

- Fig. 5. *Microparmarion Austeni*, Simr. Dorsal view,  $\times 2$ .  
 Fig. 6. Ditto. Portion of the mantle, showing the wart-like protuberances,  $\times 6$ .  
 Fig. 7. Ditto. Generative organs, dorsal view,  $\times 3$ .  
 Fig. 8. Ditto. The same viewed from the ventral side,  $\times 3$ .  
 Fig. 9. Ditto. Horizontal section through the penis.  
 Fig. 10. Ditto. Dart.

## PLATE VIII.

- Fig. 11. *Microparmarion javanica*, sp. n. View from the right side,  $\times 2$ .  
 Fig. 12. Ditto. View from the left side,  $\times 2$ .  
 Fig. 13. Ditto. Dorsal view,  $\times 2$ .  
 Fig. 14. Ditto. Dorsal view of the shell,  $\times 2$ .  
 Fig. 15. Ditto. Ventral view of the shell,  $\times 2$ .  
 Fig. 16. Ditto. Generative organs, dorsal view,  $\times 5$ .  
 Fig. 17. Ditto. The same, viewed from the ventral side,  $\times 5$ .  
 Fig. 18. Ditto. Horizontal section through the penis.  
 Fig. 19. Ditto. Dart.

## Reference Letters.

<i>d.s.</i> Dart-sac.	<i>r.m.</i> Retractor muscle.
<i>f.ov.</i> Free oviduct.	<i>r.s.</i> Receptaculum seminis.
<i>ov.</i> Oviduct.	<i>v.</i> Vestibule.
<i>p.</i> Penis.	<i>v.d.</i> Vas deferens.
<i>pr.</i> Prostate.	<i>vg.</i> Vagina.

XLVIII.—*Contributions from the New Mexico Biological Station.*—VII. *Observations on Bees, with Descriptions of new Genera and Species.* By T. D. A. COCKERELL and WILMATTE PORTER.

## MEGACHILE, Latr.

Cresson, Saunders, and Bingham state that the maxillary palpi are 2-jointed, but Ashmead calls them 4-jointed. We have examined a great many species, including two from Europe, and find in every case three joints to the maxillary palpi!

## APIS, Linné.

The maxillary palpi of *Apis* are said by authors to be 1-jointed, but in the honey-bee we find two joints fairly well differentiated.

## BOMBUS, Fabr.

Various species examined show 2-jointed maxillary palpi, the basal joint stout, the other slender and cylindrical. *B. Kincaidii*, Ckll., has the maxillary palpi 3-jointed, with two cylindrical joints instead of one.

## CROCISA, Latr.

Ashmead says of *Crocisa*, "labial palpi 2-jointed, maxillary palpi 5-jointed." Smith says the maxillary palpi are 2-jointed, labial palpi 5-jointed. Bingham agrees with Smith. In *Crocisa ramosa*, Lep., we find the maxillary palpi 2-jointed, the first joint short and globose, but the labial palpi are only 4-jointed, the suture figured by Bingham and Smith between the second and third long joints being non-existent. The true third joint (*i. e.* the first of the small terminal ones) is very stout.

## ASHMEADIELLA, Ckll.

In *A. bigeloviae* (Ckll.) the maxillary palpi are 4-jointed; joint 1 short and broad, 2 longest, 3 and 4 about equal.

## ALCIDAMEA, Cresson.

According to Cresson the maxillary palpi of this genus are 4-jointed, but in *Alcidamea simplex* (Cress.), from Kansas, we find the maxillary palpi with five very distinct joints, 1 and 2 short, 3 long and cylindrical, 4 and 5 also cylindrical, 4 a good deal shorter than 3, 5 shorter still and perhaps a little shorter than 1 or 2.

## CERATINA, Latr.

The type of this genus is *C. albilabris*, Fabricius, a synonym of *C. cucurbitina*, Rossi. This insect is black, and has 5-jointed maxillary palpi, as stated by Fricse and confirmed by us in specimens received from him. Taschenberg and Friese state that the maxillary palpi of *Ceratina* have from 4 to 6 joints; F. Smith says there are 6 joints, the three basal ones about equal, the three apical minute. Ashmead has recently (Tr. Am. Ent. Soc. 1899, p. 69) regarded the species with 6-jointed maxillary palpi as typical *Ceratina*, and has proposed a new genus, *Zaodontomerus* (printed *Zadontomerus*, but corrected by the author in my copy), for those with the maxillary palpi 4-jointed.

We have examined a number of species, and find three with 5-jointed maxillary palpi, seven with 6 joints, and none with 4. Moreover, a specimen of *C. tejonensis*, the type of *Zaodontomerus*, has 6-jointed maxillary palpi. This example of *tejonensis* is an Illinois one, received from Mr. Robertson, and we believe it is correctly identified. It seems not impossible that the records of *Ceratina* with 4-jointed maxillary

palpi are based on broken specimens, as we have found that the loss of one or two joints of a palpus is often very difficult to detect without the use of a high power of the compound microscope.

The species with 5-jointed maxillary palpi are very diverse among themselves, as follows:—

- (1) Joint 4 about equal to 5 and not greatly shorter than 3; fourth joint of labial palpus narrow and cylindrical; insect black; apex of abdomen (♂) truncate ..... *cucurbitina*, Rossi. [(Europe.)]
- (2) Joint 4 conspicuously shorter than 3 or 5.
  - (a) Joint 5 very narrow, only about half width of 3; fourth joint of labial palpus broadly truncate at end; insect with the thorax green, abdomen crimson ..... *amabilis*, Ckll. (Tropical Mexico.)
  - (b) Joint 5 nearly as broad as 3; insect black, apex of ♂ abdomen truncate ..... *arizonensis*, Ckll. [(Arizona.)]

These will stand as typical *Ceratina*, though perhaps *amabilis* (with *eximia*, Sm.) might be separated subgenerically. The series will also doubtless be found to include *nigra*, Handl., *bispinosa*, Handl., *nitidula*, Mor., and *parvula*, Sm.

The species with 6-jointed maxillary palpi separate thus:—

- (A) Black, with yellow markings; joint 4 of maxillary palpi about equal to 5 ..... *hieroglyphica*, Smith. [(India, China.)]
- (B) Blue or green.
  - (1) Apex of ♂ abdomen moderately broad, rounded, with a sharp tooth on each side; insect very bright blue or green ..... *viridissima*, D. T. [(India, Burma.)]
  - (2) No lateral teeth at apex of abdomen; insect dark green or blue.
    - (a) Apical portion of ♂ abdomen broader than long.
      - (i) Apical portion very broad; hind femora of ♂ triangular ..... *tejonensis*, Cresson. [(U.S.)]
      - (ii) Apical portion not so broad; hind femora of ♂ normal ..... *dupla*, Say. (U.S., [Mexico.]
    - (b) Apical portion of ♂ abdomen narrow or pointed.
      - (i) Hind femora of ♂ triangular; second submarginal cell subtriangular.
        - (a) ♀ with a light mark on clypeus .. *nanula*, Ckll. (New Mexico.)
        - (β) ♀ with clypeus dark ..... *submaritima*, Ckll. [(Washington State.)]
      - (ii) Hind femora of ♂ normal; second submarginal cell subquadrate; ♀ with clypeus dark ..... *cyanea*, Kirby. [(Europe.)]

Here are three distinct series—the first consisting of the

Indian and Chinese *hieroglyphica* (with *Morawitzii* and *flavipes*), the second of the Indian *viridissima*, and the third of the ordinary dark green or blue species of Europe and North America.

*C. hieroglyphica* may be taken as the type of a new subgenus, *Ceratinidia*. Our specimen is from the Khasia Hills, India, sent by Mr. Sladen. The second submarginal cell is less narrowed above than in typical *Ceratina* (*cucurbitina*); and the first recurrent nervure, instead of joining the second submarginal cell at its extreme apex, joins it at about the end of its second third.

*C. viridissima* has the fourth joint of the maxillary palpus unusually short; the venation resembles that of *Ceratinidia*. It is possible that this insect will fall into *Pithitis*, Klug, which was based on the Javan *C. smaragdula*, Fabr., a species we do not possess.

The remaining species form a fairly compact group, not well separable into subgenera. For this group no subgeneric name has been proposed, unless it may be possible to apply *Zaodontomerus*, Ashm., founded on *tejonensis*. This can be done, if it can be shown that the specimens examined by Ashmead (whether true *tejonensis* or not) had in reality 6-jointed maxillary palpi.

The maxillary palpi in this group afford fairly good specific characters, thus:—

*C. cyanea* has joint 3 only about half as long as 2 (2 about 150, 3 about 70  $\mu$ ); 4 and 5 are equal, both short.

*C. tejonensis* (Illinois) has joint 4 only about half as long as 6; 3 nearly as long as 2, but hardly as long as 6.

*C. nanula* has joint 3 much shorter than 2.

DIADASIELLA, Ashm., 1899, = ANTHOPHORULA, Ckll., 1897.

We have before us a  $\delta$  type of *D. Coquilletti*, Ashm., kindly sent by Mr. Ashmead. The clypeus is yellow, but the venation is that of *Exomalopsis*, the second submarginal cell presenting no tangible difference. The maxillary palpi are slender and 6-jointed, joint 4 longest, 1 and 5 shortest and about equal. The mandibles are yellow without and the flagellum is orange beneath, but the oblique truncation of the last joint is black. The specimen is from San Diego Co., California.

This insect is manifestly congeneric with *Exomalopsis* (*Anthophorula*) *compactulus*, Ckll., concerning which see Ann. & Mag. Nat. Hist., Dec. 1898, p. 451. Indeed the two are so close together that they might be taken for the same

species without very minute examination. In *E. compactulus* the fourth joint of the maxillary palpus is only about as long as the third, and the sixth is not much longer than the fifth. The first abdominal segment is much more coarsely and strongly punctured in *compactulus* than in *Coquilletti*, and the third transverso-cubital nervure is more bent.

Mr. Ashmead has referred *Anthophorula* to *Eucera*, assuming that the original specimen, with two submarginal cells, is normal. We cannot accept this conclusion, and as our specimens with three submarginals are congeneric with the type of *Diadasiella*, we hold this name to be a synonym of *Anthophorula*. The mouth-parts of *Anthophorula* are, however, practically as in *Exomalopsis*, and it seems that the group with a yellow clypeus in the male has at best only sub-generic value.

### XENOGLOSSODES, Ashm.

We have before us three species of this genus, separable as follows :—

- (A) Second joint of maxillary palpus considerably longer than third; fifth very minute; pubescence of abdomen white; wings very short, nervures fulvous ..... *X. albata* (Cresson).  
 (B) Second joint of maxillary palpus shorter or not longer than the third; fifth not so minute; pubescence of abdomen pale ochreous.  
 (1) Larger, flagellum of ♀ black ..... *X. imitatrix*, sp. n.  
 (2) Smaller, flagellum of ♀ orange fulvous beneath ..... *X. eriocarpi* (Ckll.).

*X. eriocarpi* was described as an *Exomalopsis*, but it belongs here. Mr. Ashmead, without examining the mouth-parts, referred it to *Tetraloniella* provisionally, since it agreed fairly well with that genus in venation and also in having the clypeus anteriorly margined with yellow. We have no material of *Tetraloniella* for comparison.

Our material of *X. albata* (♂ ♀) is from Texas (*Belfrage*), and was kindly sent by Mr. Ashmead. The description of the new species follows :—

#### *Xenoglossodes imitatrix*, sp. n.

♀.—Length about 12 millim.

Just like the male of *Entechnia grisella* except in the following points:—Face broader, with the vertex flattened as viewed in front (in the *Entechnia* it is rounded); sides of

vertex more or less roughened; punctures of thorax by no means so large or strong; tegulæ smaller, without any reddish tint; costal and subcostal nervures separate; marginal cell smaller and blunter; first submarginal considerably smaller, third more narrowed towards the marginal; transverso-medial nervure of hind wings very oblique (in the *Entechnia* it is very little oblique); hind femora very short and not swollen; spurs dull white; hind tibiæ and tarsi with a rather abundant scopa, hair on inner side of basal joint of hind tarsi pale ferruginous; claws much smaller; abdomen whiter, without bands. Eyes blue-grey. Mandibles blunt, simple. Clypeus, labrum, and mandibles entirely dark.

Blades of maxillæ somewhat pointed; maxillary palpi 5-jointed; basal joint club-shaped, about  $120\ \mu$  across at the base and  $50\ \mu$  at the apex,  $220\ \mu$  long; second joint about  $40\ \mu$  wide and  $160$  long; third  $180\ \mu$  long; fourth almost square in outline,  $30\ \mu$ ; fifth  $20\ \mu$  wide and  $30$  long. Labial palpi with the first joint about  $1000\ \mu$ , second  $500$ , third  $80$ , fourth  $80$ . Paraglossæ  $1700\ \mu$ ; tongue  $1780\ \mu$ .

♂.—Length 10 millim.

Antennæ long, reaching to middle of first segment of abdomen, somewhat crenulated, entirely black; flagellum without keels; clypeus and labrum white; mandibles with a white spot at base; posterior femora not swollen; abdomen subfasciate as in the male *Entechnia grisella*. The male of *X. albata* differs at once from this by having the flagellum ferruginous beneath and the face-marks quite yellow instead of creamy white.

*Hab.* Las Vegas, New Mexico, Aug. 8 (*A. Garlick*). Others taken subsequently by W. Porter. All were found at the flowers of *Sphæralcea lobata*, Wooton.

Ashmead says of *Xenoglossodes* that the last two joints of the maxillary palpus united are scarcely longer than the third; we find them not so long.

### ENTECHNIA, Patton.

A. Mesothorax with an angular band of black hair; scutellum with black hair.

(1) *E. taurea* (Say). Illinois to Georgia.

(2) *E. fulvifrons* (Smith). Texas to South America.

B. Pubescence of thorax dense, entirely pale ochreous.

a. Abdomen with distinct bands.

(3) *E. dakotensis*, sp. n. Dakota.

b. Abdomen uniformly covered with a velvety pile.

(4) *E. grisella*, sp. n. New Mexico.

*Entechnia grisella*, sp. n.

♂.—Pubescence pale yellowish grey, short and dense, especially on the abdomen, where it resembles velvet. Antennæ short, about  $3\frac{1}{2}$  millim. long, black; first joint of flagellum about three times as long as second; face wholly dark, facial quadrangle somewhat longer than broad; ocelli large, in a curve; vertex punctured behind the ocelli, smooth and shining at the sides; clypeus and labrum well punctured, the latter large, quadrate; mesothorax and scutellum with large close punctures; tegulæ rather large, brownish testaceous; wings clear, nervures dark brown; costal and subcostal nervures united by chitin, forming a very thick costal margin; stigma minute, little developed; marginal cell lanceolate, the apex away from the costa; first submarginal cell only a little longer than third; second shortest, a little narrowed above, receiving the first recurrent nervure near the end; third narrowed about half to marginal, receiving the second recurrent nervure near its end; median and submedian cells practically equal on the externo-median nervure. Legs black, with short pubescence; claws deeply cleft, pulvillus large; hind femora swollen basally; spurs black; basal joint of hind tarsi long and slender, gently curved; abdomen with the pubescence on hind margins of segments 2 to 4 whiter than the rest, producing the effect of bands.

Length about 11 millim.

*Hab.* La Cueva, Gallinas River, S. of Las Vegas, New Mexico, Aug. 6, 1899 (*W. Porter*).

The first joint of the labial palpus is much less than half the length of the second, and the first joint of the maxillary palpus is conspicuously longer than the second.

*Entechnia dakotensis*, sp. n.

♀.—Length 12 millim.

Similar to *E. grisella*, but broader, with the abdominal pubescence scanty enough to give the effect of dust on a black surface, except for the three very distinct white bands on the hind margins of segments 2 to 4. Apex of abdomen with dark fuscous hair; ventral segments fringed with dark hair; hind tibia and basal joint of tarsus with a long loose scopa of brown-black plumose hair. Flagellum brownish towards the end.

*Hab.* Hot Springs, Dakota (*L. Bruner*, no. 22).

It is just possible that *E. dakotensis* is the female of *E. grisella*, but the wide difference of locality and the conspicuous

difference in the ornamentation of the abdomen make this seem improbable. We wrote to Prof. Bruner for further information about *E. dakotensis*, and he replies:—"The *Entechnia* was represented in my collection by three female specimens. The young man who collected these said that he might have taken hundreds of them had he known that they were of any particular value, since the bank was full of them."

Comparing *E. grisella* with the published accounts of *Entechnia*, we thought it seemed generically distinct; but on comparing specimens of the several species, we found them structurally identical within generic limits. We find only five joints to the maxillary palpi; but the first joint, which is very long, is slightly constricted at the middle, and on this account was taken by Patton for two equal joints. The small apical joints are constructed much as in *Xenoglossodes*. As regards the mouth-parts *Entechnia* is to *Xenoglossodes* somewhat as *Eulema* is to *Bombus*.

#### SYNHALONIA, Patton.

Ashmead says of typical *Synhalonia*, "abdomen in female black, not fasciate." This would apply to *S. atriventris* (Smith), which, however, is not mentioned by Patton in his original account of the genus. The type of *Synhalonia* is *S. fulvitaris* (Cresson), which in the female has a more or less distinct pale band on the second abdominal segment. The differences in the venation between *Synhalonia* and *Eusynhalonia*, Ashm., seem unsatisfactory, and at most of specific value. In view of these facts it is probable that *Eusynhalonia* cannot be maintained.

*Synhalonia crenulaticornis* (*Melissodes crenulaticornis*, Ckll., Ann. & Mag. Nat. Hist., Dec. 1898, p. 454) is peculiar in having the first joint of the labial palpi relatively short, not twice the length of the remaining three together, as it is in *S. frater* and *atriventris*.

#### OXÆA, Klug.

Mr. Ashmead has kindly sent us a male *O. flavescens*, Klug, collected in April at Chapada, Brazil. We find the maxillary palpi to be absent, as stated by authors; and it becomes clear that *O. gloriosa* (Fox), which has 6-jointed maxillary palpi, must fall in another genus, which we propose to call *Protoxæa*. The two genera are separable thus:—

- (1) Apical plate of ♂ abdomen subtruncate, with rounded corners; tongue short, broad at base, filiform at apex,



much like that of *Cilissa*, covered with branched hairs; paraglossæ almost half the length of the tongue, narrow, inner margin covered with branched hairs; labial palpi short, the second, third, and fourth joints together not so long as the first, about equal to one another; blade of maxilla much shorter than stipes; maxillary palpi 6-jointed, 1 very short, almost rudimentary, 2 and 3 equal, 4 somewhat shorter, 5 a little shorter than 4, 6 narrowly cylindrical and about as long as 4 . . . . .

(2) Apical plate of ♂ abdomen bispinose; tongue much longer and narrower, not nearly so broad at base; paraglossæ relatively shorter; labial palpi with the first joint much longer, more than twice the length of the other three together; maxillary palpi wanting; blade of maxilla larger and thicker . . . . .

*Protoxæa*, gen. nov. (Type  
[*Protoxæa gloriosa*, Fox.]

*Oxæa*, Klug. (Type *O. flavescens*, Klug.)

*O. vagans*, Fox, placed by Friese in the same group as *gloriosa*, appears from the description to be a true *Oxæa*.

*Oxæa* may well be taken as the type of a distinct subfamily, Oxæinæ, as suggested by Ashmead, but it appears to us to be related to the Andrenidæ, and by no means to the Xylocopidæ. The genus *Lestis*, Lepel., from Australia, is associated by Mr. Ashmead with *Oxæa*; but we have examined an example of *L. bombylans* (Fabr.), kindly sent by Mr. Ashmead, and find that it is a true Xylocopid, very remote from *Oxæa*. The peculiarly formed blade of the maxilla, and especially the characteristic spatulate lamella close to the maxillary palpus, are essentially as in *Xylocopa*.

### MEGACILISSA, Smith.

We have before us an excellent series of *M. Yarrowi*, Cresson, collected by Prof. C. H. T. Townsend at La Cueva, Organ Mts., New Mexico, alt. 5300 feet, Sept. 5, at flowers of *Datura meteloides* before sunrise. Two specimens were taken Sept. 4, also before sunrise, at flowers of *Lippia Wrightii*. The early flight of this bee, from 5.15 to 6.15 A.M., as observed by Prof. Townsend, is very interesting.

Except that the scopa on the hind legs is white instead of dull brown, *M. Yarrowi* exactly agrees with the description of *M. superba*, Smith, the type of *Megacilissa*. It is indeed possible that the two are one species, but at all events they

must be congeneric. The second submarginal cell is subtriangular and about half the size of the third.

It seems questionable whether *Megacilissa* can be separated from *Caupolicana*, Spinola, which has two years priority over it; but it may be that the species with green abdomens, referred by Friese to *Megacilissa*, should be generically separated. In any event, typical *Megacilissa* is the form with a black, white-banded abdomen, and not the green type, as Friese has it. We do not propose a name for the latter group, having no specimens.

#### CALLIOPSIS, Smith.

##### *Calliopsis teucrii*, sp. n., Ckll.

♀.—Length  $6\frac{1}{2}$  millim.

Black; appearance of *C. andreniformis*, with the same abdominal hair-bands, which are pale ochreous. Clypeus entirely black, the only pale marks on face are a couple of round or subquadrate white spots contiguous with the orbital margins at the level of the supraclypeal area. Mandibles rufescent about the middle; flagellum yellowish beneath towards the end; scape strongly and densely punctured; front below ocelli very closely punctured; clypeus with large punctures on a shining surface; tegulæ shining piceous; mesothorax and scutellum very closely punctured; abdomen with a minutely roughened sericeous surface; spot on tubercles and an interrupted stripe on hind border of prothorax white; legs dark, with the tarsi pale ferruginous, and the anterior and middle knees with a small white spot; wings rather smoky; marginal cell obliquely truncate; second submarginal cell narrowed considerably more than half to marginal; middle femora flattened to an acute keel beneath.

*Hab.* Las Vegas, New Mexico, July 11, 1899 (*Ckll.*).  
One at flowers of *Teucrium laciniatum*.

##### *Calliopsis verbena*, sp. n., Ckll. & Porter.

♀.—Length about  $8-9\frac{1}{2}$  millim.

Black, with grey pubescence arranged about as in *C. coloradensis*. Head transversely oval, facial quadrangle a little broader than long; vertex seen from in front rounded; a smooth shining space on each side of the ocelli, but vertex otherwise strongly punctured; clypeus shining, with large sparse punctures; face moderately hairy; antennæ short, dark, the flagellum obscurely brown beneath; clypeus with the anterior edge black, but just before it a transverse band of

creamy white, which is narrow in the middle, but abruptly enlarged, forming quadrate patches, at the sides; the lateral creamy-white face-marks are not far from equilateral triangles; no supraclypeal or dog-ear marks; labrum with a transverse white patch; mandibles dark; thorax quite hairy; mesothorax shiny, but strongly punctured except a posterior smooth area; base of metathorax smooth and shining, with a large median pit, made double by a longitudinal transverse ridge; tegulæ dark brown in front, pale brown behind; wings perfectly clear, nervures and stigma dark brown, stigma very little developed; marginal cell obliquely truncate; second submarginal narrowed about one half to marginal, and receiving the recurrent nervures at about the end of the first and beginning of the last fifths; legs black, even to the tarsi, with pale pubescence; middle femora curiously flattened and broadened, the lower knife-like edge having a very short brush of orange-fulvous hairs; basal joint of middle tarsi also flat and broad; abdomen strongly but not densely punctured, with the usual thin hair-bands; hair at apex pale.

♂.—About 7 millim. long. Face more hairy; white markings more conspicuous; clypeus creamy white, with a black mark on each side of its hind margin; lateral face-marks rather more produced along the orbital margin than in the female; basal part of mandibles mostly white; anterior knees and anterior tibiæ in front yellowish; spurs whitish; tarsi sordid whitish, the small joints brown, quite dark on the middle and hind tarsi.

*Hab.* Las Vegas, N. M., Aug. 9, several at flowers of *Verbena stricta* (W. Porter).

*Calliopsis chlorops*, sp. n., Ckll.

♂.—Length  $5\frac{1}{2}$ – $6\frac{1}{2}$  millim.

Black with grey and white pubescence. Head transversely suboval; eyes prominent, in life yellowish green; face and cheeks with fairly abundant white hair, not dense enough to hide the surface; face-markings pale yellow, including the clypeus, lateral marks, supraclypeal mark, dog-ear marks, labrum, and mandibles except their reddish tips; the face would be all yellow below the level of the antennæ, except the rather obscure clypeal dots, but for the fact that below each dog-ear mark is a small triangle of black, bounded by the clypeus, lateral mark, and dog-ear mark; lateral marks rapidly narrowing from the upper margin of the dog-ear marks to an acute point on the orbital margin less than the length of the scape above the level of the antennal sockets;

flagellum brown beneath, except at the extreme base; vertex somewhat roughened; mesothorax dull, densely and strongly punctured; base of metathorax evenly and delicately longitudinally ridged; pubescence of thorax grey above, white on pleura and sides of metathorax; tubercles dark; prothorax with a small yellow line on each side of the hind margin; femora black, with yellow knees; tibiæ yellow in front and black behind; basal joints of tarsi cream-colour, of hind tarsi blackened behind; small joints brown; tegulæ brownish hyaline; wings clear, nervures and stigma dark brown; stigma almost obsolete; marginal cell appendiculate; second submarginal long, narrowed about half to marginal, receiving the first recurrent nervure about the end of its basal fourth, and the second about the beginning of its apical sixth; abdomen very closely punctured, the hind margins of the segments pallid, with very thin hair-bands; hair at apex white.

*Hab.* Las Vegas, N. M., at flowers of *Grindelia squarrosa*, Aug. 9 and 14 (*W. Porter*); also one at flowers of *Verbesina encelioides*, Aug. 12 (*Ckll.*).

#### PERDITA, Smith.

Mr. Ashmead, in dividing the old genus *Perdita*, has used the relative lengths of the joints of the labial palpi for diagnostic purposes. In some groups the first joint is twice the length of the other three together, or even more than twice, while in others it is not nearly so long. In the following table we give the measurements in  $\mu$  of a number of labial palpi; first the length of the first joint, then that of the other three together, then the latter in percentage of the former:—

	First joint.	Last three.	%.
<i>P. (Tetraperdita) sexmaculata</i> , Ckll. ....	430	150	34
<i>P. sphaeralceæ</i> , Ckll. ....	750	280	38
<i>P. (Cockerellia) verbesinæ</i> , Ckll. ....	800-900	370-380	42-46
<i>P. (Cockerellia) albipennis</i> , var. <i>hyalina</i> , Cress. ....	1050	500	47
<i>P. (Pentaperdita) albovitata</i> , Ckll. ....	680	330	48
<i>P. salicis</i> , Ckll. ....	350	180	51
<i>P. affinis</i> , Cress. ....	760	430	56
<i>P. sidæ</i> , Ckll. ....	350	200	57
<i>P. (Perditella) larreæ</i> , Ckll. ....	420	240	57
<i>P. Townsendi</i> , Ckll. ....	800	470	58
<i>P. rhodura</i> , Ckll. ....	500	300	60
<i>P. Woottonæ</i> , Ckll. ....	580	390	67
<i>P. luteola</i> , Ckll. ....	450	310	69
<i>P. phaceliæ</i> , Ckll. ....	330	220	69

	First joint.	Last three.	%.
<i>P. aneifrons</i> , Ckll. ....	560	400	71
<i>P. mentzeliae</i> , Ckll. ....	560	400	71
<i>P. bigeloviae</i> , Ckll. ....	480	350	72
<i>P. zebrata</i> , Cress. ....	450	350	77
<i>P. mentzeliarum</i> , Ckll. ....	400	320	80
<i>P. grandiceps</i> , Ckll. ...	320	260	81
<i>P. semicrocea</i> , Ckll. ....	270	240	88

*Perdita sphaeralceæ* cannot be a *Cockerellia*, as the claws are cleft in both sexes. *Neoperdita*, Ashm., was proposed for just such forms, judging from the diagnosis; but unfortunately *Perdita zebrata*, having very differently formed labial palpi, is given as the type species.

*Pentaperdita*, subgen. nov., is proposed for *P. albovittata*, which has 5-jointed maxillary palpi, these palpi in the ordinary species having 6 joints. The claws are all cleft in the male, simple in the female. The face-markings are the same in both sexes.

*Tetraperdita*, subgen. nov., is proposed for *P. sexmaculata*, which has 4-jointed maxillary palpi, and the first joint of the labial palpi excessively long. Claws simple in the female, cleft in the male. Mandibles simple. Abdomen dark, with light spots.

*Geoperdita*, subgen. nov., is proposed for *P. chamaesarachæ*, Ckll., which has the labial palpi only 3-jointed, *i. e.* with one long joint and two small ones; while the maxillary palpi are quite rudimentary, with 1 to 3 vaguely indicated joints.

*Perditella*, Ckll., is a subgenus based on *P. larreæ*, with its curious venation and toothed cheeks. The maxillary palpi are slender and 6-jointed. *P. marcialis* also belongs to this subgenus.

*Cockerellia*, Ashm., may be held to include *P. albipennis*, *P. sparsa*, *P. verbesinæ*, *P. lepachidis*, and *P. utahensis*. *Philoxanthus*, Ashm., seems hardly separable from *Cockerellia*.

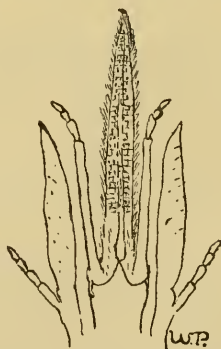
*Perdita*, s. str., can never be certainly determined until new specimens are obtained; Smith's unique type, with the palpi lost, is cited vaguely from "North America." *P. semicrocea* resembles Smith's *P. haliotoides* in its style of coloration, and may provisionally be regarded as typical; but there are other species, e. g. *P. chamaesarachæ*, which are also similarly coloured, but differ greatly in the mouth-parts.

A new description of *P. sexmaculata* is offered, the original description, from the female only, being rather too brief:—

*Perdita (Tetraperdita) sexmaculata*, Ckll.

♀.—About  $4\frac{1}{2}$  millim. long.

Very shiny, with thin white pubescence on the cheeks, pleura, legs, and end of abdomen, but little elsewhere. Head and thorax dark olive-green, clypeus and supra-clypeal area black; face wholly dark; scape black, coarsely punctured or malleate; flagellum brown above, yellowish beneath; clypeus and sides of face with sparse but distinct punctures; labrum with a group of about six large punctiform depressions on each side; mandibles yellowish ferruginous towards the tips; frontal foveæ black grooves; facial quadrangle slightly broader than long; vertex granular or minutely tessellate; mesothorax and scutellum smooth and very shiny, with a very few scattered punctures; base of metathorax dark blue, contrasting with the olive-green scutellum and postscutellum; tegulæ brown in front, whitish behind; wings clear, nervures and stigma dark sepia-brown; stigma pallid in the middle; recurrent and transverso-cubital nervures broken by hyaline dots; marginal cell obliquely truncate, the poststigmatal portion about equal to the substigmatal; second submarginal cell narrowed more than half to marginal, forming an equilateral triangle with the upper angle cut off; third discoidal distinct; legs black, anterior tibiæ yellowish in front; abdomen flat, shining black, with six round yellowish-white spots at the sides of segments 2 to 4; venter black.



*Perdita sexmaculata*, Ckll.

♂.—About 4 millim. long.

Very shiny, with thin white pubescence on the cheeks, pleura, and end of abdomen; fairly abundant pubescence on the legs, and widely scattered white hairs on the rest of the body; head and thorax dark green; mesothorax almost

black; metathorax granular, dark bluish; face yellow, yellow extending above the antennæ half the length of the scape, but the dark colour sending angular projections into the yellow as far as the sockets of the antennæ; a yellow line (half the length of the scape) runs up the anterior orbital margin a short distance above the general level of the yellow; a yellow band extending halfway up on the posterior orbital margins; scape yellow, tipped at both ends with light orange; flagellum light orange, marked with black above near base; mandibles with light brown tips and margins; frontal foveæ elongate-oval; cheeks unarmed; tubercles yellow; legs yellow, under-side of hind femora black, the tarsi becoming brownish; abdomen above shining black, with a pale cream spot at each side of segments 2, 3, 4, and 5, those on 5 smaller and more nearly circular than those on 2, 3, and 4; wings clear and iridescent.

Redescribed from numerous specimens taken at Las Vegas, N. M., at flowers of *Chamæsaracha coronopus*, during the first half of August. The male, in the table of *Perdita* in Bull. Denison Lab. 1898, runs to *P. salicis*, but has not a banded abdomen. *Perdita punctata* (*P. sexmaculata*, var. *punctata*, Ckll. Proc. Philad. Acad. 1896, p. 71) is a perfectly distinct species.

#### MACROTROPSIS, Ashm.

Ashm. says of this, "palpi as in *Microtera*, Smith." Examining *M. latior* (*Perdita latior*, Ckll.) we find the labial palpi 4-jointed, with the first joint longer than the remaining three together, and very broad and flat, as in the long-tongued bees, ending in a sharp claw-like point. The last three joints are narrow and cylindrical, subequal in length, but the first sometimes the longer, and the last the shorter, of the three. The second joint is attached to the side of the first, well before the end of the latter. The maxillary palpi are short, rather pale, and 4-jointed, with variations to 5 and 6, owing to the subdivision of the terminal joints; in the 6-jointed form there are three short joints, namely 3, 4, and 5. These palpi must be regarded as in a subrudimentary condition, which accounts for their variability, as in the more extreme case of *Geoperdita*. The tongue is narrow, with a blunt tip, and extends very little beyond the labial palpi.

It had formerly seemed possible that *Macroteropsis* might be the true *Macrotera*; but this cannot be if Smith's description and figures are worth anything. A second species of the genus is *Macroteropsis texanus* (*Macrotera texana*, Cress. Trans. Am. Ent. Soc. 1878, p. 70).

## CALLANDRENA, Ckll.

*Callandrena pectidis* (Ckll.). (*Panurgus pectidis*, Ckll. Tr. Am. Ent. Soc. 1897, p. 148.)

This has a broad galea, and the labial palpi have the first joint stout and curved, the third shortest, the fourth very narrow. The curved basal joint of the labial palpi is especially characteristic, and shows its affinity with the *pulchella* group of *Andrena*.

## HESPERAPIS, Ckll.

*Hesperapis rhodocерatus* (Ckll.). (*Panurgus rhodocерatus*, Ckll. Tr. Am. Ent. Soc. 1897, p. 148.)

*Hesperapis olivie* (Ckll.). (*Panurgus olivie*, Ckll. t. c. p. 149.)

In *H. rhodocерatus* the tongue is very short, broad at base, the apex linear, with diverging branchlets; labial palpi as in typical *Hesperapis*; maxillary palpi short, 6-jointed, 1 only about twice as long as broad, 2 very little longer than 3 or 6, 4 as broad as 3, only 6 very slender.

The dagger-like tongue with a linear fimbriate tip at once separates this genus from *Rhophitoides*.

In *Rhophitoides canus* the tongue is long, slender, parallel-sided, with the end flattened and rounded, covered with little conical projections; the labial palpi also are different from those of *Hesperapis*, having the first two joints remarkably stout and large and about equal in length.

## HYPOMACROTERA, gen. nov. (Panurginæ.)

Type *H. callops*, sp. n. Includes also *H. subalpina* (*Calliopsis subalpinus*, Ckll. 1894).

Head broad, transversely oval; wings with a black apical spot in the male; marginal cell long and narrow, obliquely subtruncate at the end; two submarginal cells, the second about or nearly three quarters the length of the first, both being long; tongue short, fairly broad; paraglossæ short; labial palpi 4-jointed, the first joint longer than, but not nearly twice as long as, the other three together; maxillary palpi 6-jointed; claws cleft.

This differs at once from *Macrotera*, Smith, by the much shorter tongue and the long narrow marginal cell. It resembles it in the narrow stigma and also quite closely in the palpi. In addition to the two species cited, it includes

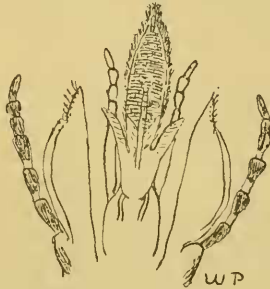


also *Calliopsis semirufus*, Ckll., but that is probably the female of *H. subalpina*. The tongue is broader in the female *H. callops* than in the male.

*Hypomacrotera callops*, sp. n.

♂.—Length about  $5\frac{1}{2}$  millim.

Shining black, with white pubescence, which is long and conspicuous on the face, cheeks, thorax, and end of abdomen, but dense only on the lower part of the face, where it overlaps the clypeus and forms a white beard; head transversely oval, facial quadrangle broader than long; eyes blue-grey; clypeus, labrum, and lateral face-marks white, the latter triangular; clypeus with the usual two black dots; labrum with a black spot in the middle; mandibles white, with rufous tips; front smooth and very shiny; ocelli in a slight curve; antennæ black, flagellum very pale yellowish brown beneath; thorax very smooth and shiny; hind parts of scutellum and post-scutellum punctured; extreme base of metathorax roughened; tegulæ hyaline; wings clear, the apex unusually produced, rounded, black; nervures dark brown; stigma very narrow, almost linear, hyaline, with a brown margin; marginal cell very long, narrow, appendiculate; second submarginal cell narrowed less than half to marginal; legs black and white; femora black, apical portion of anterior femur white in front, four hind knees white; tibiæ white, with black patches, anterior one with a patch behind, the others with one on each side, occupying a large part of the surface; tarsi white, the last joint of middle tarsus and all the small joints of hind tarsus black; abdomen obpyriform seen from above, black without marks, hairy at the end.



*Hypomacrotera callops*, ♀.

♀.—Length about 7 millim.

Face black; mandibles brown, with dark brown tips and

margin; antennæ brown, scape and lower part of flagellum dark brown or black; wings without black tips, clear throughout, apices not quite so produced, marginal cell not so long and narrow; legs black; hair at apex of abdomen dirty white.

*Hab.* Las Vegas, New Mexico, at flowers of *Chamæsaracha coronopus*, Aug. 1 to 4 (Ckll. & W. Porter).

HALICTOIDES, Nyl.

The type of this genus is *H. dentiventris*. Various species assigned here present considerable structural differences, as follows:—

- (A) Labial palpi with joint 1 longer than the other three together; joint 2 not one fourth the length of 1; abdomen of ♂ toothed at sides beneath. (*Halictoides*, s. str.) ..... *dentiventris*, Nyl.
- (B) Labial palpi with joint 1 not nearly so long as the other three together; joint 2 about three quarters length of 1; galea rather long; abdomen of ♂ simple, except that the last ventral segment has a longitudinal keel. (*Epihalictoides*, subgen. nov.) . *marginatus*, Cresson.
- (C) Labial palpi with joint 1 rather shorter than the other three together; joint 2 about half the length of 1. (*Parahalictoides*, subgen. nov.).
  - (1) Shortest joint of maxillary palpi less than half the length of the longest; joints 1 and 2 large, the others small. .... *Tinsleyi*, Ckll.
  - (2) Shortest joint of maxillary palpi more than half the length of the longest.
    - (a) Head in ♂ transversely oblong; abdomen of ♂ with a subapical ventral tuft ..... *campanulæ*, Ckll.
    - (b) Head in ♂ longitudinally oblong; abdomen of ♂ without a subapical ventral tuft ..... *paradoxus*, Moraw.

*H. campanulæ* may be taken as the type of *Parahalictoides*.

HEMIHALICTUS, Ckll.

Ashmead has referred this to *Dufourea*, but the mouth-parts are widely different, as follows:—

*Hemihalictus lustrans* (Ckll.).—Tongue short, broad at base; paraglossæ broad, much more than half the length of the tongue; galea broad and thin, notched within, the apical portion beyond the notch with large bristles; first joint

of maxillary palpi shortest. These characters, except the long paraglossæ, agree with *Halictus*.

*Dufourea vulgaris*, Schenck.—Tongue long and narrow; paraglossæ slender, not half the length of the tongue; galea tapering, with bristles along its whole length; maxillary palpi with joint 1 longest, but barely longer than 2, the others shorter, but still long.

Mesilla Park, New Mexico, U.S.A.,  
Sept. 25, 1899.

XLIX.—*Rhynchotal Notes*.—III. Heteroptera: Discocephalinæ and Pentatominæ (*part.*). By W. L. DISTANT.

THIS third contribution is a continuation of the two previous papers under the same title (*ante*, pp. 29 and 213). As the unavoidable synonymical correction to Walker's work progresses (in addition to the same species being described by that author under different genera, his descriptions are frequently vague in the extreme), one cannot wonder at Continental entomologists proposing to ignore his work altogether, as was done by Stål in 1862 ('Journal of Entomology,' vol. i. p. 481) in relation to the list of Homopterous insects which had then appeared. This course, it is needless to say, cannot be followed, though I have myself felt the great inconvenience—to use no stronger term—of sinking some of my own species when, to employ a parabolic expression, I found that my snipe had been previously described by Walker as pigeons. A more drastic treatment has, however, been advocated for Walker's species of Coleoptera by Bates (Ann. & Mag. Nat. Hist., January 1886) and by Dr. Sharp (Trans. Ent. Soc. Lond. 1890, p. 339).

DISCOCEPHALINÆ.

Genus DISCOCEPHALA.

*Discocephala scutellata*.

*Discocephala scutellata*, Sign. Ann. Soc. Ent. Fr. 1851, p. 334.

*Discocephala marmorea*, Dall. (nec Lap.) List Hem. i. p. 146 (1851).

*Discocephala marmorea*.

*Discocephala marmorea*, Lap. Hém. p. 57, pl. liv. fig. 5 (1832).

*Discocephala deplanata* (*part.*), var.  $\beta$ , Walk. Cat. Het. i. p. 185. n. 21 (1867).