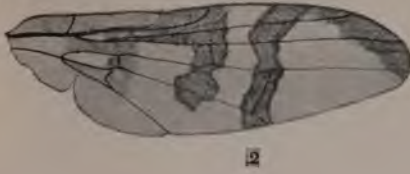
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Life-History of *Natada nasoni*.





North American Trypetidæ.





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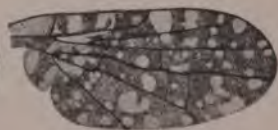
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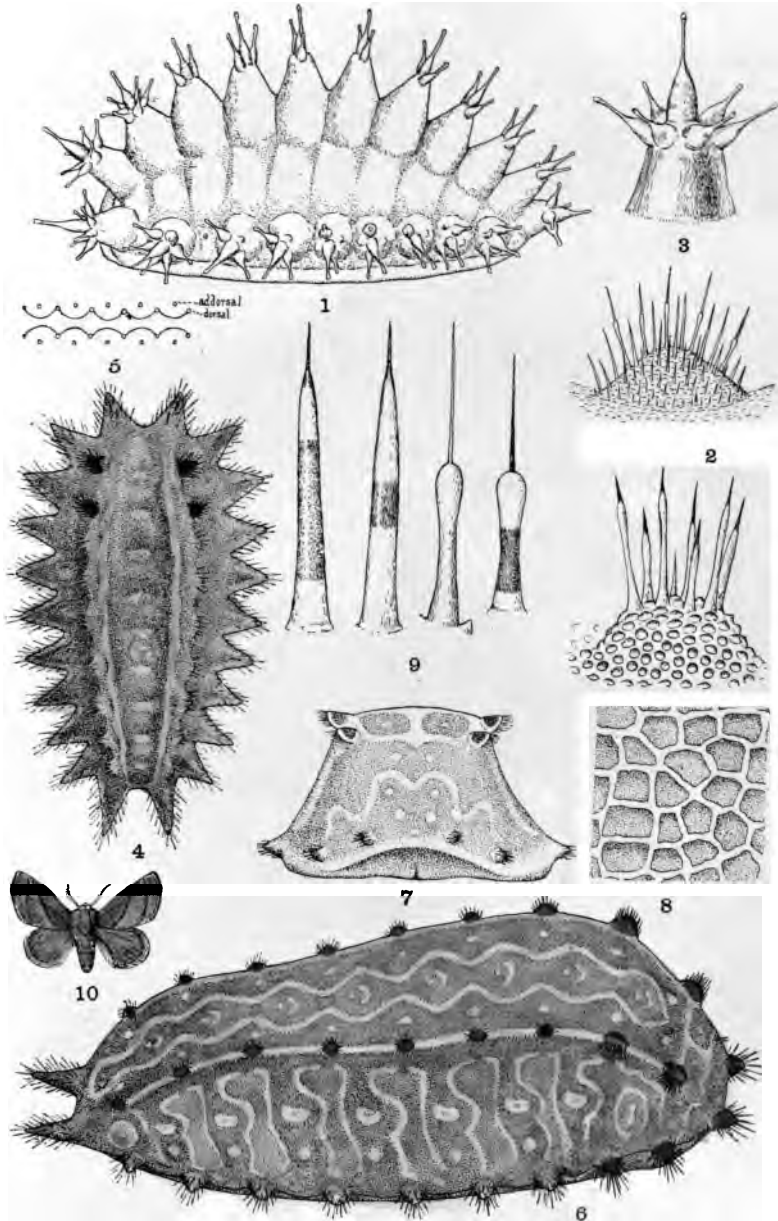


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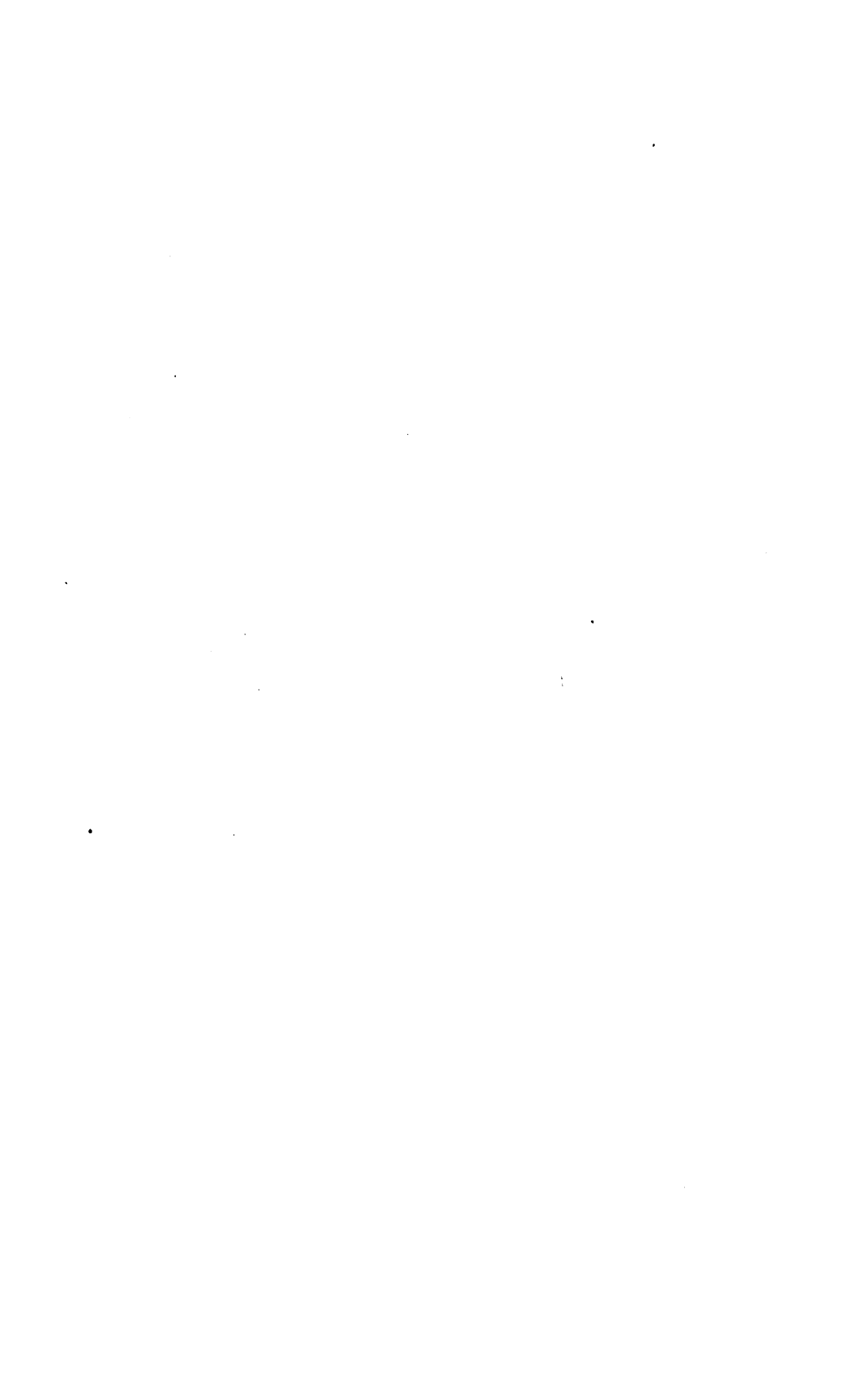


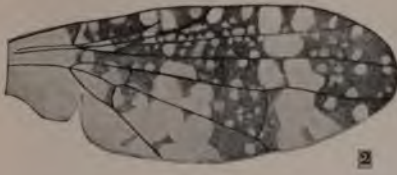
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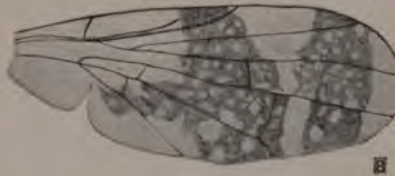


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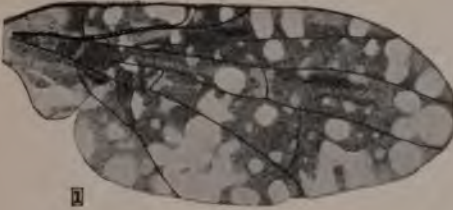




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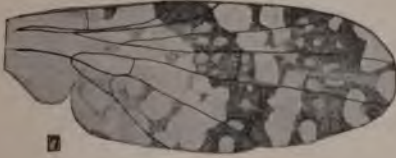
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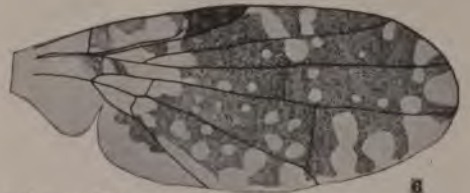
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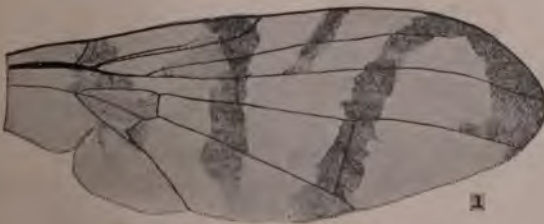
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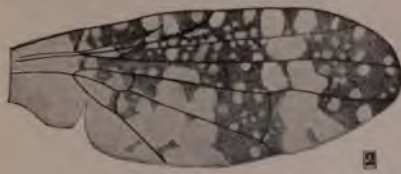


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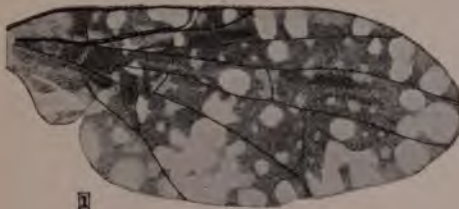
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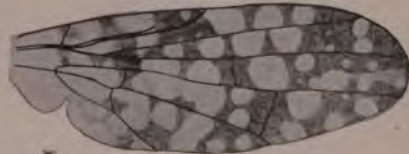
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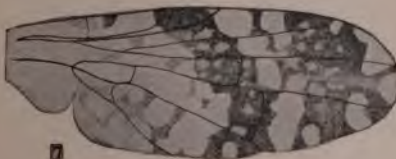
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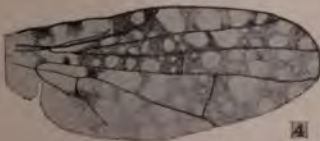
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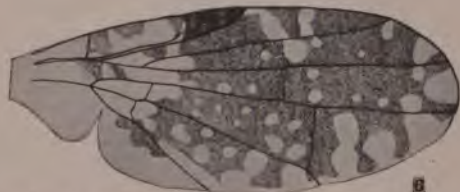
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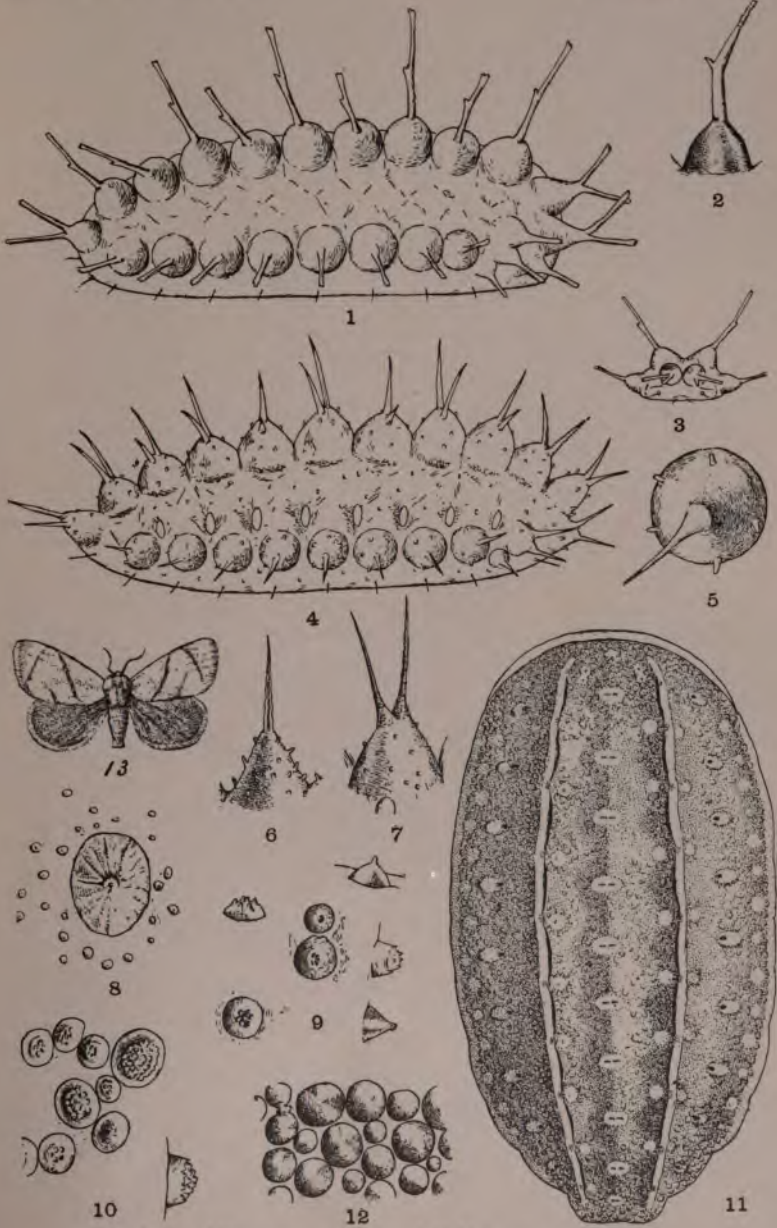
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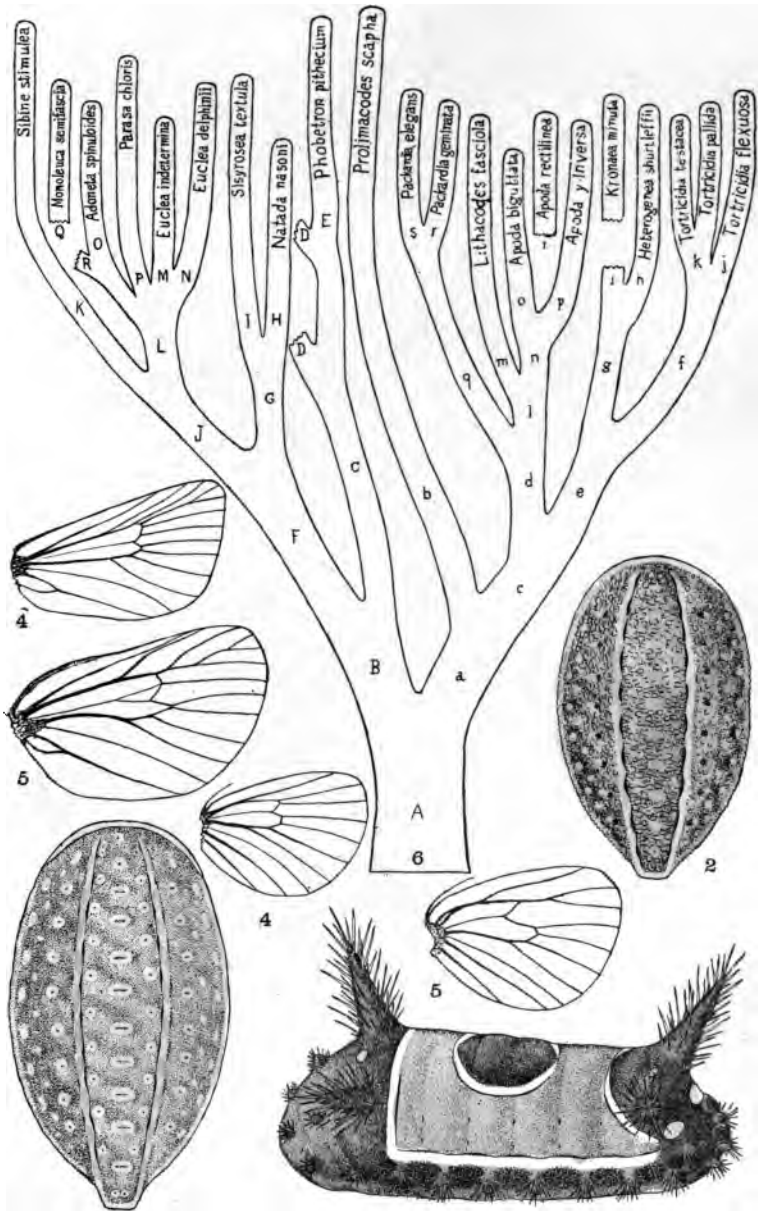
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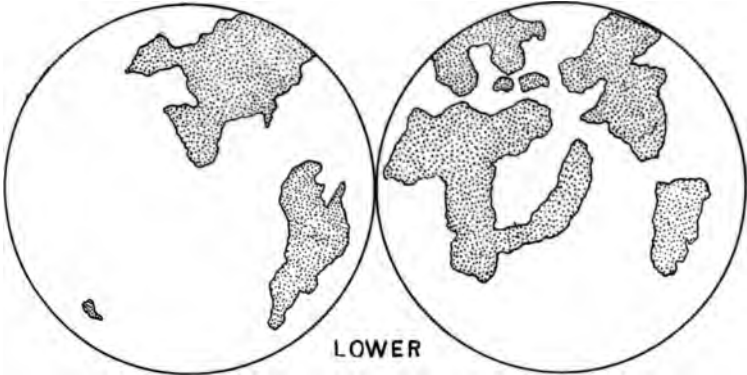
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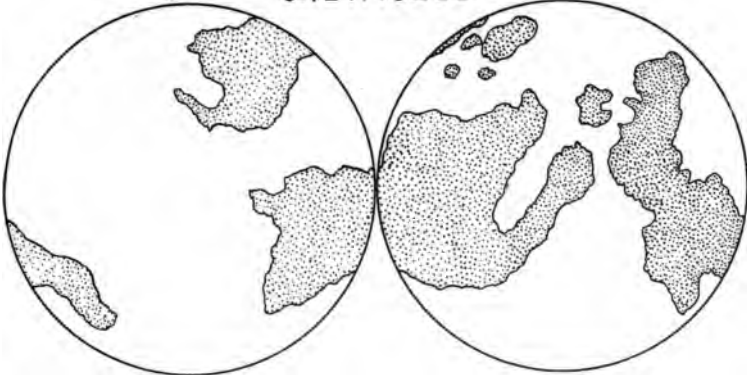
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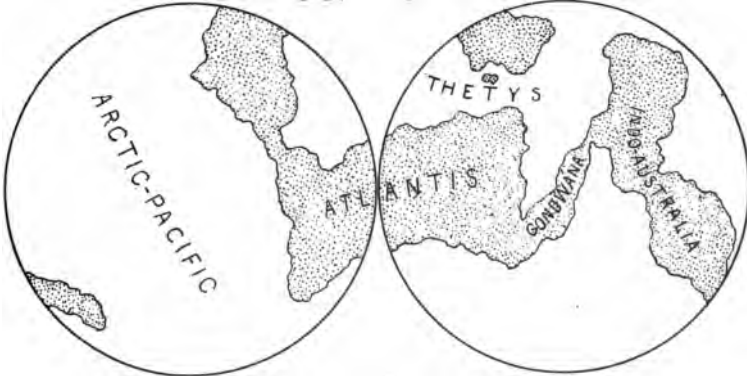
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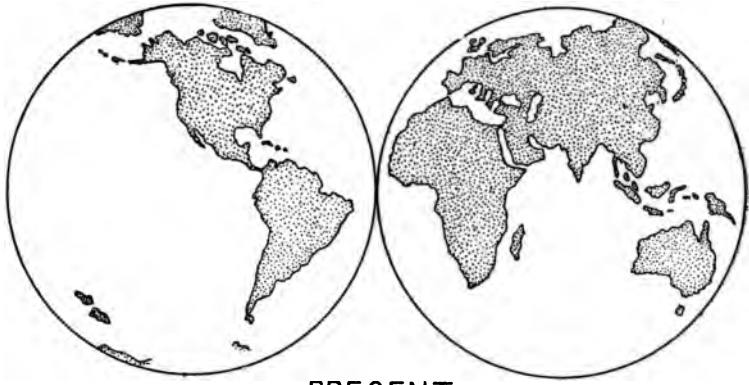
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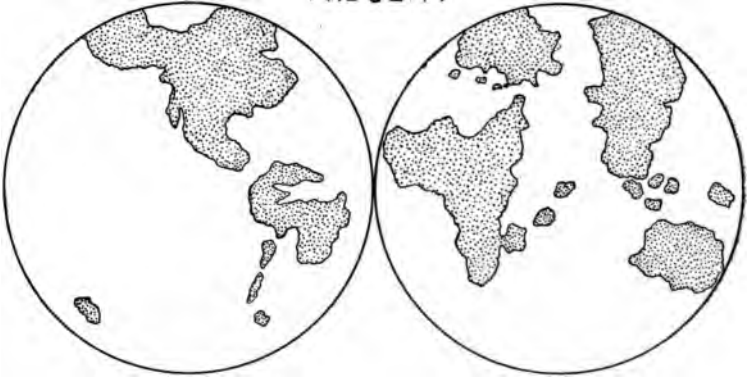
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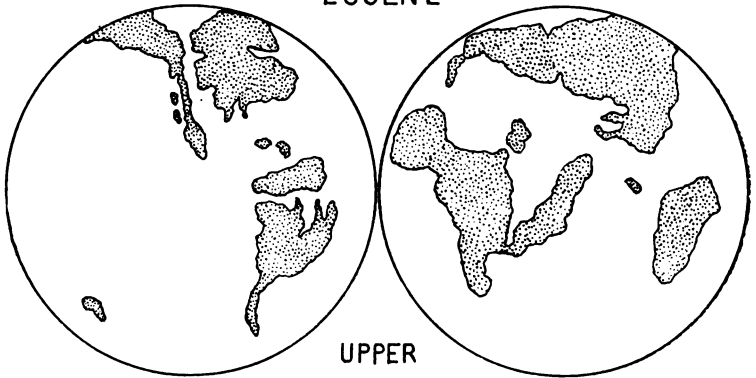
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VOL. VII.

No. 1.

JOURNAL
OF THE
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Entomological Society.



Devoted to Entomology in General.



MARCH, 1899.

Edited by WILLIAM BEUTHMÜLLER.

Published Quarterly by the Society.

NEW YORK.

1898.

Entered as second-class matter at the New York Post Office, June 11, 1893.

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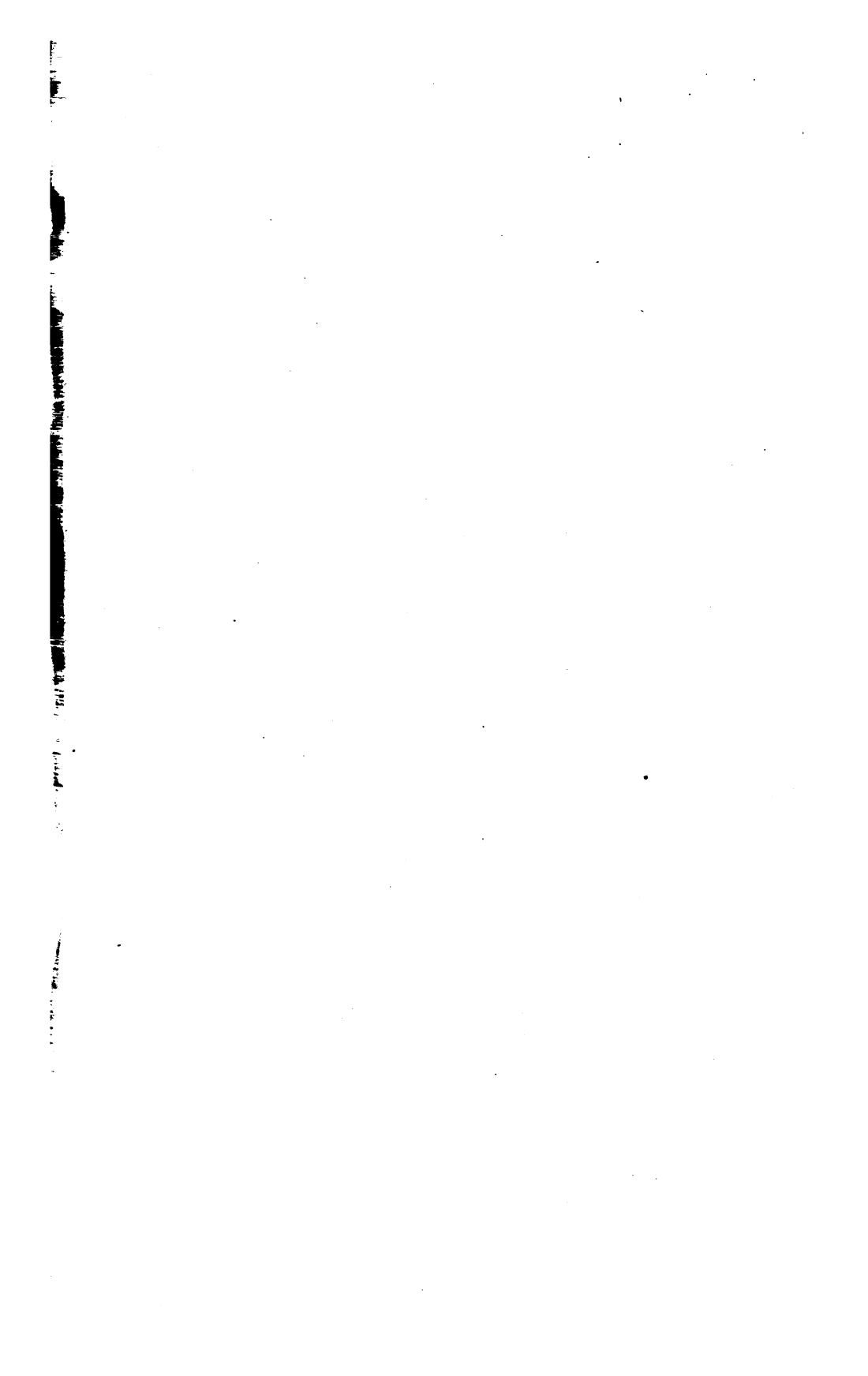
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