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Some Notes on the Bee Genus Andrena

Lawrence Bruner

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Hymenoptera - Aroidae - Andronea
Some Notes on the Bee Genus ANDRENA.

BY LAWRENCE BRUNER.

Several years ago the writer undertook to determine and label the bees contained in the collection of insects belonging to the University of Nebraska. After some preliminary work in the way of assorting and arranging the material at hand, and securing literature with which to do the naming, it was found that the large number of the species belonging to the genus Andrena in its broad sense could only be placed by the aid of some kind of synoptic key or table. Not being able to find such an aid in our entomological literature it was decided to construct one for the purpose.

This being decided upon, it was soon ascertained that the various authors who had established the already recognized and recorded species had used different characters upon which to base their descriptions. The use or choice of distinct characters by the various authors when describing their species made it very difficult for the writer when attempting to decide upon the principal features of the proposed table in order to make it as nearly a natural one as possible. After several vain attempts at employing structural characters for the separation of the main groups, at least, all efforts in this direction ceased, and such secondary characters as the presence or absence, length, abundance, color and arrangement of pubescence were employed instead. This choice was made necessary because, as stated above, the various authors when characterizing their new species had overlooked many of the structural characters now used in the limitation of forms.

While nothing like perfection is claimed for the present table as it now stands, it has been a great help to the writer in his attempts at placing the hundred or more forms belonging to the collection which he is working over. It is with this knowledge in mind that the table is offered to others who may be interested in our Andrenid bees. Later, after more of our species that are still undescribed have been determined and characterized, and when both sexes of some known species have been recognized, a new and better table can be constructed.

TRANS. AM. ENT. SOC., XXIX.

AUGUST, 1903
In describing bees of this group it would be well to employ such characters as punctuation of face, thorax and abdomen; the nature of the triangle (inclosure) at the base of the metathorax—whether bounded by a rim or by an impressed line; its surface, whether rough or smooth; shape and size of head and its attachments, as antennæ, tubercle at apex of clypeus, mandibles, etc.; form of abdomen, depression of apical portion of segments; any special characteristic of legs, as of tibiae and tarsi; pubescence, length, abundance, arrangement, color, etc.; general color of wings, and indication of variation of form and size in cells, nervures and stigma; abundance and color of anal fimbria in the female; also the general color of the insect or of any portion of it. If all, or most, of these points are kept in mind when a new form is characterized, the difficulty of its recognition by others will be greatly lessened. It will also enable the would-be tabulator to construct his key on characters that are less artificial and therefore more constant than those employed here.

While working over the described American forms it was found that a few synonyms occur. In order to make the paper a trifle more complete there are added below:

- *Andrena bicolor* (Amer. citations—not Fabr.) = *carlini* CKII.
- *fimbriala* Sm. = *americana* D. T.
- *flavoeclypeata* Sm. = *bipunctata* Cress.
- *simulia* Prov. = *canadensis* D. T.
- *clypeata* Sm. = *clypeolata* D. T.
- *laticeps* Prov. = *Provancheri* D. T.
- *sculetaria* Rob. = *sculetala* D. T.
- *hirteica* Rob. (not Sm.) = *carlini* CKII.

**A Preliminary Table for the Separation of the Species of Andrena of America north of Mexico.**

Normally with three submarginal cells in anterior wings—(*Andrena, Trachandraena, Opandrena, Ptilanerena, Pterandreana and Iome-lissa*) ........................................ 1.

Normally with but two submarginal cells in anterior wings...(*Parandrena*) 229.

1. Insect with the abdomen above more or less markedly rufous, ferruginous, orange or testaceous ............................ 2.

   Insect with the abdomen not at all rufous, ferruginous or orange, or if testaceous, only slightly so at extreme apex of segments .......... 18.

2. With the light color chiefly ferruginous or rufous .................. 3.

   With the light color orange, yellowish or testaceous—basal, apical or both . . . 16.
AMERICAN HYMENOPTERA.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Result</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Pubescence black</td>
<td>prima</td>
<td>Casad.</td>
</tr>
<tr>
<td>4</td>
<td>Wings clear or only faintly clouded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Enclosure of metathorax bounded by a sajjent rim, the surface more or less strongly longitudinally ridged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Abdomen red, except sides of 1st and 2nd segments—both sexes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Head and thorax black, or varied with yellow, finely granular. Insects large or of moderate size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Insects of moderate size (about 10 mm.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Abdomen of female red, sometimes with base of apical segments broadly black and with their apices testaceous; the males similar, but frequently entirely black. Wings hyaline, apical margins faintly clouded.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Clypeus dark in both sexes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>First segment of abdomen very feebly and sparsely punctured.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Dorsum of thorax honey-yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Pubescence on head and thorax pale yellow or fulvous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Pubescence on head and thorax dull white</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Second segment of abdomen provided with a black band</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>With the light color orange and confined to the apex and base of segments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Larger (13.5 mm.), the pubescence rather long and copious, yellowish. Apex of segments yellowish testaceous. Venter honey yellow.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Smaller (8.5 mm.), the pubescence scant, pale. Apex of segments broadly reddish.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REFERENCES:**

- *prima* Casad.
- *sphecodina* Casad. & Ckll.
- *lilinioiensis* form *biclor* Rob.
- *crythrogastra* Ashm.
- *rhodura* Ckll.
- *Jessicae* Ckll.
- *argentemis* Ckll.
- *mellic* Cress.
- *prunorum* sub. sp. *Gillettei* Ckll.
- *pascoensis* Ckll.
- *aureocineta* Ckll.
- *melliventris* Cress.

**PROV.:**

- *fineata* Prov.
18. Body of insect altogether or in part blue, green or brassy (secentus)........... 19.
    Body of insect black, with or without yellow face marks...................... 35.
    Insect with head and thorax differently colored from abdomen.............. 20.
20. Head and thorax black, abdomen more or less bronzy, green or blue........... 22.
    Head and thorax greenish....................................................... 21.
    Abdomen with a faint greenish lustre..................................... 24.
22. Abdomen with a brassy tinge.................................................. 23.
22. Segments 2-5 with their apices slightly depressed, anal fimbria fulvous.
    subtilis Sm.
    Abdomen finely roughened, impunctate, apical margins of segments depressed
    and narrowly testaceous, anal fimbria fulvous; checks in male subtri-
    angular, the angle opposite the middle of the eye...erythronii Rob.
24. Segments 3-5 with thin bands of long white hairs, anal fimbria bright orange
    fulvous; male with the pubescence on thorax with fulvous tint, and
    hair at apex of abdomen yellowish or nearly white.
    subaustralis Ckll.
    Abdomen without well-defined hair bands..................................... 32.
26. General color blue-black; anal fimbria dirty white, the abdomen of male
    bluish, the apex not densely tufted........................geranii Rob.
    General color nigro-secentus, anal fimbria rufo-fuscous..candida Sm.
    General color greenish, with blue and purple reflections.................... 27.
27. Face of \( \frac{3}{5} \) without yellow markings........................................ 28.
    Face of \( \frac{3}{5} \) with whitish yellow markings..................................... 28.
29. Males....................................................................................................... 30.
29. Fovea narrow; clypeus bare, convex, metallic; enclosure rugose; cell III
    long........................personata Rob.
    Fovea broad; clypeus more pubescent, flatter, not metallic; enclosure less
    rugose; cell III shorter........................................zizie Rob.
30. Antennae short, joint 3 nearly equalling 4 and 5 together; clypeus rather
    flat, whitish; sometimes with a whitish dot on each side of face.
    zizie Rob.
    Antennae long, joint 3 no longer than 4; clypeus convex, whitish, as well as a
    spot on each side of face........................personata Rob.
31. Robust, enclosure of metathorax narrow, the scutellum purplish.
    polemonii Rob.
    Slender, enclosure of metathorax broad, the scutellum purplish.
    illinoiensis Rob.
32. Abdomen strongly and closely punctured...............................cerasifolii Ckll.
    Abdomen impunctate, shining...................................................... 33.
33. Anal fimbria black; the pubescence of face also black.
    nigrocerula Ckll.
    Anal fimbria brownish; the pubescence of face mostly pale................. 34.
34. Pubescence of thorax ochraceous, on metathorax black...............cerulea Sm.
    Pubescence of thorax white, the few black hairs inconspicuous.
    territa Ckll.
35. Insects with whitish or yellowish face marks ........................................ 36.
Insects without such face marks ............................................................. 36.
36. Females .................................................................................................. 37.
Males .......................................................................................................... 37.
37. Spot of lemon yellow on each side of face .......................................... 38.
38. Clypeus dark, apical margins of abdominal segments pale testaceous
   pulchella Rob.
   Clypeus in part or wholly yellow ......................................................... 39.
39. Clypeus pale lemon yellow with sides black; with semicircular spot on sides
   of face below the eyes ........................................................................... 39.
   Aliciarum Ckll.
   Clypeus entirely yellow, apical margins of abdominal segments provided
   with narrow fascies of white pubescence ........................................... Alicie Rob.
   Sometimes with a yellow spot on clypeus, in the median line not far from the
   anterior edge .......................................................................................... Kincaidii Ckll.
40. With both the clypeus and a spot on each side of face white or yellowish .. 41.
   With clypeus alone light colored ......................................................... 42.
41. Abdomen impunctate, the surface finely tesselate .................................. 42.
   Abdomen distinctly punctured ............................................................. 43.
   With both the clypeus and a spot on each side of face white or yellowish .. 44.
42. Very small, not over 6 mm. long, the face marks whitish
   personata Rob.
   Larger, between 7 and 9 mm., face marks yellow or yellowish .............. 45.
43. Thorax with sparse, feeble punctures, its pubescence dirty white
   asteris Rob.
   Thorax minutely tesselate, with strong quite numerous punctures, its pubes-
   cence pale ferruginous ........................................................................... Cragini Ckll.
44. Clypeus wholly light colored, except anterior edge and the usual two dots;
   vernal species ....................................................................................... 46.
45. Clypeus with more or less black; autumnal species ............................... 47.
46. Clypeus sometimes with a small yellow spot, also one such spot on each side
   of face ................................................................................................... viola Rob.
   Clypeus wholly light colored, except anterior edge and the usual two dots;
   vernal species ....................................................................................... 48.
47. Sides of clypeus black, wings dusky at apex, first two abdominal segments
   with orange-fulvous bands .................................................................... Aliciarum Ckll.
   Anterior margin of clypeus broadly black, wings clear .......................... pulchella Rob.
48. FACE markings lemon yellow ................................................................ 49.
49. FACE markings cream color .................................................................. 50.
50. Joint 3 of antennae shorter than 13, about at long as 5, entire apical margin
   of clypeus black, lateral face marks small or wanting .......................... dubia Rob.
   Joint 3 of antennae as long as 13, and as long as 4 and 5 together ........... 51.
   Antenne dark. Wings a little dusky at tips ........................................... kansensis Ckll.
   Pubescence dull white .......................................................................... 52.
52. Middle of anterior margin of clypeus black, lateral face marks large
   Cressoni Rob.
   Entire apical margin of clypeus black, lateral face marks small or wanting.
   Bridwellii Ckll.
50. Length 12 mm., flies in June ................................................................. rudbeckie Rob.
   Length not over 8 mm., fly in March and April ..................................... 51.
51. Larger, flagellum dark ......................................................................... Capricornis Casad. & Ckll.
   Smaller (6 mm.), flagellum ferruginous .............................................. Primulifrons Casad.
52. Larger species (10–12 mm.) ........................................ 53.
Smaller species (5–9 mm.) ........................................ 58.
53. Stigma comparatively small ..................................... 54.
Stigma normal ....................................................... 55.
54. Wings clear hyaline; abdomen minutely tessellate ....... Barberi Ckll.
Wings whitish; abdomen rather finely punctured, the apical portions of seg-
ments rather broadly pale testaceous .......... helianthi Rob.
55. Abdomen without punctures, the head of moderate width .......... Alicie Rob.
Abdomen punctured, the head rather large .................. 56.
56. Head broader than thorax, the apical margins of abdominal segments broadly
pale testaceous ........................................... reflexa Cress.
Head and thorax about equal in width ...................... 57.
57. Abdomen covered with fine, short, appressed hairs which form bands on seg-
ments 4 and 5 ........................................ 59.
Abdomen without hair bands, flies late in the spring .... Kineaidii Ckll.
58. Pubescence on thorax ochraceous or pale fulvous ........ 59.
Pubescence on thorax gray or white .......................... 60.
59. Head and thorax clothed with ochraceous pubescence .. clypeolata D. T.
Pubescence on head and thorax inclining to fulvous ....... sentellata D. T.
Clypeus with a large trilobed yellow spot .................... krigiana Rob.
60. Flagellum of antenna testaceous or ferruginous beneath ...... 61.
Flagellum of antenna darker, brown or black beneath ...... 63.
61. Nervures brown. Segments 2–4 of abdomen with very distinct white bands.

simulata Prov.
Nervures of wings lighter, honey yellow or testaceous ........ 62.
62. Cheeks narrow, convex, regularly rounded; enclosure unusually broad and
rough; abdomen finely sparsely punctate; clypeus yellow.

Robertsonii D. T.
Cheeks broad, flat, subtriangular, with rounded angles behind middle of eye;
enclosure small, finely rugose, except basal middle; abdomen almost
impunctate; clypeus and sometimes spot on each side of face yellow.

bipunctata Cress.
63. Clypeus chrome yellow; abdomen finely punctate, flies in spring.

Trevoris Ckll.
Clypeus pale yellow; abdomen impunctate, flies in the fall.

solidaginis Rob.
64. Abdomen without well defined hair bands ............... 65.
Abdomen provided with more or less complete hair bands ...... 120.
65. Abdomen smooth, shining, almost without pubescence ...... 66.
Abdomen more or less thickly and evenly covered with pubescence ..... 109.
66. Pubescence entirely black .................................... 67.
Pubescence more or less fulvous, ochraceous, testaceous or cinereous .... 70.
67. Thorax with the pubescence dense, hiding the surface ...... 68.
Thorax with the pubescence rather sparse, not hiding the surface ...... 69.
68. Insects larger (17½ mm. in length); wings purplish fuliginous ... valida Say.
Insects smaller (13 mm.); wings smoky red .......................... nigra Prov.
69. Wings dusky hyaline; abdomen closely and finely punctured.

nigerrima Casad.
Wings yellowish hyaline, abdomen practically impunctate .... Portera Ckll.
70. Pubescence quite dense on face and thorax above
    Pubescence rather thin when compared to that of the species belonging to
    the alternate section
    With bright ferruginous or fulvous pile
    With the pubescence paler—some shade of testaceous, light ochraceous, gray
    or white
    Robust, rather large species (12-17 mm.), with thoracic pubescence quite
    dense
    More slender smaller species (10-12 mm.), with the thoracic pubescence
    slightly less dense, ochraceous
    Occiput and thorax above with ferruginous pubescence; anal fimbria black
    Face, cheeks, occiput and thorax above with such pubescence; anal fimbria
    fulvous
    Occiput and thorax above with fulvous pubescence; anal fimbria sooty black
    intermixed with ferruginous hairs
    Larger (14-17 mm.); with a black-appearing band between the tegulae.

    **Hallii** Dunning.

    Smaller (13 mm.); without blackish bands between the tegulae.

    **semirufa** Ckll.

    Smaller (13-14 mm.); wings yellowish hyaline
    Larger (15 mm.); wings reddish brown, with violaceous reflections.

    **obsecuripennis** Sm.

    Females
    Insects moderately large and robust (12-14 mm.)
    Anal fimbria sooty
    Anal fimbria fulvous
    Inclosure at base of metathorax strongly longitudinally plicate.

    **cupreotincta** Ckll.

    Inclosure at base of metathorax at most roughened, not at all longitudinally
    plicate
    Abdomen rather free from hairs, smooth and shiny
    Abdomen decidedly hairy throughout
    Surface of abdomen smooth, polished; hairs on face and head black; the
    facial grooves lined with a silvery down
    Surface of abdomen tessellate and well punctured; hairs on face and head
    mixed with pale and black
    Pubescence on the pleurse black; that on the face mixed with pale and black.

    **carlini** Ckll.

    Pubescence on pleurse pale; that on face black only around the mouth.

    **vicina** Sm.

    Hair of face wholly black; area at base of metathorax more closely rugulose,
    narrower; tubercle small and emarginate or binodulose at apex.

    **anograe** Ckll.

    Hair of face a little paler at sides and on occiput; area at base of metathorax
    roughened, not plicate, rather broad and long; tubercle with sloping
    sides and truncate at apex

    **pluvialis** Ckll.

    Pubescence on thorax above and the pleurse fulvo-ochraceous.

    **Dunningi** Ckll.
Pubescence on head, thorax and femora fulvous, brightest on scutellum. 

L. viciniformis Rob.

Pubescence on head and thorax above ochraceous; abdomen with shallow punctures; anal fimbria obscure fulvous. Male smaller, but for most part with similar pubescence and clearer wings ...........errans Sm.

85. Pubescence ochraceous only on mesothorax, scutellum and postscutellum. 

L. Merriami Ckll.

Pubescence on mesothorax, scutellum, postscutellum, metathorax, upper part of pleura and on first and base of second abdominal segments ochraceous ..............................washingtoni Ckll.

86. The pubescence quite uniformly fulvous or reddish ochraceous.............-87.
The pubescence paler, some shade of light ochraceous, gray or white.....-89.

87. The pubescence on head and thorax rather short, reddish brown; the anal fimbria purplish brown..........................radiatula Ckll.
The pubescence on head moderately long...........................-88.

88. Enclosure of metathorax without salient rim, minutely roughened. 

L. pruni Rob.

Enclosure of metathorax decidedly rugose......................coron Rob.

89. Males. ..................................................-90.

Females ..................................................-98.

90. Head quite large, as wide or wider than thorax, and with cheeks strongly produced back of the eyes ...........................-91.

Head of only moderate width, and with the cheeks normal...................-93.

91. Size small (6½ mm.); apical margins of abdominal segments testaceous. 

L. Provancheri D. T.

Size large (9-11 mm.); apical margins of abdominal segments not testaceous......................-92.

92. Pubescence on head and thorax silky grayish white, very copious; an abdomen present only on the first and second segments, very short, most conspicuous on sides..................................mesillae Ckll.

Pubescence on head and thorax very dense, long, mouse colored; an abdomen thin and sparse, with short black hairs on dorsum of segments 2-5. 

L. perarmata Ckll.

93. Apical margins of abdominal segments narrowly testaceous. .....................-94.

Apical margins of abdominal segments black or concolorous .....................-95.

94. The face almost naked, the punctuation fine and quite close. 

L. convexa Prov.

The pubescence on clypeus long and dense; apex of abdomen with a few gray hairs ..................................vestita Prov.

95. Body quite closely and moderately coarsely punctured; the face nearly bare.........................................-96.

Body less closely and more minutely punctured; the clypeus provided with a more or less dense beard..............................-97.

96. Wings rather strongly infuscated; length 8-10 mm. ..............crategi Rob.

Wings hyaline, iridescent; length 7 mm..............................salicis Rob.

97. Inclosure bounded by rim strongly rugose, the wings hyaline, iridescent.

L. Marie form concolor Rob. 

Inclosure defined by impressed line, granular; wings faintly clouded at apex ..................................algida Sm.
98. Enclosure of metathorax with the surface not strongly rugose nor provided with ridges.

99. Enclosure of metathorax with the surface strongly rugose or at least provided with definite ridges.

100. Head and thorax covered with long gray pubescence; the enclosure microscopically tessellate. *Birtwistle* Ckll.

101. Head and thorax covered with yellowish pubescence; the enclosure granular (?). *convexa* Prov.

102. The enclosure bounded by a well defined ridge.


104. Pubescence short and feathery; *fimbria fulvous* *nuda* Rob.

105. Surface of enclosure strongly rugose.

106. Females. The abdomen clothed with pale pubescence, which often forms thin apical fasciae. *Sayi* Rob.

107. Larger (13-15 mm.). The abdomen clothed with pale pubescence, which often forms thin apical fasciae. *Sayi* Rob.

113. Larger (9-12 mm.). Head broader than thorax.

115. Head without black hairs. Head provided with black hairs on vertex and about margins of eyes. 116.

116. Head subquadrate above, pubescence on face and cheeks long and white. Abdomen shining, with thinly scattered hoary pubescence. \textit{moesta} Sm.

117. Abdomen with the first and second segments clothed above with long whitish hairs, those on remaining segments sparser and confined to the lateral margins. Abdomen shining, provided with a thin scattered griseous pubescence and with a few silvery hairs at the extreme tip. \textit{frigida} Sm. \textit{hirticeps} Sm.

118. Pubescence on abdomen entirely black. Pubescence on basal half of abdomen whitish, on apical half black, that on thorax rufescent. \textit{impuncta} Kby.

119. Hair on sides of face, about eyes, and on vertex pale; 2nd and 3rd submarginal cells subequal; abdomen with short dark pubescence. * \textit{viciniiformis} Rob. Hair on face, vertex and cheeks black, on sides of face and occiput pale; on pleura black; area of metathorax roughened, not plicate. \textit{pluvialis} Klil. Hair on sides of face, front and cheeks black; 2nd and 3rd submarginal cells markedly unequal. \textit{carlini} Klil. Hair on face wholly black, area more coarsely rugulose than preceding. The pubescence on thoracic dorsum brighter, more fulvous. \textit{anograe} Klil.

120. Pubescence quite long, dense and copious throughout; erect or scarcely decumbent, even on abdomen where forming bands. Pubescence on abdomen rather short, and for the most part decumbent, at least when forming bands. 121.

121. Entire pubescence golden yellow, that on all segments forming complete bands. \textit{auricoma} Sm. §. Pubescence variable in color. 122.

122. That on thorax and scutellum above bright orange red. \textit{chromatica} Klil. That on thorax and scutellum above pale yellow or ochraceous. 123.

123. Anal fimbria yellowish or reddish. Anal fimbria fuscous or black. 124.

124. Pubescence on thorax lemon yellow, on abdomen pale ochraceous; anal fimbria fulvous. \textit{permitis} Cress. Larger (12½ mm.). Pubescence on thorax pale yellow, whitish on abdomen, anal fimbria yellowish. \textit{mentzeliae} Klil. Smaller (8, 7½ mm.). Pubescence long, yellow ochraceous, forming bands on apical margins of abdominal segment; anal fimbria ochraceous. \textit{miserabilis} Prov.

125. Pubescence lemon yellow, that on apex of abdomen mostly black. \textit{hirticineta} Prov.
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Pubescence cream colored, on the middle and hind tibiae pale; facial quadrangle about as broad as long; fimbria fuscous. **apacheorum** Ckl.

Pubescence ochraceous, that on middle and hind tibiae dark fuscous; facial quadrangle a little broader than long; fimbria fuscous.

**america**n **D. T.**

126. Insects rather small, less than 8 mm. in length .......................... 127.

127. Insects larger, 8 mm. or more in length ................................. 144.

128. Females .................................................. 128.

129. Males .................................................... 135.

128. Anal fimbria white or whitish ......................................... 129.

129. Anal fimbria ochraceous, fulvous or fuscous ......................... 131.

128. Head and thorax clothed with pale yellow pubescence. Wings hyaline, the nervures brown. Stigma pale and surrounded by a brown line.

**canadensis** **D. T.**

Head and thorax clothed with rather long grayish white pubescence. Wings with the stigma light brown ................................. 130.

130. Abdomen with complete dense bands of white pubescence.

**albovirgata** Ckl.

Abdomen with the hair bands on segments 1 and 2 interrupted.

**primulifrons** Casad.

Fimbria ochraceous; the pubescence long and of the same color. Wings yellowish-hyaline, iridescent, faintly dusky at tips and with the nervures and stigma honey-yellow .......................... **miserabilis** Cress.

Fimbria fulvous or subfuscous ........................................ 132.

132. Wings with their apices decidedly clouded .......................... 133.

133. Wings with their apices not clouded ................................. 134.

133. Area at base of metathorax large, coarsely reticulated.

**Robertsonii** **D. T.**

Area at base of metathorax not especially large, shortly rugose at base.

**nebecula** Sm.

Area at base of metathorax bounded by an impressed line, finely roughened.

Cheeks rather strongly produced behind the eyes.

**nothoscordi** Rob.

Area of base of metathorax hardly at all defined, roughened.

**melanochroa** Ckl.

135. Wings distinctly clouded apically ..................................... 135.

136. Inclosure of metathorax finely roughened, more coarsely so at the base. Apical margins of abdominal segments pale testaceous, the hair bands white, very thin ........................................... **nebecula** Sm.

Inclosure of metathorax rather coarsely and longitudinally reticulate .. 137.

137. Pubescence of head and thorax fulvous .............................. 138.

Pubescence of head and thorax ochraceous; that on apical margins of segments 2–4 also ochraceous. Wings yellowish-hyaline, iridescent.

**miserabilis** Cress.

138. Fasciae on abdominal segments 3 and 4 continuous. Inclosure bounded by a raised rim ............................................. **rugosa** Rob.

Fasciae on abdominal segments 2 to 4 interrupted. Inclosure poorly defined laterally, but terminating in a sharp edge at truncation .......................... 139.
139. Metathorax on each side of inclosure coarsely reticulated and nearly bare, nerves and stigma dark. \textit{obscura} Rob. 
Metathorax on each side of inclosure rather finely rugose and closely pubescent. \textit{hippotes} Rob.

140. Head large; the cheeks broad and more or less angulated behind. \textit{platypera} Rob. 
Head of moderate size; the cheeks narrower and less distinctly angulate behind. 

141. Cheeks strongly produced behind the eyes and bordered by a carina or ridge. Inclosure of metathorax large and rather coarsely reticulated. 
Cheeks broad, with a rounded angle at point opposite and but a little below middle of eyes. Inclosure of metathorax finely roughened. \textit{gerani} form \textit{maucilata} Rob.

Inclosure of metathorax longitudinally striate or ridged. 

Head and thorax with long whitish pubescence, especially abundant on clypeus. Eyes wider apart below than above. \textit{erigenie} Rob.

144. Males. 
Females. 

145. Larger, 10 mm. and over. 
146. Smaller, 7 mm. to 9 mm. 

147. Wings clear hyaline, the nerves and stigma brown. Pubescence silky grayish white, long on head and thorax; bands on abdomen at apex of segments, interrupted and poorly defined. \textit{elettrica} Casdr. & Ckll. 
Wings hyaline, the apex broadly dusky. Pubescence yellow ochraceous, long and dense. Apical margins of segments subtestaceous and furnished with bands of short dense yellowish pubescence. \textit{texama} Cress.

148. Pubescence on head and thorax more or less fulvous or rufous. 
Pubescence on head and thorax whitish, ochraceous, or at most brownish white. 

149. Wings somewhat infuscated or clouded apically. 
Wings hyaline or at most smoky-hyaline. 

150. Head and thorax clothed with a thin pale pubescence, inclining to rufous on clypeus and mesonotum. The fascie on abdomen interrupted. \textit{hippotes} Rob. 
Head and thorax clothed with short fulvous pubescence. Nervures and stigma testaceous. \textit{Forbesii} Rob.

Nervures and stigma testaceous. Abdominal segments 2-4 with narrow fascie, interrupted on 2 and 3. \textit{spirea} Rob.

152. Head and thorax with pubescence brownish white. Wings hyaline, the nervures piceous, stigma pale brown, marginal with piceous. Abdomen with interrupted fascie. \textit{Kuuthiana} Ckll. 
Head and thorax with the pubescence whitish or pale yellow.
152. Head larger, broader than thorax, strongly produced behind the eyes. 153. Head moderate, not strongly produced behind the eyes. 155. Wings smoky-hyaline, tinged brownish, nervures and stigma brown. Mandibles toothed within. Thin hair bands on segments 5 and 6. 

**platyparia** form **occidentalis** Ckll.
Wings hyaline, nervures and stigma honey-yellow. Mandibles long, slender, the extreme base toothed below. 154. Joint 3 of antennae about equal to 5. 155. Joint 3 of antennae about equal to 4 – 5. 

**mandibularis** Rob.  
**tridens** Rob.  

155. Wings hyaline, iridescent, the nervures and stigma testaceous. Abdomen covered above with hairs. 156. Wings not iridescent, either hyaline or smoky. 157. 

Inclosure at base of metathorax not margined and scarcely rugulose. Abdominal fascire almost obsolete. 156.  

**mesta** Sm.  
Inclosure at base of metathorax bounded by an impressed line, rather dull and minutely roughened. Hind margins of segments with thin white hair bands. Antennae wholly black, moniliform. 157.  

**monilicornis** Ckll.  

157. Nervures and stigma pale yellow. Apex of abdominal segments somewhat depressed, testaceous, and more or less covered with pale hair bands. 158. Pubescence on head and thorax long, white or pale yellow. Fascire of long white hairs on abdominal segments. Stigma ferruginous. 159. Pubescence on head and thorax white, more or less mixed with black on vertex and about antennae. Stigma very dark brown. 160. Larger, usually 12 or more mm. in length. 161. Medium, between 10 and 12 mm. in length. 162. Smaller, between 8 and 10 mm. in length. 163. 


**maeienta** Prov.  
Stigma of anterior wing normal. Pubescence variable. 162. 

**distans** Prov.  
Pubescence on head and thorax white, more or less mixed with black on vertex and about antennae. Stigma very dark brown. 163. 

**segregans** Ckll.  
Anal fimbria sooty. Abdominal fascire white, that on 1 interrupted, on 2 – 4 continuous. 164.  

**Barberi** Ckll.  
Anal fimbria yellowish or fulvous. Abdominal fascire more or less ochraceous. 162.  

**Gränichei** Ckll.  
Wings milky white, the nervures and stigma dark ferruginous. Abdomen with thin fascire on segments 2 – 4. 163.  

**G. nitidior** Ckll.  
Wings more or less hyaline. 164.  

Apical margins of abdominal segments testaceous. Wings smoky, their apical margins clouded, nervures dark ferruginous. Fimbria reddish ochraceous. 165.  

**helianthi** Ckll.  
Wings clear hyaline, the nervures and tegulae pale testaceous. Fimbria pale fulvous. 166.  

**rudbeckiae** Rob.
165. Pubescence for the most part fox-red, moderately long and dense. Segments 2–4 with apical hair bands of the same color. *vulpicolar* Ckll.

Pubescence fulvous, ochraceous or whitish, of variable length and density. ............................................................. 166.

166. Pubescence on head and thorax more or less fulvous .................................................. 167.

Pubescence on head and thorax cinereous or ochraceous .................................................. 169.

167. Wings yellowish-hyaline, nervures (except subcostal) and stigma ferruginous. Sides of abdominal segments 2–4 with pubescence on hind margins. Fimbria purplish or fuscous. *Magilliivrayi* Ckll.

Wings subhyaline, with the apex clouded; nervures rufo-testaceous .......... 168.

168. Pubescence on face pale fulvous, darker on thorax. Apical margins of abdominal segments provided laterally with narrow fringe of pale pubescence ............................................................. *hilaris* Sm.

Pubescence on thorax fulvous. Abdomen at the sides and towards apex with fine gray pile. Apical margins of segments rufo-testaceous. *perciplexa* Sm.

169. Abdomen thinly covered above with hoary pubescence, the apical margins of the segments beneath fringed with the same. Wings hyaline, iridescent ............................................................. *mesta* Sm.

Abdomen provided with well-defined hair bands ............................................................. 170.

170. Wings clear hyaline, the nervures and stigma brown. Abdominal fascia very distinct, all continuous. Fimbria chocolate color. *electrica* Casad. & Ckll.

Wings with the apex clouded ............................................................. 171.


Pubescence on head and thorax long, dense, cinereous. Fimbria cinereous. Wings hyaline ............................................................. *veracunda* Cress.

172. Anal fimbria lighter, white, gray, ochraceous or orange ............................................................. 173.

Anal fimbria darker, various shades of brown or black, as ferruginous, fulvous, rufous, fuscous, etc ............................................................. 176.


Pubescence on head and thorax grayish or cinereous. Abdomen with continuous hair bands ............................................................. 174.


The pubescence dense. Hair bands also quite dense ............................................................. 175.

175. Smaller, 10 mm. in length. Fimbria whitish. Wings faintly hyaline, tinged with yellowish ............................................................. *mitatiax* Cress.


176. Pubescence at least on head and thorax above fulvous ............................................................. 177.

Pubescence paler, whitish ochraceous or cinereous ............................................................. 183.

* The descriptions of a few of these insects are so indefinite as to leave some room for doubt as to just where they should fall in the table. They may therefore be found in other sections also.
177. Facies on abdominal segments widely interrupted ............. 178.
   Facies on abdominal segments white, more or less complete .......... 179.
178. Insect clothed on thorax with long dense pubescence. The abdominal fasciae composed of fulvous hairs. Fimbria dark rufous.

   **striatitrons** Ckll.
   Insects thickly clothed on thorax with short pubescence. The abdominal bands composed of whitish hairs, Fimbria fulvous .... **rugosa** Rob.
179. Hair band on segment 2 interrupted .................................. 180.
   Hair bands on segment 2, as well as on the others, complete .......... 181.

   **claytoniae** Rob.
   Wings hyaline, apical margins somewhat clouded, the nervures and stigma testaceous. Fimbria dull ferruginous ................. **quintilis** Rob.

   **Forbesii** Rob.
   Anal fimbria fuscous ......................................... 182.
182. Wings fusco-hyaline, apical margins a little clouded, nervures and stigma dull testaceous ............................... **Cressonii** Rob.
   Wings yellowish-hyaline, nervures (except black subcostal) and stigma ferruginous ................................. **Macgillivrayi** Ckll.
183. Pubescence more or less ochraceous .................................. 184.
   Pubescence white or whitish ...................................... 190.
184. Abdominal fasciae reduced to lateral patches ....................... 185.
   Abdominal fasciae more or less complete ................................ 186.
185. The fasciae in the form of a fringe on the sides of segments 3 and 4. Fimbria fuscous ............................... **placida** Sm.
   The fasciae in the form of well-marked patches of white hair on the lateral margins of segments 2–4. Also some scattered glistening yellow hairs across middle of 3 and 4. Segment 5 and fimbria fulvous.

   **grandior** Ckll.
186. The fasciae white .................................................. 187.
   The fasciae obscure, grayish or yellowish .......................... 188.
   The pubescence long and dense, ochraceous on dorsum of thorax, elsewhere whitish. Fascia on 2–4 complete. Fimbria gray-brown.

   **sapellonis** Ckll.
188. The cheeks strongly produced behind the eyes. Mandibles long and slender, toothed below at extreme base. Abdominal segments with obscure fasciae on their pale testaceous edges. Fimbria fuscous.

   **mandibularis** Rob.
   The cheeks normal, not strongly produced behind the eyes .......... 189.
189. Abdomen with very distinct pale gray hair bands, all continuous. Wings clear hyaline, nervures, stigma and tegulre brown.

   **electric** Ckll.
190. Abdominal segments 2-4 with pale testaceous margins and thin white hair bands. Fimbria blackish ................. **salicacea** Rob.

191. Abdominal segments without testaceous margins .................................................. **191**.

192. Fasciae all interrupted, dense and white on segments 2-4. Basal nervures of wings somewhat curved ........................................ **semipunctata** Ckll.

193. Fasciae more or less complete. Basal nervure normal ........................................ **192**.

194. Segments 2-4 with thin fascie of white on the broadly depressed apical margins ........................................ **asteris** Rob.

195. Segments 2-4 normal, their fascie snow-white; that on 2 interrupted. **prunifloris** Ckll.

196. Pubescence on head and thorax above darker, more or less fulvous or blackish ........................................ **194**.

197. Pubescence on head and thorax above pale, more or less white, gray, yellow or ochraceous ........................................ **203**.

198. Head and thorax with considerable of the pubescence black. Abdominal segments 2-4 with lateral apical bands of white pubescence. Wings smoky ........................................ **195**.

199. Head and thorax above with the pubescence chiefly fulvous ........................................ **196**.

200. Abdominal fascie fulvous ........................................ **197**.

201. Abdominal fascie white or pale ........................................ **198**.

202. Wings fulvo-hyaline, the nervures, stigma and tegulae rufotestaceous. Abdomen with silken gloss. Fimbria ferrugino-s .......................... **fulvipennis** Sm.

203. Wings yellowish-hyaline, faintly clouded beyond the marginal cell; nervures and stigma honey-yellow. Fimbria brown ................. **salicis** Rob.

204. Segments and 3 at the sides with apical pubescence. The margins obscurely rufo-piceous. Fimbria rufo-piceous .................. **integra** Sm.

205. Segments 2-4 with their fascie more or less complete ........................................ **199**.

206. Hair bands dense, moderately wide, interrupted on segment 2 ........................................ **200**.

207. Hair bands thin and narrow ........................................ **201**.

208. Fascie white. Fimbria chocolate brown. Wings yellowish, faintly dusky at apex .................. **medionitens** Ckll.

209. Fascie ochraceous. Fimbria brownish ochraceous. Wings slightly yellowish, the stigma and nervures largely testaceous ............... **pecta** Vier.

210. Apical margins of segments narrowly testaceous. Fimbria fusceous ................. **scutellata** D. T.

211. Apical margins of segments concolorous. Fimbria fusceous ........................................ **202**.

212. Wings hyaline, iridescent, slightly clouded at apex; nervures and stigma ferruginous. Abdominal fascie sometimes interrupted on 2 and 3 (ap). **miranda** Sm.

213. Wings hyaline, nervures and stigma testaceous. Abdominal fascie interrupted on 2 and 3 ........................................ **spireana** Rob.

214. Thorax with ochraceous pubescence ........................................ **204**.

215. Thorax with light yellow or grayish pubescence ........................................ **206**.

216. Abdominal segments provided with conspicuous white hair bands, interrupted on 1. Wings smoky, nervures dark brown .................. **clypeonitens** Ckll.
Abdominal segments 2–4 provided with narrow hair bands. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
218. Pubescence darker, on cheeks, top of head and thorax, above dull fulvous.
   Fimbria brownish ........................................... beulahensis Vier.
   Pubescence lighter, whitish, yellowish or pale ochraceous ........... 219.
219. Triangle at base of thorax finely roughened or granulated .......... 220.
   Triangle at base of thorax rather strongly reticulated or longitudinally pli-
   cate or rugose
220. Pubescence on head and thorax grayish yellow. Tips of segments testa-
   ceous. Fimbria fulvous ....................................... frigida Sm.
   Pubescence on head and thorax white or dull white, without the yellowish
   tinge ................................................................. 221.
221. Wings yellowish, nervures brownish, the stigma deep honey yellow. Seg-
   ments 1–4 with broad but very thin apical fascie of dull white hairs.
   apacheorum var. a Ckll.
   Wings smoky or smoky hyaline ................................ 222.
222. These members hyaline ..................................... 223.
   These members more or less smoky ................................ 224.
223. Nervures and stigma dull testaceous. Head broader than thorax; cheeks
   broad and rounded. Abdominal fascie thin, narrow, whitish, com-
   plete ................................................................. geranii maculata Rob.
   Nervures and stigma dark brown. Head normal. Abdominal fascie on
   segment 1 almost obsolete ..................................... segregans Ckll.
224. Wings faintly clouded apically. Abdominal fascie interrupted on segments
   1 and 2 ............................................................... simplex Sm.
   Wings not clouded. Abdominal fascie on 1 only interrupted.
   solidaginis Rob.
225. Inclosure with its surface reticulated. Head large, broader than thorax,
   the cheeks strongly and broadly produced behind the eyes, bordered
   by a rim ............................................................ platyparia Rob.
   Inclosure with its surface longitudinally ridged, plicate or striate .... 226.
   Pubescence sparse, the thorax above nearly bare. Abdominal segments
   with apical margins narrowly testaceous and with fascie of white
   hairs on 2–4 ............................................................... 228.
227. Apical margins of abdominal segments 2–4 fringed with white pubescence,
   anal fimbria slightly fulvous ..................................... algida Sm.
   Apical margins of abdominal segments 1–4 fringed rather broadly with dirty
   white pubescence. Fimbria inclining to fuscous .................. erigene Rob.
228. Clypeus smooth, shining and impunctate, except on the sides. Mesothorax
   with scarcely a trace of punctures .............................. bipunctata Cress.
   Clypeus minutely tessellate and dull all over, with rather sparse shallow
   punctures. Mesothorax with distinct though shallow and rather
   sparse punctures .................................................. hartfordensis Ckll.
229. The prevailing color of entire insect blue or greenish ............... 230.
   The prevailing color black, but in some instances the abdomen may be
   more or less ferruginous .......................................... 231.
230. Steel-blue, sometimes tinged with dark green; the pubescence mostly pale,
   male and female .................................................. chalybea Cress.

This section, as represented in the present table, undoubtedly contains forms
that should be referred elsewhere.
Shining blue-black, the pubescence entirely black, female; on cheeks, front, occiput and thoracic dorsum dull white, male ........... *Foxii* Ckll.

231. **Females** ................................................................. 232.

Males ................................................................. 237.

232. Head and thorax black. The abdomen rufous or reddish .......... 233.

Entire insect black ...................................................... 234.


Abdomen mostly orange rufous, practically naked above, except on the apex which is mostly fringed with pale ochraceous hairs. Flies in fall.

pectidis Ckll.

234. Pubescence throughout black ....................................... *phenax* Ckll.

Pubescence pale, or at most only a few black hairs intermingled with the prevailing light colored ones.......................... 235.

235. Hind margins of abdominal segments furnished with uniform bands of dense, appressed white pubescence, the adjacent bases of the following segments with similar but thinner and narrower bands.

rhodocerata Ckll.

Hind border of abdominal segments with less conspicuous light hair bands ......................................................... 236.

236. Smaller (8–9 mm.); the metathorax rather minutely granular; the wings yellowish fuliginous........ *andrenoides* Cress.

Larger (9–10 mm.); the metathorax more rugose, and the wings clearer than the preceding—*wellesleyana* Ckll.

237. Provided with yellow face marks........................................ 238.

Face wholly black .............................................................. 241.

238. Clypeus, together with a portion of face, yellowish................. 239.

Clypeus alone yellow (7 mm.) ........................................... *concinnula* Ckll.

239. Clothed on head and thorax with rather long whitish pubescence, that on abdomen short and sub-erect........................................ 240.

Clothed on head and thorax with fulvous-yellow pubescence (7½ mm.).

nevdensis Cress.

240. Clypeus somewhat bulging, smaller (8½ mm.)........ *andrenoides* Cress.

Clypeus more flattened, larger (9 mm.)........ *wellesleyana* Rob.


Abdomen without hair bands................................................ 244.

242. The head wider than the thorax, face narrowing below, flagellum rufous below .................................................. 243.

Head not wider than the thorax. Abdomen clothed with short sub-erect pale pubescence mixed with black, apical margin of each segment with a regular narrow fasciae of dense white pubescence (10 mm.).

regularis Cress.

243. Larger (8–9 mm.); tarsi ferruginous, the wings slightly dusky toward apex.

rhodocerata Ckll.

Smaller (7–7½ mm.); legs wholly black, wings with the apex dusky hyaline and slightly milky—*olivae* Ckll.

244. Smaller (6½ mm.); wings hyaline, slightly dusky at tips.

nigrifrons Cress.

Larger (8 mm.); wings perfectly clear...................................... *enoehi* Ckll.

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The following normally three-celled species are also occasionally found in which one or both wings have but two submarginal cells: bipunctata, claytonia, hippotes, platyparia, robertsonii, solidaginis, personata, asteris, krigiana, milwaukeeensis, etc.

Since this table was finished, Dr. S. Graenicher, of Milwaukee, Wisconsin, has published a paper in the Canadian Entomologist (June, 1903, pp. 162-166), in which five additional species are described. As a remodelling of the table at this time is impracticable, it may suffice to indicate briefly where these new forms would fall:

The species thaspii Graen., ♀, will come in the vicinity of frigida Sm., or lauracea Rob., both of which it resembles in some respects. Cockerelli Graen., ♀, comes nearest macunpinensis Rob., from which it differs by having the facial foveae black instead of pale, and the fimbria purplish instead of ochraceous. The male of Cockerelli may be compared with perarmata ♂, but lacks the tooth at base of mandibles of the latter. Milwaukeeensis Graen, ♀, is nearest to impuncta Kby., but differs from it by having the pubescence on two basal segments of abdomen ochraceous to fulvous, instead of whitish. The male of this species has the pubescence entirely fulvous, and the head extremely broad. The viburnella Graen., ♀, will fall in the vicinity of rufosignata Ckl., and his albofoveata ♀ seems to come near platyparia Rob., and hartsfordensis Ckl.