

THE PANGONIINAE (DIPTERA: TABANIDAE)  
OF NEARCTIC AMERICA

by

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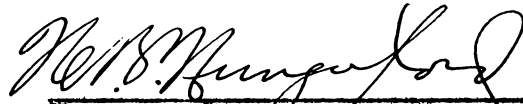
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No monographic studies of North American Tabanidae have been attempted since the classical Prodrôme of Osten Sacken (1875-1878). However, Kröber (1926) more or less successfully brought together the North American species of the genus Chrysops; but the unfortunate aspect of this work is that the author lacked sufficient material, and consequently was quite dependent on the literature and the determinations of others for his results. Nevertheless, Kröber's study has contributed materially to the preparation of the present paper. His keys, and especially his observations on the Wiedemann types, have proved useful.

It is the purpose of the author to redescribe all recognizable species of the subfamily Pangoniinae north of Mexico, to attempt to establish more firmly their generic status, and to offer synoptic tables and plates as an aid in identification and separation. Ninety species distributed through nine genera are included. Twelve species and one genus are described as new. In a few instances cases of synonymy have been established.

The literature on Tabanidae although not scanty, is for the most part scattered throughout numerous small papers. Hence the need for intensive monographic work is immediately perceived. The literature may be divided

into three fields, taxonomic, economic, and biological, although in many instances, overlapping must of necessity occur.

Among the outstanding systematic studies in this country are those of Osten Sacken and the many small papers of Hine, and in a more restricted sense, those of Daecke (1905-1907), Malloch (1917), McAtee and Walton (1918), Wehr (1924), Stone (1930), Schwardt and Hall (1930), and Philip (1931). The economic importance of the Tabanidae is too well known to require discussion in this paper. Perhaps the most important contribution in this respect in this country is that of Francis and Mayne (1922) in their work on the transmission of tularaemia by Chrysops discalis Will. Also the investigations of Mitzmain (1913) with respect to the transmission of surra by Tabanus striatus Fab. and Webb and Wells (1924) must not be overlooked. Not a great deal is known concerning the biology of Tabanidae, however, various workers have made contributions of a bionomic or strictly biological nature. At present the most complete studies are being made by Dr. H. H. Schwardt at the University of Arkansas. Likewise Hine (1903 and 1906), Mitzmain (1913), Marchand (1919 and 1920), Webb and Wells (1924), Cameron (1926), Stone (1930), and Philip (1931) have substantially contributed to our knowledge in this field.

To the writer the adults of the Tabanidae are intensely interesting taxonomically primarily because of their reputed lack of characters. The males, lacking the usual blood-sucking propensities of the females, are poorly represented in collections. It has been suggested to the author several times that he make a study of the abdominal terminalia of the males, but because of lack of material, such an investigation at present would scarcely prove profitable. Other workers have approached the Tabanidae from this aspect and have failed. Cole (1927) has concluded that the range of variation in the species examined is so slight, that it is doubtful if the characters will in all cases prove of value in taxonomic work.

The author considers the subfamily Pangoniinae, in its broadest sense, to include all species with apical spurs on the hind tibiae, as opposed to the Tabaninae in which these spurs are lacking.

The family Tabanidae of the brachycerous Orthorapha may be characterized as follows: Bristles lacking; eyes denuded or pilose, in life green or purple iridescent, usually patterned, as a rule, but not always holoptic in the male and always dichoptic in the female; flagellum of antennae five to eight or nine segmented; wings with an ambient costal vein and a three-branched radial sector; alulae large; empodia pulvilliform; genitalia never prominent.

With respect to morphological terminology the writer has attempted to follow Bromley (1926), however, conditions have arisen where it was necessary to make modifications. It should be noted that the term "vertex" has replaced the "front" or "frons" loosely used by systematists, and that "frons" applies to that sclerite just below the antennae, which in the Tabanidae is fused with the clypeus. The Comstock-Needham system of wing venation has been adopted. With respect to the wing picture in the genus Chrysops I follow Osten Sacken and Hine. Any infuscation in the apical region of the wing separated from the crossband is considered as the apical spot. It is very difficult to select an appropriate terminology for the abdominal patterns in the genus Chrysops. In speaking of triangles, the apices are always toward the anterior margins of the segments, whereas "trapezoidal spots" have their bases directed anteriorly; in "inverted V-shaped spots" the apices are anterior; by "geminate spot" is meant a figure composed of two more or less divergent variously shaped angulate spots more or less broadly joined near the anterior margins of the segments, and it follows that a "double geminate spot" implies four spots joined together anteriorly, the median two paired and usually the broader, the outer two paired and usually the narrower, the angles of divergence variable. The "usual stripes" on the thoracic dorsum refers to three brown or fuscous stripes separated by gray or yellow pollinosed stripes,

and on the pleurae a brown or fuscous stripe with gray or yellow pruinosity on each side.

With respect to the genera included herein I follow the excellent advice and suggestions of Dr. J. Bequaert. See also Bequaert (1924) and Bequaert (1930)

#### ACKNOWLEDGMENTS

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## KEY TO GENERA

1. Flagellum of antenna with five distinct annuli . . . 2  
 Flagellum of antenna with eight distinct annuli . . . 4
2. Pedicel of antenna about half as long as the scape . . . . . Silvius Meigen  
 Pedicel of antenna more than half as long as the scape, often nearly as long . . . . . 3
3. Wings evenly infuscated; abdomen globose, much wider than thorax; antennae very slender and elongate; stump at bifurcation of vein R4+5 . . . . . Neochrysope Walton  
 Wings irregularly infuscated, exhibiting a variety of patterns (entirely hyaline in C. hyalinus Shannon); abdomen normal; antennae variable; bifurcation of vein R4+5 without a stump (rarely appearing adventitiously) . . . . . Chrysope Meigen
4. Eyes bare . . . . . 5  
 Eyes pubescent, at least in the male . . . . . 8
5. Proboscis conspicuously shorter than the head; vertex very broad . . . . . 6  
 Proboscis usually longer than the head; vertex of normal width or narrow . . . . . 7
6. Eyes of female acutely angulate above; anterior portion of wings infuscated . . . . . Goniops Aldrich  
 Eyes of female normal; wings of uniform color, usually subhyaline to fumose . . . . . Apatolestes Will.
7. Cell R5 petiolate . . . . . Esenbeckia Rondani  
 Cell R5 open . . . . . Buplex Austen
8. Vein 2d A sinuous; abdominal segments in caudad from V narrowed and laterally compressed, when completely exerted appear to be modified for oviposition; head broad, proboscis very short . . . . . Beguertomyia g.n.  
 Vein 2d A normal; abdomen normal; proboscis of variable length, never long . . . . . Scaptia Walker

Chrysops Meigen (1803)

- 1803 Chrysops, Meigen, Illiger's Mag., II, 267.  
 1823 Chrysopsis Dumeril, Consider. Gener. Classif. Insectes, 227.  
 1856 Memorius Rondani, Prodrum. Dipt. Ital., I, 171.  
 1873 Haemophila Kriechbaumer, Verh. Zool. Bot. Ges. Wien., XLIII, 70.  
 1882 Haematophila Verrall, in Scudder, Kom. Zool., I, 152.  
 1920 Heterochrysops Krober, Zool. Jahrb., Abt. Syst., XLIII, 1-4, pp. 50 and 55.  
 1922 Neochrysops Szilady, Ann. Mus. Nat. Hungarici, XIX, 126, (nec Walton)  
 1923 Ziemannia Enderlein, Deutsche Ent. Ztsch., p. 544.  
 1923 Kleineana Enderlein, Deutsche Ent. Ztsch., p. 544.  
 1926 Psylochrysops Szilady, Zool. Anz., LXVI, 328.  
 1926 Turanochrysops Stackelberg, Bull. Ent. Res., XVI, 4, p. 326.

Genotype: Tabanus caecutiens Linnaeus, 1758.

Generic characters: Eyes demuded, in life green iridescent with a purple pattern, separated in the female, contiguous in the male; ocelli present; the female with a frontal callosity; fronto-clypeus prominent; antennae slender or swollen, the flagellum five-segmented, sometimes the long basal segment appears more or less annulated, pedicel more than half as long as the scape; proboscis about equal to the length of the head or shorter; palpi more or less lanceolate about three-fourths the length of the proboscis. Wings usually with an infuscated picture. Flies relatively small, rarely exceeding twelve millimeters. Perhaps more variation is exhibited in the dorsal abdominal patterns than in any other group of the Tabanidae.

Specific characters: The key is based primarily upon the wing picture. At present this affords the most satisfactory character that may be applied to the whole

group within our fauna. Next in importance is the dorsal abdominal pattern, although this character must always be used in connection with others. A most valuable character in some forms is to be found in the antennae and width of the vertex, but unfortunately this has proved applicable to not more than a dozen species. It may be well to point out here that there are in North America two very distinct groups as based upon structural characters. One group, principally western and southwestern in distribution, numbering but ten species have distinctly incrassate antennae and in the female the vertex is at least as broad as long, usually broader; it appears that in studying the males of this group, the eyes are not absolutely contiguous, in the strict sense of the word, but are separated by a very narrow space, however, this is true in the case of some males of the other group. In the other group, the antennae for the most part are relatively slender (exception, C. brunnea Hine) and in the female the vertex is longer than broad, and the eyes of the male are typically contiguous. In this latter group are included the majority of our species. Another character of importance is the fronto-clypeus and its color.

Because of the frequent sexual dimorphism exhibited by this genus and because, unfortunately, all of the males are not yet known, it is necessary to construct a key for each sex. The typical wing picture of every

female has been figured, consequently this character is not dwelled upon at any length in the descriptions.

#### KEY TO FEMALES

1. Wings hyaline . . . . . hyalina Shan.  
     Wings pictured . . . . . 2
2. Apex of wing beyond crossband hyaline, some-  
     times just a trace of a cloud . . . . . 3  
     Apex of wing beyond crossband infuscated . . . . . 12
3. Whole wing infuscated in distal margin of cross-  
     band, more dilute in anal area . . . . . divisa Walker  
     Whole wing not infuscated to distal margin  
     of crossband . . . . . 4
4. Cell 2d M hyaline . . . . . 5  
     Cell 2d M infuscated, as a rule for at least  
     half its area, often more . . . . . 7
5. Abdominal pattern a contrast of yellow and  
     fuscous; cell R hyaline; crossband of wing  
     very faint . . . . . fulvistigma Hine  
     Abdomen black or fuscous; cell R partially  
     or wholly infuscated . . . . . 6
6. Crossband of wing saturate black; abdomen  
     black . . . . . niger Macq.  
     Crossband of wing faint, light brown;  
     abdomen fuscous . . . . . nigribimbo Whit.
7. (4) File of pleurae yellow or orange . . . . . 8  
     File of pleurae, and usually of cheeks and  
     of dorsal thorax whitish to gray . . . . . 10

8. Abdomen typically black, although rather indistinct grayish mid-dorsal triangles may sometimes be seen; pleurae densely golden yellow pilose . . . . . celer O.S.
- Abdomen black, the sides of the antero-dorsal region encroached upon by yellow, of variable extent; pile of pleurae pale yellow . . . . . 9
9. Posterior margins of abdominal segments conspicuously gray; grayish yellow lateral spots confined to small area . . . . . sordida O.S.
- Posterior margins of abdominal segments not gray; yellow lateral spots of greater extent; yellow or grayish yellow mid-dorsal triangles frequently present . . . . . excitans Walker
10. (7) Wing picture dilute, especially the crossband; cell 1st A hyaline; the black of the abdomen invaded dorso-laterally on segments I and II by a yellowish gray spot . . . . cuclux Whit.
- Wing picture saturate; cell 1st A partially infuscated at apex; the black of the abdomen not encroached upon by lateral spots . . . . 11
11. Base of cell Cul hyaline . . . . . carbonaria Walker
- Base of cell Cul infuscated; large obscure gray mid-dorsal triangles more likely to be present; generally larger species . . . . mitis O.S.
12. (2) Apical spot of the wing usually rather narrow, at the most including only the extreme apex of cell R4 . . . . . 13
- Apical spot of the wing generally broad, of greater extent, including as a rule at least half of cell R4 and often attaining cell M1 . . 27
13. A tooth-like projection from the distal margin of the crossband extending into cell R3 almost attaining the bifurcation of vein R4+5 . . . . . nigripes Zetter.
- Distal margin of crossband relatively regular . . . . . 14
14. Scape of antenna distinctly more swollen than pedicel . . . . . dissimilis n.sp.
- Scape of antenna not swollen more than pedicel 15



15. Cell R completely infuscated, cells 2d M  
and Cul hyaline . . . . . 16
- Cell R hyaline, or but partly infuscated; if  
the former, then cell 2d M is hyaline; if the  
latter, then cell 2d M is partly infuscated; cell  
Cul usually shows some infuscation . . . . . 18
16. Small grayish black eastern species brimleyi Hine
- Species with abdomen distinctly patterned  
in yellow and black; western or northwestern . . . 17
17. Fronto-clypeus with a very narrow denuded  
yellow longitudinal stripe . . . . . surda O.S.
- Fronto-clypeus with a broad denuded yellow  
longitudinal stripe . . . . . proclivis O.S.
18. (15) Abdomen wholly black . . . . . pertinax Will.
- Abdomen not wholly black . . . . . 19
19. Apex of hyaline triangle usually exceeds  
vein R2+3; cell R infuscated for about  
half its area . . . . . 20
- Apex of hyaline triangle rarely exceeds vein  
R2+3; greatest portion of cell R hyaline . . . . . 22
20. Abdomen predominantly black, on each side of  
the antero-dorsal region a yellow spot noctifer O.S.
- Abdomen yellow in ground color with a black  
pattern . . . . . 21
21. Wing picture dilute; oral margins of genae  
yellow; front and hind femora yellow bishoppi n.sp.
- Wing picture saturate; oral margins of genae  
black; front and hind femora black furcata Walker
22. (19) Frontal callosity usually yellow;  
apical spot of the wing at its base ex-  
tending into cell R3 . . . . . 23
- Frontal callosity black; apical spot narrow,  
at its base not extending into cell R3 . . . . . 25
23. Length 8 - 10 mm.; the black figure of the  
second abdominal segment practically joins  
with that of the first . . . . . sackeni Hine

- Length rarely exceeds 8 mm. the black figure of the second abdominal segment does not join with that of the first . . . . . 24
24. Pale species; hind femora yellow; crossband dilute; black abdominal figures faint; no black spot beneath the scutellum . . . cursim Whit.
- Darker species; hind femora fuscous, at least basal portions; crossband saturate; black abdominal figures more conspicuous; usually a black spot beneath the scutellum . . . . . pubica O.S.
25. (22) Crossband dilute, not attaining posterior margin of wing . . . . . delicatula O.S.
- Crossband saturate, usually attaining posterior margin of wing . . . . . 26
26. A black triangle encroaches upon the yellow or gray on each side of the central spot on the second abdominal segment; vertex little convergent posteriorly; apex of cell M3 often hyaline . . . . . aestuans Wulp
- As a rule no black triangle encroaches upon the yellow on each side of the central spot on the second abdominal segment; vertex more convergent posteriorly; cell M3 usually entirely infuscated . . . . . callida O.S.
27. (12) Cell R completely infuscated, rarely a small subhyaline spot near its apex; antennae slender, never swollen . . . . . 28
- Cell R not completely infuscated, usually not more than half; sometimes almost entirely hyaline; antennae variable, slender to extremely robust . . . . . 47
28. Hyaline triangle represented by a hyaline spot occupying mostly the center of cell R3 . . . . . bistellata Daecke
- Hyaline triangle otherwise represented, always open to the posterior margin of the wing . . . . . 29
29. Crossband broken by dilute areas along the margins of the veins . . . . . shermani Hine
- Crossband evenly saturate throughout . . . . . 30

30. Apex of hyaline triangle not extending beyond vein M1 . . . . . moecha O.S.  
 Apex of hyaline triangle extending beyond M1 . . . . . 31
31. Wholly black species; legs black . . . . . separata Hine  
 Not wholly black species legs variable, usually showing some yellow or brown . . . . . 32
32. Abdomen with no conspicuous pattern; usually fuscous or black (indistinct yellow stripes sometimes visible) . . . . . 33  
 Abdomen conspicuously patterned in yellow and black . . . . . 37
33. Front coxae brown to black; wing picture fuliginous, a rather prominent spot at the bifurcation of vein R4+5, sometimes formed by a continuation of the distal margin of the crossband . . . . . fuliginosa Wied.  
 Front coxae yellow; wing picture brown to dark brown; no spot at bifurcation of vein R4+5 . . . . . 34\*
34. Hyaline triangle of the wing quite narrow, crescent shaped, open usually to vein R2+3; cubital and anal areas frequently dilutely infuscated . . . . . 35  
 Hyaline triangle of the wing more broadly open at its base, the apex not usually attaining vein R2+3; cubital and anal areas hyaline . . . . . 36
35. Dorsum of abdomen with three more or less obsolete yellow stripes; pleurae and thoracic stripes yellow pollinose . . . . . obsoleta Wied.  
 Dorsum of abdomen entirely fuscous, sometimes a trace of a pale mid-dorsal stripe; pleural and thoracic stripes gray pollinose . . . . . ultima Whit.
36. Hine femora and tibiae predominantly fuscous; dorsum of abdomen entirely fuscous; length 5.5 - 7 mm. . . . . parvula Daecke

\*The characters used for separating the species of this group are to be applied with considerable caution.

- Hind femora and tibiae predominantly yellow; dorsum of abdomen fuscous, frequently with a faint gray mid-dorsal stripe; length 6.5 - 8.5 mm. . . . . luzens Wied.
37. (32) Abdomen with a broad black mid-dorsal stripe . . . . . dorsovittata Hine  
 Abdomen with no black mid-dorsal stripe . . . . . 38
38. The yellow of the abdomen with four more or less complete brown or black longitudinal stripes . . . . . 39  
 The yellow of the abdomen not with four longitudinal stripes . . . . . 45
39. Apex of hyaline triangle extending considerably beyond vein R4+5, usually attaining at least vein R2+3, often vein R1 . . . . . 40  
 Apex of hyaline triangle extending but very little beyond vein R4+5 . . . . . 43
40. Lateral abdominal stripes incomplete, not appearing on segments I and II . . . . . pikoi Whit.  
 Lateral abdominal stripes complete . . . . . 41
41. Frontal callosity black . . . . . sequax Will.  
 Frontal callosity yellow . . . . . 42
42. Apical spot extending but little into cell R5; hyaline triangle broad at base . . . . . beameri n.sp.  
 Apical spot typically extending deep into cell R5, often into M1; hyaline triangle narrow at base . . . . . hinei Daecke
43. (39) Ground color of dorsum of thorax plumbeus; at least disc of scutellum brown or plumbeus; frontal callosity variable, black to yellow . . . . . striata O.S.  
 Ground color of dorsum of thorax yellow; scutellum yellow; frontal callosity always yellow . . . . . 44

44. Abdominal stripes obsolete, brown, the lateral stripes scarcely at all represented on segments I and II; apical spot of the wing extending into cell R5  
vittata Wied. var. floridana John.
- Abdominal stripes conspicuous, black; apical spot of the wing broken or ceasing entirely before entering cell R5 .. vittata Wied.
45. (38) Fourth abdominal segment with a fuscous cruciform spot . . . . . ornata Kröbber
- Fourth abdominal segment not with a fuscous cruciform spot . . . . . 46
46. Apical spot exceeds vein R5; abdomen with a broad yellow mid-dorsal stripe between two black ones; size 6 - 7 mm. . . . . univittata Macq.
- Apical spot not exceeding vein R5; abdomen not so marked; size 8 - 10 mm. . . . . inda O.S.
47. (27) Antennae distinctly swollen, at least the scape . . . . .
- Antennae not distinctly swollen, often quite slender . . . . . 57
48. Vertex broader than long, or at least as broad as long . . . . . 49
- Vertex longer than broad . . . . . 56
49. First segment of flagellum distinctly longer than the sum of the four apical segments  
virgulata Bell.
- First segment of flagellum not longer than the sum of the four apical segments . . . . . 50
50. Apical spot of the wing not exceeding vein R5, as a rule occupying about half of cell R4 . . . . . 51
- Apical spot of the wing exceeds vein R5 . . . . . 55
51. Discal cell typically hyaline; a tooth-like projection extends from the distal margin of the crossband into cell R3 attaining the bifurcation of vein R4+5 . . . . . latifrons n.sp.

- Discal cell usually infuscated; no tooth-like projection, etc. . . . . 52
52. Fronto-clypeus and oral margins of genae with black spots; antennae moderately incrassate . . . . . facialis Towns.
- Fronto-clypeus and oral margins of genae pure yellow; antennae strongly incrassate . . . . 53
53. Second abdominal tergite with a double geminate black spot . . . . . robusta n.sp.
- Second abdominal tergite not with a double geminate black spot . . . . . 54
54. Abdominal tergites III and IV each with four black spots; cell 1st M2 infuscated; robust species . . . . . coquilletti Hine
- Abdominal tergites III and IV each with two black median spots; cell 1st M2 often hyaline in the center; smaller species . . . pachycera Will.
55. (50) Cell 1st M2 with a dilute fenestrated spot; scape of antennae not bottle-shaped . . . . . fulvaster O.S.
- Cell 1st M2 infuscated to the same degree as the rest of the crossband; scape of antennae bottle-shaped . . . . . clavicornis n.sp.
56. (48) Abdomen light brown, pattern obscure; scape and pedicel of antennae prominently swollen . . . . . brunnea Hine
- Abdomen more yellowish, pattern distinct; scape and pedicel of antennae not so markedly swollen . . . . . flavida Wied.
57. (47) Discal cell hyaline, a conspicuous infuscated spot at bifurcation of vein R4+5 . . . . . discalis Will.
- Discal cell infuscated, no spot at bifurcation of vein R4+5 . . . . . 58
58. Black species; pleurae densely fulvous pilose . . . . . amazon Daecke
- Not black species; pile of pleurae variable; abdomen patterned in yellow and black . . . . 59

59. Abdomen typically fuscous or black with a conspicuous yellow mid-dorsal stripe, sometimes on each side of which appears an obsolete stripe of the same color wiedemanni Kröber
- Abdomen not so patterned, the yellow ground color usually very conspicuous but not always predominant . . . . . 60
60. Apex of hyaline triangle distinctly exceeds vein R2+3, often attaining vein R1 . . . . . 61
- Apex of hyaline triangle not exceeding vein R2+3, often not even attaining this vein . . . . . 64
61. Frontal callosity yellow, at least on the disc . . . . . coloradensis Bigot
- Frontal callosity black . . . . . 62
62. Second abdominal segment pure yellow geminata Wied.var.impuncta Kröber
- Second abdominal segment with two median divergent black spots . . . . . 63
63. Crossband reaches the posterior margin of the wing; apical spot occupies nearly the whole of cell R4; geminate spots on second abdominal segment do not attain posterior margin . . . . . geminata Wied.
- Crossband not typically reaching posterior margin of the wing; apical spot occupies about a half of cell R4; geminate spots on second abdominal segment attain the posterior margin . . . . . lateralis Wied.
64. (60) Fronto-clypeus black, only the pollinosed areas yellow . . . . . frigida O.S.
- Fronto-clypeus yellow, demuded . . . . . 65
65. Hind femora entirely yellow; frontal callosity always yellow; spot beneath scutellum absent or obsolete . . . . . 66
- Hind femora not entirely yellow; frontal callosity variable, often black; conspicuous black spot beneath the scutellum . . . . . 67

66. Ground color of thoracic dorsum and scutellum typically yellow; crossband of wing saturate  
flavida Wied.
- Ground color of thoracic dorsum and scutellum not yellow; crossband of wing dilute . . . . . cursor Whit.
67. Second abdominal tergite with a small black spot on each side of the median figure, tergites III and IV each with four black spots . . . . . montana O.S.
- Second abdominal tergite not with a small black spot on each side of the median figure, tergites III and IV predominantly black with narrow yellow hind margins which expand into mid-dorsal triangles . . . . . 68
69. Hind femora and tibiae predominantly black; frontal callosity usually black; the black median figure on the second abdominal tergite usually attains the anterior margin . . . . . dimmocki Hine
- Hind femora and tibiae predominantly yellow; frontal callosity usually yellow; the black median figure on the second abdominal tergite does not attain the anterior margin pubica O.S.

## KEY TO MALES

1. Apex of the wing beyond the crossband hyaline (apical spot absent) . . . . . 2
- Apex of the wing beyond the crossband more or less infuscated (apical spot present) . . . . . 8
2. Crossband of wing light brown, very dilute, almost obsolete . . . . . 3
- Crossband of wing fuscous, saturate . . . . . 4
3. Dorsum of abdomen a contrast of yellow and fuscous . . . . . fulvistigma Hine
- Dorsum of abdomen wholly fuscous . . nigribimbo Whit.



4. Fronto-clypeus yellow except for a fuscous spot on each side . . . . . niger Macq.  
Fronto-clypeus black . . . . . 5
5. Base of cell Cul typically with a hyaline spot . . . . . carbonaria Walker  
Base of cell Cul infuscated . . . . . 6
6. Dorsum of abdomen with some yellowish pubescence, especially near the apex and forming median triangles . . . . . excitans Walker  
Dorsum of abdomen black pubescent . . . . . 7
7. Crossband attaining posterior margin of wing; antennae wholly black . . . . . celer O.S.  
Crossband not attaining posterior margin of wing; antennae not wholly black . . . . . mitis O.S.
8. (1) Apical spot approximately the same width for its entire length, including only the apex of cell R4 . . . . . 9  
Apical spot not as above, variable, usually including at least half of cell R4, often extending considerably beyond . . . . . 16
9. A tooth-like projection from the distal margin of the crossband extending into cell R3 practically attaining the bifurcation of vein R4+5  
nigripes Zetter.  
No tooth-like projection from the distal margin of the crossband, etc. . . . . 10
10. Wholly black species; fronto-clypeus black; apical spot practically separated from the crossband . . . . . pertinax Will.  
Not wholly black species; fronto-clypeus yellow; apical spot distinctly united with the crossband . . . . . 11
11. Apical spot at its base distinctly exceeding vein R2+3 . . . . . sackeni Hine  
Apical spot at its base not exceeding vein R2+3 . . . . . 12

12. Fronto-clypeus and oral margins of  
genae entirely yellow . . . . . 13
- Fronto-clypeus and oral margins of genae  
    not entirely yellow, usually with a black  
    spot on each side . . . . . 15
13. Wing picture dilute bishoppi n.sp.
- Wing picture saturate . . . . . 14
14. Antennae black, the yellow of the second  
    abdominal tergite encroached upon postero-  
    laterally by a black triangle . . . . . aestuans Wulp
- Antennae mostly yellow; as a rule no  
    postero-lateral black triangle encroaches  
    upon the yellow of the second abdominal  
    tergite . . . . . callida O.S.
15. Fronto-clypeus black with a narrow yellow  
    mid-streak . . . . . surda O.S.
- Fronto-clypeus yellow with a black spot  
    on each side . . . . . proclivis O.S.
16. (8) Antennae incrassate . . . . . 17
- Antennae not incrassate . . . . . 25
17. Eyes contiguous; light brown species . . . brunnea Hine
- Eyes separated, often very narrowly, but  
    nevertheless, distinctly; species not  
    light brown . . . . . 18
18. Annulate portion of flagellum much shorter  
    than basal segment . . . . . virgulata Bell.
- Annulate portion of flagellum not shorter  
    than basal segment, usually longer . . . . . 19
19. Apical spot of the wing extending beyond  
    vein R5 . . . . . 20
- Apical spot of the wing not extending beyond  
    vein R5, usually not even attaining this vein . . . . . 21
20. Antennae yellowish, the scape distinctly bottle-  
    shaped; second abdominal tergite yellow with a  
    median broad black geminate figure and a black  
    spot on each side . . . . . clavicornis n.sp.

- Antennae black, the scape not bottle-shaped; second abdominal tergite not patterned as above . . . . . fulvaster O.S.
21. A tooth-like projection from the distal margin of the crossband extending into cell R3 to the bifurcation of vein R4+5 latifrons n.sp.
- No tooth-like projection from the distal margin of the crossband . . . . . 22
22. Second abdominal tergite with a double black geminate figure . . . . . robusta n.sp.
- Second abdominal tergite not with a double black geminate figure . . . . . 23
23. Fronto-clypeus yellow with a row of four black spots across the disc . . . . . facialis Towns.
- Fronto-clypeus wholly yellow . . . . . 24
24. Cell 2d M infuscated sub-equally with R; crossband sometimes fenestrate; abdominal tergites III and IV rarely with a black spot on each side . . . . . pachycera Will.
- Cell 2d M infuscated about one-half that of R; crossband never fenestrate; abdominal tergites III and IV always with a black spot on each side . . . . . coquilletti Hine
25. (16) Discal cell (1st M2) hyaline . . discalis Will.
- Discal cell infuscated . . . . . 26
26. Apical spot includes practically all of cell R4, often extending beyond vein R5 . . . 27
- Apical spot not including all of cell R4, never attaining vein R5 . . . . . 34
27. Abdomen black; apex of hyaline triangle not extending beyond vein M1 . . . . . moecha O.S.
- Abdomen not black, apex of hyaline triangle extending beyond vein M1 often as far as the costal margin . . . . . 28
28. Apex of hyaline triangle distinctly extending beyond vein R4+5, usually attaining vein R2+3, and sometimes exceeding it . . . . . 29

- Apex of hyaline triangle not extending beyond vein R4+5, but sometimes a small hyaline spot at its bifurcation . . . . . 32
29. Dorsum of abdomen vittate (four black stripes); apex of hyaline triangle not exceeding vein R2+3 . . . . . 30
- Dorsum of abdomen not vittate; apex of hyaline triangle attains vein R1 . . . . . 31
30. Lateral abdominal stripes incomplete; cells 2d M and Cul mostly hyaline; hyaline triangle broadly open . . . . . *pikoi* Whit.
- Lateral abdominal stripes complete; cells 2d M and Cul considerably infuscated; hyaline triangle narrow . . . . . *sequax* Will.
31. Second abdominal tergite yellow with two median divergent black spots . . . *geminata* Wied.
- Second abdominal tergite completely yellow . . . . . *geminata impuncta* Kröber
32. (28) Dorsum of abdomen predominantly fuscous with a trace of yellow on the sides and a conspicuous yellow median stripe *univittata* Macq.
- Dorsum of abdomen predominantly yellow with four more or less complete black stripes . . . 33
33. Ground color of thoracic dorsum and scutellum yellow . . . . . *vittata* Wied.
- Ground color of thoracic dorsum and scutellum plumbeus . . . . . *striata* O.S.
34. (26) Body entirely fuscous or black (including antennae palpi and greater portions of the legs) . . . . . 35
- Body not entirely fuscous or black . . . . . 37
35. Apical spot narrowly joined to the crossband; an infuscated spot at the bifurcation of vein R4+5 . . . . . *fuliginosa* Wied.
- Apical spot separated from the crossband; no infuscated spot at the bifurcation of vein R4+5 . . . . . 36

36. Wing practically entirely infuscated to the distal margin of the crossband; a small hyaline spot at the apices of cells R and 2d M . . . . . separata Hine
- Wing not entirely infuscated to the distal margin of the crossband; the hyaline areas of cells R and 2d M appear as a single band near their apices extending from vein R2+3 to Cul . . . . . amazon Daecke
37. Fronto-clypeus and oral margins of genae entirely yellow . . . . . 38
- Fronto-clypeus and oral margins of genae with a large black spot on each side . . . . . 44
38. Cells R and 2d M predominantly hyaline; dorsum of abdomen pale yellow with light brown or fuscous markings; second tergite with an inverted V-shaped median spot not reaching the anterior margin . . . . . 39
- Cells R and 2d M predominantly infuscated; dorsum of abdomen not as above, often predominantly black . . . . . 41
39. Ground color of thoracic dorsum and scutellum typically yellow; abdominal figures usually light brown . . . . . flavida Wied.
- Ground color of thoracic dorsum and scutellum green gray; abdominal figures usually black . . . . . 40
40. Basal portion of hind femora black . . . . . pudica O.S.
- Hind femora mostly yellow . . . . . cursor Whit.
41. Dorsal abdominal pattern more or less vittate; the second tergite with a narrow black spot on each side of the black median geminate figure . . . . . montana O.S.
- Dorsal abdominal pattern not vittate; no black spot on the sides of the second tergite . . . . . 42
42. The apical spot at its base not reaching the bifurcation of vein R4+5; hind femora black . . . . . dimroeki Hine

- The apical spot at its base practically attains the bifurcation of vein R4+5; apical portion of hind femora yellow . . . . . 43
43. Sides of abdominal tergites II to IV broadly incised with yellow . . . . pilunna Kröber
- Sides of abdominal tergites II to IV very narrowly incised with yellow . . . inda O.S.
44. (37) Apex of hyaline triangle not attaining vein R2+3; abdominal pattern not at all vittate . . . . . frigida O.S.
- Apex of hyaline triangle distinctly exceeds vein R2+3; abdominal pattern vittate . . . 45
45. Dorsum of abdomen fuscous with a conspicuous yellow median stripe . . . wiedemanni Kröber
- Dorsum of abdomen not as above . . . . . 46
46. Dorsum of abdomen yellow with a broad black median stripe . . . . . dorsovittata Hine
- Dorsum of abdomen yellow with a series of black vittate spots (two on the second tergite, four on tergites III and IV, etc.) . . . . . lateralis Wied.

Chrysops aestuans Van der Wulp (1867)

- 1867 C. aestuans Van der Wulp, Tijdsch.v.Ent.,X,135;  
pl.III,f.8,9; Wis.
- 1875 C. aestuans Osten Sacken, Prodrôme,I,378;Ill.,N.D.
- 1895 C. aestuans Hart, Bull.Ill.State Lab.N.H.IV,227;Ill.
- 1897 C. aestuans Lugger, 2d Rept.Ent.Minn.p.169;fig.;Minn.
- 1901 C. aestuans Hine, Ohio Nat.,II,168; Ohio.
- 1904 C. aestuans Fletcher, 34th Rept.E.S.Ont.,p.98;N.W.Terr.
- 1904 C. aestuans Snow, Kans.Univ.Sci.Bull.,II,323.List.
- 1905 C. aestuans Washburn, 10th Rept.State Ent.Minn,p.78,  
Minn.
- 1913 C. aestuans Shelford, Animal Communities, p.188;Ill.
- 1914 C. aestuans Gibson, Ent.Rec.,Rept.Ent.Soc.Ont.,XLV,  
140;Man.
- 1924 C. aestuans Curran, Ent.Rec.,Rept.Ent.Soc.Ont.LIV,  
99; B.C.,Sask.
- 1931 C. aestuans Philip, Minn.Tech.Bull LXXX,p.82; Minn.

The following also refer to this species:

- 1848 C. moerens Walker, List, I, 201; N.S. (preoc.)
- 1901 C. moerens Ricardo, Ann.& Mag.N.H.,Ser.7,VIII,299,302.
- 1903 C. moerens Hine, Ohio State Acad.Sci.Spec.Pap.No.5,  
p.40; Ohio.
- C. moerens Hine, Tech.Ser.,Bur.Ent.Bull.12,pt.II,  
36-38.
- 1912 C. moerens Gibson, Ent.Rec.,Rept.Ent.Soc.Ont.,XLIII.
- 1913 C. moerens Aldrich, Ent.News,XXIV,215;Utah.
- 1916 C. moerens Gibson, Ent.Rec.,Rept.Ent.Soc.Ont.,XLVII,Ont.
- 1920 C. moerens Marchand, Mon.Rock.Inst.,50.
- 1923 C. moerens Hine, Ohio J1.Sci.,XXIII,205; Ore.,Wash.
- 1924 C. moerens Wehr, Neb.Univ.Studies XXII,112;Neb.
- 1926 C. moerens Cameron, Bull.Ent.Res.,XVII,23.
- 1926 C. moerens Kröber, Stett.Ent.Ztg.,LXXXVII, 280.
- 1928 C. moerens Leonard, N.Y.State List, p.755; N.Y.
- 1931 C. moerens Knowlton, Can.Ent.,LXIII,153;Utah.

Color: Predominantly black with grayish or yellow  
markings on the abdomen.

Size: Length, 7 - 10 mm.

Structural and color characters: Female: A most vari-  
able species. Vertex and sides of genae gray to yellow-  
ish pollinose. Frontal callosity black; fronto-clypeus,  
genae, and palpi orange yellow. Antennae variable, the

ground color orange yellow; scape and pedicel with black pubescence; flagellum black apically. Thoracic dorsum and scutellum gray to yellow gray pollinose, the former with rather broad stripes; pleural and sternal regions pollinose with some black showing through. Dorsum of abdomen with a broad black spot beneath the scutellum practically reaching a heavy geminate black figure on the second segment which usually, following along the posterior margin on each side, expands again as a black triangle on the yellow or grayish ground color of the segment; remaining segments black, the yellow or gray posterior margins expanding into mid-dorsal triangles. Venter of abdomen variable; frequently dark at the base, usually a broad black median stripe, broken at the margin of the segments; apical segments and a narrow lateral streak, black; elsewhere yellowish or gray. Wings as figured; as a rule cell M3 is hyaline at the apex and the apical spot at its base often does not attain vein R2+3, however both of these characters vary. Legs variable; in those forms in which a gray color prevails rather than yellow and the venter of the abdomen exhibits more dark figuration than pale, the front coxae and the greater portions of all the legs are black; where yellow has dominance over the gray, and occupies considerable space on the venter of the abdomen, the front coxae and legs are predominantly yellow. In the first



case, yellow appears at the base of the tibiae and middle and hind tarsi; in the second case black appears at the joints, the apex of the front femora, tibiae, and entire tarsi, and the extreme apical portions of the median and posterior tibiae and tarsi. But, as indicated before, for such a variable species these characters will have to be applied with caution.

Male: Considerably darker than the female. In some specimens the antennae and palpi are practically black. Thorax and abdomen like the female except for the greater dominance of black, confining the yellow or gray to smaller areas. Cells R and 2d M of the wings infuscated except for a small hyaline area near their apices. Legs mostly black, except the usual lighter regions. The male exhibits much more pilosity than the female.

Comparative notes: Closely related to C. callida O.S. To be separated according to the key. Large series of both these species show such variation and intergradation that a point is reached where separation becomes extremely difficult. Distributional data would seem to indicate that C. aestuans is mostly confined to the North and Northwest, on the other hand C. callida has a wider range, especially in its southern distribution. In the males, the apical spot of C. aestuans is narrower than in C. callida, and I have never seen a male of the latter with black antennae and palpi;

also the male of C. callida shows a greater extent of yellow on the venter of the abdomen and legs.

Remarks: The above description is based mostly on specimens compared with the types of Walker's C. moerens. There is no doubt as regards their identity. As Philip (1931) pointed out, this name must fall since it is preoccupied by a C. moerens (Tabanus) of Fabricius (1794), therefore C. aestuans Van der Wulp becomes valid.

Distributional data:

UNITED STATES: Michigan: Cheboygan Co., July 11, 1927; Aug. 8, 1924; July 2-14, 1931; Hamlin Lake, July 8, 1907.

Ohio: Sandusky, July 9, 1904;  
Cawtawba Id., June 1923.

Indiana: Wolf Lake, July 9, 1911.

Illinois: Algonquin; Sun Lake, Aug. 8, 1906; Beach, July 1, 1931; Chicago, June 6-12, July 7, 1907; Waukegan, Aug. 24, 1927.

Minnesota: Swift Co., July 15, 1924;  
La Crescent, June 16, 1925.

South Dakota: Brookings; Newell, June 28-29, 1923; Aberdes, July 8, 1915.

Kansas: Clark Co., June; Sheridan Co.; Gove Co.; Scott Co.

Colorado: Crook, Aug. 27; La Junta, Aug. 12, 1920; Pueblo, Aug. 9, 1920.

Utah: Corinne, July 7, 1930; Tremonton, July 5, 1931; Weber Canyon, July 4, 1931.

Washington: Ritzville, July 13, 1922.

Chrysops amazon Daecke (1905)

- 1905 C. amazon Daecke, Ent. News, XVI, 250, fig.; N.J.  
 1907 C. amazon Daecke, Ent. News, XVIII, 140.  
 1925 C. amazon Johnson, Oc. Pap. Bost. Soc. N.H., VII, 99; Mass.  
 1926 C. amazon Kröbber, Stett. Ent. Ztg., LXXXVII, 305; N.J., N.H.

Color: Predominantly black with short white pubescence;  
 dense fulvous pile on the pleurae.

Size: Length, 9 - 11 mm.

Structural and color characters: Female: Vertex, frons, sides of genae and a mid-streak on the fronto-clypeus grayish pollinose. Frontal callosity, ocellar area, remaining portions of fronto-clypeus and genae, and the palpi fuscous to black. Antennae very slender; the scape and pedicel brownish yellow, flagellum black apically. Dorsum of thorax and scutellum black with white pubescence, the former with two obscure gray pruinose stripes, pleurae and thoracic venter black with some gray pruinosity, the former with conspicuous dense fulvous or orange pile. Abdomen entirely black or fuscous with sparse white pubescence. Wings as figured. Halteres black. Legs black; the base of the median and posterior tarsi light brown, the median tibiae also are somewhat lighter at the base.

Male: Wholly black, with black pubescence and pilosity. Wing picture similar to the female except for a greater extent of infuscation in cells R and 2d M, leaving but a small hyaline space near their apices.

Comparative notes: Besides C. celer O.S. this is the only other species included within the scope of this paper which has heavy orange pile on the pleurae. It is easily separated by the presence of an apical spot on the wing. Daecke (1905) relates C. amazon to C. noctifer O.S., from this species it will be readily distinguished by the pile on the pleurae, greater extent of the crossband and apical spot and absence of triangles on the abdomen.

Remarks: In the key I have placed this species with the group in which the apical spot of the wing includes more than just the apex of cell R4. A casual observation will no doubt give rise to dispute, but since the apical spot fades away into cell R4 and beyond, until the eye cannot tell where the infuscation stops and the hyaline area begins, I feel justified in assigning C. amazon to the group mentioned above.

Type data: I have studied the cotypes in the United States National Museum. According to Kröber (1926) there is one cotype in the Museum of Ottawa. Described from four females, all from Browns Mills Junction, N. J.

Distributional data:

UNITED STATES: New Jersey: Browns Mills Junction,  
June 24, 1906.

Reported by others from the following general  
localities:

UNITED STATES: Massachusetts; New Hampshire.

Chrysops beameri, new species

Color: Yellow, with fuscous stripes on the dorsum  
of thorax and abdomen.

Size: Length, 8 mm.

Structural and color characters: Female: Frontal  
callosity, fronto-clypeus, genae and palpi yellow;  
the usual areas with yellow pollen; ocellar area  
stained brown. Antennae very slender, the flagellum  
thicker than the scape; scape and pedicel yellow with  
a few black hairs, flagellum mostly black. Dorsum of  
thorax, pleural and sternal regions yellowish pollin-  
ose with fuscous stripes, the median stripe of the  
thoracic dorsum often continues on to the yellow  
scutellum. Dorsum of abdomen yellow with four  
fuscous longitudinal stripes; venter of abdomen  
yellow with a broad mid-ventral brown stripe ex-  
tending basally not beyond segment II, on each side  
a narrow stripe. Wings as figured. Legs predom-

antly yellow. Apical portion of front tibiae and entire tarsi, base of middle and hind femora and apical tarsal segments brown.

Comparative notes: This species would fall in Kröber's so called "Gruppe: vittatus". The hyaline triangle of the wings resembles that of C. sequax Will., but from this C. beameri differs by its yellow callosity and scutellum. It may be separated from C. pikei Whit. by the complete lateral abdominal stripes, the greater extent of the hyaline triangle, and also by the yellow callosity. From C. hinei Daecke it is distinguished by the hyaline triangle being broadly open at its base, cell C<sub>ul</sub> hyaline, and the more pronounced yellow of the dorsum of the thorax and scutellum.

Type data: Holotype, female; Comanche Co., Kansas; 2089 feet, 1916, R. H. Beamer. Paratypes, 11 females; same data. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Chrysops bistellata Daecke (1905)

- 1905 C. bistellatus Daecke, Ent. News, XVI, 249, figs.; N.J.  
 1907 C. bistellatus Daecke, Ent. News, XVIII, 141, fig.; N.J.  
 1907 C. bistellatus Hine, Bull. 93, La. Exp. Sta. 26, fig.; La.  
 1909 C. bistellatus Johnson, Smith Catalog; N.J.  
 1922 C. bistellatus Brimley, Ent. News, XXXIII, 230; N.C.  
 1926 C. bistellatus Kröber, Stett. Ent. Ztg., LXXXVII, 238, figs.; N.J., N.C.

Color: Yellow and brown; dorsum of thorax greenish gray with three brown stripes, scutellum yellowish, abdominal dorsum yellow with two broad brown stripes converging anteriorly; hyaline triangle of wings represented by a small spot in cell R3.

Size: Length, 8 - 9.5 mm.

Structural and color characters: Female: Vertex, frons and genae yellow pollinose; fronto-clypeus and lower portion of genae denuded, yellow; frontal callosity dark brown to black. Antennae slender, yellow; apical portion of flagellum black. Palpi yellow. Dorsum of thorax, pleurae and venter greenish gray to yellow gray pollinose with the usual distinct broad brown stripes; scutellum yellow or brown yellow. Dorsum of abdomen yellow with two broad brown stripes converging toward the base but not attaining the first segment. Apical segments caudad from V mostly brown. Venter of abdomen predominantly yellow at the base and brown at the apex. Halteres dark brown. Wings as figured. Legs yellow and brown; front coxae, femora and proximal portion of tibiae, middle femora tibiae and proximal parts of middle and hind tarsi, yellow.

Male: Unknown.

Comparative notes: This species has little or no affinities with other North American forms, it is

most distinct and separable beyond question from any other species described to date.

Remarks: The male is not yet reported. Daecke's description goes into more detail and points out the extent of variability in the abdominal pattern. Both Daecke (1905) and Kröber (1926) have figured the dorsum of the abdomen and the wing. Kröber's figure of the abdominal pattern over-accentuates the apical extent of yellow.

Type data: Described from sixteen females designated as cotypes; all from Browns Mills Junction, N. J., June 26, 1905. I have studied those in the United States National Museum and one cotype in the Snow Entomological Collection of the University of Kansas.

Distributional data:

UNITED STATES: New Jersey: Browns Mills Junction, June 25, 1905; June 24, 1906, July 1, 1906.

North Carolina: Lake Ellis, May 26, 1908.

Reported by others from the following general localities:

UNITED STATES: Louisiana.



Chrysops bishoppi, new species

Color: Yellow with black abdominal pattern; wing picture dilute.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Vertex, frons and sides of genae yellow pollinose; frontal callosity black; fronto-clypeus and oral margins of genae denuded yellow; the pits on each side of the fronto-clypeus and a tiny spot on the outer side of the oral margins of the genae, fuscous. Palpi yellow. Antennae variable; usually the scape and pedicel yellow with their outer and upper surfaces black, black pubescent; flagellum black, brown or yellowish at the base. Dorsum of thorax and scutellum green gray pollinose, sparsely yellow pubescent, the former with three fuscous stripes; pleurae and venter yellowish gray pollinose, the former with yellow pile. Dorsum of abdomen yellow; the first tergite with a black quadrate posteriorly emarginate spot beneath the scutellum, second tergite with a median black geminate figure, not attaining the posterior margin; tergites III and IV with a more or less double black geminate figure confined to the anterior half of the tergites; tergites V and VI more or less corresponding to the preceding, except the pattern seems to be composed of two posteriorly emarginate black spots confined to the anterior margins of the tergites; remaining tergite black with a yellow hind margin. Venter of abdomen yellow with a

small median black spot on segment I which may connect with another on segment II; segments III to V usually with a trace of black in the center confined to the anterior margins; remaining segments black with yellow hind margins. Halteres brown. Wings as figured; the picture very dilute brown; usually the infuscation of cell R is interrupted by hyaline before the apex. Legs orange yellow; the joints, apical portion of front tibiae and entire tarsi, apices of middle and hind tarsi, fuscous.

**Male:** Quite similar to the female, easily associated, exhibiting the usual sex differences and more melanism. The black figures of the abdominal dorsum are more extensive, the median geminate spot on tergite II thicker, in one specimen a black spot is present on each side. Cell 2a M of the wing exhibits about the same degree of infuscation as R. Legs like the female but with more fuscous as follows: dominant on the front coxae, large basal portions of front and hind femora, and extreme base of middle femora.

**Comparative notes:** Separated from C. fuscata Walker by the dilute wing picture, different abdominal pattern, absence of a black spot on each side of the fronto-dlypeus, and greater predominance of yellow on the abdomen and legs. The black frontal callosity and abdominal picture should at once distinguish this species from C. coloradensis Bigot.

**Remarks:** Described from reared specimens variously

determined as C. coloradensis Bigot and C. furcata Walker.

Type data: Holotype: Male; Topaz, California; July 16, 1917; Bishopp, No. 6764, Br 2. Allotype: Female; Topaz, California; June 27, 1917; Bishopp, No. 6867, Br.4.

Paratypes: Five males and seven females same locality, reared by Bishopp; May 16 to July 10, 1917. Holotype, allotype and six paratypes in the United States National Museum. Six paratypes in the Francis Huntington Snow Entomological Collection of the University of Kansas.

Chrysops brimleyi Hine (1904)

- 1904 C. brimleyi Hine, Can.Ent.,XXXVI,55; N.C.  
 1904 C. brimleyi Brimley and Sherman,Ent.News,XV,270;N.C.  
 1905 C. brimleyi Harbeck, Ent.News,XVI,341; N.J.  
 1907 C. brimleyi Daecke, Ent.News,XVIII, fig.;N.J.  
 1909 C. brimleyi Greene, Ent.News,XX,302,fig.; des.;N.J.  
 1918 C. brimleyi McAtee and Walton, Proc.Ent.Soc.Wash.,  
 XX,196; Va.,Ma.  
 1923 C. brimleyi Bequaert and Davis, Bull.Brook.Ent.Soc.,  
 XVIII,119; N.Y.  
 1926 C. brimleyi Kröber, Stett.Ent.Ztg.,LXXXVII,269;N.J.  
 1928 C. brimleyi Leonard, N.Y.State List, p.754; N.Y.

Color: Fuscous with gray pruinosity and pubescence.

Size: Length, 6 - 7 mm.

Structural and color characters: Female: Vertex, frons, and genae yellowish pollinose. Frontal callosity, lateral projections of the yellow fronto-clypeus, and lower margin of the genae, brown. Antennae slender, the flagellum exceeding the pedicel in thickness; scape and pedicel yellow, flagellum mostly black. Palpi brown. Dorsum of thorax and scutellum fuscous, light gray pubescent. The fuscous ground color of the pleurae and venter gray pruinose the former with whitish pile. Dorsum of abdomen fuscous with gray pubescence and narrow grayish hind margins on all the segments (in some specimens this last character is observed with difficulty); on the second and third segments the gray hind margins expand into small mid-dorsal triangles, more or less distinct. Venter of abdomen shining fuscous. Halteres fuscous. Wings as figured. Legs brown; more dilute on the

proximal portions of the anterior tibiae, median and posterior tarsi, and most of the median tibiae.

Male: According to Green (1909), "Like the female, except basal half of the antennae clothed with long black hair. Frontal triangle gray pollinose, with the apex shining black. Thorax black, clothed with black hairs, no stripes visible. The abdomen black, with the posterior margins of all the segments, except the first, gray pollinose. The wings differ from the female in having the basal end of the black crossband reaching slightly beyond the middle of the anal cell. The first basal cell has two hyaline spots near the apex, and the second basal cell one. First submarginal cell with a hyaline spot at the base. The discal cell has a hyaline spot at the base, the fifth posterior cell has a semihyaline spot at the base and one at the apex. The apical spot reaches downward over the upper end of the marginal cell, covering about half of the first submarginal and nearly all of the second submarginal cell. A small black spot at the apex of the posterior branch of the third vein. Length about 8 mm."

Comparative notes: Hine (1904) separates this species from C. niger Macq. from which it is distinguished by the presence of an apical spot on the wings, somewhat smaller size and different color. In this

last character C. brimleyi resembles C. fuliginosa Wied. but is immediately separated by the wing picture, color of antennae, etc.

Remarks: I have not been able to successfully identify the male. The description given for this sex by Greene (1909) is not satisfactory. Obviously it is a description of a specimen and not a species. He states that it is based upon one specimen from Glassboro, N. J., May 19, 1907, and that the females were very common. The description sounds suspiciously like that of C. fuliginosa Wied. which species should also be found in that locality. The presence of an infuscated spot at the bifurcation of vein R4+5 and the general extent of the infuscation of the wing is certainly applicable to the male of C. fuliginosa. The length, 8 mm. seems large for C. brimleyi, especially a male.

Type data: I have seen one metatype at the United States National Museum. Described from a number of specimens from Raleigh, N. C. April and May 1902.

Distributional data:

UNITED STATES: North Carolina: Raleigh, May 2, 1902, May 15, 1903, April 28, 1903, April 30, 1904, June 15, 1907.

New Jersey: Wenonah, May 30, 1905;  
Ocean Co., Clementon,  
May 30, 1906; Browns  
Mills Junction, July 4,  
1907; Lacy, May 27, 1906.

Reported by others from the following general  
localities:

UNITED STATES: New York; New Jersey; Maryland;  
Virginia; North Carolina.

Chrysops brunnea Hine (1903)

- 1903 C. brunneus Hine, Ohio State Acad. Sci. Spec. Pap.  
No. 5, p. 34; Ohio.  
1906 C. brunneus Daecke, Ent. News, VII, 41.  
1907 C. brunneus Hine, Bull. 93, La. Exp. Sta., 26, figs.; La.  
1907 C. brunneus Daecke, Ent. News, XVIII, 146; N.J.  
1916 C. brunneus Snyder, Proc. Ent. Soc. Wash., XVIII, 210; Fla.  
1918 C. brunneus McAtee and Walton, Proc. Ent. Soc. Wash.,  
XX, 197; Va.  
1926 C. brunneus Kröbber, Stett. Ent. Ztg., LXXXVII, 258; Ga., O.  
1927 C. brunneus Curran, Rept. Ent. Soc. Ont., p. 99; Ont.  
1928 C. brunneus Leonard, N.Y. State List, p. 754; N.Y.

Color: Light brown.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Frontal callosity, fronto-clypeus, genae, antennae, and palpi yellow; the usual areas with yellow pollen; apex of flagellum black. Scape and pedicel of antennae swollen, the former slightly more than the latter. Dorsum of thorax, pleurae and venter yellowish gray to greenish gray pollinose with distinct brown stripes;

scutellum yellow brown to dark brown. Dorsum of abdomen yellow brown to brown with more or less faint yellow white mid-dorsal triangles on segments II to V. Most specimens exhibit narrow pale hind margins to all segments except the first and second. Sometimes the mid-dorsal triangles have on each side near their apex a small oblique fuscous spot. Venter of abdomen mostly yellow at the base and brown at the apex, occasionally the brown being prolonged toward the base to form an obscure broken mid-ventral stripe on each side of which may appear a lateral streak. Halteres light brown. Wings as figured, the infuscation light brown. Legs yellow; the distal portion of the anterior tibiae and entire tarsi, and the four distal segments of the median and posterior tarsi, brown.

Male: Like the female except for the sex characters. One specimen at hand shows considerable dark brown occupying the entire disc of the last five or six abdominal segments, the whitish mid-dorsal triangles being obsolete.

Comparative notes: Allied to C. flavida Wied, however that species is more yellow; the abdominal pattern is more conspicuous, the black markings being more prevalent; the wing picture is usually a darker brown, the apical spot of less extent; the scape and pedicel



of the antennae much less swollen, in some instances would not be regarded as swollen at all. Hine (1903) states that the antennae of C. brunnea are noticeably longer than those of C. flavida. Daecke (1906) in his studies of the eye pattern of wing specimens has indicated that the occipital border in C. brunnea attains the hind margin of the eye whereas in C. flavida it does not.

Type data: I have studied Hine's types at the Ohio State Museum. Described from many specimens taken at Sandusky, Ohio from June to August, 1902.

Distributional data:

CANADA: Ontario: Point Pelee, Aug. 14-17, 1920.

UNITED STATES: New York: Watchogue, June 29, 1919.  
Staten Island, July 1916.

Ohio: Sandusky, June 21, 1899, July 1-12, 1902, Aug. 8, 1901, Aug. 1, 1902, July 3-14, 1903; Logan Co., June 15, 1930; Buckeye Lake, Aug. 3, 1929; Indian Lake, June 15, 1930.

Indiana: Miller, June 29, 1919.

Louisiana: Vinton, Sept. 5, 1916; Colcasien Co., July 21, 1917; Cameron, Aug. 14-28, 1903; New Orleans, Aug. 29, 1903.

Kansas: Doniphan Co., July 22, 1924.

Arizona: Near the Mexican Border.

Reported by others from the following general localities:

CANADA: Ontario.

UNITED STATES: New York; New Jersey; Virginia;  
Georgia; Florida; Louisiana; Ohio.

Chrysops callida Osten Sacken (1875)

- 1875 C. callidus Osten Sacken, Prodrôme, I, 379; N.J., Del., Mich., Ill.
- 1887 C. callidus Williston, Trans. Kans. Acad. Sci., X, 132; Wash.
- 1895 C. callidus Townsend, Trans. Am. Ent. Soc., XXII, 56; Va.
- 1895 C. callidus Hart, Bull. Ill. State Lab. N.H., IV; Ill.
- 1895 C. callidus Johnson, Proc. Acad. N.S. Phil., p. 321; Fla.
- 1903 C. callidus Hine, Ohio State Acad. Sci. Spec. Pap. No. 5, p. 35; Ohio.
- 1904 C. callidus Brimley and Sherman, Ent. News, XV, N.C.
- 1905 C. callidus Harbeck, Ent. News, XVI, 341; N.J.
- 1906 C. callidus Daecke, Ent. News, XVII, 42.
- 1907 C. callidus Daecke, Ent. News, XVIII, 145, fig.; N.J.
- 1907 C. callidus Hine, Bull. 93, La. Exp. Sta., p. 28, figs.; La.
- 1913 C. callidus Graenicher, Bull. Wis. N.H. Soc., X, 171; Wis.
- 1913 C. callidus Vental, Bull. Ill. State Lab. N.H., 55; Ill.
- 1913 C. callidus Johnson, Bull. Am. Mus. N.H., XXXII, 51; Fla.
- 1913 C. callidus Shelford, Animal Communities, p. 188; Ill.
- 1915 C. callidus Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVI, 194; Ont.
- 1917 C. callidus Marchand, Jl. N.Y. Ent. Soc., XXV, 150; biol.; N.J.
- 1918 C. callidus McAtee and Walton, Proc. Ent. Soc. Wash., XX, 196; D. C.
- 1920 C. callidus Criddle, Ent. Rec., Rept. Ent. Soc. Ont., LI, 82; Man.
- 1920 C. callidus Britton, Bull. Conn. St. Geol. N.H. Sur. V., XXXI, ; Conn. List
- 1920 C. callidus Marchand, Mon. Rock, Inst., p. 46, biol.
- 1923 C. callidus Jones and Bradley, Jl. Econ. Ent., XVI, 310; La.
- 1923 C. callida Bequaert and Davis, Bull. Brook. Ent. Soc., XVIII, 119; N.Y.
- 1924 C. callidus Jones and Bradley, Jl. Econ. Ent., XVII, 49.
- 1924 C. callidus Wehr, Neb. Univ. Studies, XXII, 113; Neb.
- 1925 C. callidus Johnson, Occ. Pap. Bost. Soc. N.H., VII, 100; N. Eng.



attains a broad geminate black figure, on the second segment, which may or may not continue along the posterior margin, and sometimes expands into black lateral spots on the yellow of that segment; remaining segments black with yellow posterior margins which expand into mid-dorsal triangles on III, IV, and V, which sometimes have on each side a yellow oblique spot. Venter of abdomen usually yellow at the base, the black of the apical segments extending toward the base as a broad broken median stripe with lateral streaks on each side. Wings as figured, sometimes the apex of cell M3 is not infuscated. Legs yellow and black, the former color distributed as follows: anterior coxae and base of tibiae, median tibiae and metatarsi, proximal half of posterior tibiae and metatarsi. In a few specimens which I am sure are this species, the front coxae are black. Male: Similar to the female except for sex characters; a more dense pubescence and pilosity; both cells R and 2d M infuscated except small hyaline areas near their apices; a greater portion of the legs black, i.e., the front coxae and most of the front and hind tibiae.

Comparative notes: See under description of C. aestuans Van der Wulp. The yellow sides of the second segment of the abdominal dorsum often show evidence of black

triangles encroaching from the posterior margin, this condition of course adds to the difficulties of separating these two species. Kröber (1926) separates his C. moerens confusa from C. callida principally on the extent of infuscation in cell M3, stating that the former shows this infuscation but half way, and the latter, completely; however, from large series of C. callida I am able to pick out specimens exhibiting both characters. The abdominal pattern is far too variable to be of much taxonomic value. In making measurements concerning the posterior convergence of the vertex in the females it was apparent that in general C. callida exhibits a greater convergence than C. aestuans. or to express it otherwise, the distance between the eyes across the ocellar area is greater in the latter than in the former.

Quoting from my notes taken on the types of C. callida O.S.: "As described. Abdomen quite variable as indicated. Venter yellow basally-- but not always entirely, for a brown spot may appear on I and II, as in one specimen. Wing pattern not wholly constant. No actual black triangles encroach on II of the dorsum, but a variation occurs which might permit this."

Remarks: It is self evident that to undertake describing a new variety from one specimen of the group of that most variable and difficult aestuans - callida complex, is a dangerous proceeding. But, this is exactly what Kröber (1926) has done.

Dr. G. S. Walley of the Entomological Branch, Ottawa, Canada, very kindly compared a specimen of C. callida O.S. data: (LaCrescent, Minn., Marsh Flats, June 16, 1925, C.B. Philip; det. Philip) with Kröber's type of C. moerens confusus and comments as follows: "General dorsal abdominal pattern--extremely similar to your specimen and the second segment identical - - Ventral aspect of abdomen -- a gradually broadening mid-ventral fuscous stripe commences at base of abdomen and extends posteriorly occupying the entire width of sternites 5, 6 and 7; mid-way between this and lateral margins on sternites 3 and 4 is a narrow fuscous stripe which on 5 unites with the median one. Legs -- hind femora are uniformly brownish except for narrow black apices, not entirely blackish as in your specimen."

Because of the locality (British Columbia) I am puzzled as to whether or not C. moerens confusa Kröber is an aberrant C. aestuans Van der Wulp or C. callida O.S., however, from point of separate-ness, comparison, and description it is more likely the latter species. To further verify my opinion,

I have other typical specimens of C. callida, same data as specimen compared. I am much more at a loss to understand why Kröber has related his new variety to C. coloradensis Bigot, for there are scarcely any similarities.

Type data: I have studied the types at the Museum of Comparative Zoology, and also the specimens of C. aestuans Van der Wulp which Osten Sacken used for comparison. Described from eleven females of which I was able to locate six. Osten Sacken (1875) gives as the habitat: New Jersey; Delaware; Connecticut; Detroit, Michigan; and Illinois.

Distributional data:

CANADA: Ontario.

UNITED STATES: Massachusetts: Longmeadow; Springfield; July 1, 1905.

New York: Buffalo, June 28, 1909;  
Cold Spring Harbor,  
June 20, 23, 1930; Ithaca.

Pennsylvania.

Maryland: Bay Ridge.

Virginia: Dixie Landing, June.  
Quantico, June 14, 1895.

Michigan: Oakland Co.; Berien Co.,  
Washtenaw Co.

Ohio: Cincinnati, May 30-31, 1902;  
 Columbus, May 24, 1899; June 7,  
 1902; Wauseon, July 8, 1898;  
 Summit Co., July 1, 1920;  
 Georgeville, June 4, 1899; Buck-  
 eye Lake, July 27-29, 1929;  
 Indian Lake, June 14, 1929,  
 June 15, 1930; Turkeyfoot Lake,  
 July 1, 1928; Ira; Logan Co.,  
 June 15, 1930; New Lexington,  
 June 13, 1925; Castalia, June  
 17-18, 1932; Ross Co., June 20,  
 1931; Erie Co., June 15, 1932;  
 Ottawa Co., July 13-14, 1932;  
 Licking Co., June 7, 1931, July  
 19, 1931; Streetsborough, June  
 21, 1932; Tuscarawas Co., June 22,  
 1932; Hocking Co., July 4, 1931;  
 Put-In-Bay, June 7, 1921.

Illinois: Algonquin, June 14, 1895;  
 June 22, 1909; Glen Ellyn,  
 June 30, 1903; Rockford,  
 July 5, 1932.

Mississippi: Scooba, July 17, 1930.

Minnesota: LaCrescent, June 16, 1925;  
 Roseau Co., June 29, 1920.

Nebraska: Mitchell, July 10, 1923.

Kansas: Clark Co., June; Doniphan Co.,  
 July 22, 1924; Sherman Co.,  
 Aug. 1, 1925; Scott Co.,  
 June 17, 1925; Pratt Co.;  
 Logan Co., June 22, 1925;  
 Douglas Co., June 12, 1923;  
 Montgomery Co., June 26, 1926.

Arkansas: Fayetteville, April 12-14,  
 1930 (reared by H.H. Schwardt)

Oklahoma: LeFlore, May 24, 1928; Tuska-  
 homa, May 23, 1928.



Colorado: Boulder, June 28, 1931.

Reported by others from the following general localities:

CANADA: Ontario; Manitoba; British Columbia.

UNITED STATES: Massachusetts; Connecticut; New York; New Jersey; Delaware; Maryland; Virginia; District of Columbia; North Carolina; Louisiana; Florida; Michigan; Ohio; Wisconsin; Illinois; Minnesota; Iowa; Nebraska; Kansas; Arkansas; Montana; Washington.

Chrysops carbonaria Walker (1848)

- 1848 C. carbonarius Walker, List, I, 203; N.S.  
 1848 C. carbonarius Walker, var.  $\gamma$ , l.c.  
 1901 C. carbonarius Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 303.  
 1904 C. carbonarius Hine, Ohio Nat., V, 220.  
 1907 C. carbonarius Daecke, Ent. News, XVIII, 140; N.J.  
 1908 C. carbonarius Hine,  
 1913 C. carbonarius Graenicher, Bull. Wis. N.H. Soc., X, 171, Wis.  
 1915 C. carbonarius Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVI, 194; Ont.  
 1917 C. carbonarius Cockerell, Proc. Biol. Soc. Wash., XXX, 19; Florissant, Col.  
 1918 C. carbonarius McAtee and Walton, Proc. Ent. Soc. Wash., XX, 197; Va.  
 1920 C. carbonarius Britton, Bull. Conn. State Geol. N.H. surv., XXXI, ; Conn.  
 1923 C. carbonarius O'Donoghue, Can. Field Nat., XXXV, no. 7, 19; Man.  
 1923 C. carbonarius Hine, Can. Ent., LV, 145; Alaska.  
 1923 C. carbonaria Bequaert and Davis, Bull. Brook. Ent. Soc., XVIII, 119; N.Y.

- 1924 C. carbonarius Wehr, Neb.Univ.Studies, XXII, III; Neb.  
 1925 C. carbonarius Johnson, Occ.Pap.Bost.Soc.N.H., VII, 99;  
 New Eng.  
 1926 C. carbonarius Kröber, Stett.Ent.Ztg., LXXXVII, 245.  
 1927 C. carbonarius Johnson, Ins.Mt.Des.Reg., p.179.  
 1928 C. carbonarius Leonard, N.Y.State List, p.754; N.Y.  
 1930 C. carbonarius Curran, Bull.Am.Mus.N.H., LXI, 37; N.Y.  
 1930 C. carbonarius Stone, Ann.Ent.Soc.Am., XXIII, 275,  
 biol.; N.Y.  
 1931 C. carbonarius Philip, Minn.Tech.Bull. LXXX, 84; Minn.

The following also refer to this species:

- 1848 C. niger Walker (nec Macq.), List, I, 202, N.Y.  
 1850 C. provocans Walker, Dipt.Saund., pt.1, p.73.  
 1850 ?C. ater Macquart, Dipt.Exot., Suppl., IV, 40.  
 1875 C. fugax Osten Sacken, Prodrôme, I, 375; Me., N.H., Can.  
 1887 C. fugax Williston, Trans.Kans.Acad.Sci., X, 132;  
 Mass., Col., Que.  
 1904 C. fugax Brimley and Sherman, Ent.News, XV, 270; N.C.  
 1906 C. fugax Daecke, Ent.News, XVII, 41.  
 1926 C. fugax Essig, Ins.W.N.A., p.554.

Color: Black.

Size: Length, 7 - 9 mm.

Structural and color characters: Female; Vertex yellow gray pollinose; frons, a streak on the fronto-clypeus, sides of genae yellow pollinose. Frontal callosity, fronto-clypeus, genae and palpi fuscous to shining black; occasionally the palpi display some red brown; the genae grayish to yellowish pilose. Antennae variable, usually the scape, pedicel and base of flagellum yellowish or reddish; apex of flagellum black. Dorsum of thorax and scutellum black with some green gray pruinosity and whitish pubescence, the former with obscure gray stripes, pleurae and venter black with considerable green gray pruinosity, the former with

gray yellow pile. Abdomen black with sparse intermixed black and pale pubescence, sometimes on the sides near the base dark gray pruinose; obscure gray mid-dorsal triangles sometimes present. Halteres black. Wings as figured, but there is a variable extent of infuscation and the presence of a hyaline spot at the base of cell M3 is not always clearly defined. Legs black; the extreme base of the front and middle tibiae, the middle and hind metatarsi, yellow or reddish.

Male: Like the female except for a greater extent of infuscation in cells R and 2d M of the wings. The hyaline spot at the base of cell M3 usually present. Cell 1st A and anal angle infuscated.

Comparative notes: To be separated from C. mitis O.S. by the presence of a hyaline spot at the apex of cell M3. Studied by series C. carbonaria is some smaller than C. mitis, and it appears that the latter is more apt to exhibit mid-dorsal triangles. Easily separated from C. niger Macq. by the extent of infuscation in cells R and 2d M of the wings.

Remarks: Philip (1931) has given an excellent discussion concerning the variability and separateness of C. carbonaria and C. mitis. He has shown the difficulties involved in separating the adults but

in the final analysis, resorting to larval characters, verified the distinctness of these two species.

Type data: The above description is based upon specimens compared with Walker's types by Major Austen at the British Museum. I have also studied the types (eight females) of C. fugax O.S. at the Museum of Comparative Zoology, Cambridge, Massachusetts. The synonymy of these two species is of too long standing to need further discussion. The type locality of Walker's species is Nova Scotia; Osten Sacken's, Canada, Maine, New Hampshire, Montana, Idaho, and the Yukon River.

Distributional data:

CANADA: Quebec: Chambly Co.; Anticosti, July 24, 1887; Montreal, May 20, 1904; Godbout, July 13, 1918.

Newfoundland: Spruce Brook, Aug. 8, 1912.

UNITED STATES: Maine: Saddleback Lake, July 18-20, 1916.

Massachusetts: Lowell, June 6, 1879.

New Hampshire: White Mts.

New York: Big Indian Valley, Catskill Mts., June 23-28, 1907; July 2-5, 1907, June 9, 1908; Ithaca, June; Richmond, June 21, 1912.

New Jersey: Buena Vista, June 11, 1893; Lakehurst, May 31, 1912; Browns Mills, June 11, 1921; Lakehurst, May 24-29, 1909; Clemonton, June 6, 1904, June 30, 1905; Da Costa,

June 4, 1905; Jamesburg,  
July 2.

Pennsylvania: Inglenook, June 21, 1910.

Maryland: Bladensburg, June 23, 1916.

North Carolina: Raleigh, May 15, 1903.

Michigan: Cheboygan Co., July 4, 1931.  
Gogebic Co., Aug. 15, 1919.

Ohio: Hocking Co., June 4-14, 1925.

Wisconsin: Fond d'Laoc, June 4, 1918.

Wyoming: Green River, July 2, 1920;  
Stewart R. Sta., July 18, 1920;  
Lauder.

Colorado: Boulder, June 28, 1931;  
Dawson, June 30, 1931;  
Durango, July 8, 1899.

Idaho: Montpelier, July 6, 1920.

Utah: Weber Canyon, July 4, 1931.

California: Los Angeles.

Reported by others from the following general  
localities:

CANADA: New Foundland; Nova Scotia; Quebec;

Ontario; Manitoba.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
Connecticut; New York; New Jersey;  
Virginia; North Carolina; Wisconsin;  
Minnesota; Nebraska; Wyoming; Colorado;  
Montana; Idaho; Alaska.

Chrysops celer Osten Sacken (1875)

- 1875 C. celer Osten Sacken, Prodrôme, I, 376; Middle States, Mass.  
1901 C. celer Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 301.  
1903 C. celer Hine, Ohio State Acad. Sci. Spec. Pap. no. 5, p. 36; Ohio.  
1904 C. celer Brimley and Sherman, Ent. News, XV, 270; N.C.  
1905 C. celer Washburn, 10th Rept. State Ent. Minn., p. 79; Minn.  
1906 C. celer Daecke, Ent. News, XVII, 41.  
1907 C. celer Daecke, Ent. News, XVIII, 39; N.J.  
1913 C. celer Graenicher, Bull. Wis. N.H. Soc., X, 172; Wis.  
1915 C. celer Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVI, 194; Nfd., Sask.  
1916 C. celer Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVII, Ont.  
1918 C. celer McAtee and Walton, Proc. Ent. Soc. Wash., XX, 197; D.C.  
1920 C. celer Britton, Bull. Conn. St. Geol. N.H. Surv., XXXI, Conn. List.  
1920 C. celer Marchand, Mon. Rock. Inst., p. 47.  
1923 C. celer Bequaert and Davis, Bull. Brook. Ent. Soc. XVIII, 120; N.Y.  
1925 C. celer Johnson, Proc. Bost. Soc. N.H., LXXVIII, 68; Me.  
1925 C. celer Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99; N. Eng.  
1926 C. celer Kröber, Stett. Ent. Ztg., LXXXVII, 244.  
1927 C. celer Johnson, Ins. Mt. Des. Reg., p. 179.  
1928 C. celer Leonard, N.Y. State List, p. 754; N.Y.  
1930 C. celer Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.  
1930 C. celer Stone, Ann. Ent. Soc. Am., XXIII, 279, biol.; N.Y.  
1931 C. celer Schwardt, Jl. Kans. Ent. Soc., IV, 7, biol., Ark.  
1931 C. celer Philip, Minn. Tech. Bull., LXXX, 84; Minn.

Color: Black, the female with dense orange pile on the pleurae.

Size: Length, 8 - 11 mm.

Structural and color characters: Female: Vertex, frons, a broad longitudinal stripe on the fronto-clypeus, sides of genae, yellow or gray yellow pollinose; frontal callosity, ocellar area, fronto-clypeus and oral regions of genae, black. Antennae reddish yellow except the black apex of the flagellum. Palpi reddish brown to fuscous. Thoracic dorsum and scutellum black with white pubescence, the former faintly striped with gray; pleurae and venter black with grayish pruinosity, the former with dense orange pile. Dorsum of abdomen black with white pubescence and more or less indistinct gray mid-dorsal triangles on segments II and III. Venter of abdomen black with white pubescence. Ocelli brown. Wings as figured. Legs black; middle and hind metatarsi yellow; the front coxae, middle and hind femora with white hairs.

Male: Differs from the female as follows: The antennae are mostly black; pleurae black pilose; cell 1st A of the wings infuscated, and a greater extent of infuscation in cells R and 2d M.

Comparative notes: Distinguished from C. amazon Daecke by the absence of an apical spot on the wing. The females are readily separated from other species of the group lacking an apical spot by the heavy orange pile of the pleurae. Hine (1903) states, "The male is distinguished from that of niger by

the hyaline spots at the apex of the basal cells, occupying the whole width of these cells; and from that of fugax (C. carbonaria Walker) by the crossband practically filling out the fourth posterior cell". From C. excitans Walker the male is separated by the wholly black pubescence of the abdomen and entirely black antennae.

Remarks: Ricardo (1901) doubtfully makes C. celer O.S. and C. cincticornis Walker synonyms. In this she has been followed by others, all with a doubt. Major Austen of the British Museum has compared one of my specimens of C. celer with Walker's type of C. cincticornis and asserts that they are not the same.

Type data: Described from eight females of which I have seen four. In the Museum of Comparative Zoology, Cambridge, Massachusetts. Habitat given as Middle States and Massachusetts.

Distributional data:

CANADA: Quebec: Montreal, July 21, 1904; Isle of Quebec, July 23, 1903; St. Johns, July 1; Ile de Montreal, July 27, 1906.

UNITED STATES: Maine: Meddybemps, July 3-17, 1922.

New York: Cold Spring Harbor,  
May 27, 1923.

North Carolina: Raleigh, May 7, 1902;  
Southern Pines, May 4,  
1908.



Pennsylvania: Chambersburg, June 8.

Michigan: Cheboygan Co., June 29, 1929.

Ohio: Columbus, May 26; May 20, 1899, May 30, 1900; London, May 25, 1902; Ira, July 1, 1920; Cedar Swamp; June 7, 1927; Turkeyfoot Lake, July 1, 1928; Fort Ancient, June 10-12, 1902.

Illinois: Chicago, June 12-13, 1926.

Reported by others from the following general localities:

CANADA: Newfoundland; Nova Scotia; Quebec; Ontario;  
Saskatchewan.

UNITED STATES: Maine; Massachusetts; Connecticut;  
New York; New Jersey; District of Columbia; Virginia; North Carolina;  
Ohio; Wisconsin; Minnesota;  
Arkansas.

Chrysops clavicornis, new species

Color: Yellow, with black abdominal pattern; appendages yellow.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Vertex, frontal callosity, fronto-clypeus, genae, and palpi yellow, the usual regions with yellow pollen. Ocellar area, a margin around the callosity, and a spot on the

genae, brown. Vertex and genae with rather dense pile. Scape and pedicel of antennae yellow with black hairs, flagellum mostly black; the bottle-shaped scape is distinctly swollen. Dorsum of thorax and scutellum yellow gray pollinose, pilose, the former with faint brown stripes. Pleurae and sternal region yellow gray pollinose with fuscous stripes, the former with dense yellow white pile. Dorsum of abdomen yellow with a quadrate black spot under the scutellum which nearly unites with the geminate spot of the second segment. Segments III, IV and V usually with a double geminate black spot; the remaining segments black; all with yellow posterior margins. Sometimes a small black lateral spot appears on segment II, in one specimen also on segment I. Venter of abdomen yellow with a complete fuscous mid-stripe and two lateral stripes. Wings as figured, the hyaline triangle sometimes more broadly open at the base; in one specimen the apical spot definitely ending in cell R5. Legs yellow; all joints, apical portion of front tibiae and entire tarsi, apical tarsal segments of middle and hind legs, fuscous. Posterior tibiae with rather long black hairs.

Male: Predominantly black. Head and its appendages as described for the female except the sex characters. Thorax and scutellum exhibit more brown ground color, more densely pilose. First abdominal segment almost entirely black except the yellow latero-posterior margin; second with a large trapezoidal black spot encroached upon from the posterior margin by a yellow triangle, the yellow on each side with a black spot; the remaining segments as in the female, except that black is more dominant. Venter of abdomen yellow with three black stripes. Wing picture like the female, except that the infuscation of cell 2d M is equal to that of cell R, and the base of cell 1st A is infuscated. Legs as described for the female, in addition, the apical portion of the front femora and of the hind tibiae are fuscous.

Comparative notes: The abdominal pattern resembles that of C. coquilletti Mine, from which C. clavicornis may be separated by the much greater extent of the apical spot and the more narrow hyaline triangle. The characteristic bottle-shaped scape of the antennae generally does not appear to be so swollen as in any of the related species.

Type data: Holotype, male; San Diego Co., California; July 7, 1929, R. H. Beamer. Allotype, female; same data. Paratypes, four females; same data, one female same locality and date; Paul W. Oman; one female,

Los Angeles Co., California; one female, Riverside, California, Mission Inn; September 3, 1930; D. Martin. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Chrysops coloradensis Bigot (1892)

- 1892 C. coloradensis Bigot, Mem. Soc. Zool. Franc., V, 605; Col.  
 1901 C. coloradensis Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 307.  
 1904 C. coloradensis Hine, Ohio Nat., V, 220; Col., Wash.  
 1913 C. coloradensis Aldrich, Ent. News, XXIV, 218; Nev.  
 1921 C. coloradensis Cole and Lovett, Proc. Calif. Acad. Sci., XI, 232; Ore. List.  
 1926 C. coloradensis Kröber, Stett. Ent. Ztg. LXXXVII, 293, Col.

Color: Tawny with black abdominal pattern, and considerable yellowish pubescence throughout.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Frontal callosity yellow, margined above with brown; fronto-clypeus, genae and palpi orange yellow; the pits on each side of the fronto-clypeus and a small spot near the oral margin of the genae, brown; the usual areas yellow pollinose. A brown line usually connects the more or less denuded ocellar area and the frontal callosity. Antennae yellow and black as follows: Scape and pedicel on inner and lower surfaces yellow, on outer and most of upper surfaces black, with black pubescence; flagellum yellowish at base, black at apex. Dorsum of thorax and scutellum green gray to

yellow gray pollinose, the former with three broad brown stripes, the latter sometimes appears plumbeus. The pruinosity of the pleurae and venter of the thorax broken by the usual brown stripes. Dorsum of abdomen tawny yellow with a black emarginate quadrate spot beneath the scutellum, not attaining the hind margin of the first segment; second segment with two obliquely angulate black spots on the disc, not attaining either margin; in addition to these spots on the third, fourth and fifth segments is a black lateral spot, often the black figures on these segments may be in the form of two geminate spots; remaining segments black with yellow hind margins. Venter of abdomen yellow, usually with a mid-ventral brown stripe and the usual lateral ones; apical segments brown with yellow hind margins. I have one specimen without a trace of a mid-ventral stripe. Halteres yellow with brown knobs. Wings as figured. Legs yellow; all joints, apical portion of anterior tibiae and entire tarsi, the four distal segments of the median and posterior tarsi, brown.

Male: Unknown.

Comparative notes: Hine (1904) has related C. coloradensis to C. proclivis O.S., but it appears more closely allied to C. furcata Walker from which it may be separated by the yellow frontal callosity and

generally greater extent of yellow in the facial regions, and the two spots on the second abdominal tergite instead of a single geminate one. In both C. proclivis and C. furcata the prevailing yellow is more orange whereas in C. coloradensis it is more tawny. Kröber (1926) states, ". . . grosse Ähnlichkeit mit furcatus (C. montana), lupus (C. furcata) und moerens." Ricardo (1901) redescribes the type and she also relates this species to C. furcata Walker.

Remarks: I have not been able to find large series for study.

Type data: Two females from Colorado. In the British Museum. The other specimens of the series are C. fulvaster O.S. See Ricardo (1901).

Distributional data:

UNITED STATES: Nevada: Fallon, June 17-18, 1930,  
4000 feet.

California: Oroville, May 11, 1921;  
Orange Co., July 14, 1929.

Reported by others from the following general localities:

UNITED STATES: Colorado; Washington; Oregon;  
Nevada.

Chrysops coquilletti Hine (1904)

1904 C. coquilletti Hine, Ohio Nat., V, 220; S. Calif.  
 1926 C. coquilletti Kröber, Stett. Ent. Ztg., LXXXVII, 263.

Color: Yellow, with black abdominal pattern; appendages mostly yellow.

Size: Length, 8 - 9 mm.

Structural and color characters: Female: Vertex broader than long, yellow pollinose; sides of genae and a mid-streak on the fronto-clypeus yellow pollinose; region immediately surrounding antennae white pollinose; ocellar area denuded, black; frontal callosity yellow margined above with black; fronto-clypeus and oral margin of genae yellow, the latter with a small fuscous spot. Palpi yellow. Antennae incrassate, the scape extremely bulbous, practically swollen uniformly throughout; both scape and pedicel yellow with black pubescence; flagellum black except for a little yellow at the base. Dorsum of thorax and scutellum fuscous, pruinose, with yellowish pile, the former with gray with gray yellow pollinose stripes; pleurae and venter gray yellow pollinose with the usual brown stripes, the former with yellowish pile. Dorsum of abdomen yellow with a quadrate black spot beneath the scutellum, posteriorly emarginate; second segment with a heavy geminate black mid-spot which attains the anterior margin; segments III, IV and V

each with four black spots, the median pair the larger and conforming more nearly to the geminate spot on segment II; remaining segments mostly black with yellow hind margins. Venter of abdomen yellow with a black median stripe and the usual black lateral stripes; apical segments black with yellow hind margins. Halteres yellow. Wings as figured; the apical spot including less than half of cell R4. Legs yellow, all the joints, apical portion of front tibiae and entire tarsi, the four apical segments of the middle and hind tarsi, black.

Male: Like the female except for sex characters. The dorsal abdominal pattern differs as follows: The black quadrate spot beneath the scutellum is more extensive, scarcely emarginate posteriorly, and practically coalesces with the black geminate figure on the second tergite; on the third tergite the median pair of angular black spots are fused anteriorly, the lateral black spots are much smaller; remaining tergites like the female.

Venter of abdomen like the female. Wings like the female; the base of cell 1st A is hyaline, the extent of infuscation into cell 2d M is not more than in the female. Legs like the female; in one specimen the apical portion of the hind tibiae is black.

Comparative notes: This species is generally larger



than C. pachycera Will. and as a rule both sexes exhibit much more black on the abdomen; in the female the infuscation of cell 2d M in C. pachycera is more confined to the base than in C. coquilletti where it often continues tapering toward vein M and ending with the infuscation of cell R, however, in the male, the infuscation of cell 2d M in the former is more extensive than in the latter; frequently the wing picture of C. pachycera is fenestrate, but I have never seen this condition in C. coquilletti. From C. clavicornis n.sp. C. coquilletti may be easily separated by the scape of the antennae which is practically barrel-shaped and extremely swollen, in the former the scape is not so swollen and is typically bottle-shaped; also the extent of the apical spot of the wing in C. clavicornis is considerably greater than in C. coquilletti. Also see under description of C. robusta n.sp.

Remarks: Part of Hine's types are my C. clavicornis. See under type data.

Type data: Two females and one male labelled "cotypes" in the Ohio State Museum. One female, Los Angeles Co., California; April; collection Coquillett, I accept as the true C. coquilletti Hine and hereby designate this specimen as the holotype. One female, Pasadena, California; June 12, 1895; R. W. Doane, is my C. clavicornis; the bottle-shaped scape of the antennae, the extent of

the apical spot of the wing into cell R5, and a black lateral spot on the second abdominal tergite easily identify this specimen. One male, Los Angeles Co., California; collection Coquillett, conforms well to my male of C. clavicornis. For the allotype of C. coquilletti I select the male of my description, Marin Co., California, August 3, 1929, R. H. Beamer; in the Francis Huntington Snow Entomological Collection of the University of Kansas.

Distributional data:

UNITED STATES: California: Dulzura, San Diego Co., May 15, 1917;  
Poway Co., San Diego Co., April 12, 1930.

Chrysops cuclux Whitney (1879)

- 1879 C. cuclux Whitney, Can. Ent., 35; N.H.  
 1906 C. cuclux Daecke, Ent. News, XVII, 404.  
 1907 C. cuclux Daecke, Ent. News, XVIII, 140; N.J.  
 1911 C. cuclux Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLII, Que.  
 1918 C. cuclux McAtee and Walton, Proc. Ent. Soc. Wash., XX, 197; Md.  
 1920 C. cuclux Britton, Bull. Conn. St. Geol. N.H. Surv., XXXI, Conn. List.  
 1922 C. cuclux Brimley, Ent. News, XXXIII, 230; N.C.  
 1925 C. cuclux Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99; N. Eng. List.  
 1926 C. cuclux Kröber, Stett. Ent. Ztg., LXXXVII, 253.  
 1928 C. cuclux Leonard, N.Y. State List, p. 754; N.Y.  
 1930 C. cuclux Curran, Bull. Amer. Mus. N.H., LXI, 37; N.Y.  
 1930 C. cuclux Stone, Ann. Ent. Soc. Am., XXIII, 280, biol.; N.Y.  
 1931 C. cuclux Philip, Minn. Tech. Bull., LXXX, 85.

The following also refers to this species:

1901 C. cuchix Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 300.

Color: Fuscous, abdomen with a gray yellow spot on each side near the base, crossband of wings not saturate.

Size: Length, 7 - 9 mm.

Structural and color characters: Female: Frontal callosity, ocellar space, fronto-clypeus and oral margins of genae, dark brown; vertex, frons, sides of genae, and a broad longitudinal stripe on the fronto-clypeus, grayish yellow to creamy yellow pollinose. Antennae rather slender; the scape and pedicel yellowish, flagellum black except for a little yellow at the base. Palpi brown. Thoracic dorsum and scutellum black with whitish pubescence; pleurae and venter with the black ground color hidden by some gray pruinosity, the former with yellow white pile. Dorsum of abdomen fuscous with whitish pubescence; the sides of the first two segments deeply encroached upon by gray yellow spots. Venter of abdomen fuscous with whitish pubescence. Halteres fuscous. Wings as figured, the picture dilutely infuscated. Legs brown except the yellowish median and posterior metatarsi.

Male: I have not recognized this sex.

Comparative notes: Whitney (1879) compares this species to C. sordida O.S., stating, ". . . but is smaller, lacks the gray posterior margins of the

abdominal segments, the crossband is more abbreviated and lighter colored, and the second basal cell is further infuscated". C. cuclux is a distinct species and should offer no difficulties in separating it from any of the group lacking the apical spot on the wing.

Type data: Described from seventeen females all taken at Milford, New Hampshire in June. Four of these are still preserved at the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: Nova Scotia: Kings Co., June 24, 1931.

Quebec: Rigaud, May 24, 1902; St. Johns Co.,

UNITED STATES: Maine: Meddybemps, June 28, 1922; Orono, June 1899.

New Hampshire: Milford, June 1899; Durham, May 30, 1904.

Massachusetts: Gt. Barrington, June 16, 1915; Sudbury.

New York: Mosholu, June 10, 1905.

Pennsylvania: Charter Oak; Pittsburgh.

Michigan: Schoolcraft Co., July 6, 1915; Mackinac Co., June 16, 1920, June 10, 1921.

Ohio: Ira; Turkeyfoot Lake, June 1, 1928; Loudonville, June 6, 1915; Summit Co., June 8, 1926; June 20, 1909.

Reported by others from the following general localities:

CANADA: Quebec; Ontario.

UNITED STATES: New Hampshire; Massachusetts; New York; New Jersey; Maryland; North Carolina.

Chrysops cursim Whitney (1879)

- 1879 C. cursim Whitney, Can. Ent., XI, 36; N.H.  
 1887 C. cursim Williston, Trans. Kans. Acad. Sci., X, 134  
 (syn. of C. pudica O.S.)  
 1901 C. cursim Ricardo, Ann. and Mag. N.H. ser. 7, VIII, 300.  
 1905 C. cursim Harbeck, Ent. News, XVI, 341; N.J.  
 1905 C. cursim Daecke, Ent. News, XVI, 342; N.J.  
 1906 C. cursim Daecke, Ent. News, XVII, 41.  
 1907 C. cursim Daecke, Ent. News, XVIII; N.J.  
 1908 C. cursim Brimley and Sherman, Ent. News, XIX, 168; N.C.  
 1914 C. cursim Whitney, Can. Ent., XLVI, 345; N.J., Pa., Mass.  
 1920 C. cursim Britton, Bull. Conn. St. Geol. N.H. Surv.,  
 XXXI, Conn. List.  
 1923 C. cursim Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 120; N.Y.  
 1925 C. cursim Johnson, Occ. Pap. Bost. Soc. N.H., VII, 100;  
 Conn., N.H., Mass.  
 1928 C. cursim Leonard, N.Y. State List, p. 754; N.Y.

Color: Yellow, with more or less faded black abdominal pattern; crossband of the wings very dilute.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Frontal callosity, fronto-clypeus, genae, palpi, basal segments of antennae yellow; the usual areas pollinosed including the ocellar space; flagellum of antennae black apically. Dorsum of thorax and scutellum with

gray yellow pollen, the former with brown stripes; pleurae and venter pruinose with the usual stripes. Dorsum of abdomen yellow with an inverted V-shaped black spot on the second segment which does not attain either margin; the remaining segments with more or less emarginate black bands on their anterior margins, sometimes these figures conform more or less to the spot on segment II. Venter of abdomen yellow, only the extreme apex fuscous. Halteres yellowish. Wings as figured, the dilute crossband inclined to be irregular. Legs yellow; apical portions of front and hind femora and tibiae, entire front tarsi and distal four segments of middle and hind tarsi, brown.

Male: Similar to the female except for the usual sex characters. and the crossband usually more saturate.

Comparative notes: This species is related to C. pudica O.S. of which Williston (1887) considers it a synonym. Kröber (1926) follows Williston, but undoubtedly lacks any other evidence. I have seen no intergrading forms, so I prefer to consider these as two distinct species. C. cursim exhibits more yellow throughout; the crossband is much more dilute and usually more irregular; the frontal callosity is always yellow, sometimes margined above with brown.

In C. pudica the frontal callosity is variable, often brown; the dorsum of the thorax and scutellum are more plumbeus; the hind femora are mostly fuscous at the base; a black spot is usually present beneath the scutellum; both the dorsum and venter of the abdomen exhibit a greater extent of black.

Type data: Described from six females Milford, N.H.  
June.

Distributional data:

UNITED STATES: New Jersey: Lakehurst, July 4, 1909;  
Malaga, July 20, 1907;  
Jamesburg, July 4, 1905.

North Carolina: Lake Ellis, May 24,  
1907; Raleigh, June 10,  
1903, June 16, 1906;  
Southern Pines, May 23,  
1908.

Florida: Escambia Co., June 6, 1924;  
Suwanee Co., April 28, 1924;  
Alachua Co., April 12, 1923.

Reported by others from the following general  
localities:

UNITED STATES: New Hampshire; Massachusetts;  
Connecticut; New York; New Jersey;  
Pennsylvania.

Chrysope delicatula Osten Sacken (1875)

- 1875 C. delicatulus Osten Sacken, Prodrôme, I, 380; N.H.  
 1906 C. delicatulus Daecke, Ent. News, XVII, 42.  
 1907 C. delicatulus Daecke, Ent. News, XVIII, 144; N.J.  
 1916 C. delicatulus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLVII, Ont.  
 1920 C. delicatulus Britton, Bull. Conn. St. Geol. N.H. Surv.,  
 XXXI, Conn. List.  
 1923 C. delicatula Bequaert and Davis, Bull. Brook. Ent.  
 Soc., XVIII, 120; N.Y.  
 1925 C. delicatulus Johnson, Occ. Pap. Bost. Soc. N.H., VII,  
 100; N.H., Mass., Conn.  
 1926 C. delicatulus Kröber, Stett. Ent. Ztg, LXXXVII, 265.  
 1928 C. delicatulus Leonard, N.Y. State List, p. 754; N.Y.

The following also refers to this species:

- 1904 C. delicatus Fletcher, 34th Rept. Ent. Soc. Ont., p. 98.

Color: Predominantly black with creamy yellow abdominal triangles.

Size: Length, 6.5 - 8 mm.

Structural and color characters: Female: Vertex, frons, sides of genae, ocellar area, yellow to creamy yellow pollinose; frontal callosity a spot on each side of the fronto-clypeus, a spot on the oral area of the genae dark brown to black; fronto-clypeus, palpi, scape and pedicel of antennae reddish yellow; flagellum of antennae black except the reddish basal portion. Thoracic dorsum, pleurae and venter gray yellow pruinose with the usual brown stripes. Scutellum plumbeus. Dorsum of abdomen yellow with a black quadrate spot beneath the scutellum, not quite attaining a black geminate figure on the second segment which may or may not continue along the posterior margin; remaining seg-



ments black, the yellow hind margins of III, IV and V expanding into small mid-dorsal triangles. Venter of abdomen yellow, the anterior margins caudad from III, black; black lateral streaks usually present. Halteres fuscous. Wings as pictured. Legs black; the proximal portion of the front tibiae, nearly all of the middle tibiae, the middle and hind metatarsi, reddish yellow.

Male: Not identified; probably much like the female except for greater melanism.

Comparative notes: To be separated from C. callida O.S. by its generally smaller size; the crossband of the wings attenuated posteriorly; and the brown spots on the fronto-clypeus and genae.

Type data: Described from two females from North Conway, New Hampshire, middle of August, 1874. I have studied both specimens; they have faded somewhat, but otherwise are in good condition. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Maine: Orono, June, 1899.

New Hampshire: North Conway, Aug. 1874.

Connecticut:

New York: Chappaqua, June 29, 1919.

New Jersey: Lakehurst, June 29, 1911;  
July 2, 1912; June 25,  
1919; Browns Mills Junction  
June 24, 1906; July 4, 1907;  
June 12, 28, 29, 1921.

Michigan: Montmorency Co., July 14, 1923;  
Dexter, July 3, 1923.

Reported by others from the following general  
localities:

CANADA: Ontario.

UNITED STATES: New Hampshire; Connecticut;

Massachusetts; New York; New Jersey.

Chrysops dimmocki Hine (1905)

- 1905 C. dimmocki Hine, Ohio Nat., VI, 393; Mass., N.J., Ohio.  
1906 C. dimmocki Daecke, Ent. News, XVII, 41.  
1907 C. dimmocki Daecke, Ent. News, XVIII, 145; N.J.  
1908 C. dimmocki Brimley and Sherman, Ent. News, XIX, 168; N.C.  
1918 C. dimmocki McAtee and Walton, Proc. Ent. Soc. Wash.,  
XX, 197; Md., Va.  
1920 C. dimmocki Britton, Bull. Conn. St. Geol. N.H. Surv.,  
XXXI, Conn. List.  
1923 C. dimmocki Bequaert and Davis, Bull. Brook. Ent. Soc.,  
XVIII, 120; N.Y.  
1925 C. dimmocki Johnson, occ. Pap. Bost. Soc. N.H., VII, 100;  
Mass., R.I., Conn.  
1926 C. dimmocki Kröber, Stett. Ent. Ztg., LXXXVII, 294.  
1928 C. dimmocki Leonard, N.Y. State List, p. 754; N.Y.

Color: Black, with yellow abdominal triangles.

Size: Length, 7.5 - 9 mm.

Structural and color characters: Female: Vertex, frons  
and side of genae with gray yellow pollen; fronto-clypeus,

genae, palpi and basal segments of antennae, yellow; flagellum of antennae yellow basally and black apically; frontal callosity variable, black to yellow. Dorsum of thorax greenish gray pollinose with three brown stripes; pleurae and venter grayish yellow pollinose with the usual brown stripes; scutellum concolorous with thoracic dorsum, sometimes yellow at the tip. First abdominal tergite with a quadrate black spot beneath the scutellum, not attaining the posterior margin; second tergite with an inverted V-shaped or geminate black spot attaining the anterior margin and may or may not follow along the posterior margin; remaining segments more or less black, the yellow posterior margins expanding into mid-dorsal triangles. Venter of abdomen yellow, a black spot, successively increasing in size on segments III, IV and V; remaining segments black with yellow hind margins; the usual brown lateral streaks present. Wings as figured. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, large basal portion of hind femora, apex of hind tibiae, apical four tarsal segments of middle and hind legs, fuscous.

Male: I have but one specimen which I believe to be the male of this species. Superficially it approximates this sex in C. sackeni Hine, but the greater extent of infuscation in cell 2d M and the broader

apical spot offer separable characters. It differs from the female as follows: Thoracic dorsum and scutellum darker; the median yellow triangles on the abdominal dorsum practically obsolete, tergites III and IV yellow on the sides; the black quadrate median spots of the venter attain the base; cells R and 2d M of the wing considerably infuscated except for a small hyaline space near their apices, cells Cul and 1st A more extensively infuscated. Legs fuscous, bases of front and hind tibiae, entire middle tibiae, middle and hind metatarsi, yellow.

Comparative notes: This species is related to C. pudica O.S. from which it should be separated by the greater extent of the apical spot into cell R4. In general there is a greater extent of black on the abdominal dorsum of C. dimmocki, and the vertex of the median figure on the second tergite reaches the anterior margin. Based on the original descriptions these two could be separated by the black frontal callosity in C. dimmocki and the yellow one in C. pudica, but unfortunately this character is variable in each species. The characters offered by the apical spot of the wing and the dorsal abdominal pattern have thus far proved most useful, although I have at hand specimens which show intergradation.

Type data: I have studied the types. Described from one female, Longmeadow, Massachusetts and eight other specimens from Columbus and Wauseon, Ohio; and Anglesea and Westfield, New Jersey. Five cotypes in the Ohio State Museum.

Distributional data:

UNITED STATES: Massachusetts: Woods Hole, July 24, 1903.

Connecticut: New Haven, June 27, 1910.

New York: Hampstead, June 31, 1921;  
Riverhead, June 30, 1921;  
Cold Spring Harbor,  
June 23, 1930.

New Jersey: Anglesea, June 11, 1905;  
Westfield, June 19, 1904.

North Carolina: Lake Ellis, May 27,  
1907; May 8, 1906.

Georgia: Mimsville, May 9-25, 1907,  
June 8, 1907.

Florida: Hillsboro Co., March 17, 1925.

Ohio: Indian Lake, June 14, 1929;  
Jackson Co., June 12, 1932.

Reported by others from the following general localities:

UNITED STATES: Massachusetts; Rhode Island; Connecticut; New York; New Jersey; Maryland; Virginia; North Carolina; Georgia; Ohio.

Chrysops discalis Williston (1880)

- 1880 C. discalis Williston, Trans.Conn.Acad.Sci.,VI,  
245;Wyo.,Col.
- 1904 C. discalis Mine, Ohio Nat.V,221,3 desc.;Mont.,Utah.
- 1913 C. discalis Aldrich, Ent.News,XXIV,215-218;Utah,Nev.
- 1920 C. discalis Criddle, Ent.Rec.,Rept.Ent.Soc.Ont.,  
LI,82;Man.
- 1921 C. discalis Cole and Lovett, Proc.Cal.Acad.Sci.,XI,  
232;Ore.List.
- 1921 C. discalis Francis, Public Health Reports,XXXVI,  
1731-1792 (Transmission of  
tularaemia); Utah.
- 1922 C. discalis Francis and Mayne, Bull.130,U.S.Pub.Health  
Service, Hyg.Lab.,p.8.
- 1924 C. discalis Wehr, Nebr.Univ.Studies,XXII,112;Neb.
- 1926 C. discalis Essig, Ins. W.N.A.,p.554.
- 1926 C. discalis Cameron, Bull.Ent.Res.,XVII,18(larva  
and pupa); Man.,Sask.
- 1931 C. discalis Knowlton, Can.Ent.,LXIII,153;Utah.
- 1926 Heterochrysops discalis Kröbber, Stett.Ent.Ztg.,  
LXXXVII,236.

Color: Female: Gray to yellow gray with black spots on the abdomen, the wing picture fenestrate. Male: Predominantly black with yellow gray spots on the abdomen, the wing picture fenestrate.

Size: Length, 8 - 10.5 mm.

Structural and color characters: Female: Vertex, frons, ocellar area, sides of genae, and a broad stripe the full length of the fronto-clypeus creamy yellow pollinose; frontal callosity and a small spot on the fronto-clypeus just next the pollinose stripe, black; remainder of fronto-clypeus, a spot on the oral margin of the genae, and palpi pale yellow. Antennae mostly black, the scape and pedicel often yellowish on their inner and lower surfaces, with black and white pubescence intermixed. Dorsum of thorax and scutellum

gray yellow pollinose the former with three brown stripes; pleurae and venter gray yellow pollinose with the usual brown stripes, the former with dense yellow white pile. Dorsum of abdomen gray yellow with a black spot, broader than long, beneath the scutellum, not attaining the hind margin of the first segment; second segment with two black angular spots on the disc whose bases attain the anterior margin and whose apices are directed toward the posterior margin which they do not reach; on the remaining segments these spots become successively smaller; in some specimens the extreme apical segments are mostly black with yellowish hind margins; in addition to these markings, all segments have a black spot on each side. Venter of abdomen yellow with a black spot on the disc of each segment becoming successively larger toward the apex; the usual lateral streaks appear as dotted lines. Halteres yellow with brown knobs. Wings as figured, the hyaline discal cell and spot at the bifurcation of vein R4+5 are quite characteristic. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, the proximal four segments of the middle and hind tarsi, brown.

Male: Darker than the female, but readily associated. Head similar to that of female except for sex characters; the antennae wholly black. Dorsum of thorax

and scutellum predominantly black, the former with gray pollinose stripes; pleurae and venter black with pollinose stripes, the pile of the former black and white intermixed. Dorsum of abdomen with first segment entirely black except for a small yellow lateral spot; remaining segments black, the gray yellow posterior margins encroaching to form mid-dorsal triangles on each side of which is a longer spot almost attaining the anterior margin of the segment; segments VI and VII mostly black with narrow yellow hind margins. Venter of abdomen like the female, except the black occupies more space. Wing picture like the female except a much greater extent of infuscation in all cells. Legs black; the extreme base of the front tibiae, apex of middle femora, middle and hind tibiae except extreme apex, middle and hind metatarsi, yellow.

Comparative notes: C. discalis is distinct from all other North American species. The general color and wing pattern is suggestive of C. fulvaster O.S. but the swollen antennae of that species, smaller size, etc. will easily separate it.

Type data: One female in the Snow Entomological Collection of the University of Kansas.

Distributional data:



UNITED STATES: North Dakota: Devil's Lake, July 19,  
1919, July 19, 1920.

Nebraska: Mitchell, July 10, 1923.

Utah: Great Salt Lake, June 8, 1915;  
Collinston, June 8, 1912; Willard,  
June 11, 1930; Ferry, May 17, 1930;  
Corrine, June 12 and Aug. 5, 1929;  
Bert, Aug. 16, 1930; Snowville;  
Aug. 27, 1931; Lampo, June 2,  
1931; Magna, June 3, 1932.

Wyoming: Green River, July 7, 1920;  
Rawlins, June 17 to 26, 1920;  
Medicine Bow, June 23, 1920;  
Rock Springs, June 29, 1920.

Nevada: Pyramid Lake, June 10, 1911.

Oregon: Boardman, July 15, 1931.

California: Mojave Desert, May 23, 1917.

Reported by others from the following general  
localities:

CANADA: Manitoba; Saskatchewan.

UNITED STATES: Nebraska; Colorado; Montana;  
Wyoming; Utah; Nevada; Oregon.

Chrysops dissimilis new species

Color: Mouldy brown gray, wing pattern not saturate, appendages mostly yellow.

Size: Length 8 mm.

Structural and color characters: Female: Ocelli, frontal callosity, fronto-clypeus, and genae yellow. Vertex, frons, a mid-streak on the fronto-clypeus and that area of the genae next the fronto-clypeus yellow pollinose. Antennae yellow except the apical extremities of the flagellum; scape somewhat elongate, distinctly more swollen than the pedicel. Palpi yellow, Dorsum of thorax, scutellum, pleurae and venter of thorax a sort of mouldy greenish gray, the first with brownish stripes. Pile of pleurae sparse, whitish. Dorsum of abdomen mouldy yellowish gray with two narrow broken longitudinal brown stripes; venter of abdomen concolorous with a broad mid-ventral brown stripe. Wings as figured, the crossband more dilutely infuscated than the costal area and the apical spot. Legs yellow. The joints, apical portion of front tibiae and entire tarsi, the last four tarsal segments of the middle and hind legs, brown.

Comparative notes: The color of this species seems to defy description. Its closest relative appears to be C. altivaga O.S., which has not been reported north of Mexico. From this C. dissimilis differs

in having yellow antennae, frontal callosity and legs. Cell Cul is hyaline and the apical spot is not broadly separated from the crossband.

Type data: Holotype, female; Roosevelt Co., New Mexico, July 7, 1927, R. H. Beamer. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

I was somewhat hesitant to describe a Chrysops from only one specimen, but the species seems so distinct from all others north of Mexico, that I am reasonably certain that there need be no confusion concerning its identity.

Chrysops divisa Walker (1848)

- 1848 C. divisus Walker, List, I, 204; Fla.  
 1901 C. divisus Ricardo, Ann. and Mag. N.H. ser. 7, VIII, 303, (syn.)  
 1913 C. divisus Johnson, Bull. Am. Mus. N.H., XXXII, 51; Fla.

The following also refers to this species:

- 1875 C. atropos Osten Sacken, Prodrôme, I, 372; Fla.  
 1926 C. atropos Kröber, Stett. Ent. Ztg., LXXXVII, 240.

Color: Black, wings infuscated completely to distal margin of crossband.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Vertex, frons, sides of genae yellow pollinose; ocellar area, frontal callosity, fronto-clypeus, genae, palpi, and antennae

fuscous to black. Thorax and abdomen black with sparse whitish pubescence; pleurae with black pile. Halteres black. Wings as figured, cells Cul, 1st A, and the anal angle more dilutely infuscated. Legs black; middle and hind metatarsi yellowish.

Male: This sex has never been reported.

Comparative notes: Easily distinguished from any other species lacking the apical spot of the wing by the wing picture.

Remarks: Ricardo (1901) has established the synonymy of C. divisa Walker and C. atropos O.S., but Kröber (1926) recognizes the synonymy with a doubt.

Type data: The above description is based on a specimen compared with Walker's type in the British Museum by Major Austen. I have also studied the specimens on which Osten Sacken based his description of C. atropos. Nine females remain in the Museum of Comparative Zoology, Cambridge, Massachusetts, among them the type of the description.

Distributional data:

UNITED STATES: Florida: Tampa; Plant City, April 26, 1926; Alachua Co., March 31, 1908, May 18, 1922.

Reported by others from the following general localities:

UNITED STATES: Florida.

Chrysops dorsovittata Hine (1907)

1907 C. dorsovittatus Hine, Ohio Nat., VIII, 229; Ga., Fla.

1913 C. dorsovittatus Johnson, Bull. Am. Mus. N.H., XXXII,  
52; Fla.

1922 C. dorsovittatus Brimley, Ent. News, XXXIII, 230; N.C.

1926 C. dorsovittatus Kröber. Stett. Ent. Ztg., LXXXVII, 325.

Color: Black and yellow, the yellow of the abdominal dorsum with a broad black longitudinal stripe.

Size: Length, 6.5 - 7 mm.

Structural and color characters: Female: Vertex, frons, sides of genae, a longitudinal stripe on the fronto-clypeus, yellow pollinose; ocellar space, frontal callosity, fronto-clypeus and genae, black. Scape of antennae yellow; pedicel and base of flagellum red brown; apex of flagellum black. Palpi dark brown. Dorsum of thorax and scutellum fuscous, the former with yellow gray pollinose stripes; pleurae and venter yellow pollinose with the usual brown stripes. Dorsum of abdomen yellow, the apical three or four segments fuscous, which color extends to the base as a broad median stripe; and on each side as a narrow lateral stripe to the anterior margin of the third segment. Venter of abdomen mostly fuscous, only the first two segments and the sides of the third, yellow. Halteres brown. Wings as figured. Legs black; the front coxae, base of front and middle tibiae, middle and hind metatarsi yellow.

Male: Like the female; cell 2d M at the base and the margins along vein Cu infuscated.

Comparative notes: A distinct species. Readily recognized by the mid-dorsal abdominal stripe and its small size.

Type data: Described from one female from Georgia and a male from Florida. I have studied both in Hine Collection at the Ohio State Museum.

Distributional data:

UNITED STATES: Maryland: Glenburnie, June 22, 1922.

North Carolina: Southern Pines,  
May, 1909.

Reported by others from the following general localities:

UNITED STATES: North Carolina; Georgia; Florida.

Chrysops excitans Walker (1850)

- 1850 C. excitans Walker, Dipt. Saund., I, 72; Cape Breton.  
 1875 C. excitans Osten Sacken, Prodrôme, I, 373; Can. N.Y. N.H.  
 1887 C. excitans Williston, Trans. Kans. Acad. Sci., X, 132;  
 Wash.  
 1895 C. excitans Hart, Bull. Ill. State Lab. N.H., IV, Ill.  
 1902 C. excitans Howard, Ins. Book, pl. XVI, f. 16.  
 1904 C. excitans Hine, Ohio Nat., V, 222; B.C.  
 1906 C. excitans Daecke, Ent. News, XVII, 312.  
 1907 C. excitans Daecke, Ent. News, XVIII, 139; N.J.  
 1913 C. excitans Graenicher, Bull. Wis. N.H. Soc., X, 172; Wis.  
 1921 C. excitans Cole and Lovett, Proc. Cal. Acad. Sci., XI,  
 232; Ore. List.  
 1925 C. excitans Johnson, Proc. Bost. Soc. N.H., XXXVIII, 68; Me.  
 1925 C. excitans Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99;  
 N. Eng. List.  
 1926 C. excitans Cameron, Bull. Ent. Res., XVII, 19, figs.,  
 (larva and pupa); Man.

- 1926 C. excitans Essig, Ins.W.N.A., p.554.  
 1926 C. excitans Kröber, Stett.Ent.Ztg., LXXXVII, 250.  
 1927 C. excitans Johnson, Ins.Mt.Des.Reg., p.179.  
 1928 C. excitans Leonard, N.Y.State List, p.754; N.Y.  
 1929 C. excitans Johnson, Psyche, XXXVI, 134; Lab.  
 1931 C. excitans Philip, Minn.Tech.Bull., LXXX, 85; Minn.

The following also refers to this species:

- 1905 C. sordidus Washburn, 10th Rept.State Ent.Minn.,  
 p.79; Minn.

Color: Black, with a large yellow spot on each side of the abdominal dorsum near the base. Abdominal triangles conspicuous or obsolete.

Size: Length, 7 - 12 mm.

Structural and color characters: Female: Vertex, frons, sides of genae, and a broad longitudinal median stripe on the fronto-clypeus, yellow pollinose. Frontal callosity, ocellar area, fronto-clypeus, and genae black. Scape of antennae yellow; pedicel and base of flagellum reddish brown to yellow; apex of flagellum black. Palpi black. Dorsum of thorax and scutellum black with dense yellowish pubescence, the former with faint grayish pruinose stripes; pleurae and venter gray yellow pruinose, the former with heavy yellow pile. Dorsum of abdomen black with a yellow lateral spot on each side near the base. The extent of this spot is quite variable; sometimes ending at the hind margin of the second segment and in some large specimens extending beyond the hind margin of the third segment. A mid-dorsal yellow triangle often occurs on the second segment, sometimes on the third and a trace

on the fourth; in small specimens there is scarcely a trace of these triangles. Venter of abdomen mostly black, sometimes yellow at the base. Halteres brown. Wings as figured, the crossband and infuscation in cells R and 2d M subject to variation. Legs black; the extreme apices the front and middle tibiae, the middle and hind metatarsi, yellow.

Male: According to Osten Sacken (1875) this sex is entirely black. The thorax with black and some yellowish pubescence intermixed. The black abdomen with some yellow pubescence and a faint gray mid-dorsal triangle on segment II. Infuscation of wings of greater extent in cells R and 2d M. Cell 1st A and the anal angle lightly infuscated.

Comparative notes: See under description of C. noctifer O.S. Separated from C. sordida O.S. by the absence of gray hind margins of the abdominal segments.

Remarks: The extreme variation within this species makes description difficult and not seeing large series would tend to make one dubious as to properly placing specimens. Fortunately I have a series of more than one hundred females from northern Michigan which exhibit all the variations in size and pattern that I have mentioned. Also see Philip (1931)



Type data: In two females which were compared with Walker's types in the British Museum by Major Austen, the yellow lateral spot on the dorsum of the abdomen does not extend beyond the posterior margin of the second segment; the mid-dorsal triangles are obsolete.

Distributional data:

CANADA: Newfoundland: Spruce Brook, Aug. 8, 1912;  
Red Indian Lake, July 20, 1906.

Labrador: St. Lewis Inlet, July 12, 1906.

Ontario: Temagami Forest.

British Columbia: Vancouver, June 11, 1905.

UNITED STATES: Maine: Orono, July 1, 1899; Saddleback Lake, July 18-20, 1916.

New Hampshire: Durham.

New York: Cranberry Lake, July 26, 1917.

New Jersey: Lacy, May 27, 1906.

Michigan: Montmorency Co., July 14, 1923;  
Charlevoix Co., June 18, 1920;  
Schoolcraft Co., July 2-26,  
1915; Otsego Co., July 11,  
1923; Cheboygan Co., Douglas  
Lake, June and July 1925,  
1926, 1929, 1931.

Wisconsin: Amery, June 4, 1918.

Minnesota: Stillwater, June 15, 1925.

Reported by others from the following general localities:

CANADA: Labrador; Quebec; Ontario; Manitoba;  
British Columbia.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
New York; New Jersey; Michigan;  
Wisconsin; Illinois; Minnesota;  
Washington; Oregon.

Chrysops facialis Townsend (1897)

- 1897 C. facialis Townsend, Psyche, VIII, 39; H.M.  
1904 C. facialis Hine, Ohio Nat., V, 223; N.M.  
1926 C. facialis Kröber, Stett. Ent. Ztg., LXXXVII, 261.

Color: Black and yellow, the dorsum of the abdomen with some black more or less geminate figures.

Size: Length, 8 mm.

Structural and color characters: Female: Vertex, frons, a narrow stripe on the fronto-clypeus, and sides of genae, yellow pollinose. Ocellar area, a line leading from it to the frontal callosity, this latter, oral margins of genae, a row of four spots across the fronto-clypeus, fuscous to black; remainder of fronto-clypeus and palpi reddish to brown. Scape of antennae swollen, the outer surfaces black, inner surfaces yellow; pedicel not so swollen, may be colored like the scape or concolorous with the red-

dish base of the flagellum; apex of flagellum black; both scape and pedicel with black hairs. Dorsum of thorax and scutellum black, the former with faint gray yellow stripes; pleurae and venter yellow pollinose with brown stripes, the former with dense yellow pile. Dorsum of abdomen yellow with a black quadrate emarginate spot beneath the scutellum; second and third segments each with a pair of triangular black spots on the disc whose bases are united at the anterior margin of the segment; fourth and fifth segments with a more or less double geminate black spot; remaining segments mostly black; all segments with narrow yellow hind margins. Venter of abdomen yellow with a median row of large quadrate black spots which toward the apex extend the full width of the segments; each side with a black stripe, between this and the median row of spots is a dotted black line; all segments with narrow yellow hind margins. Halteres yellow. Wings as figured. Legs yellow; the joints, apex of front tibiae and entire tarsi, apical four segments of the middle and hind tarsi, black.

Male: According to Hine (1904); "Colored like the female except more black on legs and wings. In the latter the apical triangle is the same in both sexes, but in each basal cell there is only a small

hyaline spot, and the hyaline in the anal cell is much reduced".

Comparative notes: Separated from others of the group with incrassate antennae by the black frontal callosity and four black spots across the fronto-clypeus. See remarks.

Remarks: I have seen but two females. The advisability of using the black frontal callosity as a character is questionable. In one specimen from Arizona the frontal callosity is yellow bordered with black, but conforms in all other respects to the description.

Type data: Described from one female, West Fork, New Mexico, July 19. In the British Museum. My identification is based on a homotype in the United States National Museum.

Distributional data:

UNITED STATES: Arizona: Coconino Co., July 1, 1929; Oak Creek Canyon, 6000 feet, July.

Reported by others from the following locality:

UNITED STATES: New Mexico.

Chrysops flavida Wiedemann (1821)

- 1821 C. flavidus Wiedemann, Dipt. Exot. I, 105; Ga.  
 1828 C. flavidus Wiedemann, Auss. Zw., I, 199.  
 1875 C. flavidus Osten Sacken, Prodrôme, I, 385; Can., R. I.,  
 N. Y., Md.  
 1885 C. flavidus Keen, Can. Ent., XVII, 51; Pa.  
 1895 C. flavidus Johnson, Proc. Acad. N. S. Phil., Fla.  
 1895 C. flavidus Hart, Bull. Ill. State Lab. N. H., IV, Ill.  
 1901 C. flavidus Ricardo, Ann. and Mag. N. H., ser. 7, VIII, 300.  
 1901 C. flavidus Hine, Ohio Nat., II, 168; Ohio.  
 1903 C. flavidus Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, p. 37;  
 Ohio.  
 1904 C. flavidus Brinley and Sherman, Ent. News, XV, 270; N. C.  
 1905 C. flavidus Harbeck, Ent. News, XVI, 341; N. J.  
 1905 C. flavidus Slosson, Ent. News, XVI, 70; Fla.  
 1905 C. flavidus Daecke, Ent. News, XVI, 342; N. J.  
 1906 C. flavidus Daecke, Ent. News, XVII, 41.  
 1907 C. flavidus Daecke, Ent. News, XVIII, 146; N. J.  
 1907 C. flavidus Hine, Bull. 95, La. Exp. Sta., 29; La.  
 1909 C. flavidus Johnson, Psyche, XVI, 7; Me. to Fla.  
 1913 C. flavidus Johnson, Bull. Am. Mus. N. H., XXXII, 51; Fla.  
 1918 C. flavidus Mosier and Snyder, Proc. Ent. Soc. Wash.,  
 XX, 126, 184.  
 1919 C. flavidus Mosier and Snyder, Proc. Ent. Soc. Wash.,  
 XXI, 188; Fla.  
 1920 C. flavidus Britton, Bull. Conn. Geol. N. H. Surv.,  
 XXXI, Conn. List.  
 1923 C. flavida Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 120; N. Y.  
 1923 C. flavidus Jones and Bradley, Jl. Econ. Ent., XVI, 310; La.  
 1924 C. flavidus Jones and Bradley, Jl. Econ. Ent., XVII, 49.  
 1925 C. flavida Johnson, Occ. pap. Ent. Soc. N. H., VII, 100;  
 N. Eng. List.  
 1925 C. flavidus Johnson, Proc. Ent. Soc. N. H., XXXVIII, 68; Me.  
 1925 C. flavidus Hine, Occ. Pap. Mus. Zool. U. of Mich., 1762,  
 p. 19; Cuba.  
 1926 C. flavidus Kröber, Konowia, IV, 329; Ga., Ill.  
 1926 C. flavidus Kröber, Stett. Ent. Ztg., LXXXVII, 291.  
 1928 C. flavidus Leonard, N. Y. State List, p. 755; N. Y.  
 1930 C. flavidus Johnson, List Dipt. Nantucket, p. 127.  
 1930 C. flavidus Schwardt and Hall, Bull. 256, Ark. Exp.  
 Sta., 14; Ark.  
 1931 C. flavidus Schwardt, Jl. Kans. Ent. Soc., IV, 7, larva; Ark.

The following also refer to this species:

- 1848 C. canifrons Walker, List, I, 197  
 1859 C. pallidus Bellardi, Saggio, I, 73, pl. II, f. 16; Mex.

Color: Yellow, with brown abdominal pattern.

Size: Length, 7 - 10 mm.

Structural and color characters: Female: Variable.

Frontal callosity, fronto-clypeus, genae, and palpi yellow, the usual areas including the ocellar space with yellow pollen. Antennae slightly swollen or not; the scape, pedicel and base of flagellum yellow to brown yellow, the first two with black pubescence; apex of flagellum black. Thoracic dorsum, pleurae and venter yellow or gray yellow pollinose with the usual brown stripes; scutellum yellow to brown, or sometimes yellow with a brown spot at the base. Dorsum of abdomen yellow, the second segment with a more or less inverted V-shaped brown figure at the posterior margin; remaining segments with emarginate brown bands which become nearly plain near the apex; posterior margins of the segments caudad from III, yellow. Venter of abdomen yellow at base; anterior margins of apical segments brown, which color may or may not appear in the form of quadrate median spots on segments III, IV, and V; usually traces of brown lateral streaks.

Halteres brown. Wings typically as figured, although the extent of infuscation, especially of the apical spot and anal area shows considerable variation.

Sometimes the apical spot fades gradually toward the posterior margin of the wing and the crossband fades

into the anal area and toward the base of the wing. Daecke (1907) has shown some of these variations. In some specimens the wing picture is nearly similar to that figured for C. brunnea Hine. Legs yellow; the joints and distal half of the tibiae and entire tarsi of the front legs, the four distal tarsal segments of the middle and hind legs, brown. Sometimes the hind femora and tibiae are more brown than yellow.

Male: Like the female except for sex characters, more densely pilose.

Comparative notes: See under description of C. brunnea Hine. I have some specimens from Florida which superficially resemble C. pudica O.S. but the greater extent of the apical spot into cell R4, the absence of a black spot under the scutellum and the yellow hind femora easily identified them. The male may be confused with the male of C. cursim Whit. The wing picture and color of the thoracic dorsum and scutellum will aid in separation.

Remarks: Because of the variation within this species I have taken it out in two places in the key to females. Whether or not the antennae of C. flavida are swollen is perhaps a matter of opinion. In most cases the antennae are midway between what is generally con-

sidered as distinctly incrassate (C. pachycera Will.)  
and slender (C. vittata Wied.).

Type data:

Distributional data:

UNITED STATES: Massachusetts: Cohasset, July 15, 1905,  
Aug. 20, 1907; Woods  
Hole, July 25, 1904,  
July 26, 1903.

Maryland: Bay Ridge, June 16, 1899,  
July 2, 1899,

North Carolina: Raleigh, June 10, 1903.

Georgia: Wrens, Aug. 22, 1930.

Florida: Homestead; Plant City,  
Aug. 15, 1930; Cape Sable,  
Feb. 25, 1919; Fort Pierce,  
Aug. 7, 1930; Wildwood,  
Aug. 2, 1930; Fruitville,  
Aug. 11, 1930; Key Largo,  
Aug. 9, 1930; Everglades,  
Aug. 11, 1930; Royal Palm  
Park, Aug. 10, 1930;  
Hilliard, Aug. 19, 1930.

Alabama: Delchamps, August, 1912.

Indiana: Miller, July 23, 1919

Illinois: Pulaski, May 25, 1932,  
June 28, 1909.



Louisiana: Lecompte, Aug. 25, 1906;  
Buras, July 8-11, 1906.

Kansas: Doniphan Co., July 22, 1924.

Arkansas: Fayetteville, June 4, 1930.

Texas: Galveston, May; Hidalgo Co.,  
July 30, 1928; College Station,  
May 2, 1919; Brownsville,  
March 11.

BAHAMA ISLANDS: New Providence, June 30, 1897.

CUBA: Havana: Gabriel, June.

Reported by others from the following general  
localities:

BRITISH AMERICA.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
Rhode Island; Connecticut; New York;  
Pennsylvania; New Jersey; Maryland;  
Virginia; North Carolina; Georgia;  
Florida; Ohio; Illinois; Kansas;  
Arkansas; Louisiana.

CUBA.

MEXICO.

Chrysops frigida Osten Sacken (1875)

- 1875 C. frigidus Osten Sacken, Prodrôme, I, 384; Can., N.Y.,  
Mass.
- 1876 C. frigidus Osten Sacken, Prodrôme, II, 474.
- 1903 C. frigidus Hine, O. State Acad. Sci. Spec. Pap. No. 5,  
p. 37; Ohio
- 1904 C. frigidus Fletcher, 34th Rept. Ent. Soc. Ont., p. 98;  
Man., B.C.
- 1904 C. frigidus Hine, Ohio Nat., V, 223; Wash.
- 1907 C. frigidus Daecke, Ent. News, XVIII, 145; N.J.
- 1908 C. frigidus Hine,
- 1913 C. frigidus Graenicher, Bull. Wis. N.H. Soc., X, 171; Wis.
- 1913 C. frigidus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
XLIV, N.B.
- 1915 C. frigidus Gibson, Ent. Red., Rept. Ent. Soc. Ont.,  
XLVI, Nfd.
- 1920 C. frigidus Britton, Bull. Conn. Geol. N.H. Surv., XXXI,  
Conn. List.
- 1925 C. frigida Johnson, Occ. Pap. Bost. Soc. N.H., VII, 101;  
N. Eng. List.
- 1926 C. frigidus Cameron, Bull. Ent. Res., XVII, 20; Man.
- 1926 C. frigidus Kröber, Stett. Ent. Ztg., LXXXVII, 330.
- 1927 C. frigidus Johnson, Ins. Mt. Des. Reg., p. 179.
- 1928 C. frigidus Leonard, N.Y. State List, p. 755; N.Y.
- 1930 C. frigidus Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.
- 1930 C. frigidus Johnson, List Dipt. Nantucket, p. 127.
- 1931 C. frigidus Philip, Minn. Tech. Bull. LXXX, 86; Minn.

The following also refers to this species:

- 1926 C. canadensis Kröber, Stett. Ent. Ztg., LXXXVII, 277.

Color: Black and golden yellow, extent of both colors  
extremely variable on both abdomen and legs.

Size: Length, 6.5 - 8 mm.

Structural and color characters: Female: A variable  
species. Ocellar area, frontal callosity, fronto-  
clypeus and oral margins of genae, black; vertex, frons,  
a streak down the center of the fronto-clypeus, sides  
of genae, yellow pollinose. Antennae with a variable  
amount of black and yellow on the scape and pedicel,  
the black usually dominant on the latter; base of

flagellum sometimes reddish or yellow, usually the entire flagellum is black. Palpi yellow to yellow brown. Dorsum of thorax and scutellum shining black with some yellowish pruinosity which on the former takes the form of more or less faint stripes; pleurae and venter gray yellow pruinose with black stripes, the former with bright yellow pile. Dorsum of abdomen yellow with a black quadrate or trapezoidal spot beneath the scutellum which practically attains the hind margin of the first segment, here it merges with a broader than long black more or less pentagonal spot on the second segment emarginate posteriorly. In some specimens the black spot on segment II is rectangular and confined to the anterior margin, however, it is practically always emarginate. Remaining segments predominantly black with yellow hind margins tending to expand into mid-dorsal triangles. Venter of abdomen yellow at the base, the apical segments black with yellow posterior margins; sometimes a black spot is present on the disc of the first two or three basal segments. Halteres yellowish to black. Wings as figured. Legs variable, in some forms predominantly yellow, in others black. In the former, the front coxae, extreme bases and apices of all femora, distal tarsal segments, dark; in the latter, the base of the front tibiae, most of the middle and

hind tibiae and metatarsi, yellow.

Male: Head as in the female except for sex characters. Thorax more densely yellow pubescent and pilose. Dorsum of abdomen yellow with a median broad black trapezoidal spot on each of the first four segments; remaining segments mostly black; all segments with narrow yellow hind margins. In some specimens the abdominal pattern is much like the female, except the black spots instead of being emarginate posteriorly are more or less produced. Venter of abdomen exhibiting variations as in the female, in one specimen almost entirely black, except for the narrow yellow hind margins of the segments and traces of yellow at the sides near the base. Halteres yellowish to black. Wings with a greater extent of infuscation of cells R and 2d M and in the anal area. Legs variable, usually with more black than in the female.

Comparative notes: The peculiar abdominal pattern should easily separate this species from others with an apical spot on the wing and black fronto-clypeus with a mid-streak of yellow pollen, namely C. pertinax Will., C. amazon Daecke and C. noctifer O.S. In the first two the abdomen is wholly black; in the last, the apical spot includes only the extreme apex of cell R4, the apex of the hyaline triangle extends

beyond vein R2+3, and the yellow of the abdomen is confined to the sides near the base. C. frigida is probably close to C. pilumna Kröber (assuming this latter to be a distinct species and not an aberrant or teneral C. frigida). In Kröber's species the fronto-clypeus is yellow, lacking a pollinose mid-streak, and the first abdominal tergite is almost completely black, the legs are predominantly yellow.

Remarks: I have had a male specimen of C. frigida compared with Kröber's type of C. canadensis; except for slight variations, they are identical. Dr. Walley, of the Canadian National Museum, who made the comparisons, states that Kröber's specimen seems slightly teneral and also adds as follows: "General dorsal abdominal pattern . . . First tergite with median blackish portion a little broader than in your specimen, thus postero-lateral paler portions slightly reduced. Second tergite with blackish portion a little broader than your specimen and continued (though slightly less heavily blackish) to apex of tergite. remaining tergites maculate as in your specimen except that blackish bands are more transverse with less tendency to be produced posteriorly in the middle. Fronto-clypeus, face, and cheeks agree in color with your specimen. Facets of eyes . . . of two sizes as in your specimen."

Type data: I have studied the types (five females and "two hypothetical males") in the Museum of Comparative Zoology, Cambridge, Massachusetts. Habitat, according to Osten Sacken (1875): Great Slave Lake and Northwestern Regions of the British Possessions; Saskatchewan; Quebec; New York; Massachusetts.

Distributional data:

CANADA: Quebec: Val Morin, June 16, 1904.

Manitoba: Kettle Rapids, near Winnipeg,  
July 16, 1917.

British Columbia: Hope Mts., July 18, 1906.

UNITED STATES: Massachusetts: Southboro; Melrose  
Highlands, June 12;  
Cambridge; Springfield.

Michigan: Cheboygan Co., July 2, 1927,  
July 21, 1929, July 1, 1931;  
Oakland Co., July 25, 1923;  
Alger Co., July 1916.

Ohio: Sandusky, June 8, 1902.

Washington: Copalis, July 25, 1931.

Reported by others from the following general  
localities:

CANADA: Newfoundland; Quebec; New Brunswick; Ontario;  
Manitoba; Saskatchewan; British Columbia.

UNITED STATES: Massachusetts; New Hampshire;  
Connecticut; New York; New Jersey;  
Ohio; Wisconsin; Minnesota; Washington

Chrysops fuliginosa Wiedemann (1821)

- 1821 C. fuliginosus Wiedemann, Dipt. Exot., I, 109; N.A.  
 1913 C. fuliginosus Johnson, Bull. Am. Mus. N.H., XLXII, 52; Fla.  
 1923 C. fuliginosus Johnson, Maine Nat., III, 9; Me.  
 1925 C. fuliginosus Johnson, Proc. Bost. Soc. N.H., XXXVIII,  
 68; Mass.  
 1925 C. fuliginosa Johnson, Occ. Pap. Bost. N.H. Soc., VII, 99;  
 N. Eng.  
 1926 C. fuliginosus Curran, Record, 56; N.S.  
 1926 C. fuliginosus Kröber, Stett. Ent. Ztg., LXXXVII, 311.  
 1927 C. fuliginosus Johnson, Ins. Mt. Des. Reg., p. 179.  
 1928 C. fuliginosus Leonard, N.Y. State List, p. 755; N.Y.  
 1930 C. fuliginosus Johnson, List, Dipt. Nantucket, p. 127.

The following also refer to this species:

- 1828 C. plangens Wiedemann, Auss. Zw., I, 210; Ga.  
 1875 C. plangens Osten Sacken, Prodrôme I, 393; Atlantic  
 States.  
 1895 C. plangens Johnson, Proc. Acad. N.S. Phil., p. 303; Fla.  
 1905 C. plangens Daecke, Ent. News, XVI, 342; N.J.  
 1906 C. plangens Daecke, Ent. News, XVII, 42.  
 1907 C. plangens Daecke, Ent. News, XVIII, 141; N.W.  
 1909 C. plangens Johnson, Psyche, XVI, 9; Me. to Fla.  
 1913 C. plangens Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLIV, 15; Halifax  
 1918 C. plangens Mosier and Snyder, Proc. Ent. Soc. Wash.,  
 XX, 126, 184.  
 1919 C. plangens Mosier and Snyder, Proc. Ent. Soc. Wash.,  
 XXI, 181, 195; Fla.  
 1920 C. plangens Britton, Bull. Conn. Geol. N.H. Surv.,  
 XXXI, Conn. List.  
 1923 C. plangens Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 121; N.Y.

Color: Gray black or brown; infuscation of wings not  
 very saturate, usually a distinct spot at the bifur-  
 cation of vein R4+5.

Size: Length, 6 - 7.5 mm.

Structural and color characters: Female: Vertex, frons, and sides of genae yellow pollinose; ocellar space, frontal callosity sides of fronto-clypeus, oral margins of genae, and palpi, fuscous; fronto-clypeus and basal segments of antennae yellow to brown yellow; apical segments of flagellum black; sometimes the scape and pedicel considerably darkened. Dorsum of thorax and scutellum fuscous with yellowish pubescence, the former with obscure grayish to gray yellow pollinose stripes; pleurae and venter grayish pollinose with brown stripes, the former with more or less fulvous pile. Dorsum of abdomen gray brown, all segments with narrow yellowish hind margins; the dark color on the disc of the first three or four segments more pronounced and forming obscure but definite geminate spots. Venter of abdomen gray brown with very narrow yellowish hind margins to the segments. Halteres brown. Wings as figured; a faint tooth-like projection from the crossband to the bifurcation of vein R4+5 present or absent. Legs brown; the extreme base of the front tibiae, most of the median tibiae, sometimes the basal portion of the hind tibiae, the median hind metatarsi, yellow.

Male: Darker than the female. Antennae fuscous. Pile of the pleurae black. Abdomen fuscous. The wings more extensively infuscated; The apex of the



hyaline triangle beyond vein R4+5 represented by a mere hyaline streak; a small hyaline dot near the apices of cells R and 2d M. Legs much like the female but with a little more brown.

Comparative notes: Separated from C. brimleyi Hine by the greater extent of the apical spot of the wings, and the infuscated spot at the bifurcation of vein R4+5.

Type data: Described from a male, "Aus Nordamerika," in the Museum of Vienna. A female described as C. plangens, Savannah, Georgia, presumably in the University of Berlin. Kröber (1926) in his description of C. fuliginosa states that a female from Savannah designated as the type is in the University of Berlin, but does not say whether it is labelled C. fuliginosa or C. plangens.

Distributional data:

UNITED STATES: Massachusetts: Fall River, June 17; Cohasset, June 13, 1932.

Connecticut.

New York: Cold Spring Harbor, June 17, 1930; Staten Island, June 13-23; Wading River, June 29, 1917.

New Jersey: Anglesea, June 11, 1905, May 28, 1905; Avalon, June 9.

South Carolina: Dewees Isle, May, 1929.

Georgia: St. Simon Island.

Florida: St. Augustine, April 12, 1919.

Reported by others from the following general localities:

CANADA: Nova Scotia.

UNITED STATES: Maine; Massachusetts; Connecticut;  
New York; New Jersey; Georgia;  
Florida.

Chrysops fulvaster Osten Sacken (1877)

- 1877 C. fulvaster Osten Sacken, West. Dipt., p. 221; Col.  
1887 C. fulvaster Williston, Trans. Kans. Acad. Sci., X,  
134; Col., Mont., Calif.  
1901 C. fulvaster Ricardo, Ann. and Mag. N.H., ser. 7, VIII,  
299, 306.  
1903 C. fulvaster Snow, List, Kans. Univ. Sci. Bull., II, 213; Ks.  
1904 C. fulvaster Hine, Ohio Nat., V, 223; Wyo., Ariz., N.M.  
1904 C. fulvaster Fletcher, 34th Rept. Ent. Soc. Ont., p. 98;  
Sask.  
1913 C. fulvaster Aldrich, Ent. News., XXIV, 205; Utah.  
1924 C. fulvaster Wehr, Nebr. Univ. Studies, XXII, 112; Neb.  
1926 C. fulvaster Cameron, Bull. Ent. Res., XVII, 21; Sask.  
1931 C. fulvaster Stanford, Pan. Pac. Ent., VII, 100; Utah.  
1931 C. fulvaster Knowlton, Can. Ent., LXIII, 153; Utah.  
1931 C. fulvaster Philip, Minn. Tech. Bull., LXXX, 86; Minn.  
1926 Heterochrysops fulvaster Kröber, Stett. Ent. Ztg.,  
LXXXVII, 233; Alta.  
1928 H. fulvaster Kröber, Deutsche Ent. Ztsch., p. 427; Col.

The following also refers to this species:

- 1892 C. coloradensis Bigot, Mem. Soc. Zool. France, V,  
605, (partim).

Color: Female: Fuscous or brown with gray yellow abdominal triangles, etc.; wing picture fenestrate.

Male: mostly black or fuscous, abdominal triangles much reduced; wings much more infuscated.

Size: Length, 6 - 8 mm.

Structural and color characters: Female: Vertex, frons, sides of genae and a mid-streak on the fronto-clypeus yellow pollinose; upper margin of frontal callosity, a small spot on each side of the fronto-clypeus, another on the oral margin of the genae, fuscous; disc of frontal callosity, remainder of fronto-clypeus and genae, and the palpi, yellow. Antennae decidedly incrassate, the scape most strongly; flagellum scarcely longer than the scape; the scape, pedicel, and base of flagellum brown yellow to brown, sometimes the outer surfaces of the first two, and always the apex of the flagellum, black. Dorsum of thorax and scutellum brown or yellow brown pruinose, the former with fuscous stripes; pleurae and venter gray yellow pollinose with the usual brown stripes. Dorsum of abdomen yellowish or gray yellow with a black spot beneath the scutellum; second segment with a median pair of oblique black spots, sometimes nearly united at the anterior margin to form a geminate spot; remaining segments black with yellowish postero-lateral angles and hind margins which expand to form mid-dorsal triangles. Venter of abdomen gray yellow, each segment with a large fuscous quadrate median spot which apically occupies nearly the whole

width of a segment; hind margins of all segments gray yellow; fuscous lateral stripes usually present. Halteres yellow. Wings as figured. Legs orange yellow; the joints, front tarsi, and apical three or four segments of the middle and hind tarsi, fuscous.

Male: Predominantly black. Antennae and palpi black. Thorax similar to female but with a greater extent of black. Dorsum of abdomen black; all segments with yellowish postero-lateral angles and narrow hind margins which expand into very small mid-dorsal triangles.

Wings with all cells included by the picture more extensively infuscated than in the female, but the general pattern is the same, and should cause no difficulty in associating the two sexes. Legs practically like the female, except the front legs which are wholly black except the base of the tibiae, and the hind femora sometimes are black at the base.

Comparative notes: This species is distinct and should not be easily confused with others of the group with swollen antennae. From C. discalis Will. it may at once be separated by the antennae; from C. coquilletti Hine, and C. clavicornis n.sp. by the fenestrate discal cell and abdominal pattern; from C. latifrons n.sp. by the abdominal pattern and absence of a tooth-like projection of the crossband, as well as a greater extent of the apical spot.

Type data: Described from five females and one male from Colorado and Utah. I have studied these types at the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: South Dakota: Springfield, June 25, 1924.

Kansas: Clark Co., June; Cheyenne Co., July 3, 1925; Scott Co., June 1-28, 1925, July 18, 1925.

Wyoming: Sheridan; Yellowstone National Park, July 24-25, 1920, July 22, 1930; Lusk, July 1895; Albany Co., July 21, 1899.

Colorado: Marshall Pass, Aug. 12, 1914; Aspen, July 24-27, 1919; Lamar, June 4-11, 1919; Pagosa Springs, June 21-24, 1919; Electra Springs, June 28 - July 1, 1919; Crook, Aug. 14, 1921; LaJunta, Aug. 12, 1920; Boulder, July 30, 1922; June 28, 1931; Omay, July 14, 1919; Craig, June 30, 1931; Maybell, June 30, 1931; Colorado Springs, July; El Paso Co., July 2, 1914.

New Mexico: White Mts., 6700 feet, July 29.

Idaho: Montpelier, July 6, 1920.

Utah: Corinne, July 27-30, 1929; Cedar City, Aug. 13, 1929; Cove Fort, Aug. 14, 1929; Promontory, July 13, 1929; Alton, July 12, 1925.

Arizona: Apache Co., Aug. 16, 1927;  
Coconino Co., Aug. 13, 1927.

Reported by others from the following general  
localities:

CANADA: Saskatchewan; Alberta.

UNITED STATES: Minnesota; Nebraska; Kansas; Wyoming;  
Colorado; Utah; Arizona; New Mexico;  
Montana; California.

Chrysops fulvistigma Hine (1904)

- 1904 C. fulvistigma Hine, Can.Ent., XXXVI, 55; N.C.  
1904 C. fulvistigma Brimley and Sherman, Ent. News, XV, 270; N.C.  
1907 C. fulvistigma Daecke, Ent. News, XVIII, 146; N.J.  
1907 C. fulvistigma Hine, Bull. 93, La. Exp. Sta., p. 29; La.  
1924 C. fulvistigma Jones and Bradley, Jl. Econ. Ent.,  
XVII, 49.  
1926 C. fulvistigma Kröber, Stett. Ent. Ztg., LXXXVII, 248.

Color: Black and yellow, the latter color predominant  
on the two basal abdominal segments. Wing picture  
extremely dilute, so that the wings appear to be  
almost hyaline with a prominent yellowish stigma and  
yellow veins.

Size: Length, 6.5 - 7 mm.

Structural and color characters: Female: Vertex, frons,  
sides of genae, a few streaks on the fronto-clypeus,  
yellow pollinose; frontal callosity, fronto-clypeus and  
oral margins of the genae, black. Palpi and scape of  
antennae yellow; pedicel and first segment of flagellum  
yellow brown; apical four segments of flagellum black.

Dorsum of thorax and scutellum fuscous with grayish pruinosity, the former faintly striped; pleurae and venter yellow pollinose with brown stripes. Dorsum of abdomen black and yellow as follows: First segment yellow with a quadrate emarginate black spot beneath the scutellum, attaining the posterior margin; second segment yellow with a black posterior margin which on the disc sends out two finger-like processes which almost reach the anterior margin; third segment black with a small yellow median spot at the anterior margin and on each side a smaller yellow spot; remaining segments black. Venter of abdomen with the first two segments yellow; the third yellow with a large quadrate black spot on the disc; remaining segments black. Halteres brown. Wings as figured. Legs brown; front coxae, base of femora and tibiae, apex of middle femora, entire tibiae and metatarsi, base of hind tibiae and metatarsi, yellow.

Male: Like the female in all respects excepts for sex characters; very easily associated.

Comparative notes: The unusual abdominal pattern and the wings will easily distinguish this species from all others included in this paper.

Remarks: This is the first time that the male has been reported.

Type data: I have studied the types in the Hine Collection at the Ohio State Museum. Described from two females taken at Raleigh, North Carolina, July 15 and 17, 1902.

Distributional data:

UNITED STATES: North Carolina: Raleigh, June 11, 1906; June 17, 1907.

Louisiana: Osborn, July 19, 1906.

Reported by others from the following general localities:

UNITED STATES: North Carolina; New Jersey;  
Louisiana.

Chrysops furcata Walker (1848)

1848 C. furcatus Walker, List, I, 199; Can.

1904 C. furcatus Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 302.

The following also refer to this species:

1904 C. lupus Whitney, Can. Ent., XXXVI, 205; Col.

1904 C. lupus Hine, Ohio Nat., V, 224; Alta.

1921 C. lupus Cole and Lovett, Proc. Cal. Acad. Sci., XI, 232;  
Ore. List.

1922 C. lupus O'Donoghue, Can. Field Nat., XXXV, 9; L. Winnipeg.

1923 C. lupus Hine, Can. Ent., LV, 145; Alaska.

1926 C. lupus Kroeber, Stett. Ent. Ztg., LXXXVII, 304.

1931 C. lupus Philip, Minn. Tech. Bull., LXXX, 88; Minn.

Color: Black and yellow.

Size: Length, 9 - 10 mm.

Structural and color characters: Female: Vertex gray to gray yellow pollinose; frons and sides of genae



yellow pollinose; ocellar area, frontal callosity, a spot on each side of the fronto-clypeus, oral margin of genae, black; fronto-clypeus and palpi yellow, the latter with a little black on the outer surfaces; antennae black; the basal portion of the scape and sometimes the inner surface of the pedicel, yellow. Thoracic dorsum and scutellum fuscous, yellowish pubescent, the former with gray pollinose stripes; pleurae and venter yellowish pollinose with the usual fuscous stripes, the former with heavy yellow pile. Dorsum of abdomen yellow; a quadrate black spot beneath the scutellum, barely emarginate posteriorly, practically attaining a pentagonal geminate spot on the disc of the second segment; segments III, IV and V each with four black more or less triangular spots whose bases rest on the anterior margin where they tend to be united; remaining segments black with yellow hind margins. Venter of abdomen yellow; first segment with a black spot on the disc which usually continues on to the second segment; second segment with a small black spot on the disc; segments III, IV and V each with a median black quadrate spot; remaining segments black with yellow hind margins; the usual black lateral streaks present. Halteres brown. Wings as figured; the apex of the hyaline triangle distinctly exceeding vein R2+3; the extent of infuscation in cells

R and 2d M variable. Legs black and yellow, the former distributed as follows: the joints, front femora, tibiae and tarsi, except the extreme base of the tibiae and the inner surfaces of the femora, bases of middle and hind femora, apical portions of hind tibiae, and middle and hind tarsi. Sometimes the yellow is more prevalent especially on the basal portions the front femora and tibiae and the apical portion of the hind tibiae.

Male: Philip (1931) reports one male from Montana, but does not describe it. I have not seen this sex.

Comparative notes: This species is related to C. coloradensis Bigot and C. montana O.S. From the former it is readily separated by the different abdominal pattern, the black frontal callosity and the black on each side of the fronto-clypeus and on the oral margin of the genae; from the latter, by the greater extent of the hyaline triangle on the wing and the apical spot occupying only the apex of cell R<sub>4</sub>, and again by the black on each side of the fronto-clypeus and on the oral margin of the genae. C. furcata is very apt to be confused with C. proclivis O.S., but this latter has cell R of the wings completely infuscated and on the second abdominal tergite a small black spot on each side of the median geminate spot.

Remarks: The synonymy is based on a homotype in Hine's collection and Walker's description. The C. furcatus of Hine (1904), Kröber (1926) and in the key of Philip (1931) is a large form of C. montana O.S. which may deserve varietal rank. I have seen Hine's series. I fail to see how these authors were justified in referring to the facial callosities and cheeks as yellow, for Walker (1848) states: "Head yellow, slightly hoary behind, with two piceous tubercles above, ferruginous and shining in front between the feelers and the mouth, where there are also two piceous shining spots on each side . . ."

Type data: In the British Museum. Described from specimens from St. Martin's Falls, Albany River and Hudson Bay. Whitney's types of C. lupa are in very poor condition. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: New Brunswick: Youghall, July 27, 1906.

Alberta: Banff, May 7, 1922; Laggan, July 22, 1901.

Manitoba: Miles 256, near Winnipeg, July 12, 1917; Piquitenay, July 9-21, 1917.

British Columbia: Agassiz, June 12, 1927; Cultus Lake, June 25, 1927.

UNITED STATES: Colorado: Tenn. Pass, July 25, 1917;  
Grand Lake, 8300 feet;  
Florissant, June 24, 1914.

Montana: Glacier National Park, Aug. 14,  
1916; Gallatin Co., July 22,  
1912; Bridges Mts., June 23,  
1925.

Wyoming: Stewart R. Station, July 18,  
1920; Grand Teton National  
Park, Aug. 18, 1931.

Oregon: Mt. Jefferson, July 20, 1907;  
Haines, July 10, 1931.

Alaska: Fairbanks, July 4, 1921.

Reported by others from the following general  
localities:

CANADA: New Brunswick; Alberta; Manitoba;  
British Columbia.

UNITED STATES: Michigan; Minnesota; Colorado;  
Montana; Wyoming; Oregon; Alaska.

Chrysops geminata Wiedemann (1828)

- 1828 C. geminatus Wiedemann, Auss.Zw., I, 205.  
1926 C. geminatus Kröber, Stett.Ent.Ztg., LXXXVII, 299 (syn.)  
1928 C. geminatus Leonard, N.Y. State List, p. 755; N.Y.  
1930 C. geminatus Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.

The following also refer to this species:

- 1875 C. fallax Osten Sacken, Prodrôme, I, 392; Mass., N.Y.,  
Del., Md.
- 1903 C. fallax Hine, Ohio State Acad. Sci. Spec. Pap. No. 5,  
p. 36; Ohio.
- 1905 C. fallax Harbeck, Ent. News, XVI, 341; N.J.
- 1905 C. fallax Daecke, Ent. News, XVI, 342; N.J.
- 1906 C. fallax Daecke, Ent. News, XVII, 40, 41.
- 1907 C. fallax Daecke, Ent. News, XVIII, 141; N.J.
- 1908 C. fallax Brimley and Sherman, Ent. News, XIX, 168; N.C.
- 1918 C. fallax McAtee and Walton, Proc. Ent. Soc. Wash.,  
XX, 197; Md., Va.
- 1920 C. fallax Britton, Bull. Conn. St. Geol. N.H. Surv.,  
XXXI, Conn.
- 1920 C. fallax Criddle, Ent. Rec., Rept. Ent. Soc. Ont.,  
LI, 82; Ont.
- 1922 C. fallax Criddle and Curran, Rept. Ent. Soc. Ont.,  
LII, 82; Que.
- 1923 C. fallax Bequaert and Davis, Bull. Brook. Ent. Soc.,  
XVIII, 120; N.Y.
- 1925 C. fallax Johnson, List, Occ. Pap. Bost. Soc. N.H.,  
VII, 101; N. Eng.

Color: Yellow with black abdominal pattern.

Size: Length, 6.5 - 7.5 mm.

Structural and color characters: Female: Frontal callosity, ocellar area, the pit on each side of the fronto-clypeus, and a spot on the oral margin of the genae, black; fronto-clypeus, genae, and palpi, yellow; the usual areas yellow pollinose. Scape of antennae yellow; pedicel and base of flagellum yellow brown; apex of flagellum black. Dorsum of thorax, pleurae and venter gray yellow to yellow pruinose; the usual stripes and the scutellum fuscous. Dorsum of abdomen yellow with a black spot beneath the scutellum; the second segment with a pair of small black oblique spots on the disc, not reaching either margin;

segments III, IV and V mostly black with yellow hind margins and a median yellow stripe; remaining segments black with yellow hind margins. Sometimes the black on each side of the yellow median stripe of segments III, IV and V is again partly cut by yellow, so that these segments are yellow with four black spots. Venter of abdomen yellow at the base with a quadrate black median spot on segments III and IV. The apical segments black with yellow hind margins; the usual black lateral streaks present. Halteres brown. Wings as figured. Legs black; the front coxae and basal two-thirds of femora and base of tibiae, apical half of middle femora and entire tibiae and metatarsi, base of hind tibiae, and metatarsi, yellow.

Male: Similar to the female except for sex characters and a bit more infuscation at the apices of cells R and 2d M. Sometimes the median spots on the second abdominal tergite are practically united anteriorly.

Comparative notes: Related to C. lateralis Wied. from which it may be separated by the apical spot occupying most of cell R4, the crossband attaining the hind margin of the wing, and the black spots of the second abdominal tergite not reaching the hind margin. In addition, C. lateralis is a generally

larger species.

Remarks: With respect to the synonymy of C. geminata Wied. and C. fallax O.S. I prefer to follow Kröber, who has studied Wiedemann's type and compared it with "eine sec-Type" of C. fallax. A question of doubt exists however, inasmuch as Wiedemann gives as the type locality, "Vaterland:" and Kröber states the type to be "stark verschmiert".

Type data: One female in the Museum of Vienna. I have seen Osten Sacken's types of C. fallax at the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Massachusetts: North Andover, July 16, 1911; Dover, July 4-9, 1925; Chester, July 25, 1913.

Connecticut.

New York: Mosholu. July 12, 1919, July 23, 1920; Tompkins Co., July 17, 1932.

New Jersey: Berkeley Heights, June; Trenton, July 7, 1906; Lake Hopatcong, July 4, 1913; Jamesburg, July 4, 1894, July 4, 1905; Wenonah, June 22, 1905.

Pennsylvania: Lehigh Gap, July 15, 1907.

Ohio: Summit Co., July 10, 1927,  
July 14, 1929; Medina, July 15,  
Aug. 1, 1901; Ira; Licking Co.,  
June 7, 1931; Hocking Co.,  
July 4, 1931.

Illinois: Algonquin.

Tennessee: Boat Mountain, Aug. 3, 1910.

Reported by others from the following general  
localities:

CANADA: Quebec; Ontario.

UNITED STATES: New Hampshire; Vermont; Massachusetts;  
Connecticut; New York; New Jersey;  
Delaware; Maryland; Virginia; North  
Carolina; Georgia; Ohio.

Chrysops geminata impuncta Kroeber (1926)

1926 C. geminatus Wied. var. impunctus Kröber, Stett. Ent.  
Ztg., LXXXVII, 301; Ont.

Color: Yellow with black abdominal pattern.

Size: Length, 6.5 - 7 mm.

Structural and color characters: Female: Similar to  
C. geminata Wied. except for the total absence of black  
on the first and second abdominal segments. Legs yellow;  
apical portion of front tibiae and entire tarsi, distal  
four segments of the middle and hind tarsi, base of



hind femora and apex of tibiae, fuscous. Wings as figured for C. geminata.

**Male:** Like the female except for sex characters.

**Comparative notes:** Separated from C. geminata Wied. by the absence of the black spots on the second abdominal tergite. Dr. Walley of the Canadian National Museum compared one of my specimens with Kröber's type concerning which he states, "Size-very slightly larger than your specimen. Length, 6.5 mm. Abdominal pattern . . First and second tergites identical with your specimen except that first tergite has only a very faint trace of brownish at middle of anterior margin. Third tergite with a small median pale triangle, the apex of which scarcely attains the posterior margin. Fourth tergite with narrow obscure median stripe. Fifth tergite without pale median stripe."

**Type data:** Type No. 1341 Canadian National Collection, Ottawa.

**Distributional data:**

**UNITED STATES:** Maryland: Catonsville, June 30, 1922.

Ohio: Medina Co., July 19, 1903,  
Aug. 1, 1901; Ira.

Reported by others from the following localities:

**CANADA:** Ontario: Port Stanley; Ottawa; Guelph.

Chrysops hinei Daecke (1907)

- 1907 C. hinei Daecke, Ent. News, XVIII, 143; N. J.  
 1913 C. hinei Johnson, Bull. Am. Mus. N. H., XXXII, 51; Fla.  
 1922 C. hinei Brimley, Ent. News, XXXIII, 230; N. C.  
 1925 C. hinei Johnson, List, Occ. Pap. East. Soc. N. H.,  
 VII, 101; Mass.  
 1926 C. hinei Kröber, Stett. Ent. Ztg., LXXXVII, 338.  
 1930 C. hinei Johnson, List Dipt. Nantucket, p. 127.

Color: Yellow with black longitudinal stripes.

Size: Length, 7 - 8.5 mm.

Structural and color characters: Female: Vertex gray yellow pollinose, frons and sides of genae yellow pollinose; frontal callosity yellow, margined above with brown; fronto-clypeus, genae, palpi, and scape of antennae yellow; pedicel and base of flagellum yellow brown, the apex of the latter fuscous to black. Dorsum of thorax and scutellum brown, the former with grayish stripes, the latter sometimes yellow at the tip; pleurae and venter yellow pollinose with brown stripes. Dorsum of abdomen yellow with four longitudinal black stripes, the lateral ones broken or incomplete, extending toward the base rarely beyond the posterior margin of the second segment; the last two segments almost entirely black. Venter of abdomen yellow with a broad black median stripe, not attaining the base; two black lateral streaks present; apical segments mostly black. Halteres brown. Wings

as figured, the long narrow hyaline triangle characteristic. Legs yellow; apical portion of front tibiae and entire tarsi, base of hind femora and apex of tibiae, apical four segments of middle and hind tarsi, brown.

**Male:** Not identified. Daecke (1907) mentions a hypothetical specimen from Clementon, New Jersey, September 7, 1905, but defers description for want of evidence.

**Comparative notes:** To be separated from related species according to the key. The narrow hyaline triangle due to the broad posterior extent of the apical spot along with the yellow frontal callosity and incomplete lateral stripes on the abdominal dorsum easily distinguishes this species.

**Type data:** Described from seventeen females, all from New Jersey. I have studied the cotypes in the United States National Museum and at the Ohio State Museum.

**Distributional data:**

**UNITED STATES:** New Jersey: Lakehurst, Sept. 4;  
Weymouth, Aug. 16, 1904.

South Carolina: Plantersville, Sept. 20,  
1912.

Georgia: Mimsville, Sept. 12, 1907.

Reported by others from the following general localities:

UNITED STATES: Massachusetts; New Jersey; North Carolina; Georgia; Florida.

Chrysops hyalina Shannon (1924)

- 1924 C. hyalinus Shannon, Proc.Ent.Soc.Wash.,XXVI,178.  
 1930 C. hyalinus Bequaert, Rept.Harvard-African Exped.  
 etc.,p.890.

The following also refer to this species:

- 1916 C. vitripennis Shannon, Ins.Ins.Menst.,IV,69;Md.  
 (preoc.)  
 1918 C. vitripennis McAtee and Walton, Proc.Ent.Soc.Wash.,  
 XX,198.  
 1926 Nemorius claripennis Kröber, Stett.Ent.Ztg.,LXXXVII,  
 230.

Color: Black, with hyaline wings.

Size: Length, 5.5 - 6 mm.

Structural and color characters: Female: Vertex black with sparse whitish pubescence, at the base of the antennae some white pollen; frons and sides of genae whitish pollinose. Frontal callosity, fronto-clypeus, genae, and palpi, black. Antennae slender, mostly black, except the scape which is light brown pollinose. Thorax and abdomen shining black with pale pile and pubescence in the usual regions. Halteres black. Wings hyaline except the yellowish costal area and stigma; veins yellow. Legs black; the middle and hind metatarsi pale.

Male: Unknown.

Comparative notes: This is the only described species in this country without a wing picture, and hence quite distinct. Its nearest relative is C. nigribimbo Whit. from which it differs in general color, vertex, fronto-clypeus, wings and legs.

Remarks: According to McAtee by Shannon (1916) the habits of C. hyalina are quite different from those of C. nigribimbo, the former has been taken only in sphagnum bogs; it perches on low vegetation, and flies slowly and feebly but a short distance at a time.

Type data: Described from four females all from Beltsville, Maryland. I have studied the type (No. 21301) in the United States National Museum.

Distributional data: Reported from Beltsville, Maryland. Kröber (1926) adds Southern Pines, North Carolina.

Chrysops inda Osten Sacken (1875)

- 1875 C. indus Osten Sacken, Prodrôme, I, 383; N.Y., Can.  
 1901 C. indus Hine, Ohio Nat., II, 168.  
 1903 C. indus Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, p. 58,  
 Ohio.  
 1905 C. indus Daecke, Ent. News, XVI, 342; N.J.  
 1906 C. indus Daecke, Ent. News, XVII, 42.  
 1907 C. indus Daecke, Ent. News, XVIII, 141; N.J.  
 1913 C. indus Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLIV,  
 Ont.  
 1913 C. indus Graenicher, Bull. Wis. N.H. Soc., X, 171; Wis.  
 1916 C. indus Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVII,  
 Ont.  
 1920 C. indus Britton, Bull. Conn. Geol. N.H. Surv., XXXI,  
 Conn. List.  
 1920 C. indus Marchand, Mon. Rock. Inst., p. 48.  
 1922 C. indus Brimley, Ent. News, XXXIII, 230; N.C.  
 1923 C. inda Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 120; N.Y.  
 1925 C. inda Johnson, Occ. Pap. Bost. Soc. N.H., VII, 180;  
 N. Eng. List.  
 1926 C. indus Kröber, Stett. Ent. Ztg., LXXXVII, 326.  
 1928 C. indus Leonard, N.Y. State List, p. 755; N.Y.  
 1930 C. indus Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.  
 1930 C. indus Stone, Ann. Ent. Soc. Am., XXIII, 282; N.Y.  
 1931 C. indus Philip, Minn. Tech. Bull., LXXX, 87; Minn.

Color: Black and yellow, the former dominant in the dorsal abdominal pattern, especially in the male.

Size: Length, 7.5 - 10 mm. Philip (1931) gives 6.5 - 10 mm.

Structural and color characters: Female: Vertex and sides of genae yellow pollinose; frontal callosity black; fronto-clypeus, genae, and palpi, orange yellow; antennae rather thick; the scape yellow, pedicel and base of flagellum reddish, apex of the latter, black. Often the distal ends of both scape and pedicel are darker than their bases. Dorsum of thorax and scutellum gray pruinose, with yellow pubescence the former

with brown stripes, the latter with the brown ground color distinctly showing through; pleurae and venter gray yellow pollinose with the usual brown stripes, the former with fulvous pile. The yellow of the abdominal dorsum with a black spot beneath the scutellum, emarginate on the hind margin of the first segment; a black geminate or inverted-U-shaped spot on the disc of the second segment, practically attaining both margins; third and fourth segments black with yellow hind margins which expand into long narrow median triangles whose apices are broadly open at the anterior margins; remaining segments black with yellow hind margins. Frequently the yellow of the first two segments continues posteriorly on the sides of segments III and IV. Venter of abdomen mostly yellow, the last three segments black with yellow hind margins; the usual black lateral streaks. Halteres brown. Wings as figured. Legs orange yellow; all the trochanters, apex of front tibiae and entire tarsi, apical four segments of the middle and hind tarsi, extreme apex of hind femora, black.

Male: Much darker than the female. Dorsum of thorax and scutellum mostly black, the former with faint grayish pollinose stripes; pleurae with black pile. Dorsum of abdomen black; the postero-lateral angles of the first segment, the sides and a very small postero-

median triangle on segments II, III and IV, the narrow posterior margins of all segments caudad from III, yellow. Venter of abdomen yellow, the first three segments each with a median broad black quadrate spot, the remaining segments black with yellow hind margins; the black lateral stripes are quite broad and practically attain the base. Wings like the female but that cell 2d M is completely infuscated except a small hyaline spot near the apex, and cell 1st A and the anal angle are infuscated, the latter dilutely. Legs yellow; all the joints, basal portions of all femora, apical portion of front tibiae and entire tarsi, apical segments of middle and hind tarsi, black.

Comparative notes: The abdominal pattern in both sexes of this species is distinct, this along with the wing picture will easily separate C. inda from others of its group. It has no close relatives. Osten Sacken (1875) states that it is "very like C. pudicus, montanus, hilaris, . . ."

Type data: Described from two females from Cayuga Lake, New York and Montreal. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: Quebec: Montreal, June 20, 1924.



UNITED STATES: New York: Chappaqua, June 29, 1919;  
Dunkirk, June 18, 1906.

Michigan: Cheboygan Co., Aug. 4, 1931;  
Dexter, July 3, 1923.

Ohio: Akron, July 1, 1928; Summit Co.,  
June 14, 1929; July 1, 1920;  
Ira, June 1925; Logan Co., July  
13, 1930; Sandusky, June 12, 1905;  
Loudonville, June 6, 1925;  
Columbus, May 26, 1899; May 22,  
1902; Hocking Co., May 30, 1932;  
Castalia, June 17-18, 1932.

Indiana: Bluffton, June 1907.

Illinois: Freeport, July 4, 1917;  
Algonquin, July 8, 1906;  
Antioch, June 15, 1928;  
Volo, July 8, 1932.

Minnesota: International Falls,  
July 3-6, 1924; Anoka Co.,  
June 14-28, 1925.

Reported by others from the following general  
localities:

CANADA: Quebec; Ontario.

UNITED STATES: New Hampshire; Vermont; Massachusetts;  
Connecticut; New York; New Jersey;  
North Carolina; Ohio; Wisconsin;  
Minnesota.

Chrysops lateralis Wiedemann (1828)

- 1828 C. lateralis Wiedemann, Auss.Zw., I, 209.  
 1926 C. lateralis Kröber, Stett.Ent.Ztg., LXXXVII, 302,  
 (syn).  
 1927 C. lateralis Johnson, Ins.Mt.Des.Reg., p.179.  
 1928 C. lateralis Leonard, N.Y.State List, p.755; N.Y.

The following also refer to this species:

- 1875 C. hilaris Osten Sacken, Prodrôme, I, 391; Northern  
 States and Can.  
 1902 C. hilaris Howard, Ins.Book, pl.XVI, f.17.  
 1904 C. hilaris Fletcher, 34th Rept.Ent.Soc.Ont., 98; Can.  
 1905 C. hilaris Washburn, 10th Rept.State Ent.Minn., p.79.  
 1920 C. hilaris Britton, Bull.Conn.Geol.N.H.Surv., XXXI,  
 Conn.  
 1924 C. hilaris Curran, Ent.Rec., Rept.Ent.Soc.Ont., LIV,  
 20; N.S.  
 1925 C. hilaris Johnson, Proc.Bost.Soc.N.H., XXXVIII, 68;  
 Me., N.H.  
 1925 C. hilaris Johnson, Occ.Pap.Bost.Soc.N.H., VII, 100;  
 N.Eng. List.

Color: Yellow, with black abdominal pattern.

Size: Length, 7.5 - 9 mm.

Structural and color characters: Female: Vertex gray  
 yellow pollinose; frons and sides of genae yellow  
 pollinose; frontal callosity, a spot on each side of  
 the fronto-clypeus, oral margins of genae, black;  
 fronto-clypeus, palpi, scape of antennae, yellow;  
 apical portion of flagellum black. Dorsum of thorax  
 and scutellum brown or plumbeus, the former with the  
 usual grayish pollinose stripes; pleurae and venter  
 yellow pollinose with brown stripes. Dorsum of ab-  
 domen yellow with two small black spots beneath the  
 scutellum which do not quite extend to the posterior

margin of the first segment; second segment with a median pair of vittate black spots which often attain the posterior margin and sometimes apparently the anterior margin; third and fourth segments each with two more or less quadrate black lateral spots through the center of which the yellow ground color shows; (sometimes these black spots are so completely separated by the yellow ground color that segments III and IV may be said to be yellow with four black spots); remaining segments black with yellow posterior margins, frequently the yellow of segment V incises the black on the disc, but does not attain the anterior margin. Venter of abdomen yellow; segments III, IV and V with a quadrate black median spot; remaining segments black with yellow posterior margins; the usual black lateral streaks extend toward the base not beyond the posterior margin of the second segment. Halteres fuscous. Wings as figured; the apical spot separated from the crossband; the latter not quite attaining the hind margin. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, basal portion of hind femora and sometimes apical portion of hind tibiae, apical four segments of middle and hind tarsi, black. Male: Much like the female except for sex characters. On the dorsum of the abdomen, the pair of black spots

beneath the scutellum is larger; a small median black spot is present on each of segments I and II of the abdominal venter. Wings like the female except for a dilute infuscation in the cubital and anal areas. Legs generally exhibiting more black, especially on the hind femora and tibiae, and the apices of the middle and hind metatarsi.

Comparative notes: Related to C. geminata Wied. from which it may be separated by its larger size, the crossband of the wing not attaining the hind margin, and the black spots on the second abdominal tergite usually attaining the hind margin.

Remarks: I accept the synonymy of Kröber (1926). He has seen Wiedemann's type and has evidently compared specimens from this country determined as C. hilaris O. S.

Type data: Female, locality doubtful, in the Museum of Vienna. I have studied the Osten Sacken types of C. hilaris at the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: Quebec: St. Johns, July 1, 1904, July 23, 1899; Montreal July 11, 1904.

UNITED STATES: Maine: Bridgeton, June 25.

New Hampshire: Franconia; White Mts.

Vermont: Rutland, Aug. 1, 1915.

New York: Cranberry Lake, July 30, 1917, July 2, 1919; Greene Co., July; Long Lake, July 13, 1929; Tupper Lake, July 13, 1929; Freeville, July 4, 1904; Kiamesha; Big Indian Valley, Catskill Mts., July 18-30, 1907; Aug. 1, 1907, July 1, 1908.

Reported by others from the following general localities:

CANADA: Nova Scotia; Ontario.

UNITED STATES: Maine; New Hampshire; Massachusetts; Connecticut; New York; New Jersey; Pennsylvania; Kansas?

Chrysops latifrons, new species

Color: Yellow with black abdominal pattern; appendages yellow; crossband of wing broken by hyaline areas.

Size: Length, 7 mm.

Structural and color characters: Female: Entire head and its appendages yellow, except the eyes, proboscis and apical portion of the flagellum; a brown area may appear about the ocelli; the usual areas with yellow pollen. Scape of antennae ~~much~~ swollen, the pedicel just a little. Dorsum of thorax and scutellum yellow,

the former with obscure brown stripes; pleural and sternal regions yellowish pollinose with faint brown stripes. Dorsum of abdomen yellow with a quadrate black spot under the scutellum which nearly attains the posterior margin of the first segment; segments II, III and IV with a black geminate spot, on each side of which may appear a small black spot; remaining segments black; all posterior margins yellow. Venter of abdomen yellow with a median black stripe and two lateral ones. Wings as figured. Legs yellow; apical portion of front tibiae and entire tarsi, apical tarsal segments of middle and hind legs, and all joints, brown. Male: Predominantly black. Head and its appendages as in the female except for sex characters. Thoracic region more brown. First abdominal segment black except the yellow latero-posterior margin; second with a large black trapezoidal spot encroached upon from the posterior margin by a yellow triangle, the yellow on each side with a small black spot; segments III, IV and V almost entirely black with a double geminate figure; remaining segments black; all segments with narrow yellow posterior margins. Venter of abdomen like the female. Wings similar to the female, except the infuscation of cell 2d M is equal to that of cell R; cell 1st A infuscated at the base. Legs as de-

scribed for the female except that the front femora and hind tibiae show some brown at the apices.

Comparative notes: Related to C. pachycera Will. from which it may easily be separated by the tooth-like prolongation of the crossband which attains the bifurcation of vein R4+5.

Type data: Holotype, male; Owens, Nevada; Clark County, August 23, 1919; 3,000 feet. Allotype, female; Fairbanks Ranch, Ash Meadows, 2300 feet; Amargosa Desert, Nevada; (R and H); August 17, 1919. Paratypes, one female same data as holotype; one female, same data as allotype.

All specimens received from the Philadelphia Academy of Natural Science. Holotype, allotype and one paratype to be deposited there; one paratype in the Francis Huntington Snow Entomological Collection of the University of Kansas.

Chrysops lugens Wiedemann (1821)

- 1821 C. lugens Wiedemann, Dipt. Exot., I, 109; Ga.  
 1828 C. lugens Wiedemann, Auss. Zw., I, 212.  
 1903 C. lugens Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, p. 39; Ohio.  
 ?1904 C. lugens Brimley and Sherman, Ent. News, XV, 270; N. C.  
 1907 C. lugens Daecke, Ent. News, XVIII, 142; N. J.  
 1907 C. lugens Hine, Bull. 93, La. Exp. Sta., 30; La.  
 1913 C. lugens Johnson, Bull. Am. Mus. N. H., XXXII, 52; Fla.  
 ?1920 C. lugens Britton, Bull. Conn. Geol. N. H. Surv., XXXI, Conn.

1926 C. lugens Kröber, Stett.Ent.Ztg., LXXXVII, 315.

1928 C. lugens Leonard, N.Y.State List, p.755; N.Y.

Color: Fuscous, sometimes with a faint grayish mid-dorsal abdominal stripe.

Size: Length, 6.5 - 8 mm.

Structural and color characters: Female: Vertex gray yellow pollinose; frons and sides of genae yellow pollinose; ocellar area, frontal callosity, a line connecting them, sides of fronto-clypeus, oral margins of genae, and palpi fuscous; remainder of fronto-clypeus and basal segments of antennae yellow or brown yellow; flagellum mostly black. Thoracic dorsum and scutellum fuscous, the former with grayish pollinose stripes; pleurae and venter fuscous with the usual gray yellow pruinosity. Abdomen fuscous; sometimes the dorsum with a faint grayish mid-stripe and the venter with a little gray yellow on the sides near the base. Halteres fuscous. Wings as figured. Legs yellow, the trochanters, base of front tibiae and entire tarsi, bases of middle and hind femora, apex of hind tibiae, apical segments of middle and hind tarsi, fuscous.

Male: Similar to the female except for sex characters. The male of Hine (1903) with the broad yellow thoracic stripes may be C. obsoleta Wied.

Comparative notes: The wing picture is much like that



of C. parvula Daecke except that the apical spot more nearly approximates the posterior margin. The generally larger size of C. lugens and the dominant yellow of the hind femora and tibiae readily separate it from C. parvula.

Type data: Described from a male specimen from Savannah. In the Vienna Museum. Kröber (1926) states that there is no specimen recognizable as the type.

Distributional data:

UNITED STATES: Alabama: Prattsville, July 21, 1930.

Florida: Ocala, July 17, 1930;  
Hilliard, Aug. 19, 1930.

Reported by others from the following general localities:

UNITED STATES: Connecticut; New York; New Jersey;  
North Carolina; Georgia; Florida;  
Ohio; Louisiana.

Chrysops mitis Osten Sacken (1875)

- 1875 C. mitis Osten Sacken, Prodrone, I, 374; Can. to Yukon R.  
 1895 C. mitis Hart, Bull. Ill. State Lab. N.H., IV, 111.  
 1904 C. mitis Fletcher, 34th Rept. Ent. Soc. Ont., p. 98; B.C.  
 1904 C. mitis Hine Nat., V, 224; Wash.  
 1905 C. mitis Harbeck, Ent. News, XVI, 341; N.J.  
 1907 C. mitis Daecke, Ent. News, XVIII, 140; N.J.  
 1908 C. mitis Hine,  
 1913 C. mitis Graenicher, Bull. Wis. N.H. Soc., X, 172; Wis.  
 1925 C. mitis Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99; N. Eng.  
 1926 C. mitis Krober, Stett. Ent. Ztg., LXXXVII, 247.  
 1926 C. mitis Cameron, Bull. Ent. Res., XVII, 22.  
 1927 C. mitis Johnson, Ins. Mt. Des. Reg., p. 179.  
 1928 C. mitis Leonard, N.Y. State List, p. 755; N.Y.  
 1929 C. mitis Johnson, Psyche, XXXVI, 134; Lab.  
 1931 C. mitis Knowlton, Can. Ent., LXIII, 153; Utah.  
 1931 C. mitis Philip, Minn. Tech. Bull., LXXX, 89.

Color: Black.

Size: Length, 8.5 - 11 mm.

Structural and color characters: Female: Vertex, frons, a mid-streak on the fronto-clypeus, sides of genae, gray pollinose; ocellar area frontal callosity, fronto-clypeus, oral region of genae and palpi, black; scape, basal portion of pedicel, and base of flagellum red yellow; remainder of antennae black. Dorsum of thorax and scutellum black, pale pubescent, the former with faint gray stripes; pleurae and venter black, the former with dense gray yellow pile except for the black pile of the humeri. Abdomen black with light and dark pubescence intermixed; small gray mid-dorsal triangles on segments II, III and IV. Halteres black. Wings as figured; extent of infuscation in cells R and 2d M, and the cubital area variable. Legs black;

bases of median and posterior metatarsi red yellow.

Male: Like the female except for sex characters.

The gray pubescence and pile replaced by black.

Comparative notes: Generally more robust than C. carbonaria Walker from which it may also be separated by the infuscation at the apex of cell Cul of the wing. See under description of C. carbonaria.

Type data: Described from nine females from British Possessions in North America from Canada to the MacKenzie and Yukon Rivers and Lake Superior. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: Quebec: Val Morin, June 27, 1904; July 3, 1904.

Mer Blanc, May 25, 1903.

Manitoba: Winnipeg, June 10, 1911.

UNITED STATES: New York: Mosholu.

Wisconsin: Madison, May 26, 1919.

Illinois: Antioch, June 15, 1928.

Minnesota: Grand Rapids, July 1905; Bemidji, June 30, 1924; July 6-16, 1924; International Falls, July 5-7, 1924; Minn., June 24, 1914.

Colorado: Dawson, June 30, 1931;  
Garland, June 30.

Montana: Beaver Creek, Aug. 1913.

Idaho: Bear Lake, July 9, 1920.

Reported by others from the following general  
localities:

CANADA: Labrador; Ontario; Saskatchewan; Alberta;  
British Columbia.

UNITED STATES: Maine; New Hampshire; Vermont;  
Massachusetts; New York; New Jersey;  
Illinois; Wisconsin; Minnesota;  
Wyoming; Utah; Washington.

Chrysops moecha Osten Sacken (1875)

- 1875 C. moechus Osten Sacken, Prodrôme, I, 387; Mid. and S.  
States.  
1901 C. moechus Hine, Ohio Nat., II, 168.  
1903 C. moechus Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, p. 39;  
Ohio.  
1904 C. moechus Brimley and Sherman, Ent. News, XV, 270; N.C.  
1905 C. moechus Daecke, Ent. News, XVI, 342; N.J.  
1906 C. moechus Daecke, Ent. News, XVII, 40.  
1907 C. moechus Daecke, Ent. News, XVIII, 141; N.J.  
1907 C. moechus Hine, Bull. 93, La. Exp. Sta., p. 31; La.  
1918 C. moechus McAtee and Walton, Proc. Ent. Soc. Wash.,  
XX, 197; Md., Va.  
1918 C. moechus Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLIX,  
Que.  
1920 C. moechus Britton, Bull. Conn. Geol. N.H. Surv., XXXI,  
Conn. List.

- 1920 C. moechus Marchand, Mon. Rock. Inst., p.49.  
 1923 C. moecha Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 120; N.Y.  
 1925 C. moecha Johnson, Occ. Pap. Bost. Soc. N.H., VII, 100;  
 N. Eng. List.  
 1926 C. moechus Krober, Stett. Ent. Ztg., LXXXVII, 332.  
 1928 C. moechus Leonard, N.Y. State List, p.755; N.Y.  
 1930 C. moechus Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.  
 1930 C. moechus Schwardt and Hall, Bull. 256, Ark. Exp.  
 Sta., 14; Ark.  
 1930 C. moechus Stone, Ann. Ent. Soc. Am., XXIII, 283; N.Y.  
 1931 C. moechus Philip, Minn. Tech. Bull., LXXX, 89; Minn.

Color: Female, yellow with black abdominal stripes;  
 male, black.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Vertex,  
 frons, and sides of genae, yellow pollinose; frontal  
 callosity and a spot on the oral margin of the genae  
 black; fronto-clypeus, remainder of genae, and palpi,  
 yellow; scape of antennae yellow, remainder of flagellum  
 black. Rarely, the frontal callosity is yellowish.  
 Dorsum of thorax green gray pruinose with brown  
 stripes; scutellum yellow with a green gray or brown  
 spot on the disc; pleurae and venter yellow with the  
 usual brown stripes. Dorsum of abdomen yellow with  
 two broken black median stripes extending from seg-  
 ment V almost to the anterior margin of II on which  
 segment they often converge; on each side a broken  
 black stripe from segment V to segment III or II;  
 a small black spot beneath the scutellum; segments  
 VI and VII black. Venter of abdomen yellow; the

usual lateral streaks and the apical two or three segments, black. Halteres fuscous. Wings as figured; the very small hyaline triangle not exceeding vein M1 is characteristic. Legs yellow; trochanters, apical portion of anterior tibiae and entire tarsi, basal portion of posterior femora, apices of median and posterior tarsi, black.

Male: Much different than the female but readily associated by the hyaline triangle of the wing. Antennae, sides of fronto-clypeus, oral margin of genae, and palpi, black. Whole body, except traces of gray yellow pruinose stripes on the thoracic dorsum and pleurae, and a touch of yellow on the sides of the abdomen, black. Wings entirely infuscated except the small hyaline triangle and a tiny spot near the apices of cells R and 2d M; the cubital and anal areas more dilute. Legs black; base of anterior tibiae, apex of median femora and entire tibiae; median and posterior metatarsi brown yellow.

Comparative notes: The females may be mistaken for C. univittata Macq. but the characteristic wing picture with the reduced hyaline triangle should easily separate this species. The superlative degree of melanism in the males of C. moecha makes them totally different from this sex in C. univittata.

Type data: Described from the District of Columbia, Georgia, Kentucky and Missouri. Two females and one male in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: New Jersey: Malaga, Aug. 4, 1907;  
Beatquetown, July 2.

District of Columbia: Washington,  
June 8, 1910.

Virginia: Great Falls, July 31; Fairfax Co., June 29, 1915.

Pennsylvania: Harrisburg, June 27, 1923.

Ohio: Indian Lake, June 14, 1929; Fort Ancient, June 10-12, 1902;  
Georgesville, June 4, 1899;  
Licking Co., July 6, 1931;  
Hocking Co., July 14, 1931.

Illinois: Oakwood, June 6-16, 1925;  
Muncie, June 28, 1925;  
Freeport, June 2, 1917.

Mississippi: Hamilton, July 15, 1930.

Kansas: Bourbon Co., 1915.

Arkansas: Washington, Co., July 9, 1930.

Oklahoma: Tuskahoma, May 23, 1928;  
LaFlore, May 24, 1928.

Reported by others from the following general localities:

CANADA: Quebec.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
Connecticut; New York; New Jersey;  
District of Columbia; Maryland;  
Virginia; West Virginia; North  
Carolina; Georgia; Ohio; Kentucky;  
Missouri; Arkansas; Louisiana;  
Minnesota.

Chrysops montana Osten Sacken (1875)

- 1875 C. montanus Osten Sacken, Prodrôme, I, 382; N.Y.  
 1895 C. montanus Townsend, Trans. Am. Ent. Soc., XXII, 57; Vt.  
 1903 C. montanus Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5,  
 p. 40; Ohio.  
 1905 C. montanus Daecke, Ent. News, XVI, 342; N.J.  
 1906 C. montanus Daecke, Ent. News, XVII, 41.  
 1907 C. montanus Daecke, Ent. News, XVIII, 145; N.J.  
 1908 C. montanus Brimley and Sherman, Ent. News, XIX, 168;  
 N.C.  
 1915 C. montanus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLVI, Que.  
 1916 C. montanus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLVII, Ont.  
 1918 C. montanus McAtee and Walton, Proc. Ent. Soc. Wash.,  
 XI, 197; D.C., Va.  
 1920 C. montanus Britton, Bull. Conn. St. Geol. N.H. Surv.,  
 XXI, Conn.  
 1923 C. montana Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 121; N.Y.  
 1923 C. montanus Jones and Bradley, Jl. Econ. Ent., XVI, 308; La.  
 1924 C. montanus Jones and Bradley, Jl. Econ. Ent., XVII, 49.  
 1925 C. montana Johnson, Occ. Pap. Bost. Soc. N.H., VII, 101;  
 N. Eng. List.  
 1926 C. montanus Kröber, Stett. Ent. Ztg., LXXXVII, 298.  
 1928 C. montanus Leonard, N.Y. State List, p. 755; N.Y.



- 1930 C. montanus Stone, Ann.Ent.Soc.Am.,XXIII,284;N.Y.  
 1931 C. montanus Philip, Minn.Tech.Bull.LXXX,90;Minn.

The following also refer to this species:

- 1904 C. furcatus Hine, Ohio Nat.,V,222;N.Y.,Que.  
 1926 C. furcatus Krober, Stett.Ent.Ztg.,LXXXVII,296;Mass.

Color: Yellow with black abdominal pattern.

Size: Length, 7.5 - 10 mm.

Structural and color characters: Female: Vertex, frons and sides of genae gray yellow to yellow pollinose; frontal callosity black, rarely yellowish; frontoclypeus, oral margin of genae, and palpi, yellow; scape, pedicel and base of flagellum yellow to brown yellow; apical portion of flagellum black. Dorsum of thorax and scutellum dark brown or plumbeus, the former with the usual grayish pollinose stripes; pleurae and venter gray yellow pollinose with fuscous stripes. Dorsum of abdomen yellow; a black quadrate spot beneath the scutellum emarginate posteriorly; the second segment with a median geminate or inverted V-shaped black figure on each side of which is a small black spot; segments III, IV and V with four black spots which attain the anterior but not the posterior margins; sometimes segment V, along with the remaining segments, is black, only the posterior margins, yellow. Venter of abdomen yellow; a median black spot on each of segments III, IV and V; sometimes also on I and II;

remaining segments black with yellow posterior margins; the usual black lateral streaks present. Halteres fuscous. Wings as figured; sometimes the apical spot includes barely more than the apex of cell R4 and the extent of infuscation in cell R is variable, in some cases nearly the whole cell being colored. Legs yellow; the trochanters, base of front tibiae and entire tarsi, base of hind femora, apices of middle and hind tarsi, black.

**Male:** I do not have access to this sex for description. I quote Hine (1903): "Both basal cells infuscated except a small hyaline patch at the apex of each; the first segment of the abdomen is blackish with the exception of a yellow posterior margin which is slightly expanded on either side, the second has a large quadrate black spot in the middle enclosing a small yellow triangle posteriorly and on each side a narrow longitudinal spot also black; three and four are colored like two; the segments behind the second are plainly margined posteriorly with yellow and five, six and seven are uniformly black in front. These markings form a wide longitudinal black stripe in the middle of the abdomen enclosing small yellow triangles on segments two to four, and on each side of this a much narrower black stripe followed by a still narrower black stripe."

Comparative notes: Osten Sacken (1875) relates this species to his C. pudica, but I fail to see any resemblances except in the wing picture. Philip (1931) states that some specimens of C. montana, especially where cell R is infuscated for more than half its total area, is near C. striata O.S., but the more extensive apical spot of the latter should easily separate the two. The abdominal pattern of C. montana resembles that of some specimens of C. lateralis Wied. but the wing pictures are totally different. Also see under description of C. furcata Walker.

Remarks: As indicated in my description of C. furcata Walker, there is a large form of C. montana O.S. which Hine (1904) and Kröber (1926) identified as C. furcata, however, the latter author was doubtful. I have seen such specimens and there are no marked differences between them and the typical C. montana except that they are more robust. I lack sufficient evidence to raise this form to varietal rank.

Type data: Described from two females from Catskill Mountain House, New York, July 1874, and one female from Ogle County, Illinois. I have studied the types, in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: Quebec: Val Morin, Aug. 8, 1904.

Ontario: Go Home Bay.

UNITED STATES: Massachusetts: Lexington, August;  
Needham, July 28, 1904.

New Jersey: Clementon, July 9, 1905;  
July 4, 1904.

Michigan: Oakland Co., July 25, 1923;  
Huron Co., June 29, 1908.

Ohio: Ira; Indian Lake, June 15, 1930;  
Cincinnati, June 19, 1902;  
Columbus, June 1902.

Indiana: Miller, July 23, 1919.

Illinois: Beech, Aug. 25, 1925;  
Volo, July 8, 1932.

Minnesota: Anoka Co., July 9, 1925;  
Ramsey Co., July 5, 1929;  
Nisswa, July 6, 1922.

Reported by others from the following general  
localities:

CANADA: Quebec; Ontario.

UNITED STATES: New Hampshire; Vermont; Massachusetts;  
Connecticut; New York; New Jersey;  
District of Columbia; Virginia;  
North Carolina; Louisiana; Ohio;  
Minnesota.

Chrysops niger Macquart (1838)

- 1838 C. niger Macquart, Dipt. Exot., I, 1, p. 161; N. Am.  
 1875 C. niger Osten Sacken, Prodrôme, I, 377; Can., Middle  
 and N. States.  
 1895 C. niger Townsend, Trans. Am. Ent. Soc., XXII, 57; Va.  
 1895 C. niger Hart, Bull. Ill. State Lab. N.H., IV, Ill.  
 1901 C. niger Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 301.  
 1902 C. niger Howard, Ins. Book, pl. XV, f. 36.  
 1903 C. niger Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, p. 41;  
 Ohio.  
 1904 C. niger Brimley and Sherman, Ent. News, XV, 270; N. C.  
 1905 C. niger Daecke, Ent. News, XVI, 342; N. J.  
 1906 C. niger Daecke, Ent. News, XVII, 41.  
 1907 C. niger Daecke, Ent. News, XVIII, 140; N. J.  
 1908 C. niger Paxson, Ent. News, XIX, 336; Pa.  
 1913 C. niger Graenicher, Bull. Wis. N.H. Soc., X, 172; Wis.  
 1913 C. niger Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLIV,  
 N. S.  
 1915 C. niger Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVI,  
 Nfd., Ont.  
 1918 C. niger McAtee and Walton, Proc. Ent. Soc. Wash.,  
 XX, 197; Va.  
 1920 C. niger Britton, Bull. Conn. St. Geol. N.H. Surv.,  
 XXXI, Conn. List.  
 1923 C. niger Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 121; N. Y.  
 1925 C. niger Johnson, Proc. Bost. Soc. N.H., XXXVIII, 68; Mass.  
 1925 C. niger Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99;  
 N. Eng. List.  
 1926 C. niger Kröber, Stett. Ent. Ztg., LXXXVII, 241.  
 1926 C. niger Blake, Ill. Biol. Mon., X, 30; Me.  
 1927 C. niger Weiss, N. J. Circ., 106, pp. 18-20; N. J.  
 1927 C. niger Johnson, Ins. Mt. Des. Reg., p. 179.  
 1928 C. niger Leonard, N. Y. State List, p. 755; N. Y.  
 1928 C. niger Kröber, Deutsche Ent. Ztsch., p. 429; Mont.  
 1930 C. niger Curran, Bull. Am. Mus. N.H., LXI, 36; N. Y.  
 1930 C. niger Stone, Ann. Ent. Soc. Am., XXIII, 285; N. Y.  
 1930 C. niger Schwardt and Hall, Bull. 256, Ark. Exp. Sta.,  
 13; Ark.  
 1931 C. niger Schwardt, Jl. Kans. Ent. Soc., IV, 8; Ark.  
 1931 C. niger Philip, Minn. Tech. Bull., LXXX, 91; Minn.  
 1932 C. niger Wilson, Jl. N. Y. Ent. Soc., XL, 83; N. J.

The following also refers to this species:

- 1848 C. carbonarius Walker, List, I, 203 (in part)

Color: Black.

Size: Length, 6.5 - 8.5 mm. Philip (1931) gives 7.5 - 10 mm.

Structural and color characters: Female: Vertex gray pollinose; frons and sides of genae yellow pollinose; ocellar area, frontal callosity, a spot on each side of the fronto-clypeus, oral margin of genae, and palpi, fuscous to black; fronto-clypeus and scape of antennae yellow; pedicel and base of flagellum brown yellow; apex of flagellum black. Dorsum of thorax and scutellum black, white pubescent, the former with gray pollinose stripes; pleurae and venter gray pruinose with the usual black stripes, the former with whitish pile. Abdomen entirely black with white pubescence. Halteres black. Wings as figured. Legs black; base of anterior tibiae, basal half of median tibiae, median and posterior metatarsi, yellow. In some specimens the legs are completely black except the yellow median and posterior metatarsi.

Male; Similar to the female except for sex characters. Cell 2d M is mostly infuscated except a small hyaline spot near the apex; cubital and anal areas dilutely infuscated.

Comparative notes: The yellow fronto-clypeus and hyaline cell M2 readily separates this species from

all others of the group lacking an apical spot. The male is apt to be confused with that of C. carbonaria Walker, but also in this case the fronto-clypeus offers the best character.

Type data: Described from "Amerique du Nord". In the Museum of Lille.

Distributional data:

CANADA: Ontario: Hayden, July 31, 1906.

UNITED STATES: New York: Cranberry Lake, July 26, 1917; Big Indian Valley, Catskill Mts., July 19, 1907.

New Jersey: Browns Mills Jct., June 10, 1921; June 25, 1905; Ramsey, June 20, 1912; National Park, June 3, 1905.

Maryland: Beltsville.

North Carolina: Asheville, May 20, 1899.

Pennsylvania: Indiana; Lehigh Gap, July 12, 1907; Perkaisie, June 18, 1905.

Ohio: Median, June 10-11, 1899; Cincinnati, May 30-31, 1902; Columbus, May 23-24, 1890, May 24, 1907, June 1, 1901; Loudonville, June 5, 1916; Summit Co., July 1, 1920; Akron, Aug. 23, 1898.

Illinois: Dougola, May 10, 1916;  
Alto Pass, June 5, 1919;  
Glen Ellyn, May 30, 1903;  
Herod, May 29, 1928.

Missouri: Columbia.

Arkansas: Washington Co., June 7-11,  
1929.

Reported by others from the following general  
localities:

CANADA: Newfoundland; Nova Scotia; Quebec; Ontario.

UNITED STATES: Maine; Massachusetts; Connecticut;  
New York; New Jersey; Virginia;  
North Carolina; Pennsylvania; Michi-  
gan; Ohio; Wisconsin; Illinois;  
Minnesota; Arkansas; Montana.

Chrysops nigribimbo Whitney (1879)

- 1879 C. nigribimbo Whitney, Can.Ent., XI, 35; N.H.  
1904 C. nigribimbo Johnson,  
1905 C. nigribimbo Daecke, Ent.News, XVI, 342; N.J.  
1906 C. nigribimbo Daecke, Ent.News, XVII, 41.  
1907 C. nigribimbo Daecke, Ent.News, XVIII, 141; N.J.  
1908 C. nigribimbo Brimley and Sherman, Ent.News, XIX,  
168; N.C.  
1923 C. nigribimbo Bequaert and Davis, Bull.Brook.Ent.  
Soc., XVIII, 121; N.Y.  
1925 C. nigribimbo Johnson, Occ.Pap.Bost.Soc.N.H., VII,  
99; N.H., Mass.  
1928 C. nigribimbo Leonard, N.Y.State List, p.755; N.Y.

Color: Fuscous; crossband of wing obsolete.



Size: Length, 5.5 - 7 mm.

Structural and color characters: Female: Vertex, frons and sides of genae gray pollinose; ocellar area, frontal callosity, a spot on each side of the fronto-clypeus, another on the oral margin of the genae, fuscous, and palpi, yellow, the latter often with some fuscous; scape of antennae yellow; pedicel and base of flagellum brown yellow; apical portion of flagellum black. Entire body fuscous, white pubescent; the pleurae with the usual gray pruinosity and white pile. Halteres fuscous.

Wings as figured, the picture very dilute, almost obsolete, most saturate along the costal margin and the stigma. Legs fuscous; front coxae, proximal portion of front tibiae, middle and hind metatarsi and sometimes the middle femora and tibiae, brown yellow.

Male: Like the female in all respects except for sex characters. The head is relatively quite large.

Comparative notes: This species is distinct from all others in our North American fauna. It is most closely related to C. hyalina Shan., but may at once be separated by the presence of a wing picture. See under description of C. hyalina.

Remarks: To my knowledge this is the first time the male has been described.

Type data: Described from Milford, New Hampshire.

I have studied the types. Four females in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: New Hampshire: Milford.

New Jersey: Browns Mills Jct.,  
June 28-30, 1921;  
Aug. 15, 1921.

North Carolina: Lake Ellis, May 16,  
1906, June 22, 1905.

Reported by others from the following general localities:

UNITED STATES: New Hampshire; Massachusetts; New York; New Jersey; North Carolina.

Chrysops nigripes Zetterstedt (1838)

- 1838 C. nigripes Zetterstedt, Ins.Lapp., p.519; N.Europe.  
1842 C. nigripes Zetterstedt, Dipt.Scand., I, 125.  
1858 C. nigripes Loew, Verh.Z.B.Ges.Wien., p.623; N.Am.  
1875 C. nigripes Osten Sacken, Prodrôme I, 394; Alaska.  
1900 C. nigripes Coquillett,  
1904 C. nigripes Hine, Ohio Nat., V, 224.  
1923 C. nigripes Hine, Can.Ent., LV, 145; Alaska.  
1926 C. nigripes Kröber, Stett.Ent.Ztg., LXXVII, 323.

Color: Black, abdominal tergites with gray hind margins which expand into median triangles.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Vertex,

frons, a mid-streak on the fronto-clypeus, sides of genae, gray pollinose; frontal callosity, fronto-clypeus, oral margins of genae, palpi, and antennae, fuscous to black; sometimes the inner surfaces of the basal antennal segments are reddish. Dorsum of thorax and scutellum black, pale yellow pubescent, the former with gray pollinose stripes; pleurae and venter black with a gray pruinosity, the former with pale yellow pile and a trace of black pile on the humeri. Dorsum of abdomen black; first segment with the posterolateral angles and the very narrow hind margin gray yellow; the black of the second segment is encroached upon from each side by gray yellow; all segments caudad from II with conspicuous gray hind margins which on II to V expand into mid-dorsal triangles. Venter of abdomen black, the segments with gray hind margins; a small patch of yellow on each side near the base usually present. Halteres fuscous. Wings as figured; the tooth-like projection of the crossband characteristic. Legs black; the base of the front tibiae, middle and hind metatarsi, brown.

Male: According to Kröber (1926) who has described this species from European specimens this sex differs from the female as follows: The dorsum of the thorax lacks the gray stripes; the pleurae are black pilose; the gray hind margins of the abdominal tergites do

not expand into triangles; there is a greater extent of infuscation in cells R and 2d M of the wings.

Comparative notes: This species has no close American relatives. From both C. noctifer O. S. and C. pertinax Will. it is readily distinguished by the conspicuous gray hind margins of the abdominal tergites which in the female expand into median triangles, and by the tooth-like projection of the crossband of the wing.

Remarks: This species is the only European Chrysons undoubtedly represented in boreal North America.

Type data: One female. In the Museum of Lund.

Distributional data:

CANADA: Manitoba: Kettle Rapids, near Winnipeg, July 16, 1917.

UNITED STATES: Maine: Saddleback Lake, July 18-20, 1916.

Montana: Lakeview, Aug. 4, 1920.

Alaska: Nenana, July 5-7, 1921;  
Anchorage, July 21, 1921;  
Savonoski, Naknek Lake,  
Aug. 5, 1919.

Reported by others from the following general localities:

NORTHERN EUROPE.

UNITED STATES: Montana; Alaska.

Chrysops noctifer Osten Sacken (1877)

- 1877 C. noctifer Osten Sacken, West Dipt., p.220; Calif.  
 1903 C. noctifer Baker, Inv. Pacif., I, 21; Calif.  
 1904 C. noctifer Hine, Ohio Nat., V, 224 (C. pertinax  
 Will. a syn.)  
 1926 C. noctifer Essig, Ins. W.N.A., p.556.  
 1927 C. noctifer Cole, Proc. Cal. Acad. Sci., XVI, 420 and 469  
 f.72.

The following also refers to this species:

- 1927 Chrysops sp. near sordidus Essig, Pan. Pac. Ent.,  
 IV, 186; Calif.

Color: Shining black, dorsum of abdomen with a yellow spot on each side near the base.

Size: Length, 8 - 9.5 mm.

Structural and color characters: Female: Vertex, frontal callosity, fronto-clypeus, and genae, black; sides of vertex, frons, a mid-streak on the fronto-clypeus, and sides of genae, gray yellow pollinose. Antennae slender; scape and pedicel yellowish, flagellum mostly black, slightly thicker than the scape. Palpi and proboscis red brown. Dorsum of thorax and scutellum black with whitish pubescence, the former with obscure gray stripes; pleurae and venter black, the former with dense grayish yellow pile and some black pile on the humeri. Dorsum of abdomen black, encroached upon antero-laterally by two large yellow spots; faint grayish mid-dorsal triangles sometimes visible on segments II, III and IV. Venter of ab-

domen black with a greater extent of yellow antero-laterally. Wings as figured; the apical spot narrow and practically separated from the crossband which does not reach the posterior margin of the wing. Legs black; base of tibiae, median and posterior metatarsi, red brown; anterior coxae and posterior femora with long whitish hair.

**Male:** To my knowledge this sex has not been reported.

Comparative notes: Separated from C. pertinax Will. principally by the yellow lateral spots on the abdomen. Taken by series C. noctifer is smaller than C. pertinax I have seen specimens of C. excitans Walker with a trace of an apical spot which might easily be confused with C. noctifer, but in this instance the geographic distribution of these species will aid in separation.

Type data: Described from four females, Sierra County, California, July 20-27. I have studied the types. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: California: Sacramento, June 4, 1915; Fallen Leaf, 6500 ft. July 15, 1917; Sonoma Co.; Fallen Leaf Lake, 6300 ft. Lake Tahoe, June 12-30, 1930, June 28, 1931.

Reported by others from the following general localities:

UNITED STATES: New Mexico; California.

Chrysops obsoleta Wiedemann (1821)

- 1821 C. obsoletus Wiedemann, Dipt. Esot., p.108; N. Am.  
 1828 C. obsoletus Wiedemann, Auss. Zw., I, 211.  
 1926 C. obsoletus Krober, Stett. Ent. Ztg., LXXXVII, 315.

The following also refer to this species:

- ? 1838 C. trinotatus Macquart, Dipt. Exot., I, 1, 161.  
 1875 C. morosus Osten Sacken, Prodrôme I, 389.  
 1928 C. morosus Leonard, N.Y. State List, p.755.  
 1903 C. lugens Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5,  
 p.39; Ohio (in part)  
 1907 C. lugens Hine, Bull. 93, La. Exp. Sta., p.30, (in part)  
 1907 C. lugens morosus Daecke, Ent. News, XVIII, 142.  
 1925 C. lugens morosa Johnson, Occ. Pap. Bost. Soc. N.H.,  
 VII, 100; N. Eng. List.

Color: Fuscous; abdominal dorsum with three more or less obsolete yellow stripes.

Size: Length, 7.5 - 8.5 mm.

Structural and color characters: Female: Vertex gray yellow pollinose; frons and sides of genae yellow pollinose; ocellar area frontal callosity, a spot on each side of the fronto-clypeus, another on each side of the oral margin of the genae, and palpi, fuscous; remainder of fronto-clypeus and genae brown yellow; scape of antennae yellow, pedicel and base of flagellum brown yellow, apex of flagellum black. Dorsum

of thorax and scutellum fuscous, the former with gray to gray yellow pollinose stripes, the latter sometimes yellowish near the tip; pleurae and venter yellow pollinose with the usual fuscous stripes. Dorsum of abdomen fuscous with three more or less obscure yellow stripes which begin near the base and fade out near the apex, their length variable. Venter of abdomen fuscous with a variable amount of yellow on the sides near the base. Halteres fuscous. Wings as figured; cell R completely infuscated, the cubital and anal areas hyaline or dilutely infuscated. Legs yellow; joints, apical portion of front tibiae and entire tarsi, bases of middle and hind femora, sometimes the apex of the hind tibiae, apical segments of middle and hind tarsi, fuscous.

Male: I have not been able to satisfactorily identify this sex. Wiedemann (1828) states that the abdomen lacks stripes. Kröber (1926) states that the male designated as the type is much greased.

Osten Sacken (1875) in his description of C. morosus states that the male in its essential characters is like the female and that the three yellow abdominal stripes are very distinct.

Comparative notes: Separated from C. lugens Wied.



by the three yellow abdominal stripes and the more arcuate and narrow hyaline triangle of the wing.

The wing picture is much like that of C. ultima Whit. but that species as the abdomen almost entirely fuscous and the pleural stripes are gray pollinose.

From C. parvula Daecke, C. obsoleta is distinguished by the abdominal stripes, the wing picture, the dominance of yellow on the hind legs, and its generally larger size. C. wiedemanni Kröber, the C. obsoletus of authors, is an entirely different fly, at once distinguished from C. obsoleta Wied. by the hyaline cell 2d M.

Remarks: The characters used for separating C. obsoleta, C. lugens, C. ultima, and C. parvula must be employed with care, for these are all very close. In large series the characters most readily discernible intergrade. It is quite probable that future work may bring some of these species into synonymy.

Type data: Through the courtesy of the Museum of Vienna, I received one type female (Savannah) for study. It is in excellent condition, slightly faded, and unfortunately the hind legs are missing. However, the fundamental characters are well preserved.

Distributional data:

UNITED STATES: New Jersey: Billingsport, July 28, 1918.

Maryland: Beltsville, June 1918;  
Annapolis July 31, 1932.

District of Columbia: July 7, 1899.

Ohio: Ira.

Reported by others from the following general localities:

UNITED STATES: Massachusetts; Connecticut; New York;  
New Jersey; Maryland; Georgia;  
Florida; Pennsylvania; Ohio;  
Louisiana.

Chrysops ornata Kröber (1926)

1926 C. ornatus Kröber, Stett.Ent.Ztg., LXXVII, 328; Ont. I have not been able to identify this species. It belongs in Kröber's "Gruppe vittatus". According to description, the length is 8.5 mm. Frontal callosity and fronto-clypeus yellow; antennae slender. Thorax with the usual yellowish pollinose and brown stripes; scutellum yellow. The pattern of the abdominal dorsum is peculiar; the black cruciform median spot on the fourth tergite seems characteristic. The wing

picture is not markedly different from that of C. vittata Wied. Legs yellow with the usual fuscous areas.

Described from one female, Jordan, Ontario.

In Kröber's collection.

Chrysops pachycera Williston (1887)

- 1887 C. pachycera Williston, Trans.Kans.Acad.Sci., X,134;Calif.  
 1895 C. pachycera Townsend, Proc.Cal.Acad.Sci.,ser.2, IV,596;L.Calif.  
 1903 C. pachycera Adams, Kans.Univ.Sci.Bull.,II,442, (Type = C. proclivis O.S);Ariz.  
 1904 C. pachycera Snow, Kans.Univ.Sci.Bull.,No.12,341;Ariz.  
 1904 C. pachycera Hine, Ohio Nat.,V,224;Calif.,Ariz.  
 1921 C. pachycera Cole and Lovett, Proc.Cal.Acad.Sci., XI,232;Ore. List.  
 1926 C. pachycera Essig, Ins.W.N.A.,p.554.  
 1926 C. pachycera Kröber, Stett.Ent.Ztg.,LXXVII,264.

Color: Yellow, with black abdominal pattern.

Size: Length, 6.5 - 8 mm.

Structural and color characters: Female: Vertex broader than long, yellow pollinose; frontal-callosity, fronto-clypeus, genae, and palpi yellow, the usual areas pollinosed; sometimes a small spot on the oral margins of the genae and the upper border of the frontal callosity, brown; antennae incrassate, especially the scape, mostly yellow or brown yellow except for the black apical portion of the flagellum; scape and pedicel with coarse black pubescence. Dorsum of thorax

and scutellum typically yellow gray pollinose with whitish pubescence, the former with the usual dark stripes; pleurae and venter yellow pollinose, some brown ground color showing through. Dorsum of abdomen yellow; a black quadrate spot beneath the scutellum, posteriorly emarginate, not attaining the hind margin of the first segment; second segment with a small median black geminate figure (sometimes this figure assumes the form of two divergent spots) which attains neither margin; segments II to VI each with a median pair of black sub-triangular spots whose bases are directed anteriorly; segment VII usually black with a yellow hind margin, sometimes the sixth segment approaches this condition; rarely, obscure black lateral spots are present on all segments caudad from III. Venter yellow with a narrow black median stripe and a lateral stripe running full length; apical two or three segments black with yellow hind margins. Halteres yellow. Wings as figured; sometimes the crossband is fenestrate. Legs yellow; joints, apex of front tibiae and entire tarsi, apical segments of middle and hind tarsi, black.

**Male:** Head like the female except for sex characters. Dorsum of thorax and scutellum more brown. Dorsum of abdomen yellow; the black spot beneath the scutellum more extensive than in the female; segments II and III

each with a heavy median geminate black spot; remaining segments much like the female; the sixth typically with a black lateral spot. Venter of abdomen like the female. Wings like the female, except for a greater extent of infuscation in cells R and 2d M, that of 2d M being about equal to R. Legs very similar to the female.

Comparative notes: Closely related to C. latifrons n.sp., but that species is easily distinguished by the tooth-like projection of the crossband. C. pachycera is smaller and predominantly more yellow than C. coquilletti Hine. See also under description of C. coquilletti. The presence or absence of infuscation at the base of cell 1st A in the male (a character mentioned in most of the literature) appears to be of no taxonomic value.

Remarks: The characters used by Hine (1904) in his key are not very satisfactory for separating C. pachycera from C. coquilletti, although the species are very distinct. To make matters worse, Kröber (1926) in his key has absolutely reversed the characters used by Hine.

Type data: Unfortunately the types have disappeared. Described from three specimens from California, the male of which has proved to be C. proclivis O.S.

Distributional data:

UNITED STATES: Utah: Zion National Park, Aug. 13, 1929; Pintura, Aug. 11, 1929; St. George, June 5-7, 1919, June 2, 1928.

Arizona: Bill Williams Fork, August; Lewis Springs, Aug. 5, 1907.

Reported by others from the following general localities:

UNITED STATES: Oregon; California; Arizona.

Chrysops parvula Daecke (1907)

- 1907 C. parvulus Daecke, Ent. News, XVIII, 142; N.J.  
 1908 C. parvulus Brimley and Sherman, Ent. News, XIX, 168; N.C.  
 1913 C. parvulus Johnson, Bull. Am. Mus. N.H., XXXII, 51; Fla.  
 1918 C. parvulus McAtee and Walton, Proc. Ent. Soc. Wash., XX, 197; Md., Va.  
 1926 C. parvulus Kröber, Stett. Ent. Ztg., LXXXVII, 314.  
 1928 C. parvulus Leonard, N.Y. State List, p. 756; N.Y.  
 1930 C. parvulus Schwardt and Hall, Bull. 256, Ark, Exp. Sta., 13; Ark.

The following also refers to this species:

- 1875 C. morosus Osten Sacken, Prodrôme, I, 390, (in part); Md.

Color: Fuscous.

Size: Length, 5.5 - 7 mm.

Structural and color characters: Female: Vertex and sides of genae gray yellow pollinose; ocellar area, fronto-clypeus, a line connecting them, a large spot on each side of the fronto-clypeus, oral margins of genae, and palpi, fuscous; the disc of the fronto-

clypeus usually brown yellow, sometimes however, this region is entirely fuscous; Antennae slender; scape and pedicel, and sometimes the extreme base of the black flagellum, yellow to brown yellow. Thorax and scutellum fuscous, the former with faint gray pollinose stripes; pleurae and venter gray yellow pollinose with the usual fuscous stripes. Abdomen entirely fuscous. Halteres fuscous. Wings as figured; the apex of the hyaline triangle not attaining vein R2-3 and the apical spot not often exceeding vein R5. Legs yellow; the trochanters, apex of front femora, apical three-fourths of front tibiae and entire tarsi, base of middle femora, most of the hind femora and tibiae, except at their extreme apex and base respectively, apical segments of middle and hind tarsi, fuscous. Male: This sex has never been reported, unless one is to accept the male with the wholly brown abdomen mentioned by Osten Sacken (1875) under his description of C. morosus.

Comparative notes: This species is no doubt the smallest of its group and is distinguished by its fuscous abdomen and typically fuscous hind femora and tibiae. See also under description of C. lugens Wied.

Remarks: Daecke (1907) offers an additional means of separating C. parvula from C. lugens by the eye

pattern. The former having the frontal spot usually excised anteriorly and the occipital border separated from the occiput, the latter with a solid frontal spot and the occipital border connected with the occiput.

Type data: Described from a large series, most of them from Bamber, New Jersey, July 9, 1906. I have studied the types in the United States National Museum.

Distributional data:

UNITED STATES: New Jersey: Lakehurst, July 2-3, 1912, July 25; Bamber, July 9, 1906; Jersey City; Rawlins Aug. 11, 1907.

Florida: Hilliard, Aug. 19, 1930.

Arkansas: Washington Co., Aug. 16, 1929; Fayetteville, Aug. 12, 1929.

Reported by others from the following general localities:

UNITED STATES: New York; New Jersey; Maryland;  
Virginia; North Carolina; Florida;  
Arkansas.



Chrysops pertinax Williston (1887)

- 1887 C. pertinax Williston, Trans.Kans.Acad.Sci.,X,  
132; Wash.  
1901 C. pertinax Ricardo, Ann.and Mag.N.H.,ser.7,VIII,307.

The following also refer to this species:

- 1892 C. nigriventris Bigot, Mem.Soc.Zool.France,V,604;  
Wash.  
1904 C. noctifer Fletcher, 34th Rept.Ent.Soc.Ont.,98;B.C.  
?1921 C. noctifer Cole and Lovett, Proc.Cal.Acad.Sci.,  
XI,232;Ore.List.  
1926 C. noctifer Kröbber, Stett.Ent.Ztg.,LXXVII,308.

Color: Black.

Size: Length, 8.5 - 11 mm.

Structural and color characters: Female: Vertex gray pollinose; frons, a mid-streak on the fronto-clypeus, and sides of genae, yellowish pollinose; ocellar area, frontal callosity, fronto-clypeus, oral margins of genae, palpi, and proboscis, black; antennae variable, usually black except for some yellow at the basal portion of the scape; sometimes the bases of the pedicel and flagellum are red brown. Dorsum of thorax and scutellum black with light gray pubescence, the former with faint gray pollinose stripes; pleurae and venter black, the former with dense yellowish gray pile and on the humeri black pile. Abdomen black, white pubescent with some black intermixed; tergites II to IV often with grayish mid-dorsal triangles. Halteres black. Wings as figured; some variation in the ex-

tent of infuscation in cells R and 2d M; Legs black; the middle and hind metatarsi, and sometimes the extreme bases of all the tibiae, red brown.

**Male:** Like the female except for sex characters.

Antennae wholly black. Entire body black, the pubescence and pile brown or black. Wings with a greater extent of infuscation in cells R and 2d M. Legs similar to the female.

Comparative notes: See under description of C. noctifer O.S. Superficially the species resembles C. mitis O.S., but the presence of an apical spot immediately distinguished C. pertinax.

Remarks: I am taking this species out of synonymy because I fail to find any intergrading forms. I have studied both Osten Sacken's types of C. noctifer and Williston's types of C. pertinax, and in addition, large series of both species. In very few specimens of C. pertinax I have observed just a faint trace of yellow on the sides of the abdomen near the base. This species is more robust and is principally northwestern in distribution. I have no records of C. noctifer north of California.

Type data: Described from eight females from Washington Territory, of which two cotypes (one of which I am designating and labelling as the holotype) remain in

the Francis Huntington Snow Entomological Collection of the University of Kansas. Kröber described the male under C. noctifer O.S. but failed to designate the type. I hereby select as the allotype, the male of my description, data: Anthony Lake, Oregon; July 11, 1931; M. W. Sanderson.

Distributional data:

CANADA: Alberta: Banff, July 3, 1922, Aug. 23, 1922.

British Columbia: Van Couver, May 9-19, 1906;  
Cultus Lake, June 25, 1927;  
Agassiz, June 12, 1927,  
June 24, 1926; Nanaimo,  
June 24, 1920.

UNITED STATES: Michigan: Cheboygan Co., July 4, 1931.

Wyoming: Stewart R. Station, July 18,  
1920; Grand Teton National  
Park, Aug. 18, 1931.

Utah: Emigration Canyon, 7000 ft.  
June 24-25, 1925, July 21,  
1917; Logan Canyon, July 26,  
1915; Logan.

Idaho: Moscow Mt., June 8, 1921.

Montana: Gallatin Co., June 27, 1900;  
Beaver Creek, Aug. 1913;  
Glacier National Park,  
Aug. 14, 1916.

Washington: Blue Mts., July 15, 1896;  
 Clallam Co., July 5, 1920;  
 Copalis, July 25, 1931;  
 Mt. Baker, July 29, 1931;  
 Montesano, July 23, 1931;  
 Quinault, July 26, 1931;  
 Kalama River, July 21, 1931;  
 Mason Co., July 2-15, 1919;  
 Seattle, July 15, 1901;  
 Mt. Adams, July 24, 1921;  
 Mt. Rainier, Aug. 5, 1922;  
 Yakima, July 26, 1922;  
 Olympia, May 26-28, 1932;  
 Sumner, June 6, 1932.

Oregon: Haines, July 10, 1931;  
 Anthony Lake, July 11, 1931;  
 Hood River, July 17, 1931;  
 Mt. Hood, July 18, 1931; Mt.  
 Jefferson, July 12, 1907;  
 Lake Co., July 22-26, 1932;  
 Blue Mts., Horseshoe and  
 Aneroid Lakes, July 24-26, 1929;  
 Wallawa Lake, July 25, 1929.

California: Santa Cruz Mts., May 20-25,  
 1907; Los Angeles Co.

Reported by others from the following general  
 localities:

CANADA: Ontario; British Columbia.

UNITED STATES: Washington; Oregon.

Chrysops pikei Whitney (1904)

- 1904 C. pikei Whitney, Can. Ent., XXXVI, 205; Mo.  
 1904 C. pikei Hine, Ohio Nat., V, 224; Kans.  
 1907 C. pikei Hine, Bull. 93, La. Exp. Sta., 33; La., Kans., Ohio.  
 1924 C. pikei Wehr, Nebr. Univ. Studies, XXII, 113; Nebr.  
 1924 C. pikei Jones and Bradley, Jl. Econ. Ent., XVII, 45  
 and 49; La.  
 1926 C. pikei Kröber, Stett. Ent. Ztg., LXXXVII, 336.  
 1930 C. pikei Schwardt and Hall, Bull. 256, Ark. Exp. Sta.,  
 13; Ark.  
 1931 C. pikei Schwardt, Jl. Kans. Ent. Soc., IV, 9; Ark.

Color: Yellow and black, abdomen vittate.

Size: Length, 6.5 - 8 mm.

Structural and color characters: Female: Vertex, frons, sides of genae, yellow pollinose; frontal callosity black; fronto-clypeus oral margins of genae and palpi, yellow, sometimes a black spot on the oral margin of the genae and each side of the fronto-clypeus; antennae slender; scape, pedicel and base of flagellum yellow; apex of flagellum black. Dorsum of thorax gray yellow pruinose with fuscous stripes; scutellum yellow with a fuscous spot on the disc (usually a continuation of the median stripe of the thoracic dorsum); pleurae and venter yellow pollinose with the usual fuscous stripes. Abdominal dorsum yellow with four longitudinal black stripes, the lateral ones extending toward the base not beyond the posterior margin of the second tergite. Venter of abdomen yellow; usually a small median black spot on each of segments III, IV and V; remaining

segments black with yellow hind margins; the usual lateral streaks present. Halteres black. Wings as figured; the hyaline triangle broadly open, its apex not exceeding vein R2+3. Legs yellow; apical portion of front tibiae and entire tarsi, middle and hind coxae, trochanters, and apical tarsal segments, black.

Male: Like the female except for sex characters.

The fuscous stripes of the thoracic and abdominal dorsum are broader. Apical abdominal segments black.

Comparative notes: A distinct species. Usually separated from the more variable C. sequax Will. by the incomplete lateral abdominal stripes and the hyaline triangle of the wing which is more broadly open. The males of these species are quite distinct.

Type data: Described from eleven females, Pike County, Missouri.

Distributional data:

UNITED STATES: New Jersey: Riverton.

North Carolina: Raleigh, May 30, 1902.

Ohio: Indian Lake, June 14, 1929, June 15, 1930, June 15, 1931; Ira, Aug. 1, 1925; Logan Co., July 13, 1930; Columbus, July 12, 1930; Madison Co., June 14, 1930; Wauseon, Aug. 21, 1902; Cincinnati, June 13, 1902; Vinton, June 5-12, 1900; June 19-22, 1901; W. Jefferson, Aug. 6, 1923; Milan, June 29, 1894;

Harrisburg, June 14, 1929;  
 Hocking Co., May 30, 1932;  
 July 4-25, 1931; Streetsborough,  
 June 21, 1932; Cedarville, July 2,  
 1931; Fairfield Co., June 16,  
 1931; Pickaway Co., July 7, 1931.

Indiana: Bluffton, 1908; Angola, July 10,  
 1910.

Illinois: White Heath, June 12, 1915;  
 June 11, 1916; St. Joseph,  
 July 9, 1912; Algonquin,  
 July 7, 1909; Palos Park,  
 July 23, 1905; Champaign,  
 June 21, 1892; Urbana,  
 July 9, 1891; June 1890;  
 Quincy, June 7, 1928.

Alabama: Tuskegee, July 22, 1930.

Mississippi: Hamilton, July 15, 1930.

Arkansas: Fayetteville, May 2, 1930;  
 Washington Co., May 26, 1928;  
 June 27, 1929.

Louisiana: Logansport, Sept. 6, 1905;  
 LeCompte, Aug. 28, 1906;  
 Opelousas, April, 1897.

Kansas: Sumner Co., 1916; Montgomery  
 Co., June 6-26, 1926; Philips  
 Co., July 8, 1925; Butler Co.,  
 1916; Decatur Co., July 6, 1925;  
 McPherson Co., June 28, 1923;  
 Kiowa Co., July 25, 1923;  
 Fort Scott, June 3, 1926;  
 Elk City, June 8, 1926;  
 Leavenworth Co., June 30, 1924;  
 Rice Co., July 3, 1923; Ells-  
 worth Co., July 13, 1923;  
 Russell Co., Johnson Co., 1915;  
 Harvey Co., Aug. 8-27, 1917;

Morris Co., July 1923;  
 Rooks Co.; Douglas Co.;  
 Atchison Co., July 10, 1924;  
 Doniphan Co., July 23, 1924;  
 Cherokee Co.; Ellis Co.

Oklahoma: Tuskahoma, May 23, 1928;  
 LeFlore, May 24, 1928.

Texas: Colorado Co., May 12, 1922.

Reported by others from the following general  
 localities:

UNITED STATES: Ohio; Illinois; Missouri; Nebraska;  
Kansas; Louisiana; Arkansas.

Chrysops pilumna Kröber, (1926)

1926 C. pilumnus Kröber, Stett.Ent.Ztg., LXXXVII,  
 278; Ont.

I have not satisfactorily identified this species.  
 Some northwestern forms of C. frigida O.S. (which  
 ultimately may prove to be a distinct species) coin-  
 cide fairly well with Kröber's description except for  
 the black on the fronto-clypeus and genae, and the  
 abdominal pattern.

Dr. Walley of the Canadian National Museum who  
 kindly compared one of my specimens with Kröber's type  
 states as follows: "Wing pattern exactly as figured  
 by Kröber. The maculate portion is much darker brown



than in your specimen and does not fade out in the apices of marginal, first and second submarginal cells as it does in your specimen. General dorsal abdominal pattern as figured by Kröber except that first tergite is entirely dark except small postero-lateral angles and there is no narrow pale posterior margin as he has shown; median black portion of second tergite slightly broader than shown by Kröber thus with narrow pale lateral areas; following tergites as in Kröber's figure. Fronto-clypeus, face and genae uniformly yellow, shining, with yellowish pollinose areas as in your specimen except that the median pollinose stripe on the fronto-clypeus is lacking in the type; the deep frontal fossae are brownish and the lower margins of the genae are bordered with pale brownish. Antennae (only two basal segments present) dark brownish shaded with blackish above, much as in your specimen, but a little darker throughout. There is not a well defined line separating the large upper facets from the small lower ones, the transition is about as in your specimen; the upper facets are noticeably larger than the lower facets, the difference in size being greater than in your specimen. Leg color . . front legs agree with your specimen; mid-coxae, trochanters, basal fourth of mid-femora and apices of mid-tarsi

dull brownish black, the apical third of hind femora and entire hind tibiae uniformly yellowish brown."

Described from one male, Jordan, Ontario. In the Canadian National Collection, Type No. 2491.

Chrysops proclivis Osten Sacken (1877)

- 1877 C. proclivis Osten Sacken, West Dipt., p.222; Calif., Wash., Ore.  
 1887 C. proclivis Williston, Trans.Kans.Acad.Sci., X, 134; Calif., Wash., Ore.  
 1901 C. proclivis Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 306.  
 1903 C. proclivis Hine, Can. Ent., XXXV, 244; Ariz.  
 1904 C. proclivis Hine, Ohio Nat. V, 225; Calif., Wash.  
 1904 C. proclivis Fletcher, 34th Rept. Ent. Soc. Ont., p. 98.  
 1917 C. proclivis Cockerell, Proc. Biol. Soc. Wash., XXX, 19; Florissant, Col.  
 1921 C. proclivis Cole and Lovett, Proc. Cal. Acad. Sci., XI, 233; Ore.  
 1926 C. proclivis Cameron, Bull. Ent. Res., XVII, 24.  
 1926 C. proclivis Essig, Ins. W.N.A., p. 554.  
 1926 C. proclivis Kröber, Stett. Ent. Ztg., LXXVII, 320; B.C., Wash.

The following also refer to this species:

- 1887 C. pachycera Williston, Trans.Kans.Acad.Sci., X, 134, (in part)  
 1892 C. atricornis Bigot, Mem. Soc. Zool. France, V, 604; Col.

Color: Black and yellow, the former predominant.

Size: Length, 7.5 - 9 mm.

Structural and color characters: Female: Vertex grayish pollinose; frons and sides of genae yellow pollinose; ocellar area, frontal callosity, a connecting line between them, a spot on each side of the yellow fronto-

clypeus, and oral margins of the genae, fuscous to black. Palpi and antennae mostly fuscous, often with some red brown showing through; scape, pedicel and base of flagellum sometimes yellow brown. Dorsum of thorax and scutellum fuscous, yellow pubescent, the former with narrow gray pollinose stripes; pleurae and venter gray yellow pollinose with the usual fuscous stripes, the former with yellow pile and on the humeri some brown. Dorsum of abdomen with a dominant black pattern; the first segment yellow with a broad black quadrate spot beneath the scutellum, posteriorly emarginate, almost attaining a heavy black median geminate figure on the second segment on each side of which is a small black spot; segments III and IV black, narrowly incised in the center by the yellow of the hind margins, and sometimes also on each side; remaining segments black with yellow hind margins. Venter of abdomen mostly black; the segments with yellow postero-lateral angles and hind margins; the second segment usually yellow with a large black median spot. Halteres fuscous. Wings as figured; the apical spot very narrow, and cell R practically entirely infuscated. Legs black and yellow, the latter distributed as follows: apex of front femora and base of tibiae, apical portion of middle and hind femora, middle and hind tibiae and metatarsi; sometimes the hind tibiae are mostly black.

Male: I have no specimens at hand except that of Williston's C. pachycera, this sex of which has generally been conceded to be C. proclivis. It is quite different from the female (perhaps a teneral). The antennae, except the black apex of the flagellum, and palpi are yellow. The fronto-clypeus is almost completely yellow with a trace of a brown spot on each side. The oral margins of the genae instead of being fuscous, are yellow with a small fuscous spot on each side. Thorax like the female. Dorsum of abdomen predominantly black; only the narrow posterolateral angles of the first segment, yellow; segments II and III with a very broad and heavy black double geminate figure; remaining segments black with narrow yellow hind margins; sometimes the pattern on segment V approximates that of IV, but the yellow incised areas are much more reduced. Venter of abdomen much like the female, except the yellow along the sides is more conspicuous. Wings somewhat like the female; cells R and 2d M about equally infuscated, neither completely. Legs similar to the female, with a little more yellow on the front femora and tibiae.

Comparative notes: Separated from C. furcata Walker by the lateral black spots on the second abdominal tergite, but in some specimens which I believe to be C. proclivis these spots are obsolete. From C. surda

O.S. this species is distinguished by the predominantly yellow fronto-clypeus, its generally larger size, and a greater display of yellow on the abdomen and legs.

Type data: Described from four females, Marin County, California. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Colorado: Manitou Park, July.

Washington: Hoquiam, June 13, 1904;  
Montesano, July 23, 1931;  
Copalis, July 25, 1931.

Oregon: Haines, July 10, 1931;  
Hood River, July 13, 1931;  
Mt. Hood, July 18, 1931.

California:

Reported by others from the following general localities:

CANADA: Quebec; British Columbia.

UNITED STATES: Colorado; Arizona; Washington;  
Oregon; California.

Chrysops pudica Osten Sacken (1875)

- 1875 C. pudicus Osten Sacken, Prodrôme, I, 381; Mass.  
 1876 C. pudicus Osten Sacken, Prodrôme, II, 474; Fla.  
 1904 C. pudicus Brimley and Sherman, Ent. News, XV, 270; N.C.  
 1905 C. pudicus Harbeck, Ent. News, XVI, 341; N.J.  
 1905 C. pudicus Daecke, Ent. News, XVI, 342; N.J.  
 1906 C. pudicus Daecke, Ent. News, XVII, 41.  
 1907 C. pudicus Daecke, Ent. News, XVIII, 145; N.J.  
 1907 C. pudicus Hine, Bull. 93, La. Esp. Sta., p. 33; La.  
 1913 C. pudicus Johnson, Bull. Am. Mus. N.H., XXXII, 52; Fla.  
 1920 C. pudicus Britton, Bull. Conn. St. Geol. Surv., XXXI,  
 Conn.  
 1922 C. pudicus Brimley, Ent. News, LXXIII, 230; N.C.  
 1923 C. pudica Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 121; N.Y.  
 1925 C. pudica Johnson, List, Occ. Pap. Bost. Soc. N.H., VII,  
 100; N. Eng.  
 1925 C. pudicus Johnson, Proc. Bost. Soc. N.H., LXXVIII, 68; Mass.  
 1926 C. pudicus Kröbber, Stett. Ent. Ztg., LXXXVII, 289.  
 1928 C. pudicus Leonard, N.Y. State List, p. 756; N.Y.  
 1930 C. pudicus Johnson, List, Dipt. Nantucket, p. 127.

Color: Yellow, with a black abdominal pattern of variable extent and intensity.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Vertex grayish pollinose; frons and sides of genae yellow pollinose; frontal callosity typically yellow, often bordered above with brown, rarely completely brown or fuscous; fronto-clypeus, genae, palpi, and antennae except the black annulate portion of the flagellum, yellow to brown yellow. Dorsum of thorax and scutellum plumbeus, the former with fuscous stripes, the latter sometimes with yellow at the tip; pleurae and venter gray pru-

inose with the usual fuscous stripes. Dorsum of abdomen yellow; a broader than long quadrate black spot beneath the scutellum, not attaining the hind margin of the first segment; second segment with an inverted V-shaped black spot, variable in its divergence, attaining neither margin; segments III and IV black with yellow posterior margins which expand into small mid-dorsal triangles; remaining segments black with yellow hind margins. Venter of abdomen with a quadrate black spot which becomes successively larger on segments III, IV and V; remaining segments black with yellow hind margins; black lateral streaks usually present; in specimens exhibiting much yellow, the entire venter is yellow except at the apex. Halteres fuscous. Wings as figured; the apical spot as a rule includes only the apex of cell R4, but quite frequently it extends much deeper. Legs yellow; all trochanters, middle and hind coxae, apical portion of front tibiae and entire tarsi, apical segments of middle and hind tarsi, basal portion of hind femora, apex of hind tibiae, fuscous; sometimes the hind femora and tibiae are mostly yellow.

Male: At the University of Michigan are a series of males from Florida determined by Hine, which I take

to be this species. They are very similar to the females.

Comparative notes: Separated from C. cursim Whit. as indicated in the key. Also see under description of C. cursim. Some forms of C. pudica (especially those with the fuscous frontal callosity and the apical spot including more than the apex of cell R4) may be confused with C. dimmocki Hine, but in that species the black V-shaped spot on the second abdominal tergite invariably attains the anterior margin.

Remarks: It will be seen from the description that this is a variable species and hence considerable caution must be exercised in separating it from related forms.

Type data: Described from three females from Massachusetts and one female, locality not certain. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Massachusetts: Ashland; Melrose Highlands, June 16, 1912.

New York: Farmingdale, June 23, 1914.



New Jersey: Lakehurst, June 30, 1907,  
June 24-29, 1911, July 3,  
1912; Milltown; Browns  
Mills, June 28-30, 1921;  
Wildwood, July 25; Jamesburg,  
July 4, 1905; Browns Mills  
Jct., June 25, 1905; DeCosta,  
July 4, Aug. 3, 1902; Cape  
May Co., Aug. 15, 1912.

North Carolina: Lake Ellis, May 25, 1907;  
Southern Pines, June 2,  
1908; Raleigh, July 17,  
1902; Ellis I., June 20,  
1905.

Georgia: Mimsville, May 14-24, 1907;  
Okefenokee Swamp, June 1912.

Florida: Alachua Co., May 12, 1923;  
Palm Beach, April 8, 1918.

Reported by others from the following general  
localities:

UNITED STATES: Massachusetts; Rhode Island; Connecti-  
cut; New York; New Jersey; North  
Carolina; Florida; Louisiana.

Chrysops robusta, new species

Color: Fulvous, with a fuscous abdominal pattern.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Vertex  
broader than long, yellow pollinose; frons, sides of  
genae and a mid-streak on the fronto-clypeus yellow  
pollinose; the region immediately surrounding the

antennae white pollinose; frontal callosity yellow, bordered with brown; fronto-clypeus, oral margin of genae and palpi, yellow. Antennae strongly incrassate; scape and pedicel brown yellow with rather coarse black pubescence; flagellum black except for a little yellow at its base. Dorsum of thorax and scutellum fuscous with a brownish pruinosity and long whitish pile, the former with broad fulvous pollinose stripes; pleurae and venter fulvous pollinose with whitish pile, the usual brown stripes somewhat faint. Dorsum of abdomen fulvous with a fuscous quadrate spot, posteriorly emarginate, beneath the scutellum; antero-laterally this spot relatively connects with an obscure fuscous spot on each side; second segment with a double geminate fuscous spot, the outer portions of which are narrowly lunate; segments III, IV and V each with a double geminate fuscous spot; remaining segments fuscous; all segments with narrow fulvous posterior margins. Venter of abdomen fulvous, the first three segments each with a broad fuscous quadrate median spot; the remaining segments fuscous with yellow hind margins; the usual lateral stripes present. Halteres yellow. Wings as figured. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, apices of middle and hind tarsal segments, black.

Male: Head and its appendages like the female except for sex characters. Thorax like the female but somewhat darker; the humeral region of the pleurae black pilose. Dorsum of abdomen predominantly black; the first segment entirely so except for a little yellow at the postero-lateral angles; segments II, III and IV each with a double geminate black figure whose outer portions, especially on the second segment, are narrow; remaining segments black with yellow hind margins; sometimes segment V bears a black figure suggestive of that on the preceding segment. Venter yellow with a broad black mid-stripe and on each side a narrow lateral one; apical segments mostly black with yellow hind margins. Halteres yellow. Wings like the female except for a greater extent of infuscation in cells R and 2d M; base of cell 1st A infuscated. Legs like the female.

Comparative notes: This species is related to C. coquilletti Hine and C. clavicornis n.sp. From the former it may be separated by the abdominal pattern (especially the figure on the second tergite) and by the greater extent of infuscation in cell 2d M of the wings; from the latter by the abdominal pattern, the apical spot of the wings not exceeding cell R4, and by the scape of the antennae which is uniformly

swollen for its entire length.

Type data: Holotype, male; Los Angeles, California; May 2, 1915; M. C. VanDuzee. Allotype, female; same data. Paratype, one male, Los Cerritos, California; March 21, 1915; M. C. VanDuzee. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Chrysops sackeni Hine (1903)

- 1903 C. sackeni Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, 42; Ohio.  
 1907 C. sackeni Daecke, Ent. News, XVIII, 145; N.J.  
 1911 C. sackeni Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLII, Que.  
 1913 C. sackeni Johnson, Bull. Am. Mus. N.H., XXXII, 51; Fla.  
 1913 C. sackeni Graenicher, Bull. Wis. N.H. Soc., X, 173; Wis.  
 1920 C. sackeni Britton, Bull. Conn. St. Geol. N.H. Surv., XXXI, Conn.  
 1923 C. sackeni Bequaert and Davis, Bull. Brook. Ent. Soc., XVIII, 121; N.Y.  
 1925 C. sackeni Johnson, Occ. Pap. Bost. Soc. N.H., VII, 100; N. Eng. List.  
 1926 C. sackeni Kröber, Stett. Ent. Ztg. LXXXVII, 287.  
 1928 C. sackeni Leonard, N.Y. State List, p. 756; N.Y.  
 1931 C. sackeni Philip, Minn. Tech. Bull., LXXX, 95; Minn.

Color: Black and yellow, the former dominant in the abdominal pattern.

Size: Length, 7.5 - 10.5 mm.

Structural and color characters: Female: Vertex, frons, and sides of genae, gray yellow pollinose; frontal callosity variable, yellow margined above with black, black with yellow on the disc, or wholly black;

fronto-clypeus, genae, and palpi, orange yellow; antennae orange yellow except the black apex of the flagellum. Dorsum of thorax and scutellum fuscous, the former with broad gray pollinose stripes; pleurae and venter gray yellow pollinose with fuscous stripes. Abdominal dorsum yellow with a dominant black pattern; a broad black quadrate spot beneath the scutellum, posteriorly emarginate, nearly reaching a heavy inverted V-shaped spot on the second segment which often follows along the posterior margin; remaining segments black with yellow posterior margins which on segments III and IV expand into mid-dorsal triangles and narrow lateral spots. Venter of abdomen yellow with a median black spot on each segment from I to IV, becoming successively larger caudad; remaining segments black with yellow hind margins; the usual black lateral streaks; sometimes the basal three or four segments are wholly yellow. Halteres black. Wings as figured; the apical spot at its base just exceeding vein R2+3; the crossband not attaining the posterior margin. Legs orange yellow; the joints, apex of front tibiae and entire tarsi, basal portion of hind femora, apical segments of middle and hind tarsi, black; sometimes the entire hind femora and apex of tibiae are black.

**Male:** Head and thorax like the female except for sex characters. On the dorsum of the abdomen the black figures on segments I and II are much broader; the yellow hind margins of the remaining segments are narrower and consequently the mid-dorsal triangles on III and IV are smaller. In one specimen the sides of III and IV are more broadly yellow than in the female. Venter of abdomen like the female. Wings with more infuscation in cells R and 2d M; otherwise like the female. Legs darker than in the female; the front femora and sometimes the apex of the front coxae, base of middle femora, black.

Comparative notes: Separated from C. callida O.S. by the broader apical spot and generally larger size; likewise I have never seen a specimen of C. callida with any yellow on the frontal callosity.

Type data: In the Ohio State Museum, Columbus, Ohio. Four females, Sandusky, Ohio, June 29, 1899 and July 10, 1900.

Distributional data:

UNITED STATES: New York: June 27, 1907.

New Jersey: Browns Mills Jct.,  
June 25, 1905.

North Carolina: Lake Ellis, May 8,  
1906.

Florida: Jacksonville, April 16, 1922.

Michigan: Cheboygan Co., July 11-12, 1931; Oakland Co., July 25, 1923; Charlevoix, July 18, 1923; Hamlin Lake.

Ohio: Summit Co.; Sandusky, July 5, 1903.

Tennessee: Knoxville.

Indiana: Miller, July 1, 1919.

Illinois: Volo†, July 15, 1926;  
Waukegan, Aug. 24, 1917;  
Antioch, June 15, 1928.

Minnesota: Anoka Co., July 12, 1925.

†Utah.

Reported by others from the following general localities:

CANADA: Quebec.

UNITED STATES: Vermont; Massachusetts; Rhode Island;  
Connecticut; New York; New Jersey;  
Florida; Ohio; Wisconsin; Minnesota.

Chrysops separata Hine (1907)

- 1907 C. separatus Hine, Ohio Nat., VIII, 228; N.C.  
1908 C. separatus Brimley and Sherman, Ent. News, XIX, 168; N.C.  
1922 C. separatus Brimley, Ent. News, XXXIII, 230; N.C.  
1923 C. separatus Jones and Bradley, Jl. Econ. Ent., XVI, 308; La.  
1924 C. separatus Jones and Bradley, Jl. Econ. Ent., XVII, 49.  
1926 C. separatus Kröber, Stett. Ent. Ztg. LXXXVII, 311.

Color: Black.

Size: Length, 8 mm.

Structural and color characters: Female: Vertex, frons, sides of genae, a streak on the fronto-clypeus, gray to gray yellow pollinose; ocellar area, frontal callosity, fronto-clypeus, oral margin of genae, and palpi, black. Antennae mostly black, basal portions of scape, pedicel, and flagellum, yellow to brown yellow. Thoracic dorsum and scutellum black with whitish pubescence, the former with traces of gray pollinose stripes; pleurae and venter black with some gray pruinosity, abdomen black, white pubescent. Halteres black. Wings as figured, the apical spot separated from the crossband. Legs black, extreme base of anterior tibiae, basal portion of median tibiae, median and posterior metatarsi, yellowish.

Male: Like the female with much black pubescence and pilosity intermixed with a little white. Antennae almost entirely black. Wings to the distal border of the crossband almost entirely infuscated, more dilute in cells Cul, 1st A, and the anal angle; a small hyaline spot includes the extreme apex of cell R, 2d M and the base of cell Cul; apical spot like the female. Legs like the female except for the absence of yellow at the bases of the front and middle tibiae.



Comparative notes: C. separata is distinct from all others included within this paper. The black color and the apical spot entirely separated from the cross-band will easily identify this species.

Remarks: Kröber (1926) has misquoted Hine's description. Only the first basal cell (R) is black, not both basal cells (R and 2d M). To my knowledge this is the first time the male has been described.

Type data: Holotype, female; Raleigh, North Carolina; April 18, 1906; C. S. Brimley. Allotype, male; Agricultural College, Mississippi; March 19, 1921; F. M. Hull. In the Ohio State Museum, Columbus, Ohio.

Distributional data:

UNITED STATES: North Carolina: Raleigh.

Mississippi.

Reported by others from the following general localities:

UNITED STATES: North Carolina; Louisiana.

Chrysops sequax Williston (1887)

- 1887 C. sequax Williston, Trans.Kans.Acad.Sci.,X,133;  
Kans.
- 1903 C. sequax Snow, Kans.Univ.Sci.Bull.,II,213;Kans.
- 1904 C. sequax Hine, Ohio Nat.,V,225.
- 1905 C. sequax Harbeck, Ent.News,XVI,341;N.J.
- 1905 C. sequax Daecke, Ent.News,XVI,342;N.J.
- 1906 C. sequax Daecke, Ent.News,XVII,41.
- 1907 C. sequax Daecke, Ent.News,XVIII,141;N.J.
- 1907 C. sequax Hine, Bull.93,La.Exp.Sta.,p.34;La.
- 1908 C. sequax Brimley and Sherman, Ent.News,XIX,168;N.C.
- 1918 C. sequax McAtee and Walton, Proc.Ent.Soc.Wash.,XX,  
198;Md.,Va.
- 1924 C. sequax Wehr, Nebr.Univ.Studies,XXII,113;Nebr.
- 1926 C. sequax Krüber, Stett.Ent.Ztg.,LXXXVII,345.
- 1930 C. sequax Schwardt and Hall, Bull.256,Ark.Exp.Sta.,  
14;Ark.
- 1931 C. sequax Philip, Minn.Tech.Bull.,LXXX,92;Minn.

Color: Black and yellow with vittate abdominal pattern.

Size: Length, 8 - 9 mm.

Structural and color characters: Female: Vertex grayish yellow pollinose; sides of genae yellow pollinose; frontal callosity black, but not infrequently with some yellow; fronto-clypeus, except a black spot on each side, palpi and antennae, except the black apex of the flagellum, yellow; oral margins of genae black. Dorsum of thorax and scutellum green gray pollinose, the former with fuscous stripes, sometimes the latter yellow at the tip; pleurae and venter yellow pollinose with the usual fuscous stripes. Dorsum of thorax yellow with four complete black longitudinal stripes; the apical segments black with yellow hind margins. Venter of abdomen yellow; usually a black quadrate

spot on each of segments III to V; remaining segments black with yellow hind margins; the usual lateral streaks present. Halteres fuscous. Wings as figured; the apex of the hyaline triangle attains vein R2+3, and its base is of variable width. Legs yellow; apex of front tibiae and entire tarsi; basal portions of middle and hind femora, apex of hind tibiae, apical segments of middle and hind tarsi, black.

Male: Like the female except for sex characters and more pronounced melanism. The palpi are darker. The black abdominal stripes are broader; the median spots on the venter are coalesced thus forming a broad stripe which tapers toward the base. Cell 2d M of the wings infuscated for about one-half its length, the brown color tapering along vein Cu to the end of the cell; cell Cu1 infuscated except for a hyaline spot at its apex; cell 1st A infuscated along its upper margin, the brown color following vein Cu and Cu2 to the posterior margin of the wing; anal area dilutely infuscated. Legs like the female except the posterior femora and tibiae which are yellow only at their apex and base respectively.

Comparative notes: A more variable species than its close relative C. pikei Whit. from which it is at

once separated by the complete lateral abdominal stripes. From C. beameri n.sp. C. sequax may be distinguished by its frontal callosity which is usually black, and the apex of the hyaline triangle of the wing not exceeding vein R2-3. See under description of C. beameri.

Type data: Described from four females and one male from Western Kansas. One female and the male remain in the Francis Huntington Snow Entomological Collection of the University of Kansas.

Distributional data:

UNITED STATES: Massachusetts: Woods Hole, Aug. 6, 1899.

New Jersey: Ashland, July 16, 1905;  
Wenonah, July 27, 1905;  
Cape May, Aug. 19, 1912.

Virginia: Mundern Point, Sept. 9, 1904.

North Carolina: Church Island, Sept. 5, 1909; Raleigh, Aug. 25, 1904.

Ohio: Harrisburg, July 24, 1930.

Illinois: Homer Park, Aug. 10, 1925;  
Fullman, Aug. 7, 1897; Muncie,  
Sept. 1, 1912; Kankakee,  
July 10-16, 1925; Urbana,  
Aug. 7, 1914, July 22, 1915;  
Lake Villa, July 21, 1916.

Minnesota: Geneva, Aug. 5, 1924.

Kansas: Kingman Co., 1916; Scott Co.,  
Aug. 16, 1925; Butler Co.,  
1916; Sherman Co., Aug. 1, 1915;  
Norton Co., July 5, 1925;  
Wallace Co.; Philips Co.,  
July 8, 1925; Sumner Co., 1916;  
Morris Co., July 20, 1923;  
Ellsworth Co., July 13, 1923;  
Russell Co., Aug. 26, 1912;  
Kiowa Co., July 5, 1923;  
Clark Co.; Osborne Co.; Rooks Co.

Colorado: Wray, Aug. 17-19, 1919.

Reported by others from the following general  
localities:

UNITED STATES: New Jersey; Maryland; Virginia;  
North Carolina; Minnesota; Iowa;  
Nebraska; Kansas; Arkansas;  
Louisiana.

Chrysops shermani Hine (1907)

- 1907 C. shermani Hine, Ohio Nat., VIII, 229; N.C.  
1908 C. shermani Brimley and Sherman, Ent. News, XIX, 168; N.C.  
1916 C. shermani Gibson, Ent. Rec., Rept. Ent. Soc. Ont., XLVII,  
Ont.  
1926 C. shermani Kröber, Stett. Ent. Ztg., LXXXVII, 347.

Color: Black and yellow; abdominal pattern more or less  
vittate; the dilute crossband of the wings interrupted  
with hyaline where it crosses the veins.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Vertex, frons

and sides of genae yellow pollinose; frontal callosity orange yellow, bordered above with brown which continues as a line to the fuscous ocellar area; frontoclypeus, oral margins of genae, and palpi orange yellow. Antennae slender; scape yellow, reddish near the apex; pedicel and base of black flagellum red brown. Dorsum of thorax and scutellum black, the former with gray yellow pollinose stripes; pleurae and venter yellow pollinose with the usual fuscous stripes. Dorsum of abdomen yellow; a large quadrate black spot beneath the scutellum practically coalescing with a parallel-sided black geminate spot on the second segment, on each side of which is a narrow black vittate spot not attaining the anterior margin; segments III to V each with four black vittate spots which do not attain the posterior margins; remaining segments black with yellow hind margins; the spots on segment V are usually so close so that the aspect of the apical segments. Venter yellow; a small fuscous median spot on each of segments III to V; remaining segments black with yellow hind margins; the usual black lateral streaks, not quite attaining the base. Halteres fuscous. Wings as figured; the crossband dilute, interrupted with hyaline where it crosses the veins, not reaching the posterior margin; stigma saturate brown; apical spot

nearly separated from the crossband, dilute, also interrupted by hyaline along the veins. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, base of hind femora and apex of tibiae, apical four middle and hind tarsal segments, black.

Male: This sex has never been reported.

Comparative notes: C. shermani is distinct from all other North American species by virtue of its unique wing pattern. The abdominal pattern is somewhat like that of C. montana O.S.

Type data: Cotypes, five females from Highlands, North Carolina, July 1907, one female, same locality, July 5, 1906; one female, Hayden, Ontario, July 10, 1906. In the Ohio State Museum, Columbus, Ohio. One cotype female in the Museum of Comparative Zoology, Cambridge, Massachusetts (C. W. Johnson Collection).

Distributional data:

CANADA: Ontario: Hayden, July 30, 1906; Algonquin Park, July 28-31, 1916; Brule Lake, Aug. 2, 1911.

UNITED STATES: North Carolina: Highlands, July 5, 1906, July 1907.

Michigan: Cheboygan Co., July 11, 1931;  
Marquette Co., July 15, 1919;  
Dickinson Co., July 16, 1909.

Reported by others from the following general localities:

CANADA: Ontario.

UNITED STATES: North Carolina.

Chrysops sordida Osten Sacken (1875)

- 1875 C. sordidus Osten Sacken, Prodrôme, I, 376; White Mts.,  
Can.  
1887 C. sordidus Williston, Trans. Kans. Acad. Sci., X, 134.  
1925 C. sordidus Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99;  
Me., N.H., List.  
1926 C. sordidus Kröber, Stett. Ent. Ztg., LXXXVII, 249.  
1926 C. sordidus Blake, Ill. Biol. Mon., X, 30; Me.  
1928 C. sordidus Leonard, N.Y. State List, p. 756; N.Y.  
1929 C. sordidus Johnson, Psyche, XXXVI, 134; Lab.

Color: Black, abdominal tergites with gray hind margins, the first two encroached upon on each side by a small gray yellow spot.

Size: Length, 8 - 10 mm.

Structural and color characters: Female: Vertex gray pollinose; frons, a mid-streak on the fronto-clypeus, and sides of genae yellowish pollinose; frontal callosity, fronto-clypeus, oral margins of genae, and palpi, fuscous to black. Antennae fuscous; the scape except its extreme apex, yellow. Dorsum of thorax and scutellum black with yellowish pubescence, the former with faint gray pollinose stripes; pleurae and venter fuscous with a gray pruinosity, the former with yellow pile. Dorsum of abdomen black; a small gray yellow spot on each side near the base; all segments caudad



from II with rather conspicuous gray hind margins which on segments II to IV expand into median triangles. Venter black; the segments with narrow pale hind margins. Halteres fuscous. Wings as figured; often a narrow trace of an apical spot present. Legs black; the middle and hind metatarsi dark brown.

Male: Unknown.

Comparative notes: Separated from C. excitans Walker by the gray hind margins of the abdominal tergites and the smaller extent of the pale spot on each side of tergites I and II. From C. cuclux Whit. C. sordida is readily distinguished by the more saturate wing picture and again by the gray hind margins of the abdominal tergites.

Type data: Described from nine females from the White Mountains, New Hampshire. I have studied the types, in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

CANADA: Newfoundland: Little River, July 15, 1905.

UNITED STATES: New Hampshire: White Mountains.

New York: Cranberry Lake, June 9-20, 1919.

Reported by others from the following general localities:

CANADA: Labrador.

UNITED STATES: Maine; New Hampshire; New York.

Chrysops striata Osten Sacken (1875)

- 1875 C. striatus Osten Sacken, Prodrôme, I, 391; D.C., Ill.  
 1903 C. striatus Hine, Ohio St. Acad. Spec. Pap. No. 5, 43; Ohio.  
 1905 C. striatus Daecke, Ent. News, XVI, 342; N.Y.  
 1906 C. striatus Daecke, Ent. News, XVII, 41.  
 1907 C. striatus Daecke, Ent. News, XVIII, 141; N.J.  
 1913 C. striatus Graenicher, Bull. Wis. N.H. Soc., X, 173; Wis.  
 1914 C. striatus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLV, 140; Que.  
 1918 C. striatus Gibson, Ent. Red., Rept. Ent. Soc. Ont.,  
 XLIX, Que.  
 1918 C. striatus McAtee and Walton, Proc. Ent. Soc. Wash.,  
 XX, 198; Va.  
 1923 C. striata Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 121; N.Y.  
 1925 C. striatus Hine, Occ. Pap. Mus. Zool. Univ. Mich., No. 162, 20.  
 1925 C. striatus Johnson, Proc. Bost. Soc. N.H., XXXVIII, 69;  
 Mass.  
 1925 C. striata Johnson, Occ. Pap. Bost. Soc. N.H., VII, 101;  
 N. Eng. List.  
 1925 C. striatus Kröber, Konowia, IV, 331; Me., Ont., N.H., Pa.,  
 La., Ill.  
 1926 C. striatus Kröber, Stett. Ent. Ztg., LXXXVII, 343.  
 1927 C. striatus Johnson, Ins. Mt. Des. Reg., p. 179.  
 1928 C. striatus Leonard, N.Y. State List, p. 756; N.Y.  
 1930 C. striatus Stone, Ann. Ent. Soc. Am., XXIII, 287; N.Y.  
 1931 C. striatus Philip, Minn. Tech. Bull. LXXX, 92; Minn.

The following also refers to this species:

- 1861 C. vittatus Bellardi, Saggio, I, 74; Mex.

Color: Black and yellow; abdominal pattern vittate.

Size: Length, 7 - 9.5 mm. Philip (1931) gives 6 -  
 9.5 mm.

Structural and color characters: Female: Vertex,

frons, and sides of genae, yellow pollinose; frontal callosity variable black to yellow; fronto-clypeus, oral margins of genae, and palpi, yellow; sometimes the fronto-clypeus with a small black spot on each side. Antennae slender, variable in color; sometimes yellow with only the apex of the flagellum black; or sometimes the scape and pedicel red brown, especially on their outer surfaces. Dorsum of thorax and scutellum plumbeus in ground color, the former with the usual fuscous stripes, the latter often yellow at the tip; pleurae gray yellow pollinose with fuscous stripes. Dorsum of abdomen yellow; typically with four black longitudinal stripes, the median pair broader, the lateral ones not always reaching the base; these stripes are often broken by the yellow margins of the segments; the two apical segments black with yellow hind margins; in some specimens the median stripes so converge on the second segment that they form a sort of geminate figure. Venter of abdomen variable; usually yellow at the base; the black of the apical segments extending toward the base as a broad mid-stripe; lateral streaks present. Halteres fuscous. Wings as figured. Legs yellow; trochanters, apical portion of front tibiae and entire tarsi, bases of

middle and hind femora, apex of hind tibiae, apical segments of middle and hind tarsi, black.

**Male:** Like the female but that cell 2d M of the wings is infuscated except for a small hyaline area near the apex, cubital and anal regions dilutely infuscated. The median stripes of the abdominal dorsum are broader than in the female, usually coming together near the anterior margin of the second segment. The median stripe of the abdominal venter practically attains the base.

Comparative notes: The species is so variable that separation is often difficult. Its closest relative is C. vittata Wied. from which it is most readily distinguished by the plumbeous ground color of the thoracic dorsum and scutellum. Philip (1931) states that the thoracic stripes may vary from greenish gray to a yellow not much different from that of C. vittata.

Remarks: Philip (1931) has given an excellent account of the variability of C. striata. His material consisted of something over two hundred and fifty specimens.

Type data: Described from several females from the District of Columbia and Illinois. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Massachusetts: Melrose Highlands,  
July 3, 1911; Woods  
Hole, Aug. 9, 1899.

New Jersey: Riverton, July 3.

Michigan: Cheboygan Co., July and Aug.  
1931, July 31, 1923, Aug. 3,  
1926, Aug. 6, 1928; Ann Arbor,  
Sept. 7, 1921; Emmett Co.,  
Cecil Bay, July 10, 1921.

Ohio: Sandusky, June 11, 1899, Aug. 8-14,  
1902; Fort Ancient, June 10-12,  
1902; Columbus; Buckeye Lake,  
July 27, 1929; Ira, June 1928;  
Logan Co., July 13, 1930; Indian  
Lake, June 14, 1929, June 15,  
1930; Licking Co., July 19-25,  
1931.

Indiana: Miller, July 10, 1921;  
Aug. 23, 1917.

Wisconsin: Balsam Lake, June 24, 1923.

Illinois: Antioch, July 5-7, 1932;  
Volo, July 15, 1926, July 8,  
1932; Algonquin, July 10, 1897.

Minnesota: New Brighton, July 26, 1924.  
Anoka Co., July 20, 1925;  
Princeton, 1919; Ramsey Co.,  
Aug. 7, 1924; Geneva, Aug. 5,  
1924.

Reported by others from the following general  
localities:

CANADA: Quebec; Ontario.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
New York; New Jersey; District of  
Columbia; Maryland; Virginia;  
Pennsylvania; Ohio; Wisconsin;  
Minnesota; Illinois; Louisiana.

Chrysops surda Osten Sacken (1877)

- 1877 C. surdus Osten Sacken, West. Dipt., p. 223; Sierra Nevada.  
 1887 C. surdus Williston, Trans. Kans. Acad. Sci., X, 134; Wash.  
 1903 C. surdus Baker, Inv. Pacif., I, 21; Nev.  
 1904 C. surdus Hine, Ohio Nat., V, 226; Calif., B.C.  
 1921 C. surdus Cole and Lovett, Proc. Cal. Acad. Sci., XI, 233; Ore.  
 1926 C. surdus Kröber, Stett. Ent. Ztg., LXXXVII, 322.  
 1926 C. surdus Essig, Ins. W.N.A., p. 554.  
 1928 C. surdus Essig, Pan-Pacif. Ent., IV, 186; Calif.

Color: Predominantly black; abdominal pattern with some yellow.

Size: Length, 6.5 - mm.

Structural and color characters: Female: Vertex gray pollinose; frons and sides of genae yellow pollinose; ocellar area, frontal callosity, a line connecting them, fronto-clypeus (except a denuded brown yellow mid-streak), oral margins of genae, and palpi, fuscous to black. Antennae fuscous; basal segments brown yellow, red brown, or sometimes fuscous, especially on the outer surfaces.

Thoracic dorsum and scutellum black, the former with gray pollinose stripes; pleurae and venter gray pollinose with the usual black stripes. Dorsum of abdomen predominantly black; first segment yellow with a large quadrate black spot beneath the scutellum practically attaining a heavy black median geminate figure on the second segment on each side of which is a small black spot; sometimes an antero-lateral black spot is apparent on the first segment; segments III and IV black, narrowly incised in the center by the yellow of the hind margins; remaining segments black with yellow hind margins. Venter black; the segments with yellow hind margins; first three or four segments yellow, each with a large black median spot becoming successively broader caudad; broad black lateral stripes present, practically attaining the base. Wings as figured. Halteres black. Legs black; extreme base of front tibiae, apex of middle femora, basal portion or all of middle tibiae, middle and hind metatarsi, brown yellow.

**Male:** Like the female except for sex characters; exhibiting more melanism. Cell 2d M of the wings considerably infuscated. The black of the first two abdominal tergites more extensive than in the female.

Comparative notes: Separated from C. proclivis O.S. by the black fronto-clypeus with only a narrow yellow mid-streak, the dominantly black legs, and generally smaller size.

Type data: Described from four females, Webber Lake, Sierra County, California, July 21. In the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Oregon: Mt. Hood.

California: Giant Forest, July 28, 1929; California, "Baron".

Reported by others from the following general localities:

CANADA: British Columbia.

UNITED STATES: Nevada; Washington; Oregon;  
California.

Chrysops ultima Whitney (1914)

1914 C. ultimus Whitney, Can. Ent., XLVI, 345; Fla.  
1926 C. ultimus Kröber, Stett. Ent. Ztg., LXXXVII, 320.

Color: Fuscous.

Size: Length, 8 mm.

Structural and color characters: Female: Vertex, frons and sides of genae, gray to gray yellow pollinose;



ocellar area, frontal callosity, a line connecting them, a spot on each side of the yellow fronto-clypeus, oral margins of genae, and palpi, fuscous. Antennae slender; scape yellow, pedicel and base of flagellum brown yellow, apex of flagellum, black. Dorsum of thorax and scutellum fuscous, the former with faint gray pollinose stripes, most pronounced anteriorly; pleurae and venter gray pollinose with the usual fuscous stripes. Abdomen fuscous, a very faint grayish mid-dorsal stripe sometimes apparent. Halteres fuscous. Wings as figured; the hyaline triangle narrow and open to vein R2-3. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, bases of middle and hind femora, apex of hind tibiae, apical segments of middle and hind tarsi, fuscous.

Male: Unknown.

Comparative notes: To be separated from its very close relatives according to the key. Wing picture like C. obsoleta Wied.; abdomen more like C. parvula Daecke and C. lugens Wied.

Remarks: I have seen but a few specimens of this species. I doubt its validity, but I have not sufficient evidence to support my belief.

Type data: Described from West Palm Beach, Florida.  
One female (the head missing) in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: New York: N. Fairhaven, Aug. 20-30, 1918.

New Jersey: Lakehurst, July 29;  
Jersey City; Chatworth,  
Aug. 28, 1922.

Maryland: Montgomery Co., June 26,  
1911.

?North Carolina: Lake Ellis, May 16,  
1900.

Florida: Jacksonville; Lakeland;  
Royal Palm Park, March.

Chrysops univittata Macquart (1855)

- 1855 C. univittatus Macquart, Dipt. Exot., Suppl., V, 36;  
N. Am.
- 1875 C. univittatus Osten Sacken, Prodrôme, I, 387.
- C. univittatus Pettit, Bull. 186, Mich. Agr. Exp. Sta.; Mich.
- 1885 C. univittatus Keen, Can. Ent., XVII, 51; Pa.
- 1895 C. univittatus Hart, Bull. Ill. State Lab. N.H., IV, 184;  
Ill.
- 1895 C. univittatus Johnson, Proc. Acad. N.S. Phil., p. 303; Fla.
- 1903 C. univittatus Hine, Ohio St. Acad. Spec. Pap. No. 5, 44; O.
- 1904 C. univittatus Brimley and Sherman, Ent. News, XV, 270;  
N.C.
- 1905 C. univittatus Daecke, Ent. News, XVI, 342; N.J.
- 1906 C. univittatus Daecke, Ent. News, XVII, 41.
- 1907 C. univittatus Daecke, Ent. News, XVIII, 141; N.J.
- 1907 C. univittatus Hine, Bull. 93, La. Exp. Sta., p. 34; La.

- 1913 C. univittatus Johnson, Bull. Am. Mus. N.H., XXXII, 51; Fla.  
 1913 C. univittatus Graenicher, Bull. Wis. N.H. Soc., X,  
 173; Wis.  
 1918 C. univittatus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLIX, Que.  
 1918 C. univittatus McAtee and Walton, Proc. Ent. Soc. Wash.,  
 XX, 198; Va.  
 1920 C. univittatus Britton, Bull. Conn. St. Geol. N.H. Surv.,  
 XXXI, Conn.  
 1923 C. univittata Bequaert and Davis, Bull. Brook. Ent.  
 Soc., XVIII, 121; N.Y.  
 1925 C. univittata Johnson, Occ. Pap. Bost. Soc. N.H., VII,  
 100; N. Eng. List.  
 1926 C. univittatus Kröber, Stett. Ent. Ztg., LXXVII, 335.  
 1928 C. univittatus Leonard, N.Y. State List, p. 756; N.Y.  
 1930 C. univittatus Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.  
 1931 C. univittatus Philip, Minn. Tech. Bull., LXXX, 93; Minn.

Color: Black and yellow; abdominal pattern vittate, with a broad yellow median stripe.

Size: Length, 6 - 8.5 mm.

Structural and color characters: Female: Vertex gray yellow pollinose; frons and sides of genae yellow pollinose; frontal callosity and a spot on each side of the fronto-clypeus, fuscous; fronto-clypeus, oral margins of genae, and palpi, yellow. Scape of antennae yellow; pedicel and base of flagellum brown yellow; remainder of flagellum black. Thoracic dorsum gray pollinose with narrow fuscous stripes; scutellum fuscous, sometimes yellow except on the disc; pleurae and venter gray yellow pollinose with the usual fuscous stripes. Dorsum of abdomen with a conspicuous yellow median stripe enclosed between two fuscous stripes whose outer sides are irregular in outline;

lateral margins yellow; apical two segments usually entirely fuscous. Venter of abdomen yellow; the black of the apical segments extends toward the base as a broad median stripe; black lateral streaks present. Wings as figured; the apical spot very broad. Legs yellow; the trochanters, apical portion of front tibiae and entire tarsi, apical segments of middle and posterior tarsi, black; sometimes the base of the hind femora, black.

**Male:** Very similar to the female; the infuscation of cell 2d M more extensive; the black of the median abdominal stripes more nearly reaching the lateral margins.

Comparative notes: Separated from C. moecha O.S. by the greater extent of the hyaline triangle of the wing and by the two fuscous abdominal stripes instead of four. See also under description of C. moecha.

Type data: Described from female specimens from Baltimore, Maryland. In the Museum of Lille.

Distributional data:

UNITED STATES: Massachusetts: Chicopee, July 8, 1903.

New York: Mosholu, Aug. 23, 1920;  
Chappaqua, June 29, 1919;  
Cold Spring Harbor,  
June 23, 1930.

New Jersey: Lakehurst, July 3, 1912;  
 Lake Hopatcong, June 28,  
 1913; Jamesburg, July 4,  
 1905; Clementon, June 28,  
 1905; Browns Mills Jct.,  
 June 25, 1925; Morris  
 Plains, June 24, 1892.

Maryland: Plummers Island, July 1,  
 1914; Hyattsville, July 4,  
 1899; Beltsville, June 14,  
 1914.

Virginia: Fairfax Co., June 15, 1929.

Pennsylvania: Lehigh Gap, July 10,  
 1907, July 20, 1902;  
 Chambersburg, June 21;  
 Germantown, June 18, 1905;  
 Pittsburgh, June 5, 1899.

Michigan: Berien Co.; Alger Co.;  
 Oakland Co.

Ohio: Newark, June 7-8, 1899; Coshoc-  
 ton, June 11, 1929; Summit Co.,  
 July 1, 1920, July 1, 1929,  
 July 10, 1927, Aug. 1, 1925;  
 Hocking Co., June 14, 1925,  
 June 14, 1931, July 4, 1931,  
 July 17, 1931; Turkeyfoot Lake,  
 July 1, 1929; Cedar Swamp, June 7,  
 1927; Ira, June 1925; Highland Co.,  
 Aug. 5, 1929; Adams Co., June 4,  
 1930; Miami Co., June 25, 1926;  
 Loudonville, June 14, 1900;  
 Waterloo, June 2, 1899; Vinton,  
 June 5, 1912; Streetsborough,  
 June 21, 1932; Jackson Co., June  
 11, 1932; Castalia, June 17-18,  
 1932; Fairfield Co., June 16, 1931;  
 Madison Co., Aug. 27, 1931;  
 Columbiana, June 21, 1932; Licking  
 Co., June 13, 1931.

Illinois: Momence, July 17, 1914;  
Algonquin; Elliott, July 10,  
1906.

Kansas.

Reported by others from the following general  
localities:

CANADA: Quebec.

UNITED STATES: New England States; New York; New  
Jersey; Maryland; Virginia; North  
Carolina; Florida; Pennsylvania;  
Michigan; Ohio; Wisconsin; Illinois;  
Louisiana; ?Minnesota.

Chrysops virgulata Bellardi (1861)

- 1861 C. virgulatus Bellardi, Saggio, I, 71, pl. II, f. 17; Mex.  
1901 C. virgulatus Williston, Biologia, Dipt., I, 255; Mex.  
1904 C. virgulatus Hine, Ohio Nat. V, 226; Mex.  
1925 C. virgulatus Kröber, Konowia, IV, 235; Mex.  
1926 C. virgulatus Kröber, Stett. Ent. Ztg., LXXXVII, 256.

The following also refer to this species:

- C. geminatus Macquart (nec Wied.), Dipt. Exot.,  
Suppl. IV, 39.  
1884 C. crassicornis Van der Wulp, Wien, Ent. Ztg., III, 141.

Color: Fulvous with black abdominal pattern.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Vertex broader  
than long, gray yellow pollinose; frons, sides of genae,  
and a mid-streak on the fronto-clypeus, yellowish pollin-  
ose; upper margin of frontal callosity and a small spot

on each side of the oral margins of the genae, fuscous; frontal callosity, remainder of genae and palpi, yellow. Antennae strongly incrassate, the annulate portion of the flagellum shorter than the basal segment; wholly yellow or brown yellow except the black apex of the flagellum. Dorsum of thorax and scutellum fulvous pollinose, the former with faint brown stripes; pleurae and venter fulvous pollinose with the usual brown relations. Abdominal dorsum fulvous; a quadrate black spot beneath the scutellum, posteriorly emarginate, sometimes expanding antero-laterally; segments II to IV each with a heavy double geminate black figure the outer portions of which are narrowly lunate; remaining segments mostly black with yellow hind margins; sometimes the pattern on the fifth segment corresponds to those preceding. Venter of abdomen fulvous; the black of the apical segments produced basally as a median stripe; the black lateral stripes attain the base. Halteres yellow. Wings as figured. Legs yellow; the joints, apical portion of front tibiae and entire tarsi, apical segments of middle and hind tarsi, black.

Male: Easily associated with the female but much darker. The palpi and antennae are yellow brown. Dorsum of thorax and scutellum with fuscous ground color. Abdomen like the female, except the black is more extensive; the first tergite being entirely black

except for the narrow postero-lateral angles. Wings like the female except that the infuscation of cell 2d M is equal to that of cell R and cell 1st A is more extensively infuscated. Legs generally darker.

Comparative notes: Easily distinguished from related species with the broad vertex and swollen antennae by the very short annulate portion of the flagellum. The abdominal pattern is much like that of C. robusta n.sp.

Remarks: This is the first time that C. virgulata has been reported north of Mexico.

Type data: Described from a male specimen, Cuautla, Mexico; from Saussure's Collection. Probably in the Museum of Turin.

Distributional data:

UNITED STATES: Arizona: Douglas, August; San Bernardino Ranch, 3750 ft.

MEXICO: Jalisco: Guadalajara, June 18, 1903, July 21, 1903, Aug. 8, 1903.

Reported by others from the following general localities:

MEXICO: Jalisco; Guerrero; Guanajuata;  
Colima.



Chrysops vittata Wiedemann (1821)

- 1821 C. vittatus Wiedemann, Dipt. Exot., 106; N. Am.  
 1828 C. vittatus Wiedemann, Auss. Zw., I, 200.  
 1841 C. vittatus Harris,  
 1855 C. vittatus Macquart, Dipt. Exot., Suppl., V, 37; Md.  
 1875 C. vittatus Osten Sacken, Prodrôme, I, 390.  
 1885 C. vittatus Koen, Can. Ent., XVII, 51; Pa.  
 1895 C. vittatus Townsend, Trans. Amer. Ent. Soc., XXII, 57; Kans.  
 1895 C. vittatus Hart, Bull. Ill. State Lab. N. H., IV, 228; Ill.  
 1902 C. vittatus Howard, Ins. Book, pl. XV, f. 37.  
 1903 C. vittatus Snow, Kans. Univ. Sci. Bull., II, 213; Kans.  
 1903 C. vittatus Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, 44;  
 Ohio.  
 1904 C. vittatus Brimley and Sherman, Ent. News, XV, 270; N. C.  
 1905 C. vittatus Harbeck, Ent. News, XVI, 341; N. J.  
 1905 C. vittatus Washburn, 10th Rept. State Ent. Minn.,  
 79; Minn.  
 1905 C. vittatus Daecke, Ent. News, XVI, 342; N. J.  
 1906 C. vittatus Daecke, Ent. News, XVII, 41.  
 1907 C. vittatus Daecke, Ent. News, XVIII, 141; N. J.  
 1907 C. vittatus Hine, Bull. 93, La. Exp. Sta., p. 35; La.  
 1908 C. vittatus Needham, 23d N. Y. Rept., p. 171; N. Y.  
 1913 C. vittatus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLIV, Ont.  
 1913 C. vittatus Graenicher, Bull. Wis. N. H. Soc., X, 173; Wis.  
 1918 C. vittatus McAtee and Walton, Proc. Ent. Soc. Wash.,  
 XX, 198; D. C., etc.  
 1920 C. vittatus Britton, Bull. Conn. St. Geol. N. H. Surv.,  
 XXXI, Conn.  
 1920 C. vittatus Marchand, Mon. Rock. Inst., p. 52.  
 1923 C. vittata Bequaert and Davis, Bull. Brook. Ent. Soc.,  
 XVIII, 122; N. Y.  
 1924 C. vittatus Wehr, Nebr. Univ. Studies, XXII, 113; Nebr.  
 1924 C. vittatus Jones and Bradley, Jl. Econ. Ent., XVII, 49.  
 1925 C. vittatus Johnson, Proc. Bost. Soc. N. H., XXXVIII, 69; Me.  
 1925 C. vittata Johnson, Occ. Pap. Bost. Soc. N. H., VII, 101;  
 N. Eng. List.  
 1926 C. vittatus Kröber, Stett. Ent. Ztg., LXXXVII, 339.  
 1927 C. vittatus Johnson, Ins. Mt. Des. Reg., p. 179.  
 1928 C. vittatus Leonard, N. Y. State List, p. 756; N. Y.  
 1930 C. vittatus Curran, Bull. Am. Mus. N. H., LXI, 38; N. Y.  
 1930 C. vittatus Schwardt and Hall, Bull., 256, Ark. Exp. Sta.,  
 f. 2; Ark.  
 1930 C. vittatus Stone, Ann. Ent. Soc. Am., XXIII, 288; N. Y.  
 1931 C. vittatus Schwardt, Jl. Kans. Ent. Soc., IV, 9; Ark.  
 1931 C. vittatus Phillip, Minn. Tech. Bull., LXXX, 94; Minn.

The following also refer to this species:

1848 C. areolatus Walker, List, I, 197; N.Y.

1867 C. lineatus Jaenicke, Neue Exot. Dipt., p. 26; Ill.

Color: Yellow; dorsum of abdomen with four black stripes.

Size: Length, 7 - 10 mm.

Structural and color characters: Female: Vertex, frons, and sides of genae yellow pollinose; frontal callosity, fronto-clypeus, genae, and palpi, yellow. Antennae slender, yellow, except the black apical portion of the flagellum. Dorsum of thorax and scutellum yellow, the former with fuscous stripes; pleurae and venter yellow with the usual fuscous stripes. Dorsum of abdomen yellow with four black longitudinal stripes; the median pair usually but not always complete, the lateral ones usually incomplete. Venter of abdomen yellow; the black of the apical segments may or may not extend part way to the base as a median stripe; the usual lateral streaks present. Halteres fuscous. Wings as figured; the fuscous streak extending from the distal margin of the crossband into cell R5 not always present. Legs yellow; apex of front tibiae and entire tarsi, middle and hind coxae and trochanters, apical three or four segments of the middle and hind tarsi, fuscous.

Male: Similar to the female except for sex characters and a greater extent of infuscation in cell 2d M of the wing. The sexes are very readily associated.

Comparative notes: Exhibits more yellow than its closest relative C. striata O.S. The yellow frontal callosity, yellow ground color of the thorax, wholly yellow scutellum, and predominantly yellow legs offer the best characteristics for separation. See also under description of C. striata.

Type data: In the Museum of Vienna. Kröber (1926) states that no specimen is designated as the type.

Distributional data:

CANADA: Quebec: St. Johns, July 1.

UNITED STATES: Massachusetts: Woods Hole.

Connecticut.

New York: Cranberry Lake, July 26, 1917; Ithaca, June 1913; Big Indian Valley, Catskill Mts., July 18, 1910; Mosholu, July 23, 1920.

New Jersey: Browns Mills, June 28-30, 1921, Aug. 15, 1921; Lakehurst.

South Carolina: Batesburg, Aug. 24, 1930.

Georgia: Prattsburg, July 25, 1930;  
Wrens, Aug. 22, 1930.

Alabama: Mt. Meigs, July 21, 1930;  
Tuskegee, July 22, 1930.

Florida: Hilliard, Aug. 17, 1930;  
Liberty Co., June 1, 1924.

Pennsylvania: Harrisburg, Aug. 22, 1908.

Michigan: Cheboygan Co., July and Aug,  
1928, 1930, 1931; Grand Jct.,  
July 15, 1914; Dowagiac,  
July 5, 1913.

Ohio: Summit Co., June 16, 1929,  
July 4, 1929, July 1, 1925,  
July 10, 1927, July 14, 1929,  
Aug. 1, 1925, Aug. 10, 1927;  
Huron Co., Aug. 1, 1931;  
Streetsborough, July 1, 1932,  
July 15, 1931; Carroll Co.,  
June 22, 1932; Jackson Co.,  
June 11, 1932; Geauga Co.,  
July 15, 1931; Hocking Co.,  
July 4, 1931; Lawrence Co.,  
Aug. 18, 1929; Franklin Co.,  
July 9, 1931; Greene Co., July 2,  
1931; Columbus; Akron (Turkey-  
foot Lake) July 1, 1928; Logan  
Co., July 13, 1930.

Illinois: Algonquin, July 26, 1905;  
Volo, July 8, 1932; Cham-  
paign Co.

Mississippi: Iuka, July 14, 1930;  
Fulton, July 14, 1930;  
Meridian, July 17, 1930;  
Hamilton, July 14, 1930.

Missouri: Columbia.

Kansas: Atchison Co., July 9, 1924;  
Troy, Aug. 25, 1932, Sept.  
4, 1932.

Arkansas: Washington Co., June 29, 1929.

Reported by others from the following general  
localities:

CANADA: Quebec; Ontario.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
Connecticut; New York; New Jersey;  
District of Columbia; Maryland;  
Virginia; North Carolina; Georgia;  
Pennsylvania; Ohio; Wisconsin;  
Illinois; Minnesota; Nebraska;  
Kansas; Arkansas; Louisiana.

Chrysops vittata floridana Johnson (1913)

- 1913 C. vittatus floridanus Johnson, Bull. Am. Mus. N.H.,  
XXXII, 52; Fla.  
1926 C. vittatus floridanus Kröber, Stett. Ent. Ztg.,  
LXXXVII, 341.

Color: Yellow; abdominal stripes obscure.

Size: Length, 9 mm.

Structural and color characters: Female: General aspect of C. vittata Wied. The thoracic stripes are light brown, the abdominal stripes more obsolete. Wings as figured; the infuscation more extensive

than in C. vittata, especially the apical spot. Legs like C. vittata.

Male: This sex has not been reported.

Type data: In the Museum of Comparative Zoology, Cambridge, Massachusetts. I have studied the types.

Distributional data:

UNITED STATES: Virginia: Hickory, July 3, 1903.

Florida: Alachua Co., May 31, 1925, Sept. 15, 1923; Hillsboro Co., March 23, 1925; Horse Landing, May 17, 1894; St. John's River, May 7-17, 1924.

Reported by others from the following general localities:

UNITED STATES: Georgia; Florida.

Chrysops wiedemanni Kröber (1926)

- 1926 C. wiedemanni Kröber, Stett.Ent.Ztg., LXXXVII, 267, (new name for C. obsoletus of authors, nec. Wied.)
- 1928 C. wiedemanni Leonard, N.Y. State List, p. 755; N.Y.
- 1930 C. wiedemanni Curran, Bull. Am. Mus. N.H., LXI, 37; N.Y.
- 1930 C. wiedemanni Stone, Ann. Ent. Soc. Am., XXIII, 290; N.Y.
- 1931 C. wiedemanni Philip, Minn. Tech. Bull., LXXXVII

The following also refer to this :

- 1875 C. obsoletus Osten Sacken, Prodr., 1, 395; N. States.
- 1885 C. obsoletus Keen, Can. Ent., XVII, 52; Pa.
- 1903 C. obsoletus Hine, Ohio St. Acad. Spec. Pap. No. 5, 42; Ohio.
- 1904 C. obsoletus Brimley and Sherman, Ent. News, XV, 270; N.C.
- 1905 C. obsoletus Harbeck, Ent. News, XVI, 341; N.J.
- 1905 C. obsoletus Washburn, 10th Rept. State Ent. Minn., p. 79; Minn.

- 1905 C. obsoletus Daecke, Ent. News, XVI, 342; N. J.  
 1906 C. obsoletus Daecke, Ent. News, XVII, 38, figs.  
 1907 C. obsoletus Daecke, Ent. News, XVIII, 144; N. J.  
 1907 C. obsoletus Hine, Bull. 93, La. Exp. Sta., p. 32; La.  
 1913 C. obsoletus Graenicher, Bull. Wis. N. H. Soc., X, 173; Wis.  
 1916 C. obsoletus Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
 XLVII, Ont.  
 1918 C. obsoletus McAtee and Walton, Proc. Ent. Soc. Wash.,  
 XX, 197; D. C., Md., Va.  
 1919 C. obsoletus Gibson, Ent. Rec., Rept. Ent. Soc. Ont., L,  
 Ont.  
 1920 C. obsoletus Britton, Bull. Conn. St. Geol. N. H. Surv.,  
 XXXI, Conn.  
 1923 C. obsoleta Bequaert and Davis, Bull. Brook. Ent.  
 Soc., XVIII, 121; N. Y.  
 1924 C. obsoletus Jones and Bradley, Jl. Econ. Ent., XVII, 47.  
 1924 C. obsoletus Wehr, Nebr. Univ. Studies, XXII, 112; Nebr.  
 1925 C. obsoleta Johnson, Occ. Pap. Ent. Soc. N. H., VII, 100;  
 N. Eng. List.  
 1930 C. obsoletus Schwardt and Hall, Bull. 256, Ark. Exp.  
 Sta., p. 13; Ark.  
 1931 C. obsoletus Schwardt, Jl. Kans. Ent. Soc., IV, 8; Ark.  
 1926 C. fraternus Krober, Stett. Ent. Ztg., LXXXVII,

Color: Fuscous; dorsum of abdomen typically with a yellow median stripe.

Size: Length, 6.5 - 8 mm.

Structural and color characters: Female: Vertex gray pollinose; frons and sides of genae yellowish pollinose; frontal callosity, a spot on each side of the fronto-clypeus, another on the oral margins of the genae, and palpi, fuscous to black; remainder of fronto-clypeus and genae, yellow. Scape of antennae yellow; pedicel and base of flagellum brown yellow; apical portion of flagellum black. Dorsum of abdomen and scutellum plumbeous, the former with fuscous stripes, sometimes the latter yellow at the tip; pleurae and venter yellow

pollinose with the usual fuscous stripes. Dorsum of abdomen fuscous with a conspicuous yellow median stripe; in one specimen also a yellow lateral stripe on each side. Venter variable; usually yellow with a broad fuscous median stripe extending basally from the fuscous apical segments, and the usual lateral streaks; sometimes the venter is almost entirely fuscous except for some yellow on the sides near the base. Halteres fuscous. Wings as figured; cell R hyaline, the apical spot nearly disconnected from the crossband, and the hyaline triangle broadly open posteriorly. Legs yellow; the trochanters, apical portion of front tibiae and entire tarsi, base of hind femora and sometimes the apex of the tibiae, apical segments of middle and hind tarsi, black.

Male: Differs from the female by the usual sex characters and by cell R being infuscated. The head is proportionately large.

Comparative notes: C. wiedemanni is a distinct North American species. It has for many years been identified as C. obsoleta Wied., but is readily separated by the wing picture. In the female cell R is hyaline, in both sexes, the apical spot is narrowly joined to the crossband and usually extends but a little way into cell R4, consequently the hyaline triangle is broadly open.



Remarks: The males (identified from reared specimens by Dr. H. H. Schwardt at the University of Arkansas) conform in all respects to Kröber's description of C. fraterna. It is quite evident that the infuscated cell R of this sex should make the association with the female improbable. I have not seen Kröber's type, but undoubtedly it is the same as his C. wiedemanni.

Type data: Through the courtesy of the Museum of Vienna I received one type female for study. The specimen had been previously determined (by Wiedemann?) as C. obsoletus. From "Pennsylvanien, Coll. Winthem".

Distributional data:

UNITED STATES: New York: Mosholu, July 23, 1920.

New Jersey: Ramsey, July 14, 1917.

Maryland: Hyattsville, July 4, 1899.

District of Columbia: Washington,  
July 7, 1899.

North Carolina: Raleigh, July 10-17,  
1907.

South Carolina: Batesburg, Aug. 24,  
1930.

Georgia: Prattsburg, July 25, 1930.

Michigan: Montmorency Co., July 14, 1923; Cheboygan Co., July 28, 1929, July 4-13, 1931; New Buffalo, July 11, 1911.

Ohio: Columbus, July 2, 1898; Indian Lake, June 15, 1930, July 14, 1927; Summit Co., July 10, 1927; Aug. 1, 1929; Logan Co., July 13, 1930; Cincinnati, June 13, 1902; Cedarville, July 2, 1931; Lancaster, July 1, 1931; Hocking Co., July 4, 1931.

Tennessee: Knoxville, July 10, 1907; Aug. 31, 1907.

Wisconsin: Spread Eagle, July 30, 1910.

Illinois: Algonquin; Kankakee, July 10, 1925; Ogle Co., July 4, 1932; Grundy Co., Aug. 4-12, 1928.

Mississippi: Iuka, July 14, 1930; Scooba, July 17, 1930; Smithville, July 15, 1930; Fulton, July 14, 1930.

Kansas: Atchison Co., July 24; Onaga, June 20, 1898.

Arkansas: Fayetteville, April 16, 1930, June 17, 1930, July 18, 1930; Scott Co., Aug. 23, 1928.

Reported by others from the following general localities:

CANADA: Quebec; Ontario.

UNITED STATES: Massachusetts; New Hampshire;  
Connecticut; New York; New Jersey;  
Maryland; District of Columbia;  
Virginia; North Carolina; Pennsyl-  
vania; Ohio; Wisconsin; Minnesota;  
Iowa; Nebraska; Arkansas; Louisiana.

Neochrysops Walton (1918)

1918 Neochrysops Walton, Proc. Ent. Soc. Wash., XX, 191.

Original description: Hind tibiae bearing spurs; head much as in Chrysops but antennae more slender; first joint subequal with the third which is but faintly swollen at base and bears five annuli; second segment slender and two-thirds length of first. Eyes in life marked as in figure (four more or less triangular coalescent spots on the disc). Ocelli present, closely approximated; wings evenly infuscated throughout; anterior branch of third vein bearing a stump at its bend extending into second marginal cell; abdomen globose, much wider than thorax.

Genotype: N. globosa Walton (1918)

Remarks: Neochrysops is doubtfully a good genus. Bequaert (1930) includes it under Chrysops. There is so little evidence, in so far as there is but one specimen, that I prefer to let it stand as the original author intended.

Neochrysops globosa Walton (1918)

1918 N. globosus Walton, Proc. Ent. Soc. Wash., XX, 192; Md.

Color: Yellow and black; abdominal dorsum with a double row of large black spots; wings uniformly infuscated.

Size: Length, 8 mm.

Structural and color characters: Female: Vertex, frons, an abbreviate mid-streak on the upper part of the fronto-clypeus, and sides of genae, yellow pollinose; ocellar area, frontal callosity, a large spot on each side of the yellowish fronto-clypeus, another on the oral margins of the genae, black. Palpi yellow. Antennae very slender and elongate; the scape yellow, pedicel and base of flagellum brown yellow, apical portion of flagellum black. Dorsum of thorax and scutellum yellow pollinose with pale yellowish pubescence, the former with three fuscous stripes, the median one extending part way onto the scutellum; pleurae and venter yellow pollinose with fuscous stripes, the former with sparse yellowish pile. Abdomen inflated, yellow, with black pubescence most dense at the lateral margins and the apex; the dorsum with a double row of more or less rounded large black spots beginning on the first segment, becoming on each succeeding segment somewhat smaller; venter wholly yellow. Halteres yellow. Wings uni-

formly infuscated, most saturate along the costal margin and the stigma; a stump at the bifurcation of vein R4+5. Legs yellow; the trochanters, apices of tibiae, entire front tarsi, apical segments of middle and hind tarsi, black.

Male: Unknown.

Comparative notes: This species has close affinities with the genus Chrysops. It differs from the North American species of that genus by the wholly infuscated wings with a stump at the bifurcation of vein R4+5, the inflated abdomen (Bequaert (1930) suggests that this condition may be due to the presence of a worm), the very long and slender antennae, and according to Walton (1918), the eye-marking consisting of four coalescent more or less diamond-shaped spots.

Type data: Described from one female (up to now the only specimen represented in collections) from Cabin John Bridge, Maryland, July 20, 1916. In the United States National Museum.

Distributional data:

UNITED STATES: Maryland.

Silvius Meigen (1820)

1820 Silvius Meigen, Syst. Beschreib. Europ. Zweifl. Ins., p.27.  
 1922 Perisilvius Enderlein, Mitt. Zool. Mus. Berlin, X, 2, p.344.

Generic characters: Eyes bare, often with numerous brown spots, contiguous in the male, broadly separated in the female. Ocelli present. Frontal callosity present in the female. Pedicel of antennae half or less the length of the scape; flagellum five-segmented. Palpi a little more than half the length of the proboscis which is a little shorter than the head.

Genotype: Tabanus vituli Fabricius (1805)

## KEY TO SPECIES

1. Wings maculate, costal cell hyaline;  
 species predominantly gray . . . . . 2  
 Wings immaculate, costal cell yellow  
 species predominantly yellow . . . . . 4
2. Dorsum of abdomen with four longitudinal  
 rows of vittate black spots quadrivittatus (Say)  
 Dorsum of abdomen not so marked . . . . . 3
3. Frontal callosity equals about one-half the  
 width of the vertex; body heavily pollin-  
 oseed with gray, sometimes so much as to  
 obscure any markings; two rows of black  
 spots usually visible on the abdominal  
 dorsum . . . . . pollinosus Will.  
 Frontal callosity equals more than one-half  
 the width of the vertex, narrowly separated  
 from the eyes; body not heavily pollinosed  
 with gray; black abdominal figures very  
 conspicuous . . . . . maculatus n.sp.

4. Fronto-clypeus entirely pruinose; abdominal tergites with conspicuous whitish median triangles . . . . . microcephalus Wehr

Fronto-clypeus partially denuded; abdominal tergites lacking median triangles  
gigantulus (Loew)

Silvius gigantulus (Loew) (1872)

- 1872 Chrysops gigantulus Loew, Cent., X, 12.  
1877 Silvius gigantulus Osten Sacken, West. Dipt., p. 215; Calif., Col.  
1887 S. gigantulus Williston, Trans. Kans. Acad. Sci., X, 131; Wash., Calif., Co., N.M., B.C., Ida.  
1895 S. gigantulus Townsend, Proc. Cal. Acad. Sci., IV, 595; Calif.  
1901 S. gigantulus Ricardo, Ann. and Mag. N.H., ser. 7, VIII, 292; B.C.  
1904 S. gigantulus Fletcher, 34th Rept. Ent. Soc. Ont., 98; B.C.  
1904 S. gigantulus Hine, Ohio Nat. V, 229.  
1921 S. gigantulus Cole and Lovett, Proc. Cal. Acad. Sci., XI, 235; Ore.  
1924 S. gigantulus Wehr, Nebr. Univ. Studies, XXII, 110; Nebr.  
1926 S. gigantulus Essig, Ins. W.N.A., p. 554; N.M., Col., Cal., Ore., Ida., B.C.

The following also refers to this species:

- 1875 Silvius trifolium Osten Sacken, Prodrôme, I, 395.

Color: Yellow.

Size: Length, 9 - 11 mm.

Structural and color characters: Female: Vertex, frons, upper and lower limits of the yellow brown fronto-clypeus, and genae yellow pollinose; ocellar space more or less denuded, black; frontal callosity sub-round or pear-shaped, shining black. Genae and post genae yellow pilose. Palpi tapering to a point, orange yellow. Antennae variable as to color, typically orange

yellow except the black apical portion of the flagellum. Dorsum of thorax and scutellum fulvous pruinose with yellow pubescence; pleurae and venter gray pollinose, the former with dense yellow pile. Abdomen golden yellow with black pubescence; usually a quadrate posteriorly emarginate black spot beneath the scutellum and an elongate black spot on the disc of the second tergite. Halteres yellow. Wings hyaline except the yellow costal cell and stigma; a stump at the bifurcation of vein R4+5. Legs yellow; the trochanters, femoro-tibial joints, apex of front tibiae and entire tarsi, apices of middle and hind tarsi, fuscous.

**Male:** Like the female except for sex characters, more densely pubescent and pilose, etc. The sexes are very easily associated.

Comparative notes: Separated from S. microcephalus Wehr by the demuded areas on the fronto-clypeus, the head larger in relation to the thorax, and the lack of mid-dorsal triangles.

Remarks: There is at hand a series which I am sure belongs to this species, but the black spot of the first and second abdominal tergites is lacking and in general the specimens are somewhat smaller. I do not feel that I have sufficient evidence to raise this



form to varietal rank.

Type data: Described from California. One female in the Museum of Comparative Zoology, Cambridge.

Distributional data:

CANADA: British Columbia: Hope Mts., July 15-27, 1906; Similkameen, July 21, 1906; Agassiz; Pt. Renfrew, Aug. 10, 1902; Merrit, Aug. 3, 1931.

UNITED STATES: Washington: Seattle, July 15, 1901; Kincaid; Kalama River, July 21, 1931; Montesano, July 23, 1931.

Oregon: Wallawa Lake, July 27, 1929.

California: Lassen Co., July 20, 1911; Ontario, July 13, 1907; Great Alpine Creek, July 21, 1915; Glenwood, May 27, 1908; Tahoe River, Aug. 23, 1916; Fallen Leaf Lake, July 14; Giant Forest, July 28, 1929; San Jacinto Mts., July 21, 1929.

Montana: Missoula, Aug. 11, 1931.

Reported by others from the following general localities:

CANADA: British Columbia.

UNITED STATES: Idaho; Colorado; New Mexico; Nevada;  
Washington; Oregon; California.

Silvius maculatus n.sp.

Color: Gray, with conspicuous black abdominal figures.

Size: Length, 7 - 8 mm.

Structural and color characters: Female: Vertex, frons, fronto-clypeus, and genae pale gray pollinose, the pits on the sides of the fronto-clypeus denuded, brown; ocelli reddish; frontal callosity broad, equal to at least three-fourths the width of the vertex, shining black, a narrow line extending from the upper margin to the median ocellus. Palpi brown with grayish pollen; antennae mostly black, the basal segments with a grayish pruinosity, the extreme base of the scape and flagellum reddish. Dorsum of thorax and scutellum black, gray pruinose, the former with three narrow lighter gray pollinose stripes; pleurae and venter gray black, pruinose, the former with white pile. Dorsum of abdomen gray; a broad quadrate black spot beneath the scutellum, posteriorly emarginate, not reaching the hind margin of the first segment; segments II to V with a heavy black more or less double geminate figure whose inner portions are the broader and whose outer portions are more strongly divergent; the sixth segment more or less corresponds to the pattern on the preceding segments; the seventh segment blackish with the hind margin gray. Venter of abdomen gray; a black lateral spot present or absent

on each of segments V and VI. Halteres brown.

Wings hyaline; the stigma brown, and the bifurcation of vein R4+5 and the cross veins brown maculate. Legs brown yellow; the trochanters, apices of femora and tibiae, and tarsi (only the apices of the middle and hind metatarsi), fuscous.

Comparative notes: Differs from other North American species of Silvius by the very conspicuous black abdominal figures and the broad frontal callosity.

Type data: Holotype, female, Hermiston, Oregon, July 9, 1922; A. L. Melander. Paratype, one female, San Diego, California, May; E. P. Van Duzee. Holotype in the Ohio State Museum, Columbus, Ohio. Paratype in the Francis Huntington Snow Entomological Collection of the University of Kansas.

Silvius microcephalus Wehr (1924)

1924 S. microcephalus Wehr, Nebr.Univ.Studies, XXII, 109; Col.

Color: Yellow; abdominal dorsum with a median row of whitish triangles.

Size: Length, 9.5 - 11 mm.

Structural and color characters: Female: Head small as compared to the thorax. Vertex, frons fronto-clypeus and genae yellow pollinose; only the pits on each side of the fronto-clypeus denuded, yellow brown; frontal callosity sub-round, black. Palpi slender, orange

yellow; antennae yellow, except the black apical portion of the flagellum, the scape and pedicel black pubescent. Dorsum of thorax and scutellum fulvous pollinose; pleurae and venter yellow gray pollinose, the former with short yellow pile. Abdomen yellow with black and some pale pubescence, the dorsum with a median row of large whitish triangles apparently placed upon a dark mid-stripe. Halteres yellow. Wings hyaline, except the yellow costal cell and stigma, bifurcation of vein R4-5 with a stump. Legs yellow; apices of tibiae, femore-tibial joints, front tarsi, apical portions of middle and hind tarsi, fuscous.

Male: I have but one poorly preserved specimen at hand. It is undoubtedly the male of this species. Similar to the female except for sex characters, more densely pilose; the thoracic dorsum and scutellum more gray than fulvous. The wholly pollinosed fronto-clypeus and genae along with the dorsal abdominal markings easily associate the sexes.

Comparative notes: To be separated from S. gigantulus Loew according to the key. See also under description of that species. In general the yellow coloration of S. microcephalus is more pale than that of S. gigantulus, although this is by no means a safe character. Attempting to separate these two species by the size

of the head in proportion to the body does not appear reliable.

Type data: Described from two females. Ute Creek, Costilla County, Colorado, August 7, 1907. In the University of Nebraska Collection. My identification is based on a specimen labelled "Paratype", in the Ohio State Museum.

Distributional data:

UNITED STATES: Colorado: Mountain Home Lake, Fort Garland, 8300 feet, July 20-25, 1932; Riley, August, 1890.

Reported by others only from Colorado.

Silvius pollinosus Williston (1880)

- 1880 S. pollinosus Williston, Trans.Conn.Acad.A. and S., IV, 244; Kans.  
 1887 S. pollinosus Williston, Trans.Kans.Acad.Sci., X, 131; Kans.  
 1903 S. pollinosus Snow, Kans.Univ.Sci.Bull., II, 213; Kans.  
 1904 S. pollinosus Hine, Ohio Nat., V, 229; Col.  
 1924 S. pollinosus Wehr, Nebr.Univ.Studies, LXII, 110; Nebr.  
 ?1931 S. pollinosus Knowlton, Can.Ent., LXIII, 154; Utah.

Color: Gray pollinose; black abdominal spots obscure; wings spotted.

Size: Length, 9 - 10.5 mm.

Structural and color characters: Female: Vertex, frons, fronto-clypeus, and genae pale gray pollinose; the black sub-oval frontal callosity equals about one-half the width of the vertex; the pit on each side of

the fronto-olypeus denuded, black. Palpi reddish, the outer surfaces with some black. Antennae mostly black; scape and pedicel sometimes reddish at their bases, grayish pruinose. Entire body pale gray pollinose; the dorsum of the thorax striped rather faintly with alternate light and dark; the abdominal dorsum with an obscure double row of median black angulate spots most visible on segments II to IV. All pilosity and pubescence, white. Halteres black. Wings hyaline; the stigma brown, also brown spots at the cross veins and bifurcation of vein R4+5. See figure. Legs yellow; the front coxae gray pollinose; the joints, apices of tibiae and front and middle femora, practically the entire hind femora, all the tarsi, except the yellow bases of the metatarsi, fuscous.

Male: Differs from the female by being less heavily pollinosed, hence the dorsum of the thorax and scutellum more blackish. The black abdominal spots are more conspicuous; the sides of the abdomen near the base are yellowish. Wings like the female. Legs like the female, except that all the femora are fuscous. All pilosity and pubescence more dense than in the female.

Comparative notes: The very heavy pruinosity of this species is quite characteristic. Separated from S. maculatus n.sp. by the abdominal pattern, smaller

frontal callosity, fuscous hind femora, etc. From S. quadrivittatus (Say), S. pollinosus, in addition to its pollinosity, is separated by the abdominal dorsum having two rows of black spots instead of four, its larger size, and in the male, the femora are entirely fuscous. Also see under description of S. quadrivittatus.

Type data: Described from Western Kansas. One female (antennae and one wing missing, coloration good) in the Francis Huntington Snow Entomological Collection of the University of Kansas.

Distributional data:

UNITED STATES: South Dakota: Elk Point, June 19, 1924; Springfield, June 25, 1924; Hot Springs July 9, 1924.

Kansas: Clark Co., 1967 feet, June; Morton Co., 3200 feet, June, 1902; Onaga, 1901; Rock Creek, August, 1903.

Colorado: Las Animas Co., Sept. 22, 1927.

Reported by others from the following general localities:

UNITED STATES: Nebraska; Kansas; Colorado; Utah.

Silvius quadrivittatus(Say) (1823)

- 1823 Chrysops quadrivittatus Say, Jl.Acad.N.S.Phil.,III,33.  
 1828 C. quadrivittatus Wiedemann, Auss.Zw.I,200.  
 1859 C. quadrivittatus Say, Comp.Works,II,54.  
 1887 Silvius quadrivittatus Williston, Trans.Kans.Acad.  
 Sci.,X,131;Calif.  
 1895 S. quadrivittatus Townsend, Trans.Am.Ent.Soc.,XXII,  
 57;S.D.,N.M.,Nebr.,Cal.,Kans.  
 1903 S. quadrivittatus Snow, Kans.Univ.Sci.Bull.,II,No.5,  
 213;Kans.  
 1904 S. quadrivittatus Snow, Kans.Univ.Sci.Bull.,II,341;  
 Ariz.  
 1904 S. quadrivittatus Hine, Ohio Nat.,V,229;Cal.,Nebr.,  
 N.M.,Texas.  
 1905 S. quadrivittatus Washburn, 10th Rept.State Ent.  
 Minn.,p.79.  
 1924 S. quadrivittatus Wehr, Nebr.Univ.Studies,XXII,110;  
 Nebr.  
 1931 S. quadrivittatus Stanford, Pan-Pacif.Ent.,VII,100;  
 Utah.  
 1931 S. quadrivittatus Philip, Minn.Tech.Bull.,LXXX,95;Minn.

The following also refers to this species:

- 1892 Diachlorus notatus Bigot, Mem.Soc.Zool.France,  
 V,223;Calif.

Color: Gray or yellow gray; abdominal dorsum with  
 four rows of spots; wings spotted.

Size: Length, 7 - 10 mm.

Structural and color characters: Female: Vertex,  
 frons, fronto-clypeus and genae yellowish gray pollin-  
 ose; frontal callosity black, one half the width of the  
 vertex; the pit on each side of the fronto-clypeus de-  
 nuded, black. Palpi reddish with some black, especi-  
 ally on the outer surfaces. Antennae variable; some-  
 times mostly black except the reddish bases of the  
 segments, sometimes mostly reddish or yellow, only



the apex of the flagellum black. Dorsum of thorax and scutellum yellow gray pollinose, the former with alternate light and dark stripes; pleurae and venter gray pollinose. Dorsum of abdomen yellow gray or gray pollinose with four rows of black vittate spots. Venter of abdomen gray with a faint suggestion of a dark broken median stripe and a lateral one. Halteres black. Wings hyaline; the stigma brown, and brown spots typically distributed according to the figure. Legs yellow; the front coxae grayish pollinose; the trochanters, apices of femora and tibiae, and the tarsi (except the yellow bases of the metatarsi), fuscous.

Male: Similar to the female except for sex characters. The abdomen is more yellowish. The three rows of vittate spots on the venter are quite distinct.

Comparative notes: Separated from related species according to the key. Also see under description of S. pollinosus Will. In addition, in the male, the abdomen of S. quadrivittatus is considerably more yellow than in S. pollinosus. It appears that in general there is a greater distribution of spots on the wings in S. quadrivittatus than in S. pollinosus.

Type data: Described from near the Rocky Mountains.

The types are destroyed.

Distributional data:

UNITED STATES: Nebraska: Mitchell, July 10, 1923.

Kansas: Barber Co., 1916; Morton Co., June; Hamilton Co.

Colorado: La Junta, Aug. 12, 1930.

Texas: Galveston, May.

Utah: Zion National Park, Aug. 13, 1929; Fort Duchesne, June 28, 1932.

New Mexico: Las Cruces, June 10; Sabinal, Aug. 7.

Arizona: Bill Williams Fork, August.

Reported by others from the following general localities:

UNITED STATES: South Dakota; Nebraska; Kansas;  
Texas; Montana; Utah; New Mexico;  
Arizona; California.

Esenbeckia Rondani (1864)

1864 Esenbeckia Rondani, Arch.Zool.Modena, III, 84.

Generic characters: Eyes bare, contiguous in the male, narrowly separated in the female. Ocelli present. No frontal callosity in the female.

Flagellum of antennae eight-segmented. Proboscis about as long as the head or slightly longer. Palpi about one-third or more the length of the proboscis. Cell R5 of the wings petiolate.

Genotype:

## KEY TO SPECIES

1. Yellow brown; pile of head and thorax yellow; legs yellow; in the male no definite demarcation between the large and small facets of the eyes . . . . . incisuralis (Say)
- Gray brown; pile of head and thorax grayish white; legs brown; a distinct line marks the transition from large to small facets in the eyes of the male . . . . . delta (Hine)

Esenbeckia delta (Hine) (1920)

1920 Pangonia delta Hine, Ohio Jl.Sci.,XX,313;Ariz.

1925 Pangonia delta Hine, Occ.Pap.Mus.Zool.Mich,No.162,6.

The following also refers to this species:

1904 Pangonia saussurei Hine, Ohio Nat.,V,228;Ariz.

Color: Gray brown (this apparent color produced by a whitish pruinosity on a light brown ground).

Size: Length, 16 mm.

Structural and color characters: Male: Frontal triangle, fronto-clypeus and genae gray white pollinose; genae and post-genae white pilose. Palpi yellow with black hairs. Antennae yellow, the two basal segments with black hairs, the pedicel about half the length of the scape. Thorax pale gray brown pruinose with white pubescence and pile in the usual places. Abdomen more or less uniformly gray brown, the sides of the segments darker apically. Halteres light brown. Wings sub-hyaline with a light brown tinge, more saturate in the costal regions; veins light brown; the bifurcation of vein R4+5 with a stump. Legs practically uniformly brown with black hairs except for the whitish pollinose front coxae which are white pilose.

Female: Not available for description. According to my notes, the sexes are easily associated.

Comparative notes: Separated from E. incisuralis (Say) according to the key. In addition, the black hairs of the legs of E. delta and the yellow hairs of the legs of E. incisuralis offer good characters.

Remarks: My description is based on a homotype male.

Type data: Two males and one female, Huachuca Mts. and Palmerlee, Arizona. In the Ohio State Museum, Columbus, Ohio.

Distributional data:

UNITED STATES: Arizona: Huachuca Mts., Aug. 1, 1927.

Reported by Hine from Arizona only.

Esenbeckia incisuralis (Say) (1823)

1823 Pangonia incisuralis Say, Jl. Acad. N.S. Phil., III, 31; Ark.

P. incisuralis Say, Amer. Ent., pl. XXXIV.

1859 P. incisuralis Say, Comp. Works, I, 75.

1887 P. incisuralis Williston, Trans. Kans. Acad. Sci., X, 130; Col., N.M.

The following also refer to this species:

1828 P. incisa Wiedemann, Auss. Zw. I, 90.

1904 P. incisa Hine, Ohio Nat., V, 228, Okla.

Color: Fuscous and yellow, the former usually dominant.

Size: Length, 14-16 mm.

Structural and color characters: Female: Vertex, fronto-clypeus and genae fulvous pruinose. Palpi and

antennae orange yellow, the pedicel of the latter not more than half the length of the scape. Genae and post-genae yellow pilose. Dorsum of thorax and scutellum fuscous, yellow pubescent; pleurae and venter fuscous, yellow pilose. Dorsum of abdomen fuscous, the hind margins of all the segments and the sides of the first two, yellow, the yellow pubescence most dense on the hind margins; venter mostly fuscous the segments with yellow hind margins. The yellow of the abdomen is of variable extent, sometimes occupying considerably more than the sides of tergites I and II. Halteres brown yellow. Wings sub-hyaline with a yellow tinge most saturate in the costal regions; veins yellow; a stump usually present at the bifurcation of vein R4+5. Legs yellow with yellow hairs the front coxae and basal portions of all femora fuscous.

Male: Like the female except for the usual sex characters.

Comparative notes: Separated from E. delta (Hine) according to the key.

Type data: Described from "Arkansas". The types are destroyed.

Distributional data:

UNITED STATES: Kansas: Chautauqua County; Cawley County, 1916.

Reported by others from the following general localities:

UNITED STATES: Arkansas; Oklahoma; Colorado;  
New Mexico.

Buplex Austen (1920)

1920 Buplex Austen, Bull.Ent.Res., XI, 139.

Generic characters: Eyes bare, contiguous in the male, separated in the female. Ocelli present. Frontal callosity absent in female. Vertex narrow. Flagellum of antennae eight-segmented. Proboscis of variable length, averaging about the length of the head. Palpi one-third to one-half the length of the proboscis. Cell R5 of the wings open.

Genotype: Pangonia suavis Loew (1858)

## KEY TO SPECIES

1. Yellow species (including antennae and legs) . . . . . 2
  - Not yellow species . . . . . 3
2. Pedicel more than half the length of the scape; the bifurcation of vein R4+5 without a stump . . . . . pietra (O.S.)
  - Pedicel not more than half the length of the scape, usually less; the bifurcation of vein R4+5 with a stump . . . ruficornis (Bigot)
3. Length of proboscis equals width of head; palpi black . . . . . fera (Will.)
  - Length of proboscis noticeably less than width of head; palpi not black . . . . . 4
4. All femora black; abdomen with yellowish pubescence . . . . . tranquilla (O.S.)
  - All femora ferruginous; abdomen with grayish pubescence . . . . . rasa (Loew)

Buplex fera (Williston) (1887)

- 1887 Pangonia fera Williston, Trans.Kans.Acad.Sci., X,130;Ore.  
 1904 P. fera Hine, Ohio Nat.,V,227;B.C.,Wash.  
 1921 P. fera Cole and Lovett, Proc.Cal.Acad.Sci.,XI, 232;Ore.  
 1921 Corizoneura fera Surcouf, Gen.Ins.,CLXV,134.  
 1924 Buplex fera Bequaert, Psyche, XXXI,33.

Color: Predominantly fuscous; sides of abdomen brown yellow, hind margins of tergites pale; antennae, palpi, and legs black.

Size: Length, 12 - 13 mm.



Structural and color characters: Female: Vertex, fronto-clypeus and genae yellow gray pollinose.

Antennae and palpi black. Proboscis black, its length equal to the width of the head. Genae and post genae with dense yellowish pile. Dorsum of thorax and scutellum fuscous to black with a variable amount of gray pruinosity, the former with faint gray stripes; pleurae and venter gray pruinose, the former densely yellow pilose. Abdomen fuscous with black and pale pubescence; broadly brown yellow on the sides, especially near the base; hind margins of the segments whitish. Sometimes the second and third tergites are practically entirely brown yellow except for a very small black median spot; sometimes all of the segments of the venter are fuscous with pale hind margins, usually the second is predominantly brown yellow, and often the third. Halteres black. Wings sub-hyaline; stigma brown, costal area yellowish; usually no stump at the bifurcation of vein R4+5. Legs black.

Male: Like the female except the usual sex characters.

Comparative notes: The long proboscis and black antennae, palpi and legs make this species readily recognized. Some forms of the eastern B. tranquilla (O.S.) bear striking similarities, but neither the

palpi nor the legs are wholly black and the proboscis is not so long.

Type data: Described from one male, Mt. Hood, Oregon. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Distributional data:

UNITED STATES: Washington: Mt. Rainier, July 22, 1920;  
Mt. Cheam, Oct. 8, 1907.

Oregon: Mt. Hood, July 18, 1931.

California: Giant Forest, July 28, 1929; Tallac Lake, July 17, 1915.

Reported by others from the following general localities:

CANADA: British Columbia.

UNITED STATES: Washington; Oregon; California.

Buplex pigra (Osten Sacken) (1875)

- 1875 Pangonia pigra Osten Sacken, Prodrôme, I, 367; N.Y. N.J., Ky.  
1918 P. pigra McAtee and Walton, Proc. Ent. Soc. Wash., XX, 191; Md., Va.  
1928 Buplex pigra Leonard, N.Y. State List, p. 754; N.Y.

Color: Yellow.

Size: Length, 11 - 12 mm.

Structural and color characters: Female: Vertex convex anteriorly, gray yellow pollinose; fronto-clypeus and genae gray yellow pollinose. Antennae yellow, the pedicel more than half the length of the scape. Palpi slender, yellow. Proboscis shorter than the head. Thorax gray yellow pollinose with whitish yellow pubescence and pile. Abdomen brown yellow; the hind margins of the segments appear lighter due to yellowish pubescence. Wings hyaline, except the yellow stigma and costal area; no stump at the bifurcation of vein R4+5. Halteres brown yellow. Legs uniformly brown yellow.

Male: Similar to the female in all respects except for sex characters and more dense pubescence and pilosity.

Comparative notes: Separated from all other eastern species by its yellow color. From B. ruficornis (Big.), a western species, it is easily distinguished by the absence of a stump at the bifurcation of vein R4+5 and the pedicel being more than half as long as the scape.

Type data: Described from two females and one male, Kentucky and New York. Two females in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: New Jersey: Delaware Water Gap,  
July 12, 1898.

Maryland: Beltsville, June 25, 1915.

District of Columbia: Dalecarlia Re-  
servoir, June 14,  
1914.

Virginia: Suffolk, June 11, 1895.

Reported by others from the following general  
localities:

UNITED STATES: New York; New Jersey; Maryland;  
Virginia; Kentucky.

Buplex rasa (Loew) (1869)

- 1869 Pangonia rasa Loew, Cent., VIII, 7; Wis.  
1875 P. rasa Osten Sacken, Prodrôme, I, 366; N.Y., Ill.  
1887 P. rasa Williston, Trans. Kans. Acad. Sci., X, 130; Conn.  
1901 P. rasa Hine, Ohio Nat., II, 169.  
1903 P. rasa Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5, 45; Ohio.  
1913 P. rasa Graenicher, Bull. Wis. N.H. Soc., X, 171; Wis.  
1918 P. rasa McAtee and Walton, Proc. Ent. Soc. Wash., XX, 191; Md.  
1920 P. rasa Britton, Bull. Conn. St. Geol. N.H. Surv., XXXI,  
Conn.  
1924 Buplex rasa Bequaert, Psyche, XXXI, 33.  
1925 B. rasa Johnson, Occ. Pap. Bost. Soc. N.H., VII, 98; N. Eng.  
1928 B. rasa Leonard, N.Y. State List, p. 754; N.Y.  
1931 B. rasa Philip, Minn. Tech. Bull. LXXX, 95; Minn.

The following also refers to this species:

- ?1905 Pangonia tranquilla Washburn, 10th Rept. State Ent.  
Minn., 79; Minn.

Color: Brown; hind margins of abdominal segments pale; pubescence and pilosity light gray.

Size: Length, 10.5 - 14 mm.

Structural and color characters: Female: Vertex, fronto-clypeus and genae pale gray pollinose. Scape, pedicel and extreme base of flagellum yellow brown or reddish, apical portion of flagellum fuscous. Palpi slender, yellow. Proboscis about equal to the length of the head, distinctly less than the width. Genae and post genae gray white pilose. Dorsum of thorax and scutellum brown with gray pruinosity, the former with alternate light and dark stripes; pleurae and venter gray pruinose, the former densely pale gray pilose. Abdomen chestnut brown, light gray pubescent, especially on the whitish hind margins of the segments. Halteres fuscous. Wings sub-hyaline; stigma brown and a suggestion of dilute yellow in the costal areas; no stump at the bifurcation of vein R4+5. Legs ferruginous; the coxae and femora with white pile, the tibiae and tarsi with short black pubescence.

Male: Somewhat darker than the female; the costal areas of the wings more distinctly yellow and the legs darker; in other respects, except for sex characters, very readily associated with the female.

Comparative notes: Separated from B. tranquilla (O.S.) according to the key. In addition the palpi are more yellow, the costal cell of the wing more dilute yellow,

and the general color chestnut brown as opposed to the fuscous and yellow brown of B. tranquilla.

Type data: Described from the female with Wisconsin as the type locality. In the Museum of Berlin.

Distributional data:

CANADA: Quebec: Isle of Montreal, July 1, 1900.

UNITED STATES: Massachusetts: Chelsea Aug. 28, 1929;  
Dover, Aug. 8, 1925.

Connecticut: Colebrook, Aug. 10, 1922.

New York: Ithaca, Aug. 14, 1894;  
McLean, July 17, 1929.

Ohio: Summit Co., Aug. 21, 1904;  
Wauseon, Aug. 29, 1920;  
Jackson Co., Aug. 30, 1931;  
Ira.

Illinois: Algonquin, July 24, 1902.

Reported by others from the following general localities:

UNITED STATES: Maine; New Hampshire; Massachusetts;  
Connecticut; New York; New Jersey;  
Maryland; Ohio; Wisconsin; Illinois.

Buplex ruficornis (Bigot) (1892)

- 1892 Corizoneura ruficornis Bigot, Mem.Soc.Zool.France,  
V,615;Calif.  
1904 Pangonia ruficornis Hine, Ohio Nat.,V,228;Calif.  
1921 Corizoneura ruficornis Surcouf, Gen.Ins.,CLXXV,134.

Color: Yellow.

Size: Length, 12 - 14 mm.

Structural and color characters: Female: Vertex concave anteriorly, yellow pollinose; fronto-clypeus and genae yellow pollinose. Antennae yellow, the pedicel not more than half the length of the scape. Palpi attenuate, yellow. Proboscis less than the length of the head. Thorax gray yellow pollinose with yellow pubescence and pilosity. Dorsum of abdomen brown yellow; venter variable, usually yellow with the apical segments blackish with yellow hind margins. Halteres yellow. Wings hyaline, yellow along the costal areas; a stump at the bifurcation of vein R4+5. Legs uniformly yellow.

Male: Like the female except the usual sex characters and more dense pubescence and pilosity.

Comparative notes: A distinct western species. Separated from B. pigra (O.S.) according to the key. Also see under description of that species. In addition B. ruficornis is somewhat larger and more slender and the anterior vertex is noticeably concave.

Type data: Described from two males, California.

In the British Museum.

Distributional data:

UNITED STATES: Wyoming: Yellowstone, August.

California: Cuyamaca Lake, July 6,  
1929; Los Angeles Co.,  
May; Dulzura, June 14,  
1917; Calaveras Co.,  
Palo Alto, July 27, 1891;  
Fredalba, July 21, 1912.

Reported by others only from California.

Buplex tranquilla (Osten Sacken) (1875)

- 1875 Pangonia tranquilla Osten Sacken, Prodrôme, I, 367;  
Que., Mass., N.H., Pa.  
1887 P. tranquilla Williston, Trans. Kans. Acad. Sci., X,  
130; N.Y.  
1902 P. tranquilla Howard, Ins. Book, pl. XVI, f. 7.  
1915 P. tranquilla Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
XLVI, N.S.  
1916 P. tranquilla Gibson, Ent. Rec., Rept. Ent. Soc. Ont.,  
XLVII, Que.  
1921 Corizoneura tranquilla Surcouf, Gen. Ins. CLXXV, 134.  
1924 Buplex tranquilla Bequaert, Psyche, XXXI, 33.  
1925 B. tranquilla Johnson, Proc. Bost. Soc. N.H., XXXVIII,  
68; N.J.  
1925 B. tranquilla Johnson, Occ. Pap. Bost. Soc. N.H., VII, 99;  
N. Eng. List.  
1927 B. tranquilla Johnson, Ins. Mt. Des. Reg., p. 179.  
1928 B. tranquilla Leonard, N.Y. State List, p. 754; N.Y.

Color: Yellow brown; the abdomen more or less pre-  
dominated with fuscous.

Size: Length, 10.5 - 14.5 mm.



Structural and color characters: Female: Vertex, fronto-clypeus and genae, yellow gray pollinose. Genae and post-genae yellowish pilose. Palpi slender, ferruginous with a little fuscous showing through. Antennae black; sometimes the base of the flagellum reddish. Proboscis not usually longer than the head, always less than the width of the head. Dorsum of thorax and scutellum fuscous, gray pruinose, the former with alternate light and dark stripes; pleurae and venter gray pollinose, the former densely yellow pilose. Dorsum of abdomen yellow brown on the sides, especially on tergites II and III, and sometimes IV; elsewhere fuscous, the tergites with yellowish hind margins. Venter of abdomen usually with segments II and III yellow brown and the remaining segments fuscous with yellow hind margins. Entire abdomen yellow pubescent, especially the hind margins of the segments. Halteres fuscous. Wings sub-hyaline; the stigma brown and costal cells yellow; bifurcation of vein R4+5 without a stump. Legs black; the femoro-tibial joints and basal portions of tarsal segments, red brown; sometimes the basal portion of the front tibiae and entire middle and hind tibiae red brown. Male: Similar to the female except for sex characters and generally darker.

Comparative notes: Separated from B. rasa (Loew) according to key characters. Also see under description of B. rasa. In addition the antennae of B. tranquilla are almost entirely black and the proboscis frequently longer in proportion to the head.

Type data: Described from one male and two females.

Habitat given as Canada, Massachusetts, White Mountains and Middle States. The three type specimens are in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Distributional data:

UNITED STATES: Maine: Mt. Cadillac, Mt. Desert, Aug. 17, 1920; Bar Harbor, July 25, 1916.

New Hampshire: Alstead, Aug. 8, 1904; Durham; Franconia.

Vermont: Rutland, Aug. 15, 1916.

Connecticut: Colebrook.

New York: Old Forge, July 13-19, 1905, Aug. 12, 1905; Minerva; Elka Park, Aug. 10, 1917; McLean, July 23, 1919; Cranberry Lake, July 23, 1918, July 22-23, 1919.

Michigan: Douglas Lake, Aug. 4, 1924.

Reported by others from the following general localities:

CANADA: Nova Scotia; Quebec.

UNITED STATES: Maine; New Hampshire; Massachusetts;  
New York; Pennsylvania; Michigan.

Goniops Aldrich (1892)

1892 Goniops Aldrich, Psyche, VI, 236.

Generic characters: Eyes bare, holoptic in the male, dichoptic in the female, in the latter very small and narrow, acutely angulate above, the width of one being less than that of the broad vertex. Ocelli present. Vertex broad, gradually convergent above. Antennal prominence conspicuous, slightly exceeding the fronto-clypeus. Flagellum of antennae eight segmented, the basal segment more or less disc-shaped. Palpi at least three-fourths the length of the proboscis which is distinctly shorter than the head. Cell R5 of the wings broadly open.

Genotype: Pangonia chrysocoma Osten Sacken (1875)

Remarks: Up to the present this genus is represented by one species only. It is doubtful whether or not the infuscation of the anterior portion of the wings is of any generic value.

Goniops chrysocoma (Osten Sacken) (1875)

- 1875 Pangonia chrysocoma Osten Sacken, Prodrôme, I, 368; N.Y.  
 1887 P. chrysocoma Williston, Trans. Kans. Acad. Sci., X,  
 130; N.Y.  
 1900 Goniops chrysocoma Hine, Ent. News, XI, 392 (syn.);  
 N.Y., Pa., Del., Ohio.  
 1901 G. chrysocoma Hine, Ohio Nat., II, 168.  
 1903 G. chrysocoma Hine, Ohio St. Acad. Sci. Spec. Pap. No. 5,  
 46; Ohio.  
 1903 G. chrysocoma Malloch, Bull. Ill. State Lab. N.H., XII,  
 356.  
 1908 G. chrysocoma Walton, Ent. News, XIX, 464, (biol.); Pa.  
 1911 G. chrysocoma McAtee, Proc. Ent. Soc. Wash., XIII, 21-29,  
 (biol.); Md.  
 1918 G. chrysocoma McAtee and Walton, Proc. Ent. Soc. Wash.,  
 IX, 191; D.C.  
 1920 G. chrysocoma Marchand, Mon. Rock. Inst., p. 56.  
 1921 G. chrysocoma Surcouf, Gen. Ins., CLXXV, 104.  
 1928 G. chrysocoma Leonard, N.Y. State List, p. 754; N.Y.  
 1930 G. chrysocoma Schwardt and Hall, Bull. 256, Ark. Exp.  
 Sta., p. 26; Ark.  
 1930 G. chrysocoma Stone, Ann. Ent. Soc. Am., XXIII, 293; (biol.)  
 N.Y.

The following also refers to this species:

1892 Goniops hippoboscoides Aldrich, Psyche, VI, 236; Pa.

Color: Female, straw yellow; male, dark brown; large anterior portion of wings infuscated.

Size: Length, 9.5 - 14 mm.

Structural and color characters: Female: Vertex, genae, and occiput yellow pollinose, the first more or less denuded on the disc. Fronto-clypeus yellow bare. Palpi and antennae yellow the former with conspicuous black pubescence. Proboscis brown yellow. Entire body straw yellow with pale yellow pubescence and pile in the usual regions, that of the abdominal dorsum most dense at the posterior margins of the

segments. Halteres yellow. Wings infuscated as follows: Cells R, 2d M and 1st A except at their extreme bases and a small round hyaline spot in cell 2d M at the bifurcation of vein M, also the apical portion of cell 1st A is more or less hyaline along vein 2d A; cell R1 apically from the yellow stigma; cells R3 and R4 entirely, except for a sub-hyaline area along the apical portion of the latter; the proximal half of cell R5 (in this cell the color is solid up to the bifurcation of veins M1 and M2 from which it extends across to the bifurcation of vein R4+5, thence tapering along vein R5); the proximal third of cell 1st M2; the extreme base of cell M3; the basal portion of cell Cu1 and tapering along vein Cu2. Legs pale yellow; apical tarsal segments darker.

Male: Antennae yellow with long black hairs on the two basal segments; palpi and proboscis brown, the former with long black hairs; genae and fronto-clypeus fulvous brown pollinose with fulvous pile. Dorsum of thorax and scutellum fuscous with sparse pale yellow pubescence and long dark pile, the former with two faint pale stripes most apparent anteriorly; pleurae and venter gray brown pruinose with pale yellow and some black pile. Dorsum of abdomen fuscous with black

pubescence, the hind margins of the segments yellow with yellow pubescence. Venter light brown with yellow pubescence, the apical segments somewhat darker on their discs. Halteres yellow. Wings like the female except that the infuscation is darker and the costal cell is yellow except at the base. Legs yellow; the apical two segments of the front and hind tarsi, fuscous.

Remarks: This most interesting species (the only one of its genus) is so well known and so distinct that it need be discussed no further within the scope of this paper.

Type data: I have seen the type female in the Museum of Comparative Zoology, Cambridge, Massachusetts. It is somewhat faded, but otherwise in excellent condition. Osten Sacken gives as the habitat the Middle States; Trenton Falls, New York and Delaware. According to the author a type male is in the Museum of the Entomological Society of Philadelphia.

Distributional data:

UNITED STATES: Pennsylvania: Inglenook, June 27; Allegheny Co.; Jeanette.

Ohio: Lawrence Co., June 26, 1932; Hocking Co., July 4, 1931; Cincinnati, June 13-14, 1902; Summit Co.; Georgesville, June 18, 1909.

Arkansas: Fayetteville, May 19-22,  
1932.

Reported by others from the following general  
localities:

UNITED STATES: New York; New Jersey; Delaware;  
Maryland; District of Columbia;  
Pennsylvania; Ohio; Arkansas.

Apatolestes Williston (1885)

1885 Apatolestes Williston, Entom.Amer., I, 12.

Generic characters: Eyes bare, contiguous in the  
male, broadly separated in the female. Ocelli pre-  
sent. Vertex broad. Flagellum of antennae eight-  
segmented. Proboscis shorter than the head, scarcely  
longer than the palpi. Wings with a stump at the bi-  
furcation of vein R4-5.

Genotype: Apatolestes comastes Williston (1835)

KEY TO SPECIES

- |   |   |
|---|---|
| 1. File of head, thorax and front coxae<br>white; palpi light . . . . .                           | 2 |
| File of head, thorax and front coxae black,<br>with some fulvous intermixed; palpi dark . . . . . | 4 |

2. Gray black; vertex shining black, inflated above the antennae like a frontal callosity; femora mostly black; length not exceeding 11 mm. . . . . 3

Gray brown; vertex not shining, more or less fulvous pruinose, no callosity-like area; femora light brown; length 14 mm.

albipilosa n.sp.

3. Antennae yellowish, apex of the flagellum black, palpi with pale pubescence; costal cell of the wings hyaline . . . . comastes Will.

Antennae black; palpi with black pubescence; costal cell of the wings yellow . . . . . comastes willistoni n.var.

4. Shining black species; vertex shining black, inflated above the antennae like a frontal callosity; abdominal tergites without light hind margins . . . . . ater n.sp.

Dull black species; vertex not shining, fulvous pollinose about the edges, no callosity-like area; abdominal tergites with gray hind margins . . . . . hinei n.sp.

Apatolestes albipilosa new species.

Color: Light brown with some gray pruinosity; wings lightly fumose, most saturate at the costal margin and along the veins.

Size: Length, 14 mm.

Structural and color characters: Female: Vertex light brown with some yellowish pollen; genae and fronto-clypeus grayish yellow pollinose with little black and much whitish pile. Antennae yellow except



the black at the apex of the flagellum. Palpi yellow with black pubescence. Thorax and scutellum light brown with a gray pruinosity, the former with obscure stripes on the dorsum. Abdomen light brown, gray pruinose, with light gray posterior margins on all segments. Wings pale fumose, most saturate at the costal area and along the veins; an appendage at the bifurcation of vein R4+5. Legs light brown with intermixed black and whitish pubescence; the front coxae with white pile.

Comparative notes: Separated from A. hinei n.sp. as indicated under that description.

Type data: Holotype, female; Lemon Cove, California; July 26, 1929; R. H. Beamer. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Apatolestes ater new species.

Color: Shining black.

Size: Length, 13 mm.

Structural and color characters: Female: Vertex shining black with traces of gray pollen, the anterior vertex inflated thus forming a broad quadrate

area similar to a frontal callosity. Ocelli white. Fronto-clypeus and genae grayish pollinose with brown gray pile. Antennae black, scape and pedicel gray pollinose with black pubescence. Palpi appear black, although the ground color is somewhat reddish, with dense black pubescence. Thorax and scutellum black, the former with faint streaks of gray on the dorsum; pleurae with blackish pile. Abdomen black, the posterior margins of the segments scarcely differentiated as to color. Wings fumose, costal cell and stigma brown; an appendage at the bifurcation of vein R4+5. Legs black.

Male: Similar to the female except for sex characters. Frontal triangle fulvous pruinose. The large facets occupy the upper three-fourths of the eyes.

Comparative notes: The shining black appearance of A. ater should be sufficient to separate it from the other species of Apatolestes. The vertex resembles that of A. comastes Will., but the dark pile of the facial regions is distinctive, as well as its larger size. The male is readily separated from that of A. hinei n.sp. by the abdominal tergites which lack pale hind margins.

Type data: Holotype, female; San Diego, California; July 7, 1929; Paul W. Oman. Allotype, male; Claremont,



brown; a stump at the bifurcation of vein R4+5.

Legs light brown and black, the latter distributed as follows: Front and hind coxae and femora, front tarsi and sometimes the apex of the front tibiae, and a little on the middle femora. The front coxae are covered with grayish pollen and white pile.

Male: Unknown.

Comparative notes: The gray black or bluish gray color is characteristic for this species. This along with the white hind margins of the abdominal tergites and the shining black inflated anterior vertex permits ready separation. See also under descriptions of A. ater and A. hinei, new species.

Remarks: In the series of A. comastes which I have for study I find two distinct forms, one of which differs sufficiently from the type so that it deserves varietal rank. See under description of A. comastes willistoni n. var.

Type data: Described from two females from California. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Distributional data:

UNITED STATES: California: Lemon Cove, July 26, 1929; Three Rivers, Aug. 1, 1929; Marin Co., Aug. 3, 1929; California, "Baron".

Reported by others from the following general localities:

UNITED STATES: California; Arizona.

Apatolestes comastes willistoni n.var.

Color: Gray black.

Size: Length, 8 - 11 mm.

Structural and color characters: Female: Similar to A. comastes Will. with the following differences: The costal cell of the wing is yellow; the antennae are wholly black, sometimes the scape and pedicel with some grayish pruinosity; palpi with black pubescence and a little white intermixed. The legs are predominantly black; basal half of front tibiae, basal three-fourths of middle and hind tibiae, basal segments of middle and hind tarsi, light brown.

Type data: Holotype, female; San Diego County, California; July 7, 1929; Paul W. Oman. Paratypes, eight females, San Jacinto Mts., California, July 21, 1929; R. H. Beamer, Paul W. Oman, and L. D. Anderson; eight females, San Diego County, California; R. H. Beamer, Paul W. Oman, and L. D. Anderson; two females Big Bear Lake, California, July 26, 1932, J.D. Beamer;

one female, Laguna Mts., California, July 6, 1929;  
R. H. Beamer.

Apatolestes hinei new species

Color: Gray brown; abdominal segments with pale posterior margins.

Size: Length, 12 - 14 mm.

Structural and color characters: Female; Posterior vertex brown with a trace of gray yellow pollen; anterior vertex, frons, fronto-clypeus and genae pollinose, these last two with fulvous and black pile. Scape and pedicel reddish or yellowish with black hairs; flagellum black apically, at its base reddish. Palpi, concolorous with basal antennal segments, with long black pubescence. Dorsum of thorax, scutellum, pleurae and venter brown gray pollinose; the first with obscure stripes of alternate gray and brown. Abdomen gray brown with blackish pile; the posterior margins of all segments conspicuously pale yellow gray with whitish pile. Wings fumose, sub-costal cell, stigma and veins light brown; an appendage at the bifurcation of vein R4+5. Legs brown with black hairs; anterior coxae, femora, and apical portions of tarsi nearly fuscous.

**Male:** Like the female except for sex characters. More densely pilose about the head, thorax, and pleurae. The large facets distinctly differentiated from the small ones occupy about the upper three-fourths of the eyes.

Comparative notes: The general aspect of this species is that of a large A. comastes Will., however, the different color, large size, more fumose wings, absence of a shining black area on the anterior vertex, yellowish facial regions with fulvous pile, readily separate these two. A. hinei is more nearly related to A. albipilosa, but the latter exhibits a lighter brown color throughout, the pilosity of the head and thorax is mostly white and the front femora and coxae are concolorous with the remainder of the legs.

Type data: Holotype, male; San Jacinto Mts., July 21, 1929; Paul W. Oman. Allotype, female; same locality and date; R. H. Beamer. Paratypes, two males, same data as holotype and allotype respectively; three females, same data; one female, Alpine, California, July 9, 1929; Paul W. Oman. In the Francis Huntington Snow Entomological Collection, of the University of Kansas.

Scaptia Walker (1850)

- 1850 Scaptia Walker, Ins.Saund.,Dipt.,I,p.8.  
 1850 Csca Walker, Ins.Saund.,Dipt.,I,p.10.  
 1863 Diatomineura Rondani, Archiv.Zool.Anat.Fisiol.  
 Canestrini,III,p.84.  
 1922 Pseudoscaptia Enderlein, Mitt.Zool.Mus.Berlin,X,2,338.

Generic characters: Eyes hairy, at least in the male, dichoptic in the female, holoptic in the male. Ocelli present. Flagellum of antennae eight-segmented. Proboscis of variable length not longer than the head, usually shorter.

Genotype: Pangonia aurata Macquart (1838)

## KEY TO SPECIES

1. Wings black . . . . . jonesi (Cresson)  
 Wings sub-hyaline . . . . . 2
2. Brown yellow species, palpi slender  
californica (Bigot)
- Grayish species, palpi short  
 and stubby . . . . . hera (O.S.)

Scaptia californica (Bigot) (1892)

- 1892 Diatomineura californica Bigot, Mem.Soc.Zool.  
 France,V,618;Col.

The following also refer to this species:



- 1887 Pangonia dives Williston, Trans.Kans.Acad.Sci.,X,  
130, (preoc.);Wash.,Col.  
1904 P. dives Hine, Ohio Nat.,V,227;D.californica Big.  
a syn.  
1921 Diatomineura dives Surcouf, Gen.Ins.,CLXXV,131.  
1921 D. dives Cole and Lovett, Proc.Cal.Acad.Sci.,XI,  
232;Ore.

Color: Brown yellow; the anterior margins of the abdominal tergites more or less fuscous.

Size: Length, 13 - 16 mm.

Structural and color characters: Female: Vertex, fronto-clypeus and genae fulvous pollinose; genae and post-genae whitish yellow pilose. Palpi slender, orange yellow with black hairs. Antennae orange yellow except the black apical half of the flagellum, the scape and pedicel with black hairs. Dorsum of thorax and scutellum fulvous pollinose, yellow pubescent; pleurae and venter grayish pruinose with yellow to white yellow pile. Dorsum of abdomen brown yellow; the broad anterior margins of tergites I and IV to VII fuscous; tergites II and III with a small fuscous median spot, rarely their whole anterior margins fuscous; apex, sides and discs of tergites with black pubescence, the hind margins of the segments yellow pubescent. Venter of abdomen variable; usually brown yellow at the base and fuscous apically, sometimes almost entirely fuscous with yellow at the sides near the base and on the hind margins of the

segments. Halteres brown. Wings sub-hyaline, the costal cell yellow; a stump at the bifurcation of vein R4+5. Legs ferruginous; the front coxae, apex of front tibiae and entire tarsi, bases of all femora, apical segments of middle and hind tarsi, fuscous.

**Male:** Like the female except for sex characters.

**Comparative notes:** A distinct western species.

Separated from congeneric species according to the key and from Buplex fera Will. and others of that genus which it superficially resembles by the pubescent eyes, shorter proboscis, etc.

**Remarks:** Hine (1904) has indicated the synonymy of Pangonia dives Will. (1887) and Diatomineura californica Bigot (1892). However, there is an earlier Pangonia dives of Macquart (1857), Dipt. Exot., Suppl. I, p. 25. Therefore Bigot's name must stand.

**Type data:** Described from California. In the British Museum. I have studied the Williston types of Pangonia dives, two females and one male, California, in the Francis Huntington Snow Entomological Collection of the University of Kansas.

**Distributional data:**

UNITED STATES: Utah: Salt Lake City, July 3, 1931.

Oregon: Hood River, July 17, 1931.

California: Giant Forest, July 28,  
1929.

Reported by others from the following general  
localities:

UNITED STATES: Washington; Oregon; California.

Scaptia hera (Osten Sacken) (1877)

- 1877 Pangonia hera Osten Sacken, West. Dipt., 214; Calif.  
1904 P. hera Hine, Ohio Nat., V, 227.  
1921 Diatomineura hera Surcouf, Gen. Ins., CLXXV, 130.  
1925 Apatolestes hera Parker, Proc. Ent. Soc. Wash., XXVII,  
195; Calif.

Color: Gray black.

Size: Length, 12.5 - 14 mm.

Structural and color characters: Female: Vertex  
(except a broad denuded brown mid-streak), genae and  
fronto-clypeus, gray white pollinose; the genae and  
post-genae with white and a little black pile. Palpi  
short, stubby, gray yellow, with black and white hairs.  
Flagellum of antennae black; scape and pedicel gray  
yellow with black hairs. Dorsum of thorax and scu-  
tellum black, gray pruinose, white pubescent, the  
former with faint stripes; pleurae and venter gray  
pruinose, the former with white pile, and on the  
humeri some black. Abdomen gray pollinose with black  
and white pubescence, the former dominant along the

sides, apex and discs of the tergites, the latter conspicuous on the whitish hind margins of the segments; a ferruginous ground color shows through the pruinosity on the venter near the base. Halteres yellow brown. Wings sub-hyaline; the bifurcation of vein R4+5 with a stump. Legs fuscous; basal portion of front tibiae, middle and hind tibiae and metatarsi, ferruginous.

Male: I have one doubtful specimen in poor condition that conforms to the description of the female fairly well, but the eyes are just barely pubescent.

Comparative notes: This species has the aspect of an Apatolestes but differs primarily by the pubescent eyes. The short stubby palpi and general color will easily distinguish S. hera from S. californica (Bigot) and from S. jonesi Cresson. S. hera is readily distinguished by the relatively hyaline wings.

Remarks: The true status of this species is doubtful. I have a note taken from the card catalog of Dr. J. M. Aldrich (in which the species is assigned to Apatolestes) as follows: "Nov. 29, 1917; Hine says it goes here; Henry Edwards' two types are in the American Museum and he has studied them." I fail to grasp the significance as regards the disposition of the types. See under type data.

Type data: Described from one? female. In the Museum of Comparative Zoology, Cambridge, Massachusetts. I have studied this specimen. Osten Sacken (1877) states, "Habitat--San Francisco, California, caught in the street twice, by Mr. Henry Edwards in July. I have a single female."

Distributional data:

UNITED STATES: California: Los Angeles Co., July; Pasadena, June 8, 1895.

Reported by others from California only.

Scaptia jonesi (Cresson) (1919)

1919 Silvius jonesi Cresson, Proc.Acad.N.S.Phil.,175; Calif.

I have not seen this species. However, it may be of interest to include the original description along with the notes which Dr. J. Bequaert made from the types.

Original description: In general appearance this interesting species does not suggest any affinity with gigantulus Loew, but more critical examination makes it reasonably certain that it belongs to a group including that species and is very distinct from any yet described, to my knowledge. It is much larger than that species and the abdomen has black or dark bases to all segments. The tibial and antennal

characters certainly place this species in Silvius, although in general appearance it suggests some of those in Pangonia. The eyes are uniformly green when moistened.

Male; black; antennae except four black terminal annuli of third joint, palpi, abdomen except dark bases of dorsal and ventral segments especially towards apex of abdomen, femora except bases, bases of tibiae tawny, or brown. Halteres pale. Wings blackish, more intense along costa. Subopaque. Yellow pruinose above, becoming gray below. All pile on head and thorax yellow and rather abundant, also on the narrow apices of abdominal segments; the broad bases of the segments with appressed black pile, similar on venter. Femora with pale pile which on the tibiae becomes darker. Pile on first antennal joint and base of palpi, yellow; on second, and apices of palpi, black. No mesonotal vittae. No denuded areas on face. Proboscis not longer than head, and palpi is slightly more than half as long as proboscis. First antennal joint twice as long as second; third twice as long as first and second together; the thickened basal annulus nearly broad as long, the following annuli together as long as the basal one. Neuration as in gigantulus. Length, 17 mm.

**Female:** Similar but frons twice as broad as width of antennae entirely pruinose, Mesonotum more grayish.

**Type.--Male;** Keddie, Plumas County, California, July 6, 1918, (F. M. Jones), (A.N.S.P. No.61977).

**Paratype.** One female; topotypical.

**Bequaert's notes:** Type male and allotype female. A large Pangonia-like species, but the third antennal segment five-jointed only, the basal portion (or first segment) being superficially divided into four parts (then eight joints in all). The two basal antennal segments as in Pangoniinae. The antennae are more like those of Tabanus than any other Pangoniinae known to me. There are two very long spurs on the hind tibiae. In the male the eyes are distinctly hairy, in the female they are bare. The face is short convex (not snout-like) and without shiny callosities. Ocelli present. Frons without callosity. Proboscis about as long as height of head. Palpi slender and narrowly pointed, longer than half the proboscis in female, in the male very little shorter than the proboscis. Anal cell closed; all posterior cells open. A distinct appendix to the upper branch of the fourth vein. Tarsi of male normal. In Enderlein's key it runs to Silviini, but it is certainly not a Silvius. I regard it as an

aberrant species of Scaptia, in which the divisions of the base of the third segment of the antenna are more fused than usual in the genus and the eyes are hairy in the male only.

Bequaertomyia new genus

Structural characters: Hind tibiae with apical spurs; vein 2d A sinuous, all marginal cells open; eyes densely pubescent in both sexes; ocelli present; vertex of the female broad; flagellum of the antennae eight-segmented; fronto-clypeus very prominent; proboscis much shorter than the head; palpi short, arcuate, pointed. The abdominal segments of the female caudad from V are narrowed and laterally compressed, when completely exerted appear to be modified for oviposition.

Comparative notes: The sinuous anal vein would place this genus in the subfamily Coenomyiinae of Bequaert (1930), but until further study gives more evidence to the contrary, I prefer to include all North American genera of Tabanidae with apical spurs on the hind tibiae in the subfamily Pangoniinae. Bequaertomyia has no close relatives in North America, however, its general aspect would indicate affinities with the



Chilean genus Coenura Bigot, from which it differs in the pubescence of the eyes and the palpi which are pointed at the ends and not scooped out. Coenomyia Latreille (not included in this paper for want of material and evidence) is the only other genus north of Mexico which Bequaert has assigned to his Coenomyiinae, but it is not sufficiently close to Bequaertomyia to necessitate calling attention to its distinctness. The sinuous anal vein should be sufficient to separate Bequaertomyia from Scaptia Walker.

Named in honor of Dr. J. Bequaert, who has contributed evidence to show that this genus and the genera Coenomyia Latreille, Coenura Bigot, and Pelecorhynchus Macquart form a transitional group between the Leptidae and Tabanidae.

I hereby designate the following species Bequaertomyia anthracina, new species, as the genotype.

Bequaertomyia anthracina new species

Color: Coal black, wings fumose, Antennae and palpi orange.

Size: Length, 13 - 15 mm; length of wing 12 - 13 mm; width of vertex barely 1 mm.

Structural and color characters: Female: Dense black pilose. Head scarcely as broad as the thorax. Eyes pubescent, broadly separated by the vertex. Antennae orange; the scape and pedicel of equal length, together about as long as the first segment of the flagellum. Vertex with a slightly convex shining black quadrate callus-like area, broader than long. Posterior vertex somewhat hollow; ocelli yellowish, mounted on a high gray pollinose tubercle. Fronto-clypeus shining black, prominent, globose, somewhat covered by gray pollen near the oral margin. Frons and genae gray pollinose. Proboscis very short, about one-half the length of the head; labellae large and fleshy. Palpi short, arcuate, pointed; orange with long black pile. The black of the dorsum of the thorax with dark gray pollen; the distinctly projecting humeral callus orange. Scutellum, pleural and sternal regions shining black. Halteres orange. Abdomen broad at base, shining black. Wings fumose with a yellowish tinge at the base, most saturate along the costal area and in cells R and R1; veins light brown to orange. Legs black, the usual basal portions of the tibiae and tarsi lighter, nearly a dull red

brown, especially noticeable in the posterior tibiae. Male: Like the female except for the usual sex characters. The eyes are contiguous, the pubescence and pile longer and more dense producing a shaggy appearance. Abdomen gradually tapering from its base.

Type data: Holotype: Male, Signal Park, Washington; July 4, 1930; A. R. Rolfs. Allotype: Female, Giant Forest, California; July 28, 1929; R. H. Beamer.

Paratypes: Three females, Giant Forest, California; July 28, 1929; R. H. Beamer, L. D. Anderson, and Paul W. Oman, respectively. In the Francis Huntington Snow Entomological Collection of the University of Kansas.

Species reported from North America north of Mexico not included within this paper because of insufficient or no evidence for identification:

Chrysops cincticornis Walker (1848) List, I, 201; N.A.?

Chrysops sepulcralis (Fabricius) (1794) Ent. Syst. IV,  
Europe.

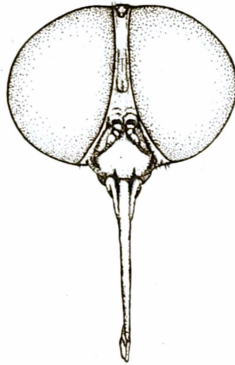
Pangonia macroglossa Westwood (1835) Lond. and Edinb.  
Philos. Mag., ser. 3, VI, Ga.

Corixoneura velutina Bigot (1892) Mem. Soc. Zool. France,  
V, 615; Calif.

EXPLANATION OF PLATE I

1. Esenbeckia incisuralis (Say) female, anterior aspect of head.
2. Chrysops beameri n.sp., female, anterior aspect of head. Typical for a large group in which the vertex is longer than broad.
3. Scaptia californica (Bigot), female, anterior aspect of head. Drawn from Williston's type of Pangonia dives.
4. Chrysops latifrons n.sp., female, anterior aspect of head. Typical for a small western group in which the vertex is broader than long.
5. Bequaertomyia anthracina n.g., n.sp., portion of wing showing wavy anal vein.
6. Chrysops brunneus Hine, male, anterior aspect of head.
7. Bequaertomyia anthracina n.g., n.sp., female, dorsal view of abdomen with caudal segments completely exerted.
8. Chrysops clavicornis n.sp., male, anterior aspect of head. Typical of a small western group in which the eyes of the male are not absolutely contiguous.
9. Bequaertomyia anthracina n.g., n.sp., female, lateral aspect of head.
10. Goniops chrysocoma (Osten Sacken), female, anterior aspect of head.
11. Apatolestes comastes Williston, female, anterior aspect of head. Drawn from the type.
12. Bequaertomyia anthracina n.g., n.sp., female, anterior aspect of head.

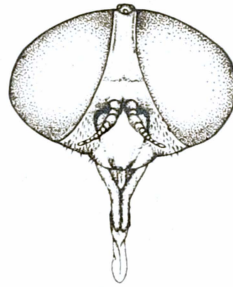
PLATE I



1 *E. incisuralis* (Say)



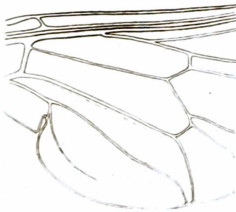
2 *C. beameri* n. sp.



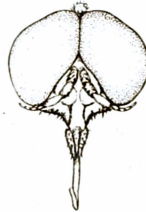
3 *S. californica* (Big.)



4 *C. latifrons* n. sp.



5 *B. anthracina* n. sp.



6 *C. brunnea* Hine



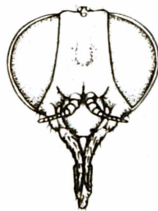
7 *B. anthracina* n. sp.



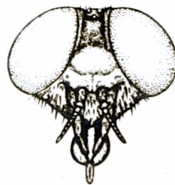
8 *C. clavicornis* n. sp.



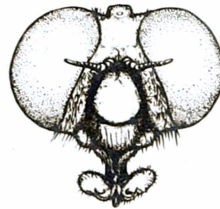
9 *B. anthracina* n. sp.



10 *G. chrysocoma* (O.S.)



11 *A. comastes* Will.



12 *B. anthracina* n. sp.

EXPLANATION OF PLATE II

13 to 24. Wing pictures drawn from typical females of the genus Chrysops.

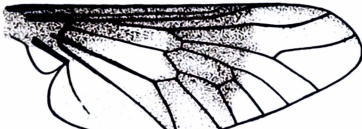
PLATE II



13 *C. fulvistigma* Hine



14 *C. euelux* Whit.



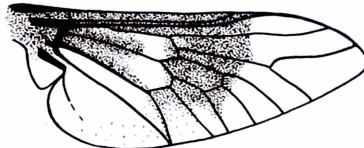
15 *C. sordida* O.S.



16 *C. niger* Macq.



17 *C. nigribimbo* Whit.



18 *C. mitis* O.S.



19 *C. celer* O.S.



20 *C. carbonaria* Walker



21 *C. excitans* Walker



22 *C. divisa* Walker



23 *C. noctifer* O.S.



24 *C. pertinax* Will.



EXPLANATION OF PLATE III

25 to 37. Wing pictures drawn from typical females of the genus Chrysops.

PLATE III



25 *C. brimleyi* Hine



26 *C. bishoppi* n. sp.



27 *C. surda* O. S.



28 *C. montana* O. S.



29 *C. proclivis* O. S.



30 *C. dimmocki* Hine



31 *C. delicatula* O. S.



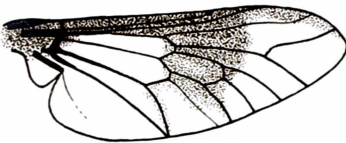
32 *C. sackeni* Hine



33 *C. callida* O. S.



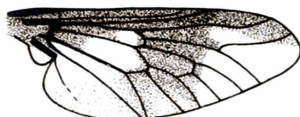
34 *C. coloradensis* Big.



35 *C. aestuans* Wulp



37 *C. furcata* Walker



36 *C. nigripes* Zetter.

EXPLANATION OF PLATE IV

38 to 49. Wing pictures drawn from typical females of the genus Chrysops.

PLATE IV



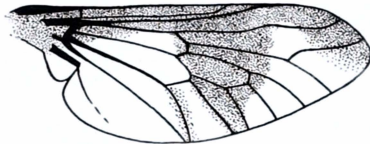
38 *C. shermani* Hine



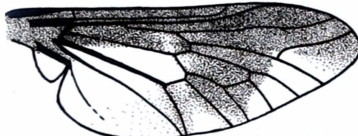
39 *C. striata* O. S.



40 *C. beameri* n. sp.



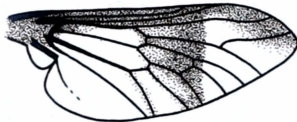
41 *C. pudica* O. S.



42 *C. inda* O. S.



43 *C. vittata floridana* John.



44 *C. cursim* Whit.



45 *C. geminata* Wied.



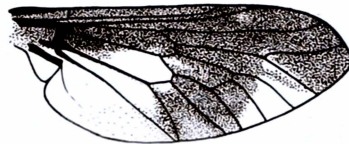
46 *C. lateralis* Wied.



47 *C. pikei* Whit.



48 *C. sequax* Will.



49 *C. vittata* Wied.

EXPLANATION OF PLATE V

50 to 63. Wing pictures drawn from typical females of the genus Chrysops. Figures 50, 52 and 58 from the types.

PLATE V



50 *C. obsoleta* Wied.



52 *C. wiedemanni* Kröber



54 *C. lugens* Wied.



56 *C. univittata* Macq.



58 *C. separata* Hine



60 *C. fuliginosa* Wied.



62 *C. frigida* O. S.



51 *C. parvula* Daecke



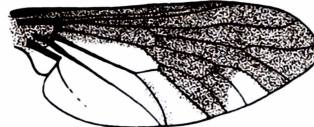
53 *C. ultima* Whit.



55 *C. hinei* Daecke



57 *C. dorsovittata* Hine



59 *C. moecha* O. S.



61 *C. amazon* Daecke



63 *C. bistellata* Daecke

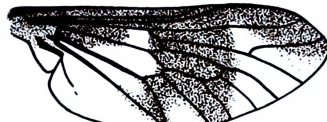
EXPLANATION OF PLATE VI

64 to 75. Wing pictures drawn from typical females of the genus Chrysops.

PLATE VI



64 *C. clavicornis* n. sp.



65 *C. coquilletti* Hine



66 *C. facialis* Towns.



67 *C. robusta* n. sp.



68 *C. pachycera* Will.



69 *C. flavida* Wied.



70 *C. fulvaster* O. S.



71 *C. virgulata* Bell.



72 *C. discalis* Will.



73 *C. dissimilis* n. sp.



74 *C. •latifrons* n. sp.



75 *C. brunnea* Hine



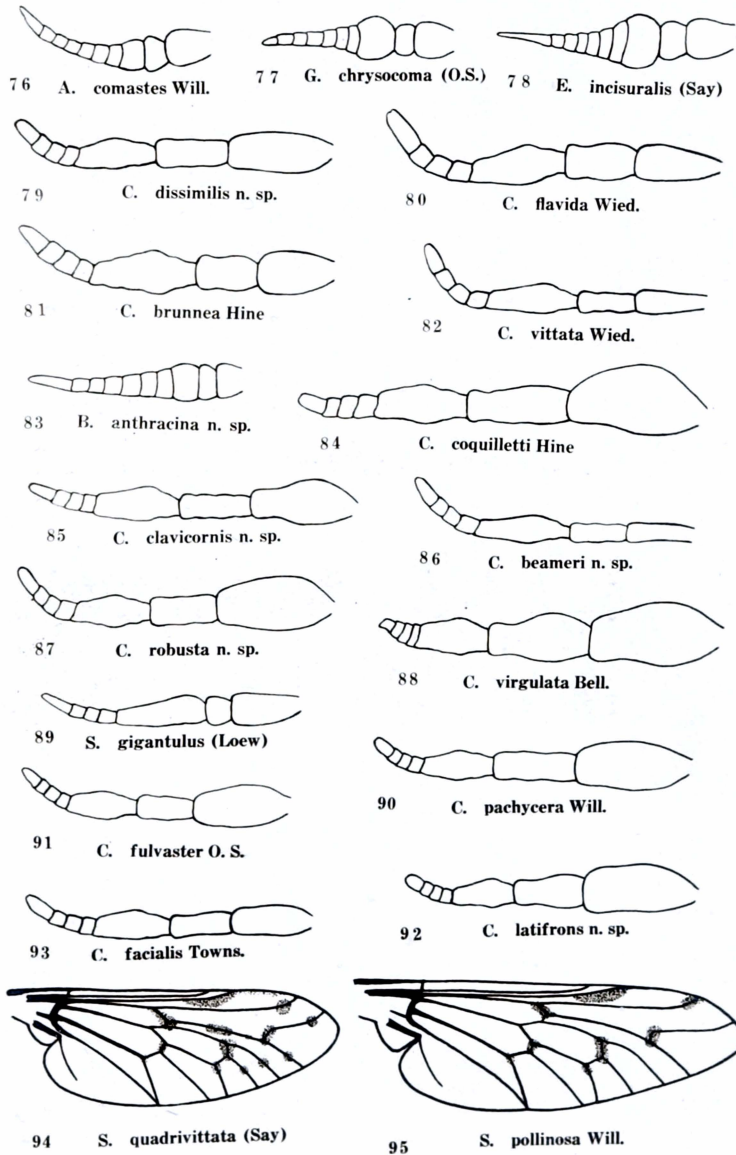
EXPLANATION OF PLATE VII

76 to 93. Lateral aspects of some typical pangoniine antennae, as labelled.

94. Wing of Silvius quadrivittatus (Say), showing typical distribution of spots.

95. Wing of Silvius pollinosus Williston, showing typical distribution of spots.

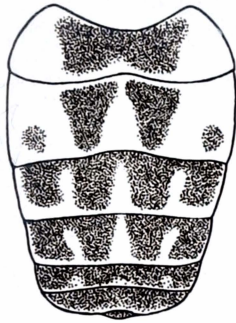
PLATE VII



EXPLANATION OF PLATE VIII

96. Chrysops clavicornis n.sp., female, dorsal abdominal pattern.
97. Chrysops robusta n.sp., female, dorsal abdominal pattern.
98. Chrysops bishoppi n.sp., female, dorsal abdominal pattern.
99. Chrysops pachycera Williston, female, dorsal abdominal pattern.
100. Chrysops pachycera Williston, male, dorsal abdominal pattern.
101. Chrysops clavicornis n.sp., male, dorsal abdominal pattern.
102. Chrysops coquilletti Hine, male, dorsal abdominal pattern.
103. Chrysops coquilletti Hine, female, dorsal abdominal pattern.
104. Chrysops robusta n.sp., male, dorsal abdominal pattern.
105. Chrysops furcata Walker, female dorsal abdominal pattern.

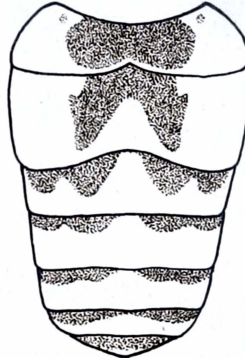
PLATE VIII



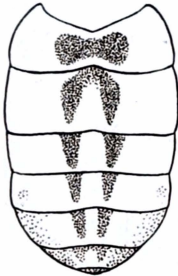
96 *C. clavicornis* n. sp.



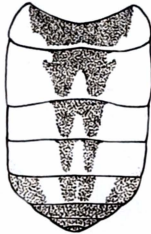
97 *C. robusta* n. sp.



98 *C. bishoppi* n. sp.



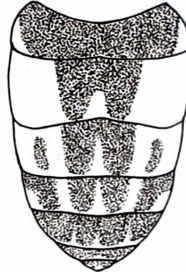
99 *C. pachycera* Will.



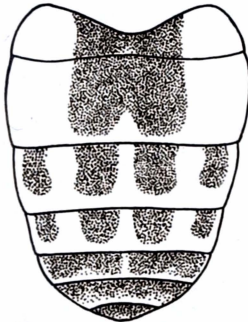
100 *C. pachycera* Will.



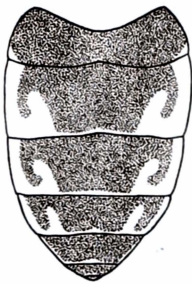
101 *C. clavicornis* n. sp.



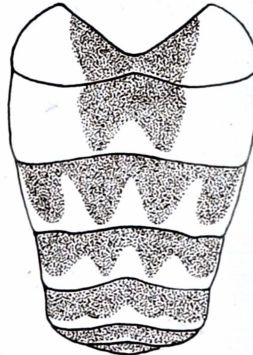
102 *C. coquilletti* Hine



103 *C. coquilletti* Hine



104 *C. robusta* n. sp.



105 *C. furcata* Walker