

FAMILY ANDRENIDAE

The bees in this family are small to medium size. The wings have either two or three submarginal cells. The mouth parts also vary as to length, the more usual condition being a short, pointed glossa and segments of the labial palpi about equal in length. The glossa sometimes is elongated, however, and the basal segments of the palpi also considerably lengthened in comparison with the apical segments. The presence of two subantennal sutures beneath each antennal fossa is a distinctive feature in this family, but is sometimes difficult to see in densely pubescent forms. Females have a distinct triangular pygidial area at the tip of the abdomen, and facial foveae usually are well developed. These characters are less evident or absent in the males.

The genus *Andrena* alone represents the subfamily Andreninae in the East, but in the West, two other genera, *Megandrena* and *Ancylandrena* have a limited distribution. The subfamily Panurginae includes all of the remaining genera in the East.

In the key that follows, the genus *Nomadopsis* has been included, even though it seems to be strictly western in its distribution. Provancher described two species of *Calliopsis*¹ from Ontario which have since been assigned to *Nomadopsis*. The types of these two species cannot now be located, so it has not been possible to determine the authenticity of the generic determination. According to J. G. Rozen, who has recently revised the genus *Nomadopsis*, the group is restricted to the far West, and the easternmost authentic record of any species is western Nebraska. There is considerable doubt, therefore, that any of the species occur in the East, and the Provancher species either were erroneously determined as to genus, or the locality record was in error.

KEY TO GENERA

1. With three submarginal cells 2
 With but two submarginal cells 3
2. Marginal cell narrowly rounded apically;
 females with relatively broad and

¹ *Calliopsis interrupta* and *C. 4-lineata* Provancher, 1888. Addit. Corr. Faune Ent. Canada Hym., pp. 319 & 320.

- densely pilose facial foveae
 *Andrena* (p. 86)
- Marginal cell obliquely truncate apically;
 facial foveae of females small, not
 pilose *Psaenythia* (p. 286)
- 3 (1). Marginal cell very short, about equal
 in length to stigma, abruptly truncate
 apically *Perdita* (p. 295)
- Marginal cell much longer than stigma
 4
- 4. Abdominal terga with conspicuous yellow
 spots or transverse bands
 *Nomadopsis*
- Abdominal terga not maculated, with
 at most the apical depressed margins
 ferruginous or subhyaline 5
- 5 (4). Stigma very small; recurrent veins
 about equidistant from transverse cubital
 veins *Calliopsis* (p. 287)
- Stigma large; recurrent veins usually
 not equidistant from transverse cubital
 veins 6
- 6. Tip of marginal cell narrowly rounded
 *Andrena* (part) (p. 86)
- Tip of marginal cell truncate 7
- 7. First recurrent vein nearly interstitial
 with 1st transverse cubitus, 2nd considerably
 removed from 2nd transverse cubitus
 *Panurginus* (p. 258)
- Second recurrent vein entering 2nd sub-
 marginal cell nearer its apex than 1st
 does to base
 *Pseudopanurgus* (p. 263)

Andrena Fabricius

(Figs. 1, 2 & 4)

Andrena Fabricius, 1775. Systema Ent., p. 376.

Type: *Apis helvola* Linnaeus. Desig. by Viereck, 1912.

Anthrena Illiger, 1801. Mag. Insektenk. 1, p. 127. Emendation.

Anthocharessa Gistel, 1850. Isis (Encycl. Ztschr.) 6, p. 82.

Type: *Apis helvola* Linnaeus.

Simandrena Perez, 1890. Actes Soc. Linneene Bordeaux 44, p. 174.

Type: *Andrena propinqua* Schenck. Desig. by Hedicke, 1933.

- Parandrena* Robertson, 1897. Acad. Sci. St. Louis, Trans, 7, p. 337.
Type: *Panurgus andrenoides* Cresson. Desig. by Cockerell, 1897.
- Micrandrena* Ashmead, 1899. Amer. Ent. Soc. Trans. 26, p. 89.
Type: (*Micrandrena pacifica* Ashmead) = *Andrena melanothroa* Cockerell Monob. and orig. desig.
- Iomelissa* Robertson, 1900. Acad. Sci. St. Louis, Trans. 10, p. 50.
Type: *Andrena violae* Robertson. Monob.
- Trachandrena* Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 189.
Type: *Andrena rugosa* Robertson. Orig. desig.
- Ptilandrena* Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 192.
Type: *Andrena erigeniae* Robertson. Orig. desig.
- Opandrena* Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193.
Type: *Andrena cressonii* Robertson. Orig. desig.
- Pterandrena* Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193.
Type: *Andrena pulchella* Robertson. Orig. desig.
- Andrena* (*Gonandrena*) Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 390.
Type: *Andrena* (*Gonandrena*) *persimulata* Viereck. Monob.
- Andrena* (*Conandrena*) Viereck, 1924. Canad. Ent. 56, p. 20.
Type: *Andrena bradleyi* Viereck. Monob. and orig. desig.
- Andrena* (*Cnemidandrena*) Hedicke, 1933. Berlin Zool. Mus. Mitt. 19, p. 212.
Type: (*Melitta*) *Andrena nigriceps* (Kirby). Orig. desig.
- Andrena* (*Gymnandrena*) Hedicke, 1933. Berlin Zool. Mus. Mitt. 19, p. 213.
Type: (*Apis*) *Andrena thoracica* (Fabricius). Orig. desig.
- Andrena* (*Leucandrena*) Hedicke, 1933. Berlin Zool. Mus. Mitt. 19, p. 215.
Type: (*Apis*) *Andrena sericea* (Christ). Orig. desig.
- Andrena* (*Schizandrena*) Hedicke, 1933. Berlin Zool. Mus. Mitt. 19, p. 218.
Type: *Andrena aulica* Morawitz. Orig. desig.
- Andrena* (*Taeniandrena*) Hedicke, 1933. Berlin Zool. Mus. Mitt. 19, p. 219.
Type: (*Melitta*) *Andrena ovatula* (Kirby). Orig. desig.
- Andrena* (*Thysandrena*) Lanham, 1949. Calif. Univ., Pubs., Ent. 8, p. 213.
Type: *Andrena candida* Smith. Orig. desig.
- Andrena* (*Mimandrena*) Lanham, 1949. Calif. Univ., Pubs., Ent. 8, p. 217.
Type: *Andrena imitatrix* Cresson. Orig. desig.
- Andrena* (*Cryptandrena*) Lanham, 1949. Calif. Univ., Pubs., Ent. 8, p. 222. Preocc.
Type: *Andrena carlini* Cockerell. Orig. desig.
- Andrena* (*Bythandrena*) Lanham, 1950. Ent. News 61, p. 140. N. name for *Andrena* (*Cryptandrena*) Lanham.
Type: *Andrena carlini* Cockerell. Orig. desig.

Most species of *Andrena* have three submarginal cells in the front wing (fig. 1), the marginal cell narrowly rounded apically with the tip closely approximate to the costal margin. In many of the males the clypeus is yellow, and in addition there may be lateral yellow maculae between the clypeus and lower inner orbits. The females of a very few of the eastern species also have yellow maculae on the face or clypeus. The facial foveae are well developed in the females, usually quite broad, at least toward the upper end, and are densely pilose. None of the species have any yellow or pale markings on either the thorax or abdomen.

These bees nest in the soil, sometimes gregariously, and occasionally do some damage by making these burrows in lawns. Such injury is usually of brief duration, however, for the period of flight is quite short. The biology of a few of the species has been studied.¹ Species are either vernal or autumnal, and with many the flight period is very short, being correlated apparently with the blooming period of limited groups of plants.

This genus is an extremely large one, with hundreds of species known from the northern hemisphere of both the Old and New Worlds. Along with this multiplicity of species there is a considerable diversity in size, structure and to some extent coloration. If a logical grouping of these into smaller genera or into subgenera could be achieved, the problem of specific identification would possibly be less imposing. Group limits, however, are so obscure and the number of species so great, that only partial success has been realized up to this

¹ See references to biology in the bibliography of the following species: *A. carlini*, *erythrogaster*, *gardineri*, *helianthi*, *imitatrix*, *milwaukeeensis*, *placida*, *vicina* and *wilkella*.

time. Robertson (1902) was the first to attempt such a division, and he recognized 7 groups of species occurring in southern Illinois as distinct genera. Viereck however (1917 & 1924), as well as Hedicke in Europe (1933), returned to the original generic concept and reduced Robertson's genera to the lesser rank of subgenus. Also they recognized a number of additional groups, among them several inhabiting the Eastern United States. More recently Lanham (1949) reviewed the classification of the nearctic species and proposed a number of additional subgeneric groups. At the present time (1958) there are 19 subgenera that include one or more species inhabiting this area. Several subgeneric groups of western species apparently have no representation in the eastern part of the continent.

It is difficult to define these groups, and when new species are discovered it is often impossible to place them in any of these recognized subgenera with any degree of confidence. In consequence, a number of the new species described in the following pages are placed in groups only tentatively. It is suspected that there are still additional groups as yet unnamed that should be recognized, but this writer is unprepared to suggest any modification of the classification of *Andrena* in this work. This is a major unsolved problem in the classification of bees and it will require a much broader base, geographically, and a much more intensive study of this genus to accomplish any positive results.

A brief summary of the key to females and a similar one to the males are given below. It is believed that these will facilitate use of the keys, which are quite long. Only positive conditions are stated. In using the summary a specimen should be examined with respect to each successive character, in the order of its listing (A, B, C, etc.). When a statement is reached which describes the specimen accurately, turn to the page and couplet of the key indicated, and proceed from that point. They will be found useful also in making an initial sorting, when a large amount of material is being identified.

The use of these summaries is not essential, and if there is any question concerning their use, it would be advisable to avoid

them, and start at the beginning of each key. They are only intended to make it possible to reach a given point in the keys more quickly and easily.

Summary of key to females of *Andrena*

- A—With but two submarginal cells—couplet 2 (p. 89)
- B—Cheeks with a carinate posterior rim—couplet 6 (p. 89) can be very slight & rounded
- C—Hind tibial scopa black—couplet 8 (p. 89)
- D—Scopa distinctly plumose—couplet 14 (p. 89)
- E—Propodeal triangle coarsely rugose or striate—couplet 37 (p. 91)
- F—Vertex narrow, with lateral ocelli separated from its margin by a space no greater than their diameter—couplet 72 (p. 93)
- G—Abdomen distinctly punctate—couplet 129 (p. 96)
- H—Punctures of abdomen lacking, or very minute and obscure—couplet 141 (p. 97)

Summary of key to males of *Andrena*

- A—Clypeus yellow, at least in part—couplet 2 (p. 97)
- B—Cheeks with a carinate posterior rim—couplet 34 (p. 99)
- C—Mandible with a basal, inferior angle or tooth—couplet 39 (p. 99)
- D—Cheeks very broad and flat, posterior margin to some degree angulate—couplet 44 (p. 100)
- E—Propodeal triangle coarsely rugose or striate—couplet 63 (p. 101)
- F—Segment 1 of flagellum (not pedicel) equal to 2 and 3 combined, each of the latter no longer than broad—couplet 85 (p. 102)
- G—Vertex narrow, ocelli separated from its margin by a space no greater than their diameter—couplet 89 (p. 102)
- H—Space separating lateral ocelli from margin of vertex considerably exceeding their diameter—couplet 100 (p. 103)

KEY TO SPECIES

Females

1. With but two submarginal cells 2
With the usual three submarginal cells 5
2. Abdomen entirely ferruginous *andrenoides charigastra* Viereck (p. 239)
Abdomen black 3
3. Clypeus with a strongly elevated, median, impunctate line, this becoming more or less flattened toward apical margin; scutum and scutellum dull, tessellate *wellesleyana* Robertson (p. 241)
Median line of clypeus not elevated, if at all evident; scutum posteriorly and scutellum shining 4
4. Clypeus more sparsely punctate; propodeal triangle subrugose
..... *nida* new species (p. 240)
Clypeus more closely punctate, with at most a narrow median impunctate line; propodeal triangle smooth
..... *andrenoides andrenoides* Cresson (p. 238)
- 5(1). Cheeks posteriorly with a distinct carinate rim 6
Hind margin of cheeks not or only very obscurely carinate 7
6. Process of labrum large and conspicuous, quadrate, its truncate apex fully as wide as the base
..... *fragilis* Smith (p. 231)
- Process of labrum narrowed apically, its truncate apex much narrower than the base *integra* Smith (p. 232)
- 7(5). Scopa on hind tibiae black 8
Tibial scopa largely or entirely pale, or possibly brownish, in color 13
8. Vertex very narrow, with space between its margin and lateral ocelli no greater than diameter of ocelli; pubescence of abdominal terga 1 and 2 usually pale, remainder of terga with erect black pubescence
..... *milwaukeeensis* Graenicher (p. 107)
Vertex not so narrow, space between lateral ocelli and its hind margin distinctly greater than their diameter. . . 9
9. Clypeus nearly impunctate, with only a few widely scattered and exceedingly minute punctures at all evident
..... *critica* new species (p. 113)
Clypeus deeply and distinctly punctate 10
10. Abdominal terga 1-4 with long, copious, erect, yellow pubescence
..... *hirticincta* Provancher (p. 173)
Pubescence of abdominal terga either very short and obscure, or largely black or fuscous 11
11. Clypeus shining, punctures very fine, uniformly but quite sparsely distributed over median area, and entirely lacking a median impunctate line
..... *regularis* Malloch (p. 118)
Clypeus more closely and deeply punctate, usually with a quite distinct median impunctate line 12
12. Pleura and cheeks pale pubescent
..... *vicina* Smith (p. 132)
Pleura and cheeks black pubescent
..... *carlini* Cockerell (p. 111)
- 13(7). Scopa conspicuously plumose ... 14
Scopa at most very obscurely plumose, usually simple 36
14. Facial foveae and propodeal corbicula poorly developed or absent
..... *aliena* Smith (p. 256)
Facial foveae and propodeal corbicula well developed 15
15. Face or clypeus with yellow maculae ..
..... 16
Face entirely black 17
16. Clypeus reddish or blackish; face with large yellow maculae between clypeus and eyes .. *accepta* Viereck (p. 137)
Clypeus entirely yellow; lateral facial maculae absent
..... *aliciae* Robertson (p. 138)
- 17(15). Basal segment of flagellum little if any longer than segment 2
..... *dimorpha* new species (p. 143)
Basal segment of flagellum fully twice the length of segment 2 18
18. Vertex quite broad, lateral ocelli being separated from its hind margin by a space greater than their diameter 19
Vertex narrower, distance between lateral ocelli and hind margin of vertex about equal to their diameter 25
19. Process of labrum entire, or with a barely evident emargination 20
Process of labrum distinctly and usually deeply emarginate 22
20. Smaller (8 mm.); abdominal terga shining, punctures minute and sparse, but evenly distributed
..... *distans* Provancher (p. 154)
Larger (12 mm.); abdominal terga dull and tessellate, punctures inevident or very minute and obscure 21
21. Wings lightly infuscated, 2nd and 3rd submarginal cells about equal in length; abdominal terga without evident punctures
..... *braccata* Viereck (p. 141)
Wings whitened, 2nd submarginal cell much shorter than 3rd; abdominal terga 3 and 4 with exceedingly minute but rather close and distinct punctures
..... *helianthi* Robertson (p. 147)

- 22(19). Abdominal terga with shallow but rather coarse punctures, surface very densely tessellate; wings fuliginous *rudbeckiae* Robertson (p. 149)
Surface of abdominal terga somewhat shining, punctures minute or very fine 23
23. Tibial scopa rather thin, hairs short-plumose; mid basitarsi rather narrow; clypeus strongly protuberant, punctures quite deep and distinct, even toward upper margin, surface shining; process of labrum large, deeply emarginate apically
..... *angusi* Viereck (p. 139)
Tibial scopa dense, plumosities of hairs more elongate; clypeus not strongly convex, punctures fine, shallow and quite sparse, apical margin narrowly subrugose, surface dull and tessellate; process of labrum either very small or only shallowly emarginate 24
24. Smaller (9 mm.); process of labrum small, deeply incised apically
..... *solidaginis* Robertson (p. 151)
Larger (13 mm.); process of labrum more robust, broader at base, the narrowed apex shallowly emarginate
..... *asteris* Robertson (p. 139)
- 25(18). Process of labrum entire 26
Process of labrum distinctly and usually rather deeply emarginate 32
26. Clypeus evenly convex, shining, largely impunctate, with only a few scattered punctures at extreme sides 102
Clypeus either dull and tessellate or with deep distinct punctures except possibly in mid line 27
27. Dorsum of thorax and abdominal terga greenish *polemonii* Robertson (p. 157)
Thorax and abdomen entirely black, without greenish reflections 28
28. Clypeus dull and densely tessellate, becoming subrugose toward apical margin laterally 29
Clypeus deeply and distinctly punctate, more or less shining 30
29. Scutum and scutellum somewhat shining, with scattered, sparse and fine but distinct punctures
..... *simplex* Smith (p. 151)
Scutum and scutellum dull, densely granular, with punctures at all evident only toward anterior margin of scutum
..... *krigiana* Robertson (p. 156)
- 30(28). Dorsum of thorax densely covered with bright fulvous pubescence hiding the surface; median area of clypeus flattened, shining, nearly impunctate, becoming closely punctate laterally; pleura coarsely punctate
..... *duplicata* new species (p. 144)
Dorsum of thorax with ochraceous pubescence; clypeus very broad and rather flat, dull toward base, becoming shining apically between the deep, distinct punctures; pleura densely tessellate and impunctate 31
31. Abdominal terga shining, punctures exceedingly minute, widely separated, evenly distributed; propodeal triangle dull, tessellate or very finely roughened *distans* Provancher (p. 154)
Abdominal terga rather finely, but deeply and distinctly punctate; propodeal triangle with a few rather coarse striations
..... *erigeniae* Robertson (p. 155)
- 32(25). Abdominal terga uniformly, coarsely, deeply and quite closely punctate, interspaces only slightly greater than diameter of punctures 33
Abdominal terga impunctate, or more sparsely and finely punctate, interspaces much exceeding diameter of the fine punctures 34
33. Apical margins of abdominal terga broadly yellowish-hyaline, entirely impunctate
..... *gardeneri* Cockerell (p. 146)
Apical margins of abdominal terga ferruginous, with a very narrow, yellowish rim, closely punctate
..... *lauracea* Robertson (p. 148)
- 34(32). Abdominal terga very densely tessellate and dull, without evident punctures *fulvipennis* Smith (p. 145)
Abdominal terga finely tessellate, somewhat shining, with fine but distinct punctures 35
35. Larger (11 mm.); punctures of abdominal terga 2 & 3 relatively deep and distinct, interspaces only 2 or 3 times diameter of punctures; pubescence of thorax copious and elongate; triangle of propodeum finely rugose toward base *asteroides* new species (p. 140)
Smaller (10 mm.); punctures of terga 2 & 3 exceedingly minute and obscure; thoracic pubescence yellowish-white, short and rather thin; triangle of propodeum tessellate, not at all rugose
..... *solidaginis* Robertson (p. 151)
- 36(13). Dorsal triangle of propodeum coarsely rugose or striate 37
Dorsal triangle of propodeum either tessellate or only subrugose or granular 71

37. Facial foveae much constricted below, that part being half or less as wide as upper portion 38
 Facial foveae not much constricted below, and if at all so, only gradually narrowed to about half the width of the upper portion 56
38. Scutum nearly impunctate, with only a few widely scattered punctures
 *nuda* Robertson (p. 192)
 Punctures of scutum close or crowded 39
39. Constricted portion of facial foveae very widely separated from margin of eye; punctures of scutum coarse, deep and closely crowded
 *rugosa* Robertson (p. 198)
 Lower part of foveae not so widely separated from eye; scutum with distinctly separated punctures 40
40. Apical impressed area of tergum 2 occupying fully two-thirds of its median length 41
 Impressed area of tergum 2 not so extensive 44
41. Front below ocelli, closely, deeply and rather coarsely punctate
 *miranda* Smith (p. 190)
 Front below ocelli shining, punctures very fine and well separated 42
42. Constricted portion of facial foveae separated from eye margin by a somewhat wider space
 *heraclei* Robertson (p. 184)
 Space separating constricted part of foveae from eye not exceeding this part in width 43
43. Basal abdominal tergum polished, nearly impunctate; apical impressed area of tergum 3 only slightly exceeding the basal area in median length, this basal part not strongly elevated
 *spiraeana* Robertson (p. 202)
 Basal tergum shining, punctures minute, sparse and irregular, but distinct; apical impressed area of tergum 3 fully twice the basal area in median length, the basal part strongly elevated
 *montensis* new species (p. 191)
- 44(40). Lateral ocelli separated from margin of vertex by a space much greater than their diameter 45
 Ocelli separated from margin of vertex by a space subequal to or only slightly exceeding the diameter of the ocelli 51
45. Scutum sparsely punctate, even anteriorly, interspaces several times diameter of punctures
 *obscura* Robertson (p. 193)
 Scutum more closely punctate, at least over anterior half 46
46. Pubescence of scutum very short, subappressed, conspicuously plumose and scale-like, quite dense along lateral margins ... *quintilis* Robertson (p. 195)
 Pubescence of scutum more elongate and erect, not at all scale-like and not conspicuously plumose 47
47. Anterior half of scutellum sparsely punctate, interspaces much exceeding diameter of punctures
 *sigmundi* Cockerell (p. 200)
 Scutellum closely punctate throughout 48
48. Basal abdominal tergum closely, deeply and quite coarsely punctate throughout; lower half of facial fovea no wider than space separating it from margin of eye ... *ceanothi* Viereck (p. 179)
 Basal tergum shining, very minutely and quite sparsely punctate 49
49. Abdominal tergum 2 closely and deeply punctate, interspaces about equal to diameter of punctures
 *virginiana* new species (p. 203)
 Punctures of tergum 2 very fine, interspaces much wider than diameter of punctures 50
50. Constricted lower part of facial fovea no wider than space separating it from margin of eye, except possibly at extreme tip
 *spiraeana* Robertson (p. 202)
 Constricted part of fovea not so narrow nor so widely separated from eye ...
 *votula* new species (p. 204)
- 51(44). Impressed apical area of tergum 2 occupying slightly less than half the median length of disc 52
 Impressed area of tergum 2 occupying fully half median length of disc ... 53
52. Punctures of abdominal terga 1 and 2 close, deep and quite coarse, interspaces not exceeding their diameter
 *forbesii* Robertson (p. 183)
 Punctures of terga 1 and 2 fine and rather sparse, interspaces several times diameter of punctures
 *arenakensis* new species (p. 177)
- 53(51) Basal abdominal tergum shining, punctures minute, irregular and sparse over most of disc
 *hippotes* Robertson (p. 184)
 Basal tergum shining or not, punctures deep and distinct, although fine, quite close and evenly distributed 54

54. Constricted portion of facial fovea one-half or less the length of the broad upper part
mariae concolor Robertson (p. 188)
 Constricted portion of fovea subequal in length to the broad upper part .. 55
55. Punctures on scutellum and on posterior half of scutum quite sparse, interspaces being much greater than their diameter
pyracanthae new species (p. 194)
 Punctures of scutum and scutellum rather close, interspaces not exceeding their diameter
sigmundi Cockerell (p. 200)
- 56(37). Abdomen bright ferruginous
mariae mariae Robertson (p. 187)
 Abdomen black 57
57. Pubescence of scutum and scutellum pale ochraceous or brownish, very short, scale-like and subappressed 58
 Pubescence of scutum and scutellum relatively long and erect 59
58. Abdomen more minutely punctate, interspaces on terga 1 and 2 considerably greater than diameter of punctures; depressed apical margins of terga reddish, fasciae poorly developed
alleghamensis Viereck (p. 177)
 Punctures of terga 1 and 2 quite close and deep, interspaces not much exceeding diameter of punctures; discs of terga entirely dark; fasciae white, well developed *rubi* new species (p. 198)
- 59(57). Facial foveae relatively narrow above, occupying only about half of space between eyes and ocelli 60
 Foveae broader above, nearly or quite filling space between eyes and ocelli 62
60. Scutum shining, finely and quite sparsely punctate; scutellum polished, nearly or quite impunctate 61
 Scutum and scutellum smooth but rather dull, with close, deep and distinct punctures *atlantica* new species (p. 178)
61. Clypeal punctures evenly distributed, with no median impunctate line; process of labrum nearly as long as its basal width
platyparia Robertson (p. 236)
 Clypeus with a distinct, median, impunctate line; process of labrum much broader than its median length
monroensis new species (p. 233)
- 62(59). Hind tibial spurs strongly curved; dorsal triangle of propodeum very coarsely reticulate; clypeus shining, rather coarsely and sparsely punctate
crataegi Robertson (p. 206)
 Hind tibial spurs straight; dorsal triangle of propodeum either rugose, striate or finely reticulate 63
63. Clypeus uniformly, finely, closely and contiguously punctate throughout .. 64
 Punctures of clypeus either more coarse and deep, more sparse, or with a more or less distinct median impunctate line 65
64. Smaller (8 mm.); punctures of scutum well separated even along anterior margin; abdomen rather dull and tessellate between minute, well separated punctures *daekei* Viereck (p. 181)
 Larger (10 mm.); punctures of scutum close along anterior margin; abdomen more shining, more deeply and closely punctate *kalmiae* Atwood (p. 186)
- 65(63). Posterior part of mesopleura with deep and distinct, well separated punctures; hind tibiae and all tarsi bright ferruginous *ilicis* new species (p. 186)
 Punctures of mesopleura posteriorly shallow and obscure; tarsi and hind tibiae usually dark 66
66. Lateral ocelli separated from margin of vertex by a space considerably greater than their diameter
rehni Viereck (p. 196)
 Space between margin of vertex and lateral ocelli no greater than their diameter 67
67. Basal abdominal tergum finely and rather sparsely punctate, those on tergum 2 well separated 68
 Terga 1 and 2 closely, deeply and rather coarsely punctate, interspaces not much exceeding diameter of punctures .. 69
68. Scutum quite closely and coarsely punctate, interspaces not much exceeding diameter of punctures
morrisonella Viereck (p. 192)
 Scutum finely and sparsely punctate, interspaces much exceeding diameter of punctures, even anteriorly
mendica new species (p. 189)
- 69(67). Lateral faces of propodeum, below corbicula, with conspicuously plumose hairs 70

- Hairs on lateral faces of propodeum, below corbicula, entirely simple
 *fenningeri* Viereck (p. 182)
70. Hind tibiae and tarsi usually entirely dark *imitatrix imitatrix* Cresson (p. 205)
 Hind tibiae and tarsi bright ferruginous *imitatrix profunda* Viereck (p. 206)
- 71(36). Vertex narrow, space between its hind margin and lateral ocelli little if any greater than diameter of ocelli 72
 Vertex broad, space between its hind margin and lateral ocelli much greater than their diameter 128
72. Abdomen ferruginous at least at base, usually entirely so 73
 Abdomen entirely dark 74
73. Large (11 mm.); thorax black, with copious ochraceous pubescence; intercubital vein not very close to stigma *erythrogaster* Ashmead (p. 114)
 Small (7 mm.); thorax dull metallic, pubescence rather short and thin; first intercubital vein ending close to stigma *nigrae* Robertson (p. 165)
- ^{can}
_{see} 74(72). ⁴First intercubital vein joining marginal cell very close to stigma; small (7 mm. or less); hind tibiae usually cuneate, gradually broadening to the apex which is twice the width of its basitarsus 75
 First intercubital vein joining marginal cell only slightly nearer stigma than to second intercubital, if at all 84
- ^{point}
_{to}
_{stigma} 75. Cheeks distinctly broader than eyes; triangle of propodeum finely tessellate, not at all granular 76
 Cheeks subequal to eyes in width 77
76. Clypeus dull; scutum impunctate; 2nd submarginal cell narrowed above *nothoscordi* Robertson (p. 165)
 Clypeus shining, with minute and rather sparse, scattered punctures; scutum and scutellum polished, with very minute but distinct, sparse punctures; 2nd submarginal cell not narrowed above *uvulariae* new species (p. 245)
- 77(75). Process of labrum short and very broad, occupying most of width of labrum 78
 Process of labrum more narrowly rounded or subtriangular, breadth not greatly exceeding its length 80
78. Clypeus dull basally, becoming somewhat shiny apically, punctures exceedingly minute and obscure; dorsum of thorax dull, tessellate and impunctate; basal segment of flagellum equal to 2nd and 3rd combined
 *fragariana* Graenicher (p. 161) ^{melanochroa}
- Clypeus shining, punctures fine but distinct; dorsum of thorax to some degree punctate 79 ^{can be hard to see}
79. Segment 1 of flagellum slightly shorter than 2 and 3 combined; clypeus moderately convex, punctures well separated but hardly sparse *neonana* Viereck (p. 163)
 Segment 1 of flagellum about equal to segments 2-4 combined; clypeus more protuberant, sparsely, minutely punctate *ziziaeformis* Cockerell (p. 169)
- 80(77). Triangle of propodeum entirely and quite coarsely granular or subrugose; clypeus dull but smooth, minutely and sparsely punctate
 *personata* Robertson (p. 165)
 Triangle of propodeum at most finely granular along basal margin and in center 81
81. Facial foveae broad at upper end, occupying most of space between eyes and ocelli, and reaching slightly below level of antennae; pleura protuberant below, having a flattened triangular area anterior to mid coxal cavities, delimited by a distinct ridge
 *vernalis* new species (p. 168)
 Facial foveae narrow, occupying only about half of space between eyes and ocelli, and not reaching below level of antennae; pleura not protuberant 82
82. Clypeus smooth but dull, punctures quite sparse; segments 2 and 3 of flagellum short, breadth considerably exceeding length *ziziae* Robertson (p. 168)
 Clypeus more shining and rather closely punctate; segments 2 and 3 of flagellum nearly as long as broad 83
83. Scutellum polished
 *illinoensis* Robertson (p. 161)
 Scutellum dull and tessellate
 *salictaria* Robertson (p. 167)
- 84(74). Hind tibiae cuneate, apex nearly twice width of their basitarsi; scopal hairs short, length less than apical width of tibiae *nasonii* Robertson (p. 244)
 Hind tibiae usually more slender, apex not much broader than mid portion and only slightly broader than their basitarsi; if at all cuneate, then some of the anterior scopal hairs fully as long as apex of tibia is wide 85
85. Malar space relatively extensive, length equal to one-fourth or more of the basal width of mandible 86
 Malar space linear, if at all evident 98

86. Facial foveae narrow, occupying only about half of space between eyes and ocelli 87
 Facial foveae broad, upper end occupying most of space between eyes and ocelli 90
87. Face much longer than distance between eyes; clypeus polished and sparsely punctate... *bradleyi* Viereck (p. 226)
 Face about as long as broad; clypeus relatively dull and closely punctate 88
88. Clypeus somewhat shining, with a distinct median impunctate line 89
 Clypeus dull and tessellate, the shallow punctures more scattered and sparse near midline, but without a distinct impunctate line; abdominal terga 2-4 with thin, white, apical fasciae
 *algida* Smith (p. 218)
89. Abdominal terga 2-4 with conspicuous, yellowish, apical fasciae; propodeal triangle smooth, lacking any basal striations *chromotricha* Cockerell (p. 172)
 Abdominal fasciae lacking; propodeal triangle finely rugose
 *bisignata* new species (p. 122)
- 90(86). Head with at least a few black hairs along inner orbits 91
 Pubescence of head and thorax entirely pale 92
91. Most of head, and thorax laterally and beneath, black pubescent
 *clarkella* Kirby (p. 104)
 Pleura and middle of face covered with copious pale pubescence
 *frigida* Smith (p. 105)
- 92(90). Length of malar space fully one-third basal width of mandible 93
 Malar space short, about one-fourth basal width of mandible 94
93. Mandibles more elongate, tips extending beyond the lateral limits of the clypeal margin when closed; process of labrum subtriangular
 *carolina* Viereck (p. 228)
 Mandibles shorter, tips not extending beyond lateral limits of clypeal margin; process of labrum short, much broader than long *rufosignata* Cockerell (p. 230)
- 94(92). Scutum densely tessellate and entirely impunctate; tomentum of facial foveae brownish or fuscous at certain angles 95
 Scutum dull, but with distinct and rather close punctures; tomentum of foveae pale ochraceous or whitish 97
95. Clypeus nearly impunctate, with only a very few, widely scattered, minute punctures toward lateral angles
 *seavillensis* new species (p. 217)
 Clypeus deeply and rather coarsely punctate, with a median impunctate line 96
96. Wings hyaline
 *mandibularis* Robertson (p. 106)
 Wings brownish *banksi* Malloch (p. 254)
- 97(94). Cheeks dull and tessellate, only slightly broader than eyes; process of labrum very large, occupying nearly entire width and length of labrum; segments 2 and 3 of flagellum hardly as long as their breadth
 *albisigna* Viereck (p. 211)
 Cheeks shining, very finely punctate; process of labrum smaller; segment 2 of flagellum fully as long as broad, segment 3 longer
 *thaspis* Graenicher (p. 108)
- 98(85). Median third of clypeus with few if any punctures 99
 Median area of clypeus distinctly punctate although possibly with a median impunctate line 103
99. Cheeks considerably broader than eyes, subcarinate posteriorly; pleura slightly protuberant below
 *integra* Smith (p. 232)
 Cheeks little if any broader than eyes; pleura rounded below, not at all protuberant 100
100. Abdominal terga 1 and 2 shining, with very fine but distinct punctures, these evenly distributed and rather close on tergum 2
 *robertsonii* Dalla Torre (p. 237)
 Abdominal terga dull and tessellate, either impunctate or with exceedingly minute, barely distinguishable, sparse punctures 101
101. Propodeal triangle coarsely granular; median area of clypeus dull, with a few scattered fine punctures; process of labrum short, broadly truncate
 *dreisbachi* new species (p. 230)
 Propodeal triangle smooth, finely tessellate, with a basal fringe of very short striations; clypeus shining and impunctate over median third; process of labrum rounded 102
- 102(26). Dorsum of thorax with whitish or ochraceous pubescence, the metathoracic tuft rather inconspicuous
 *miserabilis bipunctata* Cresson (p. 159)

- Dorsum of thorax with bright fulvous pubescence, and with a dense tuft of elongate hairs on metanotum
 . . . *miserabilis scutellata* Dalla Torre (p. 160)
- 103(98). Abdomen punctate to at least some slight degree, the punctures sometimes being very minute and obscure . . . 104
 Abdomen entirely impunctate 119
104. Cheeks considerably broader than eyes (ratio of about 3:2) 105
 Cheeks only very slightly broader than eyes, if at all 111
105. Pleura strongly, angulately protuberant below . . . *persimulata* Viereck (p. 235)
 Pleura rounded below, not at all protuberant 106
106. Process of labrum nearly as long as its basal width, subtriangular, with truncate apex 107
 Process of labrum much broader than its median length 108
107. Scutellum polished, nearly impunctate, with only a few scattered punctures near midline
 *platyparia* Robertson (p. 236)
 Scutellum rather dull, with shallow but distinct, rather sparse punctures, becoming rather close laterally
 *placida* Smith (p. 214)
- 108(106). Abdominal terga bluish, shining, punctures minute and rather uniformly sparse . . . *geranii* Robertson (p. 221)
 Abdominal terga black, possibly reddened apically 109
109. Clypeus rather flat, dull and tessellate, the punctures shallow but close and distinct, separated by little more than a puncture width *erythrogaster*
 *subaustralis* Cockerell (p. 115)
 Clypeus strongly convex and protuberant, punctures quite coarse and deep, close laterally but becoming rather widely separated above median line 110
110. Hind tibiae cuneate, the apex nearly twice the width of the basitarsi; facial foveae broad, occupying most of space between eyes and ocelli
 . . . *chippewaensis* new species (p. 212)
 Hind tibiae slender and elongate, not broadened apically; facial foveae narrower, occupying only slightly more than half of space between eyes and ocelli *seviensis* new species (p. 132)
- 111(104). Punctures of abdominal terga close, coarse and deep, interspaces not much exceeding their diameter . . 112
- Abdominal punctures minute, interspaces very much greater than their diameter 113
112. Process of labrum very short, three or four times broader than long
 *ressonii* Robertson (p. 248)
 Process of labrum large and conspicuous, about half as long as it is broad
 *violae* Robertson (p. 252)
- 113(111). Facial foveae broad, occupying at upper end two thirds or more of space between eyes and ocelli 114
 Facial foveae relatively narrow, occupying little more than half of space between eyes and ocelli 117
114. Smaller (7 mm.); clypeus shining, with a few very sparse, scattered, irregular punctures *ziziaeformis* Cockerell (p. 169)
 Larger (9 mm.); clypeus closely punctate laterally, with a more or less definite median impunctate line 115
115. Smaller (length 9-10 mm., breadth of abdomen, 3 mm.); clypeus usually with a distinct median impunctate line 116
 Larger (length 11 mm., breadth of abdomen 4 mm.); clypeus uniformly punctate, without a distinct median impunctate line
 . . . *macoupinensis* Robertson (p. 106)
116. Hind tibiae slender, about as broad at center as at apex, and this not much wider than basitarsi; foveae narrower, occupying about two-thirds of space between eyes and ocelli
 *miserabilis miserabilis* Cresson (p. 160)
 Hind tibiae gradually broadening to the apex, which is about twice the width of the basitarsi; foveae broad, occupying most of space between eyes and ocelli . . . *wheeleri* Graenicher (p. 246)
- 117(113). Median area of clypeus flattened, punctures deep and distinct, uniformly rather sparse, interspaces being several times diameter of punctures
 *arabis* Robertson (p. 251)
 Clypeus broadly convex, more closely punctate laterally than along midline 118
118. Clypeus more protuberant and shining; hind tibiae slender, not much broader at apex than their basitarsi
 *novae-angliae* Viereck (p. 224)
 Clypeus relatively dull, less protuberant; hind tibiae broader at apex than in center, and considerably broader than their basitarsi
 *phaceliae* new species (p. 224)

- 119(103). Vertex and dorsum of thorax with considerable blackish or fuscous pubescence 120
 Head and thorax entirely pale pubescent 121
120. Clypeus with a median, shining, impunctate area which is narrow and slightly elevated near the base, becoming much broader apically, to fill about one-third of the margin
 *peckhami* Cockerell (p. 234)
 Clypeus uniformly dull, punctures fine, shallow and rather close, with only a narrow, median, impunctate line toward apical margin
 *robervalensis* new species (p. 175)
- 121(119). Mid basitarsus equal to its tibia in width, widest at center, and each margin slightly bowed 122
 Mid basitarsus parallel-sided, rather narrow, not attaining the tibia in relative width 124
122. Clypeus somewhat flattened medially, with a rather wide, median, impunctate line; process of labrum very short and broad, median length about one-third its breadth
 *recta* new species (p. 217)
 Clypeus more convex, with a narrow, indefinite median, impunctate line or none 123
123. Wings hyaline apically
 *canadensis* Dalla Torre (p. 172)
 Wings infuscated apically and in marginal cell *nubecula* Smith (p. 174)
- 124(121). Facial foveae broad above, occupying at least two-thirds of area between eyes and ocelli 125
 Facial foveae relatively narrow, occupying little more than half of area between eyes and ocelli
 *tridens* Robertson (p. 109)
125. Clypeus markedly flattened, deeply punctate on each side of a distinct, median, slightly elevated, impunctate line
 *erythronii* Robertson (p. 212)
 Clypeus more evenly convex, with at most an indefinite, median, impunctate line 126
126. Clypeal punctures deep and distinct, quite close on each side of median area, interspaces only slightly exceeding diameter of punctures 127
 Clypeal punctures minute and widely separated, even laterally
 *picta* new species (p. 214)
127. Process of labrum entire; abdomen dull, densely tessellate, black, with no evidence of any punctures
 *bisalcis* Viereck (p. 219)
 Process of labrum slightly emarginate; abdomen somewhat shining, very faintly greenish, and with exceedingly minute, obscure punctures barely evident with high magnification
 *lata* Viereck (p. 222)
- 128(71). Abdomen closely, deeply and distinctly punctate 129
 Abdomen impunctate or with exceedingly minute and obscure, sparse punctures 141
129. Inner hind tibial spur strongly flexed at a point about one-third from tip .. 130
 Inner hind tibial spur not so flexed .. 131
130. Abdominal terga 2-4 with dense and conspicuous, whitish, apical fasciae
 *flexa* Malloch (p. 126)
 Abdominal terga at most only subfasciate at extreme slides
 *macra* Mitchell (p. 127)
- 131(129). Facial foveae narrow, occupying at upper end only about one-half the space between eyes and ocelli, and separated from eye margin by a space nearly equal to their width
 *pruni* Robertson (p. 117)
 Facial foveae much broader than space separating them from eye margin .. 132
132. Apical impressed area of abdominal terga nearly or quite impunctate, in marked contrast to remainder of disc
 133
 Apical impressed area of terga distinctly punctate .. about same density 134
133. Abdomen with purplish reflections; 2nd submarginal cell distinctly shorter than 3rd ... *viburnella* Graenicher (p. 119)
 Abdomen black without purplish reflections; 2nd and 3rd submarginal cells subequal in length *perplexa* Smith (p. 116)
- 134(132). Larger (15 mm.); wings deep fuliginous; pubescence of face and dorsum of thorax fulvous; abdomen entirely lacking fasciae; legs mainly ferruginous *obscuripennis* Smith (p. 129)
 Usually smaller (12 mm. or less); wings yellowish-hyaline; abdomen usually to some degree fasciate; only tarsal segments of legs ferruginous, or legs entirely dark 135
135. Punctures of abdominal tergum 2 close, separated by little more than their own diameters 136

- Punctures of tergum 2 medially very fine, separated by two or more times their diameters 137
136. Abdominal terga dull, segments 2-4 with narrow, yellowish, apical fasciae more or less interrupted medially; clypeus strongly flattened, dull and tessellate, with a distinct median impunctate line *wilkella* Kirby (p. 250)
Abdominal terga shining, not fasciate; clypeus more convex *beutenmuelleri* Viereck (p. 122)
- 137(135). Mid tibiae and basitarsi with fuscous or blackish pubescence *nivalis* Smith (p. 128)
Pubescence of mid tibiae and tarsi pale 138
138. Metanotum densely granular and dull; clypeal punctures uniformly deep and close, nearly contiguous, even medially *commoda* Smith (p. 124)
Metanotum either shining between distinct punctures, or finely tessellate, with a few obscure punctures; clypeal punctures well separated, even though not sparse 139
139. Clypeus less strongly convex, surface dull and tessellate, punctures shallow and widely separated over most of disc; glossa slender and elongate *carolinensis* new species (p. 123)
Clypeus strongly convex, shining, quite closely punctate; glossa acute but short, broadened toward base 140
140. Metanotum quite flat, dull and tessellate, usually quite densely pubescent, but with a few obscure punctures evident *hilaris* Smith (p. 126)
Metanotum elevated and protuberant, to some degree triangular, surface shining, bare, with distinct, well separated punctures *sayi* Robertson (p. 131)
- 141(128). Head and dorsum of thorax largely black pubescent; clypeus short and broad, projecting but slightly below suborbital line *parnassiae* Cockerell (p. 213)
Head and thorax entirely pale pubescent 142
142. Process of labrum distinctly and quite deeply emarginate *lata* Viereck (p. 222)
Process of labrum entire or only very obscurely or slightly emarginate .. 143
143. Vertex broad, lateral ocelli separated from its hind margin by nearly or fully twice their diameter 144
- Vertex less broad, space between its hind margin and lateral ocelli only slightly greater than their diameter 145
144. Second submarginal cell considerably shorter than 3rd; process of labrum subtriangular, with apex somewhat truncated *victima* Smith (p. 134)
Second and 3rd submarginals about equal; process of labrum short, very broadly and regularly rounded *dunningi* Cockerell (p. 113)
- 145(143). Cheeks considerably broader than eyes, smooth and shining, punctures sparse and exceedingly minute *gabrielsoni* new species (p. 115)
Cheeks subequal to eyes in width, smooth but rather dull, punctures not clearly evident *confederata* Viereck (p. 125)
- Males*
1. Clypeus wholly or in part yellow ... 2
Clypeus entirely black 33
2. With but two submarginal cells ... 3
With three submarginal cells 5
3. Lateral angles of sternum 6 strongly produced, reflexed or recurved; usually larger (11 mm.) *wellesleyana* Robertson (p. 241)
Lateral angles of sternum 6 only slightly produced and reflexed, if at all; usually smaller 4
4. Face with large yellow maculae between clypeus and eye, reaching slightly above upper margin of clypeus; mandibles with a small, basal, yellow maculation; propodeal triangle smooth *andrenoides* Cresson (p. 238)
Lateral facial maculae small; not extending above margin of clypeus; mandibles not maculated; propodeal triangle subrugose *nida* new species (p. 240)
- 5(2). With a distinct malar space; upper and lateral borders of clypeus black *bradleyi* Viereck (p. 226)
Malar space reduced; clypeus usually entirely yellow 6
6. With conspicuous yellow maculae between clypeus and eye 7
Lateral face marks either lacking or with mere traces of yellow along clypeal margin which do not extend to margin of eye 18
7. Mandibles elongate, tip of one reaching base of other when closed, and with a large triangular, basal, inferior dilation .. *dimorpha* new species (p. 143)
Mandibles not so elongate, simple at base 8

8. Basal segment of flagellum slightly shorter than 2nd segment *personata* Robertson (p. 165)
 Basal segment of flagellum longer than segment 2, often equalling or exceeding segments 2 and 3 combined 9
- into account
ints
9. Clypeus very broad and flat, nearly twice as broad as the median length 10
 Clypeus less broad and flat, median length exceeding half the breadth; flagellar segments 2 and 3 no more than equalling the 1st 11
10. Eyes parallel; process of labrum narrowly truncate; lateral facial maculae terminated about at level of upper margin of clypeus *cressonii cressonii* Robertson (p. 248)
 Eyes slightly divergent below; process of labrum short and very broad; lateral facial maculae terminated about at level of antennae *cressonii tallahasensis* new subspecies (p. 249)
- 11(9). Lateral face marks large, extending to level of antennae *accepta* Viereck (p. 137)
 Lateral face marks small, not nearly attaining level of upper margin of clypeus 12
12. Abdominal terga smooth but dull, with scattered, sparse and minute punctures; abdominal fasciae rather loose and thin, widely interrupted medially on segments 1 and 2 *asteris* Robertson (p. 139)
 Abdominal terga densely pebbled and entirely impunctate, fasciae dense and complete on segments 2-5, somewhat interrupted medially on 1 *fulvipennis* Smith (p. 145)
- 13(6). Basal segment of flagellum somewhat shorter than segment 2 14
 Basal segment of flagellum at least equal in length to segment 2 15
14. Mandibles short, apex of one not nearly attaining base of the other; cheeks rounded, subequal to eyes in width *neonana* Viereck (p. 163)
 Mandibles elongate, apex of one nearly attaining base of the other when closed; cheeks broad and flat, conspicuously angulate *banksi* Malloch (p. 254)
- 15(13). Lower angle of cheek strongly produced to form a conspicuous, ventral, elongate lobe *cerebrata* new species (p. 255)
 Lower angle of cheek not produced .. 16
16. Basal segment of flagellum considerably shorter than segments 2 and 3 combined 17
 Basal segment of flagellum nearly or quite equal to segments 2 and 3 combined 22
17. Cheeks much broader than eyes, with a rounded angle opposite middle of eye 18
 Cheeks rounded posteriorly, not much broader than eyes, if any 19
18. Scutellum with a dense tuft of erect, elongate, fulvous hairs *miserabilis scutellata* Dalla Torre (p. 160)
 Pubescence of scutellum relatively thin, short and pale *miserabilis bipunctata* Cresson (p. 159)
- 19(17). Length of clypeus nearly equal to its breadth, punctures deep and rather coarse *duplicata* new species (p. 144)
 Clypeus considerably broader than long, punctures minute 20
20. Process of labrum broad and very short, not emarginate *robertsonii* Dalla Torre (p. 237)
 Process of labrum more elongate and to some degree emarginate 21
21. Basal segment of flagellum no more than equal in length to 2nd segment *asteroides* new species (p. 140)
 Basal segment of flagellum considerably longer than 2nd segment *placata* new species (p. 148)
- 22(16). Lateral angles of sternum 6 strongly reflexed 23
 Lateral angles of sternum 6 not reflexed 25
23. Abdominal terga rather dull, with only widely spaced and very obscure and minute punctures 24
 Abdominal terga to some degree shining, with deep and distinct, although fine punctures *gardineri* Cockerell (p. 146)
24. Median segments of flagellum about as broad as long; space between margin of vertex and lateral ocelli somewhat greater than their diameter *solidaginis* Robertson (p. 151)
 Median segments of flagellum longer than broad; space between margin of vertex and lateral ocelli no greater than their diameter *trassicae* new species *arabis* (p. 142)

- 25(22). Cheeks broad, somewhat angulate opposite middle of eye; mandible with a triangular, basal, inferior dilation *ziziaeformis* Cockerell (p. 169)
Cheeks not at all angulate, if broad; mandibles simple at base 26
26. Space between margin of vertex and lateral ocelli equal to no more than diameter of the ocelli 27
Space between margin of vertex and lateral ocelli distinctly greater than diameter of ocelli 30
27. Lateral and upper margins of clypeus dark; segments 2-4 of flagellum very short, their combined length not much exceeding the basal segment *krigiana* Robertson (p. 156)
Clypeus entirely yellow; at least 4th segment of flagellum fully as long as broad 28
28. Small (5-6 mm.); abdominal terga smooth and shining; 1st transverse cubitus meeting marginal cell very close to stigma *ziziae* Robertson (p. 168)
Larger (8 mm.); abdominal terga dull, tessellate or pebbled; 1st transverse cubitus rather widely separated from stigma 29
29. Wings deep brownish, with violaceous reflections; abdominal terga densely pebbled, with entire, dense, bright ochraceous, apical fasciae *fulvipennis* Smith (p. 145)
Wings subhyaline; abdominal terga finely tessellate, with scattered minute and obscure punctures, the fasciae of loose, elongate, whitish hairs *arabis* Robertson (p. 251)
- 30(26). Second and 3rd submarginal cells subequal in length; abdomen impunctate, dull and tessellate *braccata* Viereck (p. 141)
Third submarginal cell exceeding 2nd in length; abdomen to some degree punctate 31
31. Apical margins of abdominal terga narrowly and deeply depressed, testaceous, discs otherwise closely punctate, dull and densely tessellate between punctures *rudbeckiae* Robertson (p. 149)
Apical margins of terga more broadly and shallowly depressed, discs rather smooth, tessellate, very finely and sparsely punctate 32
32. Thorax with dense ochraceous pubescence; apical margins of abdominal terga broadly yellowish-hyaline *helianthi* Robertson (p. 147)
Thorax with rather thin, greyish-white pubescence; apical margins of terga only very narrowly and inconspicuously hyaline *aliciae* Robertson (p. 138)
- 33(1). Posterior margin of cheeks sharply and conspicuously carinate 34
Cheeks at most with a posterior angle, often broadly rounded, at most, subcarinate 38
34. Largely covered with long, erect and quite dense, yellow pubescence, this forming broad, entire, but rather loose apical fasciae on abdominal terga *hirticincta* Provancher (p. 173)
Pubescence relatively short, thin and inconspicuous, more whitish; abdominal fasciae poorly developed 35
35. Triangle of propodeum smooth, with at most some very short and fine striations along basal margin 36
Triangle of propodeum completely and quite coarsely rugose or rugoso-striate 37
36. Scutum with some admixture of black or fuscous pubescence; abdominal terga somewhat shining, with very fine but distinct punctures *peckhami* Cockerell (p. 234)
Pubescence of scutum entirely pale; abdominal terga dull, tessellate, without visible punctures *integra* Smith (p. 232)
- 37(35). Cheeks smooth and shining, posterior carina sharp and distinct to lower angle opposite lower end of eye, about parallel to margin of eye *fragilis* Smith (p. 231)
Cheeks dull and tessellate, posterior carina distinct only at upper end, hind margin divergent from eye margin, with a rounded angle opposite lower third of eye *persimulata* Viereck (p. 235)
- 38(33). Mandible with a distinct basal inferior angle or tooth 39
Mandible lacking the basal angle or tooth 43
39. Face with black hairs along inner orbits and around antennae *milwaukeeensis* Graenicher (p. 107)
Pubescence of face entirely pale 40
40. Malar space very short, almost linear 41
Malar space longer, the length being equal to about one-third the basal width of the mandible 42

41. Basal segment of flagellum more elongate, nearly equalling segments 2 and 3 combined *tridens* Robertson (p. 109)
Basal flagellar segment shorter, much exceeded in length by 2 and 3 combined *macoupinensis* Robertson (p. 106)
- 42(40). Face above level of antennae coarsely, irregularly striate
 *bisignata* new species (p. 122) Tauson
Face above antennae relatively smooth, with only a few obscure striations
 *mandibularis* Robertson (p. 106)
- 43(38). Cheeks very broad and flat, posterior margin to some degree angulate 44
Cheeks either more narrow, or posterior margin broadly rounded 62
44. Abdomen, as well as head and thorax, clothed with long, erect, yellow pubescence, forming broad, distinct, apical fasciae; scutum densely tessellate and impunctate *hirticincta* Provancher (p. 173)
Pubescence of abdomen short and inconspicuous; scutum to some degree punctate 45
45. Propodeal triangle very coarsely striate and pleura coarsely rugose
 *mendica* new species (p. 189)
Propodeal triangle and pleura relatively smooth 46
46. Malar space indistinct, linear or lacking 47
Malar space distinct 57
47. Segments 1 and 2 of flagellum about equal in length, or front wings infuscated in marginal cell and along outer margin 48
Basal flagellar segment considerably longer than segment 2; marginal cell not infuscated 50
48. Smaller (7-8 mm.); mandibles not much elongated, inner tooth only slightly beyond center line of face when mandible closed 49
Larger (9-10 mm.); mandibles much elongated, inner tooth much beyond mid line when closed *perplexa* Smith (p. 000) 1/6
49. Front wings entirely clear hyaline
 *canadensis* Dalla Torre (p. 172)
Front wings lightly infuscated in marginal cell and along outer margin
 *nubecula* Smith (p. 174)
- 50(48). Segment 1 of flagellum equal to segments 2 and 3 combined 51
Segment 1 shorter than 2 and 3 combined 53
51. Punctures of abdominal terga deep and distinct, rather coarse, but interspaces much greater than their diameter
 *erigeniae* Robertson (p. 155)
Punctures of abdominal terga minute and obscure 52
52. Median flagellar segments relatively short not much longer than broad, segments 2 and 3 slightly broader than long
 *distans* Provancher (p. 154)
Median flagellar segments longer than broad, including segment 3
 *erythronii* Robertson (p. 212)
- 53(51). Impressed apical areas of abdominal terga yellowish-hyaline, or abdomen largely ferruginous 54
Only a very narrow apical border of abdominal terga yellowish 55
54. Abdomen more or less ferruginous, at least apically and toward sides of the terga *erythrogaster erythrogaster* Ashmead (p. 114)
Abdomen largely black or piceous, except that the margins of the segments are rather broadly brownish-hyaline
 *erythrogaster subaustralis* Cockerell (p. 115)
- 55(53). Punctures of abdominal terga minute and sparse; angle of cheek acute, opposite middle of eye
 *canadensis* Dalla Torre (p. 172)
Punctures of abdominal terga distinct, uniformly fine and close; angle of cheek rounded 56
56. Pubescence of dorsum of thorax greyish; gonocoxal lobes not at all produced
 *macra* Mitchell (p. 127)
Pubescence of dorsum of thorax ochraceous or fulvous; gonocoxal lobes quite strongly produced *acra* new species (p. 111) Wheeler
- 57(46). Basal segment of flagellum but very slightly longer than segment 2, if at all 58
Basal segment of flagellum nearly or quite twice as long as 2nd 59
58. Mid antennal segments hardly twice as long as their breadth; gonostyli but slightly exceeding tips of penis valves
 *carolina* Viereck (p. 228)
Mid antennal segments fully twice as long as they are broad; gonostyli elongate, much exceeding tips of penis valves *durangoensis* Viereck & Cockerell (p. 229)
- 59(57). Larger (9-10 mm.); face with black pubescence along margin of eyes and around antennae 60
Smaller (6-8 mm.); pubescence of face entirely pale 61

I would call them fine

60. Hind tibiae and tarsi ferruginous
 *clarkella* Kirby (p. 104)
 Hind tibiae and tarsi dark, concolorous
 with the other legs
 *frigida* Smith (p. 105)
- 61(59). Dorsum of thorax densely tessellate
 and entirely impunctate; gonocoxal
 lobes not produced
 *bifurcata* new species (p. 211)
 Dorsum of thorax somewhat shining, with
 rather fine but distinct punctures;
 gonocoxal lobes strongly produced
 *parnassiae* Cockerell (p. 213)
- 62(43). Enclosure of propodeum coarsely
 rugose or striate; 2nd segment of fla-
 gellum fully as long as, or longer than,
 1st 63
 Enclosure of propodeum usually relative-
 ly smooth 84
63. Lateral apical angles of sternum 6
 strongly reflexed 64
 Sternum 6 not noticeably reflexed apical-
 ly 66
64. Pleura dull and densely tessellate, but
 not at all rugose; gonocoxal lobes much
 produced, tips almost attaining gono-
 styli *ferri nigeri* new species (p. 206)
 Pleura coarsely rugose; gonocoxal lobes
 produced but slightly, if at all 65
65. Process of labrum broad and short, fully
 three times broader than long, and
 relatively large ... *crataegi* Robertson
 (p. 206)
 Process of labrum very small, nearly as
 long as broad, its apex narrowly
 emarginate ... *atlantica* new species
 (p. 178)
- 66(63). Basal half or more of abdomen
 bright ferruginous
 *mariae mariae* Robertson (p. 187)
 Abdomen largely dark 67
67. Apical margin of abdominal tergum 2
 broadly impressed, covering one-half of
 the disc along the mid line 68
 Apical margin of tergum 2 more narrow-
 ly impressed 69
68. Scutum and scutellum dull, densely tes-
 sellate, punctures rather coarse, shal-
 low and indistinct
 *rugosa* Robertson (p. 198)
 At least the scutum somewhat shining
 punctures deep and distinct, quite close
 over most of disc
 *pseudobscura* new species (p. 193)
- 69(67). Impressed apical area of abdominal
 terga closely, deeply and quite coarsely
 punctate, these punctures extending
 rather uniformly to the very narrow,
 yellow, apical rim 70
 Punctures of apical impressed area of
 terga at most very fine, usually becom- ^{can be same}
 ing more sparse and minute toward ^{as non impress}
 apical margin 71 ^{areas}
70. Front wings rather deeply infuscated;
 1st recurrent vein received by 2nd
 submarginal cell only slightly beyond
 middle; abdominal terga 2-4 uniformly
 shining, punctures quite regular and
 evenly distributed
 *quintilis* Robertson (p. 195)
 Front wings subhyaline; 1st recurrent
 vein received by 2nd submarginal cell
 very close to apex; abdominal terga 2-4
 less shining, punctures of apical im-
 pressed areas laterally much closer
 and finer than those over basal area of
 disc *compacta* new species
 (p. 181)
- 71(69). Second abdominal tergum impressed
 no more than a third of its median
 length 72
 Second tergum impressed over more than
 a third of its length 75
72. Basal abdominal tergum closely, deeply
 and rather coarsely punctate, inter-
 spaces not much exceeding diameter of
 punctures *forbesii* Robertson
 (p. 183)
 Basal tergum finely or minutely punctate,
 interspaces much greater than dia-
 meter of punctures 73
73. Hind tibiae and all tarsi bright testa-
 ceous, in marked contrast to the re-
 maining segments of the legs which
 are piceous or black
 *imitatrix profunda* Viereck (p. 206)
 Hind tibiae and tarsi not contrasting in
 color with other leg segments ... 74
74. Space between margin of vertex and
 lateral ocelli considerably greater than
 their diameter; scutellum more coarse-
 ly sculptured than scutum; flagellum
 dull red ... *kalmiae* Atwood (p. 186)
 Space between margin of vertex and
 lateral ocelli about equal to their di-
 ameter; punctures of scutum and scu-
 tellum not markedly different
 *imitatrix imitatrix* Cresson (p. 205)
- 75(71). Posterior half of mesopleura rela-
 tively smooth, more tessellate than
 rugose 76
 Mesopleura uniformly, coarsely rugose
 throughout 77

76. Abdomen more or less suffused with red
 *mariae mariae* Robertson (p. 187)
 Abdomen entirely black
 *marie concolor* Robertson (p. 188)
- 77(75). Punctures of vertex rather coarse
 and distinct, interspaces to some degree
 shining 78
 Vertex dull and tessellate, punctures
 obscure 80
78. Segment 2 of flagellum little if any long-
 er than segment 1; scutellum coarsely
 and closely punctate
 *miranda* Smith (p. 190)
 Segment 2 of flagellum much longer than
 segment 1 79
79. Abdominal terga shining, punctures very
 fine, those on basal tergum minute,
 well separated *rehni* Viereck
 (p. 196)
 Abdomen somewhat less shining, punctures
 deep and distinct, interspaces not
 much more than twice the diameter of
 punctures, at most
 *ceanothi* Viereck (p. 179)
- 80(77). Basal abdominal tergum shining,
 punctures exceedingly minute, barely
 visible if at all; segment 2 of flagellum
 nearly twice length of segment 1 . . 81
 Basal tergum less shining, punctures
 deep and distinct, although fine; seg-
 ment 2 of flagellum only slightly long-
 er than segment 1 82
81. Smaller (7-8 mm.); sternum 7 only
 slightly produced medially, not emar-
 ginate *spiraeana* Robertson
 (p. 202)
 Larger (8-9 mm.); sternum 7 strongly
 produced, this portion broadly, trian-
 gularly emarginate
 *antica* new species (p. 203)
- 82(80). Punctures of clypeus rather fine
 and crowded, especially over upper
 half 83
 Clypeal punctures rather coarse, uni-
 formly although not widely separated .
 *sigmundi* Cockerell (p. 200)
83. Abdominal terga shining, punctures
 somewhat finer and closer; hind tibiae
 and all tarsi testaceous
 *hippotes* Robertson (p. 184)
 Abdominal terga rather dull, punctures
 more widely separated; legs entirely
 dark *fenningeri* Viereck (p. 182)
- 84(62). Basal segment of flagellum equal-
 ling 2 and 3 combined, these quite short,
 no longer than broad 85
- Second and 3rd segments of flagellum
 combined usually longer than basal
 segment, at least the 3rd longer than
 broad 88
85. Larger (9 mm.); clypeus strongly con-
 vex, protuberant; ocelli separated from
 margin of vertex by about twice their
 diameter *violae* Robertson
 (p. 252)
 Smaller (7 mm. or less); clypeus not
 markedly protuberant; space between
 margin of vertex and lateral ocelli no
 greater than their diameter 86
86. Abdomen entirely impunctate; propodeal
 triangle well defined, finely reticulate
 *fragariana* Graenicher (p. 161)
 Abdomen finely but distinctly punctate;
 propodeal triangle poorly defined, very
 short, with a basal fringe of short
 striae 87
87. Clypeus strongly protuberant, projecting
 fully one-half below suborbital line;
 segment 3 of flagellum fully as long
 as broad *crenata* new species
 (p. 221)
 Clypeus moderately convex, projecting
 but very little below suborbital line;
 segment 3 of flagellum much broader
 than long
 *parakrigiana* new species (p. 157)
- 88(84). Diameter of lateral ocelli fully equal
 to space separating them from margin
 of vertex 89
 Lateral ocelli separated from margin of
 vertex by a space greater than their
 diameter 100
89. Face, including clypeus, with much long
 blackish pubescence
 *algida* Smith (p. 218)
 Face usually entirely pale pubescent, but
 if any dark hairs present, limited to
 inner orbits or upper portion of head
 90
90. Second segment of flagellum equal to
 1st in length 91
 Basal segment of flagellum considerably
 longer than 2nd 92
91. Slightly smaller (6.5 mm.); gonocoxal
 lobes moderately reproduced; 1st recur-
 rent vein reaching 2nd submarginal
 cell at middle or toward apex
 *nasoni* Robertson (p. 244)
 Larger (7.5 mm.); gonocoxal lobes not
 produced; 1st recurrent vein reaching
 2nd submarginal cell nearer to base
 than to apex
 *wheeleri* Graenicher (p. 246)

- 92(90). Basal segment of flagellum fully twice the length of 2nd 93
 Basal segment of flagellum only slightly exceeding 2nd in length 95
93. Clypeus protuberant; dorsal area of propodeum rather narrow; gonostyli slightly expanded apically
 *polemonii* Robertson (p. 157)
 Clypeus relatively flat; dorsal area of propodeum quite broad; gonostyli very slender and spine-like apically 94
94. Sixth ventral segment of abdomen reflexed, with a short, dense median tuft of hairs, and on each side a longer and quite dense tuft of straight hairs
 *illinoensis* Robertson (p. 161)
 Abdominal sternum 6 simple, not of the above form *salictaria* Robertson (p. 167)
- 95(92). Very small (5-6 mm.); median segments of flagellum no longer than broad *fragariana* Graenicher (p. 161)
 Larger (8 mm. or more); median segments of flagellum considerably longer than broad 96
96. Process of labrum narrow, entire, length nearly equal to breadth
 *placida* Smith (p. 214)
 Process of labrum short, much broader than long 97
97. Abdominal terga finely but distinctly punctate; clypeus protuberant; gonocoxities slender apically 98
 Abdominal terga impunctate or with extremely minute, obscure punctures, clypeus broadly convex; gonocoxites to some degree expanded apically ... 99
98. Cheeks slightly broader than eyes; clypeus shining, with coarse, deep and rather sparse punctures
 *geranii* Robertson (p. 221)
 Cheeks subequal to eyes in width; clypeus dull and tessellate, punctures shallow and obscure
 *phaceliae* new species (p. 224)
- 99(97). Abdominal terga with a faint greenish tinge; apical produced portion of sternum 8 parallel-sided; gonocoxal lobes only slightly produced
 *lata* Viereck (p. 222)
 Abdominal terga dull black; apical portion of sternum 8 more gradually narrowed to a slender tip; gonocoxal lobes strongly produced
 *bisalicis* Viereck (p. 219)
- 100(88). Segment 2 of flagellum considerably longer than the basal segment; abdomen dull, tessellate between the fine and rather close punctures; cheeks and eyes subequal in width
 *wilkella* Kirby (p. 250)
 Segments 1 and 2 of flagellum subequal in length, or 1st segment longer .. 101
101. Space separating lateral ocelli from margin of vertex relatively narrow, less than twice the diameter of ocelli .. 102
 Lateral ocelli separated from margin of vertex by a space fully equal to twice their diameter 104
102. Abdomen entirely impunctate
 *confederata* Viereck (p. 125)
 Abdomen with distinct, although possibly minute punctures 103
103. First and 2nd flagellar segments equal in length; abdominal punctures coarse, deep and close *ressonii ivanensis* new subspecies (p. 249)
 Basal segment of flagellum considerably exceeding 2nd segment in length; abdominal punctures minute and sparse *dunningi* Cockerell (p. 113)
- 104(101). Face with conspicuous black pubescence along inner margins of eyes ..
 105
 Pubescence of face entirely pale .. 106
105. Abdomen black
 *carlini carlini* Cockerell (p. 111)
 Abdomen ferruginous
 *carlini neorhodura* new subspecies (p. 113)
- 106(104). Sternum 6 with a pronounced apical tuft of elongate hairs, each hair being nearly as long as the median length of the plate
 *pruni* Robertson (p. 117)
 Apical hairs on sternum 6 of ordinary length, not nearly as long as the plate 107
107. Tip of sternum 8 sharply acute on each side of a deep median emargination
 *navalis* Smith (p. 128)
 Tip of sternum 8 blunt, truncate or with a very shallow and indefinite median notch 108
108. Relatively large (12 mm. or more); pubescence of head and thorax fulvous; wings deep fuliginous; legs bright ferruginous; dorsal triangle of propodeum rather coarsely rugose
 *obscuripennis* Smith (p. 129)

- Usually smaller; pubescence of head and thorax usually more ochraceous; wings yellowish or hyaline; legs dark; dorsal triangle of propodeum usually quite smooth 109
109. Clypeus dull, finely and densely punctate beneath the copious pubescence 110
- Clypeus shining, the median punctures, at least, distinctly separated 112
110. Segments 1 and 2 of flagellum about equal in length; abdomen somewhat bluish or violaceous
viburnella Graenicher (p. 119)
- Segment 1 of flagellum much longer than segment 2; abdomen black 111
111. Process of labrum broadly triangular, tip rather narrowly rounded; punctures of abdominal terga minute and indistinct *dunningi* Cockerell (p. 113)
- Process of labrum rather broadly truncate; punctures of abdominal terga fine, but deep and distinct
commoda Smith (p. 124)
- 112(109). Malar space very short; cheeks fully twice width of eye; gonocoxal lobes strongly produced
regularis Malloch (p. 118)
- Malar space fully a third as long as width of mandible at base; cheeks less than twice width of eyes; gonocoxal lobes only slightly produced, if at all 113
113. Wings hyaline, or only very faintly yellowish; 2nd flagellar segment fully equal to 1st in length; punctures of scutellum shallow but close
vicina Smith (p. 132)
- Wings more or less strongly yellow or infuscated; 2nd flagellar segment usually considerably shorter than 1st; punctures of scutellum rather sparse 114
114. Clypeus markedly convex and protuberant, median length fully half the breadth *hilaris* Smith (p. 126)
- Clypeus less strongly convex, shorter relative to the breadth (ratio of 2.5:-6.0) *sayi* Robertson (p. 131)

Andrena (Andrena) clarkella (Kirby)

(Figs. 15, 16 & 21)

Melitta Clarkella Kirby, 1802. Monog. Apum Angliae, 2, p. 130. ♀.*Andrena clarkella* Sladen, 1919. Canad. Ent. 51, p. 124. ♀ ♂.*Andrena (Andrena) clarkella* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 205. (classification)

FEMALE—Length 12 mm.; clypeus slightly convex, broader than long, surface rather dull, punctures rather fine and close; facial foveae broad, fuscous tomentose; space between margin of vertex and lateral ocelli slightly exceeding their diameter; cheeks slightly broader than eyes, minutely punctate; malar space short but distinct; basal segment of flagellum equal in length to 2nd and 3rd combined; process of labrum subtriangular, the tip truncate and slightly emarginate; mandibles of ordinary length, with a small inner subapical tooth; pubescence of head long, dense and erect, fuscous or blackish except for some pale hairs on vertex; thoracic integument dull and densely tessellate, punctures inevident except along lower portions of pleura; enclosure of propodeum smooth, pubescence long, dense, and erect, that on scutum, scutellum and upper portion of propodeum pale ochraceous or whitish, otherwise fuscous to black; propodeal corbicula and trochanteral flocus well developed, black; tibial scopa rather long and dense, orange; fore and hind basitarsi slightly narrower than their respective tibiae, the mid basitarsi subequal to their tibiae; hind tibiae and tarsi bright ferruginous, legs otherwise black; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga rather dull but smooth, apical third slightly depressed and slightly paler in color than the remainder of the disc, pubescence long, dense and erect, entirely fuscous except for some pale pubescence on basal segment.

MALE—Length 10 mm.; clypeus slightly convex, much broader than long, closely and finely punctate; space between margin of vertex and lateral ocelli slightly exceeding their diameter; cheeks broad and flat, subangulate, angle opposite middle of eye; malar space well developed but short; process of labrum only slightly broader than long, truncate; mandibles rather slender and slightly flexed, overlapping about one-third; pubescence of head long, dense and erect, whitish on cheeks below and on clypeus and vertex, otherwise fuscous; thoracic integument dull, densely tessellate and impunctate; propodeal enclosure smooth; thoracic pubescence long, dense and

erect, whitish in general, but with some fuscous hairs on pleura above; basitarsi narrow and elongate, much narrower than their respective tibiae; hind tibiae and tarsi ferruginous, the others dark; pubescence of legs largely pale; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent beyond middle; abdominal terga smooth but dull, the punctures exceedingly minute and obscure, apical third of discs slightly depressed, lighter in color than remainder of discs, pubescence rather long, thin and erect, entirely pale, with no trace of fasciae; apical portion of sternum 8 gradually narrowed toward the tip, with a very low, subapical, dorsal ridge, tip beyond this ridge slightly rounded, slightly longer than broad; penis valves broadly expanded basally, excavated beneath this expansion, gonocoxites moderately expanded apically, the gonocoxal lobes produced and narrowly rounded.

DISTRIBUTION—Holarctic, being recorded from Europe, Alaska, eastern Canada, and in the United States from Minnesota to New York, Massachusetts and Maine; April to July.

X

Andrena (Andrena) frigida Smith

(Figs. 15 & 16)

- Andrena frigida* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 115. ♀.
Andrena hirticeps Smith, 1853. Op. Cit. p. 116. ♂. New synonymy.
Andrena moesta Smith, 1879. Descr. New Species Hym. Brit. Mus., p. 54. ♀ ♂.
Andrena frigida Morice & Cockerell, 1901. Canad. Ent. 33, p. 149 ♀. (type)
Andrena moesta Morice & Cockerell, 1901. Canad. Ent. 33, p. 153. (type)
Andrena cockerelli Graenicher, 1903. Canad. Ent. 35, p. 163. ♀ ♂.
Andrena frigida Cockerell, 1906. Psyche 13, p. 33. (type)
Andrena moesta Cockerell, 1906. Psyche 13, p. 34. (type)
Andrena cockerelli Viereck, 1907. Ent. News 18, pp. 283 & 285. ♀ ♂. (key)
Andrena frigida Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 209, ♂ ♀. (key)
Andrena frigida Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena (Andrena) frigida Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 205. (classification)
Andrena hirtignatha Linsley, 1951. In Muesebeck, Krombein and Townes, Hym. Amer. N. Mex., U.S.D.A. Agr. Monogr. 2, p. 1068.

Andrena frigida Krombein, 1958. Hymenoptera of America North of Mexico. Synoptic Catalog. U.S.D.A. Agr. Monog. No. 2. First Suppl., p. 214. (synonymy)

FEMALE—Length 11 mm.; length and breadth of face subequal; clypeus rather flat, broader than long, finely and quite closely punctate; facial foveae broad, fuscous tomentose; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, minutely punctate; basal segment of flagellum slightly exceeding 2nd and 3rd combined; process of labrum subtriangular, truncate at tip; mandibles of ordinary length, with a small inner tooth; pubescence of head quite long and white in general, but fuscous around eyes and between foveae and antennae; thoracic integument dull and tessellate, very minutely and obscurely punctate, pubescence entirely greyish-white; enclosure of propodeum smooth; propodeal corbicula well developed, fringed anteriorly; tibial scopa short, hairs simple; trochanteral floccus well developed; fore and hind basitarsi slightly narrower than their tibiae, the mid basitarsi nearly as broad as the mid tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent vein near the apex; abdominal terga rather dull, very minutely, obscurely, and rather sparsely punctate; apical depressed margins occupying about one-third of the disc, concolorous with disc, abdominal pubescence long, thin and erect, greyish-white, slightly more dense along apical margins of terga, to form inconspicuous fasciae.

MALE—Length 8 mm.; length and breadth of face subequal; clypeus flat, slightly broader than long, finely, closely, and uniformly punctate; space between margin of vertex and lateral ocelli slightly exceeding their diameter; cheeks very broad and flat, subangulate, angle opposite middle of eye (as in *clarkella*, fig. 21); malar space distinct but short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum subtriangular, the apex truncate and slightly emarginate, mandibles slender, slightly flexed, tips overlapping about one-fourth; pubescence of head long, dense and erect, white, intermixed with fuscous around eyes, cheeks and ocelli; thoracic integument dull, densely tessellate, punctures barely visible; enclosure smooth; pubescence long and quite dense, white intermixed with fuscous above; basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent vein beyond middle; abdominal terga smooth, dull, apical margins only slightly depressed, punc-

tures exceedingly minute and obscure, pubescence rather long, thin and erect, fasciae not well developed; apical portion of sternum 8 quite narrow and elongate, with a low, dorsal, subapical ridge, tip beyond this slightly rounded and very slightly incised; penis valves broadly expanded basally, deeply excavated beneath this expansion, gonocoxites quite narrow and elongate, gonocoxal lobes strongly produced and broadly rounded.

DISTRIBUTION—Alaska to Nova Scotia, and in the United States from Minnesota to the New England states, south to Virginia; March to June.

FLOWER RECORDS — Brittain and Newton (1934) record *frigida* on *Cornus*, *Prunus* and *Salix*.

X

***Andrena (Andrena)*
macoupinensis Robertson**

(Figs. 15, 16 & 21)

Andrena macoupinensis Robertson, 1900. Acad. Sci. St. Louis, Trans. 10, p. 48. ♀.

Andrena macoupinensis Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 191. ♀. (key)

Andrena (Andrena) macoupinensis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 206. (classification)

FEMALE—Length 11 mm.; length and breadth of face subequal; clypeus rather flat, projecting only slightly below suborbital line, finely and closely punctured laterally, more sparsely so medially; facial foveae occupying about two-thirds of distance between eyes and lateral ocelli, densely covered with pale ochraceous tomentum; space between lateral ocelli and margin of vertex about equal to their diameter; cheeks slightly broader than eyes, smooth, minutely and rather closely punctate; malar space very short; basal segment of flagellum slightly exceeding 2nd and 3rd combined; process of labrum broadly rounded, about twice as broad as long, slightly incised medially; mandibles of ordinary length, with a small subapical inner tooth; pubescence of head, thorax and base of abdomen entirely pale, ochraceous above, becoming paler below; scutum anteriorly dull, closely and finely punctate, more shining and sparsely punctate posteriorly; scutellum somewhat shining, very sparsely and minutely punctate; pleura dull, tessellate, punctures very fine and obscure; enclosure of propodeum smooth; propodeal corbicula well developed, fringed anteriorly; trochanteral floccus well developed; tibial scopa rather short, dense and of simple hairs; mid and hind basitarsi rather broad and flat, nearly equalling their tibiae in width; 2nd submarginal cell shorter than 3rd, receiving 1st

recurrent beyond middle; abdominal terga smooth, somewhat shining, very minutely punctate, apical margins slightly depressed, the rims faintly reddened, discal pubescence short, erect, entirely pale, apical fasciae poorly developed.

MALE—Length 8 mm.; clypeus slightly convex, much broader than long, closely and finely punctate beneath the dense pubescence; space between lateral ocelli and margin of vertex about equal to their diameter; cheeks broad and flat, with a rounded posterior angle opposite middle of eye, subcarinate at the angle, rather dull, minutely punctate; malar space extremely short; basal segment of flagellum only slightly exceeding the length of any of those that follow; process of labrum short, rather broad, quite deeply emarginate apically; mandibles slender and elongate, overlapping about one-third, with a well developed, inner, subapical tooth and a ventral, basal, triangular projection; pubescence of head, thorax and base of abdomen entirely pale, more ochraceous above, becoming paler below; thoracic integument dull and tessellate, scutum finely and shallowly punctate anteriorly, more shining and sparsely punctate posteriorly, and scutellum shining and very sparsely punctate; enclosure of propodeum narrowly striated along basal margin, otherwise smooth; all basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, somewhat shining, very minutely and obscurely punctate, apical margins very slightly depressed, concolorous with remainder of discs, pubescence entirely pale, very thin, short and obscure, fasciae very poorly developed; apical portion of sternum 8 slender and elongate, broadly truncate apically; penis valves broadly expanded basally, excavated on each side beneath this expansion, gonocoxites moderately dilated apically, gonocoxal lobes produced, narrowly rounded.

DISTRIBUTION — Illinois, Massachusetts and North Carolina; March to June.

FLOWER RECORDS—*Prunus*, *Salix* and *Vicia*.

X

***Andrena (Andrena)*
mandibularis Robertson**

(Figs. 15 & 22)

Andrena mandibularis Robertson, 1892. Amer. Nat. 26, p. 272. ♂.

Andrena mandibularis Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 191 & 192. ♀ ♂. (key)

Andrena mandibularis Salt, 1927. Jour. Expt. Zool. 48, p. 252. (stylopization)

- Andrena mandibularis* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).
Andrena mandibularis Atwood, 1934. Canad. Jour. Res. 10, p. 209. ♂. (key).
Andrena mandibularis Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records).
Andrena (Andrena) mandibularis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 206. (classification).

FEMALE—Length 10 mm.; clypeus broader than long, with scattered irregular punctures on each side of a median impunctate line; facial foveae broad above, with pale brownish tomentum; lateral ocelli separated from margin of vertex by a space about equal to their diameter; cheeks subequal to eyes in width, very minutely and obscurely punctate; malar space evident but very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, the tip rounded; mandibles of ordinary length, scarcely at all overlapping; pubescence of head whitish, rather thin; thoracic integument dull, densely tessellate, only very obscurely punctate; enclosure of propodeum very finely rugose toward basal margin; thoracic pubescence entirely pale, rather thin; propodeal corbicula well developed, fringed anteriorly; trochanteral floccus well developed; tibial scopa of shorter, simple hairs, quite dense; all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell shorter than 3rd, receiving 1st recurrent beyond middle; abdominal terga dull, tessellate, impunctate, the apical margins slightly depressed, concolorous with discs, pubescence thin, entirely pale, the fasciae very poorly developed.

MALE—Length 8 mm.; clypeus quite flat, much broader than long, somewhat shining, minutely and rather sparsely punctate; lateral ocelli separated from margin of vertex by a space about equal to their diameter; cheeks much broader than eyes, angulate, angle opposite middle of eye (as in *tridens*, fig. 21), shining, minutely and rather sparsely punctate; malar space distinct but rather short; basal segment of flagellum only slightly exceeding each of the following segments in length; process of labrum subtriangular, much broader than long, the tip truncate, slightly incised; mandibles elongate, slender, flexed, overlapping nearly one-half, with a subapical inner tooth, and with a basal inferior projection; pubescence of head, thorax and base of abdomen rather long and dense, entirely pale, slightly yellowish above, more whitish below; thoracic integument dull, tessellate, the punctures very shallow and obscure; enclosure of propodeum smooth except for a few

obscure basal rugae; all the basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell shorter than 3rd, receiving 1st recurrent toward apex; abdominal terga smooth, somewhat shiny, with sparse, very minute and obscure punctures, apical margins slightly depressed, mostly concolorous with the discs, pubescence rather short, entirely pale, fasciae entirely lacking; apical portion of sternum 8 rather slender, tip beyond the subapical ridge slightly broader than long, subtruncate and very slightly incised; penis valves expanded basally, excavated on each side beneath this expansion, gonocoxites rather broadly dilated apically, the gonocoxal lobes produced, very broadly rounded.

DISTRIBUTION—Minnesota to the New England states, Ontario and Nova Scotia, south to Georgia; March to July.

FLOWER RECORDS—*Cornus*, *Crataegus* and *Malus*. Robertson (1929) records this species from the following additional genera: *Amelanchier*, *Claytonia*, *Hepatica*, *Prunus*, *Rhamnus*, *Rhus*, *Salix*, *Staphylea*, *Uvularia*, *Viburnum* and *Zanthoxylum*. It is recorded on *Kalmia* and *Pyrus* by Brittain and Newton (1934).

X

***Andrena (Andrena)*
milwaukeeensis Graenicher**
 (Figs. 15, 16 & 20)

- Andrena milwaukeeensis* Graenicher, 1903. Canad. Ent. 35, p. 164. ♀ ♂.
Andrena milwaukeeensis Viereck, 1907. Ent. News 18, pp. 283 & 285. ♀ ♂. (key).
Andrena milwaukeeensis Brittain, 1933. Canad. Dept. Agr. Bul. 162, p. 95.
Andrena milwaukeeensis Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 209. ♀ ♂. (key).
Andrena milwaukeeensis Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records).
Andrena (Andrena) milwaukeeensis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 206. (classification).

FEMALE—Length 11 mm.; face very slightly longer than broad; clypeus moderately convex, slightly broader than long, smooth, with widely spaced, shallow and rather fine punctures; facial foveae broad above, covered with brownish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks considerably broader than eyes, with minute, well separated punctures; malar space equal to about one-third the basal width of mandible; basal segment of flagellum longer than 2nd and 3rd combined; process of labrum extensive, much broader than long, the tip truncate with a very small median emargination; mandibles rather short, with a small

subapical inner tooth; pubescence of head rather copious, fuscous in general but with some ochraceous pubescence on vertex and around antennae; thoracic integument dull and tessellate, very obscurely punctate; enclosure of propodeum smooth; thoracic pubescence long, dense and erect, pale ochraceous above, becoming slightly more fuscous beneath; propodeal corbicula rather well developed, pale ochraceous; trochanteral flocus well developed, fuscous; tibial scopa short, dense, of simple hairs, fuscous; fore and hind basitarsi slightly narrower than their tibiae, the mid basitarsi subequal to their tibiae; pubescence of legs blackish; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent toward tip; abdominal terga smooth but dull, punctures exceedingly minute and obscure, but rather close, apical margins hardly at all depressed, pubescence rather short but dense and erect, ochraceous on terga 1 and 2, fuscous on the remainder.

MALE—Length 9 mm.; face somewhat longer than broad; clypeus rather flat, only slightly broader than long, surface smooth and shining, with rather close, fine punctures; space between margin of vertex and lateral ocelli slightly exceeding their diameter; cheeks much broader than eyes, subangulate, angle opposite middle of eye (as in *tridens*, fig. 21) quite sparsely and minutely punctate; malar space short but distinct; process of labrum short and broad, the apical margin broadly and slightly emarginate; mandibles exceedingly long and slender, tip of one about reaching base of the other, without a subapical inner tooth, with a ventral, basal, triangular projection; pubescence of head rather long and dense, ochraceous except for some fuscous hairs around bases of antennae and on vertex laterally; thoracic integument dull, densely tessellate, punctures invident; propodeal enclosure smooth; thoracic pubescence long, dense and erect, reddish-ochraceous; basitarsi narrow and elongate, much narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga shining, nearly impunctate, punctures being exceedingly minute and obscure, apical margins only very slightly depressed, slightly reddened, pubescence rather long and dense on terga 1 and 2 where it is entirely pale, much shorter and darker on the following terga; apical portion of sternum 8 narrow, sides nearly parallel, tip beyond the subapical ridge very short, very slightly incised medially; penis valves broadly expanded basally, excavated beneath this expansion, gonocoxites rather broadly expanded apically, gonocoxal lobes produced and broadly rounded.

DISTRIBUTION—Minnesota to the New England states, Quebec and Nova Scotia, south to North Carolina and Georgia; April to July.

FLOWER RECORDS—*Aruncus*, *Ilex* and *Viburnum*. Brittain and Newton (1934) record it also on *Cornus*, *Pyrus malus* and *Rubus*.

Andrena (Andrena) thaspiae Graenicher

- Andrena thaspiae* Graenicher, 1903. *Canad. Ent.* 35, p. 162. ♀ ♂.
Andrena thaspiae Cockerell, 1912. *Ann. Mag. Nat. Hist.* (8) 9, p. 382. ♀ (Var.).
Andrena thaspiae Brittain & Newton, 1933. *Canad. Jour. Res.* 9, p. 341. (flower records)
Andrena thaspiae Atwood, 1934. *Canad. Jour. Res.* 10, pp. 208 & 209. ♀ ♂. (key)
Andrena thaspiae Brittain & Newton, 1934. *Canad. Jour. Res.* 10, p. 261. (flower records)
Andrena (Andrena) thaspiae Lanham, 1949. *Univ. Calif. Pubs. Ent.* 8, p. 206. (classification)

FEMALE—Length 10 mm.; face very slightly longer than broad; clypeus slightly convex, produced considerably below suborbital line, somewhat shining, with numerous, well separated but rather coarse punctures; facial foveae broad above, with yellowish tomentum; lateral ocelli separated from margin of vertex by a space about equal to their diameter; cheeks somewhat broader than eyes, somewhat shining, minutely and rather sparsely punctate; malar space distinct; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quite large, much broader than long, broadly truncate apically, the margin slightly incised; mandibles of moderate length, with a subapical inner tooth; pubescence of head, thorax and base of abdomen entirely pale, ochraceous above, whitish below; thoracic integument dull, tessellate, with fine and distinct but well separated, shallow punctures above; enclosure of propodeum smooth; propodeal corbicula and trochanteral flocus well developed; tibial scopa quite dense, hairs simple, quite long, ochraceous; all basitarsi somewhat narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent toward apex; abdominal terga smooth but rather dull, punctures exceedingly minute and obscure, apical margins of discs somewhat depressed, the rims faintly ferruginous, discal pubescence rather short and thin, entirely pale, pubescence more dense along apical margins to form thin, obscure, whitish fasciae.

DISTRIBUTION—Minnesota and Wisconsin to New York and the New England states, Ontario and Nova Scotia; June to August.

FLOWER RECORDS—Recorded in the literature on the *Umbelliferae*. Collected also on *Rubus* and *Taraxacum*. This species is recorded by Brittain and Newton (1933 & 1934) on the following genera of plants: *Brassica*, *Chrysanthemum*, *Diervilla*, *Ledum*, *Pyrus malus*, *Raphanus*, *Rosa*, *Rubus*, *Solidago*, *Stellaria*, *Taraxacum*, *Trifolium* and *Vaccinium*.

***Andrena (Andrena) tridens* Robertson^X**

(Figs. 15, 16, 20 & 21)

Andrena tridens Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 192 ♂.

Andrena cornelli Viereck, 1907. Ent. News 18, p. 282. ♀.

Andrena tridens Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (?*Andrena*) *tridens* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 206. (classification)

Andrena tridens Krombein, 1958. Hymenoptera of America North of Mexico. Synoptic Catalog. U.S.D.A. Agr. Monog. No. 2. First Suppl., p. 216. (synonymy)

FEMALE—Length 10 mm.; face somewhat longer than distance between eyes; clypeus somewhat convex, almost as long as broad, produced considerably below suborbital line, dull and tessellate, the punctures scattered, irregular and obscure; facial foveae narrow, occupying above only slightly more than half of space between eyes and lateral ocelli, the tomentum slightly yellowish; lateral ocelli separated from margin of vertex by a space about equal to their diameter; cheeks slightly broader than eyes, smooth, minutely punctate; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum much broader than long, subtriangular, the tip truncate, slightly emarginate; mandibles of moderate length, with a small subapical inner tooth; pubescence of head, thorax and base of abdomen entirely pale, slightly yellowish above, of moderate length and density; thoracic integument dull and tessellate, with shallow and rather close punctures on scutum and on pleura above, scutellum nearly impunctate, shining; enclosure of propodeum finely rugose toward basal margin; propodeal corbicular rather thin, anterior fringe poorly developed; trochanteral floccus rather thin; tibial

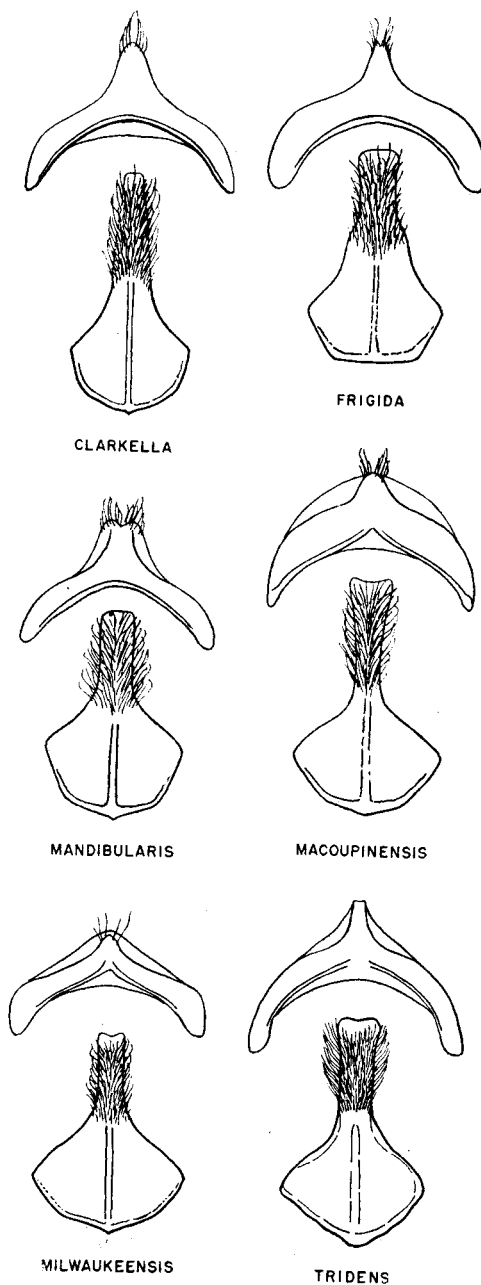


Figure 15

Sternal plates 7 (upper) and 8 (lower) of males in species of *Andrena (Andrena)*.

scopa thin, composed of long, simple, sparse hairs; hind tibiae slender and elongate, all the basitarsi somewhat narrower than their respective tibiae; 2nd submarginal cell shorter than 3rd, receiving 1st recurrent close to the tip; abdominal terga dull and tessellate, impunctate except for some very minute, obscure punctures toward base, apical margins very slightly impressed, concolorous with the remainder of the discs, discal pubescence very short, entirely pale and thin, apical margins with rather thin, but distinctly evident, white fasciae.

MALE—Length 8-9 mm.; clypeus rather flattened, much broader than long, somewhat shining medially where the punctures are fine and sparse, becoming closer toward sides; lateral ocelli separated from margin of vertex by a space about equal to their diameter; cheeks very broad and flat, with a subcarinate, rounded, posterior angle opposite upper part of eye, surface shining, minutely punctate; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum subtriangular, the apex narrowed, truncate and slightly incised; mandibles slender and elongate, slightly flexed medially, with a small subapical inner tooth, the base with a ventral subtriangular projection; pubescence of head, thorax and base of abdomen entirely pale, slightly ochraceous; thoracic integument dull, tessellate, with rather close, shallow and obscure punctures on scutum and upper portions of pleura, scutellum more shining, nearly impunctate; enclosure of propodeum subrugose toward base; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent toward tip; abdominal terga smooth, but dull and tessellate, without evident punctures, apical margins very slightly depressed, largely dark, pubescence entirely pale, very thin, without evident fasciae; apical portion of sternum 8 narrow, elongate, parallel-sided, tip beyond the subapical ridge slightly broader than long, truncate apically; penis valves expanded basally, excavated beneath this expansion on each side, gonocoxites only narrowly dilated apically, gonocoxal lobes produced, narrowly rounded.

DISTRIBUTION—Illinois and Michigan, east to New York and the New England states, south to Tennessee, North Carolina and Georgia; March to July.

FLOWER RECORDS—*Azalea*, *Hydrangea*, *Rhododendron* and *Rhus*. Also recorded by Robertson (1929) on *Dentaria* and *Hepatica*.

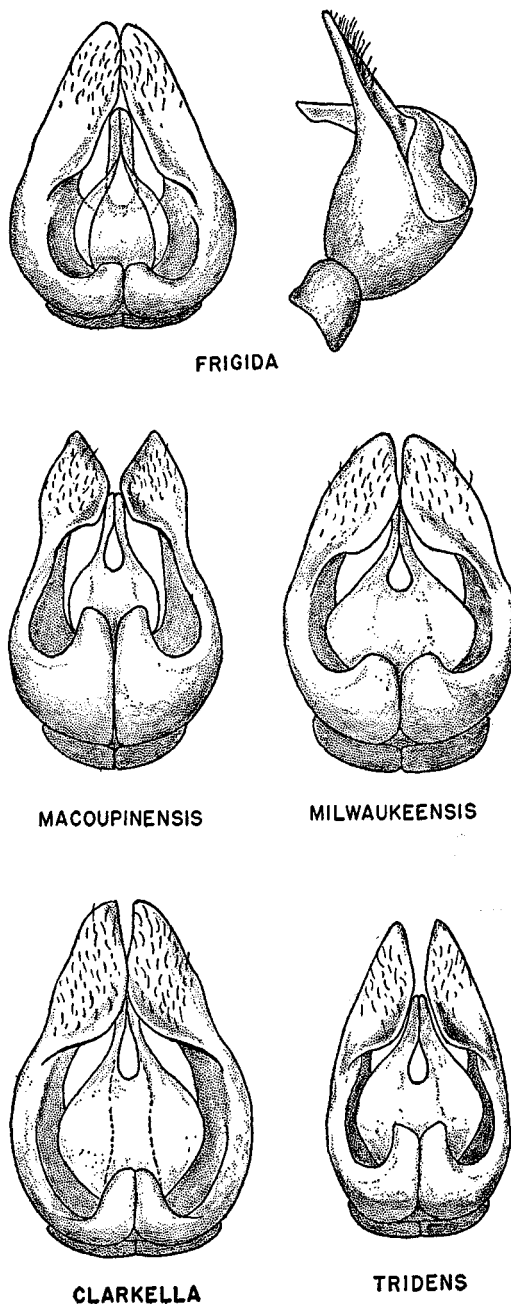


Figure 16
Apical flexed portion of male genital armature in species of *Andrena* (*Andrena*).
A lateral view, also, of *frigida* is shown.

$\overline{\text{TYCANDRENA}}$ $\overline{\text{WILMATTAE III}}$
Andrena (Bythandrena) acra

new species

(Figs. 18, 19 & 21)

MALE—Length 10 mm.; face nearly as long as distance between eyes; clypeus short, rather flat, finely punctate, median punctures distinctly but not widely separated, becoming quite densely crowded at extreme sides; vertex broad, lateral ocelli separated from its hind margin by nearly twice their diameter, surface dull but rather smooth, punctures very fine and obscure; cheeks very broad, with a rounded posterior angle about opposite middle of eye; malar space linear; process of labrum narrow, the tip somewhat produced and deeply impressed medially; basal segment of flagellum dark, slightly longer than segment 2, it and the following segments brownish-testaceous beneath, becoming piceous above; mandibles slender and elongate, with a subapical inner tooth near tip, upper face deeply grooved from this inner tooth to near the base, the pair overlapping about two-thirds when closed; pubescence of entire head pale ochraceous to whitish, rather thin but elongate, that on thorax similarly colored but more dense, that on dorsum bright ochraceous, entirely pale-ochraceous on legs; scutum dull anteriorly, becoming somewhat shining and more sparsely punctate posteriorly, punctures shallow and indistinct, those on scutellum sparse on each side of center; pleura dull, with shallow, indistinct but rather close punctures; propodeal triangle with a few fine basal striations; the more basal segments of legs black, tarsi more ferruginous; wings subhyaline, veins and stigma ferruginous, second submarginal cell slightly shorter than 3rd; tegulae piceous; abdominal terga smooth and shining, with fine, evenly distributed punctures, these sparse on basal tergum, becoming somewhat closer, but still well separated on segments 2 and 3, sparse again on 4 and 5; apical margins of segments 2-5 somewhat depressed towards sides apically, these areas somewhat coppery, discal pubescence entirely pale, very short and inconspicuous, fasciae not developed; sternum 7 produced and subtruncate medially; sternum 8 narrowly truncate apically; penis valves bulbous at base, becoming slender apically, not excavated, gonocoxites slightly expanded apically, gonocoxal lobes moderately produced, rounded at tip.

TYPES—Holotype: Male, Gull Lake Biol. Sta., Kalamazoo Co., Mich., June 9, 1956 (R. L. Fischer, on *Crataegus*) [Univ. Mich.]. Paratypes: MICHIGAN: 2♂♂, topotypical (Fischer, on *Spirea vanhouttei*); 6♂♂, Topotypical (R. W. Hodges); 1♂, Lake Co., April 17, 1955 (R. W.

Hodges); 1♂, Branch Co., June 1, 1941 (R. R. Dreisbach). WISCONSIN: 1♂, Boscobel, June 14, 1955 (R. W. Hodges). ONTARIO: 1♂, Pelee Is., June 27, (R. C. Osburn). OHIO: 5♂♂, Miami Co., May 26 (C. H. Kennedy); 1♂, Georgesville, May 31, 1925 (O. Cartwright); 1♂, Champaign Co., June, 1931 (D. Murray). MINNESOTA: 9♂♂, Houston Co., May 21, 1938; 1♂, May 29, 1939 (H. E. Milliron); 1♂, Houston Co., May 21, 1938; 1♂, May 29, 1939 (C. E. Mickel); 2♂♂, Houston Co., May 23, 1936 (Sterling Brackett); 1♂, Pine Co., May 25, 1941 (A. W. Buzicky); 1♂, John Latsch State Park, S. Minneiska, May 19 (A. T. Rozyck).

These paratypes are located in the University of Michigan, the University of Minnesota, Ohio State University, the collection of R. R. Dreisbach, and in the author's collection.

Andrena (Bythandrena) carlini
carlini Cockerell

Figs. 17 & 19

- Andrena carlini* Cockerell, 1901. *Canad. Ent.* 23, pp. 150 & 153. ♀.
- Andrena carlini* Robertson, 1929. *Flowers and Insects*, Lancaster, Pa., Science Press. (flower records)
- Andrena carlini* Brittain & Newton, 1933. *Canad. Jour. Res.* 9, p. 341. (flower records).
- Andrena carlini* Atwood, 1933. *Canad. Jour. Res.* 9, p. 456. (biology)
- Andrena carlini* Brittain, 1933. *Canada Dept. Agr. Bul.* 162, p. 94. Figs. (flower records)
- Andrena carlini* Atwood, 1934. *Canad. Jour. Res.* 10, pp. 207 & 209. ♀♂. (key)
- Andrena carlini* Brittain & Newton, 1934. *Canad. Jour. Res.* 10, p. 261. (flower records)
- Andrena carlini* Lanham, 1941. *Ent. Soc. Amer. Ann.* 34, pp. 705 & 708. ♀♂. (key)
- Andrena (Cryptandrena) carlini* Lanham, 1949. *Univ. Calif. Pubs. Ent.* 8, p. 223. (classification)

FEMALE—Length 14 mm.; clypeus strongly convex, protruding considerably below sub-orbital line, with a slightly elevated, median, impunctate line, otherwise rather finely punctate, punctures well separated but not sparse; facial foveae broad above, nearly filling area between eyes and lateral ocelli, covered with fuscous tomentum; space between margin of vertex and lateral ocelli about equal to distance between the ocelli; cheeks slightly broad-

er than eyes, rather dull, very obscurely and minutely punctate; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very large, fully twice as broad as long, evenly rounded; mandibles of moderate length, with a small, inner, subapical tooth; pubescence of head entirely blackish or fuscous; thoracic integument dull and tessellate, very finely, closely and rather obscurely punctate; enclosure of propodeum somewhat roughened along basal margin; pubescence of scutum, scutellum and upper portion of propodeum pale ochraceous or whitish, that on pleura, propodeum laterally and legs entirely black; propodeal corbicula well developed, blackish, with a distinct anterior fringe; trochanteral floccus well developed, black; tibial scopa dense, black, of simple hairs; fore and hind basitarsi slightly narrower than their tibiae, the mid basitarsi nearly as broad as their tibiae; 2nd submarginal cell nearly as long as 3rd, receiving 1st recurrent just beyond middle; abdominal terga somewhat shining, apical margins, slightly depressed, depressed area equal to about one-third length of the plates medially, concolorous with remainder of discs which are finely and rather closely punctate basally, becoming more sparsely so apically and on depressed apical areas, pubescence short, erect, entirely black, fasciae lacking.

MALE—Length 11 mm.; clypeus slightly convex, projecting hardly at all below suborbital line, quite closely and finely punctate beneath the dense pubescence; distance between margin of vertex and lateral ocelli about equal to distance between the ocelli; cheeks somewhat broader than eyes, rather dull, very minutely punctate, hind margin rounded (as in *hilaris*, fig. 21); malar space extremely short; basal segment of flagellum barely equalling 2nd segment in length; process of labrum very large; occupying most of surface of labrum, broadly rounded; mandibles slender, slightly curved, with a distinct, subapical, inner tooth, overlapping about one-third; pubescence of head long and copious, white on face, vertex and on cheeks below, fuscous along inner margin of eyes and on cheeks above; thoracic integument dull and tessellate, finely, shallowly and rather closely punctate; enclosure of propodeum narrowly roughened along basal margin; pubescence of entire thorax and legs whitish, quite long and copious; all basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent at center; abdominal terga somewhat shining, rather narrowly depressed apically, discs finely and rather closely punctate except for the almost impunctate depressed areas, pubescence short, erect, pale toward base, becoming some-

what fuscous toward apex, fasciae entirely lacking; sternum 8 rather short, sides of apical portion nearly parallel, the tip rounded or obtusely pointed, with a pronounced ventral projection which is about as long as the remainder of the apex, area between these two parts densely pubescent; penis valves bulbous basally, sides not excavated, gonocoxites rather broadly dilated apically, the gonocoxal lobes somewhat produced, markedly triangular.

DISTRIBUTION—Minnesota and Ontario, east to the New England states and Nova Scotia, south to Missouri, Georgia and North Carolina; March to August.

FLOWER RECORDS — *Amelanchier*, *Brassica*, *Malus*, *Pyrus*, *Rubus*, *Vaccinium* and *Vicia*. Robertson (1929) records *carlini* on the following additional genera: *Anemonella*, *Arabis*, *Cercis*, *Chaerophyllum*, *Claytonia*, *Cornus*, *Dentaria*, *Dicentra*, *Eri-genia*, *Erythronium*, *Hepatica*, *Heracleum*, *Hydrophyllum*, *Isopyrum*, *Polemonium*, *Rhus*, *Ribes*, *Salix*, *Sanguinaria*, *Sassafras*, *Smilacina*, *Thaspium*, *Uvularia*, *Viburnum* and *Viola*. According to Brittain and Newton (1933 & 1934) *carlinia* also visits *Prunus*, *Solidago*, *Tragana* and *Trifolium*.

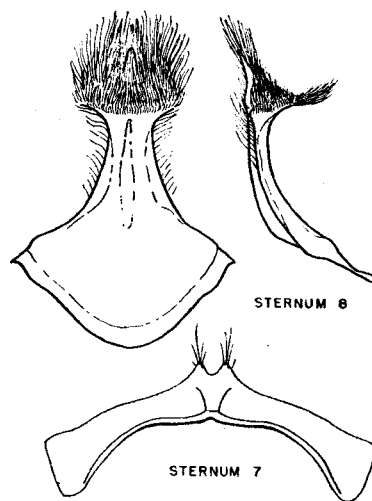


Figure 17

Sternum 7 and ventral (left) and lateral views of sternum 8 in male of *A. (Bythandrena) carlini*.

Andrena (Bythandrena) carlini
neorhodura new subspecies

MALE—Agrees with typical *carlini* in all details except the entirely bright ferruginous or testaceous abdomen.

TYPES—Holotype: Male, Minot County, Mass. [M.C.Z.]. Paratypes: 1♂, East Lansing, Mich., April 12, 1938 [Univ. Mich.]; 2♂♂, State College, Pa., May 2, 1916 and April 1, 1922 (both S. W. Frost) [Penn. State Univ.].

Andrena (Bythandrena) critica
new species

FEMALE—Length 11 mm.; length of face somewhat greater than distance between eyes; clypeus much broader than its median length, evenly convex, smooth and shining, punctures exceedingly minute and sparse, hardly visible; facial foveae broad, nearly filling area between eyes and ocelli above and reaching slightly below level of antennae, with fuscous tomentum; vertex quite broad, space between lateral ocelli and its hind margin about twice their diameter; cheeks considerably broader than eyes, rounded, surface somewhat shining, without visible punctures; malar space evident but very short; basal segment of flagellum about equal to 2nd and 3rd combined, median segments slightly longer than broad; process of labrum large and conspicuous, broadly and evenly rounded; pubescence of head largely fuscous, with a few pale hairs between antennae and foveae, that on thorax blackish below, pale ochraceous on dorsum, propodeum and upper portion of pleura; scutum and scutellum dull, microscopically tessellate, with scattered, sparse and shallow punctures; pleura dull; finely tessellate above, becoming somewhat more shining and more distinctly and deeply punctate below; dorsal area of propodeum finely tessellate; propodeal corbicula well developed, with scattered sparse hairs on lateral faces of propodeum, but without a distinct anterior fringe; trochanteral floccus well developed, of uniform length; legs black, with largely black pubescence, including the hind tibial scopa, apical tarsal segments somewhat reddened; spurs pale testaceous, those on mid and hind tibiae relatively straight; wings lightly infuscated, stigma testaceous, the veins pale testaceous, second submarginal cell slightly shorter than 3rd; tegulae piceous; abdominal terga smooth, with vague metallic tints, impressed apical margins on 2nd and 3rd segments occupying about one-third of median length, punctures very minute and quite sparse, hardly

visible, pubescence short and obscure, apparently fuscous or black, the apical fimbria blackish; fasciae absent.

TYPE—Holotype: Female, Plateau Mt., Catskill Mts., N. Y., 2200 ft., May 24, 1947 [Univ. Mich.].

Andrena (Bythandrena) dunningi
Cockerell

(Figs. 18 & 19)

Andrena dunningi Cockerell, 1898. *Canad. Ent.* 30, p. 103. ♀.

Andrena viciniformis Robertson, 1900. *Acad. Sci. St. Louis, Trans.* 10, p. 47, ♀ ♂.

Andrena viciniformis Robertson, 1902. *Amer. Ent. Soc. Trans.* 28, pp. 190 & 192. ♀ ♂. (key)

Andrena dunningi Robertson, 1929. *Flowers and Insects*, Lancaster, Pa., Science Press. (flower records)

Andrena annae Cockerell, 1931. *Canad. Ent.* 63, p. 200. ♀.

Andrena annae Brittain & Newton, 1934. *Canad. Jour. Res.* 10, p. 261. (flower records)

Andrena (Cryptandrena) dunningi Lanham, 1949. *Univ. Calif. Pubs. Ent.* 8, p. 223. (classification)

FEMALE—Length 10 mm.; clypeus broadly convex, projecting about one-half below sub-orbital line, shining, with a distinct, somewhat elevated, median, impunctate line on each side of which the punctures are rather shallow and close but quite distinct; facial foveae rather broad above, occupying about two-thirds of area between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly shorter than the distance between them; cheeks slightly broader than eyes, rounded posteriorly, rather dull, minutely and obscurely punctate; malar space short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, broadly semicircular; pubescence of head and thorax ochraceous; thoracic integument dull, tessellate, punctures of scutum rather shallow and obscure, quite close except in posterior middle, scutellum somewhat more shining, more deeply but irregularly punctate; pleura more densely tessellate but rather smooth, with fine shallow punctures anteriorly, but becoming impunctate posteriorly; enclosure of propodeum dull and tessellate; propodeal corbicula quite dense, with a distinct anterior fringe, ochraceous; trochanteral floccus well developed, pale ochraceous; tibial scopa quite dense, hairs moderately elongate, simple, more brownish; pubescence of fore and

mid tibiae and all the tarsi more fuscous, the basitarsi distinctly narrower than their respective tibiae; 2nd submarginal cell fully equalling 3rd in length, receiving 1st recurrent near middle; abdominal terga rather smooth, obscurely violaceous, apical depressed areas rather obscure, becoming very narrowly reddened along rims, occupying medially about one-third the length of the disc, nearly impunctate, the remainder of the discs with very fine scattered punctures, rather sparse medially, becoming rather close toward sides, discal pubescence very short, suberect, pale in general, fasciae not developed, tergum 5 with a rather dense apical, fulvous fimbria.

MALE—Length 9 mm.; clypeus broad and short, slightly convex, projecting but very slightly below suborbital line, dull, quite closely and finely punctate on each side of an obscure median impunctate line, densely long pubescent; space between margin of vertex and lateral ocelli slightly less than the distance between them; cheeks broader than eyes, rounded posteriorly (as in *hilaris*, fig. 21), rather dull, very minutely and obscurely punctate; malar space very short; basal segment of flagellum longer than 2nd segment, about equalling 3rd; process of labrum rather large, subtriangular, apex narrowly rounded; mandibles slender, rather elongate, slightly curved, with a distinct, inner, subapical tooth, but without a basal inferior projection, overlapping about one-third; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument rather dull, tessellate, punctures of scutum shallow, rather fine and close except in center posteriorly where they are quite sparse, fine and rather close, but irregular on scutellum; pleura more densely tessellate, the punctures minute, well separated and obscure; enclosure of propodeum dull, tessellate, obscurely short striate along basal margin; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell subequal in length to 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, apical depressed areas rather narrow, nearly impunctate, remaining portion of discs very finely and rather closely punctate, but punctures becoming more widely separated in center of discs, discal pubescence very short, suberect, entirely pale, fasciae not developed; apical portion of sternum 8 rather short and broad, with a pronounced, subcarinate, ventral, median protuberance, densely pubescent from this to the markedly narrowed tip which is very slightly incised medially; penis valves very slightly enlarged basally, not excavated, gonocoxites rather short, considerably dilated and flexed apically, gonocoxal lobes rather strongly produced, narrowly rounded.

DISTRIBUTION—Minnesota to Quebec and the New England states, south to North Carolina; April to June. One record, October 11, 1938, at Orono, Maine, is considered exceptional.

FLOWER RECORDS—*Crataegus*, *Malus* and *Salix*. Robertson (1929) records this species on *Claytonia*, *Gleditsia*, *Ribes*, *Rubus*, *Taraxacum* and *Viburnum*. It is also recorded by Brittain and Newton (1934) on *Narcissus*.

Andrena (*Bythandrena*) *erythrogaster*
erythrogaster (Ashmead)
(Figs. 18, 19 & 21)

- Cilissa erythrogaster* Ashmead, 1890. Colo. Biol. Assoc. Bul. 1, p. 6.
Andrena perezii Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 51, ♀ ♂.
Andrena rhodura Cockerell, 1898. Ent. News 9, p. 171. ♀.
Andrena erythrogastra Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 190 & 192. ♀ ♂.
(key)
Andrena erythrogastra Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena erythrogastra Rau, 1936. Ent. News 45, p. 35. (biology).
Andrena erythrogastra Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 704 & 707. ♀ ♂.
(key)
Andrena (*Cryptandrena*) *erythrogastra* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 223. (classification)

FEMALE—Length 10 mm.; clypeus evenly convex, projecting nearly one-half below suborbital line, finely, evenly and rather closely punctate beneath the short, white, dense pubescence, without a median impunctate line; facial foveae broad above, occupying fully two-thirds of area between eyes and lateral ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli very slightly broader than their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, microscopically and obscurely punctate; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, apex rather narrowly truncate; pubescence of entire body whitish, faintly ochraceous on thorax above; thoracic integument rather dull, punctures of scutum shallow, rather fine, well separated anteriorly, becoming sparse posteriorly, quite sparse and fine on the more shining scutellum, very fine on pleura below, becoming somewhat more coarse and close above; enclosure of propodeum smooth but dull; propodeal corbicula rather short but

well developed, tibial scope quite dense, the hairs short, simple, mostly whitish, but becoming fuscous toward extreme base, basitarsi somewhat narrower than their respective tibiae, the mid and hind pair pale ferruginous; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga ferruginous, somewhat shining, apical margins very slightly depressed, more yellowish, discs with extremely minute and obscure but rather close punctures, pubescence very short and obscure, entirely pale, but that of tergum 5 somewhat yellowish, fasciae not developed.

MALE—Length 9 mm.; clypeus rather flat, projecting about one-third below suborbital line, very closely, finely and uniformly punctate beneath the dense pale pubescence; space between margin of vertex and lateral ocelli very slightly exceeding their diameter; cheeks very broad, rather flat, with a rounded, obscure, posterior angle opposite upper third of eye, surface dull, rather closely but very finely and obscurely punctate; malar space very short; basal segment of flagellum longer than 2nd, but shorter than 2nd and 3rd combined; process of labrum about twice as broad as long, slightly narrowed to the truncate and slightly emarginate apex; mandibles slender, somewhat curved, with a distinct inner subapical tooth, overlapping about one-third, without a basal inferior projection; pubescence of entire body pale, somewhat ochraceous on head and dorsum of thorax; thoracic integument rather dull and tessellate, punctures of scutum quite shallow, but fine and well separated anteriorly, becoming somewhat more sparse posteriorly, very fine and quite sparse on scutellum, quite close on pleura, fine below, slightly more coarse above; enclosure of propodeum dull and tessellate; all basitarsi slender and elongate, much narrower than their respective tibiae, mid and hind tarsi pale ferruginous; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, apical margins somewhat depressed, yellowish-hyaline in contrast with the blackish, more basal portions of the discs, but these becoming yellowish-hyaline at extreme sides, discs with exceedingly minute and well separated, obscure punctures, pubescence short, suberect, entirely pale, fasciae not developed; apical portion of sternum 8 with a low submedian ventral projection, with short dense pubescence from here to the tip which is rather evenly rounded; penis valves moderately expanded basally, not excavated, gonocoxites hardly at all dilated apically, gonocoxal lobes rather broadly rounded, very slightly produced.

DISTRIBUTION — Minnesota, Illinois and Ohio to Quebec and the New England states; April to July.

FLOWER RECORDS—Robertson (1929) records this species on the following genera: *Amelanchier*, *Antennaria*, *Claytonia*, *Crataegus*, *Heracleum*, *Prunus*, *Radicula*, *Rhamnus*, *Rhus*, *Salix* and *Viburnum*.

Andrena (*Bythandrena*) *erythrogaster*
subaustralis Cockerell

Andrena subaustralis Cockerell, 1898. *Canad. Ent.* 30, p. 146. ♀ ♂.

Andrena subaustraliformis Viereck and Cockerell, 1914. *U. S. Nat. Mus. Proc.* 48, p. 28. ♂.

Andrena viridinitens Cockerell, 1936. *Pan-Pacific Ent.* 12, p. 152. ♀.

This is the dark form of *erythrogaster*, lacking as the female does the ferruginous coloration of the abdomen. The abdomen in the males of both forms is usually dark, with only an occasional specimen of typical *erythrogaster*, apparently, having a uniformly ferruginous color of this area. Thus the males are very difficult or impossible to distinguish, in the absence of the females.

DISTRIBUTION—In the East this ranges from Minnesota to Quebec and the New England states, south to Tennessee, Georgia and Florida; March to May. In Florida it is recorded as early as February.

FLOWER RECORDS—*Aronia*, *Brassica*, *Crataegus*, *Prunus*, *Salix* and *Stellaria*.

Andrena (*Bythandrena*) *gabrielsoni*
new species

FEMALE—Length 13 mm.; length and breadth of face subequal; clypeus broadly convex, rather short, projecting about one-third below suborbital line, somewhat shining, rather sparsely, finely and irregularly punctate, without a distinct, median, impunctate line; facial foveae broad above, occupying most of area between eyes and lateral ocelli, with brownish-ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, somewhat shining, very minutely and rather sparsely punctate; length of malar space about one-third width of mandibles;

basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very broad, rather short, subtriangular, with rather broadly truncate apex; pubescence of head and thorax pale ochraceous, with a few fuscous hairs on cheeks above and vertex laterally; thorax above somewhat shining, punctures of scutum very fine, rather sparse and obscure anteriorly, becoming even more sparse and minute posteriorly; scutellum shining anteriorly, very irregularly and finely punctate, becoming dull, with obscure punctures posteriorly; pleura smooth but dull and tessellate, with sparse minute punctures more clearly evident anteriorly; enclosure of propodeum dull, densely tessellate; propodeal corbicula well developed, rather short, with a distinct anterior fringe; trochanteral floccus well developed, whitish; tibial scopa white, dense, pale ochraceous along anterior portion of tibiae, but becoming fuscous posteriorly toward base, hairs quite long, entirely simple; all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent toward apex; abdominal terga dull, apical areas hardly at all depressed, nearly impunctate, with only extremely minute, microscopic punctures evident at high magnification, discal pubescence pale on terga 1 and 2, becoming more fuscous, erect but short on terga 3 and 4, tergum 5 with a quite dense, apical, fuscous fimbria, fasciae not developed.

TYPES—Holotype: Female, Colebrook, Conn., July 23, 1911 (W. M. Wheeler) [A.N.S.P.]. Paratypes: CONNECTICUT: 2♀♀, topotypical; 1♀, Bristol, July 28, 1916 (I. N. Gabrielson); 11♀♀, Colebrook, July 2, 3, 7, 11, 13 and 14, 1921 (W. M. Wheeler). MAINE: 1♀, Northeast Harbor, July 11 (C. W. Johnson). NORTH CAROLINA: 1♀, Mt. Mitchell, July 26, 1936; 1♀, Busick—Mt. Mitchell Trail, June 20, 1941; 1♀, Smokemont, June 30, 1934 (all Mitchell); 1♀, Collin Gap, Great Smoky Mountains Nat. Park, 3200 ft., June 28, 1939 (A. Stupka). MICHIGAN: 1♀, Shelby, July (?) 1939 (Sabrosky); 2♀♀, Chatham, July 12, 1946.

The type specimen was found in the collection of the Philadelphia Academy of Natural Sciences, with a Viereck determination label designating it the type specimen. The description, however, was never published, and the name evidently intended for this species by Viereck is being used. The paratypes are located in the U. S. National Museum, the Museum of Compara-

tive Zoology, the University of Michigan, the collection of R. R. Dreisbach, and the author's collection.

Andrena (Bythandrena) perplexa

Smith

(Figs. 18, 19 & 21)

- Andrena perplexa* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 148. ♀.
Andrena belfragei Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 256. ♀.
Andrena brunniventris Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 258. ♂.
Andrena bruneiventris Dalla Torre, 1896. Cat. Hym. 10, p. 107.
Andrena texana Howard, 1901. Insect Book, plate 4, fig. 7. ♂.
Andrena perplexa Parker & Boving, 1924. U. S. Nat. Mus. Proc. 64. Art. 23, pp. 1-40. (biology)
Andrena belfragei Lanham, 1949. Ent. News 60, p. 67.
Andrena (Cryptandrena) belfragei Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 223. (classification)
Andrena perplexa Krombein, 1958. Hymenoptera of America North of Mexico. Synoptic Catalog. U.S.D.A. Agr. Monog. No. 2, First Suppl., p. 215. (synonymy)

FEMALE—Length 13 mm.; clypeus broadly convex, projecting about one-half below suborbital line, shining, rather closely and deeply punctate, with a narrow median impunctate line; facial foveae broad above, occupying most of space between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly shorter than distance between ocelli; cheeks slightly broader than eyes, smooth, minutely punctate, rounded posteriorly; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, subtriangular, broadly truncate apically; mandibles of moderate length, with a distinct, inner, subapical tooth; pubescence of head, thorax, legs and base of abdomen entirely pale ochraceous, becoming more whitish below, slightly infuscated on front and middle basitarsi; scutum closely and finely punctate anteriorly, punctures becoming somewhat more sparse posteriorly where surface is more shining; scutellum somewhat shining, punctures rather irregular, fine and rather sparse; integument of pleura and propodeum dull and tessellate, punctures obscure; enclosure of propodeum smooth, tessellate; propodeal corbicula dense but rather short, with a distinct anterior fringe, pale ochraceous; trochanteral floccus well developed, whitish; tibial scopa short, dense and white, of simple hairs;

all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell about as long as 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, apical depressed areas occupying about one-third the median length of discs, nearly impunctate, basal portions of discs closely and finely punctate, punctures on basal tergum more sparse, as well as those on tergum 4 which is relatively dull, pubescence very short and thin, entirely pale, fasciae not developed.

MALE—Length 11 mm.; length and breadth of face subequal; clypeus broad and rather short, projecting but little below suborbital line, somewhat convex medially, surface dull, densely and very finely punctate beneath the dense, long pubescence; space between margin of vertex and lateral ocelli slightly shorter than space between ocelli; cheeks broad and flat, posterior margin more rounded than angulate, surface dull, very minutely and obscurely punctate; malar space very short; basal segment of flagellum subequal to 2nd segment; process of labrum subquadrate, nearly as long as broad, apex very slightly incurved; mandibles narrow and elongate, slightly curved, with a fine but distinct inner subapical tooth, overlapping fully one-third; pubescence of head and dorsum of thorax pale fulvous, more whitish on cheeks, pleura, propodeum, legs and base of abdomen; thoracic integument rather dull, scutum closely and finely punctate anteriorly, punctures becoming more sparse posteriorly and on scutellum, those on pleura shallow and obscure; enclosure of propodeum relatively smooth but dull and tessellate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell about as long as 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, apical depressed areas equalling about one-fourth the median length of discs, nearly impunctate, basal portion of discs finely but rather deeply and closely punctate, punctures sparse on basal tergum and on tergum 4 which is relatively dull, pubescence very short and obscure, entirely pale, fasciae entirely lacking; apical portion of sternum 8 with a submedian ventral protuberance, densely pubescent from this to the apex which is rather broad, truncate and slightly incurved apically; penis valves somewhat expanded basally, not excavated, gonocoxites considerably dilated apically, gonocoxal lobes strongly produced, narrowly rounded.

DISTRIBUTION—Minnesota, Michigan and New York, south to Texas, Georgia and North Carolina; March, April and May.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Crataegus*, *Fragaria*, *Geranium*, *Malus*, *Melilotus*, *Prunus*, *Pyracantha*, *Pyrus*, *Rubus*, *Salix*, *Senecio* and *Viburnum*.

Andrena (*Bythandrena*) *pruni*

Robertson

(Figs. 19 & 20)

Andrena pruni Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 51. ♀ ♂.

Andrena pruni Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 191 & 192. ♀ ♂. (key)

Andrena pruni Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (*Cryptandrena*) *pruni* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 223. (classification)

FEMALE—Length 10 mm.; clypeus strongly convex, projecting about one-half below suborbital line, somewhat shining, with distinct but rather fine and shallow, well separated punctures on each side of a median, slightly elevated, impunctate line; facial foveae narrow, occupying above hardly more than half the space between eyes and lateral ocelli and separated from inner margins of eyes by a space fully equal in width to the width of the foveae below, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to distance between them; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and obscure; malar space quite short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very large, much broader than long, broadly semicircular; pubescence of head, thorax and legs pale ochraceous; thoracic integument rather dull, punctures of scutum uniformly rather close and fine over entire disc, more minute and sparse on the somewhat more shining scutellum; pleura somewhat more densely tessellate but rather smooth, punctures minute, well separated, evenly distributed; enclosure of propodeum rather smooth but dull and densely tessellate; propodeal corbicula well developed but rather short, with a distinct anterior fringe; trochanteral floccus well developed; tibial scopa quite dense, entirely pale ochraceous, hairs simple, relatively long; hind tibiae relatively long and slender, all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell nearly as long as 3rd, receiving 1st recurrent near middle; abdominal terga rather dull, very slightly depressed apically, depressed area equal to about one-third median length of discs, becoming slightly reddened toward apical rims, nearly impunctate, remainder of discs rather closely and finely punctate

toward sides, becoming somewhat more sparsely so toward middle, discal pubescence very short and thin, suberect, entirely pale, fasciae not developed, tergum 5 with a rather dense, pale ochraceous, apical fimbria.

MALE—Length 10 mm.; clypeus rather broadly convex, short, projecting but very slightly below suborbital line, closely and deeply punctate beneath the dense pubescence; space between margin of vertex and lateral ocelli subequal to distance between them; cheeks broader than eyes, rounded posteriorly (as in *hilaris*, fig. 21), rather dull, punctures exceedingly minute and obscure; malar space very short; basal segment of flagellum slightly longer than 2nd, subequal to 3rd and following segments; process of labrum very large, occupying most of surface of labrum, broadly semi-circular; mandibles rather slender, slightly curved, with a distinct, subapical, inner tooth, overlapping about one-third; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, punctures of scutum very fine and obscure, well separated, rather evenly distributed, but somewhat more sparse posteriorly, those on scutellum very minute and obscure, scattered; pleura densely tessellate, punctures rather close and distinct above, becoming obscure below; enclosure of propodeum dull and tessellate; all basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga somewhat shining, rather distinctly but not deeply depressed apically, depressed areas more sparsely punctate than remainder of discs where punctures are fine, but deep, distinct and rather close, discal pubescence very short, thin and erect, entirely pale, fasciae not developed; apical portion of sternum 8 with a very pronounced, subapical, carinate, ventral projection which is nearly as long as the remainder of the apex, broadly rounded, area between this and apex densely pubescent, apex narrowly constricted, acute, almost spine-like; penis valves rather broadly dilated toward base but not excavated, gonocoxites broadly dilated toward apex, with a submembranous tip, gonocoxal lobes strongly produced, subtriangular.

DISTRIBUTION—Minnesota and Illinois to Massachusetts, south to North Carolina and Georgia; March to June.

FLOWER RECORDS—*Viburnum*. Robertson (1929) records *pruni* on the following: *Aruncus*, *Claytonia*, *Crataegus*, *Dentaria*, *Heracleum*, *Pastinaca*, *Polemonium*, *Prunus*, *Ribes*, *Rubus*, *Salix*, *Staphylea*, *Uvularia* and *Zanthoxylum*.

Andrena (Bythandrena) regularis Malloch

(Figs. 18 & 19)

Andrena regularis Malloch, 1917. Brooklyn Ent. Soc. Bul. 12, p. 91. ♂ ♀.

Andrena regularis Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 209. ♀ ♂. (key)

Andrena regularis Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

Andrena (Cryptandrena) regularis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 223. (classification)

FEMALE—Length 11 mm.; clypeus broadly convex, projecting about one-half below suborbital line, smooth but rather dull, punctures fine, rather sparse medially, becoming quite close at extreme sides; facial foveae broad above, occupying most of area between eyes and lateral ocelli, covered with fuscous tomentum; space between margin of vertex and lateral ocelli very slightly less than distance between them; cheeks broader than eyes, rounded posteriorly, dull, punctures very minute and rather sparse; length of malar space about one-third basal width of mandibles; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, broadly subtriangular, apex quite broadly truncate; pubescence pale ochraceous on lower part of face and cheeks, becoming fuscous above antennae, on vertex and on cheeks above; thoracic integument dull and tessellate, punctures of scutum shallow, rather fine and close but obscure, those on scutellum quite close and fine beneath the dense pubescence; punctures of pleura minute and obscure, rather close; enclosure of propodeum dull and tessellate; pubescence of scutum, scutellum and propodeum pale ochraceous, that on pleura and legs blackish except for considerably pale ochraceous pubescence on front and hind femora; propodeal corbicula well developed, with a distinct anterior fringe, pale ochraceous; trochanteral floccus well developed, fuscous; tibial scopa dense, hairs elongate, simple, black; all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent at middle; abdominal terga smooth, somewhat shining, apical depressed area rather shallow, equalling medially slightly over one-third length of disc, nearly impunctate, basal portions of disc very finely and quite closely punctate, discal pubescence very short, thin, suberect, fuscous even on basal segment, tergum 5 with a dense, apical, fuscous fimbria, fasciae not developed.

BARBORA

IX

Andrena (Bythandrena) viburnella Graenicher

(Figs. 18-20)

MALE—Length 10 mm.; clypeus very slightly convex, projecting about one-third below suborbital line, rather smooth, finely, regularly and rather closely punctate; space between margin of vertex and lateral ocelli subequal to distance between them; cheeks considerably broader than eyes, rounded posteriorly (as in *acra*, fig. 21), rather dull, punctures minute; malar space quite short; basal segment of flagellum slightly longer than 2nd, subequal in length to 3rd and following segments; process of labrum rather large, obscurely subtriangular, apex rather narrowly truncate and very slightly emarginate; mandibles slender, very slightly curved, with a distinct subapical inner tooth, overlapping about one-fourth; pubescence of head and thorax whitish, faintly yellowish above, sometimes with some fuscous hairs along inner margins of eyes; thoracic integument dull and tessellate, punctures of scutum rather obscure, rather fine and close anteriorly, more sparse posteriorly, those on scutellum very fine, irregular, rather sparse; pleura more densely tessellate, punctures very obscure; enclosure of propodeum dull and tessellate, obscurely substriate along basal margin; legs entirely pale pubescent, all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly basad of middle; abdominal terga somewhat shining, apical depressed areas distinct laterally, rather obscure medially where they occupy about one-third length of disc, becoming reddish-hyaline toward rims, nearly impunctate, basal portions of discs quite closely and finely punctate, pubescence short, suberect, thin and obscure, entirely pale, fasciae not developed; apical portion of sternum 8 quite broad, with a median ventral ridge beyond which it is densely pubescent to the more narrowly truncate tip; penis valves quite broadly expanded but not excavated, gonocoxites robust, slightly dilated apically, gonocoxal lobes strongly produced, subtriangular.

DISTRIBUTION—Transcanadian, from British Columbia to Nova Scotia, and in the eastern United States, from Minnesota to the New England states, south to Georgia; April to July.

FLOWER RECORDS — *Brassica* and *Vaccinium*. This also is recorded by Britain and Newton (1934) on *Aster*, *Pyrus malus*, *Rubus* and *Syringa*.

- Andrena viburnella* Graenicher, 1903. *Canad. Ent.* 35, p. 165. ♀ ♂.
Andrena viburnella Viereck, 1904. *Canad. Ent.* 36, pp. 189 & 194. ♀ ♂. (key)
Andrena viburnella Viereck, 1907. *Ent. News* 18, p. 365.
Andrena viburnella Lanham, 1941. *Ent. Soc. Amer. Ann.* 34, pp. 705 & 708. ♀ ♂. (key)
Andrena viburnella Michener, 1947. *Amer. Midland Nat.* 38, p. 445. ♀ ♂.
Andrena (Cryptandrena) viburnella Lanham, 1949. *Univ. Calif. Pubs. Ent.* 8, p. 223. (classification)

FEMALE—Length 13 mm.; clypeus projecting nearly one-half below suborbital line, broadly convex, with a narrow and indistinct, median, impunctate line, otherwise rather closely and deeply punctate; facial foveae broad above, occupying most of area between eyes and lateral ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly less than distance between them; cheeks slightly broader than eyes, rounded posteriorly, rather dull, very minutely and obscurely punctate; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quite large, subtriangular, apex somewhat rounded; pubescence of head and thorax entirely pale, whitish below, becoming very pale ochraceous above; thoracic integument rather dull; punctures of scutum rather coarse and indistinct but shallow, quite close anteriorly, becoming somewhat more sparse posteriorly, finer and very sparse on each side of scutellum which has a median, densely punctate line, those on pleura extremely minute and obscure; enclosure of propodeum dull, tessellate, very finely subrugose along basal margin; propodeal corbicula rather short but well developed, with a rather poorly developed anterior fringe; trochanteral floccus well developed, tibial scopa rather dense, hairs simple, rather elongate, entirely white; all basitarsi slightly narrower than their respective tibiae, pubescence of legs in general whitish; 2nd submarginal cell very slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga shining, obscurely violaceous, apical margins rather broadly depressed, depressed areas occupying about one-third median length of discs, largely impunctate, with remainder of discs, in marked contrast, very finely, closely and deeply punctate, punctures of basal terga slightly more separated, discal pubescence extremely short, suberect, entirely pale, fasciae not developed.

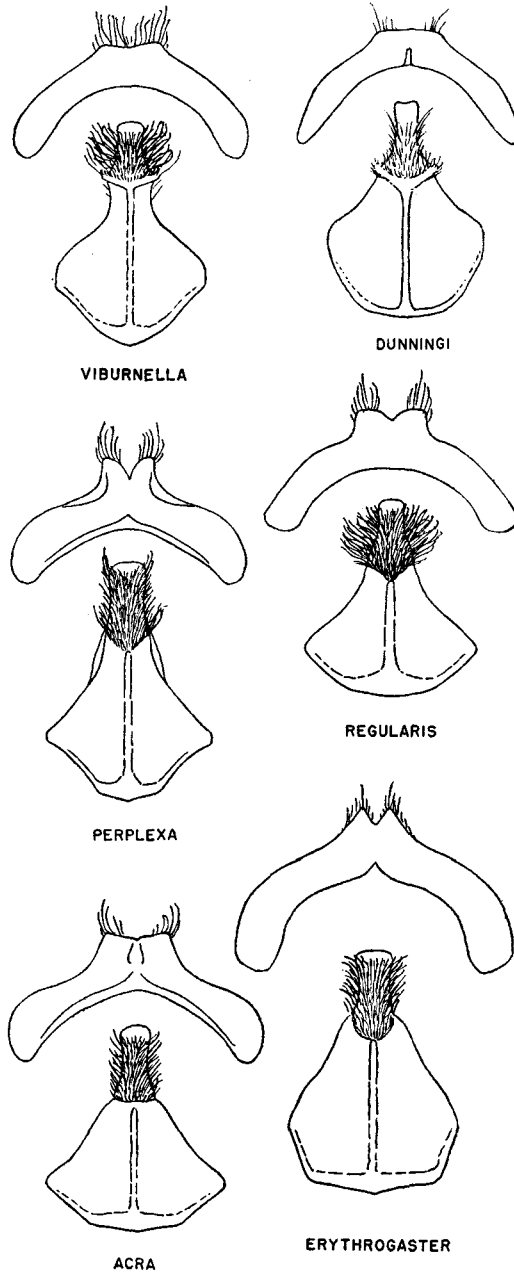


Figure 18

Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Bythandrena*).

MALE—Length 10 mm.; clypeus broad and rather flat, projecting but very little below suborbital line, dull, closely and finely punctate beneath the dense white pubescence; space between margin of vertex and lateral ocelli very slightly less than distance between ocelli; cheeks slightly broader than eyes, rounded posteriorly (as in *acra*, fig. 21), rather dull, punctures very minute and obscure; malar space very short; basal segment of flagellum hardly longer than 2nd, somewhat shorter than 3rd and following segments; process of labrum quite large, subtriangular, tip narrowly truncate; mandibles rather slender and elongate, with a distinct, inner, subapical tooth, slightly curved, without a basal inferior projection; pubescence of entire body pale, largely whitish, faintly creamy above, rather long and copious on head and thorax; thoracic integument dull, tessellate, punctures of scutum well separated, shallow but rather coarse and distinct, those on scutellum finer and sparse, those on pleura very obscure; enclosure of propodeum dull, tessellate, obscurely striate toward basal margin; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth, shining, faintly violaceous, rather narrowly and slightly depressed apically, depressed areas impunctate, discs otherwise with deep, distinct and rather close punctures, discal pubescence extremely short, suberect, entirely pale, fasciae not developed; apical portion of sternum 8 with a very pronounced, submedian, ventral protuberance which is subcarinate, with dense pubescence from here to the narrowed, subtruncate tip; penis valves slightly expanded basally, not excavated, gonocoxites quite broadly expanded apically, gonocoxal lobes somewhat produced, subtriangular.

DISTRIBUTION—Oregon to Connecticut, south to Texas, Mississippi and Georgia; March to June.

FLOWER RECORDS—*Acer*, *Amelanchier*, *Aronia*, *Brassica*, *Crataegus*, *Fragaria*, *Malus*, *Padus*, *Prunus*, *Pyrus*, *Ranunculus*, *Rubus*, *Salix* and *Viburnum*.

Andrena (Gymnandrena)
beutenmuelleri Viereck

(Fig. 20)

Andrena beutenmuelleri Viereck, 1916. Amer-
Mus. Nat. Hist. Bul. 35, p. 729. ♀.

FEMALE—Length 12 mm.; clypeus only slightly convex, projecting about one-half below suborbital line, rather dull, quite closely and finely punctate except in mid line where punctures are more sparse, but without a distinct, median, impunctate line; facial foveae broad above, occupying most of area between

eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly shorter than distance between ocelli; cheeks broader than eyes, rounded posteriorly, rather dull, very minutely and rather closely punctate; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum semicircular, about twice as broad as the median length; pubescence of head whitish, becoming ochraceous on vertex and on cheeks above, bright ochraceous on dorsum of thorax, becoming whitish on pleura, ochraceous on basal leg segments, becoming more

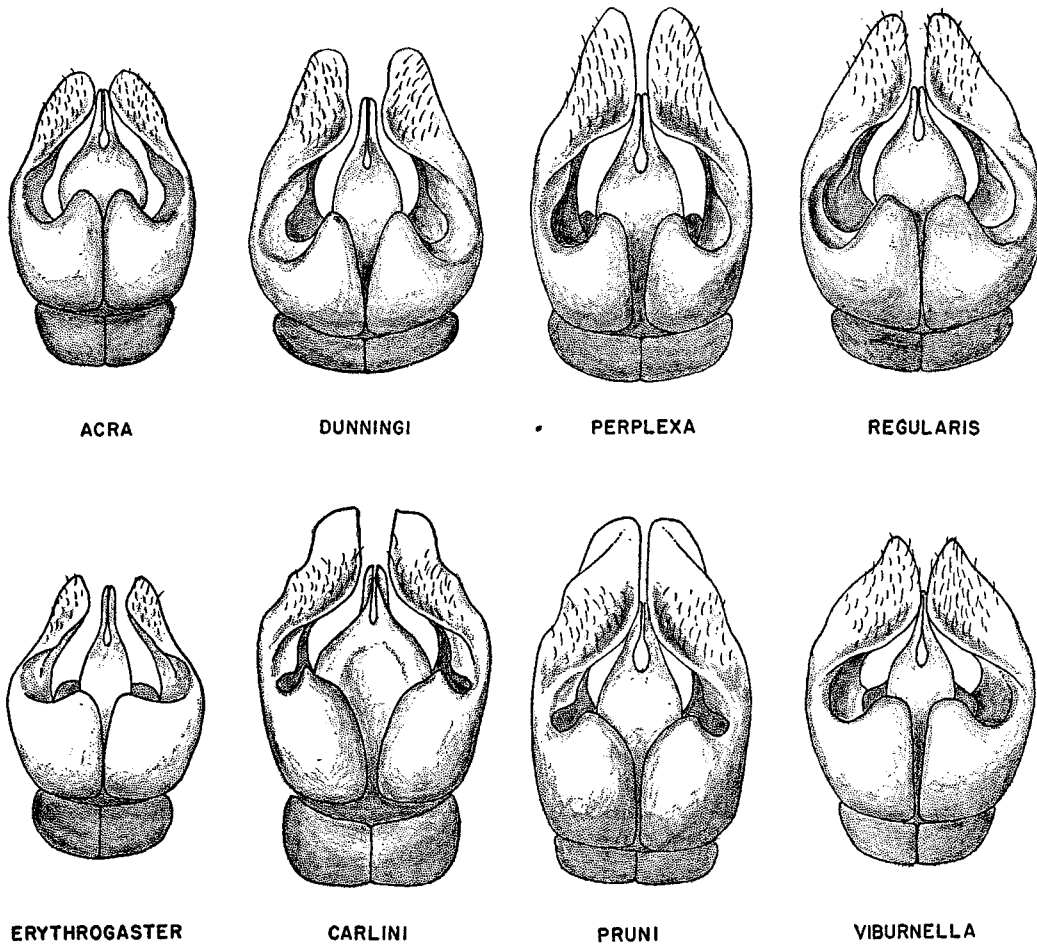


Figure 19—Male genital armature in species of *Andrena (Bythandrena)*.

fulvous on the more apical segments; thoracic integument rather dull but not densely tessellate, punctures of scutum shallow, rather close and fine, except near middle posteriorly where they are rather sparse; sparse on each side of scutellum, otherwise close and fine; pleura more densely tessellate, punctures shallow, fine, well separated in general, but becoming quite close below; enclosure of propodeum dull, tessellate, with some rather distinct basal striations; propodeal corbicula pale ochraceous, well developed but rather short, without a distinct anterior fringe, trochanteral floccus well developed, dense, whitish; tibial scopa dense, hairs simple, relatively elongate, more fulvous in color; basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, apical depressed areas distinct, occupying medially somewhat more than one-third length of the disc, minutely and rather sparsely punctate, punctures of remainder of discs uniformly fine and close but deep and distinct, discal pubescence extremely short, subappressed, white, fasciae not developed, tergum 5 with a rather dense, apical, pale fulvous fimbria.

DISTRIBUTION — North Carolina, Ohio, Michigan and Minnesota; May and June.

FLOWER RECORD—*Prunus angustifolia*.

† *Andrena* (*Gymnandrena*)
bisignata new species

(Figs. 20, 22 & 23)

FEMALE—Length 10 mm.; clypeus slightly convex, produced well below suborbital line, rather dull laterally, shining medially, with a median impunctate line, with numerous shallow, well separated punctures on each side of this line; facial foveae narrow, occupying above only about half of space between eyes and lateral ocelli, covered with brownish tomentum; space between margin of vertex and lateral ocelli about equal to their diameter; cheeks broader than eyes, rather smooth, minutely and obscurely punctate; malar space distinct, but rather short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, about twice as broad as long, tip truncate; mandibles of ordinary length, with a definite, inner, subapi-

cal tooth; pubescence of head, thorax and base of abdomen rather long, erect and dense, pure white; thoracic integument dull, densely tessellate, scutum very closely and finely punctate, punctures of scutellum obscure; enclosure of propodeum subrugose along basal margin; propodeal corbicula rather short, anterior fringe rather poorly developed; trochanteral floccus well developed; tibial scopa white, long and quite dense, of simple hairs; hind tibiae narrow and elongate, mid and hind basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell shorter than 3rd, receiving 1st recurrent vein near apex; abdominal terga smooth, dull, nearly impunctate except for some very obscure fine punctures toward base, apical margins slightly depressed, more or less reddened along rims, pubescence thin, erect, entirely white, fasciae inevident.

MALE—Length 7.5 mm.; clypeus produced well below suborbital line, slightly convex, median area flattened, narrowed to apical margin, quite smooth and sparsely and minutely punctate medially, becoming more closely and deeply punctate laterally; space between lateral ocelli and margin of vertex about equal to their diameter; cheeks broad, somewhat shining, minutely and rather sparsely punctate, angulate posteriorly, angle opposite upper third of eye (as in *tridens*, fig. 21); malar space well developed; basal segment of flagellum subequal to each of the following segments; process of labrum quite small, subtriangular, tip truncate; mandibles narrow and elongate, somewhat flexed medially, overlapping nearly one-half, with a distinct inner subapical tooth and a basal triangular ventral projection; pubescence of head, thorax and base of abdomen long and loose, entirely pale, slightly yellowish above, more whitish below; thoracic integument dull, tessellate; scutum, scutellum and pleura above with shallow, obscure punctures; enclosure of propodeum smooth; all basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent vein near apex; abdominal terga smooth, rather dull, with very sparse, minute and obscure punctures, apical margins only slightly depressed, rims faintly reddened, pubescence entirely pale, fasciae not developed; apical portion of sternum 8 narrow but rather short, tip beyond subapical ridge broader than long, truncate apically; penis valves expanded basally, excavated on each side beneath this expansion, gonocoxites broadly dilated apically, gonocoxal lobes produced and broadly rounded.

TYPES—Holotype: Female, Forest Hills, Mass., May 4, 1912 (Viereck). Allotype: Topotypical, Apr. 28, 1911 (Viereck) [both A.N.S.P.]. Paratypes: MASSACHUSETTS: 1♂, topotypical, May 14, 1912; 1♂, Cohasset, Apr. 14, 1917 (A. M. Wilcox); 1♀, Essex, Apr. 19, 1920; 1♂, Framingham, Apr. 19, 1920 (Frost); 1♂, Amherst, Apr. 30, 1920 (Mitchell). NEW HAMPSHIRE: 1♂, Jaffrey, June. NEW YORK: 2♂♂, Ithaca, Apr. 16, 1916; 1♀, Owego, Apr. 24, 1935 (H. K. Townes). WEST VIRGINIA: 4♀♀, Milville, Apr. 2, 1921 (J. C. Bradley); 1♀, Cranberry Glades, June 1, 1955 (H. V. Weems, Jr., on *Ilex verticellata*). RHODE ISLAND: 3♀♀, Kingston, May 12, 1904. MICHIGAN: 1♀, Ann Arbor, Washlenaw Co., May 5, 1949 (U. N. Lanham). NORTH CAROLINA 1♀, Asheville, Apr. 15, 1938; 1♀ Wilkes Co., April 10, 1952 (W. A. Stephen, on apple); 2♀♀, Moravian Falls, Apr. 13, 1954 (W. A. Stephen, on apple); 1♀, Raleigh, Mar. 23, 1923 (Mitchell on *Salix*). MINNESOTA: 1♀, Mille Lacs, Drow Wing Co., May 18, 1940 (Milliron); 8♂♂, Ramsey Co., May 8, 12 & 14, 1952 (R. L. Fischer, on *Prunus serotina*, *Viburnum acerifolium* and *Pyrus malus*); 1♂, St., Anthony Park, Ramsey Co., May 12, 1952 (Fischer). VIRGINIA: 1♀, Vienna, April 18, 1915; 1♀, Savage Sta., April 14, 1917 (both W. L. McAtee, on *Erythronium americanum*); 1♀, Mount Vernon, April 16, 1916 (A. Wetmore, on *Salix sericea*). MARYLAND: 2♀♀, Laurel, April 6 & 13, 1919 (W. L. McAtee, on *Salix*).

Paratypes listed above are located in the Museum of Comparative Zoology, the University of Minnesota, the University of Rhode Island, Cornell University, the U. S. National Museum, the North Carolina Department of Agriculture, in personal collections of R. R. Dreisbach, R. L. Fischer, H. K. Townes, and H. V. Weems, Jr., and in the author's collection.

Andrena (Gymnandrena)
carolinensis new species

(Fig. 20)

FEMALE—Length 10 mm.; eyes parallel; foveae narrow, occupying only about one-half of space between eyes and ocelli; vertex rather

narrow, lateral ocelli separated from its hind margin by a space only slightly greater than their diameter; cheeks about equal to eyes in width; clypeus slightly convex, projecting about one-third below suborbital line, with fine and quite sparse punctures, especially in median area; punctures on vertex and cheeks very fine and quite close, face below ocelli obscurely substriate; malar space not evident; process of labrum short and rather broad, somewhat rounded; basal segment of flagellum longer than segments 2 and 3 combined, median segments only slightly longer than broad; pubescence of head and thorax rather short, quite dense, entirely pale ochraceous; scutum rather dull, punctures quite shallow but rather close anteriorly, interspaces only slightly exceeding their diameter, somewhat more sparse posteriorly, scutellum more shining, punctured about as scutum; pleura dull, tessellate, with a few obscure shallow punctures below; triangle of propodeum densely tessellate and dull, not sharply delimited; corbicula not well-developed, dorsal hairs rather short, without an anterior fringe and with scattered interior hairs; trochanteral flocus imperfect, hairs rather short in general; legs dark, the more apical tarsal segments becoming ferruginous, pubescence entirely ochraceous, including hind tibial scopa; hind spurs relatively straight, dull testaceous; wings somewhat yellowish, veins and stigma testaceous, 2nd submarginal much shorter than 3rd, receiving 1st recurrent near center; tegulae brownish; abdominal terga smooth, apical margins only very slightly impressed, with a distinctly yellowish-hyaline apical rim, discs shining, deeply, distinctly and rather coarsely punctate, punctures rather sparse on basal segment, closer on following segments, with interspaces two or three times diameter of punctures; discal pubescence very short, entirely pale, suberect, segments 2-4 with narrow, bright ochraceous, apical fasciae, that on the 2nd rather widely interrupted, and slightly so on the 3rd segment, apical fimbria somewhat brownish.

TYPES—Holotype: Female, Raleigh, N. C., April 8, 1929 (T. B. Mitchell, on *Vicia*). Paratype: 1♀, Raleigh, April 19, 1923 (Mitchell, on *Vicia caroliniana*).

Even though considerable collection on the host plant has been done since the collection of these two type specimens, no others have been found. Both specimens are in the author's collection.

Andrena (Gymnandrena) commoda
Smith

(Figs. 22 & 23)

- Andrena commoda* Smith, 1879. Descr. New Species Hym. Brit. Mus. 53. ♀.
Andrena corni Robertson, 1900. Acad. Sci. St. Louis, Trans. 10, p. 50. ♀.
Andrena commoda Morice & Cockerell, 1901. Canad. Ent. 33, p. 152. (type)
Andrena Wilmattae Cockerell, 1906. Ann. Mag. Nat. Hist. (7) 17, p. 224. ♀.
Andrena pyrura Cockerell, 1906. Ann. Mag. Nat. Hist. (7) 17, p. 309. ♀.
Andrena commoda Cockerell, 1906. Psyche 13, p. 6. ♀ (type)
Andrena commoda Viereck, 1907. Ent. News 18, pp. 283 & 286. ♀ ♂. (key)
Andrena corni Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena Wilmattae Cockerell, 1931. Amer. Mus. Novitates 458, pp. 18 & 19.
Andrena (Gymnandrena) commoda Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 222. (classification)

FEMALE—Length 11 mm.; clypeus moderately convex, projecting nearly one-half below suborbital line, somewhat shining, uniformly, closely, deeply and rather finely punctate, without a median impunctate line; facial foveae broad, occupying above about two-thirds of area between eyes and lateral ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli slightly less than distance between ocelli; cheeks broader than eyes, rounded posteriorly, rather dull, microscopically and obscurely punctate; length of malar space about one-third basal width of mandibles; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum rather broadly semicircular, breadth about twice median length, pubescence of head and thorax whitish, faintly yellowish above; thoracic integument rather dull, punctures of scutum quite shallow, rather close and fine anteriorly, becoming quite sparse in center posteriorly, those on scutellum more fine and obscure, surface quite dull; punctures of pleura fine and indistinct but rather close; enclosure of propodeum dull and tessellate, with a few obscure striations toward basal margin; propodeal corbicula whitish, well developed but rather short, with a quite distinct anterior fringe; trochantal flocus quite short, white; tibial scopa dense, hairs simple, pale ochraceous; pubescence of basal leg joints whitish, those of tibiae and tarsi more ochraceous, all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent at middle;

abdominal terga rather dull, apical depressed areas distinct toward sides but obscure medially, rather narrow, quite closely and finely punctate except for the narrow apical rim, punctures of remainder of discs fine, quite close laterally, rather sparse medially, discal pubescence very short, erect, white, apical fasciae not well developed, tergum 5 with a quite dense apical ochraceous fimbria.

MALE—Length 10 mm.; clypeus very slightly convex, projecting but very slightly below suborbital line, rather dull, quite closely, finely and uniformly punctate beneath the rather short but dense pubescence; space between margin of vertex and lateral ocelli slightly greater than distance between ocelli; cheeks broader than eyes, rounded posteriorly (as in *hilaris*, fig. 21), rather dull, punctures exceedingly minute and obscure; length of malar space about one-fourth basal width of mandible; basal segment of flagellum considerably longer than 2nd segment, but shorter than 2nd and 3rd combined; process of labrum rather large, broadly subtriangular, the apex quite broadly truncate; mandibles of moderate length, relatively straight, with a quite distinct, inner, subapical tooth, overlapping about one-fourth; pubescence of head, thorax and legs whitish-ochraceous; thoracic integument quite dull, punctures of scutum shallow, rather fine, well separated anteriorly, becoming more sparse in center posteriorly, those on scutellum finer and more obscure; pleura more densely tessellate, the punctures shallow and obscure, well separated but not sparse; enclosure of propodeum obscurely subrugose; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga somewhat shining, apical depressed areas distinct, rather narrow, with only a few scattered punctures, punctures of remainder of discs fine, quite well separated laterally, becoming quite sparse in center of discs, discal pubescence short, erect, entirely pale, fasciae very poorly developed; apical portion of sternum 8 very narrow and slender, with a quite pronounced, submedian, ventral protuberance, dense, long pubescence from this to the truncate tip; penis valves very slightly broadened toward base, gonocoxites elongate, quite slender, very slightly dilated apically, gonocoxal lobes very slightly produced.

DISTRIBUTION — North Dakota to Vermont, south to Georgia; May to July.

FLOWER RECORDS—Robertson (1929) records this species (as *A. corni*) on *Cornus paniculata*. No other records are available.

RECORDS OF THE
***Andrena (Gymnandrena) confederata* Viereck**

(Figs. 22 & 23)

Andrena (Andrena) confederata Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 375. ♀ ♂.

Andrena (Gymnandrena) confederata Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 222. (classification).

FEMALE—Length 13 mm.; clypeus broadly convex, projecting about one-third below sub-orbital line, rather dull, with an obscure, narrow, median, impunctate line, otherwise with moderately coarse, close and shallow punctures; facial foveae broad above, occupying most of area between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli only slightly greater than their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, exceedingly minutely and sparsely punctate; length of malar space equal to about one-fourth basal width of mandibles; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum rather large, broad and rather short, obscurely subtriangular, but very broadly truncate apically; pubescence of head yellowish-white below, becoming ochraceous above, ochraceous on dorsum of thorax, becoming whitish below and on legs; thoracic integument rather dull, punctures of scutum rather shallow and fine, rather close anteriorly, becoming quite sparse posteriorly, scutellum somewhat more shining, more finely but distinctly punctured, punctures rather sparse and irregular; pleura more densely tessellate, rather closely punctured, but punctures quite shallow and indistinct; enclosure of propodeum dull, tessellate, becoming subrugose toward basal margin; propodeal corbicula ochraceous, very short, anterior fringe not well developed; trochanteral flocus white, poorly developed, very short; hind tibiae very narrow and elongate, scopa rather dense, hairs simple and elongate, faintly yellowish; all basitarsi very slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, microscopically tessellate, apical depressed areas quite narrow and obscure, faintly reddened toward rims, entire discs sparsely and very minutely and obscurely punctate, punctures visible only at certain angles, discal pubescence very short, sub-erect, pale, fasciae not developed, tergum 5 with a quite dense, apical, brownish fimbria.

MALE—Length 11 mm.; clypeus slightly convex, projecting about one-third below sub-orbital line, uniformly, closely, deeply and rather coarsely punctate beneath the quite dense pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly (as in *hilaris*, fig. 21), very minutely and obscurely punctate; malar space short; basal segment of flagellum longer than 2nd segment, but considerably shorter than 2nd and 3rd combined; process of labrum broad and rather short, slightly narrowed apically, apex rather broadly truncate; mandibles slender, short, lacking the usual sub-apical inner tooth, overlapping but very slightly; pubescence of head and thorax entirely ochraceous, somewhat more whitish on cheeks below and on pleura, entirely whitish on legs; thoracic integument rather dull, punctures of scutum rather shallow but quite close and distinct anteriorly, becoming quite sparse posteriorly, those on scutellum finer, irregularly distributed, surface somewhat more shining; pleura more densely tessellate, punctures rather close above but obscure; enclosure of propodeum dull, densely tessellate; basitarsi slender and elongate, considerably narrower than their respective tibiae, ferruginous in contrast with the darker, more basal segments of the legs; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, microscopically tessellate, apical depressed areas quite narrow, becoming very narrowly hyaline along apical rims, punctures extremely minute and obscure, visible only under high magnification, discal pubescence entirely pale, slightly elongate basally, but very short, sub-erect on the more apical segments, fasciae not developed; apical portion of sternum 8 slender and elongate, slightly broadened apically, with rather short, dense pubescence to the rather broadly truncate tip, apex of sternum 7 rather broadly produced, this area deeply incised medially; penis valves somewhat expanded basally, but not excavated, gonocoxites very slender, scarcely at all dilated apically, gonocoxal lobes only very slightly produced, narrowly rounded.

DISTRIBUTION—Ohio to New Jersey, south to Florida; March to May.

FLOWER RECORDS — *Amelanchier*, *Castanea*, *Crataegus*, *Fragaria*, *Ilex*, *Malus*, *Padus*, *Prunus*, *Pyranantha* and *Rubus*.

Andrena (? *Gymnandrena*) *flexa*
Malloch

Andrena flexa Malloch, 1917. Brooklyn Ent. Soc. Bul. 12, p. 92. ♀.

Andrena flexa Lanham, 1949. Univ. Calif. Publ., Ent. 8, p. 214. ♀. (classification)

FEMALE—Length 11 mm.; eyes about parallel; foveae broad, occupying above most of space between eyes and ocelli, covered with whitish tomentum; vertex not very broad, lateral ocelli separated from its hind margin by a space only slightly exceeding their diameter; cheeks somewhat broader than eyes; vertex and cheeks quite smooth, rather dull, punctures exceeding minute and vague; clypeus rather flat, somewhat shining between the deep, distinct and close, but rather fine punctures, with a narrow, rather vague, impunctate, median line; malar space very short; process of labrum broadly subtriangular, with a narrow, shallowly emarginate apex; basal segment of flagellum somewhat longer than 2nd and 3rd combined, these hardly as long as broad, median segments with length and breadth about equal; pubescence of head and thorax rather short and dense, entirely ochraceous, somewhat more whitish below; scutum and scutellum quite closely, finely, deeply and distinctly punctate, but punctures becoming obscured anteriorly; pleura dull, densely tessellate, punctures hardly evident; dorsal area of propodeum tessellate, not noticeably rugose; propodeal corbicula well developed, but dorsal hairs rather short, without an anterior fringe and with a few scattered interior hairs; trochanteral floccus imperfect; legs black; hind tibial scopa and pubescence generally pale ochraceous; inner apical spur of hind tibia strongly flexed near middle; wings lightly infuscated, veins and stigma ferruginous, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; tegulae pale testaceous posteriorly, more fuscous anteriorly; abdominal terga deeply, distinctly, closely and finely punctate, punctures invading the impressed apical areas where they are somewhat finer, these areas very shallow and obscure, discal pubescence very short, entirely pale, segments 2-4 with dense, white and conspicuous, apical fasciae, these very slightly interrupted on 2 and 3, apical fimbria more whitish.

DISTRIBUTION—Illinois to Oklahoma and Texas; April.

Andrena flexa and *A. macra* are closely related but seemingly distinct. In *macra* the pubescence is somewhat more deeply ochraceous, the clypeus lacks any evidence of a median impunctate line, and the ab-

dominal terga at most are subfasciate toward the extreme sides. Lanham (1949), having no male by which to judge its position more accurately, suggested that *flexa* probably belongs in *Cryptandrena* or *Thysandrena*. With the male of *macra* available, it is the opinion of this writer that these two species are more properly placed in *Gymnandrena*, but this is open to debate.

Andrena (*Gymnandrena*) *hilaris*
Smith

(Figs. 21-23)

Andrena hilaris Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 112. ♀.

Andrena hilaris Morice and Cockerell, 1901. Canad. Ent. 33, p. 151. (type)

Andrena (*Gymnandrena*) *hilaris* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 222. (classification)

FEMALE—Length 13 mm.; clypeus strongly convex, projecting about one-half below suborbital line, shining, with a narrow but distinct and slightly elevated median impunctate line, punctures otherwise deep and distinct, rather fine and close, facial foveae broad above, nearly filling area between eyes and ocelli, covered with ochraceous tomentum; distance between margin of vertex and lateral ocelli subequal to distance between ocelli; cheeks broader than eyes, rounded posteriorly, rather dull, very finely punctate; length of malar space equal to about one-third basal width of mandible; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quite large, subtriangular, apex rather narrowly truncate; pubescence of entire body pale ochraceous, becoming somewhat darker on fore and mid tibiae apically; thoracic integument rather dull but not densely tessellate, punctures of scutum rather shallow, quite close around margin but becoming sparse centrally, and sparse also in central portion of scutellum; pleura more densely tessellate, punctures very obscure; enclosure of propodeum dull, tessellate, rather narrowly but coarsely striate along basal margin; propodeal corbicula well developed but rather short, with a distinct anterior fringe; trochanteral floccus rather short; tibial scopa quite dense, hairs simple, of moderate length; basitarsi slightly narrower than their respective tibiae; wings quite strongly infuscated, especially apically; 2nd submarginal cell nearly equaling 3rd in length, receiving 1st recurrent slightly basad of middle; abdominal terga

somewhat shining, quite strongly violaceous, apical depressed areas quite distinct, occupying medially about one-third of the discs, becoming hyaline along rims, somewhat more closely punctate than remainder of the discs, punctures in general quite fine, close toward sides, somewhat more sparse medially; terga 2-4 with quite dense, apical, ochraceous fasciae which are rather widely interrupted, tergum 5 with a dense, apical, brownish fimbria.

MALE—Length 11 mm.; clypeus strongly convex, projecting about one-third below suborbital line, shining, with deep and distinct but rather fine and well separated punctures; space between margin of vertex and lateral ocelli about equal to distance between ocelli; cheeks broader than eyes, rounded posteriorly, rather dull, very minutely and closely punctate; length of malar space about one-third basal width of mandible; basal segment of flagellum slightly longer than 2nd segment, subequal to 3rd; process of labrum large, obscure, subtriangular, apex rather broadly truncate; mandibles quite slender, relatively straight, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence entirely pale ochraceous; thoracic integument rather dull but not densely tessellate, punctures of scutum rather shallow, fine and close except in center posteriorly where they become quite sparse, and quite sparse and irregular on scutellum; pleura more densely tessellate, punctures obscure but quite close; enclosure of propodeum subrugose; basitarsi slender and elongate, narrower than their respective tibiae; wings quite distinctly infuscated apically; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle, abdominal terga somewhat shining, apical depressed areas distinct but rather narrow, punctures fine and well separated, those on remainder of discs equally fine, closer on sides, quite sparse in center, discal pubescence rather short, suberect, entirely pale ochraceous, forming rather distinct but loose fasciae on extreme sides of terga 2-4; apical portion of sternum 8 quite slender and elongate, with a rather distinct, median, ventral protuberance, densely long pubescent from this to the rather abruptly truncate, narrow tip; penis valves very slightly dilated basally, not excavated, gonocoxites long and slender, hardly at all dilated apically, gonocoxal lobes rounded, very slightly produced.

DISTRIBUTION—Michigan and Ohio to eastern Canada and the New England states, south to Georgia and Alabama; March to June.

FLOWER RECORDS — *Aronia*, *Crataegus*, *Hydrangea*, *Ilex*, *Malus*, *Prunus*, *Pyrus*, *Rubus*, *Salix* and *Vaccinium*.

Andrena (? *Gymnandrena*) *macra*
Mitchell

(Figs. 22 & 23)

Andrena macra Mitchell, 1951. Elisha Mitchell Soc. Jour. 67, p. 231. ♀ ♂.

Andrena macra Sivik, 1954. Ent. News, 65, p. 253. (biology).

FEMALE—Length 11 mm.; clypeus only slightly convex, projecting about one-half below suborbital line, dull, punctures fine and quite close, without a distinct median impunctate line; facial foveae broad above, occupying most of area between eyes and lateral ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly shorter than distance between ocelli; cheeks broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and obscure; malar space exceedingly short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather small, width about twice the length, subtriangular, narrowly truncate apically; pubescence of head, of thorax laterally, and of legs pale ochraceous, that on dorsum of thorax pale fulvous, rather short and dense; scutum very closely and finely punctate, punctures becoming somewhat more sparse in center posteriorly, those on scutellum slightly more coarse, deep and distinct, well separated on each side of middle but otherwise close, surface shining; pleura dull, densely tessellate, very obscurely punctate; enclosure of propodeum dull, densely tessellate, obscurely subrugose toward basal margin; propodeal corbicula pale ochraceous, well developed, rather short, anterior fringe rather poorly developed; trochanteral floccus long, well developed, whitish; tibial scopa dense, pale fulvous to ochraceous, hairs rather elongate, simple; pubescence of basal leg joints whitish, that on tibiae and tarsi becoming ochraceous, basitarsi very slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga shining, apical depressed areas rather obscure, occupying medially about one-third length of the discs, becoming reddish-hyaline toward rim, discs uniformly, deeply, finely and very closely punctate, discal pubescence extremely short, suberect, entirely whitish, white fasciae evident toward sides, widely interrupted medially on terga 2 and 3, tergum 5 with a dense apical ochraceous fimbria.

MALE—Length 9 mm.; clypeus quite flat, projecting but very little below suborbital line, dull, very finely and quite closely punctate beneath the dense pubescence; space between margin of vertex and lateral ocelli somewhat shorter than distance between ocelli, only slightly exceeding their diameter; cheeks much broader than eyes, obscurely angulate opposite middle of eye, the angle rounded (as in *acra*, fig. 21), surface rather dull, minutely and obscurely punctate; malar space extremely short; basal segment of flagellum longer than 2nd segment, slightly shorter than 2nd and 3rd combined; process of labrum subquadrate, slightly narrowed apically, the truncate apex slightly incised; mandibles quite slender, slightly flexed, with a distinct, rather small, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs white; scutum quite finely, closely and deeply punctate anteriorly, somewhat more sparsely so in middle posteriorly where surface is more shining; scutellum somewhat shining, punctures very fine, scattered and irregular, rather sparse in center; pleura very dull, tessellate, with numerous rather coarse and close punctures on upper half; enclosure of propodeum dull, tessellate, obscurely subrugose toward basal margin; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga shining, apical margins rather narrowly and obscurely depressed, becoming reddish-hyaline toward rims, punctures of discs uniformly fine, deep and distinct, rather close except near middle, discal pubescence very short, suberect, whitish, with whitish apical fasciae evident only toward sides on terga 2 and 3; apical portion of sternum 8 rather slender, sides nearly parallel, with a very low, median, ventral ridge beyond which it is quite densely pubescent to the rather narrowly truncate tip; penis valves slender, only slightly expanded basally, not excavated, gonocoxites quite slender and elongate, very slightly dilated apically, gonocoxal lobes not at all produced.

DISTRIBUTION—Eastern North Carolina and Virginia; April and May.

FLOWER RECORDS — *Crataegus*, *Pyracantha* and *Rubus*.

MLBNDNFNA

Andrena (Gymnandrena) nivalis Smith

(Figs. 22 & 23)

- Andrena nivalis* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 118. ♀.
- Andrena convexa* Provancher, 1888. Addit. Corr. Faune Ent. Canada Hym., p. 311. ♀ ♂.
- Andrena semirufa* Cockerell, 1900. Ann. Mag. Nat. Hist. (7) 5, p. 407. ♀. New synonymy.
- Andrena nivalis* Morice & Cockerell, 1901. Canad. Ent. 33, p. 515. ♀. (type)
- Andrena nivalis* Cockerell, 1906. Psyche 13, p. 9. (type)
- Andrena (Gymnandrena) nivalis* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 222. (classification)
- Andrena (Gymnandrena) semirufa* Lanham, 1949. Ibid.

FEMALE—Length 13 mm.; clypeus quite strongly convex, projecting nearly one-half below suborbital line, shining, with a narrow, rather indefinite, median, impunctate line, punctures on each side deep and distinct, rather fine and close; facial foveae broad above, occupying most of area between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly greater than distance between ocelli; cheeks broader than eyes, rounded posteriorly, rather dull, minutely and rather closely punctured; length of malar space about one-third basal width of mandible; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, subtriangular, apex rather narrowly truncate; pubescence of head and thorax ochraceous, somewhat paler below; thoracic integument rather dull, scutum quite closely and finely punctate, punctures becoming obscure in center posteriorly, fine and close over most of scutellum; pleura more densely tessellate, punctures very fine and obscure, rather close; enclosure of propodeum dull, tessellate, rather coarsely rugoso-striate along basal margin; propodeal corbicula very short, without a distinct anterior fringe; trochanteral floccus imperfect; tibial scopa ochraceous, becoming more fuscous posteriorly, quite dense, hairs simple and rather elongate; fore and hind basitarsi slightly narrower than their respective tibiae, mid basitarsi about equal to their tibiae in width, front and middle

tibiae and all tarsi clothed with fuscous pubescence; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga somewhat shining, apical depressed areas distinct, occupying medially about one-third length of the discs, becoming reddish-hyaline toward rims, with a few very fine scattered punctures, remainder of discs finely but distinctly punctured, rather closely so toward sides, more sparsely in center, discal pubescence very short, suberect, largely pale, but with scattered, longer, more erect, fuscous hairs on 3rd and following terga, fasciae not developed, tergum 5 with a quite dense, apical, fuscous fimbria.

MALE—Length 10 mm.; clypeus rather strongly convex, projecting nearly one-half below suborbital line, somewhat shining, punctures deep and distinct, well separated medially, becoming very close laterally, moderately coarse; space between margin of vertex and lateral ocelli slightly less than distance between ocelli; cheeks broader than eyes, rounded posteriorly (as in *hilaris*, fig. 21), rather dull, very minutely and obscurely punctate; length of malar space about one-fourth basal width of mandible; basal segment of flagellum slightly exceeding 2nd segment, about equal to 3rd; process of labrum rather large, subtriangular, apex rather broadly truncate; mandibles of moderate length, rather straight, with a distinct inner subapical tooth, overlapping about one-fourth; pubescence over entire head, thorax and legs whitish, becoming slightly yellowish only on the fore and mid tibiae; thoracic integument rather dull and tessellate, punctures of scutum rather shallow but quite distinct, rather close anteriorly, becoming sparse in center posteriorly, those on scutellum fine and distinct, well separated but hardly sparse; pleura more densely tessellate, punctures fine and obscure; enclosure of propodeum dull and tessellate, very narrowly substrate along basal margin; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga rather smooth, apical depressed areas quite distinct, rather broadly hyaline along rims, nearly impunctate, remaining portions of discs very finely but distinctly punctate, punctures well separated but not sparse laterally, becoming more sparse medially, discal pubescence very short, suberect, whitish, fasciae not developed; apical portion of sternum 8 slender medially, with a rather pronounced submedian ventral protuberance, quite densely pubescent from this to near the apex which is rounded but deeply incised medially; penis

valves very gradually and slightly enlarged basally, not excavated, gonocoxites very long and slender, scarcely at all dilated, gonocoxal lobes not produced.

DISTRIBUTION—Alberta to Quebec in Canada, and Minnesota to the New England states, south to North Carolina and Georgia; April to July.

FLOWER RECORDS—*Hydrangea*, *Rhododendron*, *Rubus* and *Vagnera*.

It has been assumed that *convexa* Provancher is a synonym of *nivalis*, but as the writer was unable to locate the type of *nivalis* at the British Museum, or in the Hope Museum at Oxford, no opinion concerning the validity of this assumption can be expressed here. The types of *semirufa* Cockerell (♀) and of *convexa* (♂) have been studied and there seems little doubt that they belong together. Cockerell (1901) recognized the marked similarity of *semirufa* and *nivalis* and suggested the possibility that they are the same.

Andrena (Gymnandrena)
obscuripennis Smith

(Figs. 21 & 23)

- Andrena obscuripennis* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 118. ♀.
Andrena obscuripennis Morice and Cockerell, 1901. Canad. Ent. 33, p. 150. ♀ (type)
Andrena obscuripennis Cockerell, 1906. Psyche 13, p. 36. ♀. (type)
Andrena (Cryptandrena or Gymnandrena) obscuripennis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 233. (classification)

FEMALE—Length 15 mm.; clypeus broadly convex, projecting about one-half below suborbital line, rather coarsely, closely and distinctly punctate except for a very narrow, median, slightly raised, impunctate line; facial foveae broad above, occupying most of area between eyes and lateral ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly greater than distance between ocelli; cheeks broader than eyes, rounded, rather smooth, minutely punctate; malar space subtriangular, very narrow anteriorly but becoming quite broad posteriorly; basal segment of flagellum very slightly shorter than 2nd and 3rd combined; process of labrum about twice as broad as long, subtriangular, apex rather narrowly truncate; pubescence of head and thorax entirely pale fulvous; thoracic integument some-

what shining, punctures rather fine and close on scutum anteriorly, becoming somewhat more sparse posteriorly; scutellum more shining, with an area on either side of middle where the punctures are very sparse, otherwise very closely punctured; pleura rather dull, subrugose above, somewhat more shining and more distinctly but obscurely punctate below; enclosure of propodeum subrugose; propodeal corbicula more yellowish, well developed but rather short, with a distinct anterior fringe; trochanteral floccus relatively short, yellowish; tibial scopa quite dense, hairs relatively long, simple, entirely pale fulvous; legs ferruginous, somewhat darkened at extreme bases, fore and hind basitarsi slightly narrower than their respective tibiae, mid basitarsi nearly as broad as their tibiae; wings deep fuliginous, 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, narrowly and distinctly depressed apically, rims slightly reddened, discs uniformly, finely, closely, and quite densely punctate, punctures on basal tergum quite sparse and very fine, discal pubescence extremely short and sparse, entirely pale, fasciae not developed, but tergum 5 with a conspicuous, apical, fulvous fimbria.

MALE—Length 13 mm.; clypeus very slightly convex, broad, projecting but very slightly below suborbital line, densely and rather coarsely punctate beneath dense pubescence; space between margin of vertex and lateral ocelli very slightly shorter than distance between ocelli; cheeks broader than eyes, rounded, somewhat shining, very minutely punctate; malar space subtriangular, very short anteriorly but becoming quite broad posteriorly; basal segment of flagellum slightly longer than 2nd, subequal to 3rd segment; process of labrum short and rather broad, slightly narrowed to the broadly truncate apical margin; mandibles rather slender, very slightly flexed, with a distinct subapical inner tooth, overlapping about one-third; pubescence of head, thorax and legs entirely fulvous; thorax somewhat shining above, punctures of scutum quite close, deep and distinct anteriorly, becoming more sparse posteriorly, rather sparse in center of scutellum but otherwise very close; pleura rather dull, subrugose above, with more distinct but shallow punctures below; coxae and trochanters rather dark, legs otherwise pale ferruginous, basitarsi slender and elongate, much narrower than their respective tibiae; wings rather deep fuliginous, 2nd submarginal cell slightly

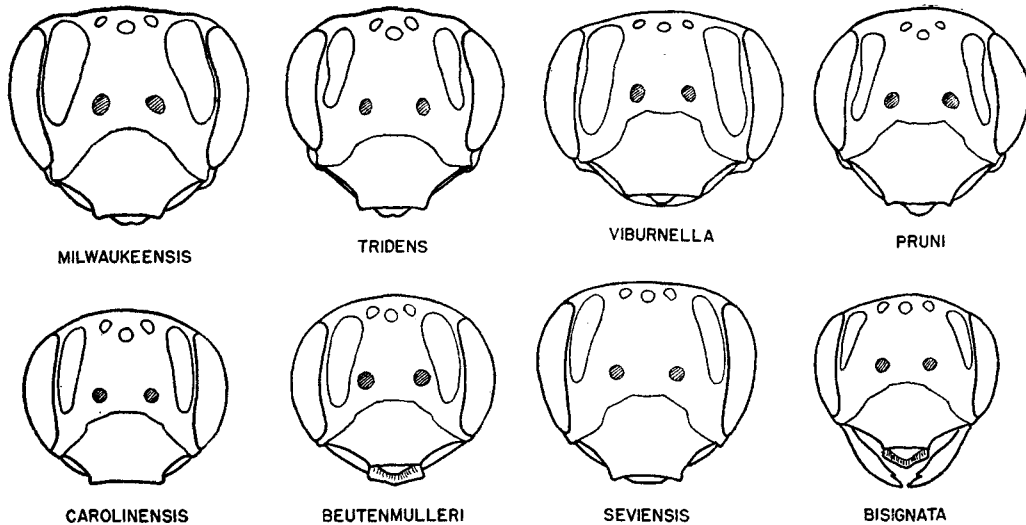


Figure 20—Facial view of female head, showing form of foveae in species of *Andrena* (*Andrena*), *A. (Cryptandrena)* and *A. (Gymnandrena)*.

shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, apical margins rather narrowly and obscurely depressed, discs rather finely and closely punctate, basal terga more sparsely punctate, discal pubescence very short, entirely pale fulvous, fasciae not developed; apical portion of sternum 8 with a low, median, ventral protuberance, densely pubescent between this and tip which is rather narrowly and abruptly truncate; penis valves only slightly expanded basally, not excavated, gonocoxites elongate, very slightly dilated apically, gonocoxal lobes scarcely produced, subtriangular (armature similar to that of *commoda*, fig. 22).

DISTRIBUTION — Georgia, Louisiana (?), North Carolina, New Jersey (?); April and May.

FLOWER RECORDS — *Batodendron*, *Crataegus*, *Ilex* and *Padus*.

MALAR SPACE

Andrena (Gymnandrena) sayi
Robertson

(Fig. 23)

Andrena sayi Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 52. ♀ ♂.

Andrena sayi Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 191 & 192. ♀ ♂. (key)

Andrena (Gymnandrena) sayi Lanham, 1949. Univ. Calif. Pubs., Ent. 8, p. 222. (classification)

FEMALE—Length 13 mm.; face slightly longer than distance between eyes above; eyes nearly parallel; foveae broad, occupying above most of area between eyes and ocelli, covered with pale yellowish tomentum; vertex broad, lateral ocelli separated from its hind margin by about twice their diameter; cheeks slightly broader than eyes; clypeus rather strongly protuberant, protruding about one-half below suborbital line, smooth and shining, with rather fine but deep and distinct, evenly distributed punctures; malar space linear; process of labrum broad, entire, truncate, apex about equal to each oblique side; basal segment of flagellum about equal to 2nd and 3rd combined, median segments somewhat longer than broad; vertex and cheeks smooth but rather dull, with minute, rather evenly distributed punctures, area below ocelli finely striate; pubescence of head and thorax rather short and thin, entirely pale ochraceous, more dense and elongate laterad of antennae and on pleura; scutum and scutellum smooth but rather dull, punctures fine but quite distinct, close and more obscure on scutum anteriorly, becoming rather sparse in center posteriorly, scattered and irregular on scutellum; pleura dull, more or less granular, with very fine and indefinite, close punctures; dorsal area of pro-

podeum finely granular or subrugose; propodeal corbicula well developed, dorsal hairs not extremely long, with a dense anterior fringe, and numerous hairs on interior; trochanteral floccus imperfect; hind tibial scopa and pubescence of legs in general ochraceous; hind tibial spurs relatively straight; wings lightly infuscated, somewhat darker toward apex, veins and stigma testaceous; 2nd submarginal considerably shorter than 3rd, stigma more ferruginous; tegulae piceous; abdominal terga somewhat shining between deep and distinct but rather close and fine punctures, these more sparse on basal tergum; apical margins of segments 2 and 3 rather narrowly and shallowly impressed, these areas well punctured; discal pubescence very short, erect, entirely pale ochraceous, apical fasciae evident laterally but not well developed, apical fimbria ochraceous.

MALE—Length 10-11 mm.; face somewhat longer than distance between eyes; eyes subparallel; vertex broad, lateral ocelli separated from its hind margin by about twice their diameter; cheeks somewhat broader than eyes, rounded posteriorly (as in *obscuripennis*, fig. 21); clypeus rather strongly protuberant, protruding nearly one-half below suborbital line, smooth and shining, with rather close and fine, evenly distributed punctures; malar space equal to about one-third width of mandible at base; process of labrum subtriangular, quite large with truncate tip; mandibles slender, with a subapical inner tooth, overlapping nearly one-half; basal segment of flagellum longer than segment 2, but shorter than 2 and 3 combined; pubescence of head rather short and thin, entirely pale ochraceous; vertex and cheeks smooth but rather dull, with very fine punctures, these becoming quite close on cheeks below; pubescence of thorax entirely pale-ochraceous, almost whitish, more ochraceous on dorsum; scutum and scutellum smooth but rather dull, punctures fine, rather close but obscure anteriorly, becoming sparse on scutum posteriorly and very fine and vague on scutellum; pleura smooth but dull, with very fine vague punctures; dorsal area of propodeum with a few fine basal striations; legs black, apical tarsal segments somewhat reddened, pubescence entirely pale; wings lightly infuscated, veins and stigma testaceous, 2nd submarginal slightly shorter than 3rd; tegulae testaceous-hyaline, somewhat darker anteriorly; abdominal terga smooth, somewhat shining, punctures fine, rather evenly distributed, well separated but not sparse, impressed apical margins hardly one-third of median length of segments 2-4, these becoming hyaline along apical rim, pubescence very short and inconspicuous, entirely pale, fasciae barely evident toward sides; sternum 7 with a deep, triangu-

lar, median emargination; sternum 8 slender and elongate apically, with a slight, subapical, ventral protuberance; penis valves of genital armature slender and elongate, the tip markedly attenuated, gonocoxites only very slightly dilated apically, the gonocoxal lobes not appreciably produced (armature similar to that of *commoda*, fig. 22).

DISTRIBUTION—Tennessee and North Carolina, north to Minnesota, Michigan, New York, New Brunswick and the New England states; March to June.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Brassica*, *Cercis*, *Crataegus*, *Malus*, *Padus*, *Prunus*, *Pyrus*, *Rubus*, *Salix*, *Stellaria*, *Taraxacum* and *Vaccinium*.

Andrena (? *Gymnandrena*) *seviensis*
new species

(Fig. 20)

FEMALE—Length 9 mm.; eyes parallel; foveae rather broad, occupying about two-thirds of space between eyes and ocelli; vertex very narrow, lateral ocelli separated from its hind margin by a space somewhat less than their diameter; cheeks very slightly broader than eyes; clypeus moderately convex, protruding about one-half below suborbital line, smooth and shining, punctures rather deep and distinct, well separated but not sparse medially, becoming somewhat closer at extreme sides; punctures of cheeks and vertex minute and obscure, surface smooth but rather dull; malar space evident but very short; process of labrum broadly rounded, rather large; basal segment of flagellum about equal to segments 2 and 3 combined, the more apical segments somewhat longer than broad; pubescence of head rather short and thin, entirely whitish, that on thorax somewhat more dense above and around tubercles and on propodeum, rather thin below; scutum and scutellum rather dull but smooth, punctures shallow and rather obscure, rather close on scutum anteriorly, becoming more sparse posteriorly, scutellum somewhat more shining, punctures irregularly scattered; pleura dull and tessellate but rather smooth, with shallow obscure punctures evident anteriorly and beneath; triangle of propodeum finely granular or subrugose, not sharply defined; propodeal corbicula poorly developed, dorsal hairs quite short, without an anterior fringe and with but a few, very fine, scattered hairs on interior; trochanteral floccus imperfect, some of the more apical hairs quite elongated; legs black, pubescence whitish in general, hind tibial scopa of elongate whitish hairs, tibia quite slender; hind tibial spurs yellowish, quite straight;

wings subhyaline, veins and stigma testaceous to piceous, 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; tegulae piceous, becoming somewhat brownish posteriorly; abdominal terga dull, posterior margins of 2nd and 3rd segments very broadly but shallowly impressed, these areas impunctate, basal portions of discs with rather deep and distinct, well separated punctures, but these hardly sparse except on basal tergum, interspaces on 3rd and 4th two or three times their diameter; discal pubescence hardly evident, apparently entirely pale, fasciae not developed, apical fimbria somewhat brownish.

TYPE—Holotype: Female, Chilhowee Mts., Sevier County, Tenn., May 12, 1951 (A. C. Cole) [Univ. Tenn.].

The poorly developed propodeal corbicula suggests a relationship with the western *Oligandrena*, but it is so far outside the range of species of this group the writer is inclined to place it in or near *Gymnandrena*.

Andrena (*Gymnandrena*) *vicina*
Smith

(Fig. 23)

- Andrena vicina* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 112. ♀.
Andrena vicina Packard, 1869. Guide Study Ins., p. 144. (nesting habits)
Andrena vicina Morice & Cockerell, 1901. Canad. Ent. 33, p. 151. (type)
Andrena vicina Clements & Long, 1923. Carnegie Inst. Wash. Pub. 336, p. 249. (ecology).
Andrena vicina Salt, 1927. Jour. Expt. Zool. 48, p. 251. (stylopization)
Andrena vicina Brittain & Newton, 1933. Canad. Jour. Res. 9, p. 342. (flower records).
Andrena vicina Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 210. ♀ ♂. (key)
Andrena vicina Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena vicina Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 705 & 708. ♀ ♂. (key)
Andrena (*Gymnandrena*) *vicina* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 222. (classification)

FEMALE—Length 13 mm.; clypeus convex, projecting full one-half below suborbital line, rather smooth, with a rather narrow and indefinite, median, impunctate line, rather deeply and closely punctate on each side; facial foveae broad above, occupying most of space between eyes and lateral ocelli, covered with brownish-ochraceous tomentum and with numerous longer, erect, more fuscous hairs; space between margin of vertex and lateral

ocelli subequal to distance between them; cheeks slightly broader than eyes, rounded posteriorly, rather smooth, punctures very minute and obscure; length of malar space about one-third basal width of mandibles; basal segments of flagellum subequal to 2nd and 3rd combined; process of labrum broad and rather short, semicircular; pubescence of head and thorax entirely pale ochraceous, quite short; thoracic integument dull, punctures of scutum rather fine and close anteriorly, becoming quite sparse in center posteriorly, those on scutellum rather irregular, sparse on each side of middle, rather fine; pleura more densely tessellate, punctures very fine and obscure, rather close; enclosure of propodeum subrugose, rather coarsely so basally; propodeal corbicula well developed but rather short, with a distinct anterior fringe, pale ochraceous; trochanteral floccus rather short, pale fuscous; tibial scopa dense, black, hairs simple, rather elongate; pubescence of legs black, all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga shining, apical depressed areas rather obscure medially where they occupy about one-third length of discs, becoming faintly reddened toward rims, punctured about as basal areas of discs where punctures are quite fine, evenly distributed,

rather close, somewhat more sparse in center and on basal tergum, pubescence of basal tergum pale, discal pubescence of following terga very short, thin, entirely fuscous to black, *fasciae* not developed, tergum 5 with a dense, apical, blackish fimbria.

MALE—Length 11 mm.; clypeus rather strongly convex, projecting nearly one-half below suborbital line, rather coarsely and deeply punctate, punctures somewhat sparse medially, becoming close and relatively fine laterally; distance between margin of vertex and lateral ocelli subequal to distance between ocelli; cheeks broader than eyes, rounded posteriorly (as in *hilaris*, fig. 21), dull, minutely and rather closely punctate; length of malar space equal to about one-third basal width of mandibles; basal segment of flagellum subequal to 2nd segment; process of labrum quite large, subtriangular, apex rather broadly truncate; mandibles rather slender, slightly curved, with a robust, subapical, inner tooth, overlapping about one-third; pubescence of head, thorax and legs entirely pale, more whitish below, pale ochraceous above; thoracic integument dull, punctures of scutum rather fine and shallow, well separated but not sparse anteriorly, becoming more sparse in middle posteriorly, those on scutellum more fine and irregular, somewhat sparse on each side of

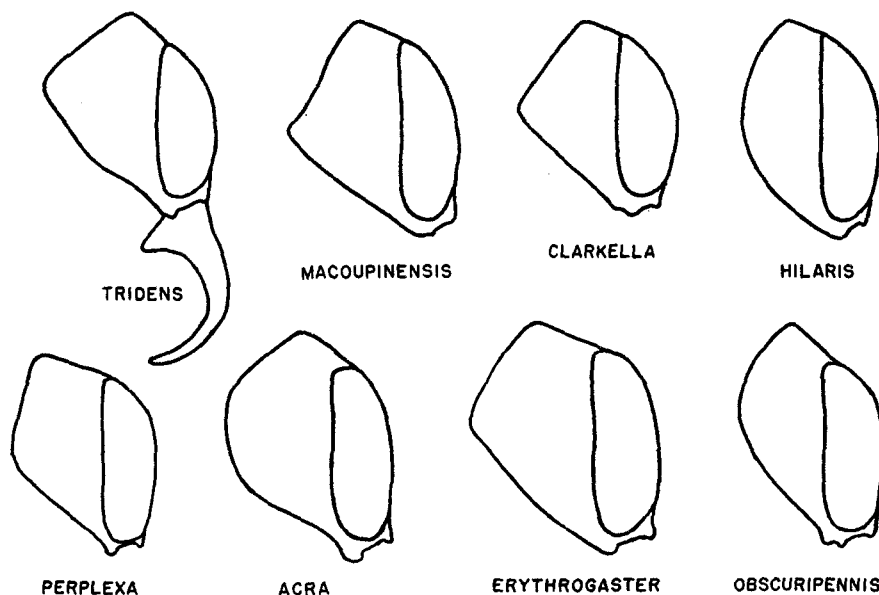


Figure 21—Lateral view of male head, showing form of cheeks in species of *Andrena* (*Andrena*), *A. (Cryptandrena)* and *A. (Gymnandrena)*.

middle; pleura more densely tessellate, punctures shallow, fine and rather obscure; enclosure of propodeum dull, densely tessellate, subrugose toward basal margin; all basitarsi slender and elongate, considerably narrower than their tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga quite smooth, apical depressed areas distinct, occupying medially not quite one-third length of disc, becoming reddish-hyaline toward rims, much more finely and sparsely punctate than the more basal part of discs where punctures are very fine and distinct, well separated but not sparse, becoming rather close toward sides, discal pubescence erect, short and thin, somewhat more elongate on basal tergum, fasciae not developed; apical portion of sternum 8 quite slender, with a median ventral protuberance, densely pubescent from this to the rather narrowly truncate apex; penis valves gradually broadened toward base, not excavated, gonocoxites elongate, only slightly dilated apically, gonocoxal lobes very slightly produced, narrowly rounded apically (armature similar to that of *commoda*, fig. 22).

DISTRIBUTION—Oregon and British Columbia, east to Nova Scotia and the New England states, south to North Carolina and Georgia; March to August.

FLOWER RECORDS—*Azalea*, *Castanea*, *Ilex*, *Malus*, *Padus*, *Prunus*, *Pyrus*, *Rhododendron*, *Rhodora*, *Rubus*, *Vaccinium* and *Viburnum*. Recorded by Brittain and Newton (1933 & 1934) on the following additional genera: *Amelanchier*, *Caragana*, *Narcissus*, *Salix*, *Scilla*, *Spiraea*, *Taraxacum*, *Trifolium* and *Tulipa*.

***Andrena* (? *Gymnandrena*) *victima*
Smith**

Andrena victima Smith, 1853. Cat. Hym. Brit. Mus., p. 113. ♀.

Andrena desponsa Smith, 1853. Cat. Hym. Brit. Mus., p. 114. ♂.

The type specimens of *victima* ♀ and *desponsa* ♂ are both styloped and as a result are neither normal nor acceptable representatives of the species to which they belong. It seems possible that they are synonymous with *vicina*. The male (*desponsa*) especially bears a very close resemblance to that of *vicina* and the differences may be due to its styloped condition. The female (*victima*) differs from *vicina* in the

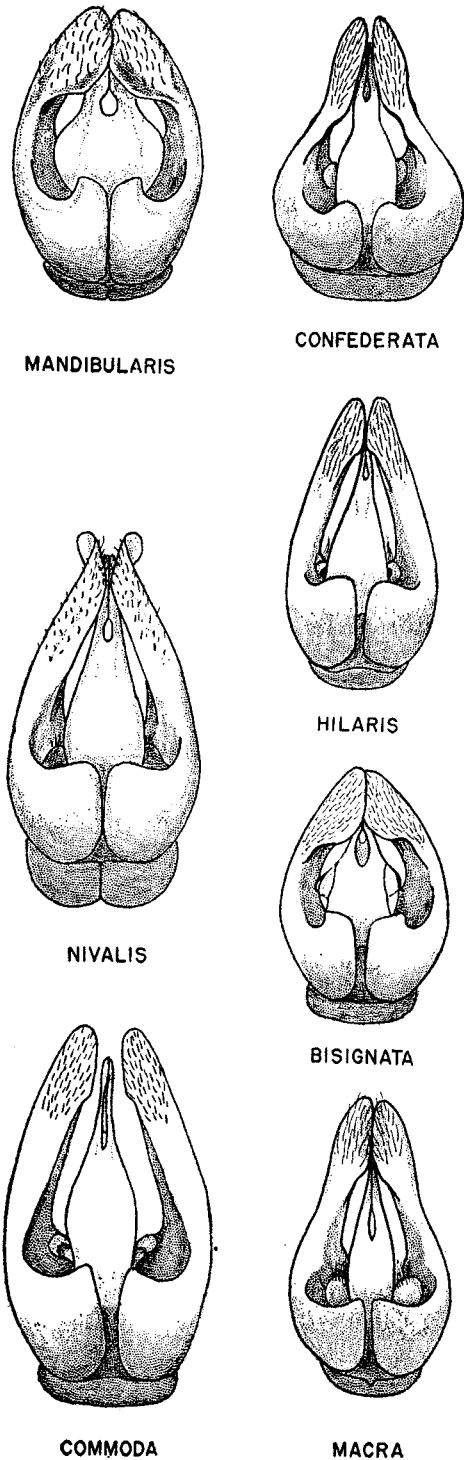


Figure 22

Apical flexed portion of male genital armature in species of *Andrena* (*Andrena*) and *A.* (*Gymnandrena*).

color of the tibial scopa. This is black in normal females of *vicina*, but in the males the tibial pubescence is pale. In the stylo-sized type of *victima* the hind tibia is slightly narrower than that of *vicina*, and the scopal hairs are shorter. Those hairs near the middle of the tibia are yellowish, but those at apex, base and along hind margin are more fuscous. Again, it seems

quite possible that these differences are due to stylopization.

No apparent normal females that seem to agree with *victima* have been found. The other specimens in the original type series also are stylopized, and one of those was made a homotype and is in the possession of the writer. A homotype of *desponsa* also is at hand.

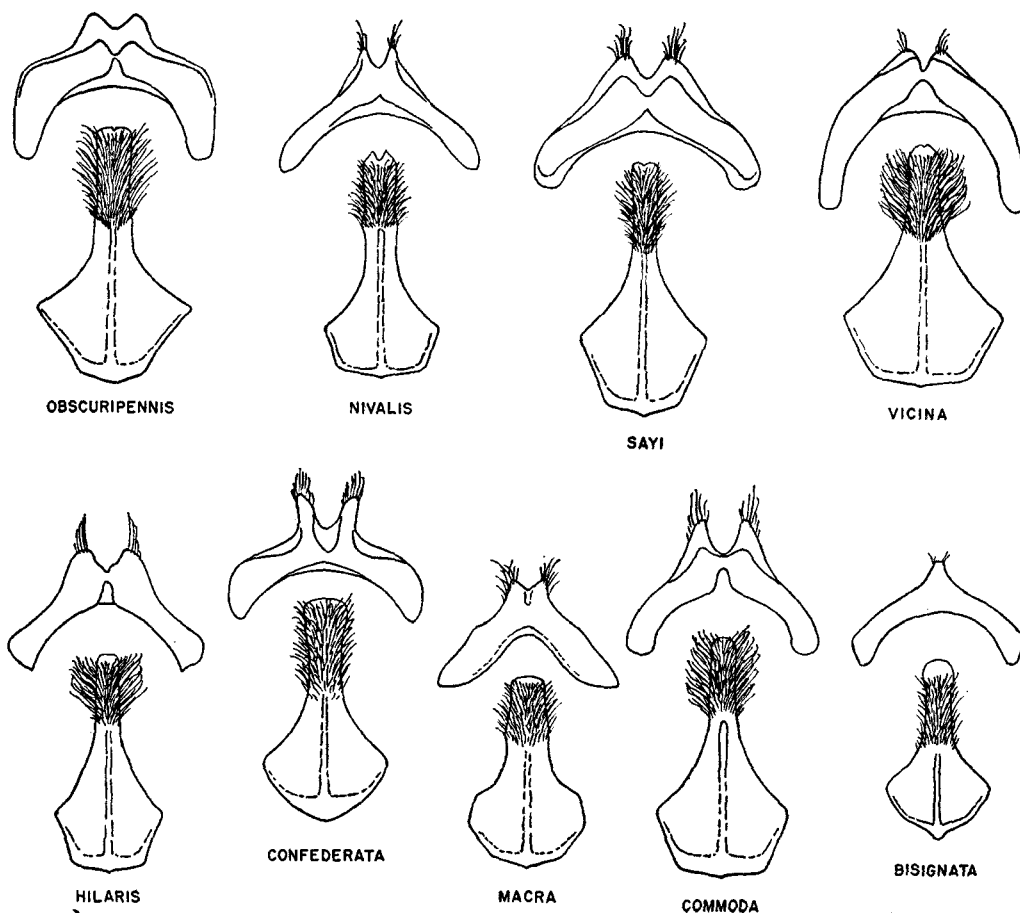


Figure 23—Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Gymnandrena*).

Table 3—Distribution of species of *Andrena*, *Bythandrena* and *Gymnandrena* by states.

Andrena	New England					North Central					Mid					South-eastern												
	Maine	New Hampshire	Vermont	Massachusetts	Rhode Island	Connecticut	Wisconsin	Michigan	Illinois	Indiana	Ohio	Kentucky	New York	New Jersey	Pennsylvania	Maryland	Delaware	West Virginia	Virginia	Dist. Columbia	Tennessee	North Carolina	South Carolina	Mississippi	Alabama	Georgia	Florida	
clarkella	X	X		X			X					X																
frigida	X	X		X	X		X	X				X	X						X									
macoupinensis				X				X							X							X						
mandibularis				X			X			X		X	X					X				X				X		
milwaukeensis	X	X	X	X		X	X					X	X				X					X				X		
thaspii			X	X		X	X			X		X					X											
tridens				X	X		X	X		X		X	X					X			X	X				X		
Bythandrena																												
acra						X	X			X																		
carlini	X			X	X	X	X		X	X		X	X	X	X		X	X			X	X				X		
c. neorhodura				X			X						X		X													
critica													X															
dunningi	X		X				X		X			X						X				X						
erythrogaster	X			X	X		X	X	X	X		X																
e. subaustralis	X			X			X					X					X	X			X	X	X			X	X	
gabrielsoni	X					X	X															X						
perplexa	X	X		X			X		X			X	X	X				X	X			X		X		X	X	
pruni				X	X			X	X	X		X		X				X				X				X		
regularis	X	X	X	X	X	X	X					X	X													X		
viburnella						X	X	X				X	X					X			X	X	X	X		X	X	
Gymnandrena																												
beutenmulleri						X					X											X						
bisignata		X		X	X		X					X					X					X						
carolinensis																						X						
commoda			X				X	X	X	X				X												X		
confederata									X				X			X						X				X	X	
flexa								X																				
hilaris			X	X			X		X	X	X	X	X		X			X	X			X		X	X	X	X	
macra																		X				X						
nivalis	X	X				X	X	X						X								X				X		
obscuripennis													X									X				X		
sayi			X	X			X	X	X	X		X	X					X			X	X						
seviensis																					X							
vicina	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X	X				X		

Andrena (Pterandrena) accepta

Viereck

(Figs. 24-26 & 28)

- Andrena pulchella* Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 57. ♀. Preocc.
Pterandrena pulchella Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 193 & 194. ♀ ♂. (key)
Andrena accepta Viereck, 1916. Biol. Soc. Wash. Proc. 29, p. 127. (new name)
Pterandrena pulchella Robertson, 1929. Flowers and Insect; Lancaster, Pa., Science Press. (flower records)
Andrena (Pterandrena) accepta Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 11 mm.; face slightly longer than broad, with large and conspicuous yellow maculae between clypeus and lower margin of eye, extending up to level of antennae; clypeus rather flat, somewhat longer than broad, projecting about one-half below sub-orbital line, smooth and shining, mostly black, but often with narrow infusions of yellowish at extreme sides and along upper margin, rather deeply and coarsely punctate, the punctures rather sparse medially, becoming more fine and close at extreme sides; facial foveae short, not extending below level of antennae, rather broad above, occupying most of area between eyes and ocelli, covered with ochraceous tomentum; space between margin of vertex and lateral ocelli broad, about equal to distance between them; cheeks broader than eyes, rounded posteriorly, somewhat shining, punctures very minute and close; malar space evident but very short; basal segment of flagellum elongate, considerably longer than 2nd and 3rd combined; process of labrum short and rather broad, width fully three times the median length, rather broadly truncate and very slightly emarginate apically; pubescence of head, thorax and basal leg segments entirely ochraceous, that on tarsi becoming somewhat fuscous; thoracic integument rather dull, punctures of scutum very fine, close and uniform, but quite deep and distinct, those on scutellum somewhat more coarse and deep and more widely separated, the surface somewhat shining; pleura with fine, shallow and rather close punctures; dorsal area of propodeum oblique, quite short, triangle obscurely roughened along basal margin; propodeal corbicula well developed, with a thin anterior fringe, ochraceous; trochanteral floccus quite long and dense, pale ochraceous; hind tibiae broadened apically, apex nearly twice width of basitarsi, scopae dense, hairs of moderate length, plumose, pale ochraceous; front basitarsi slender, mid basitarsi nearly as broad as their tibiae; 2nd submarginal cell much shorter than 3rd,

receiving 1st recurrent slightly beyond middle; abdominal terga shining, deeply, closely and quite coarsely punctate, apical depressed areas occupying about one-third median length of discs, yellowish-hyaline, discal pubescence short, thin, inconspicuous, entirely pale, terga 2-4 with pale ochraceous, apical fasciae, that on tergum 2 somewhat interrupted medially, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 9 mm.; face longer than broad, with large yellow maculae between clypeus and lower margins of eyes, extending up to level of antennae; clypeus slightly convex, mostly yellow, with a pair of dark spots and the apical rim blackish, smooth and shining, punctures fine, well separated, becoming very close at extreme sides; space between margin of vertex and lateral ocelli very broad, subequal to distance between ocelli; cheeks broader than eyes, rounded posteriorly, shining, punctures exceedingly minute, rather close; malar space evident but very short; basal segment of flagellum elongate, subequal to 2nd and 3rd combined; process of labrum quite broad basally, abruptly constricted to form a narrow tip which is slightly emarginate; mandibles rather short, with a distinct, inner, sub-apical tooth, overlapping somewhat less than one-third; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument rather dull laterally, dorsum of thorax somewhat shining, punctures of scutum deep and distinct, quite close, those on scutellum scattered irregularly and rather sparse; pleura quite closely, finely and deeply punctate; dorsal area of propodeum oblique, narrow, triangle obscurely roughened along basal margin; basitarsi pale testaceous, slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth, shining, deeply, closely and rather coarsely punctate, at least on basal segments, punctures becoming finer and more widely separated on more apical segments, apical impressed areas occupying about one-third median length of discs, hyaline, discal pubescence short, thin, erect, entirely pale, terga 2-4 subfasciate apically toward sides of terga; apical portion of sternum 8 rather short and robust, sides parallel to the somewhat broadened apex which is rather broadly and deeply emarginate apically; penis valves slender, very slightly dilated basally, gonocoxites rather robust, slightly dilated toward tip, the gonocoxal lobes quite strongly produced, subacute.

DISTRIBUTION—Illinois and Indiana, west to Utah and northern Mexico, south to North Carolina and Georgia; September and October.

FLOWER RECORDS—Collected on *Helianthus angustifolius* in North Carolina. Recorded by Robertson (1929, as *Pterandrena pulchella*) on six other species of *Helianthus*, and on *Aster*, *Bidens*, *Coreopsis* and *Silphium*.

Andrena (Pterandrena) aliciae
Robertson

(Figs. 24 & 25)

Andrena aliciae Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 57. ♀ ♂.

Pterandrena aliciae Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀ ♂. (key)

Pterandrena aliciae Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (Pterandrena) aliciae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 12 mm.; face slightly longer than broad; clypeus yellow, with two small dark spots and the apical rim blackish, broadly convex, projecting about one-half below suborbital line, smooth and shining, with a rather distinct median impunctate line, on each side the punctures deep and distinct, rather coarse and well separated, becoming quite close at extreme sides; facial foveae rather broad above, occupying most of space between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli slightly less than distance between ocelli; cheeks broader than eyes, rounded posteriorly, somewhat shining but finely pebbled, sparsely and shallowly punctate, but with a narrow, median, closely punctate area along eye margin; malar space distinct but quite short; basal segment of flagellum elongate, subequal to segments 2-4 combined; process of labrum very broad and short, broadly semicircular, but with a slight median emargination; pubescence of head and thorax whitish, very short and thin on dorsum of thorax, longer and more ochraceous on legs; thoracic integument dull and tessellate, punctures of scutum very shallow, rather close anteriorly, becoming sparse or inevident posteriorly, those on scutellum very fine, shallow and sparse, hardly evident; pleura without evident punctures; dorsal area of propodeum oblique, triangle densely tessellate, but finely rugoso-striate along basal margin; propodeal corbicula white, rather thin but moderately long, anterior fringe rather poorly developed; trochanteral flocus white, rather long and dense; hind tibiae rather slender and elongate, apex not quite twice width of the basitarsi, scopa dense, hairs quite densely plumose, pale ochraceous; front basitarsi slightly narrower than their tibiae, mid basitarsi subequal in

width to their tibiae, length about three times the breadth; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, densely tessellate, punctures very obscure, more evident on apical impressed areas, which are rather shallow, occupying medially about one-third length of discs, discal pubescence extremely short, sparse and obscure, composed of microscopic dark hairs, terga 2-4 with thin, narrow, whitish, apical fasciae, widely interrupted on tergum 2, more narrowly so on 3, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 10 mm.; clypeus yellow, slightly convex, with two small black spots and the apical rim blackish, projecting slightly less than one-half below suborbital line, smooth and shining, finely, deeply and rather sparsely punctate, the punctures becoming quite close at extreme sides; space between margin of vertex and lateral ocelli slightly greater than their diameter, cheeks broader than eyes, rounded posteriorly, somewhat shining, punctures fine, shallow, rather sparse; malar space short but distinct; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum broad and very short, semicircular, very slightly emarginate medially; mandibles of moderate length, with a distinct, inner, subapical tooth, overlapping about one-fourth; pubescence of head, thorax and legs entirely white; thoracic integument dull and tessellate, punctures of scutum very shallow, fine, well separated anteriorly, becoming very obscure posteriorly, those on scutellum shallow, fine, sparse and irregular, surface somewhat shining; pleura without visible punctures; dorsal area of propodeum oblique, triangle very finely subrugose; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga dull, tessellate, punctures very fine, shallow, well separated but not sparse on discs, becoming deeper and more distinct and close on impressed apical areas, which are rather shallow, becoming very narrowly hyaline along rims, discal pubescence extremely short, thin and obscure, hardly visible, terga 1-5 with narrow but distinct, whitish, apical fasciae, that on tergum 1 slightly interrupted; apical portion of sternum 8 quite slender and elongate, slightly dilated just beyond middle and apex slightly dilated, truncate and very slightly emarginate, apical portion rather short pubescent beneath; penis valves slender apically, slightly broadened toward base, gonocoxites quite robust, rather abruptly dilated toward apex but gradually narrowed from that to the narrowly rounded tips, gonocoxal lobes not at all produced.

DISTRIBUTION—Nebraska and Minnesota to Ohio and Maryland, south to Georgia; July to September.

FLOWER RECORDS—Collected on *Rudbeckia lanceolata* in North Carolina. Recorded by Robertson (1929) on *Bidens*, *Heli-anthus*, *Heliopsis*, *Rudbeckia* and *Silphium*.

***Andrena* (?*Pterandrena*) *angusi*
Viereck**

Andrena angusi Viereck, 1907. Ent. News 18, p. 284. ♀.

FEMALE—Length 13 mm.; eyes about parallel; foveae narrow, occupying about half of space between eyes and ocelli, reaching level of upper margin of clypeus; vertex broad, ocelli separated from its margin by fully twice their diameter; cheeks broader than eyes (about 3:2); clypeus strongly protuberant, shining, closely and deeply punctate, with interspaces no more than diameter of punctures, with a narrow but distinct median impunctate line; malar space evident but very short; process of labrum large, triangular, apex very deeply emarginate; basal segment of flagellum equal to segments 2 and 3 combined; pubescence of head and thorax entirely pale ochraceous to whitish; scutum and scutellum finely and evenly punctate, punctures close except near center; pleura somewhat shining, punctures fine, close and rather indefinite; propodeal triangle finely rugose, lateral faces subrugose, propodeal corbicula short and poorly developed; trochanteral flocus well developed, long, curved and distinctly plumose; tibial scope pale ochraceous, rather thin, plumosities short and at right angles to shaft of hair (as in *Ptilandrena*), legs otherwise entirely pale pubescent, hind tibiae and mid and hind basitarsi quite narrow and elongate; wings lightly infuscated, veins and stigma ferruginous; 2nd submarginal nearly as long as 3rd, receiving 1st recurrent vein at middle; tegulae testaceous-hyaline; abdominal terga smooth, punctures very fine and well separated, apical impressed areas about one-third median length of discs, testaceous-hyaline and nearly impunctate, discal pubescence very short, entirely pale, apical fasciae poorly developed, evident only laterally on segments 2-4, tergum 5 with a fulvous apical fimbria.

DISTRIBUTION—This was described in a key to species occurring or likely to occur in Connecticut. No other reference to the collection data is given, and the type specimen, which is unique, bears no collection information. The description above was made from this type specimen in the Philadelphia Academy of Science.

***Andrena* (*Pterandrena*) *asteris*
Robertson**

(Figs. 24-26 & 28)

- Andrena asteris* Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 56. ♀ ♂.
Pterandrena asteris Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀ ♂. (key)
Andrena asteris Salt, 1927. Jour. Expt. Zool. 48, p. 251. (stylopization)
Pterandrena asteris Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena asteris Britton, 1937. Conn. (State) Agr. Expt. Sta. Bull. 408, p. 261. (economic)
Andrena (*Pterandrena*) *asteris* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 12 mm.; clypeus only slightly convex, projecting about one-third below suborbital line, dull and tessellate, punctures extremely minute and obscure, rather sparse medially, becoming quite close at extreme sides; facial foveae rather broad above, occupying about two-thirds of space between eyes and ocelli, covered with yellowish-white tomentum; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks broader than eyes, rounded posteriorly, rather dull, punctures very minute, well separated; malar space extremely short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum much broader than long, subtriangular, apex truncate and slightly emarginate; pubescence of head, thorax and basal leg segments pale ochraceous, that on the more apical leg segments becoming fuscous; thoracic integument dull, tessellate, punctures of scutum very fine, shallow, quite close anteriorly, becoming very sparse posteriorly, surface faintly shining, those on scutellum very obscure and sparse, surface more shining; pleura without evident punctures; dorsal area of propodeum nearly vertical, triangle densely tessellate; propodeal corbicula well developed, with a quite dense anterior fringe, pale ochraceous; trochanteral flocus long and dense, pale ochraceous; hind tibiae rather narrow and elongate, apex hardly twice width of basitarsi, scopa dense, hairs densely and conspicuously plumose, whitish-ochraceous, but becoming somewhat fuscous along posterior margin; front and middle basitarsi nearly or quite equalling their tibiae in width; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent one-third of its length from apex; abdominal terga smooth, dull, very finely tessellate, punctures extremely minute and obscure, hardly visible, well separated but hardly sparse, apical impressed areas very shallow, equalling about one-third length

of discs medially, becoming narrowly brownish-hyaline along rims, discal pubescence extremely short, sparse and obscure, dark in color, terga 2-4 with thin, whitish apical fasciae, more or less interrupted medially on tergum 2, tergum 5 with a dense fuscous apical fimbria.

MALE—Length 9 mm.; with small yellow maculae between clypeus and lower margin of eyes; clypeus slightly convex, projecting about one-third below suborbital line, yellow except for a pair of small dark spots and the black apical rim, smooth and shining, very finely punctate, punctures well separated medially, becoming quite close and more minute at extreme sides; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, punctures very fine and rather close; malar space lacking; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum rather broadly subtriangular, apex truncate and emarginate; mandibles quite short, with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely whitish-ochraceous; thoracic integument dull, finely tessellate, punctures of scutum shallow and obscure, well separated but not sparse anteriorly, becoming very sparse and more obscure posteriorly, those on scutellum hardly visible, surface quite dull; pleura without visible punctures; dorsal area of propodeum very narrowly oblique, triangle densely tessellate; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but quite dull, finely tessellate, punctures exceedingly minute, well separated but not sparse, apical impressed area shallow, occupying medially about one-third length of disc, becoming brownish-hyaline along rims, discal pubescence very short, thin and obscure, entirely pale, terga 1-4 with thin, white, apical fasciae evident laterally, more or less widely interrupted medially; apical portion of sternum 8 rather robust, elongate, parallel-sided, abruptly truncate at tip, clothed with short dense pubescence beneath; penis valves slightly constricted medially, slightly expanded toward tip which is deeply, triangularly incised medially, more bulbous toward base, but not widely dilated, gonocoxites expansive apically, being broadly, triangularly dilated, gonocoxal lobes produced, acutely triangular.

DISTRIBUTION—Minnesota to the New England states, south to Georgia and Mississippi; August to October. One collection record from Indiana in May seems doubtful.

FLOWER RECORDS—*Aster* spp. Robertson (1929) records this on several species of *Aster*, and on *Eupatorium*, *Polygonum* and *Solidago*.

Andrena (Pterandrena) asteroides
new species

(Figs. 24 & 25)

FEMALE—Length 10-11 mm.; length of face slightly greater than distance between eyes above; eyes very slightly convergent below; foveae broad, filling (much as in *asteris*, fig. 26, but more nearly filling space between eyes and ocelli most of area between eyes and ocelli above) covered with pale yellowish tomentum; vertex narrow, lateral ocelli separated from its hind margin by about their own diameter; cheeks and eyes subequal in width; clypeus moderately convex, projecting about one-third below suborbital line, surface rather dull, with fine and rather sparse punctures, these becoming somewhat closer at extreme sides; face below ocelli striate, vertex smooth and impunctate but rather dull medially, becoming obscurely, finely punctate laterally; cheeks smooth and shining, with very fine, well separated punctures; malar space linear; process of labrum deeply emarginate medially; basal segment of flagellum about equal to segments 2 and 3 combined, median segments very slightly longer than broad; pubescence of entire head and thorax ochraceous, somewhat more yellowish above; scutum smooth but dull, punctures shallow and rather obscure, but definitely separated even anteriorly, becoming quite sparse in center posteriorly where the surface is somewhat more shining; scutellum somewhat shining, with rather sparse, shallow, evenly distributed punctures; pleura smooth but dull and densely tessellate, punctures very shallow and obscure; dorsal area of propodeum tessellate along margins, becoming finely rugose in center along base, propodeal corbicula well developed; trochanteral floccus well developed; legs dark, femora and other basal segments with yellow pubescence, that on tibiae and tarsi becoming more fuscous, hind tibial scopa densely plumose, yellowish anteriorly but becoming somewhat fuscous posteriorly; tegulae piceous; wings lightly infuscated, veins pale testaceous, stigma more nearly piceous, 2nd submarginal cell only slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but dull, with fine and shallow, well separated punctures on the more

basal terga, these becoming more minute and obscure on the more apical segments, invading, somewhat more finely, the impressed apical margins, these becoming narrowly yellowish-hyaline along rims, segments 2-4 with pale apical fasciae, somewhat interrupted on 2 and 3, apical fimbria fuscous.

MALE—Length 9 mm.; face slightly longer than distance between eyes above; eyes very slightly convergent below; vertex narrow, lateral ocelli separated from its hind margin by about their own diameter; cheeks and eyes subequal in width; clypeus yellow except for two small dark spots and a narrow apical border, smooth and very finely and evenly punctured; face below ocelli dull, rather deeply and closely but finely punctate, vertex smooth but dull, impunctate medially, with a few scattered, minute punctures laterally, cheeks smooth, shining, minutely and obscurely punctate; malar space linear; process of labrum deeply emarginate; basal segment of flagellum very little exceeding segment 2 in length, median segments somewhat longer than broad; mandibles with a distinct inner subapical tooth, slightly overlapping at tips; pubescence of entire head and thorax yellowish-ochraceous, quite dense, especially around antennae, on cheeks below, on dorsum of thorax, propodeum and basal segments of legs; scutum and scutellum smooth but dull, punctures shallow and rather obscure, close in general, becoming rather sparse and more obscure posteriorly, those on scutellum fine and obscure; pleura dull and densely tessellate beneath the long pubescence; dorsal area of propodeum densely tessellate but rather smooth, except for a narrow basal fringe of short and fine striations; propodeal corbicula rather well developed; front legs and basal segments of mid and hind legs blackish, hind femora and mid and hind tarsi pale testaceous, pubescence of legs entirely pale ochraceous; wings subhyaline, veins pale testaceous, stigma more piceous; 2nd submarginal cell only slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but rather dull, with deep, distinct but fine and well separated punctures, these becoming finer on the more apical segments, apical margins of segments only slightly depressed, invaded by fine punctures, becoming more or less hyaline along rims, segments 2-4 with thin, ochraceous, apical fasciae, more or less interrupted medially; sternum 7 with a shallow, subtriangular, median emargination and a rather conspicuous tuft on each side; sternum 8 with an abrupt division between the basal and more slender, apical portions, the latter parallel-sided, well covered with rather short setae, truncate apically; penis

valves slightly expanded basally but hardly excavated, gonocoxites rather evenly and broadly expanded apically, considerably exceeding tips of penis valves, gonocoxal lobes only slightly produced.

TYPES—Holotype: Female, the Cliffs State Park, N. C. October 14, 1955 (T. B. Mitchell, on *Aster*). Allotype: Topotypical (on *Haplopappus*). Paratypes: NORTH CAROLINA: 3 ♂♂, 4 ♀♀, topotypical (on *Haplopappus*); 2 ♂♂, topotypical (on *Aster*); 30 ♀♀, topotypical, Oct. 21, 1955 (on *Aster*); 2 ♀♀, Oct. 12, 1945 (on *Haplopappus*); 3 ♀♀, Harnett Co., Oct. 27, 1955; 1 ♀, Raleigh, Oct. 14, 1935; 1 ♀, Raleigh, Nov. 10, 1942, 2 ♀♀, Lakeview, Oct. 19, 1945; 1 ♀, Tarboro, Oct. 20, 1924; 4 ♀♀, Umstead State Park, Wake Co., Oct. 23, 1954; 17 ♀♀, Umstead State Park, Oct. 8, 1957; 1 ♀, Umstead State Park, Nov. 5, 1957; 2 ♀♀, Wake Co., Oct. 11, 1957; 5 ♀♀, Sampson Co., Nov. 4, 1957; 1 ♀, Clayton, Oct. 11, 1957; 13 ♀♀, Washington Co., Oct. 10, 1957 (all Mitchell, on *Aster*); 1 ♂, 22 ♀♀, Southern Pines, Oct. 15, 1957 (Mitchell, on *Chrysopsis*). MISSISSIPPI: 1 ♀, Hattiesburg, Oct. 6, 1944; 1 ♂, Camp Shelby, near Hattiesburg, Oct. 25, 1944 (both C. D. Michener). NEW JERSEY: 1 ♀, Lakehurst, Oct. 7, 1917 (J. Bequaert).

These paratypes are in the Museum of Comparative Zoology, the collection of C. D. Michener and in the author's collection.

Andrena (Pterandrena) braccata Viereck

(Figs. 24 & 25)

Andrena braccata Viereck, 1907. Ent. News 18, pp. 284 & 286. ♀♂.

Andrena braccata Clements and Long, 1923. Carnegie Inst. Wash. Pub. 336, p. 249. (ecology)

Andrena (Pterandrena) braccata Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 13 mm.; clypeus very slightly convex, projecting slightly more than one-third below suborbital line, dull, very finely tessellate, impunctate medially, but becoming very finely, obscurely and rather closely punctate toward sides; facial foveae not very broad, occupying above slightly more than half of space between eyes and ocelli, covered with pale yellowish tomentum; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and

obscure; malar space distinct, but rather short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum rather large, subtriangular, rather broadly truncate and slightly emarginate apically; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, rather densely tessellate, punctures of scutum visible only over anterior half where they are exceedingly minute, obscure and rather sparse, hardly visible, posterior half and scutellum entirely impunctate; pleura without visible punctures; dorsal area of propodeum oblique, triangle densely tessellate but finely roughened or subrugose medially toward base; propodeal corbicula rather short, without an anterior fringe, pale ochraceous; trochanteral flocus rather long and dense, pale ochraceous; hind tibiae rather slender and elongate, apex not much broader than basitarsi, scopa dense, of rather conspicuously plumose hairs, entirely pale ochraceous; front and middle basitarsi rather slender, slightly narrower than their respective tibiae; 2nd submarginal cell nearly equalling 3rd in length, receiving 1st recurrent about at middle; abdominal terga smooth, but dull, very finely tessellate, entirely impunctate, apical impressed areas shallow, quite narrow, with some minute, obscure and close punctures evident at extreme sides, discal pubescence practically lacking, terga 2-4 with narrow, whitish, apical fasciae; that on tergum 2 interrupted medially, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 10 mm.; clypeus slightly convex, projecting but very slightly below sub-orbital line, yellow, except for two small black spots and the blackish apical rim, smooth and shining, very minutely punctate, punctures sparse medially, becoming quite close at extreme sides; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks subequal to eyes in width, rather dull, punctures fine, but rather deep and close; malar space distinct but quite short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum rather broad and short, apex rather broadly truncate and slightly emarginate; mandibles quite short, with a slight inner subapical tooth, overlapping very slightly; pubescence of head, thorax and legs entirely whitish-ochraceous; thoracic integument dull, quite densely tessellate, punctures of scutum very shallow, fine and obscure, hardly visible, posterior portion and scutellum practically impunctate; pleura without visible punctures; dorsal area of propodeum nearly vertical, triangle densely tessellate, becoming finely roughened or subrugose medially toward base; basitarsi slender and elongate, considerably narrower than their respective tibiae, testaceous;

2nd submarginal cell subequal to 3rd, receiving 1st recurrent near middle; abdominal terga smooth, but dull, very finely tessellate, punctures inevident, apical impressed areas shallow and quite narrow, more or less reddened, discal pubescence extremely short, sparse and obscure, entirely pale, all terga with thin, whitish, apical fasciae, that on tergum 1 very obscure and widely interrupted; apical portion of sternum 8 rather robust, slightly narrowed toward the abruptly truncate apex, clothed beneath with rather short, dense pubescence; penis valves elongate, slightly broadened toward base, gonocoxites slender, hardly at all dilated apically, gonocoxal lobes quite strongly produced, triangular, with narrowly rounded tips.

DISTRIBUTION—The New England states to Colorado, south to Maryland; August to October.

FLOWER RECORDS—*Solidago*.

= *arabis*

Andrena (Pterandrena) brassicae
new species

(Figs. 24, 25 & 28)

MALE—Length 8 mm.; face slightly longer than broad; clypeus very slightly convex, projecting slightly less than one-half below sub-orbital line, yellow, except for two black spots, a dark apical rim and some intrusion of black laterally from adjacent areas of face; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, being widest just opposite upper end of eye, rather dull, punctures exceedingly close, minute and obscure; malar space very short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum broad and rather short, narrowed apically to the shallowly emarginate apex; mandibles rather short, with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely whitish; thoracic integument dull, quite densely tessellate, punctures of scutum exceedingly minute and obscure, rather sparse even anteriorly, those on scutellum hardly evident; pleura without evident or distinct punctures; dorsal area of propodeum oblique, triangle short and very broad, very finely subrugose; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent just basad of middle; abdominal terga dull, quite densely tessellate, impunctate, apical, impressed areas very shallow and obscure, quite narrow, becoming narrowly yellowish-

hyaline along rims, discal pubescence rather thin and sparse, but rather long and erect, entirely pale, terga 2-4 with thin, loose, whitish, apical fasciae, evident laterally but widely interrupted medially; apical margin of sternum 6 somewhat reflexed; apical portion of sternum 8 slender and elongate, sides nearly parallel, apex narrow, slightly incised medially, clothed beneath with short, pale pubescence; penis valves slender apically, somewhat dilated toward base, deeply grooved laterally toward base, gonocoxites rather abruptly dilated toward apex, resulting lobes rather narrowly rounded apically, gonocoxal lobes somewhat produced, rather broadly rounded.

TYPES—Holotype: Male, Arlington, Va., Apr. 14, 1946 (R. Bohart, on mustard) [Bohart]. Paratype: 1♂, Ithaca, N. Y., April 19, 1941 (Howard E. Evans) [Cornell].

Andrena (Pterandrena) dimorpha
new species

(Figs. 24-26 & 28)

FEMALE—Length 11 mm.; clypeus broad, very slightly convex, projecting about one-third below suborbital line, shining medially, with an indistinct, median, impunctate line, minutely and rather sparsely punctate on each side, becoming densely punctate at extreme sides; facial foveae broad, occupying above most of space between eyes and ocelli, covered with pale fulvous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute, obscure and quite close; malar space very short; basal segment of flagellum subequal to 2nd and following segments; process of labrum about twice as broad as long, slightly narrowed toward the rather broadly truncate apex, not emarginate; pubescence of head, thorax and legs fulvous, that on dorsum of thorax short and dense, obscuring the surface; thoracic integument dull and densely tessellate, punctures of scutum and scutellum exceedingly obscure, minute, rather close, hardly visible beneath the pubescence; pleura without visible punctures; dorsal area of propodeum oblique, triangle densely tessellate; propodeal corbicula well developed, pale ochraceous, with a dense anterior fringe; trochanteral floccus well developed, long and copious, pale ochraceous; hind tibiae rather slender, apex not quite twice width of basitarsi, pale ferruginous, scopa dense, hairs of moderate length, distinctly plumose, pale ochraceous but becoming fuscous toward base and along posterior margin; all basitarsi ferruginous, front and middle pair rather slen-

der, slightly narrower than their respective tibiae; wings brownish-yellow, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near apex; abdominal terga dull, densely tessellate, entirely impunctate, discal pubescence very sparse, short and obscure, entirely pale, terga 1-4 with entire, dense, ochraceous, apical fasciae, tergum 5 with a dark brownish apical fimbria.

MALE—Length 9 mm.; head broad, distance from anterior ocellus to apical margin of clypeus about equal to distance between eyes; eyes parallel; vertex rather narrow, lateral ocelli separated from its hind margin by slightly more than their own diameter; cheeks broad and flat, conspicuously angulate, angle opposite middle of eye; clypeus rather flat, short and very broad, entirely yellow; small facial maculae between lower end of eye and inner angle of clypeus; face and vertex rather dull, punctures very fine and obscure; cheeks somewhat more shining, with exceedingly minute but rather close punctures; malar space linear; process of labrum very short, transverse, and labrum exceedingly short, fringed apically with long yellowish setae; basal segment of flagellum about half length of segment 2, this and the more apical segments nearly twice as long as broad; mandibles slender and exceedingly long, with a pronounced basal inferior tooth or angle, tip of one reaching basal angle of the other when closed, with a small, inner, subapical tooth about one-fourth from tip; pubescence of head, thorax and legs entirely bright ochraceous; scutum, scutellum, pleura and propodeum entirely densely tessellate and dull, with no visible punctures; all femora blackish, hind tibiae and apex of mid and front tibiae and all tarsi bright ferruginous or testaceous, hind spurs pale yellow; tegulae yellowish-hyaline; wings rather deeply infuscated, veins and stigma testaceous, 2nd submarginal cell about half length of 3rd; abdominal terga smooth but dull, with minute barely visible punctures; these rather close on segment 2, becoming quite sparse on 3 and 4, apical margins yellowish-hyaline, segments 1-5 with yellowish, rather narrow, apical fasciae; discal pubescence rather elongate on segments 1 and 2, short on the more apical segments, entirely pale and very thin; sternum 7 with a deep, subtriangular, median emargination; sternum 8 rather narrow basally, gradually narrowed to the subtruncate apex, clothed beneath with short, yellow pubescence; penis valves bulbous at base but not excavated, gonocoxites flattened and rather broadly dilated toward apex, gonocoxal lobes moderately produced, narrowly rounded.

TYPES—Holotype: Female, Orlando, Fla., March 1944 (R. & G. Bohart). [Bohart] Allotype: Alachua Co., Fla., March 3, 1956 (R. A. Morse) [Florida State Plant Board]. Paratypes: FLORIDA: 1 ♀, topotypical (Bohart); 1 ♀, 8 miles southeast of Interlachen, Mar. 2, 1953 (Howden & Dosier); 1 ♂, Pasco Co., Mar. 20, 1957 (H. V. Weems, Jr.). NORTH CAROLINA: 1 ♀, Statesville, Apr. 20, 1925 (T. B. Mitchell). NEW JERSEY: 1 ♀, Manumuskin, May 26, 1923 (J. C. Bradley).

The females from North Carolina and New Jersey differ from the Florida specimens in having much paler pubescence, this being somewhat yellowish on head and thorax, but the abdominal fasciae almost white. Structurally there seem to be no significant differences. Paratypes are located in the collections of the State Plant Board of Florida, Cornell University, and the author.

Andrena (Pterandrena) duplicata
new species

(Figs. 24-26 & 28)

FEMALE—Length 9 mm.; face somewhat longer than broad; clypeus projecting fully one-half below suborbital line, median portion rather flat, smooth and shining, with a rather broad, distinct, median, impunctate line, punctures on each side rather coarse, deep, well separated but not sparse; facial foveae short and narrow, occupying above about half of space between eyes and ocelli, covered with fulvous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, somewhat shining, very minutely and obscurely punctate; malar space short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broad and extremely short, transversely linear, mandibles robust and elongate, with a large, inner, subapical tooth and with a rounded, subbasal, inferior dilation, overlapping about one-third; pubescence of head, thorax laterally and below, and legs, ochraceous, that on dorsum of thorax rather short, dense, bright fulvous; thoracic integument somewhat shining, punctures of scutum and scutellum very fine and close, obscured by the dense pubescence; pleura somewhat shining, with rather coarse, deep and distinct punctures, close anteriorly, becoming rather sparse posteriorly; dorsal area of propodeum narrow, oblique, triangle dull, finely tessellate; propodeal corbicula rather well developed, with a thin anterior fringe, pale ochraceous; tro-

chanteral flocus rather well developed, pale ochraceous, hind tibiae slightly broadened apically, apex not quite twice width of basitarsi, pale ferruginous, scopa rather dense, hairs finely plumose, entirely pale ochraceous; front basitarsi slightly narrower than their tibiae, mid basitarsi about equal to their tibiae in width; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga smooth, somewhat shining, punctures very minute, shallow and obscure, rather close laterally, becoming sparse medially, apical depressed areas shallow, but rather broad, occupying more than one-third median length of discs, reddish-hyaline, becoming more clear hyaline along rims, discal pubescence extremely short, sparse and obscure, apparently pale in general, terga 2-4 with ochraceous apical fasciae, that on 2 and 3 more or less interrupted medially, tergum 5 with a pale ochraceous apical fimbria.

MALE—Length 8 mm.; face somewhat longer than broad; clypeus slightly convex, projecting fully one-half below suborbital line, yellow except for a pair of small, dark spots and the dark, apical rim, smooth and shining, with an obscure, median, impunctate line, punctures on each side deep, rather coarse, becoming close at sides; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, punctures exceedingly minute and obscure; malar space lacking; basal segment of flagellum subequal to 3rd segment, 2nd somewhat shorter; process of labrum broad and very short, broadly subtriangular, apex slightly emarginate; mandibles of moderate length, with a distinct inner subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely ochraceous; thoracic integument somewhat shining, punctures of scutum and scutellum very fine and close, becoming slightly separated near center of scutum posteriorly; pleura shining, with deep, distinct punctures, quite close anteriorly, becoming more widely separated posteriorly; dorsal area of propodeum oblique, triangle tessellate, very narrowly substriate along basal margin; basitarsi pale testaceous, slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd receiving 1st recurrent near apex; abdominal terga smooth and shining, very finely punctate, punctures rather close and evenly distributed, apical impressed areas shallow, rather narrow, quite distinctly and rather broadly yellowish-hyaline along rims, discal pubescence thin and obscure, erect, entirely pale, terga 2-4 with obscure, pale ochraceous, apical fasciae, more evident laterally, widely

interrupted on tergum 2 medially; apical portion of sternum 8 rather short and slender, the tip more broadly dilated, broadly rounded, not at all protuberant beneath, covered with thin, pale pubescence; penis valves slender for most of the length, not appreciably dilated toward base, gonocoxites short and quite slender, slightly dilated at apex, gonocoxal lobes very slightly produced, broadly rounded.

TYPES—Holotype: Female, Marion, N. C., Aug. 29, 1929 (Mitchell). Allotype: topotypical. [both author's coll.]. Paratypes: NORTH CAROLINA: 2 ♀♀, 1 ♂, topotypical; 1 ♂, Marion, Aug. 27, 1930; 1 ♀, Marion, Aug. 30, 1931 (all Mitchell); 1 ♀, Cedar Mt., Aug. 15, 1957 (D. A. Young.). OHIO: 1 ♀, Jackson Co., Sept. 11, 1929 (C. H. Kennedy.)

The types and the North Carolina paratypes are in the author's collection, the Ohio specimen in the collection of Ohio State University.

Andrena (Pterandrena) fulvipennis
Smith

(Figs. 24 & 25)

Andrena fulvipennis Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 117. ♀.

Andrena fulvipennis Viereck, 1902. Ent. News 13, p. 237. ♀.

Andrena (Pterandrena) fulvipennis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 10 mm.; face slightly longer than broad; clypeus broadly convex, projecting about one-third below suborbital line, with a very narrow and obscure median impunctate line, closely, deeply and rather finely punctate otherwise, punctures becoming finer and more dense toward sides, surface medially somewhat shining; facial foveae not very broad, occupying above about two-thirds of space between eyes and ocelli, covered with ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, somewhat shining, punctures very minute and obscure, quite close; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quite small, deeply emarginate, resulting in two acute lobes; mandibles rather elongate, overlapping about one-third, with a rather robust,

basal, inferior dilation; pubescence of head and thorax short, pale ochraceous on head, more fulvous on pleura above, becoming pale ochraceous below, that on dorsum of thorax extremely short, sparse and obscure, fuscous, pubescence of legs pale basally, becoming fuscous on apical segments; scutum and scutellum somewhat shining, punctures very fine, well separated over most of scutum, somewhat more sparse on scutellum; pleura densely tessellate, without visible punctures; dorsal area of propodeum very narrowly oblique, triangle tessellate, becoming very finely roughened on basal margin; propodeal corbicula ochraceous, rather short, anterior fringe very poorly developed; trochanteral floccus rather dense and elongate, pale ochraceous; hind tibiae broadened apically, nearly or quite twice as broad at apex as the basitarsus, pale ferruginous, the scopa dense, composed of densely plumose hairs, pale ochraceous toward base and along anterior margin, becoming fuscous posteriorly and toward apex; front basitarsi slightly narrower than their tibiae, mid basitarsi about as broad as their tibiae; wings deeply infuscated, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent at middle; abdominal terga dull, densely and finely tessellate, punctures extremely shallow and obscure, practically invisible, apical impressed areas very shallow and narrow, discal pubescence extremely short, sparse and obscure, blackish, terga 2-4 with dense, entire, pale ochraceous, apical basciae, tergum 1 subfasciate laterally, tergum 5 with a blackish apical fimbria and with rather long, suberect, blackish discal pubescence.

MALE—Length 8 mm.; face considerably longer than broad, possibly with small yellow maculae between clypeus and eye; clypeus nearly as long as broad, slightly convex, yellow except for a pair of small black spots and the blackish apical rim, smooth and shining, punctures scattered and irregular, rather sparse medially, becoming closer laterally; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly narrower than eyes, somewhat shining, punctures very fine but rather deep and distinct; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very short and rather broad, truncate apex broadly emarginate; mandibles of moderate length, with a distinct, inner, subapical tooth, overlapping slightly more than one-third; pubescence of head, thorax and legs entirely pale ochraceous; scutum and scutellum somewhat shining, punctures very fine, well separated but hardly sparse, rather shallow; pleura dull, densely tessellate above, obscurely rugoso-punctate below; dorsal area of propodeum rather short,

oblique, triangle rather coarsely subrugose toward basal middle, basitarsi dark, slender and elongate, somewhat narrower than their respective tibiae, hind basitarsi bright ferruginous, contrasting with the other leg segments; wings deeply infuscated, 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent at middle; abdominal terga dull, densely tessellate, entirely impunctate, apical impressed margins very narrow, discal pubescence extremely short and obscure, fuscous, all of the terga with narrow, but dense and entire, pale ochraceous, apical fasciae; apical portion of sternum 8 quite slender and elongate, gradually narrowed toward the slightly enlarged and truncate tip, clothed beneath with rather dense, moderately long pubescence; penis valves slender apically, somewhat dilated toward base, gonocoxities somewhat elongated and slightly dilated apically, with a rather pronounced, submedian constriction, gonocoxal lobes somewhat produced, subtriangular, narrowly rounded apically.

DISTRIBUTION—New Jersey to Florida, along the Coastal Plain; September and October.

FLOWER RECORDS—*Aster*, *Chrysopsis*, *Coreopsis* and *Haplopappus*.

Andrena (Pterandrena) gardineri
Cockerell

(Figs. 24-26)

- Andrena (Pterandrena) gardineri* Cockerell, 1906. Ann. Mag. Nat. Hist. (7)17, p. 307. ♀.
Andrena ushmeadi Viereck and Cockerell, 1914. U. S. Nat. Mus. Proc. 48, p. 45. ♀.
Andrena gardineri Clements and Long, 1923. Carnegie Inst. Wash. Pub. 366, p. 249. (ecology)
Andrena (Opandrena) lamellicauda Cockerell, 1925. Ann. Mag. Nat. Hist. (9) 16, p. 629. ♂.
Andrena campbelli Cockerell, 1933. Pan-Pacific Ent. 9, p. 153. ♂.
Andrena gardineri Lanham, 1941. Ent. Soc. Amer. Ann. 34, p. 711. (key)
Andrena (Pterandrena) gardineri Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 9 mm.; face very slightly longer than broad; clypeus slightly convex, projecting about one-half below suborbital line, rather copiously short pubescent, surface rather dull, finely but rather deeply punctate, punctures well separated medially, becoming close laterally; facial foveae short and narrow, occupying above no more than half of

space between eyes and ocelli, covered with ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures minute and obscure; malar space very short; basal segment somewhat longer than 2nd and 3rd combined; process of labrum subtriangular, apex quite deeply emarginate; mandibles very slightly dilated beneath toward base, forming an obscure, broad angle; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, punctures of scutum distinct but fine and close, rather shallow, becoming somewhat sparse toward center posteriorly, very fine and close along anterior margin of scutellum, but more scattered and irregular elsewhere, surface somewhat shining; pleura with some shallow, rather coarse but obscure punctures above, otherwise densely tessellate; dorsal area of propodeum nearly vertical, triangle irregularly, finely striate along basal margin; propodeal corbicula rather short, without a distinct anterior fringe, pale ochraceous; trochanteral floccus rather short, whitish; hind tibiae rather slender, apex only slightly broader than basitarsi, scopa quite dense, hairs of moderate length, finely plumose, entirely pale ochraceous; front basitarsi rather narrow, mid basitarsi nearly equalling their tibiae in width; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent at middle, abdominal terga smooth and shining, deeply and rather closely and coarsely punctate, apical depressed areas quite shallow, occupying medially about one-third length of discs, quite broadly and very distinctly hyaline along rims, discal pubescence short, thin, erect, entirely pale, terga 2-4 with rather dense and conspicuous pale ochraceous or whitish apical fasciae, basal tergum subfasciate toward sides, tergum 5 with a brownish-ochraceous apical fimbria.

MALE—Length 8 mm.; clypeus evenly convex, projecting but very slightly below suborbital line, yellow except for a pair of small, dark spots and the blackish apical rim, smooth and shining, deeply and rather coarsely punctate, punctures well separated but not sparse medially, becoming close laterally; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures obscure; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, quite short, apex rather broadly truncate and slightly emarginate; mandibles of moderate length, with a distinct inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, finely tessellate, punctures of scutum fine,

shallow and rather obscure, quite close anteriorly, becoming rather sparse toward center posteriorly and quite sparse and irregular on scutellum, surface somewhat more shining, pleura somewhat roughened above, obscurely punctate; dorsal area of propodeum narrow, oblique, triangle finely substriate along basal margin; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle, abdominal terga smooth, shining, deeply and quite closely and coarsely punctate, apical depressed areas shallow, occupying medially about one-third length of discs, quite broadly and distinctly hyaline along rims, discal pubescence entirely pale, short, rather obscure, terga 1-5 with pale ochraceous apical fasciae evident laterally, more or less interrupted medially, especially on the more basal terga; apical portion of sternum 8 gradually narrowed from base to near apex which is somewhat dilated and truncate, with a low submedian ventral protuberance, short pubescent from this to near the apex; penis valves slender and elongate apically, quite strongly dilated toward base, not distinctly excavated, gonocoxites gradually dilated toward the somewhat rounded apex, gonocoxal lobes considerably produced, subtriangular, more or less acute apically.

DISTRIBUTION—Colorado to Texas, east to Virginia, North Carolina and Georgia; April to June.

FLOWER RECORDS—*Senecio*. Males have been collected also on *Pentstemon* and *Rubus*.

Andrena (Pterandrena) helianthi
Robertson

(Figs. 24 & 25)

Andrena helianthi Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 55. ♀ ♂.

Pterandrena helianthi Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀ ♂. (key)

Andrena helianthi Hicks, 1926. Colo. Univ. Studies 15, p. 222. (biology)

Pterandrena helianthi Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (Pterandrena) helianthi Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 12 mm.; clypeus slightly convex, projecting about one-third below suborbital line, smooth and shining, with a rather indefinite, median, subimpunctate area, punctures on each side of this quite close, coarse and deep; facial foveae short and narrow, occupying above but very little more than half of space between eyes and ocelli (resembling

those of *duplicata*, fig. 26), covered with yellowish-white tomentum; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks slightly broader than eyes, rounded posteriorly, somewhat shining, punctures shallow and irregular, minute along eye margin, more coarse and widely separated otherwise; malar space very short; basal segment of flagellum somewhat longer than 2nd and 3rd combined; process of labrum rather broadly semicircular, length about half the breadth, not at all emarginate; pubescence of head, thorax and legs entirely pale ochraceous, thoracic integument dull, tessellate, punctures of scutum very fine, shallow and obscure, rather close anteriorly, becoming quite sparse posteriorly, where surface is more shining, hardly visible on the somewhat shining scutellum; pleura without visible punctures; dorsal area of propodeum narrowly oblique, triangle with some obscure basal striations; propodeal corbicula rather well developed, pale ochraceous, without a distinct anterior fringe; trochanteral flocus quite well developed, elongate, pale ochraceous; hind tibiae rather slender and elongate, apex not much exceeding width of basitarsus, scopa dense, of rather densely plumose hairs, entirely pale ochraceous; front and middle basitarsi nearly equalling their tibiae in width; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga rather smooth, dull, finely tessellate, punctures very shallow and obscure, quite sparse, apical impressed area quite shallow, occupying medially about one-third length of discs, mostly yellowish-hyaline, discal pubescence extremely short, sparse and obscure, entirely pale, terga 2-4 with very thin, obscure, whitish apical fasciae, these sometimes inevitable, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 11 mm.; face slightly longer than broad; clypeus slightly convex, projecting about one-half below suborbital line, yellow, except for a pair of small black spots, a blackish apical margin and some infusion of black at extreme sides, smooth and shining, finely but rather deeply and distinctly punctate, punctures well separated medially, becoming quite close at extreme sides; space between margin of vertex and lateral ocelli, subequal to their diameter; cheeks somewhat broader than eyes, rounded posteriorly, rather dull, punctures well separated, shallow, rather fine and obscure; malar space distinct, but quite short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly semicircular, width more than twice the median length; mandibles of moderate length, with a distinct inner subapical tooth, overlapping nearly one-third; pubes-

cence of head, thorax and legs entirely pale ochraceous, quite long and dense; thoracic integument dull, quite densely tessellate, punctures of scutum very obscure, shallow, fine, apparently rather close anteriorly, but becoming very sparse posteriorly, those on scutellum very minute and obscure; pleura finely roughened, punctures very indefinite and obscure; dorsal area of propodeum nearly vertical, triangle finely substriate along basal margin; basitarsi ferruginous, slender and elongate, considerably narrower than their respective tibiae, hind tibiae more or less ferruginous; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but dull, microscopically tessellate, very minutely punctate, the punctures well separated but hardly sparse, apical impressed areas shallow but rather broad, occupying at least one-third median length of disc, yellowish-hyaline, all terga with thin, pale ochraceous, apical fasciae, more evident laterally, largely lacking medially; apical portion of sternum 8 rather robust, slender just beyond base, slightly dilated toward apex which is rather broadly truncate, with a slight median emargination, apical half clothed beneath with rather dense, short pubescence; penis valves quite slender apically, slightly broadened toward base, gonocoxal lobes elongate, slightly dilated just before apex, but then constricted apically to a rather narrowly rounded tip, gonocoxal lobes strongly produced, narrowly rounded apically.

DISTRIBUTION—Minnesota to Connecticut, south to Illinois and Indiana, west to Utah and New Mexico; July and August.

FLOWER RECORDS—Robertson (1929) records this species on *Aster novaeangliae*, *Bidens aristosa* and several species of *Helianthus*.

Andrena (Pterandrena) lauracea
Robertson

Andrena lauracea Robertson, 1897. Acad. Sci. St. Louis, Trans. 7, p. 331. ♀.

Pterandrena lauracea Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀. (key)

Pterandrena lauracea Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).

Andrena (Pterandrena) lauracea Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

This species, based on a unique specimen, is very similar to *A. gardineri* Cockerell. The following brief description, stressing chiefly the difference in comparison with *gardineri*, was made from the type specimen (No 17076) in the collection of the Illinois Natural History Survey:

FEMALE—Process of labrum truncate and just perceptibly emarginate; clypeal punctures quite sparse near mid line; basal segment of flagellum no more than equal to segments 2 and 3 combined; punctures of scutum and scutellum somewhat more sparse and fine than in *gardineri*; pleura and propodeum as in *gardineri*; basal abdominal tergum quite finely and sparsely punctate except toward apical margin which is narrowly yellowish-hyaline; punctures of following terga deep, distinct and rather coarse, interspaces averaging about twice diameter of punctures; tegulae brownish-testaceous; wings hyaline, violaceous, veins and stigma pale yellow, 1st recurrent vein reaching 2nd submarginal cell nearly at apex; pubescence entirely pale ochraceous; abdominal terga 2-4 with rather narrow and dense, yellowish, apical fasciae, that on segment 2 interrupted medially.

DISTRIBUTION—Illinois.

FLOWERS RECORD — Recorded by Robertson (1929) on *Sassafras variifolium*.

Andrena (Pterandrena) placata
new species

(Figs. 24 & 25)

MALE—Length 9 mm.; clypeus slightly convex, projecting but very slightly below sub-orbital line, yellow except for two small black spots and the blackish apical rim, smooth and shining, punctures fine, well separated medially, becoming quite close at extreme sides; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, punctures distinctly separated, rather obscure, becoming very minute along eye margin, more coarse posteriorly; malar space extremely short; basal segment of flagellum nearly twice as long as the very short 2nd segment, but slightly shorter than 2nd and 3rd combined; process of labrum rather short, quite broad, slightly narrowed to the deeply emarginate apex; mandibles of moderate length, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely whitish; thoracic integument dull, rather densely tessellate, punctures of scutum shallow, rather close, but distinctly separated anteriorly, becoming more sparse and surface more shining posteriorly, those on scutellum scattered, very shallow and obscure, surface somewhat shining, pleura roughened or subrugose above, with some very obscure, barely evident punctures anteriorly; dorsal area of propodeum more oblique, rather narrow, triangle obscurely subrugose toward basal margin; basitarsi slender and elongate, considerably narrower than their respective tibiae; wings

faintly infuscated apically, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga smooth, shining, minutely punctate, the punctures well separated but not sparse, exceedingly minute and obscure on basal tergum, apical impressed areas shallow, quite narrow, discal pubescence extremely short, thin, erect and fuscous, terga 1-4 with thin, narrow, white, apical fasciae evident laterally, that on tergum 4 nearly entire; apical margin of sternum 6 quite strongly reflexed; apical portion of sternum 8 slender and elongate, sides nearly parallel, apex somewhat dilated, broadly truncate, clothed beneath with thin, pale pubescence; penis valves slender apically, dilated basally, somewhat excavated or grooved laterally toward base beneath, gonocoxites gradually and slightly dilated toward apex, gonocoxal lobes quite strongly produced, narrowly rounded.

TYPES—Holotype: Male, Needham, Mass., Aug. 13, 1936 (T. B. Mitchell). Paratypes: MASSACHUSETTS: 2♂♂, Needham, Sept 3, 1927; 1♂, Needham, Aug. 21, 1926 (all Mitchell); 1♂, Middlesex Falls, Aug. 19, 1911 (W. M. Wheeler). CONNECTICUT: 2♂♂, Colebrook, Aug., 1918, and Aug. 15, 1919 (Wheeler). MINNESOTA: 1♂, St. Paul, Aug. 5, 1921 (Wm. E. Hoffman). MICHIGAN: 4♂♂, Oceana Co., Aug. 15, 1945; 4♂♂, Oceana Co., Aug. 10, 1946; 2♂♂, Ionia Co., July 24, 1940; 1♂, Bay Co., Aug. 25, 1946; 1♂, Midland Co., Aug. 5, 1951 (all R. R. Dreisbach); 1♂, Gladwin Co., Aug. 3, 1957 (R. & K. Dreisbach). VIRGINIA: 1♂, Camp Peary, Sept. 7, 1943 (R. M. & C. E. Bohart).

These paratypes are located at the Museum of Comparative Zoology, the University of Minnesota, in collections of R. R. Dreisbach and R. M. Bohart, and in the author's collection.

Andrena (Pterandrena) rudbeckiae
Robertson

(Figs. 25-28)

Andrena rudbeckiae Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 56. ♀♂.

Andrena rudbeckiae Cockerell, 1899. Ent. News 10, p. 255. ♂. (key)

Pterandrena rudbeckiae Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀♂. (key)

Pterandrena rudbeckiae, Robertson, 1929. Flowers and Insects. Lancaster, Pa., Science Press. (flower records)

Andrena (Pterandrena) rudbeckiae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 13 mm.; clypeus broadly convex, projecting slightly less than one-half below suborbital line, somewhat shining medially where the punctures are close, deep and well separated, becoming dull, with rather fine and quite dense punctures laterally, without a distinct median impunctate line; facial foveae rather broad above, filling most of space between eyes and ocelli, covered with ochraceous tomentum; space between margin of vertex and lateral ocelli only slightly less than distance between ocelli; cheeks broader than eyes, rounded posteriorly, deeply, finely and quite closely punctate; malar space distinct but quite short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum broadly subtriangular, apex quite deeply emarginate; mandibles with a very slight, subbasal, inferior dilation; pubescence of head, thorax and legs entirely ochraceous, rather short and dense; thoracic integument dull, densely tessellate, punctures of scutum very fine, shallow and obscure, hardly visible, those on scutellum more deep and distinct, rather close, surface somewhat shining; pleura with shallow and obscure, well separated, barely visible punctures anteriorly; dorsal area of propodeum oblique, triangle densely tessellate, very narrowly substriate along basal margin; propodeal corbicula ochraceous, rather thin, poorly developed, without a distinct anterior fringe; trochanteral floccus rather well developed, whitish-ochraceous; hind tibiae broadened apically, apex not quite twice width of the rather broad basitarsi, scopa rather dense, hairs rather short, finely plumose, entirely ochraceous; front basitarsi nearly as broad as their tibiae, the mid basitarsi very broad, length less than three times the breadth and fully as broad as the tibiae; wings quite strongly and uniformly infuscated, 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent near middle; abdominal terga dull, densely tessellate, punctures very shallow but rather coarse, sparse on discs basally, becoming rather close toward depressed apical margins, these quite deep, rather narrow, becoming clear hyaline along rims, discal pubescence short, thin, erect, entirely pale, apical fasciae on terga 1-4 evident but thin and rather poorly developed, tergum 5 with an ochraceous apical fimbria.

MALE—Length 11 mm.; face with a pair of small yellow maculae adjacent to clypeal margin below; clypeus broadly convex, projecting about one-third below suborbital line, yellow, except for two small dark spots and the blackish apical rim, rather densely short pubescent, but surface visible, somewhat shining, closely and finely punctate; space between margin of vertex and lateral ocelli only slightly less than distance between ocelli; cheeks

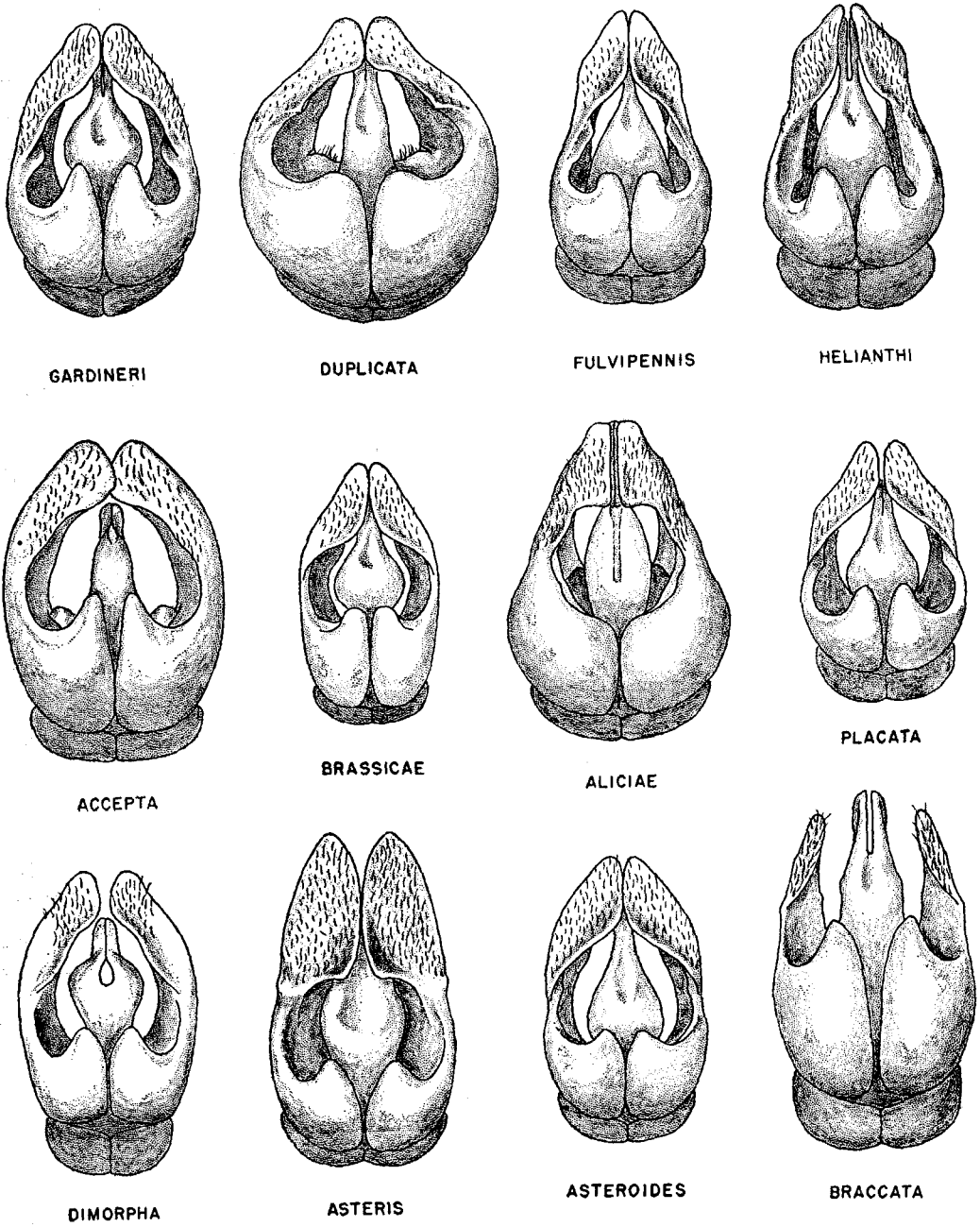


Figure 24—Male genital armature in species of *Andrena* (*Pterandrena*).

broader than eyes, rounded posteriorly, somewhat shining, closely and finely punctate; malar space distinct but very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum short, quite broad, rather broadly truncate and submarginate apically; mandibles rather short, with a distinct, inner subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely pale, tinged with ochraceous on vertex and dorsum of thorax, rather strongly ochraceous on the more apical leg segments; thoracic integument dull, densely tessellate, punctures of scutum fine and very obscure, quite close, surface uniformly dull, those on scutellum close and distinct, surface somewhat more shining; pleura with shallow, obscure but rather close punctures anteriorly; dorsal area of propodeum oblique, triangle densely tessellate, obscurely and very narrowly striate along basal margin; basitarsi rather robust, but distinctly narrower than their respective tibiae; wings uniformly brownish-hyaline, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga dull, densely tessellate, punctures shallow but rather coarse, well separated on discs basally, but becoming quite close toward apical depressed areas which are quite abrupt, entirely reddish-hyaline, discal pubescence quite long and copious, erect, entirely pale, forming loose and thin, whitish, apical fasciae on terga 1-5; sternum 8 rather robust, gradually narrowed from base to the somewhat broadened and truncate apex, very slightly protuberant beneath near center, well covered with rather long, pale pubescence beneath; penis valves slender apically, gradually broadened toward base, quite deeply grooved on each side, gonocoxites broadly dilated apically, apical lobe considerably longer than broad, gonocoxal lobes quite narrowly and acutely produced, tips very narrowly rounded.

DISTRIBUTION—Illinois to Kansas, south to Texas and North Carolina, June to August.

FLOWER RECORDS—Collected on *Rudbeckia lanceolata* in North Carolina. Recorded by Robertson (1929) on *Rudbeckia hirta*, *R. triloba* and on *Coreopsis palmata*, *Lepachys pinnata* and *Verbesina helianthoides*.

Andrena (Pterandrena) simplex
Smith

- Andrena simplex* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 114. ♀.
Andrena simplex Morice and Cockerell, 1901. Canad. Ent. 33, p. 124. (type).
Andrena simplex Cockerell, 1906. Psyche 13, p. 8. (type).

The brief description which follows was made from the type at the British Museum. No other specimens have been seen.

FEMALE—Length 9 mm.; process of labrum truncate, about twice as broad as long; clypeus dull, densely tessellate, punctures very minute, evenly distributed, slightly separated; facial foveae two-thirds as wide as distance between eyes and ocelli, pale tomentose; ocelli close to margin of vertex; cheeks shining, thinly pubescent, very slightly broader than eyes; scutum and scutellum moderately shining, punctures fine, scattered, rather sparse; propodeal triangle dull, very finely granular; pleura smooth but dull, almost tessellate; pubescence of head and thorax entirely whitish, rather short on dorsum of thorax; wings subhyaline, veins testaceous; stigma testaceous with a darker margin; hind tibiae slender, scopal hairs rather long, plumose; abdominal terga rather dull, finely tessellate, and with very minute and obscure but rather close punctures, apical margins narrowly hyaline, with thin, white fasciae, widely interrupted on segment 1, narrowly so on 2, entire on 3 and 4, discal pubescence hardly visible, segment 5 with a fulvous fimbria.

DISTRIBUTION—The type locality given in the original description is "United States," and whether it is eastern or western is not known.

Andrena (Pterandrena) solidaginis
Robertson

(Figs. 25-27)

- Andrena solidaginis* Robertson, 1893. Amer. Ent. Soc. Trans. 18, p. 55. ♀ ♂.
Pterandrena solidaginis Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀ ♂. (key).
Andrena solidaginis Viereck, 1907. Ent. News 18, p. 282. ♀. (key)
Andrena (Ptilandrena) determinata Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 394. ♀. New synonymy.
Pterandrena solidaginis, Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena (Pterandrena) solidaginis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 200. (classification)

FEMALE—Length 9 mm.; clypeus slightly convex, projecting less than one-third below suborbital line, rather dull, finely tessellate, punctures fine and shallow, rather sparse medially, becoming quite close laterally; facial foveae quite broad, filling most of space between eyes and ocelli above, with silvery tomentum which appears brownish at certain angles; space between margin of vertex and

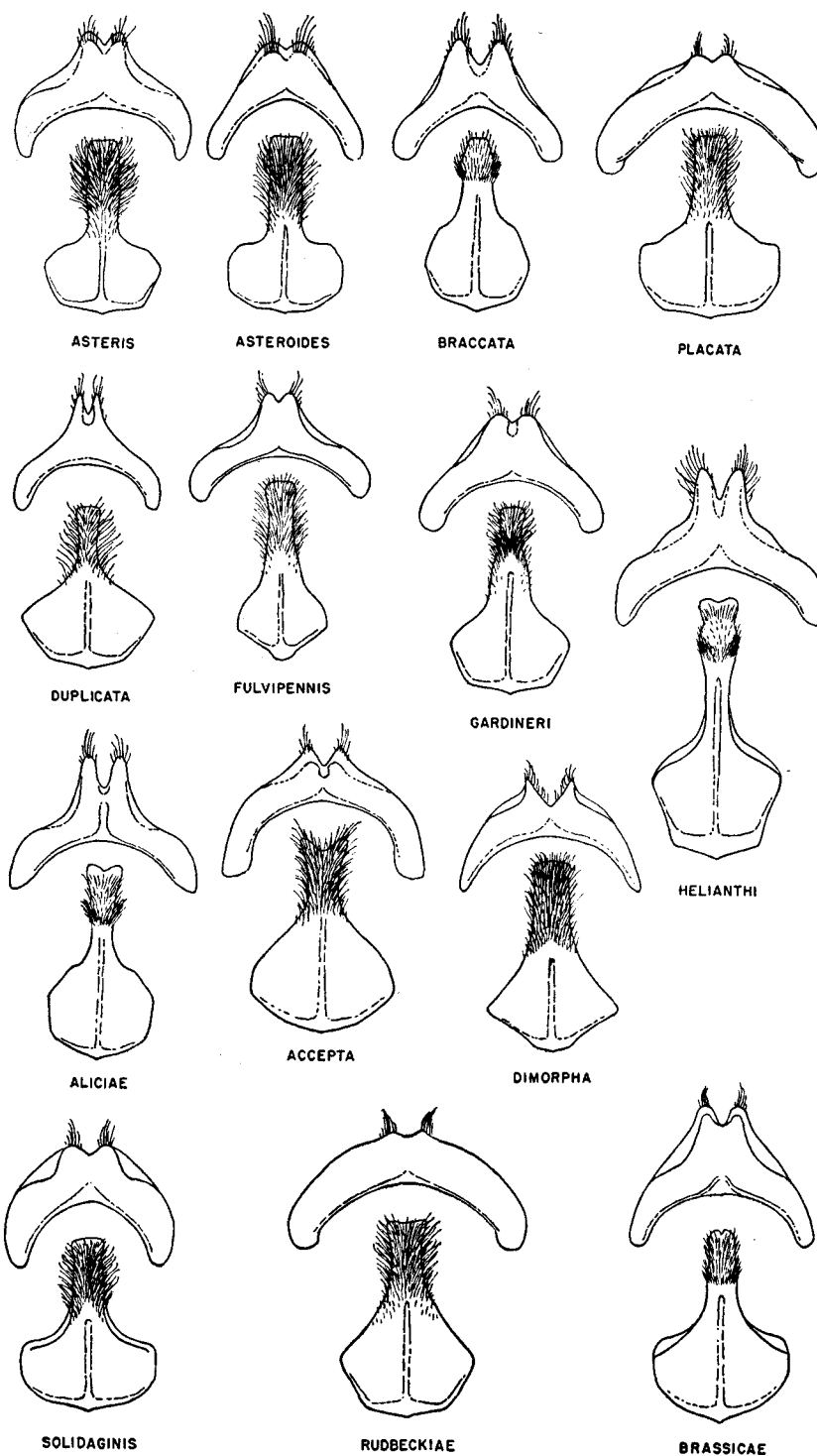


Figure 25—Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Pterandrena*).

lateral ocelli slightly greater than their diameter; cheeks very slightly broader than eyes, rounded posteriorly, somewhat shining, minutely and obscurely punctate; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, apex narrowly but deeply emarginate; mandibles with a very low, subbasal, inferior dilation; pubescence of head and thorax pale, short, somewhat tinged with ochraceous above, more whitish below, whitish on the more basal leg segments, becoming fuscous on tarsi; thoracic integument rather dull, finely tessellate, punctures of scutum shallow, rather fine and close anteriorly, becoming minute and very sparse toward center posteriorly where the surface is shining, and scutellum shining, with very minute, irregularly scattered punctures; pleura with very shallow, fine, well separated punctures on a quite densely tessellate surface; dorsal area of propodeum narrow and oblique, triangle very finely and narrowly striate along basal margin; propodeal corbicula whitish, rather short but well developed, with a quite distinct anterior fringe; trochanteral floccus rather well developed, elongate, white; hind tibiae quite slender and elongate, apex not much broader than basitarsi, scopa dense, of densely plumose hairs, entirely whitish; fore and mid basitarsi only slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, somewhat shining, very finely and rather closely punctate, apical depressed areas very shallow, occupying medially about one-

third length of discs, discal pubescence obscure, extremely short, fuscous, terga 2-4 with narrow but conspicuous, white, apical fasciae, tergum 5 with a fuscous, apical fimbria.

MALE—Length 7 mm.; face slightly longer than broad; clypeus only slightly convex, projecting but very slightly below suborbital line, yellow, except for a pair of small black spots and the blackish apical rim, smooth and shining, very finely punctate, punctures well separated but not sparse medially, becoming very close at extreme sides; space between margin of vertex and lateral ocelli slightly greater than diameter of ocelli; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, punctures very minute and obscure; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, apex deeply emarginate; mandibles short, with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of entire head, thorax and legs whitish; thoracic integument rather dull, finely tessellate, punctures of scutum fine, shallow and obscure, well separated anteriorly, becoming more sparse near center posteriorly where surface is somewhat shining, very obscure, shallow and sparse on scutellum, which is more tessellate; pleura anteriorly with some very shallow, obscure, well separated punctures, surface otherwise quite densely tessellate; dorsal area of propodeum rather narrow, oblique, triangle finely tessellate; basitarsi slender and elongate, considerably narrower than their respective tibiae;

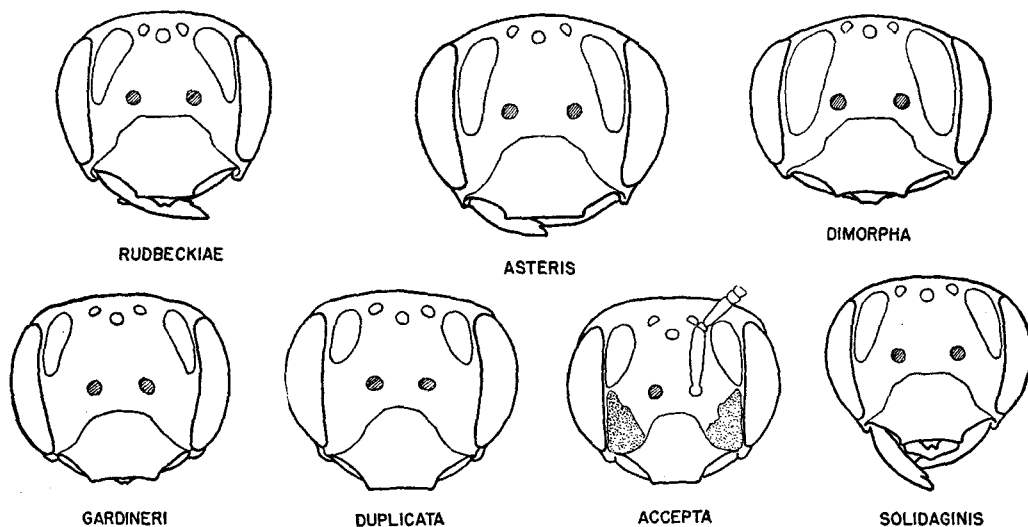


Figure 26—Facial view of female head, showing form of foveae in species of *Andrena* (*Pterandrena*).

2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga rather smooth but dull, microscopically tessellate, punctures exceedingly minute and quite sparse, hardly visible, apical depressed areas narrow and quite shallow, becoming hyaline along rims, discal pubescence extremely short, thin and suberect, color uncertain, appearing dark, at least at certain angles, apical margins of terga with thin, whitish, apical fasciae evident toward sides, widely interrupted medially; apical portion of sternum 8 robust, sides parallel, apex rounded, slightly protuberant beneath, with rather short, dense pubescence; penis valves slightly expanded and bilobed apically, slightly dilated toward base, not excavated, gonocoxites abruptly dilated toward apex, the broad apical lobe somewhat recurved and carinate basally, narrowly rounded and submembranous apically, gonocoxal lobes not produced.

DISTRIBUTION—Nebraska and Minnesota to the New England states, south to Georgia; July to September.

FLOWER RECORDS—*Aster* and *Solidago*. Recorded by Robertson (1929) on several species of each of these, as well as *Boltonia*, *Gnaphalium* and *Polygonum*.

Andrena (Ptilandrena) distans
Provancher

(Figs. 27, 29 & 30)

Andrena distans Provancher, 1888. Addit.

Corr. Faun. Ent. Canada Hym. p. 307. ♀ ♂.

Andrena g. maculati Robertson, 1897. Acad.

Sci. St. Louis, Trans. 7, p. 333. ♀ ♂. New synonymy.

Ptilandrena g. maculati Robertson, 1902. Amer.

Ent. Soc. Trans. 28, p. 192. (key)

Andrena geranii-maculati Viereck, 1907. Ent.

News 18, p. 282. ♀.

Ptilandrena g. maculati Robertson, 1929.

Flowers and Insects, Lancaster, Pa. Science Press. (flower records)

Andrena (Ptilandrena) g. maculati Lanham,

1949. Univ. Calif. Pubs. Ent. 8, p. 215. (classification)

FEMALE—Length 8 mm.; clypeus very slightly convex, projecting about one-third below suborbital line, dull and finely tessellate, punctures shallow and rather fine, well separated medially, becoming quite close laterally, with a very narrow and indistinct, median, impunctate line; facial foveae rather narrow, occupying above slightly more than half of space between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their

diameter; cheeks somewhat broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute, obscure and quite sparse; malar space very short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum rather large, median length about half the basal width, narrowed apically to the more or less broadly truncate apex; pubescence of head, thorax and legs entirely greyish-white; thoracic integument dull and finely tessellate, punctures of scutum very shallow and rather fine, well separated even anteriorly, becoming somewhat more sparse toward middle posteriorly, those on scutellum fine, obscure and well separated; punctures of pleura very obscure and indefinite; dorsal area of propodeum oblique, the triangle densely tessellate; propodeal corbicular poorly developed, rather short and thin, without a distinct anterior fringe; trochanteral floccus short and poorly developed; hind tibiae slender and elongate, apex somewhat broader than the narrow basitarsi, scopa thin, hairs elongate, erect, very finely plumose, entirely white, front and middle basitarsi considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining, punctures exceedingly minute but rather distinct, quite sparse, apical impressed areas shallow, rather narrow, becoming very narrowly hyaline along rims, discal pubescence thin and erect, but rather elongate, entirely pale, terga 2-4 with narrow, whitish, apical fasciae, interrupted medially on tergum 2, tergum 5 with an apical, brownish-ochraceous fimbria.

MALE—Length 8 mm.; clypeus rather flat, projecting about one-third below suborbital line, punctures rather fine but distinct, rather sparse in center, becoming close and more obscure laterally; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks somewhat shining, much broader than eyes, rather flat, obscurely subangulate posteriorly, angle opposite lower portion of eye, punctures exceedingly minute and obscure; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subquadrate, the truncate apex slightly emarginate medially; mandibles rather long and slender, slightly bowed, with a distinct inner subapical tooth, overlapping nearly one-half; pubescence of head, thorax and legs entirely white; thoracic integument rather dull, punctures of scutum rather shallow and fine, well separated, but not sparse anteriorly, more widely separated toward middle posteriorly, those on scutellum quite fine and distinct, well separated; pleura densely tessellate, punctures very obscure;

enclosure of propodeum dull and densely tessellate; all basitarsi slender, elongate, much narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga shining, sparsely and very minutely punctate, apical depressed areas rather narrow and obscure, becoming yellowish-hyaline at rims, pubescence very short, suberect, entirely pale, forming thin, loose and narrow, apical fasciae on terga 2-4, rather widely interrupted on 2 and 3; apical portion of sternum 8 abruptly narrowed at base, from which it is slender and parallel-sided to the very slightly expanded tip, pubescence short, thin and inconspicuous; penis valves very slightly enlarged toward base; gonocoxites rather short, slightly dilated and rounded apically, gonocoxal lobes moderately produced, subtriangular, with rather rounded apex.

DISTRIBUTION—Minnesota to the New England states, south to North Carolina; May and June.

FLOWER RECORDS—*Geranium maculatum*. Robertson (1929) records this species (as *Ptilandrena g. maculati*) also on *Herachum lanatum* and *Polymonium reptans*.

***Andrena (Ptilandrena) erigeniae*
Robertson**

(Figs. 27, 29-31)

Andrena erigeniae Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 52. ♀ ♂.

Ptilandrena erigeniae Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 192. ♀ ♂. (key)

Ptilandrena erigeniae Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (Ptilandrena) erigeniae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 215. (classification)

FEMALE—Length 8 mm.; clypeus very slightly convex, projecting about one-half below suborbital line, rather dull, punctures deep and distinct but rather fine, well separated medially but not sparse, becoming quite close at extreme sides, facial foveae narrow, occupying above about half of space between eyes and ocelli; space between margin of vertex and lateral ocelli somewhat less than their diameter; cheeks subequal to eyes in width, rounded posteriorly, dull and tessellate, punctures inevident; malar space very short; basal segment of flagellum subequal to segments 2-4 combined; process of labrum short and quite broad, fully three times as broad as the median length, slightly narrowed to the broadly truncate apex; basal half of mandibles

with a rather broad, yellowish-hyaline, ventral carina; pubescence of head, thorax and legs entirely whitish-ochraceous; thoracic integument dull and tessellate, punctures of scutum and scutellum fine and shallow, rather close on scutum anteriorly, somewhat more widely separated posteriorly and on scutellum; pleura without evident punctures; dorsal area of propodeum oblique, triangle finely striate laterally, only substriate or finely roughened medially; propodeal corbicula whitish, rather poorly developed, short and thin, with a very poorly developed anterior fringe; trochanteral floccus whitish, well developed, quite long and dense; hind tibiae rather slender and elongate, slightly broadened apically, nearly twice as broad at apex as the basitarsi, scopa rather dense, hairs very fine, suberect, very finely plumose and entirely whitish; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent near middle; abdominal terga shining, punctures fine and rather close, apical impressed areas very shallow, rather narrow, discal pubescence very thin, suberect, short and entirely pale, terga 2-4 with extremely thin and inconspicuous, whitish, apical fasciae, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 8 mm.; eyes parallel; lateral ocelli separated from margin of vertex by about their diameter; cheeks broad, with a rounded, obscure angle opposite upper end of eye; malar space very short; clypeus short, median length about half its breadth, quite flat, protruding about one-half below suborbital line, closely and deeply punctate beneath the long, copious pubescence; face below ocelli dull, closely and finely striate, vertex dull, with a few obscure punctures laterally, cheeks dull, very finely striate; process of labrum very short, transverse, entire; mandibles slender and elongate, tip of one nearly reaching base of the other when closed, with a small inner tooth about one-third from tip; basal segment of flagellum equal to 2nd and 3rd combined; median segments considerably longer than broad, dull ferruginous beneath; pubescence of head and thorax entirely yellowish-white, copious and erect throughout; scutum smooth but dull, punctures distinct but rather shallow, well separated anteriorly, those on scutellum quite similar; pleura dull and densely tessellate; dorsal area of propodeum finely and closely striate, margins obscure, propodeum becoming finely rugose on lateral and posterior faces; legs more or less reddened, pubescence entirely pale, basitarsi slender and elongate; wings subhyaline, veins and stigma testaceous, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent vein near middle; tegulae testaceous-hyaline; ab-

dominal terga smooth but dull, only faintly impressed apically, this area more than one-third median length of disc, punctures distinct but rather shallow, uniformly rather widely separated, interspaces 3-6 times diameter of punctures, discal pubescence rather thin but erect, elongate on basal terga, becoming short and decumbent posteriorly, fasciae very poorly developed, impressed, apical areas reddened, becoming narrowly yellowish-hyaline along rims; sternum 7 strongly produced medially, with a very deep median emargination, resulting in a pair of elongate rounded lobes; apical portion of sternum 8 elongate and slender, tip deeply emarginate, each resulting lobe narrow and acute; penis valves elongate, gradually broadened toward base; gonocoxites gradually widened to the elongate, spatulate tips, about attaining tips of penis valves, gonocoxal lobes only slightly produced, broadly rounded.

DISTRIBUTION—Minnesota to New York, south to North Carolina and Georgia; March to May.

FLOWER RECORDS—*Claytonia virginica* and *Erigenia bulbosa*.

***Andrena (Ptilandrena) krigiana*
Robertson**

(Figs. 27, 28, 30 & 31)

Andrena krigiana Robertson, 1901. Canad. Ent. 33, p. 229. ♀ ♂.

Pterandrena krigiana Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 194. ♀ ♂. (key)

Pterandrena krigiana Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press (flower records)

Andrena krigiana Viereck, 1917 (1916). Conn. State Geol. and Nat. Hist. Survey Bul. 22, p. 777. ♀ ♂. (key)

FEMALE—Length 8 mm.; clypeus slightly convex, projecting about one-third below suborbital line, dull, densely tessellate, punctures fine, shallow, close and obscure; facial foveae rather narrow, occupying above little more than half of space between eyes and ocelli (as in *erigeniae*, fig. 29), covered with ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, punctures fine but rather deep, well separated; malar space very short; basal segment of flagellum subequal to segments 2-4 combined; process of labrum subtriangular, apex more or less narrowly truncate; pubescence of head, thorax and legs entirely ochraceous; thoracic integument dull, densely tessellate, punctures of scutum very fine, more distinct and well separated anteriorly, becoming extremely minute and

very close posteriorly, scutellum without visible punctures; pleura with some shallow, rather coarse but indefinite punctures above, elsewhere punctures hardly evident; dorsal area of propodeum nearly vertical, triangle finely rugose; propodeal corbicula rather poorly developed, short, without an anterior fringe, pale ochraceous; trochanteral floccus rather well developed, whitish-ochraceous; hind tibiae rather narrow, apex not much broader than basitarsi, scopa quite dense, hairs of moderate length, densely plumose, entirely pale ochraceous; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell very short, much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining, very finely and rather closely punctate, apical impressed areas shallow, not very broad, becoming rather broadly yellowish-hyaline along rims, discal pubescence thin, short and erect, entirely pale ochraceous, terga 2-4 with extremely narrow and thin, pale ochraceous, apical fasciae, tergum 5 with an ochraceous, apical fimbria.

MALE—Length 8 mm.; clypeus very slightly convex, projecting not much more than one-fourth below suborbital line, yellow except for the dark marginal area and the apical rim, somewhat shining, closely and minutely punctate; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, somewhat shining, punctures very fine and quite obscure; malar space very short; basal segment of flagellum subequal to segments 2-4 combined; process of labrum about twice as broad as long, slightly narrowed to the rather broadly truncate apex; mandibles rather short, with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, densely tessellate, punctures of scutum shallow, rather fine and obscure, rather well separated anteriorly, becoming closer and more obscure posteriorly, those on scutellum hardly visible; pleura finely roughened or obscurely, shallowly punctate above, elsewhere densely tessellate; dorsal area of propodeum nearly vertical, triangle finely rugose; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell exceedingly short, receiving 1st recurrent near middle, abdominal terga smooth and shining, minutely but rather distinctly punctate, punctures well separated but not sparse, apical impressed areas very shallow, not very broad, becoming very distinctly yellowish-hyaline along rims, discal pubescence very short, thin and erect, entirely pale ochraceous, terga 2-4 with extremely thin and obscure, apical fasciae barely evident; apical portion of sternum 8 rather slender, tip rather nar-

rowly truncate, clothed beneath with short, pale pubescence; penis valves slender apically, rather broadly dilated basally, excavated laterally, gonocoxites slender basally, rather gradually and broadly dilated apically, forming rather broad lobes, gonocoxal lobes somewhat produced, rather narrowly rounded apically.

DISTRIBUTION—Illinois to Connecticut, south to North Carolina and Georgia; March to June.

FLOWER RECORDS—Robertson (1929) records *krigiana* on *Krigia amplexicaulis*.

Andrena (Ptilandrena) parakrigiana
new species

MALE—Length 7 mm.; clypeus convex, entirely black; projecting about one-fourth below suborbital line, dull and tessellate, punctures very minute, close and obscure; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly narrower than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and obscure; malar space lacking; basal segment of flagellum somewhat longer than 2nd and 3rd combined, these very short, considerably broader than long; process of labrum rather broad, quite short, broadly subtriangular, the apex truncate and not noticeably emarginate; mandibles rather short, with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull and densely tessellate, scutum and scutellum without visible punctures; pleura above with rather close, shallow and obscure punctures, otherwise very densely tessellate; dorsal area of propodeum narrowly oblique, triangle obscurely rugoso-striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth and shining, minutely but quite distinctly punctate, punctures well separated but not sparse, apical depressed areas shallow and rather narrow, distinctly hyaline along rims, discal pubescence short, thin, erect and entirely pale, apical margins of the terga only very obscurely subfasciate; apical portion of sternum 8 slender and elongate, gradually broadened toward base, subtruncate apically, clothed beneath with rather dense pale pubescence; penis valves slender apically, somewhat dilated toward base, not excavated, gonocoxites dilated apically, forming rather elongated lobes, gonocoxal lobes slightly produced, narrowly rounded apically.

TYPE—Holotype: Male, Butler, Ga., March 29, 1938 (P. W. Fattig). [author's coll.].

It seems possible that this is a variant of *krigiana*. The chief difference is in the clypeus, this being entirely black in *parakrigiana*, whereas in *krigiana* the broad central area of this plate is yellow. Collection of a longer series, of both sexes, is needed before a more positive opinion is justified.

Andrena (Ptilandrena) polemonii
Robertson

(Figs. 27 & 31)

Andrena polemonii Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 54. ♀ ♂.

Andrena polemonii Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 190 & 192. ♀ ♂.
(key)

Andrena polemonii Robertson, 1904. Canad. Ent. 36, p. 278.

Andrena polemonii Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (Ptilandrena) polemonii Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 215. (classification)

FEMALE—Length 8 mm.; face somewhat longer than broad; clypeus slightly convex, projecting about one-half below suborbital line, dull and tessellate, punctures shallow, rather fine, well separated, becoming quite close at extreme sides; facial foveae rather narrow, occupying above about half of space between eyes and ocelli (as in *distans*, fig. 29), covered with whitish tomentum; space between margin of vertex and lateral ocelli very narrow, less than half diameter of ocelli, cheeks slightly broader than eyes, rounded posteriorly, dull and finely tessellate, punctures hardly visible; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum semicircular, about twice as broad as the median length, rather large; pubescence of head, thorax and legs greyish-white, becoming somewhat brownish on the more apical leg segments; thoracic integument dull, tessellate, faintly greenish, punctures of scutum and scutellum very minute and obscure, barely visible, well separated; pleura without visible punctures; dorsal area of propodeum oblique, triangle finely tessellate, propodeal corbicula whitish, rather poorly developed, short and thin, without a distinct anterior fringe; trochanteral floccus short and poorly developed; hind tibiae slender and elongate, apex not much broader than basitarsi, scopa whitish,

quite dense, hairs rather short, finely plumose, front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga dull, finely, but rather densely tessellate, faintly greenish, punctures exceedingly minute and obscure, rather sparse medially, becoming somewhat more close laterally, apical impressed areas narrow, quite shallow, not noticeably hyaline, discal pubescence extremely short, thin, sparse and obscure, apparently entirely pale, terga 2-4 with thin, whitish, apical fasciae, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 7 mm.; face slightly longer than broad; clypeus somewhat protuberant, projecting about one-half below suborbital line, somewhat shining medially, becoming dull around margin, punctures deep and distinct, rather coarse, well separated medially, becoming close toward sides and above; space between margin of vertex and lateral ocelli very narrow, less than half their diameter; cheeks slightly broader than eyes, rounded posteriorly (as in *krigiana*, fig. 30), dull, finely roughened, punctures hardly visible; malar space very short, but distinct; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broad and rather short, length about half the basal width, slightly narrowed to the broadly truncate apex; mandibles rather short, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely whitish, faintly tinged with ochraceous above; thoracic integument dull, densely tessellate, punctures of scutum very shallow and obscure, rather close anteriorly, becoming inevident posteriorly and on scutellum; pleura finely roughened above, without evident punctures; dorsal area of propodeum oblique, triangle very finely subrugose; all basitarsi slender and elongate, distinctly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle, abdominal terga dull, rather densely but finely tessellate, punctures exceedingly minute and obscure, hardly visible, close over most of discs, apical impressed areas very shallow, rather short, not at all hyaline, discal pubescence extremely short, thin, sparse and entirely pale, fasciae not developed; apical portion of sternum 8 narrow, rather short, sides nearly parallel, apex narrowly truncate, covered beneath with short, thin pubescence; penis valves slender apically, somewhat dilated basally, sides excavated, gonocoxites quite slender, only very slightly dilated apically, gonocoxal lobes slightly produced.

DISTRIBUTION—Illinois and Michigan; May.

FLOWER RECORDS—Robertson (1929) records *polemonii* on *Geranium maculatum*, *Polemonium reptans* and *Ranunculus septentrionalis*.

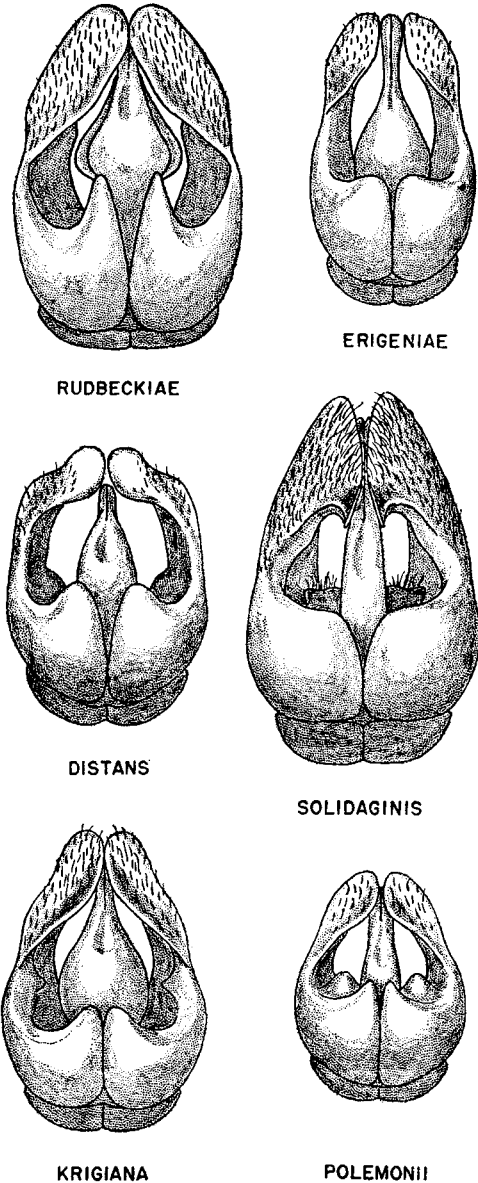


Figure 27

Apical flexed portion of male genital armature in species of *Andrena* (*Pterandrena*) and *A.* (*Ptilandrena*)

***Andrena* (? *Micrandrena*) *miserabilis*
bipunctata Cresson**

(Figs. 30-32)

- Andrena clypeata* Smith, 1853. Cat Hym. Brit. Mus. 1, p. 115 ♀. Preocc.
- Andrena bipunctata* Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 259. ♂.
- Andrena flavoclypeata* Smith, 1879. Descr. New Species Hym. Brit. Mus., p. 54. ♂.
- Anthrena clypeolata* Dalla Torre, 1896. Cat. Hym. 10, p. 133.
- Andrena clypeata* Morice & Cockerell, 1901. Canad. Ent. 33, p. 124. (type)
- Andrena flavoclypeata* Morice & Cockerell, 1901. Canad. Ent. 33, p. 152. (type)
- Opandrena bipunctata* Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193. ♀ ♂. (key)
- Andrena flavoclypeata* Cockerell, 1906. Psyche 13, p. 9. (type)
- Andrena clypeata* Cockerell, 1906. Psyche 13, p. 35. (type)
- Andrena pennsylvanicola* Viereck, 1907. Ent. News 18, p. 284. ♀.
- Andrena salicinellina* Viereck & Cockerell, 1914. U. S. Natl. Mus. Proc. 48, p. 17. ♂. New synonymy.
- Andrena miserabilis flavoclypeata* Viereck, 1917. Conn. State Geol. and Nat. Hist. Survey Bul. 22, p. 716.
- Opandrena miserabilis* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
- Andrena pronitens* Cockerell, 1930. Ann. Mag. Nat. Hist. (10) 5, p. 114. ♀.
- Andrena bipunctata* Atwood, 1934. Canad. Jour. Res. 10(2), pp. 208 & 209. ♀ ♂. (key)
- Andrena bipunctata* Brittain and Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
- Andrena* (*Micrandrena* ?) *bipunctata* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)
- Andrena bipunctata* Michener and Rettenmeyer, 1956. Kans. Univ. Sci. Bul. 37, pp. 679-681. (biology)
- Andrena miserabilis* Krombein, 1958. Hymenoptera of America North of Mexico. Synoptic Catalog. U.S.D.A. Agr. Monogr. No. 2. First suppl. p. 215. (replaces *bipunctata*).

FEMALE—Length 7-8 mm.; face slightly longer than broad; clypeus broadly convex, projecting slightly less than one-half below suborbital line, smooth and shining, broadly impunctate medially, with fine, scattered, rather irregular punctures on each side, becoming quite close at lateral angles; facial foveae rather narrow, occupying above only slightly more than half of area between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli no more than equal to half their diameter; cheeks very slightly broader than eyes, rounded posteriorly, obscurely roughened, punctures very minute and obscure, rather close; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, with a rather broadly rounded apex, fully twice as broad basally as the median length; pubescence of head, thorax and legs entirely whitish, slightly tinged with ochraceous above; thoracic integument dull, finely tessellate, punctures of scutum extremely minute and obscure, rather close anteriorly, becoming more sparse toward middle posteriorly, those on scutellum very minute, irregularly scattered, the surface shining; pleura not visibly punctate; dorsal area of propodeum nearly vertical, rather narrow, triangle obscurely striate toward basal margin; propodeal corbicula rather short, pale ochraceous, with a very short and incomplete anterior fringe; trochanteral floccus well developed, dense and elongate, white; hind tibiae slender and elongate, apex only very slightly broader than basitarsi, scopa rather dense, white, obscurely and finely plumose; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth, but rather dull, microscopically tessellate, punctures exceedingly minute and obscure, hardly visible but rather close, apical depressed areas shallow, occupying medially about one-third length of discs, becoming narrowly yellowish-hyaline along rims, discal pubescence extremely short, thin and inconspicuous, obscurely brownish, terga 2-4 with narrow, whitish, apical fasciae, slightly interrupted medially on tergum 2, tergum 5 with a pale brownish-ochraceous, apical fimbria.

MALE—Length 7 mm.; clypeus very slightly convex, projecting about one-third below suborbital line, yellow except for two small black spots and the blackish apical rim, smooth and shining, very finely, obscurely and rather sparsely punctate; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks rather broad and flat, considerably broader than eyes, rather narrowly

rounded posteriorly, dull, the punctures inevident; malar space extremely short; basal segment of flagellum subequal to 2nd and following segments which are dull brownish-ferruginous; process of labrum subquadrate, about twice as broad as long, broadly truncate apically; mandibles of moderate length, with a small, inner, subapical tooth, slightly curved, overlapping about one-third; pubescence of head, thorax and legs greyish-white; thoracic integument dull, tessellate, punctures of scutum extremely minute and obscure, hardly visible, well separated anteriorly, becoming rather sparse toward posterior middle, those on scutellum hardly visible, surface more shining; pleura without visible punctures; dorsal area of propodeum nearly vertical, rather narrow, triangle finely roughened along basal margin; all basitarsi slender and elongate, considerably narrower than their respective tibiae, more or less reddened; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, but rather dull, microscopically tessellate, punctures exceedingly minute and obscure, hardly visible, apical depressed areas very shallow medially, occupying less than one-third of median length of discs, reddened, becoming yellowish-hyaline toward rims, discal pubescence very short, thin, erect and pale, terga 2-4 with very narrow, obscure, whitish, apical fasciae, widely interrupted medially on 2 and 3; apical portion of sternum 8 quite robust, sides very nearly parallel, apex rather broadly truncate, covered beneath with short, rather dense pubescence; penis valves slender, flexed apically, quite broadly dilated basally, excavated beneath at sides, gonocoxites quite robust, somewhat dilated just beyond middle, gradually narrowed toward apex, gonocoxal lobes strongly produced, very narrowly rounded.

DISTRIBUTION—Eastern Canada to Georgia, west to Texas, Colorado and California; April to June.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Brassica*, *Crataegus*, *Fragaria*, *Ilex*, *Malus*, *Prunus*, *Pyracantha*, *Pyrus*, *Rubus*, *Salix*, *Spiraea* and *Viola*. Robertson (1929) lists the following additional genera: *Antennaria*, *Arabis*, *Capsella*, *Cardamine*, *Claytonia*, *Comandra*, *Cornus*, *Dentaria*, *Erigenia*, *Hepatica*, *Heracleum*, *Isoetes*, *Ptelia*, *Ranunculus*, *Rhamnus*, *Rhus*, *Staphylea*, *Stellaria*, *Taraxacum*, *Viburnum* and *Zanthoxylum*.

Recorded by Brittain and Newton (1934) on *Solidago*, and by Michener and Rettenmeyer (1956) on *Cercis*.

Andrena (? *Micrandrena*) *miserabilis miserabilis* Cresson

(Fig. 29)

Andrena miserabilis Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 259. ♀

FEMALE—This is quite similar to *bipunctata* but is somewhat larger (9 mm.) and the clypeus is much more fully punctate, with a rather wide, median, impunctate line, finely and deeply punctate on each side of this line, the more median punctures rather sparse.

Females of *bipunctata* are 7-8 mm. in length, and the clypeus is smooth and impunctate over the median third of its breadth.

DISTRIBUTION—North Carolina to Texas; March and April.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Crataegus* and *Prunus*.

This has been considered a synonym of *bipunctata*, but the difference between the two would seem to justify recognition of this form.

The form *bipunctata* seems to be the dominant one, as specimens definitely assignable to *miserabilis* are rather uncommon. They appear to be distinct morphologically, but are sometimes found in the same nesting area. Moreover, no males, showing any difference from *bipunctata*, that can be matched with females of *miserabilis*, have been found. The two certainly do not represent geographic races, and may be only extremes of variation in one species. A population study of some nesting site might yield some data pertinent to this problem.

Andrena (? *Micrandrena*) *miserabilis scutellata* Dalla Torre

Andrena scutellaris Robertson, 1893. Amer. Ent. Soc. Trans. 10, p. 148. ♀. Preocc.

Anthrena scutellata Dalla Torre, 1896. Cat. Hym. 10, p. 151.

This is a southeastern and coastal form of *bipunctata* in which the metanotum and posterior margin of the scutellum bear a conspicuous tuft of elongate fulvous hairs, in both sexes. This results in a distinctive appearance, markedly different from that of the form which occurs over the remainder of its range. Although this has been placed in synonymy (see Catalog of Hymenoptera, p. 1058), the distinctive appearance would seem to justify its recognition as a subspecies.

DISTRIBUTION—Coastal belt of North Carolina to Florida and Mississippi; January to March.

FLOWER RECORDS — *Prunus angustifolia*.

***Andrena (Micrandrena) melanochoera fragariana* Graenicher**

(Figs. 29-32)

Andrena fragariana Graenicher, 1904. Ent. News 15, p. 64. ♀ ♂.

Andrena (Micrandrena) fragariana Cockerell, 1932. Canad. Ent. 64, pp. 157 & 158. ♀ ♂.

Andrena (Micrandrena) fragariana Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)

FEMALE—Length 6 mm.; face slightly longer than broad; clypeus broadly convex, projecting about one-third below suborbital line, smooth, somewhat shining, punctures very minute and obscure, well separated where clearly visible; facial foveae narrow, occupying about half of space between eyes and ocelli, covered with yellowish-white tomentum; space between margin of vertex and lateral ocelli no more than half their diameter; cheeks slightly narrower than eyes, rounded posteriorly, surface obscured by short and rather dense pubescence; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very short, broadly semicircular, breadth three or four times its length; pubescence of head, thorax and legs short, rather dense, greyish; thoracic integument dull, rather densely tessellate, punctures of dorsum of thorax exceedingly minute and obscure, barely visible; pleura without visible punctures; dorsal area of propodeum nearly horizontal, broad, extensive, triangle quite densely granular; propodeal corbicula short and poorly developed, without an anterior fringe, greyish-white; trochanteral floccus rather short, whitish; hind tibiae broadened apically, width at apex about twice that of the basitarsi, scopa rather dense, composed of rather short, simple, whitish hairs; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly basad of middle; abdominal terga dull, densely tessellate, practically impunctate, obscurely greenish, the apical impressed area rather narrow and shallow, becoming narrowly yellowish-hyaline along rims, discal pubescence extremely short, suberect, whitish, forming very narrow and thin, whitish, apical fasciae on terga 2-4, this rather widely interrupted on tergum 2, tergum 5 with a brownish, apical fimbria.

MALE—Length 5 mm.; clypeus broadly convex, projecting nearly one-half below sub-

orbital line, smooth and somewhat shining; punctures rather deep, distinct and close beneath rather thin, whitish pubescence; space between margin of vertex and lateral ocelli no more than half their diameter; cheeks slightly narrower than eyes, rounded posteriorly, surface obscured by rather dense, whitish pubescence; malar space lacking; basal segment of flagellum slightly longer than 2nd segment, slightly shorter than 2nd and 3rd combined; process of labrum rather short and broad, apex rather broadly truncate; mandibles short, with a small but distinct, inner, sub-apical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely whitish; thoracic integument dull, quite densely tessellate, punctures of dorsum of thorax very minute and obscure, barely visible; pleura without visible punctures; dorsal area of propodeum quite extensive, nearly horizontal, triangle finely subrugose or granular; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly basad of middle; abdominal terga smooth, but rather dull, microscopically tessellate, obscurely greenish, without visible punctures, apical depressed area occupying about one-third median length of discs, entirely black to the rims, discal pubescence very short, suberect and whitish, fasciae very poorly developed; apical portion of sternum 8 slender and elongate, sides nearly parallel, apex rather narrowly rounded; tip of penis valves extremely slender, base more bulbous but not excavated, gonocoxites rather slender, only slightly dilated apically, gonocoxal lobes very slightly produced, broadly rounded.

DISTRIBUTION—Minnesota to Nova Scotia, south to North Carolina and Georgia; March to July.

FLOWER RECORDS — *Fragaria*, *Potentilla* and *Rubus*.

***Andrena (Micrandrena) melanochoera melanochoera* Cockerell**

Andrena melanochoera Cockerell, 1898. Entomologist 31, p. 89. ♀ ♂.

Andrena (Micrandrena) vagans Cockerell, 1932. Canad. Ent. 64, p. 157. ♀

Andrena vagans Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

This subspecies is recorded as *A. vagans* from Nova Scotia, visiting *Fragaria*, by Brittain and Newton (1934). There are no other eastern records of the typical form, however, and it is suspected that this is the subspecies *fragariana*.

Andrena (Micrandrena) illinoiensis
Robertson

(Figs. 29, 31 & 32)

Andrena illinoiensis Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 54. ♀ ♂.

Andrena salicinella Cockerell, 1895. Psyche 7 (Sup.), p. 4. ♀.

Andrena illinoiensis Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 190 & 192. ♀ ♂. (key)

Andrena placitae Cockerell, 1904. Ent. News 14, p. 215. ♂.

Andrena illinoiensis Cockerell, 1914. Ann. Mag. Nat. Hist. (8) 14, p. 10. ♀.

Andrena illinoiensis Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).

Andrena illinoiensis Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 706 & 708. ♀ ♂. (key).

Andrena (Micrandrena) illinoiensis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)

FEMALE—Length 7 mm.; clypeus broadly convex, projecting about one-third below sub-orbital line, smooth and somewhat shining, punctures exceedingly minute, well separated medially, becoming close and obscure laterally; facial foveae narrow, occupying above about half of space between eyes and ocelli (as in *fragariana*, fig. 29), covered with pale ochra-

ceous tomentum; space between margin of vertex and lateral ocelli much narrower than their diameter; cheeks slightly narrower than eyes, rounded posteriorly, somewhat shining beneath rather dense pubescence; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quite small, semicircular, about twice as broad as long; pubescence of head, thorax and legs pale ochraceous to whitish; thoracic integument dull, finely tessellate, somewhat purplish, punctures of scutum extremely minute and obscure, well separated, becoming sparse posteriorly, fine and rather close on the more shining scutellum; pleura without visible punctures; dorsal area of propodeum nearly horizontal, rather extensive, triangle tessellate, not contrasting with adjacent areas; propodeal corbicula rather short, without a well defined anterior fringe, whitish; trochanteral floccus white, quite well developed but rather short; hind tibiae somewhat broadened apically, apex nearly twice the width of basitarsi, scopa quite dense, hairs rather short, simple, entirely white; all tarsi pale ferruginous, front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth, but rather dull, the more basal segments microscopically tessellate, punctures invident, surface obscurely purplish, apical depressed areas narrow and shallow,

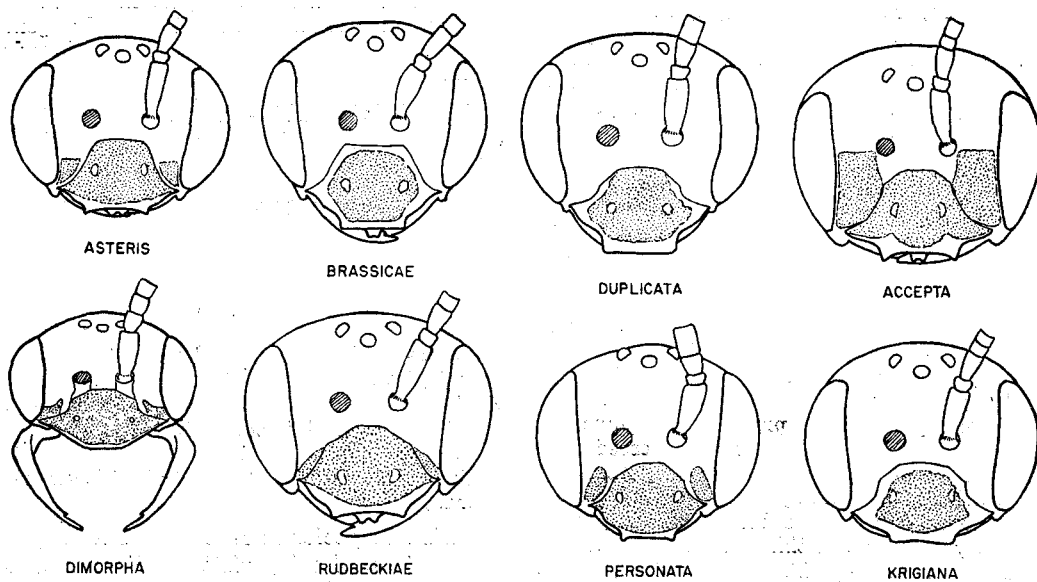


Figure 28—Facial view of male head, showing maculations in species of *Andrena (Pterandrena)*, *A. (Ptilandrena)* and *A. (Micrandrena)*.

yellow-hyaline, discal pubescence extremely short and sparse, entirely pale, terga 2-4 with narrow, white, apical fasciae, interrupted on tergum 2 and more narrowly on 3, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 7 mm.; clypeus only very slightly convex, projecting very slightly below suborbital line, very closely and finely punctate beneath short, dense pubescence; space between margin of vertex and lateral ocelli much narrower than their diameter; cheeks slightly narrower than eyes, rounded posteriorly, densely pubescent; malar space lacking; basal segment of flagellum slightly shorter than 2nd and 3rd combined, 2nd much broader than long, segments beyond 2nd pale ferruginous beneath; process of labrum semicircular, fully twice as broad as long; mandibles short, with a small but distinct, inner, subapical tooth, overlapping hardly at all; pubescence of head, thorax and legs entirely pale ochraceous, rather short but rather dense, thoracic integument dull, finely tessellate, punctures of scutum very minute and obscure, well separated, becoming rather sparse posteriorly, exceedingly minute and quite sparse on scutellum, surface obscurely purplish; pleura not visibly punctate; dorsal area of propodeum quite extensive, nearly horizontal, triangle finely roughened; all basitarsi slender and elongate, considerably narrower than their respective tibiae, pale ferruginous; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but rather dull, microscopically tessellate, obscurely purplish or greenish, not visibly punctate, apical depressed areas rather narrow and shallow, becoming yellowish-hyaline along rims, discal pubescence extremely short and sparse, entirely pale, the fasciae very poorly developed; apical portion of sternum 8 very narrow and slender, tip narrowly rounded, covered beneath with rather long, dense pubescence; penis valves bulbous medially, slightly narrowed toward base and produced apically into a sharp, slender, spine-like tip, gonocoxites slender, rather abruptly flexed medially, strongly narrowed apically, gonocoxal lobes not at all produced.

DISTRIBUTION—Transcontinental in southern Canada and the northern United States, reaching South Carolina in the East; April to June.

FLOWER RECORDS—*Prunus*, *Salix* and *Taraxacum*. Robertson (1929) records this species on *Antennaria*, *Geranium*, *Stellaria* and *Zizia*.

Andrena (Micrandrena) neonana Viereck

(Figs. 31 & 33)

Andrena (Scrapter) neonana Viereck, 1917.
Amer. Ent. Soc. Trans. 43, p. 400. ♀.
Andrena (? Micrandrena) neonana Lanham,
1949. Univ. Calif. Pubs. Ent. 8, p. 209.
(classification).

FEMALE—Length 7 mm.; clypeus broadly convex, projecting about one-third below suborbital line, smooth and shining, punctures irregular, rather deep, fine and close; facial foveae quite narrow, occupying above about half of space between eyes and ocelli (as in *fragariana*, fig. 29), covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli somewhat less than their diameter; cheeks slightly narrower than eyes, rounded posteriorly, shining, punctures hardly evident; malar space lacking; basal segment of flagellum slightly shorter than 2nd and 3rd combined; flagellum dull brownish-ferruginous; process of labrum broadly semicircular, median length slightly less than half of breadth; pubescence of head, thorax and legs short, rather thin, entirely whitish, somewhat tinged with yellowish above; thoracic integument dull, finely tessellate, punctures of scutum very fine and obscure, well separated, becoming rather sparse toward center posteriorly, surface somewhat shining, those on scutellum more minute and obscure, surface shining; pleura without visible, distinct punctures; dorsal area of propodeum extensive, nearly horizontal, triangle rather coarsely subrugose; propodeal corbicula whitish, poorly developed, quite short, without an anterior fringe; trochanteral flocus rather well developed, whitish; hind tibiae rather slender but somewhat broadened apically, apex nearly twice width of the basitarsus, front and middle basitarsi slender, somewhat narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, tergum 1 shining, 2nd and following terga dull, microscopically tessellate, punctures invident, depressed apical areas very shallow, occupying medially about one-third length of discs, brownish, becoming yellowish-hyaline along rims, discal pubescence extremely short, thin and sparse, entirely pale, forming very loose, thin and obscure, apical, pale fasciae on terga 2-4, those on 2 and 3 somewhat interrupted medially, tergum 5 with a brownish, apical fimbria.

MALE—Length 5 mm.; clypeus slightly convex, projecting about one-third below suborbital line, yellow, except for two small black

spots and the dark apical rim, smooth and shining, very finely punctate, punctures rather sparse medially, becoming quite close at extreme sides; space between margin of vertex and lateral ocelli somewhat less than their diameter; cheeks narrower than eyes, rounded posteriorly, rather dull, except along eye margin, punctures exceedingly minute and obscure, pubescence rather dense, elongate below; malar space extremely short; basal segment of flagellum very short, not much longer than broad, much shorter than 2nd and following segments; process of labrum about twice as broad as long, slightly narrowed to the rather broadly truncate apex; mandibles rather short, with a minute, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely white; thoracic integument rather dull, microscopically tessellate, punctures of scutum exceedingly minute and obscure, well separated anteriorly, becoming very sparse posteriorly and hardly visible on the more shining scutellum; pleura more densely tessellate, without visible punctures; dorsal area of propodeum quite extensive, nearly horizontal, triangle rather coarsely rugose; basitarsi testaceous, slender and

elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga rather smooth, microscopically tessellate, but tergum 1 somewhat shining, punctures exceedingly minute and obscure, hardly visible, apical impressed areas rather narrow and shallow, somewhat shining, discal pubescence extremely short, sparse and obscure, entirely whitish, fasciae not developed; apical portion of sternum 8 quite slender and elongate, apex slightly dilated, rather broadly rounded, clothed beneath with rather long, sparse, pale pubescence; penis valves slender apically, dilated basally, this part excavated laterally beneath, gonocoxites rather short and slender, not dilated apically, gonocoxal lobes but very slightly produced, rather broadly rounded.

DISTRIBUTION—Indiana and Ohio, south to Louisiana and Florida; April and May.

FLOWER RECORDS—*Ilex* and *Malus*.

The male of *neonana* has not been recognized nor described previously.

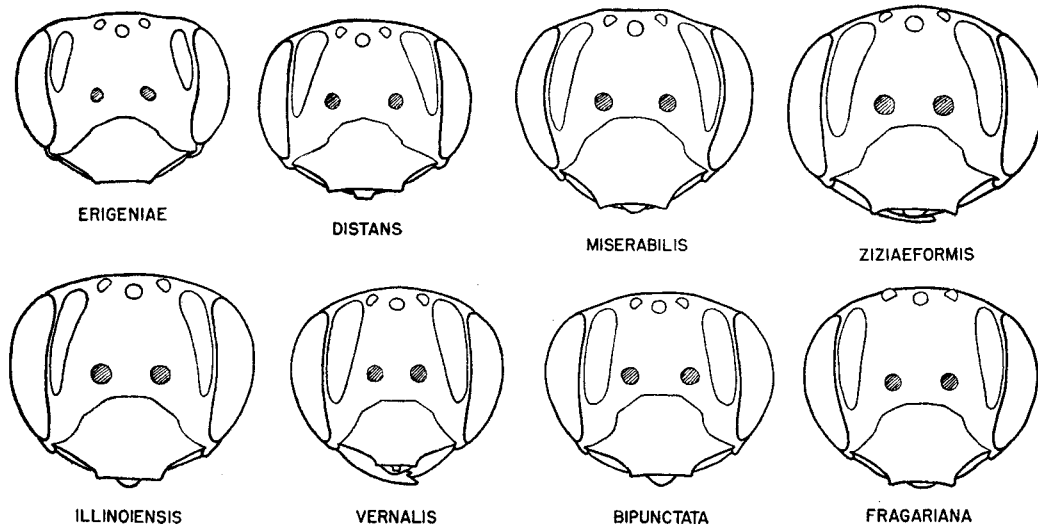


Figure 29—Facial view of female head, showing form of foveae in species of *Andrena* (*Pterandrena*) and *A. (Micrandrena)*.

***Andrena (Micrandrena) nigrae*
Robertson**

- Andrena illinoensis* var. *bicolor* Robertson, 1898. Acad. Sci. St. Louis, Trans. 8, p. 46. ♀. Preocc.
Andrena nigrae Robertson, 1905. Canad. Ent. 37, p. 237.
Andrena nigrae Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena (Micrandrena) nigrae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)

FEMALE—This answers to the description of *illinoensis* in all details except color of abdomen, which is bright ferruginous. Robertson, however, suggested that it is more closely related to *salictaria*. Eventual recognition of the male will show, possibly, whether this is a subspecies or variant of one of these two closely related species, or is a valid and different species.

DISTRIBUTION—Illinois, Minnesota; May.

FLOWER RECORDS—*Salix*. Robertson (1929) records this also on *Antennaria*.

***Andrena (Micrandrena) nothoscordi*
Robertson**

- Andrena nothoscordi* Robertson, 1897. Acad. Sci. St. Louis, Trans. 7, p. 331. ♀.
Andrena nothoscordi Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 191. ♀. (key)
Andrena (Micrandrena) nothoscordi Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)

No specimens of this poorly known species have been found in any of the collections that have been made, or received for determination. It is closely related to the species of *Micrandrena*, but differs from most of the eastern species of that group in the somewhat broader cheeks. The following brief description was made of the type specimen in the collection of the Illinois Natural History Survey:

FEMALE—Length 7 mm.; foveae broad, filling most of space between eyes and lateral ocelli; cheeks slightly broader than eyes; clypeus dull, punctures sparse and shallow; face below ocelli finely striate; malar space inevident; basal segment of flagellum equal to 2nd and 3rd combined; pubescence thin and whitish over head and thorax; scutum impunctate, dull anteriorly, more shining posteriorly, and scutellum somewhat shining; propodeal triangle finely tessellate, not granular; legs dark, with pubescence whitish, including tibial scopa and trochanteral floccus; wings hyaline, veins

and stigma testaceous; 1st intercubital vein reaching marginal cell very close to stigma, 2nd submarginal narrowed toward marginal; tegulae testaceous; abdominal terga rather dull, punctures minute and obscure, apical margins narrowly testaceous, segments 2-4 with thin, whitish, apical fasciae.

DISTRIBUTION—Carlinville, Illinois, is the type locality.

FLOWER RECORDS—Robertson records this only on *Nothoscordum bivalve*.

***Andrena (Micrandrena) personata*
Robertson**

(Figs. 28, 31 & 33)

- Andrena personata* Robertson, 1897. Acad. Sci. St. Louis, Trans. 7, p. 336, ♀ ♂.
Opandrena personata Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193. ♀ ♂. (key).
Opandrena personata Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).
Andrena personata Cockerell, 1932. Canad. Ent. 64, pp. 157 & 158. ♀ ♂. (key).
Andrena (Micrandrena) personata Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification).

FEMALE—Length 6 mm.; face slightly longer than broad; clypeus broadly convex, projecting about one-third below suborbital line, smooth but rather dull, punctures exceedingly minute, shallow and sparse; facial foveae very narrow, occupying above hardly half of space between eyes and ocelli (as in *fragariana*, fig. 29), covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli extremely short, ocelli nearly touching margin; cheeks very slightly narrower than eyes, rounded posteriorly, rather dull, punctures hardly evident; malar space lacking; basal segment of flagellum slightly shorter than 2nd and 3rd combined, flagellum apically rather dark reddish-ferruginous; process of labrum rather small, semicircular, length about half the basal width; pubescence of head and thorax quite short, entirely pale, tinged with yellowish above, that on legs entirely pale; thoracic integument dull, finely tessellate, punctures of scutum very minute and obscure, hardly evident, surface rather densely tessellate, those on scutellum exceedingly minute and obscure, surface somewhat more shining; pleura without visible punctures; dorsal area of propodeum rather extensive, nearly horizontal, triangle rather coarsely subrugose toward basal middle; propodeal corbicula poorly developed, short, without an anterior fringe, pale ochraceous; trochanteral floccus rather short, but well developed, whitish; hind tibiae gradually broadened to apex, which is about twice width

of basitarsi, scopa quite dense, hairs rather short, simple, entirely pale; fore and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga rather smooth but dull, very finely tessellate, without visible punctures, apical margins very narrowly and obscurely impressed, these areas broadly hyaline, discal pubescence extremely short, sparse and obscure, entirely pale, forming rather dense, pale ochraceous or whitish, apical fasciae on terga 2-4, somewhat interrupted medially on tergum 2, tergum 5 with a brownish, apical fimbria.

MALE—Length 6 mm.; face very slightly longer than broad, with small but distinct yellow maculae below between clypeus and eye margin; clypeus broadly convex, projecting about one-third below suborbital line, yellow except for a pair of small blackish spots and the black apical rim, smooth and shining, punctures exceedingly minute and obscure, rather sparse; lateral ocelli nearly touching margin of vertex; cheeks slightly narrower than eyes, rounded posteriorly, dull, punctures hardly evident; malar space lacking; basal segment of flagellum short, apical width about equal to length, considerably shorter than 2nd and following segments, which are brownish-testaceous, in contrast to the dark basal segment; process of labrum rather small, subtriangular, apex narrowly rounded

or subtruncate; mandibles short, with a small but distinct, inner, subapical tooth, overlapping hardly at all; pubescence of head, thorax and legs entirely whitish, thoracic integument dull, rather densely tessellate, punctures of scutum hardly visible, scutellum somewhat more shining, with exceedingly minute, barely visible punctures; pleura not visibly punctate; dorsal area of propodeum rather extensive, nearly horizontal, triangle rather finely subrugose; all basitarsi slender and elongate, somewhat narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but rather dull, microscopically tessellate, punctures inevident, narrowly impressed apically, impressed areas quite shallow, mostly hyaline; discal pubescence extremely short, thin and sparse, entirely pale, terga 2-4 with poorly developed, thin, whitish, apical fasciae evident laterally; apical portion of sternum 8 extremely long and slender, slightly broadened toward the subtruncate apex, with thin, pale pubescence; tip of penis valves abruptly constricted and flexed, more bulbous toward base, but not excavated, gonocoxites rather slender medially, abruptly broadened toward apex, gonocoxal lobes very slightly produced, rounded or subtriangular.

DISTRIBUTION—Minnesota to Connecticut, south to North Carolina and Georgia; April to June.

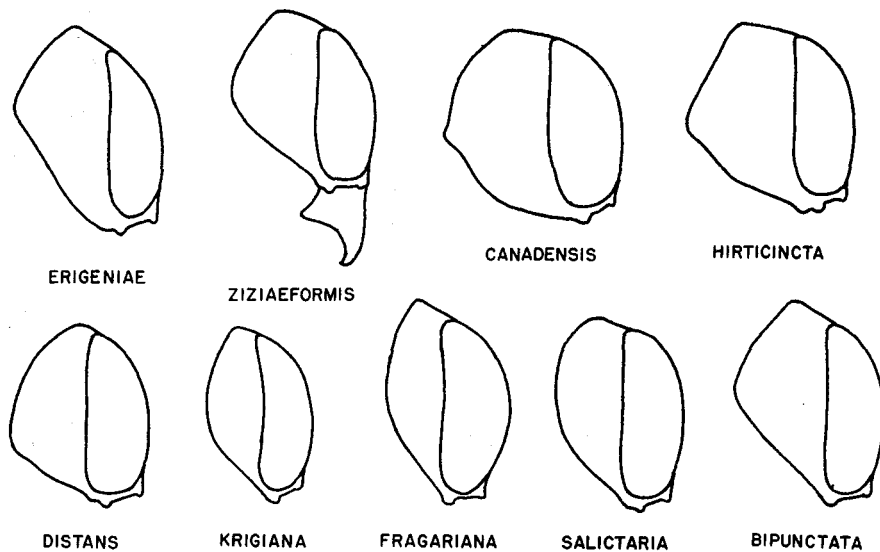


Figure 30—Lateral view of male head, showing form of cheeks in species of *Andrena* (*Ptirandrena*), *A. (Micrandrena)*, and *A. (Cnemidandrena)*.

FLOWER RECORDS—*Claytonia*, *Crataegus*, *Fragaria*, *Ranunculus*, *Rubus* and *Salix*. Robertson (1929) records it also on the following plant genera: *Arabis*, *Arun-cus*, *Capsella*, *Cardamine*, *Cerastium*, *El-lisia*, *Eulophus*, *Geum*, *Gleditsia*, *Lepidium*, *Oxalis*, *Pastinaca*, *Philadelphus*, *Potentilla*, *Rhamnus*, *Sanicula*, *Sisymbrium*, *Stellaria*, *Taenidia*, *Thaspium* and *Viburnum*.

***Andrena (Micrandrena) salictaria*
Robertson**

(Figs. 30-32)

- Andrena salictaria* Robertson, 1905. Canad. Ent. 37, p. 236. ♀ ♂.
- Andrena salictaria* Salt, 1927. Jour. Expt. Zool. 48, p. 252. (stylopization)
- Andrena salictaria* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
- Andrena salictaria* Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 210. ♀ ♂. (key).
- Andrena salictaria* Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 705, 706 & 708. ♀ ♂. (key)
- Andrena (Micrandrena) salictaria* Lanham 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)

FEMALE—Length 7 mm.; clypeus broadly convex, projecting about one-third below suborbital line, smooth and somewhat shining, punctures exceedingly minute, well separated medially, becoming close and obscure laterally; facial foveae narrow, occupying above about half of space between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli much narrower than their diameter; cheeks slightly narrower than eyes, rounded posteriorly, somewhat shining beneath the rather dense pubescence; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quite small, semicircular, about twice as broad as long; pubescence of head, thorax and legs pale ochraceous to whitish; thoracic integument dull, finely tessellate, somewhat purplish, punctures of scutum extremely minute and obscure, well separated, becoming sparse posteriorly, fine and rather close on the more shining scutellum; pleura without visible punctures; dorsal area of propodeum nearly horizontal, rather extensive, triangle tessellate, not contrasting with adjacent areas; propodeal corbicula rather short, without a well defined anterior fringe, whitish; trochanteral floccus white, quite well developed, but rather short; hind tibiae somewhat broadened apically, apex nearly twice width of basitarsi, scopa quite dense, hairs rather short, simple, entirely white; all tarsi

pale ferruginous, front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but rather dull, the more basal segments microscopically tessellate, punctures invident, surface obscurely purplish, apical depressed areas narrow and shallow, yellowish-hyaline, discal pubescence extremely short and sparse, entirely pale, terga 2-4 with narrow, white, apical fasciae, interrupted on tergum 2 and more narrowly on 3, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 7 mm.; clypeus only very slightly convex, projecting very slightly below suborbital line, very closely and finely punctate beneath short, dense pubescence; space between margin of vertex and lateral ocelli much narrower than their diameter; cheeks slightly narrower than eyes, rounded posteriorly, densely pubescent; malar space lacking; basal segment of flagellum slightly shorter than 2nd and 3rd combined, 2nd much broader than long, segments beyond 2nd pale ferruginous beneath; process of labrum semicircular, fully twice as broad as long; mandibles short, with a small but distinct inner subapical tooth, overlapping hardly at all; pubescence of head, thorax and legs entirely pale ochraceous, rather short but rather dense; thoracic integument dull, finely tessellate, punctures of scutum very minute and obscure, well separated, becoming rather sparse posteriorly, exceedingly minute and quite sparse on scutellum, surface obscurely purplish; pleura not visibly punctate; dorsal area of propodeum quite extensive, nearly horizontal, triangle finely roughened; all basitarsi slender and elongate, considerably narrower than their respective tibiae, pale ferruginous; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but rather dull, microscopically tessellate, obscurely purplish or greenish, not visibly punctate, apical depressed areas rather narrow and shallow, becoming yellowish-hyaline along rims, discal pubescence extremely short and sparse, entirely pale, the fasciae very poorly developed; apical portion of sternum 8 very narrow and slender, tip narrowly rounded, covered beneath with rather long, dense pubescence; penis valves bulbous medially, slightly narrowed toward base and produced apically into a sharp, slender, spine-like tip, gonocoxites slender, rather abruptly flexed medially, strongly narrowed apically, gonocoxal lobes not at all produced.

DISTRIBUTION—Colorado to the New England states and Nova Scotia, south to North Carolina, Georgia and Mississippi; March to May.

FLOWER RECORDS—*Crataegus*, *Prunus*, *Pyracantha* and *Salix*. Robertson (1929) records *salictaria* also on *Amelanchier*, *Antennaria*, *Erigenia*, *Rhus*, *Sassafras* and *Viburnum*.

Andrena (Micrandrena) vernalis
new species

(Fig. 29)

FEMALE—Length 8 mm.; face very slightly longer than distance between eyes above; eyes slightly convergent below; foveae broad, occupying most of space between eyes and ocelli above, only slightly narrowed below, covered with yellowish tomentum; vertex narrow, lateral ocelli separated from its hind margin by less than their own diameter; cheeks subequal to eyes in width; clypeus protruding but little below suborbital line, rather dull and tessellate, with very minute, scattered and obscure punctures, these becoming slightly closer at extreme sides; malar space hardly evident; process of labrum very small, narrowly truncate, length only slightly more than half the basal width; antennae dark basally becoming yellowish apically, basal segment of flagellum not quite equalling segments 2 and 3 combined, median segments slightly broader than long; pubescence of head and thorax rather short, pale yellowish, rather thin but erect on thorax, somewhat more elongate on thorax below; scutum and scutellum rather dull, with only a few scattered, exceedingly minute punctures evident anteriorly and on scutellum; pleura quite smooth but dull and tessellate, with a V-shaped ridge just anterior to mid-coxae; enclosure of propodeum rather poorly defined, very finely subrugose toward basal margin, lateral areas of propodeum rather smooth, propodeal corbicula rather elongate above, with scattered, elongate hairs in center but without an anterior fringe; trochanteral flocus well developed; legs somewhat reddened, the more apical tarsal segments becoming yellowish, pubescence entirely pale, hind tibiae moderately broadened apically, apex nearly twice width of their basitarsi, scopa of rather short but dense hairs; wings hyaline, veins and stigma testaceous, 2nd submarginal about half length of 3rd, receiving 1st recurrent near middle; tegulae yellowish-hyaline; abdominal terga smooth but dull, with scattered, exceedingly faint and obscure punctures, apical margins broadly yellowish-hyaline, segments 2-4 with rather broad, whitish, apical fasciae, these slightly interrupted on 2 and 3, apical fimbria yellowish-brown.

TYPES—Holotype: Female, Colebrook, Conn., May 31, 1922 (W. M. Wheeler) [M.

C. Z.]. Paratypes: CONNECTICUT: 2♀♀, topotypical [M. C. Z.]. OHIO: 1♀, Franklin Co., June 2, 1942 [Ohio State Univ.] NEW YORK: 1♀, Pine Island, June 12, 1917 (S. W. Frost) [M. C. Z.].

Andrena (Micrandrena) ziziae
Robertson

(Figs. 31 & 32)

Andrena ziziae Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 55. ♀♂.
Opandrena ziziae Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193. ♀♂. (key)
Opandrena ziziae Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena ziziae Cockerell, 1932. Canad. Ent. 64, pp. 157 & 158. ♀♂. (key)
Andrena (Micrandrena) ziziae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification)

FEMALE—Length 7 mm.; clypeus very slightly convex, projecting about one-third below suborbital line, rather dull, very finely tessellate, finely and quite sparsely punctate; facial foveae narrow, occupying above about half of space between eyes and ocelli (as in *fragariana*, fig. 29), covered with whitish tomentum; space between margin of vertex and lateral ocelli equalling about half their diameter; cheeks slightly narrower than eyes, rounded posteriorly, surface finely roughened, punctures invident; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined, flagellum brownish-ferruginous; process of labrum small, nearly as long as broad, subtruncate apically; pubescence of head, thorax and legs greyish-white, thoracic integument dull, tessellate, punctures of scutum and scutellum exceedingly minute and obscure, rather sparse, hardly visible, even at high magnification; pleura without visible punctures; dorsal area of propodeum rather broad, nearly horizontal, triangle finely roughened, not distinctly demarcated from adjacent areas; propodeal corbicula rather short, without an anterior fringe, greyish-white; trochanteral flocus rather short, whitish; hind tibiae broadened apically, apex about twice width of basitarsus, scopa rather dense, hairs of moderate length, simple, white; front and mid basitarsi rather slender, somewhat narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but rather dull, very finely tessellate, impunctate, apical margins narrowly and very slightly impressed, becoming narrowly hyaline along rims, discal pubescence very short,

sparse and inconspicuous, entirely whitish, forming rather loose, whitish, apical fasciae toward sides of terga 2-4, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 6 mm.; length and breadth of face about equal; clypeus very slightly convex, projecting about one-third below suborbital line, yellow except for two small black spots and the dark apical rim, smooth and shining, with fine and rather close but obscure punctures; space between margin of vertex and lateral ocelli considerably less than their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, punctures very minute and obscure but rather close; malar space inevident; basal segment of flagellum subequal to 2nd and 3rd combined, flagellum beyond this point brownish-ferruginous; process of labrum much broader than long, very short, broadly truncate; mandibles rather short, with a small but distinct, subapical, inner tooth, slightly curved, overlapping not more than one-fourth; pubescence of head, thorax and legs entirely whitish; thoracic integument dull, tessellate, punctures of scutum very minute and obscure, well separated, almost sparse, surface somewhat shining, those on scutellum hardly evident, surface somewhat shining; pleura without evident punctures; dorsal area of propodeum rather broad, nearly horizontal, triangle very finely roughened, not much contrasting with adjacent areas; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but rather dull, microscopically tessellate, without evident punctures, apical margins narrowly and very slightly impressed, discal pubescence very short, thin and obscure, entirely white, fasciae very poorly developed, if at all; apical portion of sternum 8 extremely slender, almost spine-like, but becoming very slightly expanded to the obscurely rounded tip, bearing rather long, thin whitish hairs for most of its length; penis valves slender and strongly flexed apically, broadly dilated basally, and sides rather conspicuously excavated beneath, gonocoxites quite short and stout, expanded medially, becoming somewhat constricted apically, gonocoxal lobes triangularly produced, very narrowly rounded apically.

DISTRIBUTION—Minnesota to the New England states, south to North Carolina and Georgia; April to June.

FLOWER RECORDS—*Aruncus dioicus* and Umbelliferae. This is recorded by Robertson (1929) on *Chaerophyllum*, *Polytaenia*, *Sanicula*, *Taenidia*, *Thaspium* and *Zizia*.

Some variation is evident in this species, in that some individuals have a more closely punctate clypeus or the facial foveae are broader than in the typical form, and the apical impressed areas of the abdominal terga are more broadly hyaline.

Andrena (Micrandrena) ziziaeformis Cockerell

(Figs. 29-32)

Andrena ziziaeformis Cockerell, 1908. Canad. Ent. 40, p. 234. ♀.

Andrena ziziaeformis Cockerell, 1932. Canad. Ent. 64, p. 157. ♀. (key).

Andrena (?Micrandrena) ziziaeformis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 209. (classification).

FEMALE—Length 7 mm.; clypeus broadly convex, projecting about one-third below suborbital line, shining, deeply but rather finely punctured, punctures well separated, becoming rather close at extreme sides; facial foveae rather narrow, occupying above very little more than half of area between eyes and ocelli, covered with silvery tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather smooth but without visible punctures, rather densely pubescent; malar space lacking, basal segment of flagellum nearly equalling segments 2-4 combined, these very short, much broader than long, segments of flagellum pale ferruginous beneath; process of labrum very broad and rather short, median length no more than one-third the basal width, quite broadly truncate apically; pubescence of head, thorax and legs whitish, rather short but quite dense; thoracic integument dull, finely tessellate, punctures of scutum very minute, obscure, well separated but not sparse, those on scutellum exceedingly minute and obscure, the surface shining; pleura without visible punctures; dorsal area of propodeum extensive, nearly horizontal, triangle rather coarsely granular; propodeal corbicula rather well developed, whitish, but anterior fringe very poorly developed; trochanteral floccus well developed, white; hind tibiae broadened apically, apex nearly twice breadth of basitarsi, scopa dense, of rather short, simple hairs, entirely whitish; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent toward apex; tegulae clear yellowish-hyaline; abdominal terga rather dull, microscopically tessellate, without distinct punctures, only very slightly de-

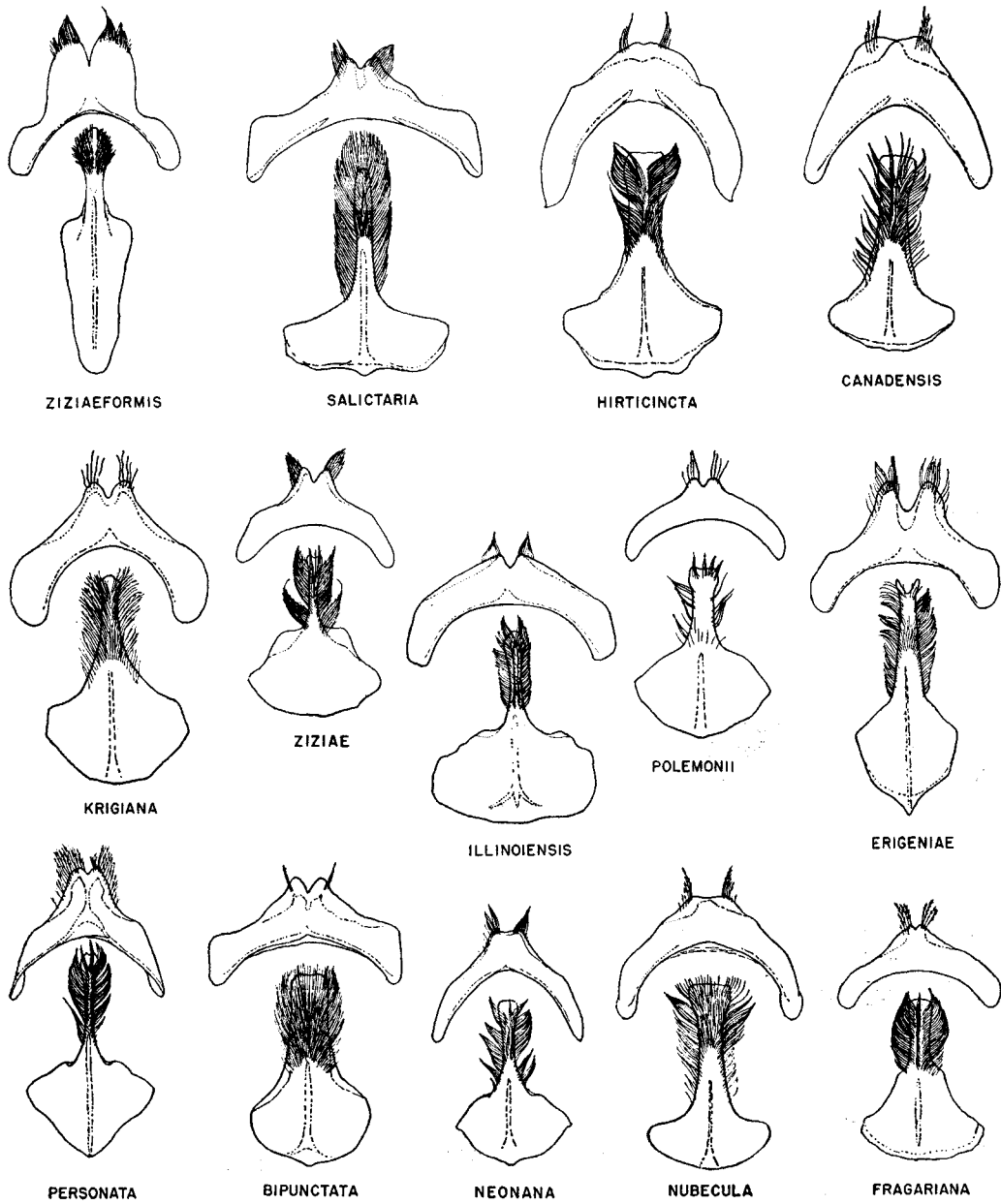


Figure 31—Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Micrandrena*), *A.* (*Cnemidandrena*) and *A.* (*Ptilandrena*).

pressed apically, depressed area occupying about one-third length of discs medially, discal pubescence very short, thin, suberect and entirely pale, terga 2-4 with very narrow, whitish, apical fasciae, tergum 5 with a pale yellowish-brown fimbria.

MALE—Length 6 mm.; head considerably broader than thorax, face slightly broader than long, clypeus yellow, very broad and flat, projecting very slightly below suborbital line, its length only about half the total breadth, smooth and shining, with exceedingly minute and sparse punctures; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks considerably broader than eyes, more or less angulate posteriorly, the angle opposite middle of eye, surface quite smooth, microscopically punctate; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined, remainder of flagellum pale ferruginous, slightly darker above; process of labrum extremely short and broad, linear in form; mandibles elongate and slender, slightly flexed toward base, with a distinct, inner, subapical tooth and with a low, inferior, basal, triangular projection, overlapping more than one-third; pubescence of head, thorax and legs whitish, somewhat tinged with yellowish above; thoracic integument dull, rather densely tessellate, punctures of scutum very minute, rather sparse and obscure, those on scutellum hardly visible, surface shining; pleura without visible punctures; dorsal area of propodeum rather extensive, nearly horizontal, triangle microscopically roughened; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent toward apex; abdominal terga smooth, but not very shiny, punctures exceedingly minute and obscure, hardly visible, discs very slightly impressed apically, becoming yellowish-hyaline along rims, discal pubescence very short and obscure, suberect, entirely pale, terga 2-4 with very narrow, thin, whitish, apical fasciae; apical portion of sternum 8 slender just beyond base, but quite abruptly dilated apically, this portion more or less triangularly pointed, pubescence extremely short and obscure; penis valves extremely slender, hardly at all dilated toward base, gonocoxites slender, slightly but rather abruptly dilated at mid point, but becoming narrowed apically, gonocoxal lobes not at all produced.

DISTRIBUTION — Massachusetts to Tennessee and Georgia; April and May.

FLOWER RECORDS—*Potentilla*.

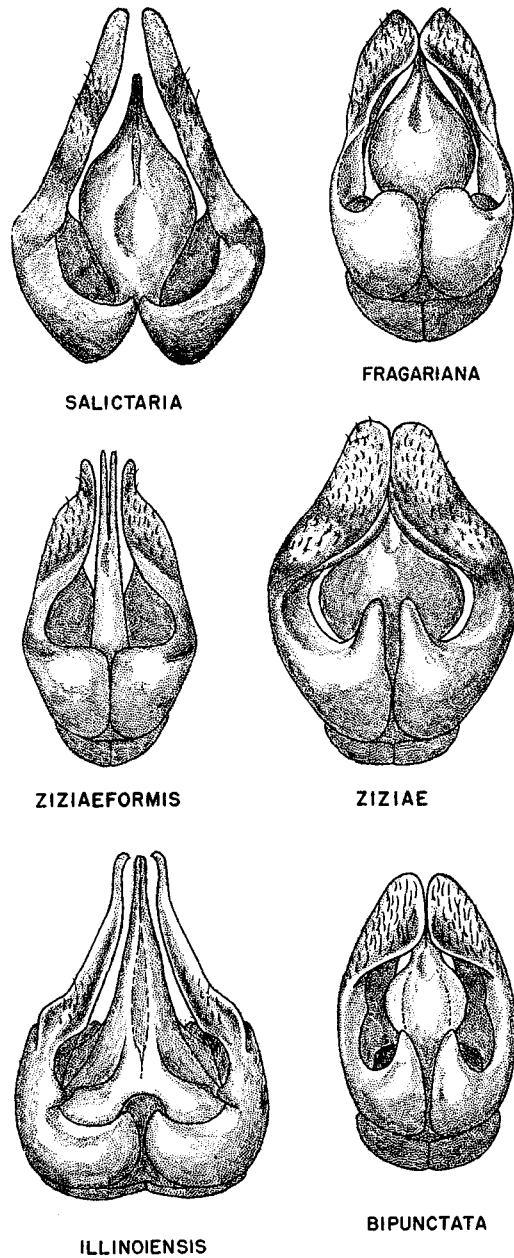


Figure 32
Apical flexed portion of male genital armature
in species of *Andrena* (*Micrandrena*).

***Andrena (Cnemidandrena) canadensis*
Dalla Torre**

(Figs. 30, 31 & 33)

- Andrena simulata* Provancher, 1888. Addit. Corr. Faune Ent. Canada Hym. p. 313. ♀ ♂. Preocc.
Andrena canadensis Dalla Torre, 1896. Cat. Hym. 10, p. 107.
Andrena (Pterandrena) persimilis Graenicher, 1904. Ent. News. 15, p. 66. ♀.
Andrena canadensis Viereck, 1907. Ent. News 18, pp. 282 & 286. ♀ ♂. (key)
Andrena canadensis Salt, 1927. Jour. Expt. Zool. 48, p. 245. (stylopization)
Andrena canadensis Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 209. ♀ ♂. (key)
Andrena canadensis Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena (Cnemidandrena) canadensis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 212. (classification)

FEMALE—Length 9 mm.; clypeus slightly convex, projecting but little below suborbital line, smooth, rather closely and finely punctured, punctures quite close toward sides, rather sparse medially; facial foveae narrow, occupying above but little more than half of space between eyes and lateral ocelli, covered with yellowish-white tomentum; space between margin of vertex and lateral ocelli about equal to their diameter; cheeks slightly broader than eyes, smooth and shining, very minutely and rather closely punctate; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum large, nearly as long as broad, subquadrate, apex slightly emarginate; mandibles of moderate length, with a small, subapical, inner tooth; pubescence of head, thorax and legs entirely pale ochraceous, erect and rather long and dense except on scutum and scutellum medially; scutum anteriorly, pleura and propodeum dull and tessellate, scutellum and remainder of scutum polished, scutum anteriorly with scattered, rather distinct, shallow punctures; enclosure of propodeum smooth; propodeal corbicula well developed, with a distinct anterior fringe; trochanteral floccus well developed; tibial scopa quite dense, hairs very minutely and obscurely plumose; fore and hind basitarsi somewhat narrower than their respective tibiae, mid basitarsi fully as broad as their tibiae; 2nd submarginal cell shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga dull, tessellate, impunctate, apical margins very narrowly and slightly depressed, becoming hyaline along rims, discal pubescence extremely short and obscure, entirely pale, terga 2-4 with dense, whitish, apical fasciae.

MALE—Length 8 mm.; clypeus much broader than long, quite flat, finely and densely punctate beneath long, dense pubescence; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks broad and flat, with a small, acute angle opposite middle of eye, margin above this angle subcarinate, surface somewhat shining, very minutely punctate; malar space extremely short; basal segment of flagellum considerably shorter than 2nd and 3rd combined; process of labrum very short, about twice as broad as long, the truncate apex very slightly emarginate; mandibles slender, slightly flexed, overlapping about one-third, with a fine but distinct, inner, subapical tooth; pubescence of head, thorax, legs and base of abdomen entirely pale ochraceous, rather long, erect and thin, exposing surface except on clypeus; scutum anteriorly, pleura and propodeum dull and tessellate, scutum posteriorly and scutellum polished, punctures shallow and rather sparse but distinct on pleura and scutum anteriorly, becoming finer and more sparse posteriorly and on scutellum; enclosure of propodeum dull and relatively smooth; all basitarsi slender and elongate, narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga rather dull, with exceedingly minute and obscure, scattered punctures, apical margins very narrowly and slightly depressed, with rather thin, whitish, apical fasciae, discal pubescence short, suberect and entirely pale; apical portion of sternum 8 slender and elongate, sides nearly parallel, with a very slight, median, ventral protuberance, apex beyond subapical dorsal ridge about as long as broad, somewhat rounded; penis valves slender basally, gonocoxites only slightly dilated apically, gonocoxal lobes somewhat rounded, very slightly produced.

DISTRIBUTION—Minnesota to Michigan, New York, New Jersey, the New England states and Nova Scotia; August and September.

FLOWER RECORDS—*Aster* and *Solidago*. Recorded by Brittain and Newton (1934) also on *Epilobium*.

***Andrena (Cnemidandrena) chromotricha* Cockerell**

- Andrena chromotricha* Cockerell, 1899. Entomologist 32, p. 128. ♀.
Andrena clypeonitens Cockerell, 1902. Canad. Ent. 34, p. 47. ♀.
Andrena truncata Viereck, 1903. Amer. Ent. Soc. Trans., 29, p. 53. ♀.

Andrena (Cnemidandrena) chromotricha Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 212. (classification).

The following brief description was made from the type specimen:

FEMALE—Length 9 mm.; black, tegulae testaceous, wings subhyaline, slightly darkened apically, veins and stigma testaceous; mid and hind legs somewhat reddened; clypeus protuberant, median portion somewhat flattened, with a median impunctate line, punctures sparse and fine on each side of line, but becoming close and very fine laterally; process of labrum very broad and short, with a more narrowly truncate apex; facial foveae very narrow; malar space short but evident; cheeks rounded, slightly broader than eyes; vertex narrow behind ocelli; face below ocelli finely striate; cheeks shining, very minutely punctate; mid antennal segments slightly longer than broad, basal segment of flagellum twice as long as second; thorax and abdomen dull and tessellate, entirely impunctate; pubescence of head and thorax ochraceous, copious on thorax, abdominal terga 2-4 with entire, apical, ochraceous fasciae, segment 1 with long and loose, ochraceous pubescence.

DISTRIBUTION—New Mexico to Wisconsin.

***Andrena (Cnemidandrena) hirticineta*
Provancher**

(Figs. 30, 31, 33 & 34)

- Andrena fimbriata* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 116. ♀ ♂. Preocc.
Andrena hirticineta Provancher, 1888. Addit. Corr. Faune Ent. Canada Hym. p. 308. ♀ ♂.
Anthrena americana Dalla Torre, 1896. Cat. Hym. 10, p. 102. (new name)
Andrena fimbriata Morice & Cockerell, 1901. Canada Ent. 33, p. 149. (type)
Andrena fimbriata Cockerell, 1906. Psyche 13, p. 9. (type)
Andrena hirticineta Salt, 1927. Jour. Expt. Zool. 48, p. 233. (stylopization)
Andrena hirticineta Atwood, 1934. Canad. Jour. Res. 10 (2), pp. 207 & 209. ♀ ♂. (key)
Andrena hirticineta Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena (Cnemidandrena) hirticineta Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 212. (classification)

FEMALE—Length 11 mm.; clypeus rather flat, projecting but little below suborbital line, closely and finely punctate beneath quite

dense pubescence; facial foveae narrow, occupying above hardly more than half the space between eyes and lateral ocelli, covered with ochraceous tomentum; lateral ocelli separated from margin of vertex by a space somewhat greater than their diameter; cheeks subequal in width to eyes, smooth and very minutely punctate; malar space evident, but very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, apex rather broadly emarginate; mandibles of ordinary length, with an inner, subapical tooth; pubescence of head, thorax and abdominal terga 1-4 bright ochraceous, long, dense and erect, that on legs including scopa largely black, and black on segments 5 and 6 and on venter of abdomen; thoracic integument dull, densely tessellate, without evident punctures; enclosure of propodeum smooth and densely tessellate; propodeal corbicularia well developed, with a distinct anterior fringe, ochraceous; trochanteral floccus well developed; tibial scopa short, dense and black, of simple hairs; fore and hind basitarsi slightly narrower than their respective tibiae, the mid basitarsi fully as broad as their tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga tessellate and dull, punctures exceedingly minute, well separated, apical margin scarcely depressed, concolorous with remainder of discs, pubescence somewhat more dense apically to form obscure fasciae.

MALE—Length 8-9 mm.; clypeus broad and flat, projecting but slightly below suborbital line, dull, very finely and closely punctate beneath dense pubescence; space between lateral ocelli and margin of vertex slightly exceeding their diameter; cheeks broad and flat, posterior margin subcarinate, not conspicuously angulate, with minute, well separated punctures; malar space short, barely evident; basal segment of flagellum slightly exceeding 2nd segment in length; process of labrum much broader than long, its truncate margin slightly emarginate; mandibles of moderate length, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and abdomen long, dense and erect, pale ochraceous throughout, that on legs largely pale, but becoming brownish on tibiae and tarsi; thoracic integument dull, densely tessellate, impunctate except for some very obscure, minute punctures on scutum anteriorly and pleura above; enclosure of propodeum smooth and tessellate; all basitarsi slender and elongate, narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, tessellate, with rather close and exceedingly minute, obscure punctures, apical margins slightly depressed, becoming hyaline toward rims, where pubes-

cence is somewhat more dense, to form rather conspicuous apical fasciae; apical portion of sternum 8 slender, elongate, sides nearly parallel, apex truncate; penis valves not expanded basally, gonocoxites moderately expanded apically, gonocoxal lobes moderately produced, subtriangular.

DISTRIBUTION—Minnesota to the New England states and Nova Scotia, south to North Carolina and Georgia; August to October.

FLOWER RECORDS—*Aster* and *Solidago*. Recorded by Brittain and Newton (1934) also on *Epilobium*.

***Andrena (Cnemidandrena) nubecula*
Smith**

(Figs. 31, 33 & 34)

Andrena nubecula Smith, 1853. Cat. Hym.

Brit. Mus. 1, p. 117. ♀.

Andrena nubecula Morice and Cockerell, 1901.

Canad. Ent. 33, p. 150. (type)

Andrena nubecula Robertson, 1902. Amer. Ent.

Soc. Trans. 28, pp. 191 & 192. ♀ ♂. (key)

Andrena nubecula Cockerell, 1906. Psyche 13,

p. 9. (type)

Andrena nubecula tristicornis Cockerell, 1931.

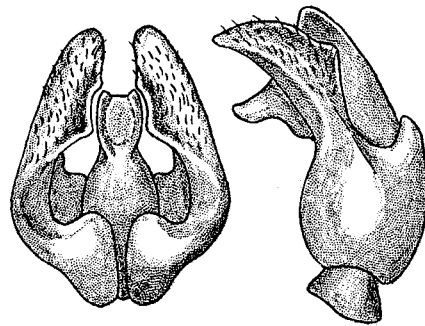
Canad. Ent. 63, p. 22. ♀.

Andrena (Cnemidandrena) nubecula Lanham,

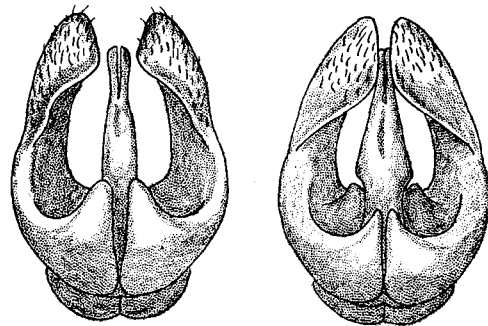
1949. Univ. Calif. Pubs. Ent. 8, p. 212.

(classification)

FEMALE—Length 8-9 mm.; face somewhat longer than broad; clypeus rather flat, projecting considerably below suborbital line, rather dull, with numerous, well separated, rather shallow punctures; facial foveae narrow, occupying above but little more than half of space between eyes and lateral ocelli, covered with silvery tomentum; space between margin of vertex and lateral ocelli about equal to their diameter; cheeks very slightly broader than eyes, rather dull, with exceedingly minute, rather sparse punctures; malar space extremely short; basal segment of flagellum somewhat shorter than 2nd and 3rd combined; process of labrum subquadrate, nearly as long as broad, slightly emarginate apically; mandibles of moderate length, with a small, inner, subapical tooth; pubescence of head and thorax entirely pale, erect, rather short and thin, not nearly obscuring the surface; thoracic integument dull, tessellate, impunctate except for a few scattered, obscure punctures on pleura; enclosure of propodeum smooth, tessellate; propodeal corbicula well developed, with a distinct anterior fringe; trochanteral floccus well developed, whitish; tibial scopa pale, quite dense, hairs very obscurely and minutely plumose; fore and hind basitarsi slightly narrower than their respective tibiae, the mid basitarsi broad, fully

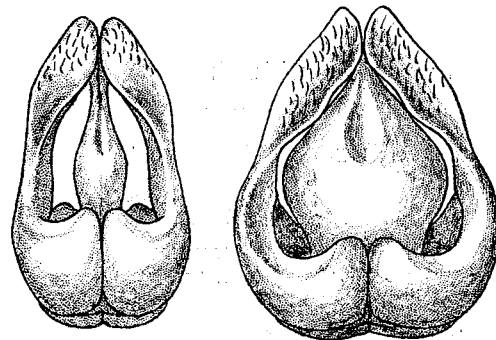


PERSONATA



NUBECULA

HIRTICINCTA



CANADENSIS

NEONANA

Figure 33

Apical flexed portion of male genital armature in species of *Andrena (Micrandrena)* and *A. (Cnemidandrena)*.

equalling their tibiae in width; pubescence of legs pale in general, slightly infuscated on basitarsi; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent beyond middle, wings infuscated in region of marginal cell and apex; abdominal terga smooth, dull and tessellate, impunctate, discal pubescence exceedingly short and obscure, but discs of terga 2-4 with dense, conspicuous, whitish, apical fasciae, tergum 5 rather densely, brownish pubescent.

MALE—Length 6 mm.; clypeus flat, much broader than long, only very slightly protruding below suborbital line; space between margin of vertex and lateral ocelli about equal to their diameter; cheeks broad, subangulate, angle opposite middle of eye, margin above this obscurely subcarinate (as in *canadensis*, fig. 30), smooth, with scattered, minute punctures; malar space invident; basal segment of flagellum subequal to the following segments; process of labrum small, much broader than long, apex very narrowly and slightly emarginate; mandibles slender, of moderate length, with an obscure, inner, subapical tooth, overlapping about one-third; pubescence of head and thorax entirely pale, moderately long and erect, thin, not at all obscuring the surface, that on legs entirely pale, thoracic integument dull except for the shining posterior half of scutum and of scutellum, these minutely and rather sparsely punctate; enclosure of propodeum smooth and dull; basitarsi slender and elongate, narrower than their tibiae, yellowish; 2nd submarginal cell very short, receiving 1st recurrent near center; abdominal terga smooth but rather dull, punctures not clearly evident, discal pubescence very obscure, but terga 2 and 3 subfasciate apically; apical portion of sternum 8 very slender and elongate, slightly broader apically, apex rounded; penis valves slender, gonocoxites elongate, slightly dilated apically, gonocoxal lobes subtriangular, very slightly produced.

DISTRIBUTION—Minnesota to the New England states and eastern Canada, south to North Carolina and Georgia; August to October. In Canada it ranges west to British Columbia.

FLOWER RECORDS—*Aster*, *Euthamia* and *Solidago*.

Andrena (?*Cnemidandrena*)
robervalensis new species

FEMALE—Length 10 mm.; clypeus slightly convex, rather short, projecting about one-third below suborbital line, surface rather dull, with rather fine, scattered, irregular punctures on each side of an obscure, median, impunctate line; facial foveae narrow, occupying above little more than half of space between eyes and lateral ocelli, covered with fuscous tomentum; space between margin of vertex and lateral ocelli about equal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather smooth, punctures exceedingly minute and obscure; malar space very short; basal segment of flagellum fully equal to 2nd and 3rd combined, these rather short; process of labrum rather broadly subtriangular, apex truncate, obscurely incised medially; mandibles of moderate length, with

a distinct, inner, subapical tooth; pubescence of head rather short, entirely pale on clypeus and on cheeks below, more fuscous on inner margins of eyes and on upper part of face, cheeks and vertex; pubescence of scutum and scutellum rather short, erect, fuscous, that on pleura, propodeum and legs in general pale, thoracic integument dull and tessellate, scutum and scutellum very sparsely and minutely punctate, scutellum somewhat more shining, pleura lacking distinct punctures; enclosure of propodeum smooth, almost shining, with a very narrow fringe of obscure, minute striae; propodeal corbicula whitish, well developed but rather short, with a rather thin anterior fringe; trochanteral floccus rather thin, white; tibial scopa rather dense, hairs rather elongate and simple, pale except for some darker basal hairs; fore and hind basitarsi distinctly narrower than their respective tibiae, the mid basitarsi nearly equalling their tibiae in width; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but dull, microscopically tessellate, impunctate, apical margins very slightly and narrowly depressed, terga 2-4 with conspicuous, whitish, apical fasciae, discal pubescence short, erect, blackish.

TYPES—Holotype: Female, Roberval, Quebec, Aug. 1910, [Univ. R. I.]. Paratypes: QUEBEC: 2♀♀, topotypical. MICHIGAN: 1♀, Isabella Co., Sept. 9, 1950 (R. R. Dreisbach). MINNESOTA: 1♀, Itasca Park, Aug. 26, 1913; 1♀, Crookston, July 24, 1951 (Roland L. Fischer, on *Melilotus alba*).

Paratypes are in the University of Michigan, the University of Minnesota, the collection of R. R. Dreisbach and in the author's collection.

Although this species does not completely agree with the description of *Cnemidandrena* as given by Lanham (1949, p. 211), it more nearly resembles the species in this group than any other of the eastern fauna, and is thus placed here tentatively.

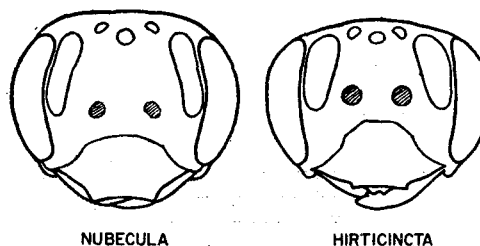


Figure 34
Facial view of female head, showing form of foveae in species of *Andrena* (*Cnemidandrena*).

XIPHTEROPSIS IV

Andrena (Trachandrena)
allegghaniensis Viereck

Andrena (Trachandrena) allegghaniensis Viereck, 1907. Ent. News 18, pp. 280 & 286. ♀.
Andrena (Trachandrena) allegghaniensis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 9 mm.; length of face somewhat greater than its breadth; clypeus slightly convex, projecting about one-third below suborbital line, smooth and shining, finely and rather closely and deeply punctate, without a median impunctate line; facial foveae rather broad, occupying above about two-thirds of space between eyes and ocelli, only slightly narrowed below, covered with silvery tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, punctures fine, shallow, close and obscure; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum subtriangular, with a rather narrowly truncate and emarginate apex; pubescence of head very short, rather thin, entirely white, that on thorax whitish laterally and posteriorly, that on dorsum very short, depressed, scale-like, tinged with brownish, that on legs pale ochraceous, somewhat tinged with fuscous on mid tibiae apically; scutum and scutellum rather dull, punctures fine, shallow, close on scutum anteriorly, becoming slightly more widely separated toward center posteriorly, those on scutellum more coarse, shallow, more distinctly separated on each side of middle, surface dull, quite flat; pleura dull, roughened or rugose above, becoming more rugoso-punctate below; dorsal area of propodeum oblique, triangle tessellate, with several widely spaced striae on each side of a complete and distinct median stria; propodeal corbicula very poorly developed, short, whitish, without an anterior fringe; trochanteral floccus rather short and poorly developed, whitish; hind tibiae rather narrow, apex not much broader than basitarsi, scopa pale ochraceous to whitish, hairs simple, rather short; front and mid basitarsi slightly narrower than their respective tibiae; wings faintly infuscated, somewhat more deeply so apically, 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga smooth and shining, finely and rather closely and evenly but distinctly punctate, apical impressed areas shallow, rather narrow, of uniform width across the disc, only very narrowly and obscurely reddened along rims, discal pubescence very short, thin, obscure, erect, entirely pale, apical fasciae very poorly

developed, if at all, tergum 5 with a brownish apical fimbria.

DISTRIBUTION—Minnesota to New Hampshire, south to North Carolina; May and June.

FLOWER RECORDS—*Viburnum*.

Andrena (Trachandrena)
arenakensis new species

(Fig. 35)

FEMALE—Length 10 mm.; face slightly longer than distance between eyes above; eyes subparallel; foveae much narrowed below, but constriction not very abrupt, this area slightly removed from margin of eye; vertex narrow, lateral ocelli separated from its hind margin by about their own diameter; cheeks slightly broader than eyes; clypeus protruding about one-third below suborbital line, somewhat shining between deep, distinct, close and rather coarse, uniformly distributed punctures; face below ocelli somewhat shining, with fine and close but quite deep and distinct punctures, these becoming somewhat more coarse and rather close but more obscure and indefinite on vertex, those on cheeks very fine and uniformly close; malar space hardly evident; process of labrum very broad, subtriangular, with truncate apex, median length not much more than one-third basal width; basal segment of flagellum considerably shorter than 2nd and 3rd combined, median segments with length and breadth about equal; pubescence of head and thorax entirely pale, slightly yellowish, rather dense around antennae, at sides of face and on cheeks, but rather thin on thorax; scutum and scutellum shining between deep and distinct punctures, these rather close on scutum anteriorly, becoming quite sparse posteriorly, and sparse on scutellum; pleura dull, rather coarsely rugoso-punctate; dorsal area of propodeum reticulate rather than striate, poorly defined, lateral areas reticulate; propodeal corbicula rather well developed but short, with a few inner hairs but no anterior fringe; trochanteral floccus rather short and thin; hind tibiae in part and all of tarsi ferruginous, other leg segments dark, pubescence entirely pale yellow, basitarsi quite slender, tibial scopa of rather elongate hairs, hind tibia slightly broadened apically, spurs pale testaceous; wings pale fuliginous, veins more testaceous, stigma somewhat brownish-testaceous; tegulae dark anteriorly, becoming yellowish-hyaline posteriorly and along outer rims; abdominal terga shining, finely and rather evenly punctate, segments 2-4 impressed for slightly less than half their median length, impressed area

punctate about as basal areas, apical fasciae evident only toward extreme sides on segments 3 and 4, apical fimbria more yellowish.

TYPE—Holotype: Female, Arenak Co., Michigan, May 30, 1951 (R. R. Dreisbach). [Dreisbach].

This specimen is stylized but does not appear to have been much modified so far as the secondary sex characters are concerned.

SCARTIENSIS IV

Andrena (Trachandrena) atlantica
new species

(Figs. 35-37)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus evenly convex, projecting somewhat more than one-third below suborbital line, closely, deeply and rather coarsely punctate, slightly more sparse along mid line, but without a distinct, median, impunctate line; facial foveae narrow, occupying above not more than half of space between eyes and ocelli, covered with silvery tomentum, lower half slightly narrower than upper half; space between margin of vertex and lateral ocelli considerably wider than their diameter; cheeks broader than eyes, rounded posteriorly, rather dull, quite closely and deeply punctate; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum strongly constricted apically, this produced part very narrow, nearly as long as broad, the tip slightly emarginate; pubescence of head and thorax very short and thin, sparse on dorsal areas, entirely whitish, and whitish in large part on legs; scutum and scutellum somewhat shining, rather deeply and coarsely punctate, punctures very close anteriorly, becoming more widely separated but not sparse posteriorly, rather close over most of scutellum, which is flattened; pleura densely rugose above, becoming rather shallowly rugoso-punctate below; dorsal area of propodeum rather narrow, oblique, triangle quite broad, with three or four widely separated striae on each side of middle; propodeal corbicula poorly developed, short, composed of fine, whitish hairs, without an anterior fringe; trochanteral floccus white, not well developed, hairs rather sparse, of moderate length; hind tibiae quite narrow and elongate, apex not much broader than basitarsi, scopa white, rather thin, hairs rather short, with some very short, fuscous hairs at extreme base; front and mid basitarsi slightly narrower than their respective tibiae; wings rather uniformly and deeply infuscated, 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent one-third from apex; abdominal terga smooth and shining, very

finely and evenly punctate, punctures well separated but not sparse, becoming rather close at extreme sides of terga, apical impressed areas rather shallow but quite broad, occupying fully one-third median length of discs, not at all hyaline, discal pubescence very sparse, short and obscure, apparently entirely whitish, apical fasciae not developed, tergum 5 with a fuscous, apical fimbria.

MALE—Length 7-8 mm.; clypeus evenly convex, projecting about one-third below suborbital line, somewhat shining between close, deep and rather fine punctures, which are quite uniformly distributed; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks slightly broader than eyes, rounded posteriorly, dull, subrugose except for a very narrow, minutely punctate area along eye margin; malar space extremely short; basal segment of flagellum slightly longer than broad at apex, slightly shorter than the 2nd and following segments; process of labrum constricted apically, this part very narrow, slightly emarginate at tip; mandibles quite short, with a distinct inner subapical tooth, overlapping nearly one-third; pubescence of head, thorax and legs whitish, rather short and thin; scutum and scutellum rather dull, rather deeply punctate, punctures close and rather coarse anteriorly, becoming finer and slightly more widely separated toward the center posteriorly, those on scutellum shallow and rather close, becoming rugose along posterior margin; pleura rather uniformly and coarsely rugose; dorsal area of propodeum oblique, triangle very coarsely rugoso-striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; wings lightly infuscated, 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent about one-fourth from apex; abdominal terga smooth and shining, minutely punctate, punctures well separated but not sparse, apical impressed areas rather shallow and narrow, coppery in color, becoming yellowish-hyaline along rims, discal pubescence extremely sparse, short and thin, hardly evident except at extreme sides and toward apex of abdomen, entirely pale, fasciae not developed; apical margin of sternum 6 rather uniformly reflexed; sternum 8 abruptly constricted at mid point to form the apical portion which is quite narrow, with nearly parallel sides, the apex rather broadly and abruptly truncate, clothed beneath with short, dense, pale ochraceous pubescence; penis valves narrowly constricted just before apex, this slightly wider apically and gradually broadened toward base, not excavated laterally, gonocoxites gradually and slightly dilated apically, gonocoxal lobes rather narrowly produced, narrowly rounded apically.

TYPES—Holotype: Female, Morehead, N. C., May 3, 1947 (T. B. Mitchell, on *Ilex*). Allotype: Male, topotypical [both Mitchell]. Paratypes: NORTH CAROLINA: 2♀♀, 3♂♂, topotypical; 1♀, 1♂, Raleigh, Apr. 30, 1938 (on *Rubus*); 8♂♂, Raleigh, May 3-9, 1950-1952 (on *Ilex*); 10♂♂, Raleigh, Apr. 15, 1945 (on *Toxicodendron*); 1♂, Raleigh, Apr. 15, 1945 (on *Polycodium*); 1♂, Raleigh, Apr. 24, 1954 (on *Pyracantha*); 1♂, Raleigh, Apr. 28, 1956 (on *Ilex*); 1♂, Sampson Co., Apr. 13, 1954 (on *Salix*); 1♂, 3♀♀, Wayne Co., Apr. 23, 1954 and Apr. 26, 1955 (on *Crataegus*); 1♂, 4♀♀, Faison, Apr. 19 and 20, 1955 (on *Fragaria*); 3♀♀, Holly Shelter, Apr. 27, May 30 and June 8, 1950 (on *Ilex* and *Linaria*); 1♀, Beaufort, June 9, 1931; 2♂♂, Ivanhoe, Apr. 18, 1951 (on *Linaria*); 6♂♂, Ivanhoe, Apr. 5 and 12, 1945 (on *Ilex*); 2♂♂, Raleigh, May 3, 1942 and May 4, 1952 (all Mitchell); 8♂♂, 6♀♀, Raleigh, May 3, 1931, Apr. 27 and May 11, 1935, June 1, 1946, May 10, 1937, May 6, 1939, May 4, 1940, May 4, 1941 and May 6, 11 and 7, 1942; 1♂, Pollocksville, May 14, 1952 (W. A. Stephen, on *Ligustrum*); 1♀, Clayton, Jan. 10, 1956 (R. L. Rabb in sandy soil); 1♂, Faison, May 2, 1953 (H. & A. Howden); 1♀, New River, Apr. and May, 1942 (G. E. Bohart); 1♂, Charlotte, Apr. 25, 1902 (F. Sherman). GEORGIA: 1♂, Atlanta, Apr. 19, 1948; 1♂, Smithville, May 17, 1937 (both P. W. Fattig). FLORIDA: 5♂♂, Tallahassee, Apr. 1, 1944; 1♂, Orlando, Mar. 1944 (both R. & G. Bohart); 1♂, 1♀, Gainesville, Apr. 13, 1924 and May 11, 1928 (G. B. Merrill); 3♀♀, Highlands Hammock State Park, Apr. 3, 1955, (Morse and Weems, on *Ilex cassine*); 4♀♀, 3♂♂, Highlands Hammock, Mar. 31, 1956 (H. V. Weems, Jr., on *Ilex cassine* and *Nyssa sylvatica biflora*); 1♀, Alachua Co., Apr. 17, 1956 (R. A. Morse, on *Melilotus alba*); 6♀♀, 38♂♂, Lake Co., Apr. 6 and 8, 1956 (R. A. Morse, on *Erigeron quercifolius*); 1♂, Highland Hammock, Sebring, Mar. 19, 1955 (R. R. Dreisbach); 2♀♀, Pensacola, Apr. 17, 1928 (P. W. Fattig). NEW JERSEY: 1♀, Clementon, June 2, 1901. NEW YORK: 2♂♂, Ithaca, May 28, 1941 (H. E. Evans) and May 8, 1915. SOUTH CAROLINA: 1♂, Dewees Isl., May 29 (J. Bequaert). TEXAS: 1♀, New Boston, May 14, 1906; 2♂♂, Dallas, Apr. 23, 1906, on *Spiraea* (?) (F. C. Bishopp). MICHIGAN: 1♂, Harrison, May 21, 1955

on *Crataegus punctata*); 1♂, Gull Lake Biol. Sta., Kalamazoo Co., June 9, 1956 (on *Spiraea vanhouteii*) (both R. L. Fischer); 2♂♂, Stevensville, Berrien Co., May 29, 1938 (C. W. Sabrosky).

Paratype specimens are at the State Plant Board of Florida, the University of Michigan, the Museum of Comparative Zoology, the U. S. National Museum, the Academy of Natural Sciences of Philadelphia, in collections of R. R. Dreisbach and R. M. Bohart, and in the author's collection.

DISTRIBUTION—Examination of the list of paratypes will show that this species ranges from Michigan and New York to Texas and Florida, and is in flight during April, May and June, with early records in February and March in Florida. One specimen collected in January in North Carolina was probably dug from the nesting site.

FLOWER RECORDS—*Crataegus*, *Erigeron*, *Fragaria*, *Ilex*, *Ligustrum*, *Linaria*, *Melilotus*, *Nyssa*, *Polycodium*, *Pyracantha*, *Rubus*, *Salix*, *Spiraea* and *Toxicodendron*.

Specimens of *atlantica* have been found in a number of collections bearing a manuscript name by Viereck which implied a similarity or relationship to *aliena* Smith. As there is little resemblance and certainly no close relationship of these two, a different name seems advisable.

Andrena (Trachandrena) ceanothi

Viereck

(Figs. 35 & 36)

Andrena (Trachandrena) ceanothi Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 404. ♀. (♂ misdetermined)

Andrena ceanothi Cockerell, 1931. Amer. Mus. Novitates 458, p. 17. ♀. (key)

Andrena ceanothi Atwood, 1934. Canad. Jour. Res. 10, p. 212. ♀ ♂. (key)

Andrena ceanothi Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (key)

Andrena (Trachandrena) ceanothi Lanham, 1949, Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 10 mm.; face very slightly longer than broad; clypeus broadly convex, projecting about one-third below suborbital line, smooth and shining, with a rather indefinite median impunctate line, irregularly but rather deeply punctate on each side, punctures well separated toward center, becoming close at extreme sides; facial foveae rather broad above, occupying about two-thirds of space between eyes and ocelli, lower half abruptly and strongly constricted to a width about one-fourth that of the upper part, covered with whitish tomentum; space between margin of vertex and lateral ocelli somewhat wider than their diameter; cheeks slightly broader than eyes, rounded posteriorly, somewhat shining, deeply, distinctly, closely and rather finely punctate, punctures becoming sparse on vertex laterally just above eyes and foveae; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum quite broad, rather short, slightly narrowed to the broadly truncate apical margin; pubescence of head very short and sparse, entirely whitish, that on thorax whitish laterally and beneath, more greyish above, thin and sparse, that on legs whitish on the more basal segments, becoming somewhat brownish on tarsi; scutum and scutellum somewhat shining between coarse and deep punctures, which are quite close on scutum anteriorly, becoming rather sparse in center posteriorly, those on scutellum very close and coarse; pleura coarsely rugose, becoming more finely so posteriorly; dorsal area of propodeum quite narrow, oblique, triangle broad, coarsely and evenly striate; propodeal corbicula quite short, poorly developed, whitish, without an anterior fringe; trochanteral flocus short and poorly developed, whitish; hind tibiae somewhat broadened apically, apex not quite twice width of basitarsi, scopa rather dense, hairs rather short, fine, entirely whitish; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga somewhat shining between close, deep and rather coarse punctures, apical impressed areas broad and shallow, occupying medially fully half length of discs, anterior margin indicated by a slightly bowed, transverse, nearly impunctate line, becoming narrowly yellowish-hyaline along rims, discal pubescence extremely short, thin and suberect, apparently entirely pale, apical, white fasciae quite dense laterally on terga 2-4, more or less widely interrupted medially, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 8 mm.; face somewhat longer than broad; clypeus somewhat protub-

erant, strongly convex, projecting about one-third below suborbital line; smooth and shining between deep and rather close and coarse punctures; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, obscurely and very finely striate, with some barely evident, fine punctures along margins of eyes; malar space short; basal segment of flagellum short, only slightly longer than apical width, considerably shorter than 2nd and following segments; process of labrum quite broad, rather short, slightly narrowed to the broadly truncate apical margin; mandibles of moderate length, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely whitish-ochraceous; scutum and scutellum somewhat shining between deep, distinct and rather coarse punctures, close over anterior half of scutum, becoming slightly more sparse in center posteriorly, those on scutellum slightly more coarse and very close; pleura rather shallowly rugose; dorsal area of propodeum oblique, triangle rather coarsely striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga somewhat shining between deep, distinct and rather coarse and close punctures, apical impressed areas rather shallow, occupying medially about one-third length of discs, becoming narrowly yellowish-hyaline along rims, discal pubescence short, thin and erect, entirely pale, terga 2-4 with white apical fasciae evident laterally, widely interrupted medially; apical portion of sternum 8 very narrow and slender, very slightly broader toward apex, which is truncate, clothed beneath with rather dense, long pubescence; penis valves rather slender apically, somewhat dilated basally, excavated laterally, gonocoxites abruptly and very broadly dilated apically, upper surface being rather strongly concave, gonocoxal lobes strongly produced, narrow, tips just reaching apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Minnesota to the New England states and Nova Scotia, south to Georgia; April to July.

FLOWER RECORDS — *Amelanchier*, *Ilex*, *Pyrus*, *Rhus*, *Salix*, *Sassafras*, *Symphlocos*, *Vaccinium* and *Viburnum*. Recorded by Brittain and Newton (1934) on *Dier-villa*, *Prunus* and *Pyrus malus*.

Andrena (Trachandrena) compacta
new species

MALE—Length 9 mm.; face somewhat longer than distance between eyes above; eyes slightly convergent below; vertex quite broad, lateral ocelli separated from its hind margin by considerably more than their diameter; cheeks subequal to eyes in width; clypeus convex, projecting somewhat less than one-half below suborbital line, smooth and shining between rather close, deep, distinct, and uniformly distributed punctures; punctures over remainder of head shallow and obscure but rather coarse and close, surface quite densely tessellate; malar space very short; process of labrum broad and short, broadly truncate; basal segment of flagellum much shorter than segment 2, very slightly longer than broad; mandibles rather short, with a distinct, inner, subapical tooth only slightly removed from tip; pubescence of entire head, thorax and legs quite long and erect, but rather thin, entirely creamy; dorsum of thorax somewhat shining between quite coarse, deep and distinct punctures, these close on anterior half of scutum, becoming slightly separated in center posteriorly, those on scutellum more irregular, slightly separated along anterior margin; pleura coarsely rugoso-punctate; triangle of propodeum coarsely striate, lateral and posterior surfaces of propodeum coarsely rugose or reticulate, the propodeal corbicula rather well developed; legs blackish, becoming somewhat reddened on apical tarsal segments; spurs pale yellow; wings subhyaline, veins and stigma brownish-ferruginous, 2nd submarginal cell quite short, receiving 1st recurrent toward apex; tegulae yellowish-hyaline posteriorly, becoming piceous anteriorly; abdominal terga closely, deeply, distinctly and rather coarsely punctate, apical impressed areas occupying slightly less than half the median length of each plate, becoming narrowly yellowish-hyaline along rims, the punctures gradually becoming slightly finer toward these rims, discal pubescence very short, erect, thin, entirely whitish, apical fasciae evident toward sides of segments 2-4; sternum 7 only slightly emarginate medially (as in *pseudobscura*, figure 36); sternum 8 also quite similar to *pseudobscura*, but apical process more slender and elongate; genital armature as in *hippotes* (figure 37).

TYPES—Holotype: Male, Roscommon Co., Mich., May 26, 1957. Paratype: 1♂, topotypical, May 31, 1957 (both R. & K. Dreisbach) [Dreisbach].

Compacta evidently is closely related to *pseudobscura*, and the 7th and 8th sterna and the genital armature are nearly iden-

tical. The chief differences are the somewhat shorter apical impressed area of the abdominal terga, with the punctures considerably coarser in *compacta*, in comparison with *pseudobscura*. In the latter, the impressed area occupies fully half the median length of each tergal plate. There is also a difference in color of pubescence, that in *pseudobscura* varying from markedly fulvous to ochraceous on the dorsum of the thorax, while in *compacta* it is pale ochraceous to whitish or creamy.

^{Scraptochrysis}
Andrena (Trachandrena) daeckei
Viereck

Andrena (Trachandrena) daeckei Viereck, 1907. Ent. News 18, pp. 280, 285 & 286. ♀ ♂.
Andrena (Trachandrena) daeckei Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification).

FEMALE—Length 8 mm.; face somewhat longer than broad; clypeus very slightly convex, projecting nearly one-half below suborbital line, very closely, deeply and rather finely punctate, punctures almost crowded; facial foveae broad, occupying above most of area between eyes and ocelli, only slightly narrowed below, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, very closely and finely punctate; malar space distinct, but quite short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum short and rather broad, somewhat narrowed to the truncate and slightly emarginate tip; pubescence of head, thorax and legs short, whitish-ochraceous, becoming somewhat more yellowish on mid tibiae apically; punctures of scutum fine but rather widely separated anteriorly, becoming quite sparse near center posteriorly, surface somewhat shining, those on scutellum somewhat more coarse and irregular, well separated, the surface shining; pleura rather coarsely rugose above, becoming somewhat more finely so below and posteriorly; dorsal area of propodeum oblique, triangle rather broad, quite coarsely and regularly striate; propodeal corbicula very poorly developed, short, whitish, without an anterior fringe; trochanteral floccus white, short and poorly developed; hind tibiae not much broadened apically, apex only very slightly broader than basitarsi, scopa dense, hairs rather short, simple, whitish, becoming somewhat fuscous toward base posteriorly; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near apex;

abdominal terga smooth, somewhat shining, quite deeply and rather closely and finely punctate, apical impressed area quite shallow, occupying medially about one-third length of disc, narrowly yellowish-hyaline along rims, discal pubescence very short, thin and erect, entirely pale, forming very thin, whitish, apical fasciae on terga 2-4, this somewhat interrupted on tergum 2 medially, tergum 5 with a brownish-ochraceous, apical fimbria.

DISTRIBUTION—Maine to New Jersey; May.

No detailed description of *daekei* has ever been published, as it was established originally merely by including it in a key. Thus the description above, made from a paratype female, is the first. Both sexes were included originally, but there is considerable doubt concerning the identity of the male. Specimens identified as such that have been seen are very similar to *kalmiae* Atwood or to *A. (Mimandrena) imitatrix* Cresson. Consequently that sex has been omitted here.

SCRYPTEROPSIS IV
Andrena (Trachandrena) fenningeri
 Viereck

Andrena (Scrypteropsis) fenningeri Viereck, 1922. Boston Soc. Nat. Hist. Occas, Papers 5, p. 42. ♀ ♂.

Andrena (Trachandrena) indianensis Cockerell, 1929. Ent. Soc. Amer. Ann. 22, p. 775. ♀. New synonymy.

Andrena (Trachandrena) fenningeri Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 9 mm.; breadth of face nearly equal to its length; clypeus broadly convex, projecting somewhat less than one-half below suborbital line, somewhat shining, with a rather distinct, narrow, median, impunctate line, punctures on each side deep and distinct, rather sparse and fine near center, becoming almost crowded at extreme sides; facial foveae rather broad, occupying above most of space between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, somewhat shining, punctures exceedingly minute and quite close; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, rather narrowly truncate apically; pubescence of head, thorax and legs whitish, somewhat ochraceous on tarsi beneath; scutum and scutellum somewhat shining, punctures deep and distinct, rather fine, close anteriorly on scutum, becom-

ing more widely separated but hardly sparse near center posteriorly, quite close over most of scutellum, which is quite flat; pleura dull, subrugose anteriorly, becoming quite smooth posteriorly; dorsal area of propodeum oblique, triangle coarsely rugoso-striate; propodeal corbicula poorly developed, short, thin, white, without an anterior fringe; trochanteral flocus complete, rather dense; hind tibiae rather slender, apex only slightly wider than basitarsi, scopa rather dense, hairs simple, of moderate length, entirely whitish; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining between the close, deep and distinct, but rather fine punctures, which are uniformly distributed, apical impressed area more sparsely and finely punctate, rather shallow, occupying about one-third length of disc medially, becoming somewhat reddened toward rim, discal pubescence extremely short, thin, apparently entirely pale, fasciae not developed, tergum 5 with a brownish yellow, apical fimbria.

MALE—Length 8 mm.; face slightly longer than distance between eyes; clypeus very slightly convex, projecting about one-third below suborbital line, punctures rather fine but deep, closely crowded throughout, pubescence quite dense, obscuring the surface; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly narrower than eyes, rounded posteriorly, dull, surface finely roughened; malar space very short; basal segment of flagellum very slightly longer than broad at apex, slightly shorter than 2nd and following segments; process of labrum short and quite broad, slightly narrowed to the broadly truncate apex; mandibles rather short, with a distinct, subapical, inner tooth; pubescence of head, thorax and legs whitish; scutum and scutellum dull, densely but finely tessellate, punctures shallow and rather obscure, rather close anteriorly, becoming quite sparse posteriorly, rather sparse and irregular on scutellum; pleura rather finely but uniformly rugose; dorsal area of propodeum oblique, triangle quite coarsely rugoso-striate; basitarsi slender and elongate, considerably narrower than their respective tibiae, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga somewhat shining, punctures fine, evenly distributed, well separated but not sparse, apical impressed areas occupying about one-third median length of disc, shallow, becoming impunctate and somewhat reddened toward rims, discal pubescence extremely short and thin, erect, entirely pale, fasciae not developed;

apical margin of sternum 6 not noticeably reflexed; sternum 7 broadly rounded, with a very slight, median indentation; apical projection of sternum 8 slender, slightly constricted just below the rounded apex, with rather long, dense pubescence, base abruptly broadened; penis valves slender apically, only slightly dilated toward base, excavated laterally, gonocoxites broadly and abruptly dilated apically, forming hatchet-shaped apical lobes, gonocoxal lobes much produced, triangular, acute apically, nearly reaching apical lobes of gonocoxites (similar to *hippotes*, fig. 37).

DISTRIBUTION—Michigan to New York, south to Georgia; March to June.

FLOWER RECORDS—*Acer*, *Amelanchier*, *Aronia*, *Malus*, *Prunus*, *Salix* and *Taraxacum*.

VI
Andrena (Trachandrena) forbesii
Robertson

(Figs. 35 & 36)

Andrena forbesii Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 59. ♀.

Trachandrena forbesii Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 189 & 190. ♀ ♂. (key)

Trachandrena forbesii Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena forbesii Atwood, 1934. Canad. Jour. Res. 10, pp. 208 & 209. ♀ ♂. (key)

Andrena forbesii Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 704 & 707. ♀ ♂. (key)

Andrena (Trachandrena) forbesii Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 10 mm.; clypeus rather strongly convex projecting about one-third below suborbital line, smooth and shining between irregular, close, deep and rather coarse punctures, without a distinct median impunctate line; facial foveae rather broad above, occupying about two-thirds of area between eyes and ocelli, quite strongly constricted below, the constricted portion about half the width of the broad upper portion, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rather dull, closely, deeply and rather finely punctate, punctures quite close even on lateral areas of vertex; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum about twice as broad basally as long, subtriangular, with rather broadly truncate apex, pubescence of head, thorax and legs pale ochraceous, somewhat brighter ochrace-

ous on dorsum of thorax and becoming somewhat fuscous on the more apical leg joints; punctures of scutum quite coarse, close and deep anteriorly, becoming quite sparse near center posteriorly where the surface is shining, those on scutellum close, somewhat irregular, surface shining; pleura dull, rather coarsely rugose above, becoming more tessellate posteriorly; dorsal area of propodeum oblique, triangle quite evenly and rather coarsely striate; propodeal corbicula rather poorly developed, without a distinct anterior fringe, pale ochraceous; trochanteral floccus short and poorly developed, ochraceous, hind tibiae rather slender, apex only slightly broader than basitarsi, scopa rather dense, composed of rather short, simple hairs, pale ochraceous, becoming fuscous at extreme base; front and mid basitarsi only very slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth, shining, closely, deeply and rather finely punctate, apical impressed areas rather shallow, occupying medially somewhat over one-third length of disc, becoming narrowly reddish-hyaline along rims, discal pubescence very short, thin, erect, entirely pale, forming rather dense, pale ochraceous, apical fasciae on terga 2-4, that on tergum 2 widely interrupted medially, tergum 5 with a brownish, apical fimbria.

MALE—Length 8 mm.; face very slightly longer than broad; clypeus rather strongly convex, projecting nearly one-half below suborbital line, closely, deeply and rather coarsely punctate, punctures almost crowded, but narrow interspaces shining; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, dull, densely tessellate, punctures exceedingly obscure; malar space very short; basal segment of flagellum very short, about as long as its apical width, distinctly shorter than 2nd and following segments; process of labrum short and quite broad, subtriangular, apex rather broadly truncate; mandibles rather short, with a distinct, inner, subapical tooth, overlapping very slightly; pubescence of head, thorax and legs entirely whitish-ochraceous; scutum rather dull, closely and rather coarsely punctate anteriorly, punctures becoming quite sparse near middle posteriorly, those on scutellum of about equal size, somewhat sparse on each side, surface more shining; pleura dull, densely tessellate, obscurely and shallowly rugose; dorsal area of propodeum oblique, triangle finely and irregularly striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal

terga somewhat shining between close, deep, fine punctures, apical impressed areas quite shallow, occupying medially about one-third length of discs, becoming narrowly yellowish-hyaline along rims, discal pubescence short, thin, erect, entirely pale, terga 2-4 with whitish apical fasciae evident at least toward sides, rather widely interrupted medially; apical portion of sternum 8 very slender and elongate, apex slightly expanded, subtruncate, clothed beneath with rather long, pale pubescence; penis valves slender apically, slightly expanded basally, sides quite strongly excavated, gonocoxites broadly expanded apically, forming triangular lobes, which are markedly concave on dorsal surface, gonocoxal lobes strongly produced, slender, acute, slightly curved, attaining the apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Colorado and Nebraska to the New England states and Nova Scotia, south to Georgia; March to July.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Brassica*, *Cornus*, *Crataegus*, *Ilex*, *Malus*, *Prunus*, *Pyracantha*, *Rubus*, *Salix* and *Viburnum*. Recorded by Robertson (1929) on *Antennaria*, *Capsella*, *Claytonia*, *Erygenia*, *Fragaria*, *Heracleum*, *Isopyrum*, *Polytaenia*, *Ptelea*, *Rhus*, *Sassafras*, *Stellaria*, *Zanthoxylum* and *Zizia*.

Andrena (Trachandrena) heraclei
Robertson

(Fig. 35)

Andrena heraclei Robertson, 1897. Acad. Sci. St. Louis, Trans. 7, p. 336. ♀

Trachandrena heraclei Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 189. ♀. (key)

Trachandrena heraclei Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena (Trachandrena) heraclei Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 10 mm.; face very slightly longer than broad, area between antennae and ocelli unusually smooth and shining, very minutely and sparsely punctate; clypeus rather broadly convex, projecting about one-third below suborbital line, smooth and shining between deep, distinct, rather coarse punctures, quite close on each side of a very narrow, slightly elevated, median, impunctate line; facial foveae broad above, occupying most of area between eyes and ocelli, abruptly and very strongly constricted below, the constricted part narrower than the space separating it from eye margin, covered with whitish tomen-

tum; space between margin of vertex and lateral ocelli somewhat greater than their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather smooth, somewhat shining, punctures exceedingly minute and indistinct; malar space very short; basal segment of flagellum considerably shorter than 2nd and 3rd combined; process of labrum quite short, rather broad, slightly narrowed apically to the broadly truncate margin; pubescence of head, of thorax laterally and below, and of basal leg segments whitish, that on dorsum of thorax and on the more apical leg segments pale ochraceous; punctures of scutum deep, distinct, quite coarse, well separated anteriorly becoming very sparse in center posteriorly where surface is somewhat shining, those on scutellum very close, deep and coarse, surface shining, quite flat; pleura coarsely rugose; dorsal area of propodeum oblique, triangle broad, very coarsely and regularly striate; propodeal corbicula short and poorly developed, whitish-ochraceous, with a rather thin, anterior fringe; trochanteral floccus short and poorly developed, whitish; hind tibiae rather broad, apex nearly twice width of basitarsi, scopa dense, hairs rather short, simple, entirely whitish; fore and mid basitarsi nearly equalling their tibiae in width; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga somewhat shining between very fine and close but deep and distinct punctures, apical impressed areas broad, occupying medially about two-thirds length of discs, becoming obscurely reddened apically, rims yellowish-hyaline, discal pubescence hardly evident, extremely short, sparse, thin, suberect, apparently entirely pale, apical fasciae poorly developed, evident toward extreme sides, whitish, tergum 5 with a golden-brownish, apical fimbria.

DISTRIBUTION—Kansas to Illinois, Virginia and North Carolina; April.

FLOWER RECORDS—*Crataegus*. Recorded by Robertson (1929) on *Cornus*, *Heracleum*, *Ptelea*, *Salix* and *Taenidia*.

Andrena (Trachandrena) hippotes
Robertson

(Figs. 35 & 37)

Andrena hippotes Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 122. ♀ ♂.

Trachandrena hippotes Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 189 & 190. ♀ ♂. (key)

Andrena (Trachandrena) perforatella Cockerell, 1906. Ann. Mag. Nat. Hist. (7) 17, p. 306. ♀.

- Trachandrena hippotes* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).
Andrena miranda Atwood, 1934. Canad. Jour. Res. 10, pp. 208 & 210. ♀ ♂. (key).
Andrena miranda Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records).
Andrena (Trachandrena) miranda Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification).

FEMALE—Length 8 mm.; facial foveae broad above, occupying most of space between eyes and ocelli, constricted below to about half that width, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, very closely and finely punctate, punctures becoming somewhat more sparse on vertex laterally above eyes; malar space very short; clypeus broadly convex, projecting somewhat less than one-half below suborbital line, closely, deeply and rather finely punctate, punctures almost crowded, somewhat shining between punctures; process of labrum short and quite broad, apex obscurely and broadly truncate; pubescence of head, thorax and basal portions of legs whitish, becoming ochraceous on the more apical parts of legs; punctures of scutum coarse, deep, well separated anteriorly, becoming rather sparse posteriorly, those on scutellum about equally coarse, well separated but not sparse, surface somewhat shining; pleura finely rugose; dorsal area of propodeum oblique, triangle rather coarsely and regularly striate; propodeal corbicula short, poorly developed, whitish, without an anterior fringe; trochanteral floccus short and poorly developed, whitish; hind tibiae rather slender, slightly broadened apically, but apex not twice the width of basitarsi, bright ferruginous, scopa rather dense, entirely pale ochraceous; front basitarsi narrower than their tibiae, mid basitarsi bright ferruginous, nearly equalling their tibiae in width, hind basitarsi also bright ferruginous; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near apex; abdominal terga somewhat shining, finely but deeply and distinctly punctate, punctures rather close in general, becoming almost crowded laterally, apical impressed areas shallow but quite broad, occupying medially about half length of discs, more finely and sparsely punctate than the basal portions of discs, discal pubescence extremely sparse and obscure, evident laterally, where the hairs are short, erect, whitish, terga 2-4 with white, apical fasciae evident laterally, tergum 5 with a golden-brownish, apical fimbria.

MALE—Length 7 mm.; face slightly longer than broad; clypeus convex, projecting nearly one-half below suborbital line, dull, densely and rather coarsely punctate beneath dense and rather short pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, dull, closely and finely punctate; malar space very short; basal segment of flagellum not much longer than breadth at apex, distinctly shorter than 2nd and following segments; process of labrum short, rather broad, apex somewhat narrowed, slightly emarginate; mandibles rather short, with a distinct, inner, subapical tooth, overlapping about one-fourth, pubescence of head, thorax and legs entirely brownish-ochraceous; punctures of scutum deep, distinct, rather close and coarse anteriorly, nearly as close posteriorly, those on scutellum slightly more coarse but quite close, surface somewhat shining; pleura rather coarsely rugose; dorsal area of propodeum oblique, triangle rather irregularly striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae, ferruginous, as also the hind tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga somewhat shining, punctures fine, rather deep and distinct, quite close, apical impressed areas much more obscurely punctate, rather dull, shallow, occupying medially about one-third length of discs, becoming obscurely reddish-hyaline along rims, discal pubescence extremely short, thin, erect, entirely pale, terga 2-4 with pale ochraceous apical fasciae, those on 2 and 3 more or less widely interrupted medially; apical portion of sternum 8 very narrow and elongate, with a quite marked subapical constriction, apex rather broadly truncate, clothed beneath with rather long, pale pubescence; penis valves slender apically, slightly broadened basally, deeply excavated laterally, gonocoxites quite abruptly and broadly dilated apically to form subtriangular lobes which are markedly concave on the dorsal surface, gonocoxal lobes strongly produced, slender, acute, attaining the apical lobes.

DISTRIBUTION—Transcanadian and the Northern United States, in the East, south to Georgia; April to June.

FLOWER RECORDS—*Aronia*, *Ceanothus*, *Ligustrum*, *Malus*, *Prunus*, *Pyracantha*, *Rubus*, *Salix*, *Spiraea* and *Viburnum*. Also recorded by Robertson (1929) on *Amelanchier*, *Cornus*, *Crataegus*, *Pastinaca*, *Ptelea*, *Sassafras* and *Zanthoxylum*. Brittain and Newton (1934) record this species on *Brassica* and *Kalmia*.

SCRAFTEROPSIS IV
Andrena (Trachandrena) ilicis
 new species

(Fig. 35)

FEMALE—Length 8 mm.; face very slightly longer than broad; clypeus convex, projecting about one-third below suborbital line, rather shining between the deep, distinct, moderately coarse punctures, which are well separated medially, becoming rather close at extreme sides, without a definite impunctate line; facial foveae occupying most of space between eyes and ocelli above and only slightly narrowed below, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, somewhat shining, punctures along margin of eye minute but rather distinct and close, becoming rather coarse posteriorly, those on vertex laterally fine, well separated but not sparse, surface somewhat shining; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined, process of labrum subtriangular, apex rather narrowly truncate; pubescence of head, thorax and legs whitish, becoming somewhat yellowish on dorsum of thorax laterally and on the more apical portions of legs; punctures of scutum deep and distinct, well separated but not sparse over median area, closer between notaulices and tegulae, surface smooth but rather dull, those on scutellum slightly coarser, well separated; pleura rather coarsely rugose anteriorly, becoming smoother and more distinctly punctate posteriorly; dorsal area of propodeum oblique, triangle very coarsely rugosco-striate; propodeal corbicula rather short, poorly developed, without a distinct anterior fringe, whitish-ochraceous; trochanteral floccus thin and poorly developed; somewhat elongate, whitish; hind tibiae quite slender, apex only slightly broader than basitarsi, bright ferruginous, scopa rather dense, hairs of moderate length, simple, entirely whitish-ochraceous; fore and mid basitarsi quite slender, slightly narrower than their respective tibiae, mid and hind basitarsi ferruginous; 2nd submarginal cell very short, receiving 1st recurrent about one-third from apex; abdominal terga smooth and shining, punctures deep and distinct, but quite fine and close, apical impressed areas narrow, occupying medially hardly one-third length of discs, very narrowly yellowish-hyaline along rims, discal pubescence very sparse, short, obscure, apparently entirely pale, terga 2-4 with narrow, white, apical fasciae, widely interrupted medially on 2 and 3, tergum 5 with a brownish-fuscous fimbria.

TYPES—Holotype: Female, Ivanhoe, N. C., April 12, 1945 (Mitchell, on *Ilex*)

[author's coll.]. Paratypes: NORTH CAROLINA: 1♀, Ivanhoe, May 3, 1945; 2♀♀, Willard, N. C., April 6, 1951 (on *Crataegus*); 1♀, Holly Shelter, Mar. 19, 1953 (on *Prunus*); 1♀, Wayne Co., May 7, 1954 (on *Batodendron*) (all Mitchell); 1♀, Waynesville, June 25, 1952 (W. A. Stephen); 2♀♀, Raleigh, May 1, 1940 and May 24, 1941. MARYLAND: 1♀, Beltsville, June 28, 1917 (L. O. Jackson, on *Castanea pumila*). GEORGIA: 1♀, Thomaston, May 1, 1937; 1♀, Atlanta, May 8, 1948 (both P. W. Fattig). VIRGINIA: 3♀♀, Arlington, May 27, 1951; 1♀, Dunn Loring, June 2, 1951 (K. V. Krombein). FLORIDA: 1♀, Levy Co., Apr. 3, 1954 (H. V. Weems, Jr.); 1♀, Gulf Hammock, Apr. 23, 1952 (J. R. Vockeroth). OHIO: 1♀, Scioto Co., June 17, 1944 (D. L. & J. N. Knull).

These paratype specimens are located in the U. S. National Museum, the State Plant Board of Florida, the Canadian National Museum, Ohio State University, and the author's collection.

SCRAFTEROPSIS IV
Andrena (Trachandrena) kalmiae
 Atwood

(Fig. 37)

Andrena kalmiae Atwood, 1934. Canad. Jour. Res. 10, p. 210. ♀♂.

Andrena kalmiae Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

Andrena (Trachandrena) kalmiae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 11 mm.; face very slightly longer than broad; clypeus only slightly convex, projecting about one-third below suborbital line, very closely, deeply and rather finely punctate, interspaces somewhat shining, but punctures almost crowded; facial foveae broad above, occupying most of area between eyes and ocelli, slightly and gradually narrowed below, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, shining, minutely and quite closely punctate, punctures becoming somewhat more coarse but still close on vertex laterally; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, considerably broader basally than long, apex rather narrowly truncate; pubescence of head, thorax and legs whitish-ochraceous, somewhat more yellowish on dorsum of thorax and on apical portion of

legs; punctures of scutum fine, but deep and distinct, rather close anteriorly, becoming somewhat more coarse and sparse posteriorly near middle, where surface is somewhat shining, those on scutellum coarser and deeper, well separated but hardly sparse, surface shining; pleura rather coarsely rugose above, becoming more rugoso-punctate posteriorly; dorsal area of propodeum oblique, triangle rather coarsely rugoso-striate; propodeal corbicula very short and poorly developed, whitish, without an anterior fringe; trochanteral floccus short but rather dense, whitish; hind tibiae slightly broadened apically, apex not much broader than basitarsi, scopa dense, hairs rather short, simple, pale ochraceous, becoming fuscous toward base; fore and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga somewhat shining, deeply but finely punctate, punctures well separated medially, becoming close laterally, but very close on apical impressed areas, which are rather shallow, narrow, occupying somewhat less than one-third length of discs medially, becoming very narrowly hyaline along rims, discal pubescence very short, thin, erect, entirely pale, terga 2-4 with very narrow, whitish, apical fasciae, tergum 5 with a brownish-ochraceous, apical fimbria.

MALE—Length 7 mm.; face very slightly longer than broad; clypeus rather strongly convex, projecting about one-third below sub-orbital line, somewhat shining, punctures deep, distinct, rather fine and close, becoming crowded at extreme sides; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks slightly broader than eyes, rounded posteriorly, dull, punctures exceedingly minute and obscure; malar space extremely short; basal segment of flagellum subequal to 2nd segment, both of these short, not much longer than broad, shorter than 3rd and following segments; process of labrum short and rather broad, somewhat narrowed to the truncate apical margin; mandibles rather short, with a distinct inner subapical tooth, overlapping about one-third; pubescence of entire head, thorax and legs whitish; dorsum of thorax somewhat shining, punctures of scutum fine but rather deep and distinct, well separated anteriorly, becoming quite sparse near middle posteriorly, those on scutellum somewhat more coarse and irregular, well separated in general; pleura rather coarsely rugose; dorsal area of propodeum oblique, triangle rather coarsely rugoso-striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent about one-fourth from apex; abdominal terga smooth and shining,

punctures very fine, well separated but not sparse, evenly distributed, apical impressed areas rather shallow and narrow, obscurely reddened, becoming yellowish-hyaline along rims, discal pubescence very short, thin, erect, entirely pale, fasciae not developed; apical portion of sternum 8 short, robust, apex subtruncate, with a very slight, median emargination, clothed beneath with short, pale pubescence; penis valves rather slender apically, somewhat broadened toward base, sides quite deeply excavated, gonocoxites gradually and rather broadly dilated apically to form hatchet-shaped lobes which are slightly concave on dorsal surface, gonocoxal lobes quite strongly produced, rather robust, but acute apically, nearly but not quite attaining apical lobes.

DISTRIBUTION—Nova Scotia, south to North Carolina; April to July.

FLOWER RECORDS—*Kalmia* and *Vaccinium*. Also recorded on *Ledum* by Brittain and Newton (1934).

✓1

***Andrena (Trachandrena) mariae*
mariae Robertson**

(Fig. 35)

- Andrena mariae* Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 58. ♀ ♂.
Trachandrena mariae Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 189 & 190. ♀ ♂. (key)
Andrena mariae Viereck, 1907. Ent. News 18, pp. 284 & 286. ♀ ♂. (key)
Trachandrena mariae Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena mariae Atwood, 1934. Canad. Jour. Res. 10, pp. 208 & 210. ♀ ♂. (key)
Andrena (Trachandrena) mariae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 9 mm.; face very slightly longer than broad; clypeus only slightly convex, projecting about one-third below sub-orbital line, shining between close, deep, distinct and rather coarse punctures, without a median, impunctate line; facial foveae broad above, occupying most of space between eyes and ocelli, constricted below to about half this width, and this portion about half the length of the broad upper part, covered with dense whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, very finely and closely punctate, becoming somewhat more sparsely so on vertex laterally; malar space very short; basal segment of flagellum sub-

equal to 2nd and 3rd combined; process of labrum broad and rather short, narrowed to the rather broadly truncate apical margin; pubescence of head, thorax and legs whitish, becoming somewhat yellowish on the more apical portions of legs; dorsum of thorax somewhat shining, punctures of scutum very deep, quite coarse, rather close anteriorly, becoming somewhat more sparse near center posteriorly, those on scutellum about equally coarse and deep, close in general, the surface flat; pleura rather finely rugose, becoming more tessellate posteriorly; dorsal area of propodeum oblique, triangle rather coarsely rugoso-striate and irregularly striate; propodeal corbicula rather short and poorly developed, whitish, with a very thin anterior fringe; trochanteral flocus short but rather dense, whitish; hind tibiae somewhat broadened apically, apex not quite twice the width of basitarsi, pale ferruginous, scopa whitish, hairs rather short, dense, simple, becoming somewhat fuscous toward base; front and mid basitarsi slightly narrower than their respective tibiae, the mid and hind tarsi ferruginous; wings somewhat yellowish, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdomen bright ferruginous, in marked contrast with head and thorax, rather shining, deeply but rather finely punctate, punctures well separated but not sparse medially, becoming quite close laterally, apical impressed areas shallow, but rather broad, occupying medially two-thirds length of disc, discal pubescence very sparse and obscure, suberect, short, entirely whitish, fasciae not developed, tergum 5 rather dark, with a golden-brownish, apical fimbria.

MALE—Length 8 mm.; clypeus convex, projecting about one-third below suborbital line, with fine, closely crowded punctures beneath rather short, dense pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, dull, punctures very fine and close, but obscure; malar space quite short but distinct; basal segment of flagellum short, only slightly longer than apical width, slightly shorter than 2nd and following segments; process of labrum short, quite broad, slightly narrowed to the broadly truncate apex; mandibles rather short, with a distinct inner subapical tooth, overlapping about one-fourth; pubescence of entire head, thorax and legs whitish-ochraceous; scutum rather dull, punctures deep, distinct, rather coarse, quite close anteriorly, becoming rather sparse near center posteriorly, those on scutellum about equally coarse, well separated but hardly sparse, surface somewhat shining; pleura rather finely and obscurely rugose;

dorsal area of propodeum oblique, triangle rather coarsely rugoso-striate medially, but becoming only finely and obscurely striate laterally; all basitarsi slender and elongate, narrower than their respective tibiae, ferruginous, as also the hind tibiae; wings somewhat yellowish, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdomen bright ferruginous, terga rather finely but deeply, distinctly and rather closely punctate, apical impressed areas rather shallow and obscure, occupying medially somewhat more than one-third length of discs, discal pubescence very short and thin, erect, entirely pale, fasciae not developed; apical portion of sternum 8 slender and elongate, with a slight, subapical constriction beyond which the apex is rather broadly rounded, clothed beneath with rather long, dense pubescence; penis valves slender apically, somewhat broadened basally, the sides quite deeply excavated, gonocoxites quite abruptly dilated apically to form broad, subtriangular lobes, with dorsal surface, rather deeply concave, gonocoxal lobes strongly and narrowly produced, apex subacute, attaining the apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Kansas, Colorado and Minnesota, east to Nova Scotia, south to Georgia; April and May.

FLOWER RECORDS—*Salix*. Recorded by Robertson (1929) on *Amelanchier*, *Comandra*, *Erigenia*, *Erigeron*, *Erythronium* and *Rhus*. Brittain and Newton (1934) record this species on *Brassica*, *Cornus*, *Narcissus*, *Prunus*, *Pyrus malus* and *Rubus*.

✓1

***Andrena (Trachandrena) mariae*
concolor Robertson**

(Fig. 38)

Andrena mariae var. *concolor* Robertson, 1898. Acad. Sci. St. Louis, Trans. 8, p. 46. ♀ ♂.
Andrena mariae concolor Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records).

This form differs from typical *mariae* in having the abdomen black, concolorous with the rest of the body in both sexes. No other significant differences are evident, and in the males many specimens intergrade between the two extremes, with respect to the color of the abdomen.

DISTRIBUTION—Minnesota to the New England states, south to North Carolina; March to May.

FLOWER RECORDS—*Salix*.

~~YPOANDRENA~~ IV
Andrena (Trachandrena) mendica
 new species

(Figs. 35-37 & 40)

FEMALE—Length 10 mm.; head broad, length of face being only slightly longer than distance between eyes; eyes parallel; foveae broad, occupying most of space between eyes and ocelli above, and only slightly narrowed below, reaching level of upper margin of clypeus, covered with whitish tomentum; lateral ocelli separated from margin of vertex by a space only very slightly greater than their diameter; cheeks slightly broader than eyes; clypeus very short and broad, projecting but very slightly below suborbital line, smooth and shining, punctures deep and distinct, rather close and evenly distributed, becoming somewhat more fine and close at extreme sides; face below ocelli rather dull, finely striate, vertex polished, with minute obscure and rather indefinite punctures, these becoming very fine and well separated but not sparse on cheeks; malar space hardly evident; process of labrum very small, broadly triangular, tip very slightly protuberant; basal segment of flagellum only slightly longer than segment 2, median segments considerably longer than broad; pubescence short and thin, entirely pale on head and thorax, more whitish below, becoming slightly yellowish on dorsum of thorax; scutum and scutellum shining, punctures fine, well separated, becoming quite sparse over posterior half of scutum and rather sparse and irregular on scutellum; pleura dull, rather shallowly and obscurely punctate, becoming rather smooth posteriorly; dorsal area of propodeum irregularly striate, poorly defined, lateral areas more rugose, propodeal corbicula short but rather dense, with numerous fine hairs on inner surface but without an anterior fringe; trochanteral flocus elongate and well developed; legs blackish, basitarsi slender, pubescence entirely pale yellowish, hind tibiae very narrow and slender, with scopal hairs much elongated; spurs pale yellowish; wings lightly infuscated, veins pale testaceous, stigma more brownish-ferruginous, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent slightly beyond middle; tegulae piceous, outer rim narrowly hyaline; abdominal terga polished, punctures exceedingly minute, rather widely separated and evenly distributed, segments 2-4 impressed for about one-third the median length, impressed areas somewhat more sparsely punctate, apical fasciae not evident, apical fimbria fuscous.

MALE—Length 10 mm.; head broad, face being only very slightly longer than distance between eyes; eyes parallel; lateral ocelli sep-

arated from margin of vertex by a space somewhat greater than their diameter; cheeks broad, with a rounded posterior angle about opposite middle of eye; clypeus very short and broad, protruding but very slightly below suborbital line, central area somewhat protuberant, shining between deep and distinct, rather uniformly distributed punctures; face below ocelli rather dull, very finely striate, vertex shining, with scattered, minute and sparse punctures, cheeks shining, with minute and sparse but rather evenly distributed punctures; malar space hardly evident; process of labrum very small, subquadrangular but with a rather broad, exceedingly short base; basal segment of flagellum slightly shorter than segment 2, median segments nearly twice as long as broad; mandibles slender and elongate, tip of one about reaching base of the other when closed, with a very small and inconspicuous, subapical, inner tooth about one-fourth from tip; pubescence of head and thorax entirely pale, largely whitish, very thin on head, somewhat more copious on thorax laterally and posteriorly; scutum and scutellum shining between very fine, rather evenly distributed punctures, these well separated on scutum anteriorly, becoming somewhat more sparse posteriorly, and quite sparse on scutellum; pleura rather coarsely rugose; dorsal area of propodeum coarsely and irregularly striate, poorly defined, lateral areas more reticulate, this extending down somewhat on the lateral faces; legs blackish, spurs testaceous; wings lightly infuscated, veins testaceous, stigma more brownish-ferruginous, 2nd submarginal cell not half the length of the 3rd, receiving 1st recurrent near middle; tegulae piceous, somewhat more brownish posteriorly, and outer margin narrowly hyaline; abdominal terga polished, with exceedingly minute, evenly distributed, well separated punctures, apical margins of segments 2-5 impressed for about one-fourth to one-third their median length, these areas becoming yellowish apically, apical fasciae not evident; sternum 7 with a deep triangular median emargination apically; sternum 8 abruptly narrowed between base and apical produced area, this very finely short pubescent, abruptly truncate at tip; penis valves slender and elongate, but very slightly dilated at base, gonocoxites rather broadly but gradually expanded apically, gonocoxal lobes produced and acute.

TYPES—Holotype: Female, Wake Co., N. C., June 12, 1957 (Mitchell, on *Ceanothus americanus*) [author's coll.]. Allotype: Grayson Co., Va., June 6, 1955 (H. V. Weems, Jr., on *Aruncus aruncus*) [Florida State Plant Board]. Paratypes: TENNES-

SEE: 1 ♀, Burrville, June 10, 1953 (Bernard Benesh). OHIO: 1 ♂, Hocking Co., June 14, (R. C. Osburn); 1 ♀, 1 ♂, Scioto Co., June 10, 1944 and June 1, 1945; 1 ♂, Shawnee For., June 9, 1943 (both D. J. & J. N. Knull).

Paratypes are located at Ohio State University, Cornell University, and in the author's collection.

Andrena (Trachandrena) miranda
Smith

(Figs. 35 & 38)

- Andrena miranda* Smith, 1879. Descr. New Species Hym. Brit. Mus., p. 54. ♀ ♂.
Andrena grandior Cockerell, 1897. Entomologist 30, p. 307. ♀.
Andrena miranda Morice & Cockerell, 1901. Canad. Ent. 33, p. 153. ♀ ♂. (types)
Andrena multiplicatiformis Cockerell, 1902. Canad. Ent. 34, p. 46. ♀.
Andrena (Trachandrena) miranda Cockerell, 1906. Psyche 13, p. 34. (type)
Andrena multiplicatiformis Viereck, 1907. Ent. News 18, p. 284. ♀.
Andrena grandior Atwood, 1934. Canad. Jour. Res. 10 (2), pp. 208 & 210. ♀ ♂. (key)
Andrena grandior Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena (Trachandrena) grandior Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)
Andrena miranda Krombein, 1958. Hymenoptera of America North of Mexico. Synoptic Catalog, U.S.D.A. Agr. Monog. No. 2. First Suppl., p. 215. (synonymy)

FEMALE—Length 9 mm.; face very slightly longer than broad; clypeus rather strongly convex, projecting about one-third below suborbital line, somewhat shining between deep, distinct and rather coarse punctures, these somewhat separated in center but becoming very close around margins; facial foveae broad above, occupying most of space between eyes and ocelli, covered with white tomentum, abruptly constricted below, this portion not much more than one-third width of the upper part; space between margin of vertex and lateral ocelli somewhat greater than their diameter; cheeks slightly broader than eyes, rounded posteriorly, somewhat shining between deep, distinct, rather fine and close punctures, these becoming somewhat more sparse above and on lateral areas of vertex; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum rather broadly semicircular; pubescence of head, thorax and

legs whitish, becoming somewhat yellowish on the more apical portions of legs; scutum shining, punctures quite coarse and deep, but close anteriorly, becoming somewhat more widely separated but hardly sparse near center posteriorly, those on scutellum somewhat more coarse and close, the narrow interspaces shining; pleura coarsely rugose; dorsal area of propodeum oblique, triangle rather broad, coarsely and regularly striate; propodeal corbicular short and poorly developed, without a distinct anterior fringe, whitish; trochanteral floccus very short and poorly developed, whitish; hind tibiae only slightly broadened apically, apex not twice as wide as basitarsi, scopa rather dense, hairs quite short, simple, entirely whitish-ochraceous; fore and mid basitarsi very slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga shining between close and fine, but deep and distinct punctures, apical impressed areas shallow but broad, occupying medially about two-thirds length of discs, becoming faintly reddened along rims, discal pubescence very sparse, short, suberect, apparently entirely pale, terga 2-4 with whitish, apical fasciae evident laterally, but broadly interrupted medially, tergum 5 with a yellowish-brown, apical fimbria.

MALE—Length 8-9 mm.; clypeus rather strongly convex, projecting about one-third below suborbital line, smooth and shining between deep, distinct, rather coarse and close punctures, space between margin of vertex and lateral ocelli somewhat greater than their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, punctures very close and rather fine, becoming somewhat more coarse but still close on vertex laterally above eyes; malar space very short; basal segment of flagellum very slightly shorter than 2nd, the following segments somewhat longer; process of labrum subtriangular, with a rather broadly truncate apex; mandibles rather short, with a distinct, inner, subapical tooth, overlapping about one-fourth; pubescence of head, thorax and legs whitish; scutum somewhat shining between deep, distinct, rather coarse punctures, these slightly more widely separated near middle posteriorly, those on scutellum still more coarse and closely crowded; pleura coarsely rugose; dorsal area of propodeum oblique, triangle very coarsely and regularly striate; all basitarsi slender and elongate, narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga somewhat shining between fine, evenly distributed and rather close punctures, the apical impressed

areas shallow, occupying medially somewhat more than one-third length of discs, becoming obscurely reddish-hyaline along rims, discal pubescence very short, thin, erect, entirely pale, forming whitish, apical fasciae toward sides of terga 2-4; apical portion of sternum 8 slender and elongate, sides parallel, apex very slightly broadened, more rounded than truncate, clothed beneath with rather short, dense, pale pubescence; penis valves slender apically, broadened somewhat basally, the sides excavated, gonocoxites abruptly dilated apically, forming broad, subtriangular lobes with upper surface rather deeply concave, gonocoxal lobes strongly produced, slender and elongate, just attaining the apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Transcontinental in Southern Canada and the Northern United States, south to New Mexico and Georgia; May to August.

FLOWER RECORDS—*Ceanothus* and *Zizia*. Brittain and Newton (1934) record *grandior* on *Prunus*, *Rosa* and *Rubus*.

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Andrena (*Trachandrena*) *montensis*
new species

(Fig. 35)

FEMALE—Length 10 mm.; face slightly longer than distance between eyes; eyes about parallel; foveae abruptly and narrowly constricted below, this area separated from eye margin by about an equal space; vertex rather broad, lateral ocelli separated from its hind margin by a space somewhat greater than their diameter; cheeks slightly broader than eyes; clypeus protruding very slightly below suborbital line, rather smooth and shining, with a narrow, median, impunctate line, deeply and distinctly but rather irregularly punctate on each side of this line, both as to spacing and size of punctures; face below ocelli smooth and shining, with minute, well separated punctures, those on vertex somewhat more coarse but rather shallow and indefinite, those on cheeks minute, close but rather obscure; malar space hardly evident; process of labrum rather broadly triangular, with truncate apex, median length about half the basal width; basal segment of flagellum slightly shorter than segments 2 and 3 combined, median segments somewhat longer than broad; pubescence of head and thorax entirely pale, rather whitish laterally and beneath, becoming somewhat yellowish above, thin and erect, more dense on dorsum of thorax laterally; scutum and scutellum shining between coarse deep and rather close punctures, these not crowded

anteriorly, becoming somewhat more sparse posteriorly, quite close and irregular on scutellum; pleura coarsely rugose anteriorly, becoming quite smooth posteriorly; dorsal area of propodeum rather narrow, distinctly and rather coarsely striate, more reticulate laterally, propodeal corbicula short but quite dense, with scattered, inner hairs but no anterior fringe; trochanteral floccus short; legs dark, basitarsi quite narrow, pubescence entirely pale, hind tibiae somewhat broadened apically, scopal hairs entirely whitish, quite elongate; tibial spurs testaceous; wings subhyaline, veins testaceous, stigma more ferruginous; 2nd submarginal cell about half length of 3rd, receiving 1st recurrent toward apex; tegulae piceous anteriorly, more yellowish-hyaline posteriorly and along outer rim; abdominal terga shining, segments 2-4 very broadly impressed, this area about three-fourths the total median length, punctures very fine and quite sparse on basal tergum and on impressed areas of remaining terga, the narrow basal portions with somewhat more coarse and close punctures, especially on 3rd and 4th terga, apical fasciae evident only at extreme sides on 3rd and 4th terga, apical fimbria pale brownish.

TYPES—Holotype: Female, Grandfather Mt., Watauga Co., N. C., June 24, 1954 (Mitchell). Paratypes: NORTH CAROLINA: 4 ♀♀, topotypical; 1 ♀, Cruso, Haywood Co., June 28, 1934 (on *Hydrangea*); 1 ♀ Grandfather Mt., Watauga Co., July 3, 1941; 1 ♀ Busick-Mt. Mitchell Trail, June 20, 1941; 2 ♀♀, Doughton Park, Wilkes Co., June 24, 1948 (on *Rhus*) (all Mitchell); 1 ♀, Black Mountain, mid June, 1922 (F. Sherman). NEW YORK: 1 ♀, Bemus Pt., June 19, 1937 (H. K. Townes). VIRGINIA: 1 ♀, Arlington, May 15, 1948 (K. V. Krombein); 1 ♀, Glen Carlyn, June 14 (Banks). VERMONT: 1 ♀, Manchester, June 9, (C. W. Johnson). CONNECTICUT: 1 ♀, Colebrook, August 2, 1926 (W. M. Wheeler). MICHIGAN: 2 ♀♀, East Lansing, July 11, 1937 and July 13, 1940; 1 ♀, Gull Lake Biol. Sta., Kalamazoo Co., June 27, 1956 (R. L. Fischer on *Rhus glabra*). WISCONSIN: 1 ♀, Boscobel, June 14, 1955 (R. W. Hodges). OHIO: 1 ♀, Zanesville, June 11, 1954 (R. L. Fischer on *Zizia aurea*).

These paratypes are located in the Museum of Comparative Zoology, the University of Michigan, the U. S. National Museum, the North Carolina Department of Agriculture, the collection of H. K. Townes, and the author's collection.

SCROPTEROPSIS N
Andrena (Trachandrena) morrisonella
 Viereck

(Fig. 35)

Andrena (Scapter) morrisonella Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 399. ♀.
Andrena (Trachandrena) morrisonella Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification).

FEMALE—Length 10 mm.; clypeus only slightly convex, projecting about one-third below suborbital line, smooth and shining between rather coarse, close but shallow punctures, with an indistinct, median, impunctate line; facial foveae quite broad, occupying above about two-thirds of space between eyes and ocelli, only slightly narrowed below, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, punctures very fine and close; malar space very short; basal segment of flagellum considerably shorter than 2nd and 3rd combined; process of labrum quite small, subtriangular, the apex narrowly rounded; pubescence of head, thorax and legs whitish, becoming somewhat yellowish on dorsum of thorax; scutum rather dull, deeply, distinctly and quite closely and coarsely punctate, punctures somewhat more widely separated near middle posteriorly, those on scutellum about equally coarse, somewhat more scattered and irregular, the surface shining; pleura finely and shallowly rugose anteriorly and above, becoming more smooth and tessellate posteriorly; dorsal area of propodeum oblique, triangle rather finely and irregularly striate; propodeal corbicula very short and poorly developed, without a distinct anterior fringe, whitish; trochanteral flocus rather thin but somewhat elongate, whitish; hind tibiae narrow, apex only very slightly broader than basitarsi, scopa rather dense, hairs rather elongate, simple, whitish, becoming somewhat brownish toward base; fore and mid basitarsi only very slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-fourth from apex; abdominal terga smooth and shining between fine, regular and rather close punctures, apical impressed area shallow, quite narrow, occupying medially hardly one-third length of disc, becoming yellowish-hyaline along rims, discal pubescence thin, short, erect and pale, forming very thin and inconspicuous whitish apical fasciae toward sides of terga 2-4, tergum 5 with a brownish apical fimbria.

DISTRIBUTION—Minnesota to the New England states, south to Georgia; April to July.

FLOWER RECORDS—*Crataegus*, *Gypsophila*, *Ilex*, *Malus*, *Prunus*, *Rubus* and *Salix*.

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Andrena (Trachandrena) nuda
 Robertson

(Fig. 35)

Andrena nuda Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 57. ♀.
Trachandrena nuda Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 189. (key)
Trachandrena nuda Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena nuda Lanham, 1941. Ent. Soc. Amer. Ann. 34, p. 704. ♀. (key)
Andrena (Trachandrena) nuda Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 10 mm.; face very slightly longer than broad; clypeus slightly convex, projecting slightly more than one-third below suborbital line, coarsely and deeply punctate, punctures close except near middle apically; facial foveae rather broad above, occupying about two-thirds of space between eyes and ocelli, covered with pale ochraceous tomentum, abruptly and very strongly constricted below, this part not much more than one-third width of upper part, and widely removed from margin of eye; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, smooth and shining, rather distinctly but finely punctate below where the punctures are well separated, becoming very sparse, minute and obscure above and on lateral portions of vertex; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum rather short and broad, rather narrowly truncate apically; pubescence of head short, entirely whitish, faintly tinged with yellowish, but very sparse above; whitish on thorax laterally, becoming very short and scale-like, subappressed and pale ochraceous around wing bases and on scutellum; pubescence of legs pale ochraceous; scutum largely bare and shining, with rather deep and distinct, moderately coarse punctures, these widely separated and very sparse over entire disc, those on scutellum deep, coarse and uniformly close, somewhat obscured by the pubescence; pleura coarsely rugose anteriorly, becoming smoother and more obscurely punctate posteriorly; dorsal area of propodeum oblique, triangle obscurely delimited from adjacent areas, coarsely striate; propodeal corbicula short, poorly developed, pale ochraceous, with a distinct anterior fringe; trochanteral floc-

cus rather thin and poorly developed, hairs moderately elongate; hind tibiae slightly dilated apically, apex not quite twice width of basitarsi, scopa quite dense, hairs simple, rather short, entirely whitish-ochraceous; fore and mid basitarsi slightly narrower than their respective tibiae, 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga somewhat shining between fine, well separated punctures, but these not sparse, apical impressed areas extremely broad, occupying medially almost entire length of disc, becoming faintly reddened along rims, discal pubescence largely absent, sparsely represented at extreme sides of basal portions, entirely pale, fasciae not developed, tergum 5 with a golden-brown, apical fimbria.

DISTRIBUTION—Colorado to New York, south to Georgia; March to June.

FLOWER RECORDS—*Acer*, *Crataegus*, *Ilex*, *Prunus*, *Pyracantha*, *Pyrus*, *Rubus* and *Salix*. Also recorded by Robertson (1929) on *Arunceus*, *Erigenia*, *Heracleum*, *Pastinaca*, *Ptelea*, *Rhus*, *Staphylea*, *Taenidia*, *Viburnum* and *Zizia*.

Andrena (Trachandrena) obscura
(Robertson)

(Fig. 35)

Trachandrena obscura Robertson, 1902. Amer. Ent. Soc. Trans. 35, p. 189. ♀.

Andrena obscura Viereck, 1907. Ent. News 18, p. 284. ♀. (key).

Trachandrena obscura Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).

Andrena obscura Cockerell, 1929. Ent. Soc. Amer. Ann. 22, p. 757. ♀.

Andrena obscura Brittain & Newton, 1933. Canad. Jour. Res. 9, p. 341. (flower records).

Andrena (Trachandrena) obscura Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification).

FEMALE—Length 9 mm.; clypeus slightly convex, projecting hardly more than one-fourth below suborbital line, with a narrow and indistinct, median, impunctate line, otherwise quite deeply, closely and coarsely punctate, the punctures becoming almost crowded at extreme sides; facial foveae broad above, occupying most of space between eyes and ocelli, covered with white tomentum, abruptly constricted below, this part hardly more than one-half width of the upper part; space between margin of vertex and lateral ocelli subequal to distance between them; cheeks somewhat broader than eyes, rounded posteriorly, rather dull, quite deeply, closely and

finely punctate, punctures becoming very sparse above and on lateral portions of vertex; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly semicircular or subtruncate; pubescence of head and thorax very short, sparse, whitish, faintly tinged with yellow above, that on legs entirely whitish; scutum somewhat shining, deeply and rather coarsely punctate, the punctures rather close along narrow anterior margin, otherwise sparse and irregularly scattered, those on scutellum slightly more coarse and close, the surface shining; pleura coarsely rugose; dorsal area of propodeum oblique, triangle short and very broad, coarsely and rather regularly striate; propodeal corbicula short and poorly developed, without a distinct anterior fringe, whitish; trochanteral floccus white, short and poorly developed; hind tibiae slightly broadened apically, apex not nearly twice width of basitarsi, scopa quite dense, hairs short, entirely simple, white; front and mid basitarsi very slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga shining between deep, distinct, rather fine but close punctures, apical impressed areas shallow but quite broad, occupying medially more than half length of disc, becoming faintly reddened along rims, discal pubescence very short, sparse and obscure, apparently entirely pale, terga 2-4 with white apical fasciae, rather well developed laterally, but broadly interrupted medially, tergum 5 with a pale brownish, apical fimbria.

DISTRIBUTION—Illinois, Michigan and New Brunswick, south to North Carolina; July and August.

FLOWER RECORDS—*Ceanothus*. Recorded by Robertson (1929) on *Pycnanthemum flexuosum*. Brittain & Newton recorded this species on a number of spring-flowering plants, including *Malus*, *Salix* and *Vaccinium* and it is suspected that they were incorrect in the identification. The record of collection on *Ceanothus* was made in McDowell Co., N. C. in August.

Andrena (Trachandrena)
pseudobscura
new species

(Fig. 36)

MALE—Length 8 mm.; clypeus rather strongly convex, projecting about one-third below suborbital line, smooth and shining between deep, close and quite coarse punctures; space between margin of vertex and lateral ocelli slightly shorter than distance between

them; cheeks subequal to eyes in width, rounded posteriorly, deeply, closely and rather finely punctate, punctures somewhat more coarse but still quite close above and on vertex laterally; malar space very short; basal segment of flagellum short, hardly longer than width at apex, slightly shorter than 2nd segment; process of labrum short and rather broad, subtruncate apically; mandibles with a distinct inner subapical tooth, overlapping about one-fourth; pubescence of head, thorax and legs entirely pale ochraceous; scutum somewhat shining, punctures deep and rather coarse, quite close over anterior half, becoming somewhat more sparse near center posteriorly, those on scutellum somewhat more coarse and close, the surface dull; pleura coarsely rugose; dorsal area of propodeum oblique, triangle short and broad, coarsely and rather regularly striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle, abdominal terga smooth and shining between fine, but deep and distinct punctures, punctures quite close, apical impressed areas rather shallow but distinct, occupying medially about one-half length of disc, discal pubescence very short, thin, erect, entirely pale, terga, 2-4 with narrow, whitish, apical fasciae evident laterally, but widely interrupted medially; apical portion of sternum 8 slender and elongate, sides parallel, apex narrowly truncate, clothed beneath with rather dense pale pubescence; penis valves slender apically, somewhat broadened basally, sides deeply excavated, gonocoxites abruptly dilated apically to form subtriangular lobes which are somewhat concave above, gonocoxal lobes strongly and narrowly rounded, tips nearly attaining apical lobes (similar to *hippotes*, fig. 37).

TYPES—Holotype: Male, Raleigh, N. C., Mar. 16, 1945 (Mitchell, on *Salix*) [author's coll.]. Paratypes: NORTH CAROLINA: 3 ♂♂, topotypical (on *Salix*); 3 ♂♂, topotypical, Apr. 7, 1934 (on *Pyrus* and *Sassafras*); 1 ♂, topotypical, Mar. 29, 1949 (R. L. Rabb); 4 ♂♂, topotypical, Apr. 7, 8 and 23, 1942; 3 ♂♂, Faison, Apr. 2, 1952 (H. F. Howden, on *Symplocos*); 1 ♂, White Lake, Mar. 14, 1953 (Mitchell, on *Amelanchier*). MARYLAND: 1 ♂, Takoma Pk., Apr. 30, 1944 (H. & M. Townes). NEW YORK: 1 ♂, Ithaca, June 6, 1935 (H. K. Townes). CONNECTICUT: 1 ♂, Colebrook, June 13, 1926 (W. M. Wheeler). MAINE: 2 ♂♂, Saco, June 13 & 16, 1951 (Mitchell). MICHIGAN: 1 ♂, Jackson Co., Apr. 13, 1951; 1 ♂, Gladwin Co., June 10-16, 1951; 1 ♂, Livingston Co., June 3, 1950 (all Dreis-

bach); 2 ♂♂, E. Lansing,) May 3, 1955 and May 15, 1954 (1 ♂ on *Prunus*) (R. L. Fischer). DISTRICT OF COLUMBIA: 1 ♂, Washington, May 15, 1944 (Bohart). INDIANA: 1 ♂, Tippecanoe Co., Apr. 19, 1954 (Montgomery, on *Pyrus*).

Paratypes are located in the Museum of Comparative Zoology, the University of Michigan, Purdue University, in collections of H. K. Townes, R. R. Dreisbach, R. M. Bohart, and the author.

It was at first thought that this species represented the male of *obscura*, but the flight records and distribution of each of these does not suggest such a relationship. The females (*obscura*) are in flight during July and August, while the males (*pseudobscura*) start the flight in March in North Carolina, and the latest records are for June, in New York, Connecticut and Maine. No females of *obscura* have been collected in the eastern part of North Carolina or in the vicinity of Raleigh.

Andrena (Trachandrena) pyracanthae new species

(Fig. 35)

FEMALE—Length 10 mm.; face slightly longer than distance between eyes above; eyes subparallel; foveae abruptly and narrowly constricted below, this area separated from eye margin by a nearly equal space; vertex rather narrow, lateral ocelli separated from its hind margin by little more than their diameter; cheeks equal to eyes in width; clypeus protruding nearly one-half below suborbital line, smooth and shining between deep, distinct, rather coarse and close, uniformly distributed punctures; punctures of face below ocelli deep and distinct, well separated but not sparse, surface somewhat shining, those on vertex somewhat closer and finer, becoming very fine and quite close on cheeks; malar space extremely short; process of labrum broadly triangular, with truncate apex, length less than half its basal width; basal segment of flagellum not quite equalling 2nd and 3rd segments combined, median segments somewhat longer than broad; pubescence of head and thorax entirely pale, more whitish below, becoming yellowish above, erect and rather thin, more copious along outer margins of dorsum of thorax; scutum and scutellum somewhat shining, punctures deep and distinct, rather close but not crowded anteriorly, becoming rather sparse posteriorly on scutum, those on scutellum quite similar; pleura dull, densely and finely rugose anteriorly, becoming rather

smooth and obscurely punctate posteriorly; dorsal area of propodeum rather finely striate, lateral areas finely rugose, propodeal corbicula rather short but dense, with a few scattered hairs on inner surface; trochanteral floccus rather well developed; legs dark, basitarsi quite narrow, pubescence entirely pale, hind tibiae rather slender, scopa of elongate white hairs; spurs pale testaceous; wings lightly infuscated, veins and stigma ferruginous, 2nd submarginal cell short, receiving 1st recurrent near middle; tegulae piceous, becoming somewhat yellowish-hyaline posteriorly toward outer margin; abdominal terga shining between deep, distinct, close and rather coarse punctures, terga 2-4 impressed for about half their median length, becoming very narrowly reddened along apical rims, apical fasciae very poorly developed, if at all evident, apical fimbria whitish.

TYPES—Holotype: Female, Raleigh, N. C., April 20, 1957 (Mitchell, on *Pyracantha*). Paratypes: 2♀♀, Whiteside Mt., N. C., June 6, 1957 (on *Rubus*); 2♀♀, Wake Co., N. C., April 2, 1955 (on *Crataegus* and *Pyracantha*) (both Mitchell); 1♀, Raleigh, N. C., April 30, 1955 (D. A. Becker) [all authors' coll.].

v1

Andrena (Trachandrena) quintilis
Robertson

(Fig. 35)

Andrena quintilis Robertson, 1898. Acad. Sci., St. Louis, Trans. 8, p. 46. ♀.

Trachandrena quintilis Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 46. ♀. (key).

Andrena (Trachandrena) quintilis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification).

FEMALE—Length 11 mm.; length of face greater than distance between eyes; eyes parallel; foveae abruptly and narrowly constricted below, separated from eye margin by a space nearly as wide; vertex rather broad, lateral ocelli separated from its hind margin by about twice their diameter; cheeks slightly broader than eyes; clypeus shining between rather close, deep and distinct but rather fine punctures, protruding nearly one-half below suborbital line; face between antennae and ocelli rather coarsely rugoso-punctate, vertex shining, with deep, distinct but well separated punctures, those on cheeks very close and fine; malar space hardly evident; process of labrum truncate, median length about half the basal width; basal segment of flagellum nearly equal to segments 2 and 3 combined, median segments about as broad as long; pubescence of head and thorax rather short, whitish, quite

dense between antennae and lower portions of foveae, and rather dense on cheeks below, very short and rather dense, scale-like and densely plumose on scutum and scutellum, becoming more loose and erect on pleura and propodeum, somewhat yellowish on thorax dorsally, especially around tegulae and tubercles; scutum and scutellum somewhat shining, punctures of scutum deep and distinct, rather coarse and close but not crowded, becoming somewhat more widely separated posteriorly, those on scutellum somewhat more coarse and sparse; pleura dull, densely rugoso-punctate; dorsal area of propodeum rather coarsely striate, lateral portions coarsely rugose, propodeal corbicula quite short, with a short anterior fringe; trochanteral floccus short and poorly developed; legs dark, the more apical tarsal segments somewhat reddened, spurs yellowish, pubescence entirely whitish, tibial scopa quite dense and entirely white; wings lightly infuscated, veins and stigma reddish-piceous, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent near middle; tegulae yellowish-hyaline, becoming more piceous anteriorly; abdominal terga deeply, distinctly and rather coarsely punctate, punctures well separated but not sparse on basal tergum, but close on the following segments, segment 2 impressed for nearly half its length medially, 3rd and 4th impressed for about one-third their median length, each segment becoming narrowly yellowish-hyaline apically, 2-4 with dense but rather narrow, white, apical fasciae, that on 2 somewhat interrupted medially, apical fimbria whitish.

MALE—Length 9 mm.; face slightly longer than distance between eyes above; eyes slightly convergent below; space separating lateral ocelli from margin of vertex slightly greater than their diameter; cheeks subequal to eyes in width; clypeus strongly convex, protruding one-half below suborbital line, coarsely, deeply, uniformly and quite closely punctate; face below ocelli coarsely rugoso-punctate, vertex with distinct, coarse and deep punctures, close near center, more sparse between eyes and ocelli, becoming close and somewhat finer on cheeks; malar space very short; process of labrum broadly subtriangular, truncate apex slightly longer than each oblique side, twice or more as broad as median length; flagellum reddish-piceous, basal segment not much longer than broad, segment 2 much longer, median segments nearly twice as long as broad; mandibles quite short, with a distinct, subapical, inner tooth; pubescence of head and thorax pale ochraceous, without dark admixture, rather short but erect, quite dense around antennae, on cheeks below and over most of thorax; scutum and scutellum shining, punctures uniformly close, coarse and deep, almost crowded

on scutellum, pleura coarsely rugose, dorsal area of propodeum rather short, coarsely and irregularly striate, lateral and posterior faces coarsely reticulate; propodeal corbicula rather poorly developed; legs piceous, apical tarsal segments more or less reddened, pubescence short, entirely pale, basitarsi slender and elongate; wings lightly infuscated, veins and stigma ferruginous, 2nd submarginal cell short, receiving 1st recurrent vein slightly beyond middle; abdominal terga shining, impressed for somewhat more than a third the median length, punctures uniformly close, coarse, deep and distinct, very slightly closer and finer on apical impressed areas, rims very narrowly hyaline, apical fasciae yellowish-white, narrow and rather poorly developed, discal pubescence short and thin, entirely pale; sternum 7 not produced medially, but with a very small, median, triangular emargination; apical portion of sternum 8 rather short, length about equal to that of basal portion, pubescence quite dense, tip slightly constricted, truncate apically; penis valves slender apically, base somewhat bulbous, strongly flexed, sides excavated; gonocoxites broadly dilated apically, inner margin of this area transverse, the gonocoxal lobes strongly produced, subtriangular and acute, flexed and nearly attaining transverse margin of apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Illinois to Iowa and South Dakota; July.

FLOWER RECORDS — *Pycnanthemum linifolium* and *P. flexuosum*.

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Andrena (Trachandrena) rehni
Viereck

(Figs. 35, 37 & 38)

Andrena rehni Viereck, 1907. Ent. News 18, p. 284. ♀.

Andrena (Trachandrena) rehni Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification).

FEMALE—Length 8 mm.; clypeus slightly convex, projecting about one-third below suborbital line, shining between deep, distinct, rather coarse and close punctures, these slightly separated in center apically; facial foveae rather broad, occupying above most of space between eyes and ocelli, only slightly narrowed below, covered with whitish-ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to distance between ocelli; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, closely and deeply, but rather finely punctate, punctures becoming quite sparse above on lateral portions of vertex; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd

combined; process of labrum quite large, considerably broader than long, slightly narrowed to the broadly truncate, apical margin; pubescence of head, thorax and legs whitish, faintly tinged with yellowish above and on the more apical portions of legs; scutum somewhat shining, rather deeply and sparsely punctate, punctures somewhat closer at anterior, lateral angles, becoming quite sparse near center of disc, moderately coarse, those on scutellum somewhat more coarse, more scattered and irregular, surface more shining; pleura dull, shallowly and rather obscurely rugose anteriorly, becoming relatively smooth, with fine punctures posteriorly; dorsal area of propodeum oblique, triangle coarsely rugoso-striate; propodeal corbicula short, rather poorly developed, without a distinct anterior fringe, whitish-ochraceous; trochanteral floccus rather poorly developed, thin but rather elongate, whitish; hind tibiae somewhat broadened apically, the apex not quite twice width of basitarsi, scopa rather dense, hairs of moderate length, simple, largely whitish, becoming somewhat yellowish toward base posteriorly; fore and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga somewhat shining, very finely, but deeply and distinctly punctate, punctures well separated but not sparse, apical impressed areas quite distinct, occupying medially fully half length of disc, quite strongly narrowed laterally, becoming yellowish-hyaline along rims, discal pubescence very short, thin, erect, entirely pale, terga 2-4 with thin, white, apical fasciae, that on tergum 2 widely interrupted, that on 3 more narrowly so, tergum 5 with a brownish, apical fimbria.

MALE—Length 8 mm.; clypeus convex, projecting but very slightly below suborbital line, quite closely, deeply and rather coarsely punctate, surface between punctures shining, quite densely pubescent; space between margin of vertex and lateral ocelli slightly shorter than distance between them; cheeks very slightly broader than eyes, rounded posteriorly, somewhat shining, the punctures minute, rather close but obscure, becoming quite sparse on vertex laterally; malar space very short; basal segment of flagellum not much longer than its apical width, considerably shorter than 2nd and following segments; process of labrum rather short, quite broad, broadly truncate apically; mandibles with a distinct, inner, subapical tooth, overlapping not more than one-fourth; pubescence of head, thorax and legs entirely pale ochraceous; scutum somewhat shining, punctures deep, distinct, rather coarse, well separated but not sparse anteriorly, becoming rather close toward sides and

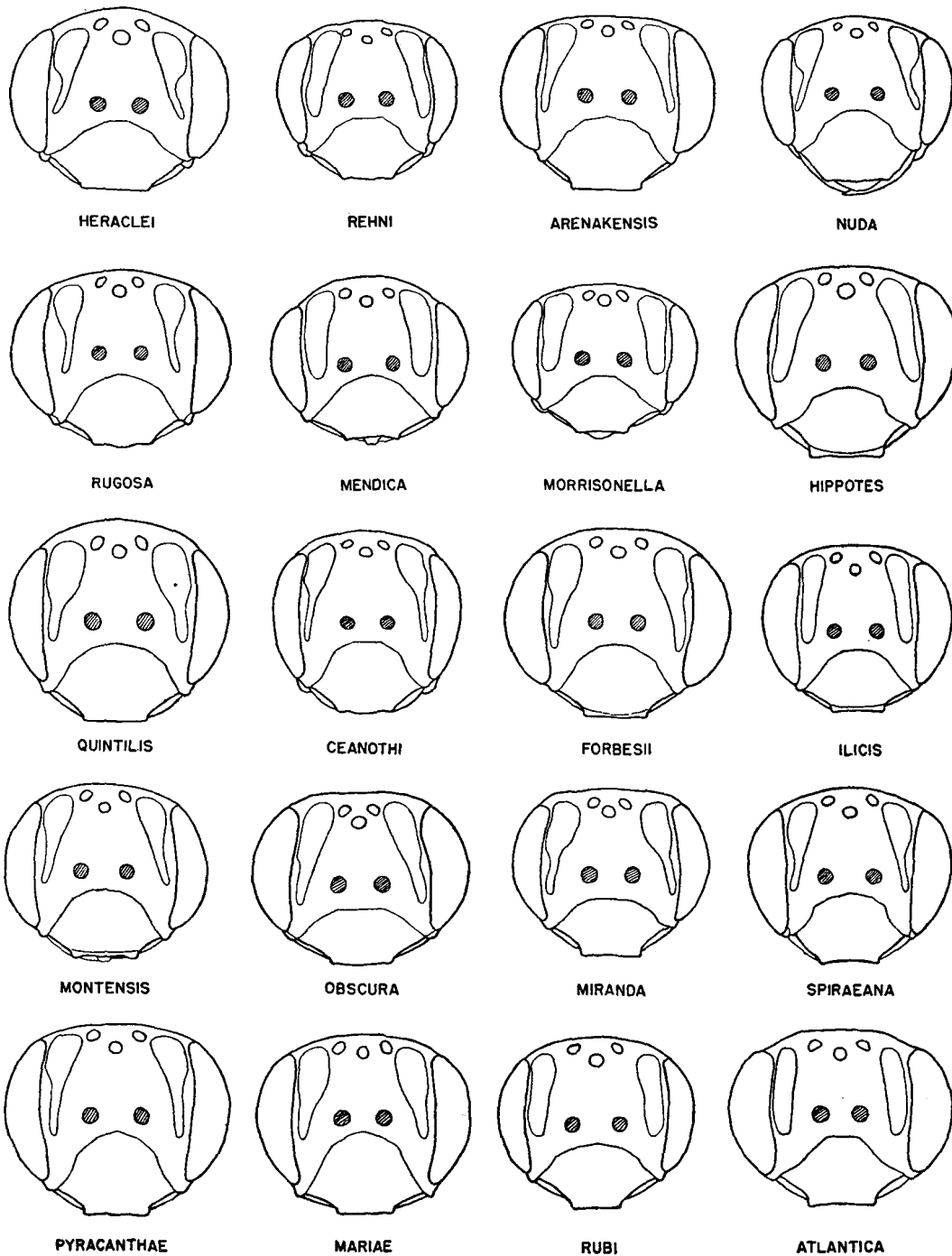


Figure 35—Facial view of female head, showing form of foveae in species of *Andrena* (*Trachandrena*).

slightly more widely separated posteriorly, those of scutellum very much coarser, close and deep, almost crowded; pleura coarsely rugose; dorsal area of propodeum nearly horizontal, triangle very coarsely striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, shining, very finely and rather closely punctate, apical impressed areas rather broad, occupying medially nearly one-half length of disc, quite shallow, becoming narrowly yellowish-hyaline along rims, discal pubescence very obscure, short, thin, sparse, entirely pale, terga 2-4 subfasciate apically toward sides, the fasciae whitish and rather obscure; basal portion of sternum 8 angulate laterally, apical portion constricted, rather slender, quite strongly protuberant beneath medially, the apex rounded, apical portion quite densely pubescent; penis valves slender apically, slightly broadened toward base, the sides narrowly grooved, gonocoxites strongly dilated apically, the resulting lobes much longer than broad, gonocoxal lobes slightly produced, but very short, acute apically.

DISTRIBUTION—The New England states, south to North Carolina and Georgia; May, June and July.

FLOWER RECORDS—*Aruncus*, *Castanea*, *Ceanothus*, *Chrysanthemum* and *Hydrangea*.

SCRIPT RECORDS
Andrena (Trachandrena) rubi
new species

(Fig. 35)

FEMALE—Length 9 mm.; clypeus slightly convex, projecting about one-third below sub-orbital line, shining between deep, distinct, rather fine and close punctures, these slightly separated toward middle where an obscure impunctate line is partially developed; facial foveae rather narrow, occupying above little more than half of space between eyes and ocelli, only slightly narrowed below, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, very finely and closely punctate, surface dull, punctures only very slightly separated above on vertex laterally where surface is more shining; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum broad basally, abruptly narrowed to a very small, slightly produced tip, which is slightly incised medially; pubescence of head, thorax and legs whitish, becoming some-

what yellowish above on head, that on dorsum of thorax more yellowish, short and rather densely plumose, almost scale-like; punctures of scutum moderately coarse, quite close and shallow anteriorly, becoming somewhat more distinctly separated, but still close, near center posteriorly, surface quite dull, those on scutellum more coarse and irregular, intervening spaces more evident, shining; pleura rather finely rugose, becoming smoother and more distinctly punctate posteriorly, where surface is quite densely tessellate; dorsal area of propodeum oblique, triangle with a few irregular striae medially, these becoming obsolescent laterally; propodeal corbicula whitish, short and poorly developed, without an anterior fringe; trochanteral flocus whitish, rather long and well developed; hind tibiae quite slender, only slightly broadened apically, apex not nearly twice width of basitarsi, scopa rather dense, hairs of moderate length, entirely simple, white, becoming somewhat fuscous toward base posteriorly; fore and mid basitarsi somewhat narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining between deep, distinct, quite uniformly close punctures, these rather coarse, apical impressed areas shallow and obscure, quite narrow, occupying hardly one-third length of disc medially, discal pubescence very short, thin, erect, apparently entirely pale, terga 2-4 with dense, white, apical fasciae, somewhat interrupted medially on tergum 2, tergum 5 with a whitish, apical fimbria.

TYPES—Holotype: Female, Carolina Beach, N. C., April 20, 1930 (Mitchell, on *Rubus*). Paratypes: 4 ♀♀, topotypical; 2 ♀♀, Beaufort, N. C., April 20, 1947 (Mitchell, on *Aronia*); 1 ♀, Taylorsville, Ga., April 30, 1939, (P. W. Fattig) [all author's coll.].

✓1
Andrena (Trachandrena) rugosa
Robertson

(Figs. 35 & 36)

- Andrena rugosa* Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 58. ♀ ♂.
Trachandrena rugosa Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 189 & 180. ♀ ♂. (key)
Andrena paenerugosa Viereck, 1907. Ent. News 18, p. 285. ♀. New synonymy.
Trachandrena rugosa Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena rugosa Brittain & Newton, 1933. Canad. Jour. Res. 9, p. 341. (flower records)

Andrena rugosa Atwood, 1934. Canad. Jour. Res. 10, pp. 208 & 210. ♀ ♂. (key)

Andrena (Trachandrena) rugosa Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus slightly convex, projecting nearly one-half below suborbital line, shining, punctures deep and distinct, rather fine, well separated but not sparse, without a distinct, median, impunctate line; facial foveae quite broad above, occupying about three-fourths of space between eyes and ocelli, covered with whitish tomentum, very abruptly and narrowly constricted below, constricted portion widely removed from eye margin and about one-fourth width of the upper part; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, finely and closely punctate, punctures becoming somewhat sparse above on lateral areas of vertex; malar space distinct, but rather short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum about twice as broad as long, somewhat narrowed to the rather broadly truncate apical margin; pubescence of head, thorax and legs whitish, becoming pale ochraceous above and on the more apical portions of legs, that on dorsum of thorax rather short, quite dense, partially obscuring surface; punctures of scutum and scutellum coarse, deep and uniformly close; pleura coarsely rugoso-punctate, becoming relatively smooth posteriorly; dorsal area of propodeum oblique, triangle quite coarsely and evenly striate; propodeal corbicula short, rather dense, without a distinct anterior fringe, very pale ochraceous; trochanteral floccus rather long, whitish; hind tibiae broadened apically, apex about twice width of basitarsi, scopa quite dense, hairs of moderate length, simple, entirely whitish; mid basitarsi subequal to their tibiae in width, the fore basitarsi somewhat narrower; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-fourth from apex; abdominal terga somewhat shining, deeply, distinctly but rather finely punctate, punctures close along the narrow basal portions, somewhat more widely separated, but yet not sparse, on the broad, apical, impressed areas, these occupying medially about three-fourths length of disc, becoming narrowly reddish-hyaline along rims, discal pubescence very sparse, short, suberect, apparently entirely pale, terga 2-4 with white, apical fasciae evident at extreme sides, but widely interrupted medially, tergum 5 with a golden-brownish, apical fimbria.

MALE—Length 9 mm.; face slightly longer than broad; clypeus rather strongly convex and protuberant, projecting nearly one-half below suborbital line, shining between deep, distinct, rather close and coarse punctures; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, very obscurely and finely punctate; malar space distinct but short; basal segment of flagellum considerably shorter than 2nd and following segments, only slightly longer than apex is broad; process of labrum about twice as broad as long, narrowed to the rather broadly truncate apical margin; mandibles with a distinct, inner, subapical tooth, overlapping nearly one-third; pubescence of head, thorax and legs pale ochraceous; scutum and scutellum dull, punctures quite deep, close and rather coarse; pleura rather coarsely rugoso-punctate; dorsal area of propodeum oblique, triangle rather coarsely and evenly striate; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-fourth from apex; abdominal terga rather dull, punctures quite fine and close, but deep and distinct, apical impressed areas shallow, occupying medially about one-half length of disc, punctures finer and more obscure than on the basal portions, becoming gradually reddish-hyaline toward rims, discal pubescence very short, thin, erect, entirely pale, terga 2-4 with very thin and obscure, whitish, apical fasciae, rather broadly interrupted on tergum 2; apical portion of sternum 8 slender and elongate, apex slightly expanded, rather abruptly truncate, clothed beneath with rather long, pale pubescence; penis valves slender apically, only very slightly dilated basally, quite deeply excavated laterally, gonocoxites abruptly dilated apically, forming subtriangular, concave lobes, which are slightly produced apically, gonocoxal lobes strongly produced, slender and acute, attaining the apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Minnesota to the New England states and Nova Scotia, south to North Carolina and Georgia; April to July.

FLOWER RECORDS—*Malus*, *Rubus*, *Spiraea* and *Viburnum*. Robertson (1929) records this species on the following plant genera: *Acer*, *Amelanchier*, *Claytonia*, *Cornus*, *Crataegus*, *Dentaria*, *Dirca*, *Eriogonum*, *Hepatica*, *Heracleum*, *Isopyrum*, *Prunus*, *Ptelea*, *Rhus*, *Ribes*, *Salix*, *Sani-*

cula and *Zanthoxylum*. It is also recorded on *Taraxacum* by Brittain and Newton (1933).

In his 1907 key, Viereck distinguished between *rugosa* and *paenerugosa* by the presence or absence of abdominal fasciae. Apparently this is not a valid distinction, for Robertson described *rugosa* as lacking fasciae except at extreme sides. A homotype specimen which the writer compared with the lectotype lacks even this degree of their development. In our opinion, this is a variable character, occasional individuals showing some degree of development of the latero-apical fasciae.

***Andrena (Trachandrena) sigmundi*
Cockerell**

(Fig. 36)

Andrena sigmundi Cockerell, 1902. Canad.

Ent. 34, p. 45. ♀.

Andrena radiatula Cockerell, 1902. Canad.

Ent. 34, p. 46. ♀.

Andrena weedi Viereck, 1907. Ent. News 18, pp. 284 & 285. ♀ ♂. New synonymy.

Andrena (Trachandrena) sigmundi Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

Andrena (Trachandrena) weedi Lanham, 1949. Op. cit. (classification)

FEMALE—Length 10 mm.; clypeus slightly convex, projecting about one-third below sub-orbital line, shining between deep, distinct and rather coarse and close punctures, with a very narrow, slightly elevated median impunctate line; facial foveae broad above, occupying most of space between eyes and ocelli, covered with whitish tomentum, abruptly and strongly constricted below, lower portion being less than half width of upper portion; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, very closely, deeply and quite finely punctate, punctures being only very slightly separated above on lateral areas of vertex; malar space short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, much broader than long, narrowed apically to the rather narrowly truncate apex; pubescence of head, thorax and legs pale ochraceous, somewhat more whitish below and on the more basal portions of legs; dorsum of thorax rather dull, punctures deep, distinct, rather coarse on scutum, close over anterior half, becoming somewhat more widely separated in center posteriorly, those on scutellum very slightly coarser, irregular, to some degree separated,

at least anteriorly; pleura dull, densely and rather coarsely rugose; dorsal area of propodeum oblique, triangle rather coarsely and regularly striate; propodeal corbicula quite short, but rather dense, without a distinct anterior fringe, whitish-ochraceous; trochanteral floccus rather well developed, elongate, whitish; hind tibiae rather broad, but not much broader apically than medially, apex not nearly twice width of basitarsi, scopa quite dense, hairs short, simple, whitish-ochraceous, becoming somewhat fuscous toward base, fore and mid basitarsi only slightly narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga somewhat shining between deep, distinct and rather coarse and close punctures, these somewhat more sparse along basal portion of discs adjacent to the apical impressed areas, which are rather shallow but broad, occupying medially fully one-half length of disc, becoming narrowly yellowish-hyaline along rims, discal pubescence very thin, short, suberect, entirely pale, terga 2 and 3 with thin, obscure, whitish, apical fasciae evident laterally, widely interrupted medially, tergum 4 not fasciate, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 9 mm.; clypeus slightly convex, projecting about one-third below sub-orbital line, shining between close, deep, distinct and quite coarse punctures; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks very slightly broader than eyes, rounded posteriorly, dull, very finely and closely punctate, punctures becoming somewhat more sparse, shallow and obscure on vertex laterally, which is densely tessellate; malar space short, but distinct; basal segment of flagellum slightly longer than broad, considerably shorter than 2nd and following segments; process of labrum much broader than long, slightly narrowed to the broadly truncate apex; mandibles with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs pale ochraceous; dorsum of thorax rather dull, punctures of scutum deep and distinct, quite close anteriorly, becoming somewhat more sparse in center posteriorly, those on scutellum somewhat more coarse but irregular, to some degree separated anteriorly; pleura rather coarsely and shallowly rugose; dorsal area of propodeum oblique, triangle rather coarsely and regularly striate; basitarsi slender and elongate, narrower than their respective tibiae; 2nd submarginal cell somewhat shining between deep, distinct, but rather fine punctures, these well separated but not sparse, apical impressed areas shallow and obscure, occupying medially less than half of length of disc, becoming very narrowly and

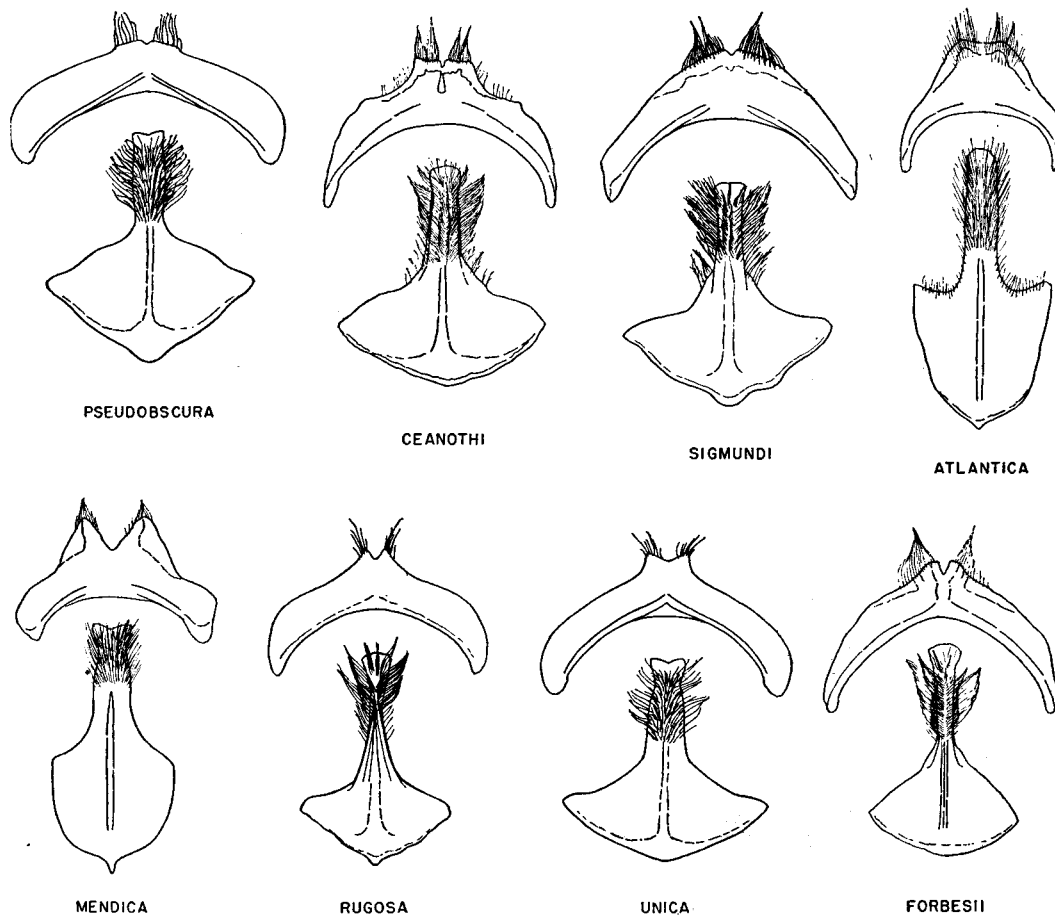


Figure 36—Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Trachandrena*).

obscurely brownish-hyaline apically, discal pubescence very short, thin, erect, entirely pale, apical fasciae very poorly developed, to some degree evident laterally; apical portion of sternum 8 slender and elongate, slightly broadened apically, the apex subtruncate, clothed beneath with quite dense, pale pubescence; penis valves slender apically, only very slightly broadened toward the base, deeply excavated laterally, gonocoxites abruptly dilated apically, forming subtriangular, rather deeply concave lobes, which are slightly produced at tips, gonocoxal lobes strongly produced, narrow and acute, attaining the apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Saskatchewan, Minnesota and Wisconsin, east to New Brunswick and the New England states, south to Georgia; March to June.

FLOWER RECORDS — *Amelanchier*, *Prunus*, *Rubus* and *Salix*.

VI

Andrena (Trachandrena) spiraeana Robertson

(Figs. 35 & 38)

- Andrena spiraeana* Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 120. ♀ ♂.
Trachandrena spiraeana Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 189 & 190. ♀ ♂. (key)
Andrena spiraeana Viereck, 1907. Ent. News 23, p. 284. (key)
Trachandrena spiraeana Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena spiraeana Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 704 & 707. ♀ ♂. (key)
Andrena (Trachandrena) spiraeana Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 217. (classification)

FEMALE—Length 10 mm.; clypeus broadly convex, projecting about one-third below suborbital line, smooth and shining between deep, distinct, rather coarse and close punctures, these somewhat separated toward middle; facial foveae broad above, occupying most of space between eyes and ocelli, covered with silvery tomentum, abruptly and strongly constricted below, this portion not more than one-third width of upper portion and remote from eye margin by a nearly equal space; space between margin of vertex and lateral ocelli somewhat greater than their diameter, but less than distance between the ocelli; cheeks subequal to eyes in width, smooth and shining, very finely and rather closely punctate, punctures becoming more sparse, coarse and deep on vertex laterally; malar space extremely short; basal segment of flagellum

slightly shorter than 2nd and 3rd combined; process of labrum rather large, subtriangular, apex rather broadly truncate; pubescence of head whitish, becoming faintly yellowish above, that on thorax whitish-ochraceous below, more yellowish above, that on legs pale ochraceous; punctures of scutum rather coarse, deep and distinct, well separated anteriorly, becoming somewhat more sparse in center posteriorly, the surface somewhat shining, those on scutellum slightly more coarse and close, with only very narrow intervening spaces; pleura coarsely rugose; dorsal area of propodeum oblique, triangle quite coarsely and regularly striate; propodeal corbicula short, without a distinct anterior fringe, pale ochraceous; trochanteral floccus rather poorly developed, short, whitish; hind tibiae somewhat broadened apically, apex about twice width of basitarsi which are rather narrow, scopa rather dense, hairs simple, rather short, entirely pale ochraceous, fore and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga smooth, shining, apical impressed areas shallow, minutely and rather sparsely punctate, rims nearly concolorous with remainder of discs, occupying medially about two-thirds length of disc, basal portions of discs finely and rather closely and deeply punctate, discal pubescence very short, thin, erect, entirely pale, terga 2-4 with narrow, whitish, apical fasciae, widely interrupted on 2 and 3, tergum 5 with a golden-brown, apical fimbria.

MALE—Length 7 mm.; clypeus convex, projecting about one-third below suborbital line, smooth and shining between coarse, close, deep and distinct punctures, these only very slightly separated medially; space between margin of vertex and lateral ocelli somewhat greater than their diameter, but less than distance between them; cheeks subequal to eyes in width, rounded posteriorly, rather dull, very finely and obscurely substriate, but with some obscure, minute punctures along margin of eyes, becoming nearly impunctate on vertex laterally, which is finely tessellate; malar space extremely short; basal segment of flagellum very short, no longer than broad, much shorter than 2nd and following segments; process of labrum subtriangular, apex rather broadly truncate; mandibles with a distinct, inner, subapical tooth, overlapping but very slightly; pubescence of head, thorax and legs pale ochraceous; punctures of scutum deep, distinct, coarse and close anteriorly, becoming somewhat more widely separated in center posteriorly, those on scutellum about equally coarse but irregular, interspaces rather densely tessellate; pleura coarsely rugose; dorsal area of propodeum oblique, triangle coarsely

and rather irregularly striate; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell rather narrow, receiving 1st recurrent about one-third from apex; abdominal terga shining, apical impressed areas rather shallow, occupying medially not quite half length of disc, punctures very minute and rather sparse, those on the more basal portions somewhat deeper and more distinct, rather fine, well separated, apical rims becoming obscurely reddened, discal pubescence very short, thin, suberect, apparently entirely pale, fasciae very poorly developed, if at all; apical portion of sternum 8 slender, with a rather deep subapical constriction, apex somewhat rounded, clothed beneath with rather dense, pale pubescence; penis valves slender apically, slightly dilated basally, deeply excavated laterally, gonocoxites abruptly dilated apically, rather deeply concave, gonocoxal lobes strongly produced, subtriangular, narrowly rounded apically, nearly attaining apical lobes (similar to *hippotes*, fig. 37).

DISTRIBUTION—Minnesota to the New England states, south to Tennessee and South Carolina; April to August.

FLOWER RECORDS—*Aruncus*, *Azalea*, *Hydrangea* and *Rhus*. Robertson (1929) records *spiraecana* also on *Cryptotaenia*, *Heracleum* and *Ptelea*.

SP. NOVA VI

Andrena (Trachandrena) unica
new species

(Fig. 36)

MALE—Length 9 mm.; face about one-fourth longer than distance between eyes above; eyes subparallel; lateral ocelli separated from margin of vertex by a space somewhat greater than their diameter; cheeks and eyes subequal; clypeus rather strongly convex, projecting only slightly below suborbital line, rather smooth and shining between rather fine, evenly distributed and rather close punctures; face below ocelli dull, rather more tessellate than rugose, vertex dull, finely tessellate, with no evident punctures, cheeks smooth, somewhat shining, becoming very finely striate below but without evident punctures; malar space hardly evident; process of labrum broad and very short, broadly truncate, median length no more than one-third its width; basal segment of flagellum about as long as broad, 2nd and following segments much longer, nearly twice as long as broad; mandibles relatively short, with a subapical inner tooth; pubescence rather dense, entirely pale-ochraceous on head and thorax; scutum somewhat shining between rather deep, dis-

tinct and close punctures, these almost crowded anteriorly, becoming somewhat more widely separated near center of disc, scutellum dull, punctures shallow but close, rather coarse and obscure; pleura densely rugose; dorsal area of propodeum irregularly and rather coarsely striate, poorly defined, lateral areas more rugose; legs dark basally, becoming somewhat yellowish on the more apical tarsal segments, entirely pale pubescent, spurs pale yellow; wings subhyaline, veins pale testaceous, stigma more brownish-testaceous, 2nd submarginal cell very short, about one-third length of 3rd, receiving 1st recurrent near middle; tegulae piceous; abdominal terga smooth and shining, almost polished, punctures exceedingly minute, well separated but evenly distributed, segments 2-4 impressed for about half the median length, these areas almost impunctate, with only a few fine, exceedingly minute punctures invading the more basal portions, fasciae inevident; sternum 7 rather narrowly produced medially, this area with a broadly triangular emargination; sternum 8 broad basally, rather abruptly but obliquely narrowed to the apical produced portion, this with a subapical, rather deep constriction, tip more broadly truncate, this area rather long pubescent; penis valves rather short, tips quite slender, broadly dilated at base, and this area excavated laterally, gonocoxites abruptly, broadly dilated apically, hind margin of this portion transverse, tips somewhat rounded and yellowish, gonocoxal lobes well developed, acute, abruptly flexed and reaching hind margin of the gonocoxal tips (similar to *hippotes*, fig. 37).

TYPE—Holotype: Male, Ithaca, New York, June 5, 1947 (C. Robinson) [Cornell Univ.].

Andrena (Trachandrena) virginiana
new species

FEMALE—Length 9 mm.; face slightly longer than distance between eyes; eyes nearly parallel; foveae broad above, much constricted below, but not abruptly so, this area separated but very slightly from margin of eye; lateral ocelli separated from margin of vertex by nearly twice their diameter; cheeks very slightly broader than eyes; clypeus rather short, projecting but slightly below suborbital line, shining between deep, distinct but rather fine and close punctures, but with a median impunctate line; face below ocelli coarsely, deeply and quite closely punctate, punctures on vertex scattered and irregular, quite sparse, surface shining; cheeks with fine, close but rather deep punctures; malar space hardly evident; process of labrum short, subtruncate,

with rather broad base, tip not emarginate; basal segment of flagellum slightly shorter than segments 2 and 3 combined, median segments about as long as broad; pubescence short, entirely pale on head and thorax, more whitish below, becoming very slightly cream-colored above, rather dense around antennae, on cheeks below and on thorax laterally; scutum and scutellum shining, punctures deep and distinct, well separated on scutum anteriorly, becoming rather sparse posteriorly, those on scutellum much closer and somewhat more coarse; pleura rather coarsely rugoso-punctate anteriorly, becoming rather smooth posteriorly; dorsal area of propodeum coarsely striate, rather short, lateral areas more reticulate, propodeal corbicula short but rather dense, interior with a few scattered erect hairs but without a distinct anterior fringe; trochanteral floccus quite short; legs dark, basitarsi quite slender, pubescence entirely whitish, hind tibiae quite slender and narrow, scopal hairs rather short and quite dense, spurs pale testaceous; wings subhyaline basally, becoming very faintly infuscated apically, veins and stigma more piceous, 2nd submarginal cell not more than half as long as 3rd, receiving 1st recurrent slightly beyond middle; tegulae piceous anteriorly, more testaceous posteriorly, outer margin narrowly yellowish-hyaline; abdominal terga shining between close, deep and distinct punctures, these quite uniformly distributed, somewhat more widely separated on basal tergum, terga 2-4 impressed for about half the median length, these areas becoming somewhat reddened toward rims, with apical, dense, white fasciae evident laterally, this nearly complete on segment 4, apical fimbria more brownish.

TYPE—Holotype: Female, Barcroft, Va., June 17, 1917 (W. L. McAtee, on *Ceanothus americanus*). Paratypes: 2♀, topotypical, [all U.S.N.M.].

Andrena (Trachandrena) votula
new species

FEMALE—Length 10 mm.; face slightly longer than distance between eyes; eyes about parallel; foveae constricted below, but not very abruptly so, with very little space between this part and eye margin; lateral ocelli separated from hind margin of vertex by a

space somewhat greater than their diameter; cheeks very slightly broader than eyes; clypeus protruding but slightly below suborbital line, shining between deep, distinct and rather coarse and close punctures, these quite uniformly distributed; face below ocelli somewhat shining between deep, distinct and rather close punctures, those on vertex quite coarse and deep, close medially, becoming quite sparse toward each side, those on cheeks becoming very fine and close; malar space hardly evident; process of labrum broadly subtriangular, with truncate apex, about half as long as basal width; basal segment of flagellum slightly shorter than 2nd and 3rd combined, median segments about as long as broad; pubescence of head and thorax entirely pale yellowish, becoming somewhat more whitish below, rather dense between antennae and eyes, cheeks below, and on thorax laterally; scutum and scutellum somewhat shining, punctures of scutum quite coarse, deep and distinct, well separated even anteriorly, but not sparse even posteriorly, those on scutellum considerably more coarse and close, this plate almost rugose; pleura coarsely rugoso-punctate; dorsal area of propodeum coarsely striate, lateral areas more finely rugose; propodeal corbicula rather dense but short, with a few inner hairs but no anterior fringe; trochanteral floccus quite short; legs dark in general, the more apical segments becoming somewhat reddened, basitarsi quite slender, hind tibiae somewhat broadened apically, tibial scopa yellowish and of rather elongate, dense hairs, spurs pale yellowish; wings sub-hyaline, veins pale testaceous, stigma more ferruginous, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent near middle; tegulae dark anteriorly, more reddish-hyaline posteriorly, yellowish along outer margin; abdominal terga smooth but rather dull, segment 2 impressed for half its median length, 3 and 4 somewhat less so, punctures quite uniform, very fine and rather close but distinctly separated, impressed areas of segments 3 and 4 somewhat reddened, segments 2-4 with rather dense, whitish, apical fasciae, widely interrupted on 2, slightly so on 3, apical fimbria golden brown.

TYPES—Holotype: Female, Milwaukee, Wisconsin, May 30, 1902 [U.S.N.M.]. Paratype: 1♀ (stylopized), Ann Arbor, Michigan, May 23, 1901 [Hubbell].

~~Scaptomyza~~
Andrena (Mimandrena) imitatrix
imitatrix Cresson

(Figs. 37-39)

- Andrena imitatrix* Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 258. ♀.
- Andrena claytoniae* Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 59. ♀ ♂.
- Trachandrena claytoniae* Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 190. ♀ ♂. (key)
- Andrena albofoveata* Graenicher, 1903. Canad. Ent. 35, p. 166. ♀. New synonymy.
- Andrena (Trachandrena) crataegiphila* Viereck & Cockerell, 1914. U. S. Nat. Mus. Proc. 48, p. 7. ♂.
- Andrena (Scapter) imitatrix* var. *profunda* Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 398. ♀.
- Andrena claytoniae* Rau, 1922. Acad. Sci. St. Louis, Trans. 24, p. 34. (biology)
- Andrena imitatrix* Clements & Long, 1923. Carnegie Inst. Wash. Pub. 336, p. 249. (ecology)
- Andrena imitatrix* Cockerell, 1929. Ent. Soc. Amer. Ann. 22, p. 755.
- Trachandrena claytoniae* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
- Andrena (Trachandrena) tardula* Cockerell, 1930. N. Y. Ent. Soc. Jour. 37, p. 447. ♀.
- Andrena (Mimandrena) imitatrix* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 218. (classification)
- Andrena (Mimandrena) albofoveata* Lanham, 1949. Op. cit. (classification)

FEMALE—Length 10 mm.; clypeus very slightly convex, projecting about one-third below suborbital line, somewhat shining, closely and rather coarsely and deeply punctate, without a distinct, median, impunctate area; facial foveae quite broad, occupying above most of space between eyes and ocelli, only slightly narrowed below, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, punctures very fine and quite close; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum rather small, subtriangular, apex more or less broadly truncate; pubescence of head, thorax and legs entirely pale ochraceous or whitish; scutum quite closely and deeply punctate anteriorly, becoming sparsely and more shallowly punctate in center posteriorly, surface somewhat shining, punctures of scutellum quite close, rather coarse and deep, surface between punctures shining; pleura finely rugose; dorsal area of propodeum oblique, triangle quite extensive, rather coarsely and evenly striate;

propodeal corbicula pale ochraceous, rather short, without a distinct anterior fringe but with numerous, inner, plumose hairs; trochanteral floccus rather long and dense, whitish; hind tibiae somewhat broadened apically, apex nearly twice the width of the basitarsi, scopa rather dense, hairs simple, rather short, pale ochraceous; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near apex; abdominal terga smooth and shining, closely, finely and rather deeply punctate, apical impressed areas rather shallow, occupying medially about one-third length of disc, sometimes becoming narrowly hyaline along rims, discal pubescence very short, thin, pale, terga 2-4 usually with whitish or pale ochraceous apical fasciae, interrupted on tergum 2, tergum 5 with a brownish apical fimbria.

MALE—Length 7-8 mm.; clypeus rather flat, densely pubescent, projecting about one-third below suborbital line, very closely and rather finely punctate beneath dense pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, dull, roughened or subrugose, punctures obscure; malar space very short, basal segment of flagellum short, length about equal to its apical width, slightly shorter than 2nd segment; process of labrum broad and rather short, slightly narrowed to the rather broadly truncate apex; mandibles quite short, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely pale ochraceous; scutum and scutellum rather dull, punctures shallow and rather fine, quite close anteriorly, becoming sparse in center posteriorly on scutum, those on scutellum somewhat more coarse and irregularly scattered; pleura finely rugose; dorsal area of propodeum oblique, triangle rather coarsely striate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near apex; abdominal terga somewhat shining, very finely and quite closely punctate, apical impressed area rather shallow, occupying medially nearly one-third length of disc, becoming narrowly yellowish-hyaline along rims, discal pubescence very short, thin, erect, entirely pale, terga 2-4 at least subfasciate apically toward sides, fasciae pale ochraceous; apical portion of sternum 8 narrow, parallel-sided, slightly broadened at apex which is broadly truncate, clothed beneath with rather long, pale pubescence; penis valves rather slender apically, very slightly broadened toward base, sides excavated, gonocoxites rather

broadly dilated apically, the resulting lobes subtriangular, with narrowly rounded apex, gonocoxal lobes strongly produced, acute apically, nearly reaching apical lobes of gonocoxites.

DISTRIBUTION—Minnesota, Ontario and the New England states, south to Mississippi and Florida; March to June.

FLOWER RECORDS—*Acer*, *Aronia*, *Aruncus*, *Crataegus*, *Houstonia*, *Ilex*, *Malus*, *Padus*, *Prunus*, *Pyracantha*, *Pyrus*, *Salix*, *Taraxacum* and *Viburnum*.

***Andrena (Mimandrena) imitatrix profunda* Viereck**

This form differs from typical *imitatrix* only in the ferruginous color of the hind tibiae and all of the tarsi in both sexes. No other significant differences are apparent.

***Andrena (?Mimandrena) verna*
new species ^{fenningeri}
(Figs. 37 & 38)**

MALE—Length 7 mm.; face only slightly longer than distance between eyes; clypeus broadly convex, projecting about one-fourth below suborbital line, smooth and shining between fine and rather close, evenly distributed punctures, somewhat closer at extreme sides, without a median, impunctate area; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, dull and very finely striate, punctures invident; malar space extremely short; basal segment of flagellum very short, not much longer than apex is broad, very slightly shorter than 2nd segment, successive following segments being slightly longer; process of labrum rather large, somewhat narrowed to the rather broadly truncate and slightly emarginate apex, median length about half its basal width; mandibles rather short, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs rather short and sparse, entirely whitish; scutum dull and tessellate, punctures shallow, rather fine, well separated anteriorly, becoming somewhat more widely separated posteriorly, those on scutellum more distinct, fine and close, somewhat sparse on each side of middle, surface more shining; pleura roughened, densely tessellate, but hardly rugose; dorsal area of propodeum oblique, triangle quite coarsely striate, with six or seven striae evenly distributed on each side; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, punctures rather deep, quite distinct, rather fine and close, apical impressed areas rather narrow

and shallow, almost entirely impunctate, becoming somewhat reddened along rims, discal pubescence extremely sparse, short and obscure, apparently entirely pale, fasciae not developed; apical margin of sternum 6 quite strongly reflexed, the lateral angles almost recurved; sternum 8 rather abruptly constricted near middle to form the narrow apical portion, which is rather slender, quite abruptly truncate at apex, nearly parallel-sided, clothed beneath with very short, pale ochraceous pubescence; penis valves slender apically, very slightly broadened toward base, rather shallowly excavated laterally toward base, gonocoxites rather short, slightly dilated apically, the resulting lobes rather small, subtriangular, nearly pointed apically, gonocoxal lobes strongly produced, nearly reaching apical lobes of the gonocoxites, rather narrowly rounded at apex.

TYPES—Holotype: Male, Raleigh, N. C., March 13, 1945, (Mitchell, on *Prunus*) [author's coll.]. Paratypes: NORTH CAROLINA: 21 ♂, topotypical, Mar. 12, 1925, Mar. 19, 1938, Mar. 11, 15 and 21, 1945 (Mitchell, on *Prunus* and *Salix*). MARYLAND: 1 ♂, College Park, Apr. 20, 1944 (H. F. Howden). INDIANA: 1 ♂, Tippecanoe Co., Apr. 9, 1933; 5 ♂, Carroll Co., Apr. 12, 1931. 16 ♂, Tippecanoe Co., April 3 & 14, 1954 & 1956 (Montgomery, on *Salix*). MISSISSIPPI: 12 ♂, Vicksburg, Mar. 11, 1955 (Dreisbach).

Paratypes are in the collections of Purdue University, H. F. Howden, T. H. Hubbell, R. R. Dreisbach, and of the author.

This species is very similar in its general appearance to the male of *imitatrix*, but the following contrasting characters will serve to separate them: Lateral apical angles of sternum 6 strongly reflexed in *verna*, not reflexed in *imitatrix*; gonocoxites triangularly dilated apically in *verna*, more rounded and club-like in *imitatrix*; and penis valves not toothed at base in *verna*, distinctly so in *imitatrix*.

***Andrena (Schizandrena) crataegi*
Robertson**

(Figs. 37-39)

- Andrena crataegi* Robertson, 1893. Amer. Ent. Soc. Trans. 20, p. 273. ♀ ♂.
Trachandrena crataegi Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 190. ♀ ♂. (key)
Andrena subcommoda Cockerell, 1902. Canad. Ent. 34, p. 45. ♀. New synonymy.
Andrena crataegi Rau, 1922. Acad. Sci. St. Louis, Trans. 24, pp. 33 & 34. (biology)

Andrena crataegi Clements & Long, 1923. Carnegie Inst. Wash. Pub. 326, p. 249. (ecology)
Trachandrena crataegi Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena crataegi Brittain, 1933. Canada Dept. Agr. Bul. 162, p. 94. (flower records)
Andrena crataegi Brittain & Newton, 1933. Canad. Jour. Res. 9, p. 341. (flower records)
Andrena crataegi Atwood, 1934. Canada. Jour. Res. 10, pp. 208 & 210. ♀ ♂. (key)
Andrena crataegi Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena (Schizandrena) crataegi Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 202. (classification)
Andrena (Schizandrena) subcommoda Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 202. (classification)

FEMALE—Length 11 mm.; clypeus evenly convex, projecting somewhat more than one-third below suborbital line, smooth and shining, deeply and rather coarsely punctate, the punctures well separated but hardly sparse, without a distinct, median, impunctate line; facial foveae rather broad, occupying above about three-fourths of space between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, somewhat shining, very finely and rather closely punctate; malar space distinct, but short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, the apex rather narrowly truncate; pubescence of head and thorax short and sparse, especially

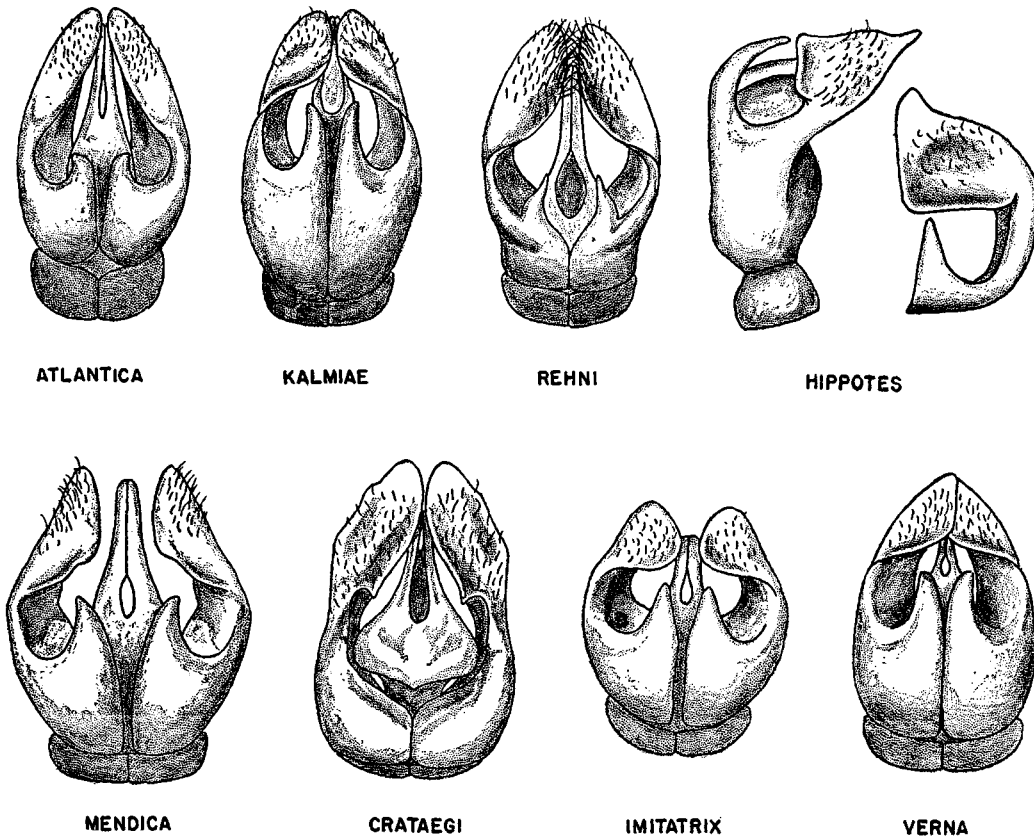


Figure 37—Apical flexed portion of male genital armature in species of *Andrena* (*Trachandrena*), *A. (Schizandrena)* and *A. (Mimandrena)*. In *hippotes* the lateral view and the apex of the right gonocoxite are shown.

on dorsum of thorax, entirely whitish-ochraceous, whitish on the more basal leg segments, becoming brownish apically on front and mid tibiae and on tarsi beneath; scutum and scutellum shining, finely and irregularly punctate, the punctures rather close anteriorly, becoming quite sparse and finer near middle of scutum posteriorly, very fine along anterior margin of scutellum, somewhat coarser and more sparse on its disc; pleura rather coarsely but shallowly rugose, without distinctly separated punctures; dorsal area of propodeum oblique, triangle coarsely reticulate, propodeal cobbicula very short and poorly developed, without an anterior fringe, pale ochraceous; trochanteral floccus long and dense, whitish; hind tibiae rather slender, apex only slightly broader than basitarsi, scopa quite dense, hairs simple and moderately elongate, entirely whitish-ochraceous; front and mid basitarsi slightly narrower than their respective tibiae; posterior spur of hind tibiae long and quite strongly curved; wings rather strongly infuscated, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga shining between the close and rather fine punctures, those on terga 2-4 becoming somewhat more sparse at margin of apical impressed area, these areas shallow, more finely and closely punctate, occupying medially about one-third length of disc and only very narrowly and obscurely hyaline along rims, discal pubescence hardly evident, extremely sparse, short and thin, suberect, apparently entirely pale, apical fasciae not developed, tergum 5 with a brownish, apical fimbria.

MALE—Length 10 mm.; face slightly longer than broad; clypeus evenly convex, projecting somewhat more than one-third below suborbital line, closely and deeply punctate, punctures rather fine, evenly distributed, without a median, impunctate line; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, punctures very fine and quite close; malar space distinct but very short; basal segment of flagellum short, not much longer than apical width and shorter than 2nd segment; process of labrum short and quite broad, narrowed apically to the quite broadly truncate apex; mandibles rather short, with a distinct, inner, subapical tooth, overlapping very slightly; pubescence of head, thorax and legs rather short, somewhat dense, entirely pale ochraceous; scutum and scutellum deeply and quite coarsely punctate, intervening spaces shining, punctures very close anteriorly, becoming more definitely separated posteriorly in center of scutum and on scutellum; pleura rather coarsely rugose; dorsal area of propodeum coarsely

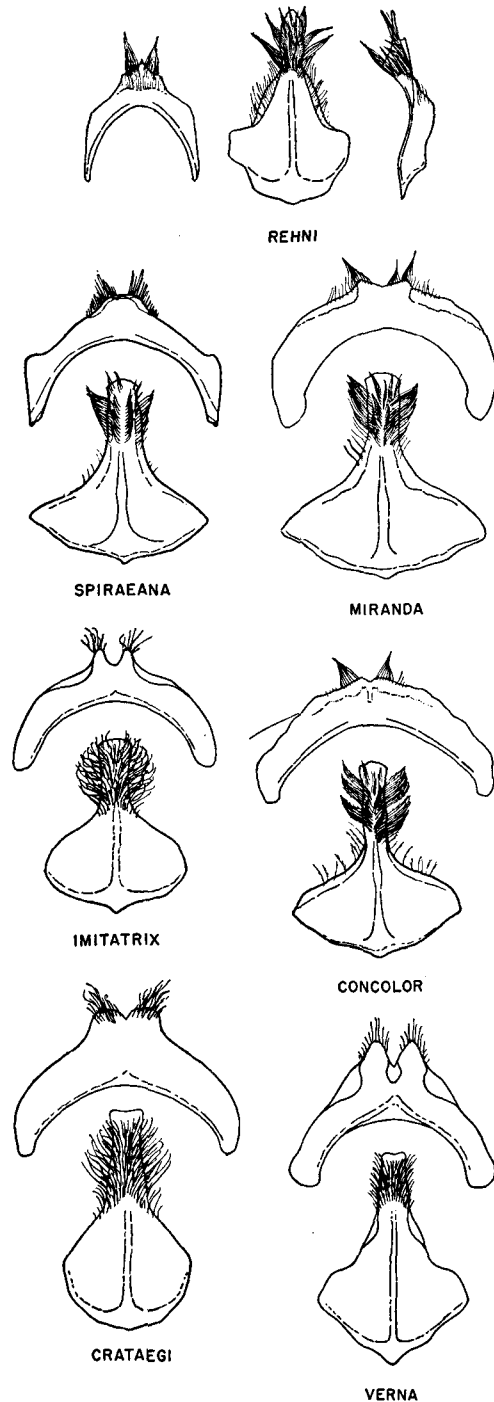


Figure 38
Sternal plates 7 (upper) and 8 of males in
species of *Andrena* (*Trachandrena*), *A.*
(*Mimandrena*) and *A.* (*Schizandrena*)

reticulate, posterior face less coarsely so, lateral faces becoming more rugose, triangle poorly defined; legs piceous, apical tarsal segments becoming more testaceous, all basitarsi slender and elongate; inner hind tibial spur rather strongly curved; tegulae piceous; wings rather strongly infuscated, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent very slightly beyond middle; abdominal terga smooth and shining, deeply and rather closely and finely punctate, punctures slightly more widely separated toward margin of impressed areas, these quite distinct, but rather narrow, with much finer punctures, discal pubescence very short, suberect, entirely pale, fasciae not developed; apical margin of sternum 6 quite strongly reflexed especially at lateral angles; apical portion of sternum 8 rather gradually narrowed form base to the narrowly rounded, subtruncate apex, slightly protuberant medially beneath, clothed with rather long and dense pubescence; penis valves slender apically, very strongly dilated basally, not excavated lateral-

ly; gonocoxites quite robust, abruptly dilated medially to form two elongate, apically rounded lobes, which are somewhat excavated on upper surface, gonocoxal lobes not developed.

DISTRIBUTION—Southern Canada and the Northern United States from British Columbia and Oregon to Nova Scotia and the New England states, south to North Carolina and Georgia; March to August.

FLOWER RECORDS—*Amelanchier*, *Aruncus*, *Brassica*, *Castanea*, *Ceanothus*, *Chrysanthemum*, *Cornus*, *Crataegus*, *Hydrangea*, *Malus*, *Potentilla*, *Prunus*, *Rhus*, *Rubus* and *Viburnum*. Recorded by Robertson (1929) on *Aruncus*, *Blephilia*, *Eulophus*, *Heracleum*, *Pastinaca*, *Philadelphus*, *Polytaenia*, *Prunus*, *Ptelea*, *Rhamnus*, *Salix*, *Taenidia* and *Zizia*. Recorded also by Brittain and Newton (1933 & 1934) on the following additional genera: *Caragana*, *Diervilla*, *Narcissus*, *Pyrus*, *Rosa*, *Spiraea*, *Taraxacum*, *Trifolium*, *Tulipa* and *Vaccinium*.

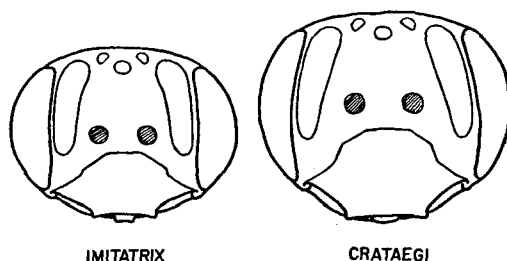


Figure 39—Facial view of female head, showing form of foveae in species of *Andrena* (*Mimandrena*) and *A.* (*Schizandrena*).

Table 5—Distribution of species of *Trachandrena*, *Schizandrena* and *Mimandrena* by states.

Trachandrena	New England					North Central					Mid Atlantic					South-eastern											
	Maine	New Hampshire	Vermont	Massachusetts	Rhode Island	Connecticut	Wisconsin	Michigan	Illinois	Indiana	Ohio	Kentucky	New York	New Jersey	Pennsylvania	Maryland	Delaware	West Virginia	Virginia	Dist. Columbia	Tennessee	North Carolina	South Carolina	Mississippi	Alabama	Georgia	Florida
alleghaniensis	X										X	X									X	X				X	X
arenakensis								X																			
atlantica												X	X									X	X			X	X
ceanothi	X			X				X		X	X											X				X	
compacta								X																			
daekei													X														
fenningeri								X	X		X	X										X				X	
forbesii	X	X	X	X		X	X	X	X	X	X	X	X	X	X				X	X	X	X	X			X	
heraclei								X											X			X					X
hippotes	X							X		X		X				X			X			X				X	
ilicis											X					X			X			X				X	X
kalmiae	X			X																		X					
mariae					X		X	X	X	X																	X
m. concolor					X			X	X	X	X	X										X					
mendica											X								X		X	X					
miranda	X			X		X	X	X	X	X	X	X	X						X	X						X	
montensis			X		X	X	X			X	X	X		X					X			X					
morrisonella		X		X		X	X	X	X	X	X	X	X						X	X	X	X				X	
nuda							X	X	X	X	X	X	X	X					X	X		X				X	
obscura						X		X														X					
pseudobscura	X				X		X		X		X				X					X		X					
pyracanthae																							X				
quintilis								X																			
rehni				X		X						X			X				X	X		X				X	
rubi																						X				X	
rugosa	X	X		X	X	X	X	X	X		X	X		X				X		X	X	X				X	
sigmundi	X	X		X	X	X	X	X		X	X											X				X	
spiraeana				X	X		X	X	X	X	X	X			X			X	X	X	X	X	X				
unica												X															
virginiana																			X								
votula							X	X																			
Schizandrena																											
crataegi	X	X	X	X	X	X	X	X		X	X	X	X					X	X		X	X				X	
Mimandrena																											
imitatrix	X	X		X	X	X	X	X	X	X	X	X		X	X			X	X	X	X	X	X	X		X	X
i.profunda				X	X	X		X		X		X							X			X				X	X
verna										X						X						X					

Andrena (Leucandrena) albisigna
Viereck

(Fig. 43)

Andrena (Andrena) albisigna Viereck, 1922.
Boston Soc. Nat. Hist. Occas. Papers 5, p.
38. ♀.

Andrena (Leucandrena?) albisigna Lanham,
1949. Univ. Calif. Pubs. Ent. 8, p. 220.
(classification)

FEMALE—Length 8 mm.; face somewhat longer than broad; clypeus strongly convex, somewhat produced, projecting nearly two-thirds below suborbital line, smooth and shining, deeply and rather coarsely punctate, punctures sparse in center, becoming rather close laterally; facial foveae narrow, occupying above no more than half of area between eyes and ocelli, covered with silvery tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, smooth but rather dull, punctures invident; malar space short but evident; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum quite large, broadly rounded, length about half the basal width; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull and tessellate, punctures of scutum shallow, but quite distinct, well separated but not sparse on scutum and scutellum; punctures of pleura minute and obscure; enclosure of propodeum finely roughened basally; propodeal corbicula poorly developed, short, pale ochraceous, anterior fringe indefinite; trochanteral flocus very short and poorly developed, pale ochraceous; hind tibiae slightly broadened apically, the scopa well developed, of simple, moderately elongate hairs, entirely pale ochraceous: fore and hind basitarsi considerably narrower than their tibiae, but mid basitarsi nearly as broad as mid tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but rather dull, punctures exceedingly minute, obscure and sparse, apical depressed areas rather shallow medially, occupying about one-third median length of disc, brownish-hyaline, becoming more yellowish toward rims, discal pubescence very short, thin, erect, entirely pale, fasciae very poorly developed, tergum 5 with a pale brownish, apical fimbria.

DISTRIBUTION—The New England states, south to Tennessee; June and July.

Andrena (Leucandrena) bifurcata
new species

(Figs. 40-42)

MALE—Length 7 mm.; head somewhat broader than the thorax; clypeus broad and flat, projecting but very slightly below suborbital line, finely and rather closely punctate beneath dense, white pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broad and flat, with a broadly rounded angle opposite upper portion of eye, rather dull, obscurely and minutely punctate; length of malar space equalling about one-third basal width of mandible; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very broad and short, median length about one-third the breadth, entire apically; mandibles long and slender, slightly curved, with a distinct, inner, subapical tooth, overlapping nearly one-half; pubescence of entire head, thorax and legs white, quite long and dense; thoracic integument dull, densely tessellate, without visible punctures; enclosure of propodeum tessellate, not markedly different from adjacent areas; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent about at middle; abdominal terga smooth, but dull, not visibly punctate, apical depressed areas quite shallow, occupying about one-third median length of discs, becoming yellowish-hyaline apically, discal pubescence very thin, short, erect, pale, apical fasciae not well developed; apical portion of sternum 8 slender and elongate, sides nearly parallel, without a distinct ventral protuberance, with rather long, thin pubescence to the tip, which is bifurcate; penis valves somewhat expanded basally but not excavated, gonocoxites quite slender, slightly dilated apically, the gonocoxal lobes broadly rounded, subtruncate, hardly at all produced.

TYPES—Holotype: Male, Ann Arbor, Mich., April 3, 1949 (U. N. Lanham). Paratypes: MICHIGAN: 1 ♂, Ann Arbor, 3rd Woods, Washtenaw Co., May 3, 1928 (F. M. Gaige). OHIO: 1 ♂, Licking Co., April 23, 1932 (Mary D. Neiswender). [All Dreisbach].

Andrena (?*Leucandrena*) *chippewaensis* new species

(Fig. 43)

FEMALE—Length 8 mm.; eyes very slightly convergent below; foveae broad, filling most of area between eyes and ocelli above, densely covered with pale ochraceous tomentum, reaching slightly below antennal line; vertex quite narrow, lateral ocelli separated from its margin by a space about equal to their diameter; cheeks somewhat shining, broader than eyes (ratio of about 3:2); clypeus evenly convex, protruding somewhat more than one-third below suborbital line, shining, with a median impunctate line, punctures on each side of this quite deep and distinct, becoming rather close at extreme lateral angles; malar space very short; process of labrum quite large, broad, evenly rounded, median length nearly half the basal width; basal segment of flagellum nearly equal in length to segments 2 and 3 combined; punctures of cheeks and vertex very minute and obscure, hardly evident; pubescence of head and thorax pale ochraceous above, becoming somewhat more whitish below, that on legs entirely pale ochraceous; scutum and scutellum smooth but rather dull and tessellate, punctures shallow, quite sparse over most of scutum, becoming somewhat closer and more coarse but still very shallow on scutellum; pleura smooth and rather dull, somewhat roughened anteriorly, but almost shining posteriorly; propodeal triangle rather sharply defined, finely rugoso-striate, becoming more finely rugose toward mid line, lateral portions of propodeum densely tessellate and dull above, lateral faces smooth and rather shining, propodeal corbicula very highly developed, with a dense, anterior fringe and without any inner hairs; trochanteral floccus complete, quite elongate and highly developed; legs dark, basitarsi rather slender, elongate and parallel-sided, hind tibial scopa of rather short, dense but simple hairs, the hind tibiae somewhat cuneate, gradually expanded apically, apex nearly twice width of basitarsi; spurs relatively straight, yellowish; wings pale fuliginous, veins and stigma more yellowish, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent at middle; tegulae testaceous-hyaline posteriorly, becoming fuscous anteriorly; abdominal terga somewhat shining, punctures of basal areas of each plate fine and obscure, but rather close and distinct on basal tergum, apical impressed areas of terga 2-4 shallow but broad, occupying about half length of each disc along mid line, these areas practically impunctate, discal pubescence extremely fine, short and obscure, hardly evident, fasciae not evident, tergum 5 with an apical, ochraceous fimbria.

TYPES—Holotype: Female, Chippewa Co., Mich., June 3, 1957 (R. & K. Dreisbach) [Dreisbach]. Paratype: 1♀, Charlotte Co., New Brunswick, June 26, 1956 (W. T. A. Neilson) [N. B. Dept. Agr.].

Andrena (*Leucandrena*) *erythronii*
Robertson

(Figs. 40-42)

- Andrena erythronii* Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 53. ♀ ♂.
Andrena erythronii Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 190 & 193. ♀ ♂. (key)
Andrena erythronii Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena (*Leucandrena*) *erythronii* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 220. (classification)
Andrena (*Leucandrena*) *erythronii* Michener, 1953. Kans. Univ. Sci. Bul. 35, p. 1035 (larva)
Andrena (*Leucandrena*) *erythronii* Michener, and Rettenmeyer, 1956. Kans. Univ. Sci. Bul. 37, pp. 645—679 (biology)

FEMALE—Length 11 mm.; clypeus flattened medially, projecting fully one-half below suborbital line, somewhat shining, with a distinct, median, slightly elevated, impunctate line on each side of which the punctures are rather fine, but deep and distinct, rather close; facial foveae rather broad, occupying above most of area between eyes and ocelli (as in *recta*, fig. 43), covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, rather smooth but dull, exceedingly minutely and obscurely punctate; malar space very short; basal segment of flagellum very slightly longer than 2nd and 3rd combined; process of labrum broadly subtriangular, with a narrowly truncate tip; mandibles of moderate length, with a distinct, subapical, inner tooth; pubescence of head, thorax, and legs entirely pale, tinged with yellowish above and on the more apical leg joints, more whitish below, thoracic integument dull, tessellate, punctures of scutum and scutellum fine, shallow and rather obscure, well separated anteriorly, becoming quite sparse on scutum posteriorly and on scutellum; pleura not visibly punctate; triangle of propodeum tessellate, not visibly differing from adjacent areas, propodeal corbicula well developed, with a distinct, anterior fringe, whitish; trochanteral floccus unusually long and dense, whitish; tibial scopa quite dense, hairs simple, of moderate length, pale anteriorly, more or less brownish medially; hind tibiae

rather slender and elongate, apex only slightly broader than their basitarsi which are quite slender; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, finely tessellate, punctures exceedingly minute and obscure, hardly visible, apical depressed areas rather shallow, occupying medially about one-third the length of the discs, becoming yellowish-hyaline toward rims, discal pubescence short, erect, rather dense, obscurely yellowish, terga 2-4 with thin, whitish fasciae, tergum 5 with a brownish, apical fimbria.

MALE—Length 8 mm.; clypeus broad and flat, projecting about one-half below suborbital line, somewhat shining but closely and finely punctate beneath dense, whitish pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very broad and flat, with a narrowly rounded angle opposite middle of eye, surface rather dull, punctures very minute and obscure; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum somewhat rounded, length about half the breadth; mandibles rather long and slender, with a distinct, inner, subapical tooth, overlapping about one-third; head slightly broader than thorax; pubescence of entire head, thorax and legs pale, tinged with yellowish above, more whitish below; thoracic integument dull, quite densely tessellate but somewhat shining on scutum posteriorly and on scutellum, where punctures are very fine and sparse, these becoming close but obscure on scutum anteriorly; pleura without visible punctures; triangle of propodeum densely tessellate, not differing markedly from adjacent areas; all basitarsi slender and elongate, slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, finely tessellate, punctures exceedingly minute and obscure, hardly visible, apical depressed areas shallow, rather narrow, becoming yellowish-hyaline along rims, discal pubescence thin, erect, rather short except on basal terga, faintly yellowish, fasciae poorly developed; apical portion of sternum 8 slender and elongate, but slightly dilated medially where there is a low ventral protuberance, long, dense pubescent from this to the rather narrowly truncate tip; penis valves only slightly expanded basally, not excavated, gonocoxites somewhat dilated apically, gonocoxal lobes slightly produced, rather broadly and evenly rounded.

DISTRIBUTION—Illinois and Michigan to Quebec, Maine and Massachusetts; April to June.

FLOWER RECORDS—This is recorded by Robertson (1929) on *Amelanchier*, *Claytonia*, *Erigenia*, *Erythronium*, *Hepatica*, *Prunus* and *Salix*.

Andrena (Leucandrena) parnassiae
Cockerell

(Figs. 40-43)

Andrena parnassiae Cockerell, 1902. Ann. Mag. Nat. Hist. (7) 9, p. 105. ♀.

Andrena parnassiae Graenicher, 1904. Ent. News 15, p. 66. ♀♂.

Andrena (Leucandrena) parnassiae, Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 220. (classification)

FEMALE—Length 10 mm.; head quite broad, length of face about equal to distance between eyes; eyes subparallel; foveae rather broad above, occupying most of space between eyes and ocelli, somewhat obscure because of dark tomentum, terminating slightly below level of antennae; lateral ocelli separated from margin of vertex by a space nearly twice their diameter; cheeks very slightly broader than eyes; clypeus quite short, protruding only slightly below suborbital line, somewhat shining, punctures scattered and irregular medially, rather sparse, becoming finer and closer toward lateral angles; face below ocelli rather smooth, dull, finely and obscurely striate, vertex smooth but rather dull, with very fine, scattered and irregular punctures, these becoming minute and irregular on the more shining cheeks; malar space hardly evident; process of labrum short and broad, median length no more than one-fourth its width; basal segment of flagellum fully equal to segments 2 and 3 combined, median segments about as long as broad; pubescence of lower portion of face and clypeus, and of thorax laterally and posteriorly, whitish, that on vertex and dorsum of thorax black; scutum smooth but rather dull, punctures very minute, those along anterior half shallow and obscure, becoming somewhat deeper and more distinct but very fine posteriorly, those on scutellum exceedingly minute and obscure; pleura smooth but dull, very finely tessellate; dorsal area of propodeum smooth but dull, lateral areas more densely tessellate, propodeal corbicula well developed, dorsal hairs elongate, with very few inner hairs; trochanteral flocus well developed and complete; legs dark, slender, all basitarsi quite narrow and elongate, pubescence largely pale, but with some obscure dark pubescence on front and mid ti-

biae, hind tibiae slender and elongate, scopal hairs entirely white, rather dense and elongate; spurs pale yellow; wings subhyaline, veins and stigma brownish-testaceous, 2nd submarginal cell no more than half length of 3rd, receiving 1st recurrent near middle; tegulae dark anteriorly, becoming somewhat testaceous-hyaline posteriorly; abdominal terga smooth, somewhat shining, punctures hardly evident, segments 2-4 rather broadly impressed apically, but the line of division very obscure, apical rims becoming very narrowly hyaline, fasciae very poorly developed, apical fimbria becoming fuscous.

MALE—Length 8 mm.; face fully as broad as long; head very much wider than thorax; clypeus very flat, projecting but very little below suborbital line, dull, finely and very closely punctate beneath rather dense pubescence; space between margin of vertex and lateral ocelli very slightly broader than diameter of ocelli; cheeks very broad, with a rounded subcarinate angle opposite upper third of eye, smooth, with sparse, minute punctures; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum very short and broad, broadly rounded; mandibles elongate, slender, flexed medially, with a distinct, inner, subapical tooth, overlapping nearly one-half; pubescence of head, thorax, and legs pale ochraceous; thoracic integument dull, tessellate, punctures of scutum shallow and rather sparse, surface somewhat more shining posteriorly; punctures of pleura very shallow and quite sparse; enclosure of propodeum quite smooth, less densely tessellate than areas on each side, but narrowly subrugose along basal margin; basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga quite smooth, somewhat shining, apical margins only very obscurely depressed, rims faintly reddened, punctures exceedingly minute and quite sparse, discal pubescence short, erect, very thin, entirely pale, apical fasciae very poorly developed; apical portion of sternum 8 narrow, with sides parallel, without a ventral median protuberance, apex rather abruptly truncate; penis valves only slightly broader basally than at apex, gonocoxites rather broadly dilated apically, gonocoxal lobes considerably produced, narrowly rounded apically.

DISTRIBUTION—Michigan, Wisconsin and Vermont; August and September.

FLOWER RECORDS—Type material collected on *Parnassia*.

Andrena (Leucandrena) picta
new species

FEMALE—Length 9 mm.; clypeus somewhat protuberent, broadly convex, projecting fully one-half below suborbital line, smooth and shining, with fine and rather sparse punctures which are well separated, even laterally, without a distinct, elevated, median, impunctate line; facial foveae rather broad, filling most of area between eyes and lateral ocelli (as in *seavillensis*, fig. 43), covered with whitish tomentum; space between margin of vertex and lateral ocelli, subequal to their diameter; cheeks broader than eyes, rounded posteriorly, smooth but rather dull, punctures exceedingly minute and obscure; malar space very short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum broadly rounded, full twice as broad as long; pubescence of head, thorax and legs entirely pale, tinged with yellow above and on the more apical leg segments, more whitish below and on the more basal segments; thoracic integument dull and densely tessellate, scutum and scutellum with some very fine, shallow, and quite sparse punctures; pleura not visibly punctate; triangle of propodeum not markedly differing from adjacent areas; propodeal corbicula rather short, with a distinct anterior fringe, whitish; trochanteral floccus well developed, long, dense and white; hind tibiae elongate and slender, apex not much broader than base, scopa white anteriorly, more brownish posteriorly, composed of rather coarse, long and rather loose hairs; all basitarsi quite slender, slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth but rather dull, not visibly punctate, apical depressed areas rather narrow and shallow, becoming yellowish-hyaline along rims, discal pubescence rather copious, erect, entirely pale, forming thin, whitish, apical fasciae on terga 2-4, tergum 5 with a brownish, apical fimbria.

TYPE—Holotype: Female, Ithaca, N. Y., April 24, 1915 [Cornell].

Andrena (Leucandrena) placida
Smith

(Figs. 40-42)

- Andrena placida* Smith, 1853. Cat. Hym. Brit. Mus., 1, p. 112. ♀.
Andrena macilentia Provancher, 1888. Addit. Corr. Faune Ent. Canad. Hym. p. 313. ♀ ♂.
Andrena macgillivrayi Cockerell, 1897. Entomologist 30, p. 308. ♀.
Andrena salicacea Robertson, 1900. Acad. Sci. St. Louis, Trans. 10, p. 48. ♀.
Andrena placida Morice and Cockerell, 1901. Canad. Ent. 33, p. 151. (type)

Andrena placida Cockerell, 1906. Psyche 13, p. 7. (type)

Andrena placida Clements and Long, 1923. Carnegie Inst. Wash. Pub. 336, p. 249. (ecology)

Andrena placida Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

Andrena (Leucandrena) placida Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 220. (classification)

FEMALE—Length 10 mm.; clypeus broadly convex, projecting somewhat less than one-half below suborbital line, surface dull, finely tessellate, rather sparsely and finely punctate medially, punctures becoming close and fine laterally; facial foveae narrow, occupying above about half the space between eyes and ocelli (as in *recta*, fig. 43), covered with silvery tomentum; space between margin of vertex and lateral ocelli somewhat less than diameter of ocelli; cheeks broader than eyes, rounded posteriorly, rather smooth, punctures very minute and obscure; malar space very short; basal segment of flagellum longer than 2nd and 3rd combined; process of labrum elongate, rounded apically, fully as long as broad; mandibles of the usual length, with a

distinct inner subapical tooth; pubescence of head, thorax and legs entirely pale, tinged with yellowish on vertex and dorsum of thorax, more whitish below and on the more basal leg segments; thoracic integument dull, tessellate, punctures of scutum and scutellum fine and shallow, sparse except over anterior portion of scutum; pleura without evident punctures; enclosure of propodeum very finely rugose; propodeal corbicula rather short, with a distinct anterior fringe, whitish; trochanteral floccus well developed, long and white; hind tibial scopa well developed, white, with a few inconspicuous, brownish hairs posteriorly, hairs simple, of moderate length; hind tibiae slender and elongate, not much wider than their basitarsi, front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; apical depressed areas of abdominal terga occupying about one-third the median length of the discs, entirely impunctate, becoming yellowish-hyaline along rims, discs somewhat shining, nearly impunctate, the punctures exceedingly minute, sparse and obscure, discal pubescence entirely pale, short, suberect and thin, terga 2-4 with thin, white, apical fasciae, that on tergum 2 broadly interrupted medially, tergum 5 with a brownish, apical fimbria.

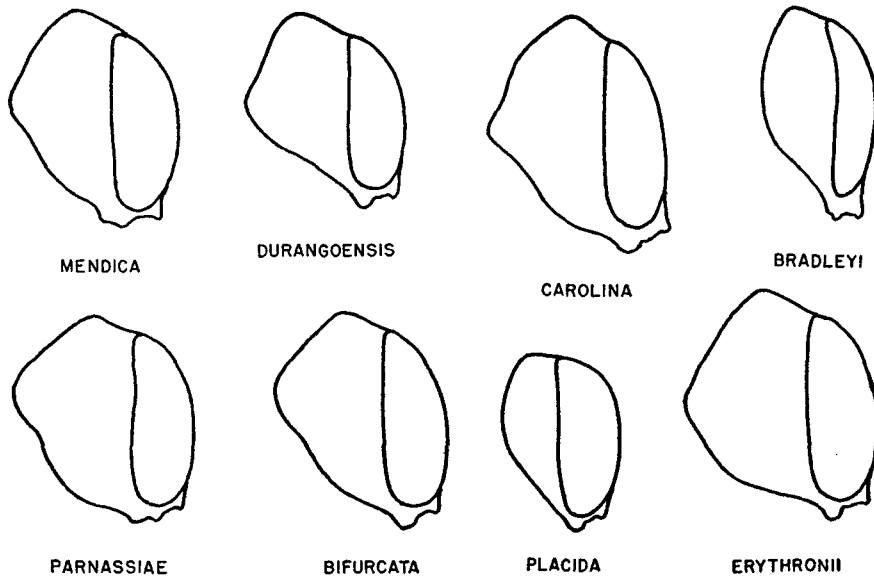


Figure 40—Lateral view of male head, showing form of cheeks in species of *Andrena* (*Trachandrena*), *A. (Conandrena)*, and *A. (Leucandrena)*.

MALE—Length 8 mm.; clypeus very slightly convex, projecting but very slightly below suborbital line, dull, finely punctate, punctures well separated medially, becoming close laterally beneath the dense, whitish pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather smooth punctures exceedingly minute and obscure; malar space extremely short; basal segment of flagellum longer than 2nd segment, but shorter than 2nd and 3rd combined; process of labrum quite narrow and elongate, rounded apically, its median length subequal to its breadth; mandibles of moderate length, slender, slightly curved, with a distinct inner subapical tooth, overlapping about one-third; pubescence of entire head, thorax and legs whitish; thoracic integument dull, quite densely tessellate, punctures of dorsum of thorax very shallow, obscure and sparse except across anterior portion of scutum, where they are somewhat closer and more coarse; pleura more finely subrugose; enclosure of propodeum finely rugose; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, somewhat shining, nearly impunctate, punctures exceedingly minute and obscure, quite sparse,

apical depressed areas rather shallow, occupying about one-third median length of discs, becoming yellowish-hyaline along rims, discal pubescence thin, erect, pale, terga 2-4 with thin, whitish, apical fasciae, that on tergum 2 widely interrupted medially; apical portion of sternum 8 rather robust, sides nearly parallel, apex truncate, ventral protuberance low and inconspicuous, with short but dense pubescence from this to near the tip; penis valves slightly expanded basally, not excavated, gonocoxites somewhat dilated apically, gonocoxal lobes strongly produced, rather slender, narrowly rounded apically.

DISTRIBUTION—According to the Catalog of Hymenoptera, this is transcontinental in Southern Canada and the Northern United States. Specimens have been seen from the following states: Illinois, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Virginia, Washington (state); April—July.

FLOWER RECORDS — *Amelanchier*, *Fragaria*, *Prunus* and *Viburnum*, Recorded by Brittain & Newton (1934) on *Acer*, *Pyrus malus* and *Taraxacum*.

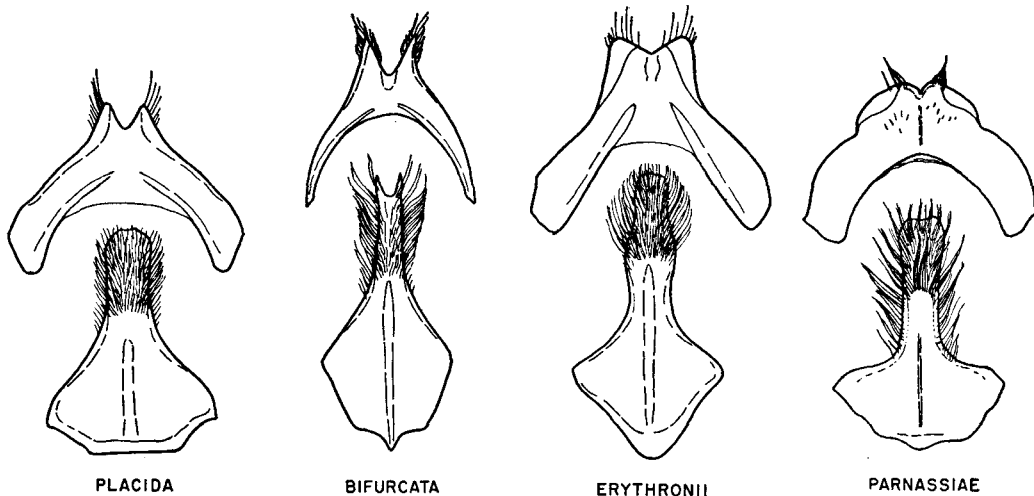


Figure 41—Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Leucandrena*).

Andrena (Leucandrena) recta
new species

(Fig. 43)

FEMALE—Length 9 mm.; clypeus broadly convex, projecting about one-half below suborbital line, shining, punctures rather irregular and sparse medially, becoming somewhat more close and distinct laterally, with a rather broad but indefinite, median, impunctate line; facial foveae rather narrow, occupying above only slightly more than half of space between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures minute, close and rather obscure; malar space short; basal segment of flagellum subequal to 2nd and 3rd combined; pubescence of head, thorax and legs pale ochraceous, becoming somewhat infuscated on the more apical leg joints; thoracic integument dull, punctures of scutum shallow and obscure, well separated but not sparse anteriorly, becoming more sparse and obscure posteriorly, those on scutellum hardly visible, surface quite smooth, more shining; pleura dull and tessellate; propodeal corbicula well developed; anterior fringe rather poorly developed; trochanteral floccus well developed; tibial scopa rather dense, hairs of moderate length, not visibly plumose, whitish; hind tibiae rather slender and elongate, basitarsi somewhat narrower, mid basitarsi fully as broad as mid tibiae, with short fuscous hairs along anterior margin; 2nd submarginal cell very short, receiving 1st recurrent toward apex; abdominal terga smooth but dull, entirely impunctate, apical depressed areas rather narrow, becoming narrowly yellowish-hyaline along rims, discal pubescence very short, sparse and inconspicuous, dark on the more apical terga, terga 2-4 with quite dense, entire, whitish, apical fasciae, tergum 5 with a dense, brownish-fuscous, apical fimbria.

TYPES—Holotype: Female, Grandfather Mt., N. C., Sept. 21, 1945 (Mitchell) [author's coll.]. Paratypes: NORTH CAROLINA: 1♀, topotypical. MICHIGAN: 1♀, Midland Co., Aug. 27, 1950 (R. R. Dreisbach). PENNSYLVANIA: 1♀, Cambria Co., Aug. 25, 1925 (C.F. Byers). MINNESOTA: 1♀, Sedan, July 1928 (Donald Denning); 1♀, J. C. Golf Club, Ramsey Co., Aug. 9, 1922 (C. E. Mitchell); 1♀, Crookston, July 24, 1951 (R. L. Fischer, on *Helianthus annuus*). NEW YORK: 1♀, Derby, Aug. 18, 1951 (K. V. Krombein); 1♀, Ithaca, Aug. 24, 1954 (prey of *Philanthus*) (C. S. Lin).

Paratypes are located at the University of Michigan, the University of Minnesota, Cornell University, the U. S. National Museum, and in the collections of R. R. Dreisbach, R. L. Fischer, and the author.

Andrena (? Leucandrena) seavillensis
new species

(Fig. 43)

FEMALE—Length 9 mm.; face somewhat longer than distance between eyes; eyes parallel; foveae broad, occupying most of area between eyes and ocelli above, terminating below about at level of antennae, covered with pale yellowish tomentum; lateral ocelli separated from margin of vertex by about their own diameter; cheeks slightly broader than eyes; clypeus broadly convex, protruding about one-half below suborbital line, smooth and shining over most of disc but becoming somewhat dull laterally, nearly impunctate, with only a very few scattered, minute punctures over central area, and with a few minute and obscure punctures toward extreme sides; face below ocelli finely substriate, with a few obscure punctures toward antennae, vertex smooth but rather dull, with a few fine and rather close punctures near center and between ocelli, but impunctate laterally, becoming shining just above eyes; cheeks quite smooth, rather dull, with minute and rather widely spaced punctures; malar space evident but short, about one-fourth width of mandible at base; process of labrum broadly triangular, with a very narrowly subtruncate tip, median length about half basal width; basal segment of flagellum slightly shorter than segments 2 and 3 combined, these and the following segments slightly longer than broad; pubescence of head and thorax pale yellowish, quite copious except for the largely bare clypeus, rather short and dense on dorsum of thorax, but not hiding surface, long and copious on thorax laterally; scutum and scutellum dull and densely tessellate, scutum with minute and very obscure, rather widely spaced punctures, scutellum entirely impunctate; pleura smooth but rather dull, becoming somewhat shining and rather sparsely and finely punctate anteriorly and above, entirely impunctate posteriorly; dorsal area of propodeum finely tessellate, rather poorly defined from the lateral densely tessellate areas; propodeal corbicula rather well developed, largely bare centrally, and without an anterior fringe; trochanteral floccus complete; legs somewhat reddened basally, becoming testaceous on apical tarsal segments, slender in general, basitarsi quite narrow and parallel-sided, hind tibiae

slender, scopal hairs somewhat elongated, entirely pale yellowish, spurs pale yellow; wings subhyaline, veins and stigma pale yellowish, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent slightly beyond middle; tegulae yellowish-hyaline, somewhat darkened anteriorly; abdominal terga smooth but dull, quite densely tessellate, basal segments with rather widely spaced, minute and barely visible punctures, the more apical segments with similar but somewhat more obscure punctures, apical margins of segments 2-4 rather narrowly and shallowly impressed, these areas very slightly reddened and becoming hyaline along rims, discal pubescence entirely pale, rather obscure but evident, suberect, apical margins of segments 1-4 with rather loose, whitish, apical fasciae, obscure on segment 1, slightly interrupted on 2, apical fimbria brownish.

TYPE—Holotype: Female, South Sea-ville, N. J., May 20, 1923 (J. C. Bradley) [Cornell Univ.]

ΕΥΑΝΔΡΩΝΑ

VII

Andrena (Thysandrena) algida Smith

(Figs. 42-44)

Andrena algida Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 116. ♀ ♂.

Andrena algida Morice & Cockerell, 1901. Canad. Ent. 33, p. 150. (type)

Andrena algida Cockerell, 1906. Psyche 13, p. 7. ♀. (type)

Andrena (Andrena) fuscisignata Viereck, 1917. Amer. Ent. Soc. Trans. 45, p. 379. ♀ ♂. New synonymy.

Andrena algida Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 209. ♀ ♂. (key)

Andrena algida Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

Andrena (Thysandrena) fuscisignata Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 214. (classification)

FEMALE—Length 10 mm.; clypeus rather strongly convex, projecting not quite one-half below suborbital line, rather dull, punctures quite distinct but rather shallow, rather sparse medially, becoming quite close but more obscure laterally; facial foveae narrow and quite short, occupying above no more than half of area between eyes and ocelli, covered with brownish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, dull, very obscurely punctate; malar space short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, about twice as broad as long, imperfectly semicircular; pubescence of head, thorax and

legs entirely white; thoracic integument dull, quite densely tessellate, punctures of scutum very shallow and obscure, well separated anteriorly but not sparse, becoming rather sparse but more minute and obscure posteriorly, those on scutellum scattered, irregular and obscure; pleura densely tessellate, punctures inevident; enclosure of propodeum dull, tessellate, obscurely subrugose toward base; propodeal corbicula very poorly developed, without an anterior fringe; trochanteral flocus rather short; tibial scopa quite dense, hairs moderately long, simple, entirely white; hind tibiae slender and elongate, all the basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell nearly as long as 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, very minutely and rather sparsely punctate, apical depressed areas rather narrow and obscure, becoming hyaline along rims, pubescence short, thin, suberect, entirely white, forming loose apical fasciae on terga 2-4, that on tergum 2 interrupted medially, tergum 5 with a quite dense, pale brownish, apical fimbria.

MALE—Length 7 mm.; clypeus rather strongly protuberant and convex, projecting about one-half below suborbital line, rather uniformly, deeply, finely and rather closely punctate beneath the quite dense, fuscous pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, somewhat flattened, rounded posteriorly, surface dull, punctures very obscure; length of malar space nearly one-third basal width of mandible; basal segment of flagellum very slightly longer than 2nd segment, subequal to 3rd; process of labrum fully twice as broad as long, slightly narrowed apically, apex quite broadly truncate; mandibles rather short, nearly straight, with a distinct, inner, subapical tooth, scarcely overlapping; pubescence of head fuscous on clypeus, inner margins of eyes, between antennae and on cheeks above, whitish on cheeks below, between clypeus and antennae and on vertex; thoracic integument dull, densely tessellate, scutum, scutellum, and pleura practically impunctate; enclosure of propodeum dull and densely tessellate; pubescence of thorax and legs largely whitish, a few dark hairs on each extreme side of scutum; basitarsi slender and elongate, narrower than their tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth and somewhat shining, punctures exceedingly minute and rather sparse, apical depressed areas rather narrow but distinct, reddish-hyaline, discal pubescence short, suberect, entirely pale, fasciae not de-

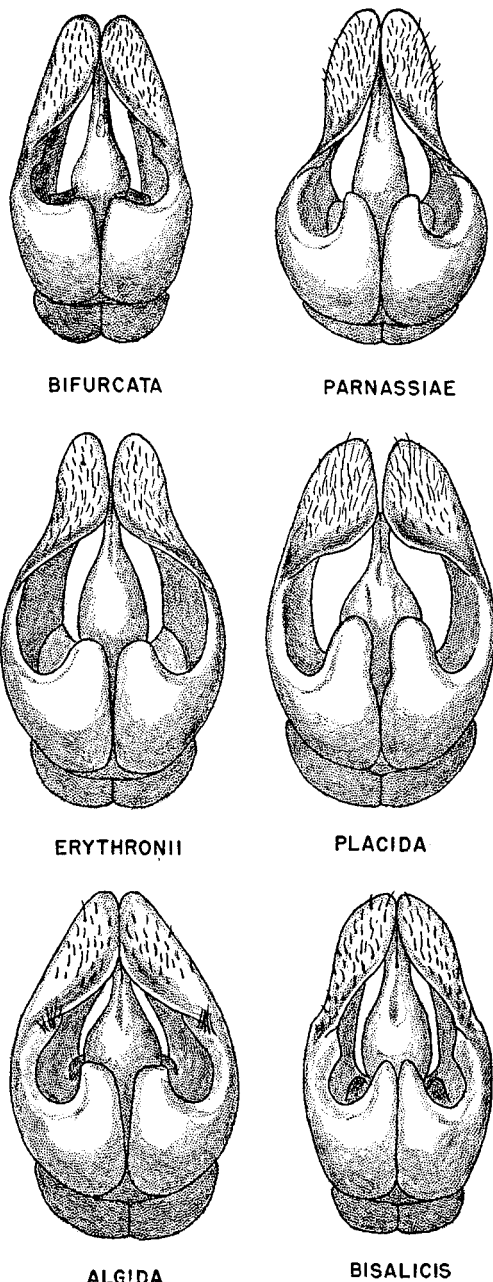


Figure 42

Apical flexed portion of male genital armature in species of *Andrena* (*Leucandrena*) and *A.* (*Thysandrena*).

veloped; apical portion of sternum 8 rather short, narrow basally, but rounded and slightly dilated apically, not protuberant ventrally, and very sparsely and thinly pubescent; penis valves slender, slightly expanded basally, gonocoxites also quite slender, very slightly dilated apically, gonocoxal lobes produced, narrowly rounded.

DISTRIBUTION—Minnesota to Nova Scotia and Hudson's Bay, including Michigan. New York and the New England states; April to June.

FLOWER RECORDS—Brittain & Newton (1934) record this species on *Fragaria*.

Lanham (1949) assigned *algida* to *Gonandrena*, but the type has been examined by this writer and in his opinion it is synonymous with *fuscisignata* Viereck which Lanham assigned to *Thysandrena*. Moreover, *algica* bears little resemblance to the other species of *Gonandrena*.

Andrena (*Thysandrena*) *bisalicis*
Viereck

(Figs. 42-44)

Andrena salicis Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 53. ♀ ♂. Preocc.

Andrena salicis Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 191 & 192. ♀ ♂. (key)

Andrena bisalicis Viereck, 1908. Ent. News 19, p. 42. (new name)

Andrena (*Andrena*) *adelae* Viereck, 1922. Boston Soc. Nat. Hist. Occas. Papers 5, p. 37. ♀.

Andrena (*Thysandrena*) *bisalicis* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 214. (classification)

Andrena bisalicis Krombein, 1958. Hymenoptera of America North of Mexico. Synoptic Catalog. U.S.D.A. Agr. Monog. No. 2. First Suppl., p. 212. (synonymy)

FEMALE—Length 9 mm.; clypeus moderately convex, projecting about one-half below suborbital line, rather dull, punctures deep and distinct but rather fine, quite sparse medially, becoming rather close laterally; facial foveae rather narrow, occupying above only slightly more than half of area between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks not much broader than eyes, rounded posteriorly, dull, punctures invident; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather small, much broader than long, apex rather broadly truncate; pubescence of head, thorax and legs pale ochraceous, rather short; thoracic integument dull, punctures of scutum fine, well separated but be-

coming sparse only near center posteriorly, those on scutellum somewhat more distinct, scattered and rather sparse, surface more shining; pleura dull, quite densely tessellate, punctures very obscure; enclosure of propodeum dull, densely tessellate; propodeal corbicula rather short, with a very short, anterior fringe, pale ochraceous; trochanteral flocus quite long and dense, pale ochraceous; hind tibiae quite narrow and elongate, scopa quite dense, hairs of moderate length, simple, pale ochraceous; all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, rather densely tessellate, apical margins rather narrowly and obscurely impressed, becoming obscurely hyaline toward rims, entire discs impunctate, discal pubescence very short and obscure, entirely pale, but forming rather loose and thin, whitish, apical fasciae on terga 2-4, this interrupted on tergum 2 medially, tergum 5 with a quite dense, pale fulvous, apical fimbria.

MALE—Length 7 mm.; clypeus rather flat, projecting about one-third below suborbital line, quite uniformly, closely and finely punctate beneath the rather short, dense pubescence; space between margin of vertex and lateral ocelli slightly less than their diameter; cheeks slightly broader than eyes, rounded posteriorly, dull, punctures very obscure; malar space exceedingly short; basal segment of flagellum longer than 2nd segment, much shorter than 2nd and 3rd combined; process of labrum quite small, broader than long, sub-

triangular, apex truncate and slightly incised; mandibles short, with a small, inner, sub-apical tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely whitish-ochraceous; thoracic integument dull, finely tessellate, punctures of scutum minute and obscure, well separated, becoming sparse in center posteriorly, those on scutellum sparse and obscure; pleura densely tessellate, impunctate, quite densely long pubescent; enclosure of propodeum dull, densely tessellate; all basitarsi slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga dull, densely tessellate, impunctate except for some exceedingly minute and obscure punctures at extreme sides of discs, apical margins rather narrowly but distinctly depressed, pubescence short, sub-erect, entirely pale, fasciae lacking or very poorly developed toward extreme sides; apical portion of sternum 8 slender and elongate, without a distinct, median, ventral protuberance, apical half quite densely long pubescent to the narrowly truncate tip; penis valves slightly dilated toward base, not excavated, gonocoxites slender, very slightly dilated apically gonocoxal lobes quite strongly produced, narrowly rounded.

DISTRIBUTION—North Dakota to the New England states, south to South Carolina and Georgia; March to July.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Brassica*, *Crataegus*, *Ilex*, *Prunus* and *Salix*.

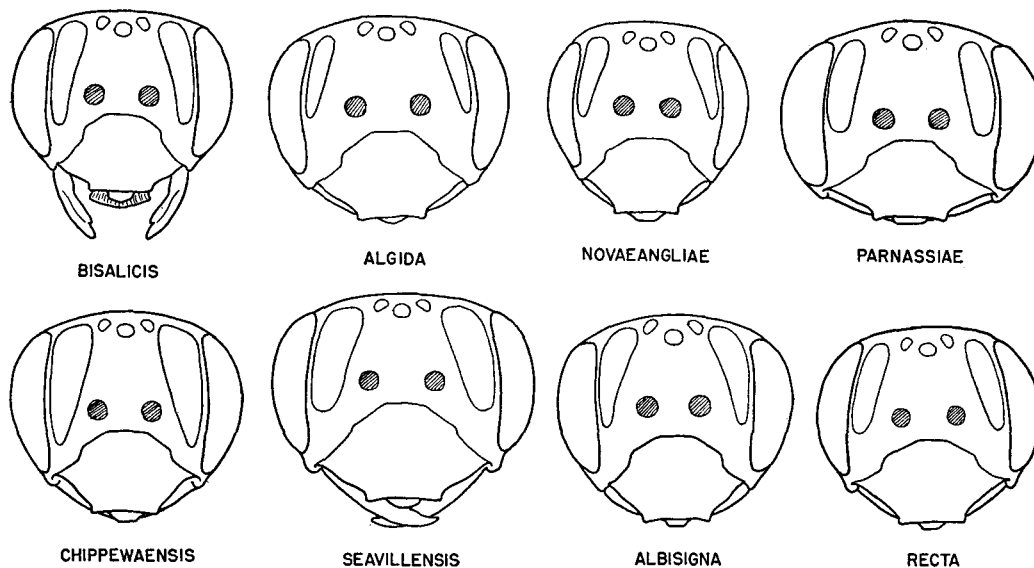


Figure 43—Facial view of female head, showing form of foveae in species of *Andrena* (*Leucandrena*) and *A. (Thysandrena)*.

Andrena (Thysandrena) crenata
new species

(Figs. 44 & 51)

MALE—Length 7.5 mm.; face somewhat longer than distance between eyes; eyes nearly parallel; lateral ocelli separated from margin of vertex by about their own diameter; cheeks and eyes subequal in width; clypeus quite strongly convex and protuberant, projecting fully one-half below suborbital line, somewhat shining, with deep, distinct, rather coarse and evenly distributed punctures, these however becoming somewhat closer and finer toward extreme lateral angles; face below ocelli densely and rather finely rugose, vertex dull and densely tessellate, with punctures exceedingly obscure; cheeks somewhat smoother but rather dull, with a few minute punctures evident along narrow area adjacent to eye; malar space evident but very short; process of labrum very short and broad, being more transverse, broadly truncate, median length less than half basal width; mandibles quite short, barely reaching beyond midline of face, tips ferruginous, with a subapical, inner tooth near apex; basal segment of flagellum slightly shorter than segments 2 and 3 combined, segment 2 slightly broader than long, 3rd and following segments becoming successively more elongate; pubescence of head and thorax entirely whitish, head largely denuded, pubescence on thorax more copious, elongate and erect; scutum and scutellum dull and densely tessellate, punctures shallow, rather fine and obscure, well separated even anteriorly; pleura dull, densely tessellate, without evident punctures; dorsal area of propodeum very finely substriate along basal margin, these striae disappearing toward the lateral margins, lateral areas densely tessellate; propodeal corbicula rather well developed; legs dark, slender, entirely whitish pubescent, spurs pale yellowish; wings subhyaline, veins pale testaceous, stigma somewhat more ferruginous, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent slightly beyond middle; tegulae dark anteriorly, becoming testaceous-hyaline posteriorly; abdominal terga smooth, rather dull toward base of each segment, becoming somewhat more shining apically, punctures fine but distinct, well separated and evenly distributed, apical margins very shallowly impressed, these areas largely impunctate, pubescence entirely pale, fasciae not evident; sternum 7 with a deep, triangular, median emargination, each side of this more or less triangular, with a fine tuft of hairs; basal portion of sternum 8 somewhat triangular on each side, apical portion short, finely pubescent, with truncate tip; penis valves slightly ex-

cavated basally, narrowed and slender apically, not quite attaining tips of gonocoxites which are only slightly expanded, gonocoxal lobes short, broadly rounded.

TYPES—Holotype: Male, Arenak Co., Mich., May 30, 1951 (R. R. Dreisbach). Paratypes: MICHIGAN: 1♂, Midland Co., May 12, 1944 (Dreisbach); 1♂, Mackinac Co., June 7, 1957 (R. & K. Dreisbach) [all Dreisbach].

Andrena (Thysandrena) geranii
Robertson

(Figs. 44 & 45)

Andrena geranii Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 54. ♀ ♂.
Andrena geranii Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 190 & 192. ♀ ♂. (key)
Andrena geranii Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena (Thysandrena) geranii Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 214. (classification)

FEMALE—Length 9 mm.; clypeus quite strongly protuberant and convex, projecting nearly one-half below suborbital line, shining, punctures deep and distinct but rather fine and quite sparse, without a distinct, median, impunctate line; facial foveae rather narrow, occupying above about two-thirds of area between eyes and lateral ocelli, (as in *novaeangliae*, fig. 43) covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, punctures very minute and obscure; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, apex rather narrowly truncate; pubescence of head, thorax and legs silvery-white, becoming fuscous on the more apical leg joints; thoracic integument rather dull, punctures of scutum fine and shallow, but distinct, well separated but not sparse in center posteriorly, scutellum somewhat more shining, punctures deep and distinct, rather sparse and irregular; pleura dull and densely tessellate, punctures barely evident; enclosure of propodeum dull, obscurely substriate toward basal margin; propodeal corbicula very thin and poorly developed, without an anterior fringe; trochanteral floccus short and poorly developed, white; hind tibiae rather slender and elongate, all basitarsi only slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly basad of middle; abdominal

terga smooth and shining, very minutely and quite sparsely punctate, punctures invading apical depressed areas which are shallow and obscure, occupying medially about one-third length of discs and becoming faintly testaceous along rims, discal pubescence thin but quite long and erect, entirely pale, forming rather narrow, loose apical fasciae on terga 2-4, tergum 5 with a quite dense, brownish, apical fimbria.

MALE—Length 8 mm.; clypeus rather strongly convex, projecting about one-third below suborbital line, shining, punctures deep and distinct, rather sparse medially, becoming rather close laterally; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, dull, very obscurely and minutely punctate; malar space extremely short; basal segment of flagellum slightly longer than 2nd segment, but considerably shorter than 2nd and 3rd combined; process of labrum about twice as broad as long, obscurely subtriangular, apex rather broadly truncate; mandibles rather short, with a distinct, inner, subapical tooth, very slightly overlapping; pubescence of head, thorax and legs silvery-white; thoracic integument dull, finely tessellate, punctures of scutum shallow and rather indistinct, well separated, becoming somewhat sparse in center posteriorly, those on scutellum somewhat deeper and more distinct, irregularly scattered, surface more shining; pleura densely tessellate, punctures very obscure; enclosure of propodeum dull and densely tessellate; basitarsi slender, considerably narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent near base; abdominal terga somewhat shining, minutely and rather sparsely punctate, apical depressed areas narrow and obscure, becoming yellowish-hyaline along rims, pubescence entirely pale, short and erect, forming loose, narrow, white, apical fasciae on terga 2-4; apical portion of sternum 8 abruptly narrowed at the base, parallel-sided, but rather broadly dilated apically, the apex truncate and slightly incurved, very thinly pubescent; penis valves narrow, not at all broadened basally, gonocoxites slender but very slightly dilated apically, gonocoxal lobes rather strongly produced, but narrowly rounded.

DISTRIBUTION—Colorado and Minnesota, east to Virginia and the New England states; April to July.

FLOWER RECORDS — *Hydrophyllum*. Robertson (1929) records this species on *Arabis*, *Blephilia*, *Geranium*, *Osmorrhiza* and *Polymonium*.

Andrena (Thysandrena) lata Viereck

(Figs. 44 & 45)

- Andrena (Andrena) lata* Viereck, 1922. Boston Soc. Nat. Hist. Occas. Papers 5, p. 39. ♀.
Andrena (Andrena) vulgaris Viereck, 1922. Opp. cit. p. 40. ♂. New synonymy.
Andrena lata Atwood, 1934. Canad. Jour. Res. 10 (2), pp. 208 & 210. ♀ ♂ (key)
Andrena lata Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261 (flower records)
Andrena (Thysandrena) lata Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 214. (classification)

FEMALE—Length 9 mm.; clypeus convex, projecting about one-half below suborbital line, rather dull, punctures fine and well separated medially, becoming closer laterally, without a median impunctate line; facial foveae rather broad above, occupying about two-thirds of area between eyes and lateral ocelli, (as in *bisalicis*, fig. 43) covered with whitish tomentum; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks broader than eyes, rounded posteriorly, somewhat shining, very minutely, obscurely and rather closely punctate; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum much broader than long, subtriangular, apex narrowly truncate; pubescence of head and thorax whitish; thoracic integument dull and tessellate, punctures of scutum shallow and rather obscure, well separated but not sparse anteriorly, becoming quite sparse posteriorly, and sparse and minute on scutellum; pleura more densely tessellate, punctures invident; enclosure of propodeum dull, densely tessellate; propodeal corbicula rather short, anterior fringe poorly developed; trochanteral flocus rather well developed, whitish; tibial scopa dense, hairs rather long, mostly simple or very obscurely plumose, pale ochraceous, becoming somewhat brownish posteriorly, hind tibiae rather slender and elongate; all basitarsi slightly narrower than their respective tibiae; basal segments of legs pale pubescent, becoming brownish pubescent on the tarsi; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent at middle; abdominal terga somewhat shining, very faintly greenish, microscopically tessellate, impunctate except for some exceedingly minute and obscure punctures laterally, apical margins rather narrowly but distinctly depressed, these areas becoming reddish-hyaline toward rims, discal pubescence exceedingly short and obscure, entirely pale, segments subfasciate toward sides, the fasciae loose, pale ochraceous, tergum 5 with a quite dense, apical, brownish fimbria.

MALE—Length 7 mm.; clypeus rather markedly convex, projecting about one-third below suborbital line, rather smooth and shining, punctures quite deep, distinct and rather fine, close laterally, more distinctly separated medially beneath rather dense, whitish pubescence; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rather flat, rounded posteriorly, somewhat shining, punctures exceedingly obscure; malar space very short; basal segment of flagellum longer than 2nd segment, subequal to 3rd; process of labrum short and rather broad, apical margin rather broadly emarginate; mandibles of moderate length, with a small but distinct inner subapical tooth, overlapping about one-third; pubescence of head, thorax and legs dull white, faintly yellowish; thoracic integument dull, tessellate, punctures of scutum very fine and obscure, well separated anteriorly, becoming quite sparse in center posteriorly, those on scutellum exceedingly minute, scattered and obscure; pleura dull, rather densely tessellate, punctures inevident; enclosure of propodeum dull, densely tessellate; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near middle; abdominal terga somewhat shining, faintly greenish, with rather sparse and exceedingly minute punctures, apical margins rather narrowly but distinctly depressed, these areas becoming reddish-hyaline toward rims, pubescence short, erect, pale, apical fasciae barely evident at extreme sides; sternum 7 produced medially, this area deeply emarginate, resulting in a pair of narrow, elongate lobes; apical portion of sternum 8 narrow and elongate, the sides nearly parallel, with a low but distinct, median, ventral protuberance, quite densely pubescent from this to near the apex, which is slightly incised medially; penis valves slightly expanded basally, but not excavated, gonocoxites slightly dilated apically, gonocoxal lobes slightly produced, narrowly rounded.

DISTRIBUTION—Minnesota to Nova Scotia and the New England states, south to North Carolina and Georgia; March to July.

FLOWER RECORDS — *Brassica*, *Hydrangea*, *Potentilla*, *Prunus* and *Rubus*. Recorded by Brittain and Newton (1934) on *Pyrus malus*.

Both *lata* ♀ and *vulgaris* ♂ were described in the same paper (Viereck 1922) but the relationship was not suggested. The type of *lata* was deposited in the Bos-

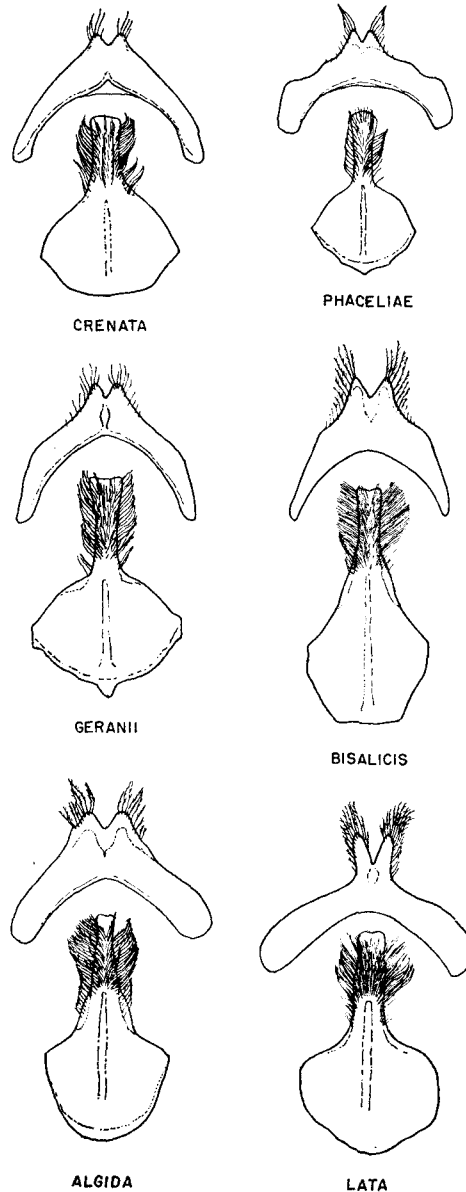


Figure 44
Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Thysandrena*).

ton Society of Natural History, and is now in the collection of the Museum of Comparative Zoology at Harvard University. According to Viereck's paper, the type of *vulgaris* was also on deposit in the Boston Society, but it could not be found in that collection. A specimen labelled "Type" in Viereck's handwriting has been found in the Philadelphia Academy of Science, however, and it agrees with the male of *lata* as it is now interpreted.

Andrena (Thysandrena) novae-angliae
Viereck

(Fig. 43)

Andrena novae-angliae Viereck, 1907. Ent. News 18, p. 283 ♀.

Andrena nivaloides Graenicher, 1911. Pub. Mus. Milwaukee, Bul. 1, p. 235. ♀. New synonymy

Andrena (Andrena) tumida Viereck, 1922. Boston Soc. Nat. Hist. Occas. Papers 5, p. 35. ♀ ♂.

Andrena novae-angliae Atwood, 1934. Canad. Jour. eRs. 10, p. 207. ♀. (key)

Andrena (Thysandrena) novaeangliae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 214 (Classification)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus strongly convex, protuberant, projecting fully one-half below suborbital line, shining, punctures deep and distinct but moderately fine, rather sparse medially, becoming close laterally, but without a distinct, median, impunctate line, facial foveae rather narrow, occupying above about two-thirds of area between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli less than their diameter; cheeks broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and obscure; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, about twice as broad as long, imperfectly subtriangular or semicircular; pubescence of head, thorax and legs whitish-ochraceous, somewhat paler below; thoracic integument quite dull, punctures of scutum fine and quite close, somewhat more widely separated posteriorly, those on scutellum quite sparse, except in mid line and extreme sides; pleura more densely pubescent, the punctures very shallow and obscure; enclosure of propodeum dull, very finely subrugose toward base, propodeal corbicula short, poorly developed, without an anterior fringe; trochanteral floccus poorly developed, quite short, whitish; tibial scopa rather dense, the hairs simple, elongate, pale ochraceous; hind tibiae quite slender and elongate, all the basi-

tarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly basad of middle; abdominal terga somewhat shining, punctures very fine, rather close laterally, becoming more widely separated but not sparse medially, depressed apical areas rather shallow, occupying medially about one-third length of disc, becoming yellowish-hyaline along rims, pubescence very short, suberect, entirely pale, forming very loose and narrow, whitish, apical fasciae on terga 2-4, that on 2 and 3 interrupted medially, tergum 5 with a quite dense, apical, brownish-fuscous fimbria.

DISTRIBUTION — Alberta, Minnesota and Illinois, east to New York, the New England states and Nova Scotia; May to July.

FLOWER RECORD — *Angelica*.

Andrena (Thysandrena) phaceliae
new species

(Figs. 44 & 45)

FEMALE—Length 8 mm.; face slightly longer than distance between eyes; eyes about parallel; foveae narrow, occupying about half of space between eyes and ocelli above (as in *algida*, fig. 43) covered with pale creamy tomentum; lateral ocelli separated from margin of vertex by about their own diameter; cheeks and eyes subequal in width; clypeus broadly convex, protruding only slightly below suborbital line, rather dull, punctures rather shallow, evenly distributed, separated by two or three times their own diameter, becoming closer and finer but quite obscure at extreme lateral angles; face below ocelli dull, finely striate, vertex dull, without evident punctures, cheeks smooth but rather dull and impunctate; malar space hardly evident; process of labrum rather large, broadly and evenly rounded, median length about half basal width; basal segment of flagellum not quite equalling segments 2 and 3 combined, these fully as long as broad, the more apical segments slightly longer than broad; pubescence of entire head and thorax greyish, quite dense, elongate and erect; scutum and scutellum rather dull, punctures shallow, rather fine, well separated even anteriorly, those on scutellum quite similar to those on scutum; pleura smooth but quite densely tessellate; dorsal area of propodeum very finely but rather densely subrugose, lateral areas quite broad, dull and densely tessellate; propodeal corbicula rather well developed, dorsal hairs elongate, with scattered interior hairs and a rather distinct anterior fringe; trochanteral floccus short and incomplete; legs dark, pubescence entirely pale, basitarsi not much broadened, hind tibiae considerably broadened apically, scopal hairs short and dense, spurs

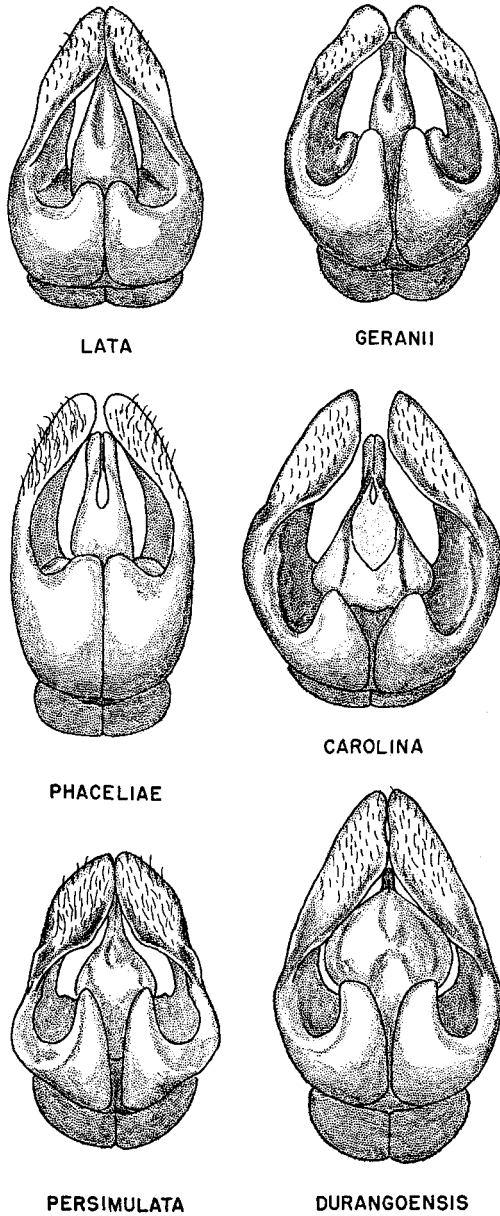


Figure 45

Apical flexed portion of male genital armature in species of *Andrena* (*Thysandrena*), *A.* (*Gonandrena*) and *A.* (*Conandrena*).

pale yellowish; wings subhyaline, veins and stigma brownish-testaceous, 2nd submarginal cell slightly more than half length of 3rd, receiving 1st recurrent near middle; tegulae dark anteriorly but otherwise testaceous-hyaline; abdominal terga rather dull, with shallow and very minute but quite distinct punctures, these separated by slightly more than twice the puncture width, apical margins only slightly depressed, these areas somewhat more shining, slightly reddened and becoming hyaline along rims, punctures more distinct, discs with abundant, erect and rather elongate but very fine pubescence, this entirely pale, apical fasciae rather loose but evident on segments 2-4, apical fimbria somewhat brownish.

MALE—Length 6.5 mm.; face not much longer than distance between eyes; eyes subparallel; lateral ocelli separated from margin of vertex by about their own diameter; cheeks and eyes subequal in width; clypeus rather strongly convex, projecting about one-third below suborbital line, somewhat shining apically but dull along margins, punctures rather coarse but shallow, well separated medially but becoming quite close toward lateral angles; vertex and face below ocelli dull, densely tessellate, cheeks somewhat smoother but without evident punctures; malar space hardly evident; process of labrum rather broad, truncate apically, the truncation slightly longer than the oblique lateral margins; basal segment of flagellum slightly longer than segment 2, subequal to segment 3, this and following segments considerably longer than broad; mandibles quite short, reaching only slightly beyond midline of face, reddened apically, with a small, inner, subapical tooth; pubescence of head and thorax entirely whitish, quite dense and elongate but not hiding surface; scutum and scutellum rather dull, tessellate, punctures quite fine and obscure, irregularly scattered; pleura rather dull but smooth, densely tessellate; dorsal area of propodeum finely subrugose, lateral areas densely tessellate and dull; propodeal corbicula rather well developed; legs entirely dark, slender, pubescence entirely whitish, basitarsi slender and elongate, spurs pale yellowish; wings subhyaline, veins testaceous, stigma testaceous medially but with darkened margins, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent near middle; tegulae dark anteriorly, otherwise yellowish-hyaline; abdominal terga rather dull, with fine and shallow but rather distinct punctures, these separated by about twice their own diameter, apical margins rather narrowly and shallowly impressed, these areas more shining, punctures more distinct, becoming narrowly hyaline along rims, discs of segments with rather short but erect and conspicuous, whitish pubescence, apical fasciae very loose and barely evident;

sternum 7 quite narrowly produced medially, this area with a triangular, median emargination; basal portion of sternum 8 rather regularly rounded, apical portion narrow, subparallel-sided, apex truncate, covered with rather short pubescence; penis valves slender and elongate, not dilated basally, gonocoxites not appreciably dilated apically, reaching slightly beyond tips of penis valves, gonocoxal lobes very slightly produced.

TYPES — Holotype: Female, Plummers Island, Md., May 9, 1915 (J. C. Crawford, on *Phacelia purshii*) [U.S.N.M.]. Allotype: Male, topotypical [U.S.N.M.]. Paratypes: MARYLAND: 1 ♂, 2 ♀, topotypical; 9 ♀, Plummers Island, May 6, 8 and 10, 1914 (J. C. Crawford); 1 ♀, near Plummers Island, Apr. 25, 1915 (J. C. Crawford, on *Alsine pubera*); 1 ♀, near Plummers Island, May 27, 1917 (H. L. Viereck, on *Phacelia purshii*). ILLINOIS: 8 ♀ Grand Tower, May 9, 1902 (H. A. Gleason). VIRGINIA: 1 ♀, Great Falls, May 16, 1931 (Timberlake, on *Phacelia dubia*).

Paratypes are in the U. S. National Museum, in the collection of P. H. Timberlake, and in the author's collection.

Andrena (Conandrena) bradleyi
Viereck

(Figs. 40, 46, 47, 49 & 50)

- Andrena bradleyi* Viereck, 1907. Ent. News 18, pp. 285 & 286. ♀ ♂.
Andrena saccharina Cockerell & Rohwer, 1907. Ann. Mag. Nat. Hist. (4) 20, p. 128. ♂.
Andrena bradleyi Salt, 1927. Jour. Expt. Zool. 48, p. 249. (stylopization)
Andrena bradleyi Brittain & Newton, 1933. Canad. Jour. Res. 9, p. 341. (flower records)
Andrena bradleyi Atwood, 1934. Canad. Jour. Res. 10, pp. 206 & 208. Figs. ♀ ♂. (key)
Andrena bradleyi Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
Andrena (Conandrena) bradleyi Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 207. (classification)

FEMALE—Length 10 mm.; face very much longer than broad; clypeus moderately convex, elongate, projecting nearly two-thirds below suborbital line, smooth and shining, punctures fine and quite sparse on each side of an indefinite, median, impunctate line; facial foveae narrow, occupying above about half of space between eyes and ocelli, covered with pale cream-colored tomentum, becoming slightly brownish at upper end; space between margin of vertex and lateral ocelli sub-

equal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, dull, punctures minute, obscure and rather sparse; malar space nearly as long as basal width of mandibles; basal segment of flagellum considerably longer than 2nd and 3rd combined; process of labrum rather large, triangular, with narrowly rounded apex; mandibles elongate, with a very minute, inner tooth, located about one-third of distance from apex, not dilated beneath toward base, overlapping about one-third; pubescence of head, thorax and legs greyish-white, becoming fuscous or blackish on the more apical segments of legs; thoracic integument dull, tessellate, punctures of scutum rather fine and shallow, quite close anteriorly, becoming rather sparse near center posteriorly, surface rather dull, those on scutellum very minute, largely lacking on each side of a median, more closely punctate line; pleura without evident punctures; dorsal area of propodeum oblique, triangle finely subrugose; propodeal corbicula rather short, whitish, anterior fringe indistinct; trochanteral floccus well developed, white; hind tibiae slender and elongate, apex only slightly exceeding basitarsi in width, scopula rather dense, hairs simple, elongate, whitish anteriorly, becoming blackish or fuscous toward base and along posterior margin; front and mid basitarsi rather narrow, slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga rather dull, finely tessellate, punctures exceedingly minute and obscure, barely visible, rather close, apical impressed areas shallow and obscure, becoming narrowly hyaline along rims, discal pubescence short, thin, erect, entirely pale, terga 2-4 with narrow, whitish, apical fasciae, tergum 5 with a fuscous, apical fimbria.

MALE—Length 9 mm.; face somewhat longer than broad; clypeus rather broadly convex, somewhat flattened medially, projecting about one-half below suborbital line, apical half yellow, the basal half black, smooth and shining, punctures fine and quite sparse; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks considerably broader than eyes, somewhat flattened, rather imperfectly rounded posteriorly, dull, the punctures minute, obscure and well separated; length of malar space equal to about half basal width of mandibles, basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, apex more or less rounded; mandible of moderate length, with a minute, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs greyish-white, with

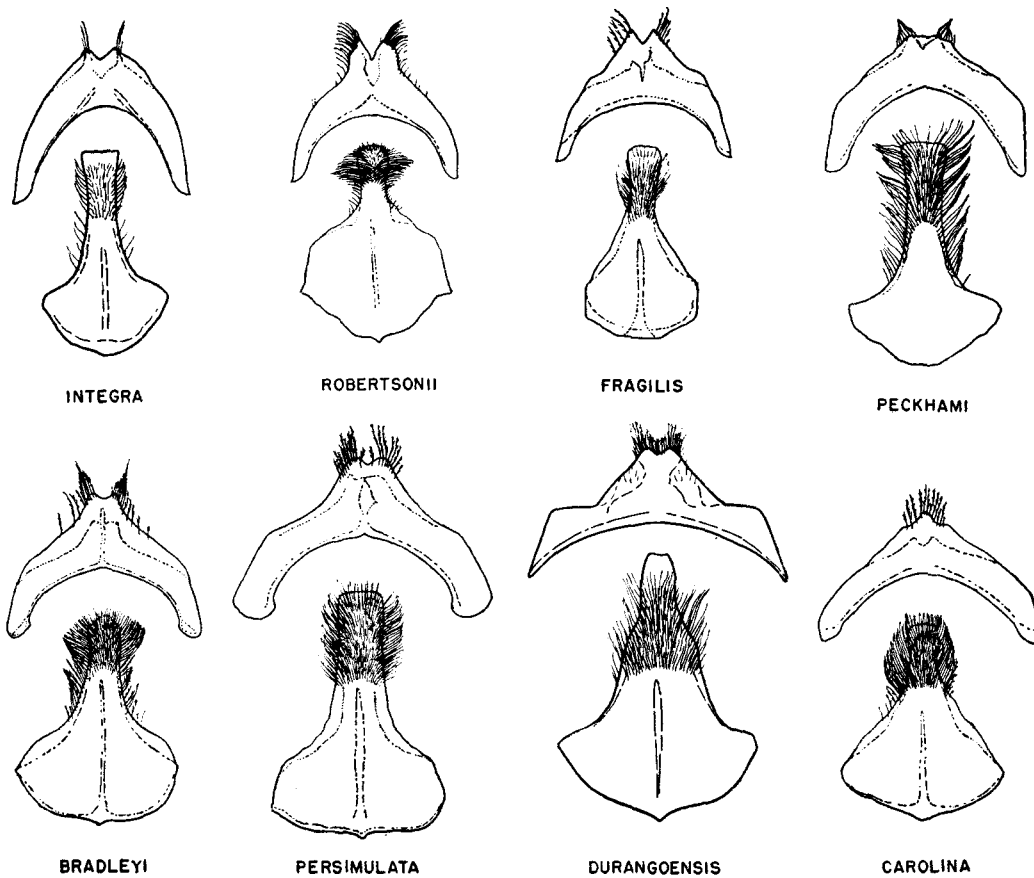


Figure 46—Sternal plates 7 (upper and 8 of males in species of *Andrena* (*Conandrena*) and *A.* (*Gonandrena*).

a few inconspicuous fuscous hairs above upper end of eyes; thoracic integument dull, tessellate, punctures of scutum rather fine, shallow, rather close anteriorly, becoming rather sparse toward center posteriorly, those on scutellum very shallow and obscure, barely visible, surface dull; pleura without visible punctures; dorsal area of propodeum oblique, triangle obscurely subrugose in center and along basal margin; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga

smooth but rather dull, microscopically tessellate, punctures exceedingly minute and obscure, barely visible, quite sparse, apical impressed areas shallow, occupying medially about one-third length of disc, concolorous with basal portions of segments, discal pubescence thin, sparse, erect, entirely pale, terga 2-4 with very thin, whitish, apical fasciae evident laterally, more or less interrupted medially; apical portion of sternum 8 elongate, gradually narrowed from base to the rather narrowly rounded apex, quite densely clothed beneath with pale pubescence over apical half; penis valves with a subapical constriction,

gradually expanded from this to the broadly and abruptly truncate tip and somewhat dilated toward base, excavated beneath on each side; gonocoxites quite broad and elongate, rather narrowly rounded at tip, slightly constricted near base, gonocoxal lobes broadly rounded, nearly straight, hardly at all produced.

DISTRIBUTION — Colorado to Nova Scotia, south to Georgia; March to June.

FLOWER RECORDS — *Vaccinium*, (1♂ is recorded on *Prunus*). Recorded by Brittain and Newton (1933 & 1934) on *Pyrus malus*, *Rhodendron* and *Ribes*.

Andrena (Conandrena) carolina
Viereck

(Figs. 40, 45, 46 & 49)

Andrena carolina Viereck, 1909. Ent. News 20, p. 126. ♀.

Andrena carolina Atwood, 1934. Canad. Jour. Res. 10, pp. 208 & 209. ♀♂. (key)

Andrena carolina Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

Andrena (Conandrena) carolina Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 207. (classification)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus broadly convex, somewhat protuberant, projecting slightly more than one-half below suborbital line, smooth and shining, punctures moderately coarse and deep, well separated on each side of an indistinct, median line; facial foveae quite broad, occupying above most of area between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, somewhat shining, punctures minute, well separated below, becoming quite close above; length of malar space equal to about one-third basal width of mandible; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum triangular, with narrowly rounded apex; mandibles rather elongate with a small, inner, subapical tooth located about one-fourth of its length from apex, not noticeably dilated beneath toward base, overlapping about one-third; pubescence of head, thorax and legs pale ochraceous; thoracic integument dull, tessellate, punctures of scutum shallow and rather indistinct, quite close anteriorly, becoming rather sparse in center posteriorly where surface is more shining, and scutellum shining with punctures more distinct but quite irregular, rather

spare; pleura with vague, shallow and rather sparse punctures anteriorly, these becoming evident posteriorly; dorsal area of propodeum nearly vertical, triangle finely substriate along basal margin; propodeal corbicula rather short, pale ochraceous, anterior fringe poorly developed; trochanteral floccus quite well developed, pale ochraceous; hind tibiae narrow and elongate, apex only slightly broader than basitarsi, scopa rather thin, hairs somewhat elongate, entirely simple, pale ochraceous; front and mid basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga rather dull, microscopically tessellate, punctures exceedingly minute and obscure, hardly visible, rather sparse, apical impressed areas very shallow, occupying medially about one-third length of disc, becoming narrowly brownish-hyaline along rims, discal pubescence very sparse, thin, erect, entirely pale, apical fasciae very poorly developed, tergum 5 with a pale ochraceous, apical fimbria.

MALE—Length 8 mm.; head broader than thorax; clypeus only slightly convex, projecting about one-half below suborbital line, strongly narrowed apically, surface smooth and shining, very minutely and quite sparsely punctate, the punctures becoming somewhat deeper, coarser and closer at extreme sides; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks much broader than eyes, rather flat, posterior margin quite conspicuously angulate, the rounded angle opposite upper third of eye, surface smooth and shining, minutely punctate, punctures well separated but hardly sparse; length of malar space equal to about one-third basal width of mandible; basal segment of flagellum subequal to 2nd segment; process of labrum short, rather broad, slightly narrowed to the broadly truncate apical margin; mandibles elongate, strongly bowed, with a distinct, inner, subapical tooth located about one-fourth of length from tip, overlapping nearly one-half; pubescence of head, thorax and legs greyish-white, slightly tinged with yellow; thoracic integument dull, tessellate, punctures of scutum very minute and obscure, hardly visible, rather close but very obscure, barely visible on the somewhat shining scutellum; pleura with a very few shallow, obscure punctures anteriorly; dorsal area of propodeum oblique, triangle finely tessellate, very obscurely substriate along basal margin; basitarsi more or less testaceous, very slender and elongate, considerably narrower than their tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near apex; abdominal terga rather smooth, somewhat shining, punctures exceedingly minute and obscure, barely

visible, well separated but not sparse, apical impressed areas very shallow, not at all hyaline, occupying medially nearly one-third length of discs, discal pubescence extremely short, sparse and obscure, apparently entirely pale, fasciae not developed; apical portion of sternum 8 narrow, sides nearly parallel, apex narrowly truncate, clothed beneath with short, pale pubescence; penis valves slender apically, quite conspicuously dilated basally, dilated area grooved laterally, gonocoxites rather slender, somewhat dilated apically, gonocoxal lobes quite strongly produced, rather narrow, narrowly rounded apically.

DISTRIBUTION — Minnesota to the New England states and Nova Scotia, south to Tennessee, North Carolina and Georgia; April to July.

FLOWER RECORDS — *Azalea*, *Rhodora* and *Vaccinium*. Recorded by Brittain and Newton (1934) on *Claytonia*, *Dentaria*, *Ledum*, *Pyrus malus* and *Pyrus* spp.

***Andrena (Conandrena) durangoensis*
Viereck and Cockerell**

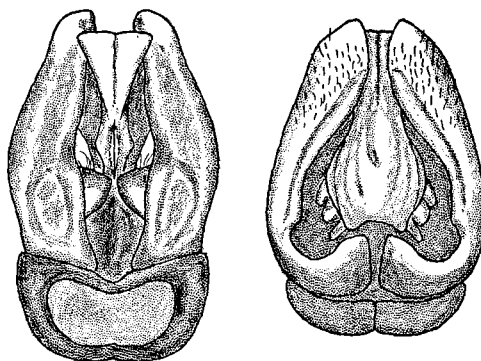
(Figs. 40, 45 & 46)

Andrena durangoensis Viereck and Cockerell, 1914. U. S. Nat. Mus. Proc. 48, p. 36. ♂.

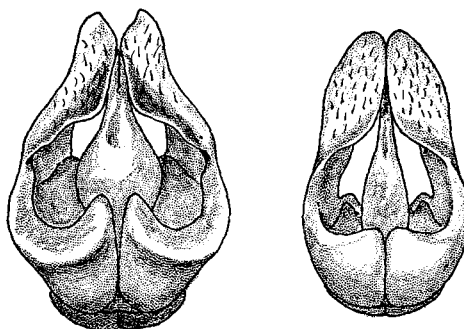
Andrena (Andrena) media Viereck, 1922. Boston Soc. Nat. Hist. Occas. Papers 5, p. 41. ♂. New synonymy.

Andrena durangoensis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 224. (classification)

MALE—Length 11 mm.; clypeus broad and rather flat, projecting but little below suborbital line, smooth and shining, with fine, evenly distributed, well separated punctures; lateral ocelli separated from margin of vertex by a space about equal to their diameter; cheeks extremely broad, with a rounded posterior angle opposite middle of eye, smooth but rather dull, with minute, well separated punctures; malar space well developed, equaling about one-third basal width of mandible; basal segment of flagellum subequal to the following segments; process of labrum broad and very short, quite deeply emarginate; mandibles elongate, slender, somewhat flexed medially, with an obscure, inner, subapical tooth, overlapping nearly one-half; pubescence of head, thorax and base of abdomen entirely pale ochraceous, rather long but not very dense; thoracic integument dull, tessellate, scutum, and scutellum with some barely visible, well separated punctures; enclosure of propodeum smooth; all basitarsi long and slender, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent vein

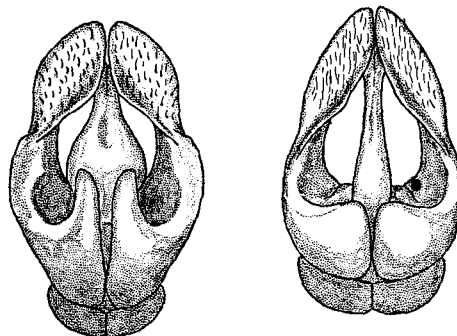


BRADLEYI



ROBERTSONII

INTEGRA



FRAGILIS

PECKHAMI

Figure 47

Apical flexed portion of male genital armature in species of *Andrena (Conandrena)*, *A. (Parandrena)* and *A. (Gonandrena)*. Dorsal (right) and ventral views of *A. bradleyi* are shown.

at center; abdomen narrow and elongate, the terga somewhat shining, with scattered, sparse, exceedingly minute punctures, apical margins slightly and narrowly depressed, faintly reddened, pubescence very short, thin and erect, entirely pale, without visible fasciae; sternum 8 gradually narrowed apically, with a low, submedian, ventral protuberance which bears a dense tuft of pubescence, slightly constricted beyond this to the rounded tip; penis valves expanded basally, excavated beneath this expansion, gonostyli rather broadly dilated apically, gonocoxal lobes strongly produced and narrowly rounded.

DISTRIBUTION — Colorado to North Dakota, east to Michigan, New York, the New England states, Nova Scotia and south to West Virginia; May to September.

FLOWER RECORDS — *Ilex* and *Rubus*.

Andrena (?*Conandrena*) *rufosignata* ^{Andrena} Cockerell ^x

(Fig. 49)

Andrena rufosignata Cockerell, 1902. Canad. Ent. 34, p. 46. ♀.

Andrena (*Andrena*) *rufosignata* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 206. (classification)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus convex, produced considerably below suborbital line, surface smooth, sparsely and finely punctate medially, becoming somewhat more closely punctate laterally; facial foveae broad above, about filling area between eyes and lateral ocelli, covered with ochraceous tomentum, sometimes appearing fuscous at certain angles; space between margin of vertex and lateral ocelli less than their diameter; cheeks very slightly broader than eyes, smooth but rather dull, very finely punctate; malar space well developed, nearly half as long as basal width of mandible; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum subtriangular, tip very narrowly truncate; mandibles of ordinary length, with a distinct, subapical, inner tooth; pubescence of head, thorax, and base of abdomen entirely pale, somewhat ochraceous above, whitish below; thoracic integument dull, tessellate; scutum and scutellum with scattered, shallow and rather obscure punctures; enclosure of propodeum smooth; propodeal corbicula rather short, with a distinct anterior fringe; trochanteral floccus well developed; tibial scopa long, dense, of simple hairs; hind tibiae narrow and elongate, the basitarsi slightly narrower; mid basitarsi only slightly narrower than their tibiae; 2nd submarginal cell shorter than 3rd, receiving 1st recurrent near apex; abdominal terga

smooth, dull, nearly impunctate except for some very fine, obscure punctures toward base, apical margins somewhat depressed, the depressed areas somewhat reddened, discal pubescence entirely pale, short, fasciae not developed.

DISTRIBUTION — Minnesota to New Brunswick and New England; May and June.

Lanham (1949) placed *rufosignata* in the subgenus *Andrena*, but it seems to the writer that it might better be placed in *Conandrena*. The facial quadrangle is not as distinctly elongate as in *bradleyi* or *carolina*, but it bears a quite close resemblance to *carolina*. It seems possible, also, that *durangoensis* Viereck & Cockerell is the male.

Andrena (*Gonandrena*) *dreisbachi* new species

FEMALE—Length 9 mm.; face somewhat longer than distance between eyes; eyes about parallel; foveae quite narrow, occupying hardly more than half of space between eyes and ocelli above (as in *robertsonii*, fig. 49), extending slightly below antennal line, covered with whitish tomentum; lateral ocelli separated from margin of vertex by somewhat less than their own diameter; cheeks about equal to eyes in width; clypeus moderately convex, projecting about one-third below suborbital line, rather dull and microscopically tessellate, with scattered, irregular, very minute and obscure punctures over median area, with the extreme lateral angles rather closely, deeply and distinctly punctate; face below ocelli finely striate and dull, vertex smooth but dull, with no evident punctures, cheeks smooth, somewhat shining toward margin of eye, without evident punctures; malar space hardly evident; process of labrum very broad, evenly rounded, median length hardly one-half basal width; basal segment of flagellum about equal to segments 2 and 3 combined, 2nd considerably shorter than broad, median segments about as long as broad; pubescence of head and thorax entirely pale, rather short and erect, quite dense on either side of antennae and on cheeks below, quite thin in general on thorax; scutum and scutellum smooth but rather dull, with scattered, exceedingly minute and obscure, well separated punctures; pleura quite smooth but dull and finely tessellate; dorsal area of propodeum very finely granular, surface on each side of this finely tessellate and dull, propodeal corbicula rather well developed dorsally, hairs rather short, with few if any hairs on interior and without an anterior fringe; trochanteral floccus complete;

legs dark, pubescence entirely pale, basitarsi quite slender and parallel-sided, tibiae quite slender, tibial scopa of whitish, rather elongate hairs, spurs pale-testaceous; wings slightly yellowish, veins and stigma pale testaceous, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent toward apex; tegulae piceous anteriorly, yellowish-hyaline posteriorly; abdominal terga smooth but dull, with exceedingly minute and barely visible punctures, segments 2-4 narrowly impressed apically, these areas more shining, becoming narrowly hyaline along rims, apical fasciae narrow, white, evident only towards sides of segments 2-4, apical fimbria pale-brownish.

TYPES — Holotype: Female, Roscommon Co., Mich., June 5, 1955 (R. R. Dreisbach) [Dreisbach]. Paratypes: MICHIGAN: 2 ♀♀, topotypical; 1 ♀, Missaukee Co., June 5, 1955 (Dreisbach); 1 ♀, Agr. Coll. June 20, 1888; 1 ♀, 13 miles north of Lapeer, May 30, 1937 (C. Sabrosky).

Paratypes are in the University of Michigan, in the collection of R. R. Dreisbach, and in the author's collection.

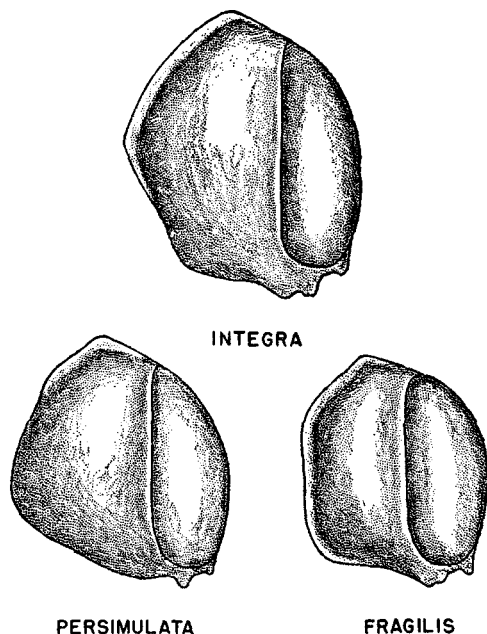


Figure 48

Lateral view of male head, showing form of cheeks in species of *Andrena* (*Gonandrena*).

Andrena (*Gonandrena*) *fragilis* Smith

(Figs. 46-49)

Andrena fragilis Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 115. ♂.

Andrena laticeps Provancher, 1888. Addit. Corr. Fauna Ent. Canada Hym. p. 307. ♂. Preocc.

Andrena platyparia Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 119. ♀ ♂. (part)

Andrena provancheri Dalla Torre, 1896. Cat. Hym. 10, p. 147.

Andrena fragilis Morice & Cockerell, 1901. Canad. Ent. 33, p. 149. (type).

Andrena fragilis Cockerell, 1906. Psyche 13, p. 7. (type)

Andrena (*Gonandrena*) *fragilis* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 210. (classification)

FEMALE—Length 8 mm.; clypeus very slightly convex, projecting about one-third below suborbital line, rather dull, finely punctate, punctures well separated medially, but becoming quite close at extreme sides, with an indefinite, median, impunctate line; facial foveae narrow, occupying above hardly half of space between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, rounded posteriorly, the posterior margin conspicuously carinate, surface shining, minutely and rather closely punctate; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum quadrate, nearly as long as broad, rather large; pubescence of head, thorax and legs whitish, faintly tinged with yellowish, thoracic integument dull, punctures of scutum fine, shallow, well separated even anteriorly, becoming somewhat more sparse posteriorly, where surface is somewhat shining, those on scutellum minute, scattered and irregular, sparse on each side of a more closely punctate median line, surface polished; pleura more densely tessellate, subrugose above; dorsal area of propodeum nearly horizontal, rather broad, triangle finely rugoso-striate; propodeal corbicula poorly developed, thin, pale ochraceous, without an anterior fringe; trochanteral floccus rather well developed, white; hind tibiae very slender, hardly exceeding the basitarsi in width, scopa thin, of rather elongate simple hairs, entirely white; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent at outer third; abdominal terga smooth and shining, basal tergum very sparsely and minutely punctate, surface polished, punctures of 2nd and following terga fine, close and distinct, becoming more sparse toward apical

impressed area on tergum 2, impressed areas shallow, occupying about one-third median length of disc, becoming quite broadly yellowish-hyaline along rims, discal pubescence extremely sparse, short, suberect, entirely pale, terga 2-4 with rather dense, white, apical fasciae, broadly interrupted on tergum 2, more narrowly so on 3, tergum 5 with a brownish-ochraceous, apical fimbria.

MALE—Length 6-7 mm.; head broader than thorax; clypeus broad and flat, markedly narrowed apically, projecting nearly one-half below suborbital line, somewhat shining, finely punctate, punctures well separated medially, becoming rather close at extreme sides; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks broader than eyes, posterior margin conspicuously carinate, more or less parallel with eye margin, surface somewhat shining, punctures exceedingly minute and rather close; malar space exceedingly short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum obscured by the overhanging margin of clypeus, tip visible, quite narrow; mandibles rather elongate, inner subapical tooth located about one-third of length from tip, overlapping fully one-third; pubescence of head, thorax and legs entirely whitish, slightly tinged with yellowish; thoracic integument dull, punctures of scutum very fine, shallow and obscure, well separated over most of disc, but becoming somewhat more sparse posteriorly, those on scutellum very minute and obscure, irregularly scattered, the surface shining; pleura finely roughened or subrugose; dorsal area of propodeum oblique, triangle finely rugoso-striate; basitarsi more or less testaceous, slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent about one-fourth from apex; abdominal terga smooth, shining, punctures exceedingly minute and obscure, rather close laterally, apical impressed areas very shallow, rather narrow, almost completely yellowish-hyaline, discal pubescence exceedingly short, sparse and obscure, apparently entirely pale, apical white fasciae very thin and obscure, partially developed toward sides of terga; apical portion of sternum 8 rather short, gradually broadened toward base, apex truncate; penis valves slender apically, broadly dilated toward base, where they are deeply grooved or excavated laterally, gonocoxites rather slender, gradually dilated toward apex, the resulting lobes rather narrowly rounded apically, gonocoxal lobes strongly produced, narrowly rounded apically.

DISTRIBUTION—Eastern Canada and the entire Eastern United States, with the

possible exception of Florida, ranging west to Colorado and New Mexico; May to July.

FLOWER RECORDS — *Ceanothus*, *Cornus*, *Hydrangea*, *Svida* and *Viburnum*. Recorded by Robertson (1929, as *A. platyparia*) on *Aruncus*, *Cryptotaenia*, *Pastinaca*, *Ptelea* and *Rhus*.

Andrena (Gonandrena) integra Smith

(Figs. 46-49)

Andrena integra Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 114. ♀.

Andrena lineata Provancher, 1888. Addit. Corr. Fauna Ent. Canada Hym. p. 309. ♀.

Andrena integra Morice & Cockerell, 1901. Canad. Ent. 33, p. 124. (type)

Andrena integra Cockerell, 1906. Psyche 13, p. 6. (type)

Andrena clypeonitens Graenicher, 1910. Canad. Ent. 42, p. 160. ♂. New synonymy.

Andrena (Gonandrena) lucifera Cockerell, 1932. Canad. Ent. 64, p. 155. ♀.

Andrena (Gonandrena) integra Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 210. (classification)

FEMALE—Length 9 mm.; clypeus convex, projecting nearly one-half below suborbital line, rather dull, microscopically tessellate, punctures fine, very sparse medially, becoming somewhat closer toward extreme sides; facial foveae very narrow, occupying above less than half of space between eyes and ocelli; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, the margin subcarinate, surface rather dull, punctures exceedingly minute, close and obscure; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather abruptly constricted at base, resulting apical portion subquadrate, truncate apically; pubescence of head and thorax very short and sparse, entirely pale, that on legs also largely or entirely pale; thoracic integument rather dull, punctures of scutum exceedingly minute and obscure, rather widely separated over most of disc, which is somewhat shining posteriorly, those on scutellum exceedingly minute, nearly absent on each side of a median punctate line, surface polished, pleura somewhat protuberant at sides below and just below wing base, surface above finely roughened or subrugose, punctures invident; dorsal area of propodeum nearly horizontal, triangle rather coarsely rugoso-striate; propodeal corbicula short, poorly developed, without an anterior fringe, pale ochraceous; trochanteral floccus long and well developed, whitish; hind tibiae very slender, apex hardly wider than basitarsi, scopa rather

dense, of elongate simple hairs, entirely pale ochraceous; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent almost at apex; abdominal terga polished, very minutely and quite sparsely punctate, punctures barely visible, apical impressed areas quite shallow but rather narrow, becoming obscurely reddish-hyaline along rims, discal pubescence extremely sparse, short and thin, entirely pale, apical fasciae not developed, tergum 5 with a brownish-ochraceous, apical fimbria.

MALE—Length 8 mm.; head broader than thorax; eyes slightly divergent below; clypeus very broad, rather flat medially, much narrowed apically, projecting about one-half below suborbital line, somewhat shining medially where the punctures are very fine and quite sparse, becoming close at extreme sides where surface is rather dull; space between margin of vertex and lateral ocelli considerably broader than their diameter, cheeks very broad, more or less rounded posteriorly, posterior margin with a conspicuous carina which extends across vertex to reach upper end of eye, surface shining, punctures exceedingly minute, obscure and quite sparse; malar space very short; basal segment of flagellum slightly shorter than 2nd and 3rd combined; process of labrum rather small, markedly protuberant, obscurely semicircular; mandibles rather elongate, inner subapical tooth located about one-fourth of length from tip, rather strongly bowed, overlapping about one-third; pubescence of head, thorax and legs entirely whitish, faintly tinged with ochraceous; thoracic integument dull, quite densely tessellate, punctures of scutum exceedingly obscure, hardly visible, scutellum shining, with more distinct but rather widely scattered punctures; pleura without visible punctures; dorsal area of propodeum oblique, triangle finely tessellate; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga smooth, rather dull, microscopically tessellate, punctures hardly visible, apical impressed areas shallow and quite narrow, not conspicuously hyaline along rims, discal pubescence extremely short, sparse and thin, apparently entirely pale, terga 2-4 with thin, whitish, apical fasciae evident laterally, apical margin of sternum 6 rather strongly reflexed; apical portion of sternum 8 narrowest medially, slightly broadened basally and apically, the apex truncate, very slightly emarginate, clothed beneath with rather short, pale pubescence; penis valves very slender and elongate, only very slightly

broadened toward base, gonocoxites gradually and slightly dilated to the rounded apex, gonocoxal lobes hardly at all produced.

DISTRIBUTION — Minnesota to Quebec and the New England states, south to North Carolina and Georgia; May to September.

FLOWER RECORDS — *Ceanothus* and *Cornus*.

Cockerell (1906) considered *lineata* Provancher a synonym of *integra*, but in the Catalog of Hymenoptera (Muesebeck, *et.al.*, 1951, p. 1066), *lineata* is given as a synonym of *fragilis* Smith. The type of *fragilis* is a male, that of *integra* a female, but the other sex in each is well known and there seems to be no question regarding the correctness of the association of the sexes in these two species. Both of these types have been studied by the writer, as also the type of *lineata*, and it is his conviction that Cockerell was correct, and that *lineata* is synonymous with *integra*.

Andrena (*Gonandrena*) *monroensis*
new species

FEMALE—Length 10 mm.; face nearly as long as distance between eyes above; eyes about parallel; foveae narrow, occupying no more than half of space between eyes and ocelli above (slightly narrower than in *robertsonii*, fig. 49), and terminating about at level of antennae; lateral ocelli separated from margin of vertex by about their own diameter; cheeks considerably broader than eyes, subcarinate above; clypeus moderately convex, protruding about one-half below suborbital line, somewhat shining, with a median impunctate line, punctures on each side rather deep and distinct, well separated but becoming quite close at extreme lateral angles; face below ocelli rugoso-striate, vertex shining, with a few obscure irregularities medially and some rather fine and close punctures at extreme sides, cheeks becoming quite smooth but rather dull, punctures minute, rather close toward margin of eye, but obscure throughout; malar space hardly evident; process of labrum subtriangular with a rather narrowly subtruncate apex, length considerably more than half basal width; basal segment of flagellum fully equal to 2nd and 3rd combined, these considerably shorter than broad, the more apical segments slightly longer than broad; pubescence of head and thorax rather thin, erect, whitish on face and cheeks and on thorax laterally and beneath, becoming somewhat yellowish on vertex and dorsum of thorax; scutum rather dull anteriorly and laterally,

punctures rather shallow and fine but distinct, well separated even anteriorly, becoming rather sparse near center posteriorly, scutellum polished, with scattered, minute but quite distinct punctures; pleura dull but rather smooth, tessellate, becoming almost rugose anteriorly; dorsal area of propodeum finely rugoso-striate, lateral areas becoming very finely rugose, propodeal corbicula rather short but distinct, with few if any interior hairs and without an anterior fringe; trochanteral flocus complete, quite elongate; legs blackish, quite slender, basitarsi narrow and parallel-sided, hind tibiae quite slender to tip, scopa of elongate whitish hairs, spurs pale testaceous; wings subhyaline, very faintly clouded toward apex, veins pale testaceous, stigma more brownish, 2nd submarginal cell hardly half length of 3rd, receiving 1st recurrent near its apex; tegulae piceous basally, becoming yellowish-hyaline posteriorly; abdominal terga polished, punctures very fine but distinct, well separated, evenly distributed, 2nd and 3rd segments rather narrowly impressed apically, becoming very narrowly hyaline along apical rim, segments 2-4 with narrow, whitish but quite dense, apical fasciae, these interrupted on 2nd and 3rd, apical fimbria pale brownish.

TYPES — Holotype: Female, Monroe Co., Mich., June 23, 1940 (R. R. Dreisbach) [Dreisbach]. Paratype: 1♀, Grand Rapids, Mich., June 25, 1937 [Univ. Mich.]

Andrena (Gonandrena) peckhami
Cockerell

(Figs. 46 & 47)

- Andrena peckhami* Cockerell, 1902. Ann. Mag. Nat. Hist. (7) 9, p. 105. ♀.
Andrena peckhami Graenicher, 1910. Canad. Ent. 42, p. 159. ♀ ♂.
Andrena (Leucandrena) peckhami Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 203. (classification)

FEMALE—Length 10 mm.; face considerably longer than broad; clypeus convex, median portion somewhat flattened, projecting fully one-half below suborbital line, shining, closely and finely punctate laterally, becoming very sparsely and minutely punctate medially, with a distinct, median, impunctate line above; facial foveae narrow, occupying above little more than half of area between eyes and ocelli (as in *robertsonii*, fig. 49); space between margin of vertex and lateral ocelli very slightly greater than diameter of ocelli; cheeks very slightly broader than eyes, rounded, very minutely and rather obscurely punctate, surface rather dull; malar space very short but distinct; basal segment of flagellum

subequal to 2nd and 3rd combined; process of labrum rather broadly subtriangular, tip narrowly truncate, very slightly emarginate; mandibles of moderate length, with a distinct, inner, subapical tooth; pubescence of head white, rather short, with blackish hairs along vertex; thoracic integument dull, tessellate, very minutely and obscurely punctate, surface of scutellum somewhat more shining; enclosure of propodeum relatively smooth but dull and tessellate; pubescence erect, black and rather short on scutum and scutellum, whitish on pleura and propodeum, whitish in general on legs, but with some fuscous hairs on outer faces of front and middle tibiae; propodeal corbicula long, white, anterior fringe very poorly developed; trochanteral flocus rather long but thin, entirely white; tibial scopa entirely white, rather short and dense, the hairs simple; fore and hind basitarsi distinctly narrower than their respective tibiae, mid basitarsi nearly as broad as their tibiae, slightly broader than hind basitarsi; 2nd submarginal cell very much shorter than 3rd, receiving 1st recurrent near tip; abdominal terga quite smooth, but dull and finely tessellate, punctures inevident, apical margins slightly depressed toward sides, but scarcely at all medially, terga 2-4 with distinct, whitish, apical fasciae, that on tergum 2 rather widely interrupted medially; discal pubescence short and erect, pale on the more basal terga, blackish on terga 3-5.

MALE—Length 8 mm.; face broad, eyes divergent below, the lower interorbital distance considerably greater than that between apical margin of clypeus and anterior ocellus; lateral ocelli separated from margin of vertex by a space somewhat greater than their diameter; cheeks shining, very broad, with an obscure angle opposite middle of eye, posterior margin from this angle to top of head sharply and conspicuously carinate; clypeus smooth and shining, very much broader than median length, apical margin much narrowed, punctures fine, well separated laterally, becoming very sparse to almost impunctate over median portion of disc below; malar space very short; process of labrum small, rounded, quite markedly protuberant; basal segment of flagellum considerably longer than segment 2 but shorter than 2 and 3 combined; mandibles slender and elongate, somewhat curved, the inner, subapical tooth about opposite lateral angle of clypeal margin; pubescence of head and thorax erect, elongate and rather copious, but not hiding surface, whitish, with intermixed fuscous hairs on dorsum of thorax; scutum smooth but rather dull, punctures very fine and quite sparse, becoming inevident toward anterior margin, scutellum somewhat more shining, punctures minute and obscure,

hardly evident; pleura smooth but dull, punctures inevident beneath the rather copious, elongate pubescence; triangle of propodeum poorly defined, smooth but dull, with some very narrow, fine striations across base, lateral surfaces of propodeum smooth but rather dull, propodeal corbicula rather well developed; legs rather dark, becoming reddened apically, pubescence entirely pale; wings lightly infuscated, veins and stigma ferruginous, 2nd submarginal cell very short, receiving 1st recurrent slightly beyond middle; tegulae brownish; abdominal terga smooth but rather dull, punctures exceedingly minute but evident, evenly distributed, rather widely separated, apical impressed areas quite narrow, with punctures hardly evident, discal pubescence short but erect, entirely pale on segments 1 and 2, more fuscous on 3-5, terga 2-4 with loose, white, apical fasciae, more or less interrupted on 2; sternum 7 with a very shallow median emargination, a few obscure setae on each resulting angle; apical portion of sternum 8 rather narrow, very slightly expanded to the abruptly truncate apex, bearing considerable dense pubescence on ventral surface; penis valves extremely slender and elongate, base hardly broader than apex, not quite attaining tip of gonocoxites, which are gradually and rather broadly expanded apically, gonocoxal lobes not produced.

DISTRIBUTION — Minnesota to Vermont, south to North Carolina; July and August.

FLOWER RECORDS — *Baptisia* and *Solidago*.

Andrena (Gonandrena) persimulata
Viereck

(Figs. 45, 46 & 48)

Andrena (Gonandrena) persimulata Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 390. ♀.

Andrena persimulata Atwood, 1934. Canad. Jour. Res., pp. 206 & 209. ♀ ♂. (key)

Andrena persimulata Brittain and Newton, 1934. Canad. Jour. Res., p. 261. (flower records)

Andrena (Gonandrena) persimulata Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 210. (classification)

FEMALE—Length 9 mm.; clypeus broadly convex, projecting slightly less than half below suborbital line, rather dull and finely tessellate, punctures deep but rather fine, well separated medially, becoming somewhat closer and finer at extreme sides, without a distinct, median, impunctate line; facial foveae narrow, occupying above no more than half of space between eyes and ocelli (as in *integra*, fig. 49), covered with silvery tomentum; space

between margin of vertex and lateral ocelli considerably less than their diameter; cheeks somewhat broader than eyes, rounded but obscurely subcarinate posteriorly, finely roughened, punctures exceedingly minute and obscure; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum almost as long as broad, slightly narrowed toward the truncate apex; pubescence of head, thorax, and legs pale ochraceous, more whitish on face and on thorax below; thoracic integument dull, tessellate, punctures of scutum shallow and rather obscure, quite close anteriorly, becoming rather sparse posteriorly, those on scutellum fine and irregular, surface much more shining; pleura subrugose above, densely tessellate below, conspicuously, angulately protuberant below, the venter a nearly straight line between these two protuberances; dorsal area of propodeum oblique, rather short, triangle rather coarsely rugose; propodeal corbicula well developed, pale ochraceous, with a quite distinct anterior fringe; trochanteral floccus long and well developed, pale ochraceous; hind tibiae slender and elongate, apex only slightly broader than basitarsi, scopal hairs rather dense, elongate, mostly simple, pale ochraceous, with some brownish, posterior hairs toward base; front and mid basitarsi rather slender, considerably narrower than their respective tibiae; wings pale yellowish, 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent at apex; abdominal terga smooth and shining, basal tergum polished, with minute and very sparse but rather distinct punctures, punctures of 2nd and following terga fine and rather close, but hardly sparse, apical depressed areas rather shallow, occupying about one-third median length of discs, becoming narrowly yellowish-hyaline along rims, discal pubescence extremely short, thin and sparse, obscure, apparently whitish in general, terga 2-4 with quite dense, white, apical fasciae, that on tergum 2 narrowly interrupted, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 7-8 mm.; breadth of face about equal to its median length, eyes about parallel; lateral ocelli separated from margin of vertex by a space slightly greater than their diameter; cheeks nearly twice as broad as eyes, posterior margin not conspicuously angulate, the upper portion of this strongly and conspicuously carinate, but this carina terminated opposite upper end of eye; clypeus very much broader than its median length, conspicuously long-pubescent, nearly hiding surface which is smooth but rather dull, with fine, well separated, shallow punctures, these somewhat closer at extreme lateral angles, apical margin very narrowly produced; malar space very short; process of

labrum rather small, truncate, more or less shining, largely hidden by the overhanging clypeal margin; basal segment of flagellum about equal to segments 2 and 3 combined; mandibles slender and elongate, rather strongly flexed medially, the inner, subapical tooth extending slightly beyond the opposite apical angle of clypeal margin; pubescence of head and thorax entirely pale ochraceous, without dark intermixture, rather copious on clypeus, vertex, cheeks below, dorsum of thorax and pleura; scutum and scutellum smooth but rather dull, punctures very fine, shallow and obscure, well separated in general; pleura dull and tessellate beneath the copious pubescence, punctures hardly visible; propodeal triangle rather coarsely rugoso-striate, lateral areas of propodeum dull, finely subrugose, the propodeal corbicula rather well developed; legs piceous to black basally, the front tarsi apically and the entire mid and hind tarsi pale testaceous, pubescence entirely pale ochraceous; spurs pale testaceous; wings subhyaline, veins pale testaceous, stigma somewhat more brownish, 2nd submarginal cell very short, receiving 1st recurrent almost at apex; tegulae piceous; abdominal terga smooth and somewhat shining, punctures very minute but quite distinct, evenly distributed and rather sparse, apical impressed areas rather short and with hardly evident punctures, becoming somewhat yellowish-hyaline toward rims, discal pubescence short and erect, entirely pale, fasciae not evident; sternum 7 somewhat produced medially, this area rather narrowly and roundly emarginate, with considerable elongate, pale pubescence; apical portion of sternum 8 rather narrow and parallel-sided, the apex subtruncate, ventral surface with rather dense but short pale pubescence; penis valves rather broadly expanded toward base, the sides quite deeply excavated, tips not quite attaining tips of gonocoxites which are rather broadly expanded apically, this area markedly elongate, gonocoxal lobes strongly and rather narrowly produced.

DISTRIBUTION—Specimens have been seen from Massachusetts, Minnesota, Michigan and New York, collected in May; June and July.

FLOWER RECORDS — Recorded by Brittain and Newton on *Cornus* and *Viburnum*.

NEW YORK

Andrena (Gonandrena) platyparia
Robertson

Andrena platyparia Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 119. ♀.

Andrena (Andrena) barbarica Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 369. ♀. New synonymy.

Andrena (Gonandrena) platyparia Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 210. (classification).

FEMALE—Length 9 mm.; clypeus broadly convex, projecting nearly one-half below suborbital line, rather dull, finely punctate, punctures well separated medially, becoming rather close at extreme sides, with an indefinite, median, impunctate line; facial foveae narrow, occupying above hardly half of space between eyes and ocelli (as in *integra*, fig. 49), covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, upper part subcarinate posteriorly, rather dull, punctures exceedingly minute and rather close; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum nearly as long as broad, narrowed apically to the narrowly truncate apex; mandibles somewhat dilated beneath toward base; pubescence of head, thorax and legs whitish, faintly tinged with yellowish above and on legs apically; thoracic integument dull, punctures of scutum rather shallow, fine and well separated, those on scutellum more minute, scattered and irregular, surface shining; pleura roughened or finely subrugose above, punctures otherwise very obscure; dorsal area of propodeum nearly horizontal, triangle finely rugoso-striate; propodeal corbicula rather poorly developed, thin, pale ochraceous, without an anterior fringe; trochanteral flocus well developed, whitish; hind tibiae very slender, only very slightly broader than basitarsi, scopa rather dense, of somewhat elongated simple hairs, entirely pale ochraceous; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga smooth and shining, punctures very fine but rather distinct, very sparse on basal tergum, somewhat closer on the others, quite close laterally, becoming rather widely separated medially, apical impressed areas quite shallow, rather narrow, becoming narrowly yellowish-hyaline along rims, discal pubescence extremely short and sparse, entirely pale, terga 2-4 with thin, whitish, apical fasciae, rather widely interrupted on tergum 2 medially, tergum 5 with a brownish-ochraceous, apical fimbria.

DISTRIBUTION—Ontario and the New England states, south to North Carolina, and west to Kansas and Texas; June and July.

FLOWER RECORDS — *Cornus asperifolia* and *Viburnum*.

The type series of 19 ♀♀, now in the collection of the Illinois Natural History Survey, has been seen and found to be composed of two distinct species. Eight of the specimens, having a large quadrate labral process, are without doubt *Andrena fragilis* Smith. The remaining 11 specimens are identical with *Andrena barbarica* Viereck. The lectotype specimen is one of the latter, and can justifiably be assumed to represent the true *platyparia*. The description (Robertson, 1895) is of little help in deciding which of these two to select, as the distinctive feature separating them is treated as a variation, and both conditions are given.

Thus it seems that the name *platyparia* should be resurrected, and *barbarica* becomes a synonym of it.

Andrena (Gonandrena) robertsonii
(Dalla Torre)

(Figs. 46, 47 & 49)

Andrena serotina Robertson, 1893. Amer. Ent. Soc. Trans. 20, p. 148. ♀. (♂ misdet.) Preocc.

Anthrena robertsonii Dalla Torre, 1896. Cat. Hym. 10, p. 149. (new name)

Opandrena robertsonii Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193. ♀♂. (key)

Andrena serotina Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena robertsonii Atwood, 1934. Canad. Jour. Res. 10, p. 208 & 209. ♀♂. (key)

Andrena (Gonandrena) robertsonii Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 210. (classification)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus slightly convex, projecting slightly less than one-half below suborbital line, microscopically tessellate but somewhat shining, punctures very fine, quite sparse medially, becoming rather close at extreme sides; facial foveae rather narrow, occupying above only slightly more than half of space between eyes and ocelli, covered with silvery tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and obscure; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum about twice as broad as long, narrowed to the rather broadly truncate apex; mandibles very slightly dilated beneath toward base; pubescence of head, thorax and legs rather thin, quite short, entirely whitish; thoracic integument dull, finely tessellate, punctures of scutum rather deep and distinct, but fine and well separated, becoming sparse toward center posteriorly, surface somewhat

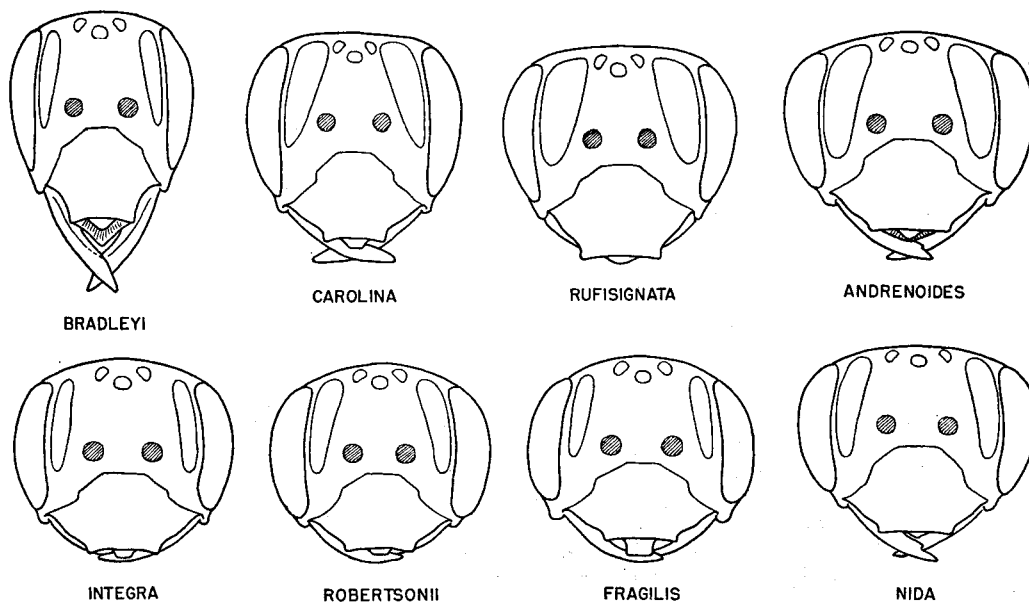


Figure 49—Facial view of female head, showing form of foveae in species of *Andrena (Gonandrena)*, *A. (Parandrena)* and *A. (Gonandrena)*.

shining, those on scutellum more minute, more irregularly scattered, quite sparse; pleura without visible punctures; dorsal area of propodeum nearly horizontal, rather broad, triangle finely subrugose toward basal margin; propodeal corbicula short, rather poorly developed, whitish, without an anterior fringe; trochanteral flocus rather poorly developed, but hairs rather elongate, whitish; hind tibiae slender and elongate, apex but very slightly broader than basitarsi, scopa rather thin, hairs elongate, simple, entirely whitish; front and middle basitarsi quite slender, slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent beyond middle; abdominal terga smooth, shining, very finely and rather closely punctate, except for the somewhat more sparse punctures on basal tergum, apical impressed areas quite shallow, occupying medially about one-third length of disc, becoming yellowish-hyaline along rims, discal pubescence extremely short, thin and obscure, apparently pale in color, terga 2-4 with narrow, white, apical fasciae, that on tergum 2 more or less interrupted medially, tergum 5 with a brownish, apical fimbria.

MALE—Length 7 mm.; face very slightly longer than broad; clypeus slightly convex, projecting but very slightly below suborbital line, yellow, except for two small black spots and the dark apical rim, smooth and shining, punctures fine but distinct, well separated medially but not sparse, becoming close at extreme sides; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, punctures exceedingly minute, obscure and close; malar space extremely short; basal segment of flagellum slightly longer than 2nd segment, but shorter than 2nd and 3rd combined; process of labrum subtriangular, with a rather broadly truncate apex; mandibles rather short, with a small but distinct, inner, subapical tooth, overlapping hardly one-third; pubescence entirely pale ochraceous on head and thorax above, more whitish below and on legs; thoracic integument dull, rather densely tessellate, punctures of scutum fine but rather deep and distinct, well separated anteriorly, becoming somewhat more sparse in center posteriorly, surface somewhat more shining, those on scutellum more minute and obscure, surface anteriorly shining, becoming dull posteriorly; pleura anteriorly with a few very minute, obscure punctures, hardly visible; dorsal area of propodeum more oblique, rather extensive, triangle finely subrugose; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent just beyond middle; abdominal terga

smooth and shining, finely and closely punctate except for the more sparse and minute punctures on basal tergum, apical impressed areas shallow and rather narrow, becoming obscurely brownish-hyaline along rims, discal pubescence extremely short, thin, erect and entirely pale, forming very narrow, thin and inconspicuous, ochraceous, apical fasciae at sides of terga 2-4; apical margin of sternum 6 quite strongly reflexed; apical portion of sternum 8 slender, rather short, sides nearly parallel, apex very slightly broadened, truncate, clothed beneath with rather short pubescence; penis valves slender apically, somewhat dilated basally, the dilated portion rather deeply grooved laterally, gonocoxites rather abruptly dilated toward apex, the resulting lobe narrowly rounded at tip, gonocoxal lobes quite strongly produced, narrowly rounded apically.

DISTRIBUTION — Colorado, Nebraska and Minnesota, east to the New England states and Nova Scotia, south to Arkansas and Georgia; April to September.

FLOWER RECORDS — *Apocynum*, *Aronia*, *Brassica*, *Ceanothus*, *Pyracantha*, *Rhus*, and *Rubus*. Recorded by Robertson (1929, as *A. serotina*) on *Aruncus*, *Cryptotaenia*, *Pastinaca*, *Ptelea*, *Taenidia* and *Viburnum*. ✓

Andrena (Parandrena) andrenoides andrenoides (Cresson)

(Fig. 49, 50, 52 & 55)

- Panurgus anarenooides* Cresson, 1878. Amer. Ent. Soc. Trans. 7, p. 62. ♂.
Panurgus rufocinctus Ashmead, 1890. Colo. Biol. Assoc. Bul. 1, p. 4. ♀.
Andrena andrenoides Salt, 1927. Jour. Exp. Zool. 48, p. 250. (stylopization)
Andrena andrenoides Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena (Parandrena) andrenoides Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 203. (classification)

FEMALE—Length 8 mm.; clypeus broadly convex, projecting nearly one-half below suborbital line, smooth and shining medially, becoming rather dull toward sides, finely punctate, punctures very sparse medially, becoming quite close at extreme sides; facial foveae rather narrow, occupying above only slightly more than half of space between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli equal to about half their diameter; cheeks slightly broader than eyes, rounded posteriorly, somewhat shining, punctures

exceedingly minute and obscure beneath rather dense pubescence; malar space distinct but quite short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum small, broadly subtriangular, much broader than long; pubescence of head, thorax and legs greyish-white; thoracic integument rather dull, finely tessellate, punctures of scutum very fine, shallow, well separated anteriorly, becoming rather sparse in center of disc, those on scutellum very minute, sparse and irregular, surface shining; pleura without evident punctures; dorsal area of propodeum rather narrow, oblique, triangle rugosostriate near center along base; propodeal corbicular rather well developed, with a quite distinct anterior fringe, whitish; trochanteral floccus well developed, long, dense and white; hind tibiae quite slender, apex only slightly broader than basitarsi, scopa quite dense, hairs rather short, simple, whitish anteriorly, becoming somewhat ochraceous toward base and along hind margin; front and middle basitarsi slightly narrower than their respective tibiae; wings with but two submarginal cells, 2nd receiving 1st and 2nd recurrent veins subequally distant from base and apex; abdominal terga smooth, somewhat shining, punctures exceedingly minute, well separated but not sparse, apical impressed area quite shallow, occupying medially about one-third length of disc, becoming rather narrowly yellowish-hyaline along rims, discal pubescence extremely short, thin and sparse, entirely pale, terga 2-4 with whitish apical fasciae, that on tergum 2 widely interrupted medially, tergum 5 with a brownish-ochraceous, apical fimbria.

MALE—Length 8 mm.; face with large and conspicuous yellow maculae between lateral margin of clypeus and lower end of eye; clypeus broad, slightly convex, projecting about one-third below suborbital line, yellow except for two small black spots and the blackish apical margin, shining, punctures very fine, rather close, becoming still closer at extreme sides; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks much broader than eyes, rather flat, broadened below where there is a broadly rounded angle opposite lower third of eye, dull, punctures exceedingly obscure, hardly visible; malar space very short; basal segment of flagellum very slightly shorter than 2nd and 3rd combined, those beyond the 2nd pale testaceous below, fuscous above; process of labrum small, subtriangular, tip narrowly truncate, mandibles quite short, with a small, inner, subapical tooth, overlapping very slightly; pubescence of head, thorax and legs entirely whitish; thoracic integument dull, punctures of scutum very fine and shallow, rather close and obscure anteriorly, becoming sparse near center posteriorly, those on scu-

tellum very minute, widely scattered and irregular, surface shining; pleura densely tessellate, without visible punctures; dorsal area of propodeum rather short, oblique, triangle densely tessellate; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell receiving 2nd recurrent slightly nearer apex than 1st recurrent to base; abdominal terga rather smooth, somewhat shining, punctures exceedingly minute and obscure, hardly visible, apical impressed areas shallow, occupying medially about one-third length of discs, becoming narrowly but distinctly yellowish-hyaline along rims, discal pubescence very short and thin, entirely pale, apical fasciae not developed; lateral apical angles of sternum 6 somewhat reflexed but not recurved; apical portion of sternum 8 quite slender toward base, somewhat expanded toward the rather broadly truncate apex, very densely short pubescent beneath; penis valves slender apically, slightly broadened toward base, not excavated, gonocoxites gradually dilated apically to form elongate subtriangular lobes which are rather narrowly rounded apically, gonocoxal lobes rather strongly produced, quite narrowly rounded apically.

DISTRIBUTION — Minnesota, Michigan and southern Canada, south to North Carolina and Georgia; March to August.

FLOWER RECORDS — *Amelanchier*, *Prunus*, *Salix* and *Viola*. Robertson (1929) records this species on *Antennaria*, *Crataegus*, *Erigenia*, *Heracleum*, *Sassafras* and *Stellaria*.

Andrena (Parandrena) andrenoides clarigastra Viereck

Andrena andrenoides f. *bicolor* Robertson, 1898. Acad. Sci. St. Louis, Trans. 8, p. 47. Preocc.

Parandrena andrenoides var. *clarigastra* Viereck, 1908. Ent. News 19, p. 42.

Andrena (Parandrena) andrenoides clarigastra Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 203. (classification)

This form is characterized by the bright ferruginous abdomen of the female. The apical impressed areas are more yellowish-hyaline. Except for the somewhat more deeply and closely punctate clypeus, this answers in all other respects to the description of typical *andrenoides*. There seems to be no evident constant differences between the males of this form and typical *andrenoides*.

DISTRIBUTION — Minnesota, Illinois and Michigan; April to May.

✓

Andrena (Parandrena) nida
new species

(Figs. 49, 50, 52 & 55)

FEMALE—Length 8 mm.; face considerably longer than distance between eyes; eyes subparallel; foveae rather narrow, occupying above slightly more than half of space between eyes and ocelli; vertex very narrow, lateral ocelli less than half their own diameter from its hind margin; cheeks very slightly broader than eyes; clypeus broadly convex, protruding about one-half below suborbital line, shining medially, with sparse punctures, becoming rather closely, finely and distinctly punctate laterally; face below ocelli dull, finely striate, vertex dull but smooth, without evident punctures, cheeks somewhat shining, punctures exceedingly minute and hardly visible; malar space short but distinct; process of labrum very small and short, broadly subtriangularly; basal segment of flagellum about equal to segments 2 and 3 combined, median segments very slightly longer than broad; pubescence of head and thorax entirely pale, rather whitish below, becoming somewhat yellowish above, rather dense, elongate and erect; scutum smooth but rather dull, finely tessellate, punctures very minute, well separated even anteriorly, becoming rather sparse in center of disc, scutellum shining, with scattered, very fine, irregular punctures; pleura dull beneath the copious, elongate pubescence, somewhat tessellate, without visible punctures; dorsal area of propodeum with a few irregular striae toward basal margin, becoming tessellate along margins, lateral areas smooth but dull and tessellate; propodeal corbicula well developed, dorsal hairs elongate and densely plumose, interior without hairs, with a quite distinct anterior fringe; propodeal corbicula complete, well developed, with extremely long, curved hairs, these approaching in length the length of the femur; legs dark basally, becoming somewhat reddened on tarsi, pubescence entirely pale, basitarsi rather narrow, hind tibiae slender and elongate, scopa of pale yellowish, rather elongate hairs; wings subhyaline, veins and stigma pale yellow, with but two submarginal cells, 2nd submarginal receiving 1st and 2nd recurrent veins at about equal distances from base and apex; tegulae yellowish-hyaline, becoming narrowly piceous toward base; abdominal terga quite smooth, with minute, scattered, rather widely separated but distinct punctures, apical margins impressed for about one-third their median length, these areas somewhat yellowish, becoming narrowly hyaline along rims, discal pubescence hardly evident but erect and whitish where visible toward sides, fasciae evident laterally on segments 2-4, interrupted on segment 2, apical fimbria golden.

MALE—Length 8 mm.; face rather broad, median length about equal to distance between eyes; eyes subparallel; lateral ocelli separated from margin of vertex by slightly less than their own diameter; cheeks considerably broader than eyes, rather flat, with an obscure, posterior angle opposite middle of eye; clypeus short and quite broad, entirely yellow except for the dark apical rim and a pair of dark spots, polished, with minute, scattered but rather distinct punctures; face with yellow maculae between clypeus and lower margin of eye, these not extending to level of upper margin of clypeus; face below ocelli dull, densely rugoso-striate, vertex and cheeks dull, tessellate, without visible punctures; malar space hardly evident; process of labrum very small, broadly subtriangular, median length no more than half basal width; flagellum brownish-testaceous beneath, more piceous above and the basal segment blackish, somewhat longer than segment 2 but considerably shorter than 2 and 3 combined, median segments considerably longer than broad; mandibles somewhat elongate and slender, tips extending slightly beyond lateral apical angles of clypeus, but not nearly reaching base of opposite mandible; pubescence of head and thorax entirely pale yellowish, becoming somewhat deeper ochraceous on vertex and dorsum of thorax; scutum dull and tessellate, with shallow, fine, scattered and rather evenly distributed punctures, scutellum somewhat more shining, punctures minute and obscure; pleura dull, tessellate beneath the copious elongate pubescence, without distinct punctures; dorsal area of propodeum with rather coarse irregular rugae in center, becoming smoother and more tessellate along lateral margins, lateral areas densely tessellate; propodeal corbicula quite elongate and well developed; legs dark, with entirely pale yellowish pubescence, slender and elongate, the more apical tarsal segments becoming testaceous, spurs pale testaceous; wings very pale yellowish or subhyaline, veins and stigma pale testaceous, with but two submarginal cells, the 2nd receiving 2nd recurrent slightly nearer apex than 1st is to base; tegulae dark anteriorly, more yellowish-hyaline posteriorly; abdominal terga smooth but rather dull, with exceedingly minute, rather evenly distributed but rather sparse punctures barely evident, apical margins of segments 2-4 shallowly impressed, these areas becoming narrowly hyaline along rims, discal pubescence short but distinct and erect, entirely pale yellowish, apical fasciae evident on segments 2-4, rather widely interrupted on segment 2; sternum 7 rather broadly produced medially, this area very shallowly emarginate medially; sternum 8 angulate on each side toward base, the apical, produced area parallel-sided, truncate, rather

broad and with short pubescence; penis valves bulbous toward base but quite slender apically, gonocoxites gradually dilated toward the triangularly broadened apex, gonocoxal lobes slightly produced.

TYPES — Holotype: Male, Currie, Pender Co., N. C., April 7, 1951 (Mitchell, on *Amelanchier*) [author's coll.]. Allotype: Female, Raleigh, N. C., March 13, 1938 (Mitchell, at nest site in sand near creek) [author's coll.]. Paratypes: NORTH CAROLINA: 1♀, Raleigh, Apr. 4, 1925 (in sand bank); 1♂, 1♀, Raleigh, Mar. 15, 1945 (on *Salix*); 4♀♀, Raleigh, Apr. 12, 1947 (at burrows); 2♀♀, Raleigh, Mar. 13, 1938 (at burrows); 1♀, Raleigh, Mar. 12, 1950 (on *Prunus*); 1♂, White Lake, Mar. 14, 1953 (on *Amelanchier*); 2♂♂, Holly Shelter, Mar. 12, 1954 (on *Prunus*); 2♀♀, Wallace, Mar. 28, 1929 (on *Salix*) (all Mitchell); 1♀, Raleigh, Mar. 20 (C. S. Brimley, on *Salix*); 1♂, New River, Apr. or May, 1942 (G. E. Bohart). DISTRICT OF COLUMBIA: 1♂, 1♀, Washington, May 7 & 15, 1944 (G. E. Bohart). MICHIGAN: 1♂, Newaygo Co., May, 1956 (Dreisbach). MISSISSIPPI: 1♂, Vicksburg, Mar. 11, 1955 (Dreisbach). MARYLAND: 2♂♂, Laurel, Apr. 13, 1919 (W. L. McAtee, on *Salix*); 1♂, Branchville to Hyattsville, Apr. 10, 1915 (W. L. McAtee, on *Salix*); 1♂, near Plummer's Is., Apr. 16, 1916 (H. L. Viereck, on *Salix*).

Paratypes are located in the U. S. National Museum, the North Carolina Department of Agriculture, and in the collections of R. R. Dreisbach and the author.

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Andrena (Parandrena) wellesleyana
Robertson

(Figs. 50, 52 & 55)

Andrena wellesleyana Robertson, 1897. Acad. Sci. St. Louis, Trans. 7, p. 337. ♀♂.

Andrena (Parandrena) wellesleyana Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 203. (classification)

FEMALE—Length 10 mm.; clypeus broadly convex, projecting slightly less than one-half below suborbital line, somewhat shining, with a very narrow and imperfect, median, impunctate line, closely and deeply but rather finely punctate on each side; facial foveae rather broad, occupying above most of space between eyes and ocelli (as in *nida*, fig. 49),

covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli equal to about half their diameter; cheeks slightly broader than eyes, rounded posteriorly, quite densely pubescent, rather dull, punctures minute and obscure, hardly visible; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum small, rather broadly subtriangular (as in *nida*, fig. 49); mandibles with a low sub-basal ventral dilation; pubescence of head and thorax pale ochraceous above, becoming more whitish below, that on legs more whitish on the basal segments, becoming somewhat more ochraceous apically; thoracic integument dull, finely tessellate, punctures of scutum very fine and obscure, rather close anteriorly, becoming quite sparse near center posteriorly, those on scutellum very minute and obscure, irregularly scattered, the surface more shining; punctures of pleura minute and obscure, largely hidden by the rather dense pubescence; dorsal area of propodeum rather narrow, oblique, triangle finely tessellate; propodeal corbicula well developed but rather short, with a distinct anterior fringe, pale ochraceous; trochanteral floccus long, dense and copious, whitish; hind tibia rather broad apically, apex nearly twice width of the basitarsi, scopa dense, hairs rather short, obscurely plumose, largely white; front and middle basitarsi slightly narrower than their respective tibiae; wings faintly yellowish, with but two submarginal cells, 2nd submarginal cell receiving 1st recurrent about one-fourth from base, 2nd recurrent at apex; abdominal terga smooth, somewhat shining, very minutely and obscurely punctate, punctures rather close but barely visible, apical impressed area very shallow but rather broad, occupying more than one-third median length of disc, becoming narrowly yellowish-hyaline along rims, discal pubescence very thin and sparse, suberect, entirely pale, terga 2-4 with dense, white, apical fasciae, broadly interrupted medially on tergum 2 and more narrowly so on 3, tergum 5 with a brownish ochraceous, apical fimbria.

MALE—Length 9 mm.; face with conspicuous yellow maculae below, filling area between lateral margins of clypeus and lower end of eye; clypeus broad and flat, projecting but very slightly below suborbital line, yellow except for a pair of small black spots and the dark apical rim, smooth and shining, rather closely and deeply but finely punctate, punctures becoming even closer at extreme sides, space between margin of vertex and lateral ocelli subequal to their diameter; cheeks much broader than eyes, rather flat, subtriangular in outline, with the rounded angle opposite

middle of eye, dull, punctures hardly visible beneath rather long, dense, white pubescence; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined, those beyond 2nd pale ferruginous beneath; process of labrum small, subtriangular; mandibles of moderate length, slender, very slightly bowed, with a distinct, inner, subapical tooth, overlapping about one-third; pubescence of head, thorax and legs entirely whitish, rather long and dense; thoracic integument dull, quite densely tessellate, punctures of scutum exceedingly minute and obscure, well separated, those on scutellum even more obscure, surface densely tessellate; pleura with exceedingly minute and obscure punctures anteriorly, barely visible beneath rather long pubescence; dorsal area of propodeum rather narrow, oblique, triangle finely tessellate, obscurely subrugose toward basal margin; basitarsi slender and elongate, considerably narrower than their respective tibiae; wings with but two submarginal cells, 2nd submarginal receiving 1st and 2nd recurrent veins at subequal distances from base and apex; abdominal terga smooth, somewhat shining, punctures exceedingly minute and obscure, barely visible, apical impressed areas rather narrow, becoming rather broadly yellowish-hyaline along rims, discal pubescence thin but erect, entirely pale, terga 2-4 with thin, white, apical fasciae developed laterally, largely inevident or interrupted medially; lateral angles of sternum 6 very strongly reflexed, the tips projecting anteriorly; apical portion of sternum 8 quite robust, gradually narrowed from base to the subtruncate apex, clothed beneath with extremely short, dense pubescence; penis valves narrowed to a slender, spine-like point apically, broadly dilated and robust basally, not excavated laterally, gonocoxites rather robust and elongate, somewhat dilated apically to form subtriangular, apical lobes which are rather acute at tip, gonocoxal lobes somewhat produced, very broadly rounded.

DISTRIBUTION — Minnesota and Illinois to the New England states; April and May.

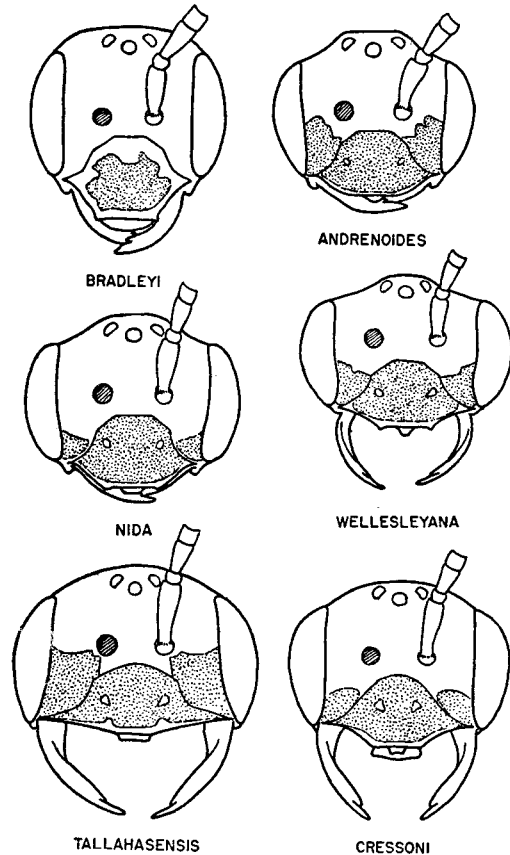


Figure 50

Facial view of male head, showing maculations in species of *Andrena* (*Conandrena*), *A.* (*Opandrena*) and *A.* (*Parandrena*).

Table 6—Distribution of species of *Leucandrena*, *Thysandrena*, *Gonandrena*, *Conandrena*, and *Parandrena* by states.

	New England					North Central					Mid Atlantic					South-eastern											
	Maine	New Hampshire	Vermont	Massachusetts	Rhode Island	Connecticut	Wisconsin	Michigan	Illinois	Indiana	Ohio	Kentucky	New York	New Jersey	Pennsylvania	Maryland	Delaware	West Virginia	Virginia	Dist. Columbia	Tennessee	North Carolina	South Carolina	Mississippi	Alabama	Georgia	Florida
<i>Leucandrena</i>																											
<i>albisigna</i>		X				X							X									X					
<i>bifurcata</i>								X			X																
<i>chippewaensis</i>								X																			
<i>erythronii</i>	X			X				X	X						X												
<i>parnassiae</i>			X				X	X																			
<i>picta</i>												X															
<i>placida</i>		X		X				X	X		X	X	X	X	X	X		X									
<i>recta</i>								X				X		X									X				
<i>seavillensis</i>													X														
<i>Thysandrena</i>																											
<i>algida</i>	X			X				X				X		X													
<i>bisalicis</i>	X	X		X		X	X	X	X	X	X			X			X			X	X					X	
<i>crenata</i>								X																			
<i>geranii</i>			X					X	X		X	X	X	X	X			X		X							
<i>lata</i>	X	X	X	X		X		X	X			X			X								X				X
<i>novaeangliae</i>	X	X	X	X		X		X	X			X		X				X									
<i>phaceliae</i>									X						X	X											
<i>Gonandrena</i>																											
<i>dreisbachi</i>								X																			
<i>fragilis</i>	X		X	X	X	X		X			X	X					X	X	X	X	X	X				X	
<i>integra</i>	X			X				X				X							X			X					X
<i>monroensis</i>								X																			
<i>peckhami</i>			X				X																X				
<i>persimulata</i>				X				X				X															
<i>platyparia</i>	X			X		X		X	X			X		X									X				
<i>robertsonii</i>	X	X	X	X		X				X		X	X	X			X	X		X	X	X	X				X
<i>Conandrena</i>																											
<i>bradleyi</i>	X			X	X	X		X				X			X								X				X
<i>carolina</i>	X	X		X	X			X				X	X	X				X		X	X	X					X
<i>durangoensis</i>		X		X		X		X				X					X										
<i>rufosignata</i>	X			X	X		X	X				X						X									
<i>Parandrena</i>																											
<i>andrenoides</i>								X		X													X				X
<i>a. clarigastra</i>								X	X																		
<i>nida</i>								X							X				X			X		X			
<i>wellesleyana</i>				X	X			X	X							X			X		X						

XIII

Andrena (Simandrena) nasonii
Robertson

(Figs. 51, 52 & 54)

- Andrena vestita* Provancher, 1888. Addit. Corr. Faune Ent. Canada Hym., p. 310. ♂. Pre-occ.
- Andrena nasonii* Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 120. ♀.
- Andrena hartfordensis* Cockerell, 1902. Ann. Mag. Nat. Hist. (7) 9, p. 103. ♀.
- Andrena nasonii* Robertson, 1902. Amer. Ent. Soc. Trans. 28, pp. 190 & 192. ♀ ♂. (key)
- Andrena nasoni* Viereck, 1907. Ent. News 18, pp. 283 & 285. ♀ ♂. (key)
- Andrena (Andrena) nasonii* var. *fulvodorsata* Viereck, 1917. Amer. Ent. Soc. Trans. 43, p. 385. ♀.
- Andrena* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
- Andrena nasoni* Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
- Andrena (Simandrena) nasonii* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 213. (classification)

FEMALE—Length 8 mm.; clypeus broadly convex, projecting about one-third below sub-orbital line, rather dull, punctures shallow and rather fine, well separated but not sparse, except for an indefinite, narrow, median, impunctate line; facial foveae broad, occupying above most of area between eyes and ocelli, covered with whitish tomentum; space between margin of vertex and lateral ocelli no more than half their diameter; cheeks subequal to eyes in width, rounded posteriorly, smooth, punctures hardly evident, but surface somewhat obscured by the rather dense pubescence; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, length about half the basal width, slightly narrowed to the broadly truncate apex; pubescence of dorsum of thorax pale ochraceous, elsewhere on head, thorax and legs, whitish-ochraceous; thoracic integument dull, rather densely tessellate, punctures of scutum fine but distinct, well separated but not sparse, those on scutellum much finer and closer, rather obscure; anterior portion of pleura with a few very obscure, scattered punctures; dorsal area of propodeum nearly vertical in position, triangle rather coarsely granular or subrugose; propodeal corbicula well developed, with a short but distinct anterior fringe, whitish in color; trochanteral floccus rather well developed, whitish; hind tibiae broadened apically, apex fully twice as broad as basitarsi, scopa whitish, rather dense, composed of very short,

simple hairs; front and middle basitarsi distinctly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga dull, quite densely tessellate, very slightly tinged with greenish, very minutely, closely and indistinctly punctate, apical impressed areas impunctate, rather shallow and narrow, becoming hyaline along rims, discal pubescence very poorly developed on the more basal terga, short, suberect, very thin, entirely pale on the more apical terga, terga 2-4 with quite dense, whitish, apical fasciae, that on tergum 2 broadly interrupted medially, tergum 5 with a pale brownish, apical fimbria.

MALE—Length 7 mm.; clypeus broadly convex, projecting slightly less than one-half below suborbital line, surface dull, with shallow, fine, obscure and rather close punctures; space between margin of vertex and lateral ocelli somewhat less than their diameter; cheeks subequal to eyes in width, rounded posteriorly, quite densely pubescent, surface rather smooth, punctures very obscure; malar space lacking; basal segment of flagellum subequal to 2nd segment; process of labrum rather broad and short, basal width about twice the median length, slightly narrowed to the rather broadly truncate tip; mandibles short, with a distinct, subapical, inner tooth, overlapping only slightly; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, quite densely tessellate, punctures of dorsum of thorax very obscure, hardly visible; pleura without distinct punctures; dorsal area of propodeum somewhat vertical in position, triangle rather finely granular; all basitarsi slender and elongate, distinctly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth, but dull, very finely tessellate, punctures exceedingly minute and obscure, hardly visible, apical impressed areas narrow and quite shallow, becoming more or less hyaline toward rims, discal pubescence very obscure, short, thin, erect and entirely pale, fasciae very poorly developed; apical portion of sternum 8 rather short, gradually narrowed from base and slightly broadened to the truncate apex, without a distinct ventral protuberance; penis valves very narrow and very slightly bulbous toward base, not excavated, gonocoxites rather short, slender, only very slightly dilated apically, gonocoxal lobes rather distinctly but not markedly produced, narrowly rounded apically.

DISTRIBUTION — Minnesota to Eastern Canada and the New England states, south to North Carolina, Georgia and Texas; March to July.

FLOWER RECORDS — *Acer*, *Apocynum*, *Claytonia*, *Crataegus*, *Forsythia*, *Fragaria*, *Ilex*, *Lygustrum*, *Potentilla*, *Prunus*, *Pyracantha*, *Ranunculus*, *Rubus*, *Senecio*, *Spirea*, *Toxicodendron*, *Viburnum* and *Viola*. Robertson (1929) records *nasonii* on the following additional plant genera: *Arabis*, *Capsella*, *Chaerophyllum*, *Polemonium*, *Polytaenia*, *Rhamnus*, *Sisymbrium*, *Taenidia* and *Zizia*. Brittain & Newton (1934) record it on *Amelanchier*.

Andrena (?*Simandrena*) *uvulariae*
new species

(Fig. 54)

FEMALE—Length 7 mm.; head rather broad, face only very slightly longer than distance between eyes; eyes parallel; foveae rather narrow, occupying above about two-thirds of space between eyes and ocelli, slightly narrowed below, terminating at about level of upper margin of clypeus, covered with pale tomentum; lateral ocelli separated from margin of vertex by a space no greater than their diameter; cheeks somewhat broader than eyes; clypeus slightly protuberant, protruding nearly one-half below suborbital line, smooth and shining, with scattered, very fine and rather sparse, irregular punctures; face below ocelli dull, finely but distinctly and closely striate, vertex dull, with a few obscure, scattered punctures at each extreme side, cheeks smooth but rather dull, punctures minute and barely evident; malar space hardly evident; process of labrum transverse, quite large, entire apically, median length about one-third basal width; flagellum becoming yellowish beneath apically, basal segment about equal to segments 2-4 combined, these very short, median segments about as long as broad; pubescence of head and thorax creamy, somewhat more whitish on cheeks, lower portions of face and on thorax laterally; scutum and scutellum shining, punctures evident on scutum anteriorly but rather minute and obscure, this portion rather dull, median and posterior areas polished, punctures exceedingly minute, sparse and irregular, scutellum with only a very few, widely scattered, minute punctures; pleura smooth but dull and tessellate; dorsal area of propodeum poorly defined, very densely tessellate or obscurely, minutely rugose, lateral areas densely tessellate; propodeal corbicula well developed, dorsal hairs long and curled, densely plumose, with a rather well developed anterior fringe, interior largely without hair; trochanteral floccus well developed, complete, of very long curved and plumose hairs; legs rather dark basally, tarsal segments becoming rather pale testaceous, basitarsi rather narrow and parallel-sided, hind tibiae becoming rather

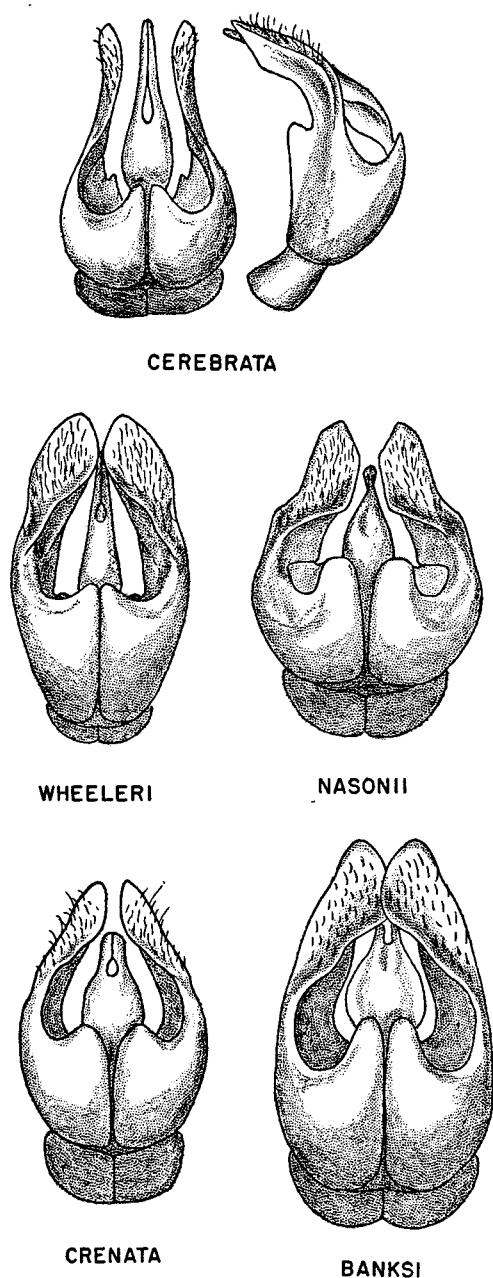


Figure 51

Apical flexed portion of male genital armature in species of *Andrena* (*Simandrena*), *A. (Thysandrena)* and unassigned species.

broad apically but not twice the width of their basitarsi, scopal hairs quite short, entirely pale yellow; spurs pale testaceous; wings subhyaline, veins pale testaceous, stigma more brownish, 2nd submarginal cell about half length of 3rd, receiving 1st recurrent slightly beyond middle; abdominal terga smooth but rather dull, punctures very fine, rather evenly distributed, well separated but not sparse, segments 2-4 rather narrowly impressed apically, these areas somewhat reddened and minutely, rather sparsely punctate, with narrow, whitish, apical fasciae, these interrupted on the 2nd and 3rd, apical fimbria rather yellowish.

TYPE — Holotype: Female, Beltsville, Md., May 2, 1915 (L. O. Jackson, on *Uvularia sessilifolia*) [U.S.N.M.].

xiii

Andrena (Simandrena) wheeleri
Graenicher

(Figs. 51 & 52)

Andrena wheeleri Graenicher, 1904. Ent. News 15, p. 65. ♀ ♂.

Andrena wheeleri Atwood, 1934. Canad. Jour. Res. 10, pp. 208 & 210. ♀ ♂. (key)

Andrena wheeleri Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)

Andrena wheeleri pallidior Cockerell, 1938. Ent. News 70, p. 7. ♀.

Andrena (Simandrena) wheeleri Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 213. (classification)

FEMALE—Length 9 mm.; length and breadth of face subequal; clypeus broadly convex, projecting about one-third below suborbital line, somewhat shining medially but becoming dull and tessellate laterally, punctures rather fine and shallow, scattered and rather sparse medially, becoming quite close laterally; facial foveae quite broad, occupying above most of area between eyes and ocelli (as in *nasonii*, fig. 54), covered with silvery tomentum; space between margin of vertex and lateral ocelli nearly equal to their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, punctures obscure; malar space lacking; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather large, semicircular, median length about half the basal width; pubescence of head, thorax and legs ochraceous; thoracic integument dull, rather densely tessellate, but scutum somewhat shining toward posterior middle, punctures very fine, shallow and rather sparse, those on scutellum much closer, but very fine and obscure; pleura subrugose anteriorly, but otherwise impunctate; dorsal area of propodeum oblique, triangle very finely granular; propodeal corbicula

rather short but well separated, with a distinct anterior fringe, pale ochraceous, trochanteral flocus well developed, of moderate length, more whitish-ochraceous; hind tibiae broadened apically, apex fully twice width of basitarsi, scopa quite dense, hairs short and simple, pale ochraceous; front and middle basitarsi very slightly narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about at middle; abdominal terga smooth, but rather dull, microscopically tessellate, very minutely and obscurely punctate, punctures rather close on discs, but lacking on the shallow, apical, impressed areas which occupy medially about one-third length of discs, becoming brownish-hyaline along rims, discal pubescence very sparse, obscure and entirely pale, fasciae not developed, tergum 5 with a brownish, apical fimbria.

MALE—Length 7.5 mm.; clypeus broadly convex, projecting about one-third below suborbital line, surface medially somewhat shining, becoming dull laterally, punctures rather close, deep and distinct on each side of an obscure, median, impunctate area, pubescence quite dense, obscuring surface details; space between margin of vertex and lateral ocelli slightly less than their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, punctures very obscure beneath rather dense pubescence; malar space lacking; basal segment of flagellum subequal to 2nd segment; process of labrum rather large, length about half basal width, apex rather broadly truncate; mandibles short, with a distinct, subapical, inner tooth, overlapping but very slightly; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, quite densely tessellate, punctures hardly visible even on dorsum of thorax; dorsal area of propodeum more oblique, short, triangle very finely and obscurely granular; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent somewhat basad of middle; abdominal terga smooth but rather dull, microscopically tessellate, punctures exceedingly minute and obscure, hardly visible, apical depressed areas rather narrow and shallow, becoming brownish-hyaline along rims, discal pubescence thin and obscure, erect, entirely pale, fasciae not developed; apical portion of sternum 8 gradually narrowed from base, slightly broadened at the subtruncate apex, pubescence rather long and dense; penis valves very slender, very slightly broadened toward base, gonocoxites rather short, slightly dilated apically, gonocoxal lobes only very slightly produced, rather narrowly rounded.

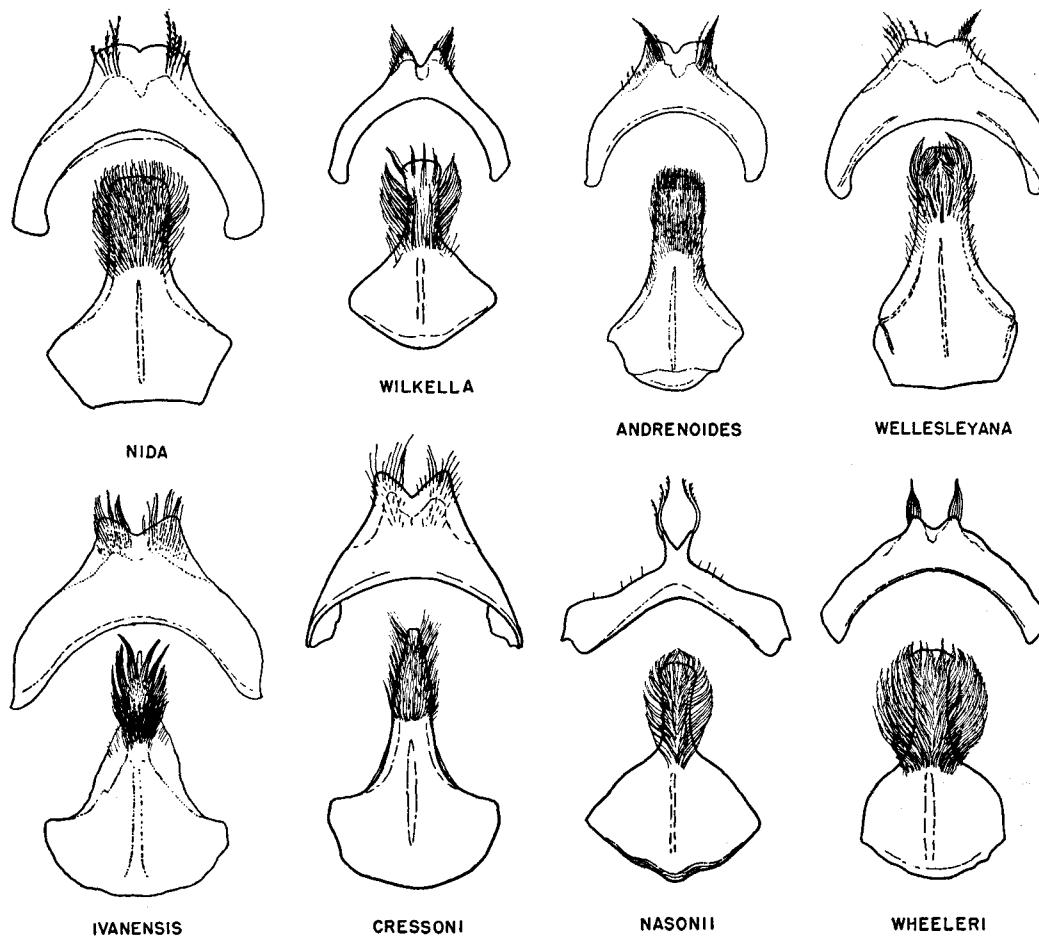


Figure 52—Sternal plates 7 (upper) and 8 of males in species of *Andrena* (*Parandrena*), *A.* (*Taeniandrena*), *A.* (*Opandrena*) and *A.* (*Simandrena*).

DISTRIBUTION—Minnesota and Colorado to Maine, south to North Carolina; April, May and June.

FLOWER RECORDS — *Chrysanthemum leucanthemum* and *Rubus*. Collected by Lovell on *Sedum acre*. Recorded also by Brittain & Newton on *Centaurea*, *Cornus* and *Rhododendron*. This was thought by Graenicher to be oligotropic on the Umbelliferae.

Cockerell described the subspecies *pallidior* as a race distinct from typical *wheeleri*

and extending from Maine to Alberta. Specimens from Wisconsin and Colorado he assigned to the typical form. The chief differences he cited were the more converging facial foveae in *pallidior* and the much less pubescent (plumose?) hair. A considerable series of females from the North Carolina highlands seem to agree with the description of *pallidior*, as does also a specimen from New Hampshire. One of the North Carolina specimens was compared with the type of *wheeleri* and was thought to be identical. The desirability of further study of the material is indicated.

Andrena (Opandrena) cressonii
Robertson

(Figs. 50, 52, 53 & 54)

- Andrena Cressonii* Robertson, 1891. Amer. Ent. Soc. Trans, 18, p. 56. ♀ ♂.
Andrena kansensis Cockerell, 1899. Ent. News 10, p. 255.
Andrena bridwelli Cockerell, 1899. Ent. News 10, p. 255. ♂.
Opandrena dubia Robertson, 1902. Canad. Ent. 34, p. 48. ♂.
Opandrena cressonii Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 193. ♀ ♂. (key)
Andrena (Trachandrena) trumani Viereck and Cockerell, 1914. U. S. Nat. Mus. Proc. 48, p. 12. ♀.
Andrena latisigna Viereck and Cockerell, 1914. U. S. Nat. Mus. Proc. 48, p. 22. ♂.
Opandrena cressonii Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena cressonii transformans Cockerell, 1934. Pan-Pacific Ent. 9, p. 157. ♀.
Andrena (Opandrena) cressonii Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 211. (classification)

FEMALE—Length 11 mm.; clypeus broadly convex, projecting slightly less than half below suborbital line, rather dull and tessellate, with a narrow, median, impunctate line, punctures on each side rather close, coarse and deep; facial foveae broad, occupying above most of space between eyes and ocelli, with ochraceous tomentum; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks very slightly broader than eyes, rounded posteriorly, rather dull, closely and very finely punctate beneath rather dense pubescence; malar space very short; basal segment of flagellum slightly longer than 2nd and 3rd combined; process of labrum broad and extremely short, very broadly semicircular, fully four or five times broader than median length; pubescence of head and thorax pale fulvous above, becoming more ochraceous below and on legs; thoracic integument dull, tessellate, punctures of scutum rather fine and close anteriorly, becoming somewhat more sparse posteriorly, surface somewhat shining, those on scutellum more irregular and sparse, surface somewhat shining; pleura roughened or obscurely subrugose; dorsal area of propodeum oblique, very short, triangle very short, very obscurely substrate; propodeal corbicula dense but rather short, without a distinct anterior fringe, ochraceous; trochanteral flocus rather thin and poorly developed, pale ochraceous; hind tibiae broadened apically, but apex not quite twice width of basitarsi, scopa dense, hairs simple and

rather short, entirely whitish; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining, deeply, closely and rather coarsely punctate, apical depressed areas occupying about one-third median length of discs, finely and closely punctate, becoming obscurely reddened at rims, discal pubescence short, thin and entirely pale, terga 2-4 with ochraceous, rather dense, apical fasciae, widely interrupted on tergum 2, more narrowly on 3, tergum 5 with a brownish-fuscous, apical fimbria.

MALE—Length 11 mm.; face with a pair of large yellow maculae occupying area between clypeus and eye margin below; clypeus yellow, very broad and rather flat, projecting about one-third below suborbital line, with a pair of small, dark spots above, and the apical rim blackish, smooth and somewhat shining, punctures rather deep but fine, rather sparse medially, becoming very close and fine at extreme sides; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks broader than eyes, rounded posteriorly, rather dull, punctures close, fine and obscure; malar space lacking; basal segment of flagellum nearly twice length of 2nd segment, but shorter than 2nd and 3rd combined; process of labrum rather small, broad and very short, strongly narrowed to the narrowly truncate and slightly emarginate tip; mandibles rather short, with a distinct, subapical tooth, overlapping about one-fourth; pubescence of head, thorax and legs whitish; thoracic integument dull, tessellate, punctures of scutum shallow, rather fine, well separated anteriorly, somewhat more sparse toward center posteriorly, those on scutellum fine, sparse and irregular, surface dull; pleura finely roughened or subrugose; dorsal area of propodeum rather narrow and oblique, triangle finely roughened, very short and broad; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth, somewhat shining, very closely and rather coarsely punctate, apical depressed areas distinct, rather narrow, more finely punctate, becoming hyaline along rims, discal pubescence very short, thin and obscure, entirely pale, terga 2-4 with whitish or ochraceous apical fasciae, widely interrupted medially on segment 2; apical portion of sternum 8 spear-shaped, slightly narrowed just basad of middle, gradually narrowed to the very narrowly truncate tip, with short, dense pubescence covering this area; penis valves slender at tip, but very broadly dilated toward

base, not excavated, gonocoxites quite slender, slightly dilated apically, gonocoxal lobes not produced, apical margins forming a nearly straight line.

DISTRIBUTION — Throughout the United States and Southern Canada; March to August.

FLOWER RECORDS — *Amelanchier*, *Aronia*, *Brassica*, *Ceanothus*, *Crataegus*, *Fragaria*, *Ilex*, *Potentilla*, *Prunus*, *Pyracantha*, *Ranunculus*, *Rubus*, *Salix*, *Stellaria* and *Viburnum*. This is recorded by Robertson (1929) on the following additional genera: *Anemonella*, *Arabis*, *Aruncus*, *Capsella*, *Celastrus*, *Claytonia*, *Cornus*, *Dentaria*, *Heracleum*, *Oxalis*, *Pastinaca*, *Philadelphia*, *Polytaenia*, *Ptelea*, *Radicula*, *Rhamnus*, *Rhus*, *Rosa*, *Sanicula*, *Sisymbrium*, *Smilacina*, *Smilax*, *Taenidia*, *Taraxacum*, *Thaspium*, *Tradescantia*, *Trifolium*, *Veronica*, *Zanthoxylum*, and *Zizia*.

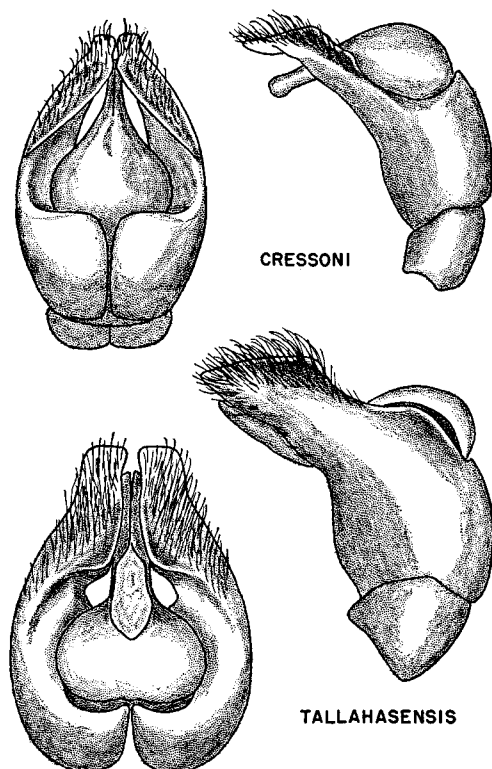


Figure 53

Male genital armature in species of *Andrena* (*Opandrena*).

Andrena (Opandrena) cressonii
tallahasensis new subspecies

Figs. 50 & 53

MALE—This agrees in most characters with typical *cressonii*, with the following exceptions: Head somewhat broader, considerably broader than long, eye margins slightly divergent below; lateral facial maculae very large, extending up to bases of antennae, slightly above upper margin of clypeus; basal segment of flagellum very long, exceeding 2nd and 3rd combined; sternum 8 produced into an extremely slender, apical projection; base of penis valves broadly dilated, sharply and abruptly constricted to form the quite narrow apical portion, this constriction being much more abrupt than in typical *cressonii*, apex of the gonocoxites somewhat produced, and broadly rounded apically.

TYPES — Holotype: Male, Tallahassee, Fla., Apr. 1, 1944 (R. & G. Bohart) [Bohart]. Paratypes: FLORIDA: 3♂♂, topotypical. NORTH CAROLINA: 1♂, Cumberland Knob Park, June 20, 1950 (Mitchell, on chinquapin).

Paratypes are in the collections of R. M. Bohart and the author.

Andrena (Opandrena) cressonii
ivanensis new subspecies

(Fig. 52)

MALE—Length 9 mm.; face without yellow maculations; clypeus entirely black, broad and short, only slightly convex, projecting about one-third below suborbital line, dull and tessellate, finely but rather deeply punctate, punctures sparse medially, becoming very close at extreme sides; space between margin of vertex and lateral ocelli considerably wider than their diameter; cheeks broader than eyes, rounded posteriorly, dull, punctures very fine, close and obscure; malar space lacking; basal segment of flagellum subequal to 2nd segment; process of labrum short, quite broad, much narrowed to the narrowly truncate and slightly emarginate apex; mandibles of moderate length, with a distinct, inner, subapical tooth, slightly curved, overlapping about one-third; pubescence of head, thorax, and legs pale ochraceous; thoracic integument dull, tessellate, punctures of scutum quite deep, well separated even anteriorly becoming rather sparse in center posteriorly, those on scutellum finer, more widely scattered, surface somewhat shining; pleura roughened, subrugose, dorsal area of propodeum narrow and oblique, triangle finely rugose; basitarsi slender and elongate,

considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining, deeply and rather coarsely and closely punctate except for the more sparse punctures on basal tergum, apical impressed areas distinct but rather narrow, concolorous with remainder of discs, somewhat more finely and sparsely punctate, discal pubescence extremely thin, short and obscure, terga 2-4 with thin, obscure, whitish, apical fasciae at least partially developed; apical portion of sternum 8 elongate triangular, gradually narrowed from base to the acute tip, apical half with short dense pubescence beneath; penis valves slender apically, broadly dilated basally, not excavated, gonocoxites rather short and slender, slightly dilated toward apex, gonocoxal lobes not produced, apical margins forming a nearly straight line.

TYPES—Holotype: Male, Ivanhoe, N. C., Apr. 5, 1946 (T. B. Mitchell, on *Padus*) [authors coll.]. Paratypes: NORTH CAROLINA: 1♂, Elizabethtown, Nov. 5, 1920 (Mitchell). VIRGINIA: 1♂, Arlington, Apr. 14, 1946 (R. Bohart, on mustard).

Although this is conspicuously different from *cressonii* in having the face entirely black, the relationship to that species evidently is very close. Paratypes are in the collections of R. M. Bohart and the author.

XIII

Andrena (Taeniandrena) wilkella
(Kirby)

(Figs. 52, 54 & 55)

- Melitta wilkella* Kirby, 1802. Monog. Apum Angliae 2, p. 145. ♀ ♂.
- Andrena winkleyi* Viereck, 1907. Ent. News 18, pp. 283 & 285. ♀ ♂.
- Andrena wilkella* Malloch, 1918. Biol. Soc. Wash. Proc. 31, p. 61.
- Andrena wilkella* Brittain, 1933. Canada Dept. Agr. Bul 162, p. 94. (biology)
- Andrena wilkella* Atwood, 1933. Canad. Jour. Res. 9, p. 456. (biology)
- Andrena wilkella* Brittain & Newton, 1933. Canad. Joul. Res. 9, p. 341. (flower records)
- Andrena wilkella* Atwood, 1934. Canad. Jour. Res. 10, pp. 207 & 210. ♀ ♂. (key)
- Andrena wilkella* Brittain & Newton, 1934. Canad. Jour. Res. 10, p. 261. (flower records)
- Andrena (Taeniandrena) wilkella* Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 215. (classification)

FEMALE—Length 11 mm.; clypeus flattened, projecting slightly less than one-half below suborbital line, dull and tessellate, punctures shallow but rather close and fine on

each side of a very narrow and indefinite, median, impunctate line; facial foveae broad, nearly filling area between eyes and ocelli, covered with bright ochraceous tomentum; space between margin of vertex and lateral ocelli nearly equalling distance between ocelli; cheeks broader than eyes, rounded posteriorly, smooth and somewhat shining, punctures very minute and obscure; malar space very short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum broadly subtriangular, narrow apex subtruncate, very slightly emarginate; pubescence of head and thorax brownish-ochraceous above, somewhat paler below and on legs, rather short and dense on dorsum of thorax; thoracic integument dull and tessellate, punctures of scutum shallow but rather coarse and close, somewhat more widely separated in center of disc, those on scutellum fine and well separated, surface more shining; pleural punctures obscure; triangle of propodeum very finely rugoso-striate; propodeal corbicula extremely short and poorly developed, without a distinct, anterior fringe, pale ochraceous; trochanteral floccus well developed, of moderate length, whitish; hind tibiae becoming quite broad apically, scopa quite dense, hairs simple, of moderate length, entirely pale ochraceous; all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent at middle; abdominal terga dull, very closely, finely and rather deeply punctate, apical depressed areas rather deep laterally, shallow medially, occupying somewhat less than one-third median length of discs, becoming very narrowly reddened along rims, discs almost completely bare of pubescence but with rather dense and narrow, apical ochraceous fasciae on terga 2-4, that on tergum 2 widely interrupted, slightly so on 3, tergum 5 with a rather narrow, brownish-ochraceous, apical fimbria.

MALE—Length 10 mm.; clypeus somewhat produced but flattened medially, projecting nearly one-half below suborbital line, surface shining, deeply and closely punctate except along narrow, median area, where they are rather sparse; space between margin of vertex and lateral ocelli only slightly shorter than distance between ocelli; cheeks not much broader than eyes, rounded posteriorly, somewhat shining, punctures minute and close, rather indistinct; malar space very short; basal segment of flagellum considerably shorter than 2nd segment, not much longer than apex is broad; process of labrum very short and broad, apex narrowly and shallowly emarginate; mandibles quite short, rather straight, with a distinct, inner, subapical tooth, pubescence of head, thorax and legs entirely pale

ochraceous; thoracic integument dull and tessellate, punctures of scutum shallow, moderately coarse, quite close except in center of disc, where they are more widely separated, well separated but not sparse on scutellum, which is somewhat more shining; pleural punctures obscure, surface more nearly subrugose; enclosure of propodeum finely subrugose; all basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell much shorter than 3rd, receiving 1st recurrent near middle; abdominal terga dull, closely, deeply and rather finely punctate, apical depressed areas rather narrow and shallow, obscurely reddened toward rims, discal pubescence very short, suberect, entirely pale, forming rather obscure, narrow, whitish, apical fasciae toward sides of terga 2-4; apical portion of sternum 8 rather robust, without a distinct, ventral protuberance, apex rather broadly rounded, apical half quite densely pubescent beneath; penis valves very slender, the base slightly enlarged, gonocoxites quite broad, only slightly dilated apically, gonocoxal lobes not produced.

DISTRIBUTION—Holarctic, occurring in North America from Nova Scotia through Quebec and the New England states to Wisconsin, eastward through Ohio to Virginia and Maryland; April to August.

FLOWER RECORDS — *Crataegus*, *Malus*, *Rhodora*, *Rubus*, *Trifolium* and *Vaccinium*. According to Brittain and Newton (1933 & 1934) *wilkella* also visits *Achillea*, *Amorpha*, *Brassica*, *Cirsium*, *Daucus*, *Epi-lobium*, *Fragaria*, *Leontodon*, *Philadelphus*, *Pinus*, *Prunus*, *Raphanus*, *Rhododendron*, *Solidago*, *Stellaria* and *Taraxacum*.

ROBERTSON

Andrena (Scaphandrena) arabis

Robertson

(Figs. 54-56)

- Andrena arabis* Robertson, 1897. Acad. Sci. St. Louis, Trans. 7, p. 334. ♀.
Andrena arabis Robertson, 1902. Amer. Ent. Soc. Trans. 28, p. 191. ♀. (key)
Andrena arabis Viereck, 1907. Ent. News 18, p. 282. ♀. (key)
Andrena arabis Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)
Andrena (Scaphandrena) arabis Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 201. (classification)

FEMALE—Length 9 mm.; face slightly longer than broad; clypeus somewhat produced, with median area flattened, projecting nearly one-half below suborbital line, rather dull and finely tessellate, punctures fine but deep and distinct, rather widely separated and uniformly distributed; facial foveae narrow, occupying above hardly more than half of space between eyes and lateral ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli less than their diameter; cheeks not much broader than eyes, rounded posteriorly, dull, very minutely and obscurely punctate; malar space very short; basal segment of flagellum very slightly exceeding 2nd and 3rd combined; process of labrum rather small, broadly subtriangular, apex narrowly truncate, slightly elevated; pubescence of head, thorax and legs entirely ochraceous; thoracic integument rather dull, punctures of scutum anteriorly fine and shallow but rather distinct and close, becoming very sparse and obscure posteriorly; scutellum very dull, sparsely and very finely punctate; pleura dull, densely tessellate, punctures evident anteriorly but inevident posteriorly; enclosure of propodeum dull, tessellate, obscurely rugose along basal margin; propodeal corbicula rather poorly developed, without an anterior fringe; trochanteral flocus rather well developed; tibial scopa quite dense, hairs rather short and simple, entirely pale ochraceous; all basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell slightly shorter than 3rd, receiving 1st recurrent slightly basad of middle; abdominal terga smooth but dull, apical depressed areas rather narrow and shallow, becoming yellowish-hyaline along rims, punctures of discs fine but rather deep and distinct, rather sparse medially, becoming somewhat closer toward sides, discal pubescence very short, suberect, entirely pale, terga 2-4 with distinct, ochraceous, apical fasciae, that on tergum 2 slightly interrupted medially, tergum 5 with a quite dense, apical, ochraceous fimbria.

MALE—Length 8 mm.; face slightly longer than broad, eyes slightly convergent below; clypeus pale yellow, apical margin and two small lateral spots blackish, rather strongly convex, projecting about one-third below suborbital line, smooth, deeply and distinctly but somewhat sparsely punctate, punctures closer laterally; space between margin of vertex and lateral ocelli less than their diameter; cheeks subequal to eyes in width, rounded posteriorly, rather dull, closely but very finely punctate; malar space extremely short; basal segment of flagellum subequal to 2nd and 3rd combined; process of labrum rather small, broad but quite short, broadly subtriangular, the

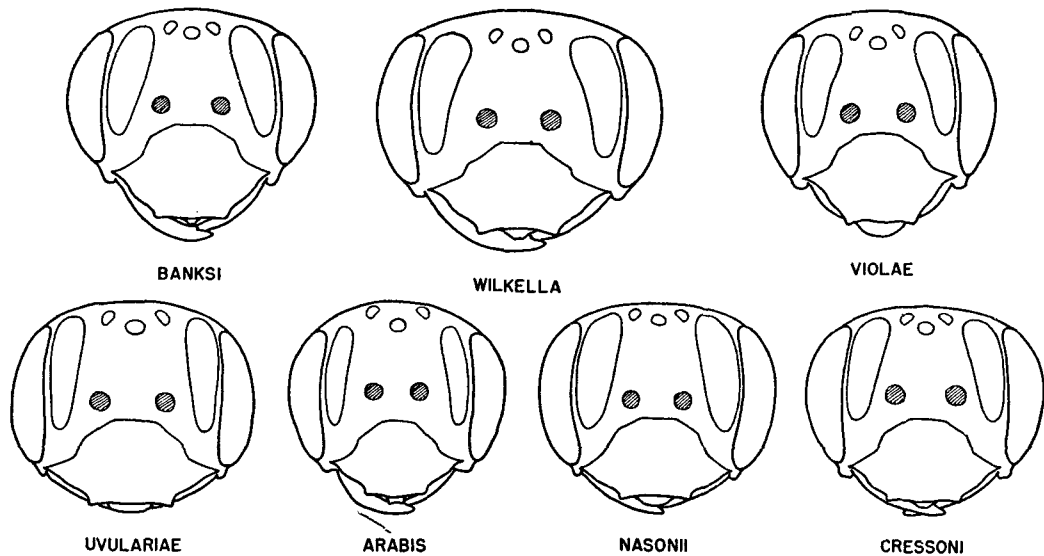


Figure 54—Facial view of female head showing form of foveae in *Andrena banksi*, *A. (Taenidrena) wilkella*, *A. (Iomelissa) violae*, *A. (Simandrena) nasonii* and *A. (S.) uvulariae*.

apex rather narrowly truncate and slightly emarginate; pubescence of entire body pale ochraceous; thoracic integument dull, rather densely tessellate, punctures of scutum shallow, rather obscure, rather close anteriorly, but becoming quite sparse posteriorly, those on scutellum about equally fine, rather widely separated; pleura more densely tessellate, punctures very obscure; enclosure of propodeum rather uniformly subrugose; basitarsi slender and elongate, considerably narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent near middle; abdominal terga dull, microscopically tessellate, apical margins but very slightly depressed, concolorous with remainder of discs except for the very narrow apical rim, punctures of discs rather uniformly minute and sparse, pubescence of discs short, thin, erect, entirely pale, terga 2-4 with fairly dense, ochraceous, apical fasciae, that on tergum 2 rather widely interrupted medially; apical portion of sternum 8 rather slender and elongate, with a low median projection, rather thinly pubescent from this to the slightly expanded, subtruncate tip which is very slightly incised medially; penis valves broadly expanded basally, excavated laterally beneath this expansion, gonocoxites quite broadly expanded apically, gonocoxal lobes slightly produced, narrowly rounded.

DISTRIBUTION — Illinois and Michigan, to Connecticut, south to Virginia and North Carolina; March to May.

FLOWER RECORDS — *Brassica*, *Dentaria*, *Prunus* and *Stellaria*. Robertson (1929) records this also on *Arabis*, *Cap-sella*, *Cardamine* and *Claytonia*.

Andrena (Iomelissa) violae Robertson

(Figs. 54-56).

Andrena violae Robertson, 1891. Amer. Ent. Soc. Trans. 18, p. 53. ♀ ♂.

Andrena davisi Viereck, 1907. Ent. News 18, p. 283. ♀. New synonymy.

Andrena violae Cockerell, 1914. Ann. Mag. Nat. Hist. (8) 14, p. 10. ♀.

Iomelissa violae Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Andrena violae Lanham, 1941. Ent. Soc. Amer. Ann. 34, pp. 706 & 707. ♀ ♂. (key)
Andrena (Iomelissa) violae Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 207. (classification)

FEMALE—Length 9 mm.; face somewhat longer than broad; clypeus protuberant, markedly convex, projecting about one-half below suborbital line, somewhat shining, deeply, rather coarsely and quite uniformly punctate, interspaces about equal to diameter of punctures; facial foveae rather narrow, occupying only slightly more than half of space between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli very slightly greater than their diameter; cheeks subequal to eyes in width, rounded posteriorly, somewhat shining, punctures very fine, quite close, more or less obscured by the pubescence; malar space very short; basal segment of flagellum only slightly shorter than 2nd, 3rd and 4th combined; process of labrum very large, broader than long, nearly semicircular; glossa elongate, linear, many times as long as basal width; pubescence of head, thorax and legs, pale ochraceous, somewhat more whitish below; thoracic integument dull, punctures of scutum very fine, rather close anteriorly, becoming more widely separated posteriorly, but not sparse, well separated and quite distinct on the scutellum, which is somewhat shining; pleura with some very shallow and obscure punctures anteriorly, otherwise densely tessellate; dorsal area of propodeum oblique, triangle densely tessellate; propodeal corbicula rather short and poorly developed, without a distinct anterior fringe, pale ochraceous; trochanteral floccus very short and poorly developed; hind tibiae quite narrow, apex only slightly broader than basitarsi, scopa rather dense, hairs simple, of moderate length, entirely pale ochraceous; front and middle basitarsi slightly narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining, closely, deeply and rather coarsely punctate, apical impressed areas very shallow, occupying medially about one-third length of discs, discal pubescence extremely short and thin, entirely pale, terga 2-4 with conspicuous but rather narrow, whitish, apical fasciae, that on tergum 2 slightly interrupted medially, tergum 5 with a brownish-ochraceous, apical fimbria.

MALE—Length 9 mm.; clypeus strongly convex and protuberant, projecting fully one-half below suborbital line, with one or two small, subapical, yellowish blotches, shining, deeply and distinctly punctate, the punctures

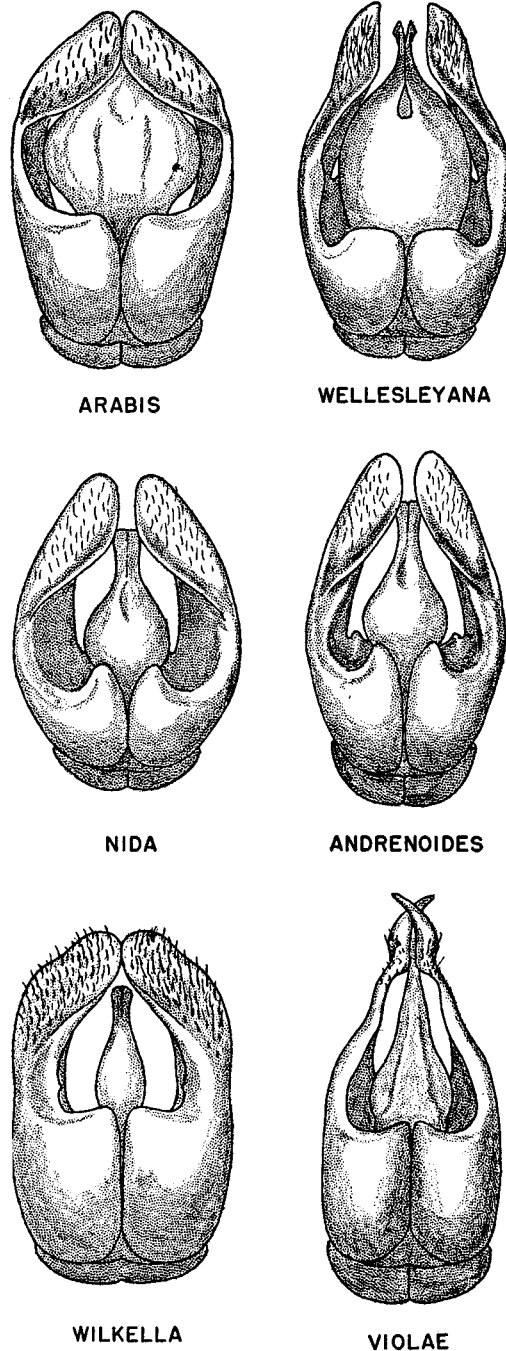


Figure 55

Apical flexed portion of male genital armature in species of *Andrena* (*Parandrena*), *A. (Taeniandrena)*, *A. (Scaphandrena)* and *A. (Iomelissa)*.

moderately coarse, well separated but not sparse; space between margin of vertex and lateral ocelli, considerably broader than their diameter; cheeks slightly broader than eyes, rounded posteriorly, quite dull, punctures very minute and obscure; malar space very short; basal segment of flagellum equalling 2nd, 3rd and 4th combined; process of labrum very large, broadly semicircular; mandibles rather short, with a distinct, inner, subapical tooth, overlapping about one-fourth; glossa elongate, linear, many times as long as basal width; pubescence of head, thorax and legs entirely whitish-ochraceous; thoracic integument dull, tessellate, punctures of scutum fine and rather shallow, rather close anteriorly, becoming well separated but not sparse posteriorly, irregularly scattered on scutellum, rather sparse medially, surface somewhat shining; pleura obscurely, rather closely and shallowly punctate anteriorly, surface otherwise very densely tessellate; dorsal area of propodeum oblique, triangle rather broad, densely tessellate; basitarsi quite slender and elongate, slightly narrower than their respective tibiae; 2nd submarginal cell somewhat shorter than 3rd, receiving 1st recurrent near middle; abdominal terga smooth and shining, deeply and quite closely punctate, punctures rather coarse, apical impressed areas very shallow and obscure, concolorous with remainder of discs, except for an exceedingly narrow subhyaline rim, discal pubescence very short, thin, erect, entirely pale, terga 2-4 with thin, pale ochraceous, apical fasciae, somewhat interrupted medially on tergum 2; sternum 7 conspicuously bifurcate apically; apical portion of sternum 8 quite broad and robust, slightly narrower toward base than at apex, which is rather broadly rounded and slightly emarginate medially, clothed beneath with thin, pale pubescence; penis valves very slender apically, somewhat broadened toward base, not excavated laterally, gonocoxites very slender to the slightly dilated tips, which are produced to an acute point, gonocoxal lobes not produced.

DISTRIBUTION — New York to North Carolina, west to Illinois and Colorado; March and April.

FLOWER RECORDS—*Viola*, *Potentilla*. Robertson (1929) records *violae* on *Cardamine*, *Ellisia*, *Oxalis*, and three species of *Viola*.

Andrena banksi Malloch

(Figs. 51, 54, 56 & 57)

Andrena banksi Malloch, 1917. Brooklyn Ent. Soc. Bul. 12, p. 89. ♂ ♀.

Andrena banksi Lanham, 1949. Univ. Calif. Pubs. Ent. 8, p. 225. (classification)

FEMALE—Length 11 mm.; clypeus broadly convex, projecting about one-half below suborbital line, somewhat shining along apical margin, otherwise rather dull, finely tessellate, very finely and quite sparsely punctate, punctures becoming rather close at extreme sides; facial foveae broad, occupying above nearly entire space between eyes and ocelli, covered with pale ochraceous tomentum; space between margin of vertex and lateral ocelli subequal to their diameter; cheeks slightly broader than eyes, rounded posteriorly, rather dull, punctures exceedingly minute and obscure; malar space equal to about one-fourth width of mandible; basal segment of flagellum very slightly shorter than 2nd and 3rd combined; process of labrum rather small, subtriangular, apex rather narrowly truncate and slightly emarginate; mandibles quite elongate, inner, subapical tooth located about one-third its length from tip, overlapping about one-third; pubescence of head pale ochraceous, that on thorax bright fulvous above, becoming pale ochraceous to whitish laterally and below, pubescence of legs whitish, becoming pale ochraceous on the more apical segments; thoracic integument rather dull, finely tessellate, punctures of dorsum of thorax inevident, surface obscured by dense pubescence, pleura more thinly pubescent, with very fine, well separated punctures evident anteriorly, becoming more obscure posteriorly; dorsal area of propodeum oblique, triangle finely tessellate, propodeal corbicula rather short, ochraceous, with a thin, poorly developed, anterior fringe; trochanteral floccus white, rather well developed; hind tibiae rather slender and elongate, apex slightly broader than basitarsi, scopa rather dense, hairs of moderate length and entirely simple, whitish, becoming brownish-ochraceous along hind margin; front and middle basitarsi quite slender, narrower than their respective tibiae; wings lightly infuscated, 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent about one-third from apex; abdominal terga dull, densely tessellate, entirely impunctate, apical impressed area quite shallow and narrow, discal pubescence suberect, thin, entirely pale, terga 2-4 with quite dense, white, apical fasciae, slightly interrupted on tergum 2 medially, tergum 5 with a brownish, apical fimbria.

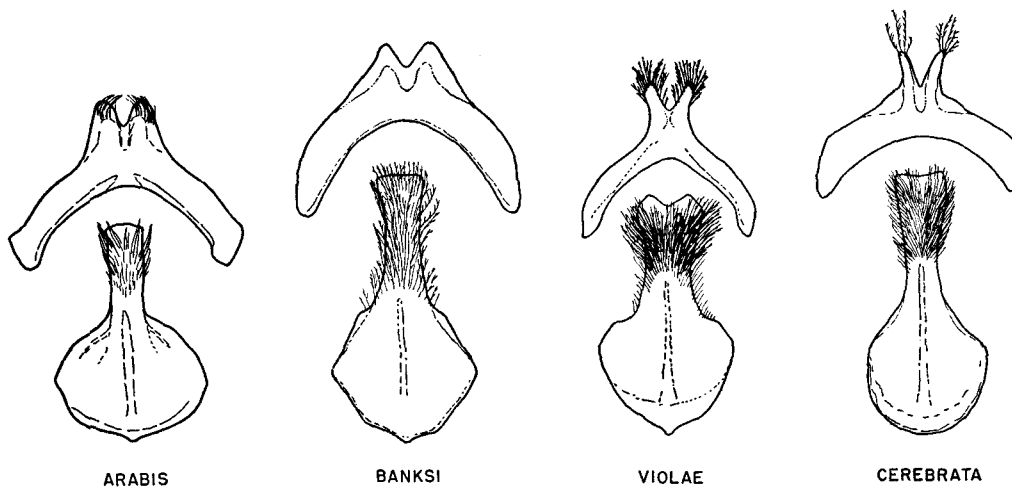


Figure 56—Sternal plates 7 (upper) and 8 of males in *Andrena* (*Scaphandrena*) *arabis*, *A. (Iomelissa) violae*, *A. banksi* and *A. cerebrata*.

MALE—Length 8 mm.; head broader than thorax; length and breadth of face subequal; clypeus broad and rather flat, projecting about one-half below suborbital line, yellow except for two small black spots and the dark apical rim, smooth and shining, finely punctate, punctures well separated medially, becoming quite close at extreme sides, with an obscure median impunctate area; space between margin of vertex and lateral ocelli slightly greater than their diameter; cheeks considerably broader than eyes, somewhat flattened or broadly concave, with a pronounced submedian rounded angle, surface rather dull, punctures exceedingly minute and obscure; malar space quite short; basal segment of flagellum very short, not much longer than broad, much shorter than 2nd segment; process of labrum short and rather broad, obscurely truncate apically; mandibles elongate, inner, subapical tooth located about one-fourth of length from the narrowly acute apex, rather strongly bowed, overlapping more than one-third; pubescence of head, thorax and legs entirely pale ochraceous; thoracic integument dull, quite densely tessellate, punctures of scutum very minute and obscure, hardly visible, well separated, those on scutellum inevident; pleura with some very minute and sparse, barely visible punctures above; dorsal area of propodeum rather oblique, triangle finely tessellate; basitarsi testaceous, slender and elongate, much narrower than their respective tibiae; 2nd submarginal cell considerably shorter than 3rd, receiving 1st recurrent near apex; abdominal terga rather dull, the more basal segments microscopically tessellate, punctures exceed-

ingly minute and obscure, hardly visible, apical impressed areas shallow and narrow, mostly yellowish-hyaline, discal pubescence rather long and erect basally, becoming quite short, sparse on the more apical terga, entirely pale, apical fasciae very poorly developed, if at all; apical portion of sternum 8 rather slender and elongate, very slightly narrower medially than at base or apex, the apex rather broadly truncate, clothed beneath with rather short pale pubescence; penis valves slender, distinctly bilobed apically, rather broadly expanded basally, sides rather deeply grooved, gonocoxites slender at base, gradually broadened to form subtriangular apical lobes, gonocoxal lobes much produced, rather narrowly rounded.

DISTRIBUTION — New Jersey to Florida and Texas; March to May.

FLOWER RECORDS—*Prunus angustifolia*.

Andrena cerebrata new species

(Figs. 51, 56 & 57)

MALE—Length 8 mm.; face slightly longer than distance between eyes; eyes slightly divergent below; lateral ocelli separated from margin of vertex by nearly twice their diameter; cheeks much broader than eyes, with an extremely large, ventral lobe projecting at right angles to lower end of eye; clypeus broad and quite flat, but projecting about one-half below suborbital line, entirely yellow except for the very narrow marginal strip and a pair of dark spots, shining, with minute and

rather sparse, vague punctures; face below ocelli dull, finely substriate; vertex somewhat shining, with a few minute, vague punctures medially, these becoming more distinct and the surface more shining just above each eye; cheeks somewhat shining and smooth, with minute, evenly spaced punctures; process of labrum rather broadly triangular but quite small, completely hidden by the markedly overlapping clypeal margin; mandibles elongate and slender, tip of one reaching base of other when closed, with an exceedingly minute, subapical, inner tooth near tip; basal segment of flagellum somewhat longer than 2nd but much shorter than 2nd and 3rd combined, median segments considerably longer than broad; pubescence of head and thorax erect, rather copious, of moderate length, entirely pale ochraceous, somewhat deeper ochraceous on dorsum of thorax; scutum and scutellum somewhat shining, punctures very fine, rather evenly distributed, well separated but hardly sparse; pleura smooth but rather dull, with fine, rather obscure, shallow punctures which are spaced about as those on dorsum; dorsal area of propodeum poorly defined, very finely subreticulate toward base, becoming more tessellate toward lateral margins, lateral areas finely tessellate, propodeal corbicula rather well developed; legs dark, slender, entirely pale pubescent, spurs pale yellowish; wings subhyaline, veins and stigma testaceous, 2nd submarginal hardly half length of 3rd, receiving 1st recurrent near apex; tegulae largely piceous but becoming somewhat yellowish-hyaline toward posterior margin; abdominal terga smooth and shining, with minute, evenly spaced but quite distinct punctures, apical margins rather narrowly impressed, these areas more finely punctate, with rims becoming somewhat yellowish, discal pubescence evident toward sides, entirely pale, suberect, fasciae very poorly developed, evident only toward sides of segments 2-4; sternum 7 strongly produced apically near center, this area deeply, triangularly emarginate, resulting in a pair of slender elongate lobes which have a few apical hairs; basal portion of sternum 8 more or less rounded, apical produced area rather slender at base, gradually broadening toward the abruptly truncate tip, covered with very short pale pubescence; penis valves slender and elongate, fully attaining tips of gonocoxites which are more compressed toward tips, being gradually somewhat expanded, gonocoxal lobes somewhat produced, narrowly rounded apically.

TYPE — Holotype: Male, Waynesville, N. C., April 30, 1952, 3000-4000 ft., (W. A. Stephen, on *Malus*) [author's coll.].

Without the female, this remarkable species cannot be assigned to any of the presently recognized subgenera.

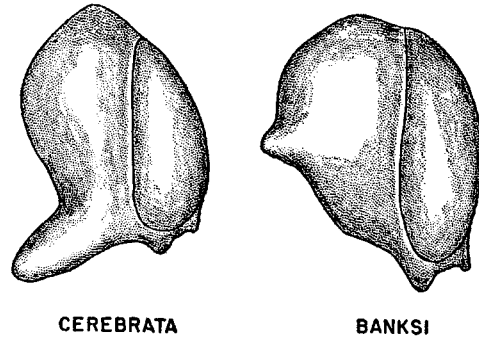


Figure 57

Lateral view of male head, showing form of cheeks in *Andrena banksi* and *A. cerebrata*.

(?) *Andrena aliena* Smith

Andrena aliena Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 113. ♀.

Andrena aliena Morice and Cockerell, 1901. Canad. Ent. 33, p. 123. (type)

Andrena aliena Cockerell, 1906. Psyche 13, p. 33. (type)

FEMALE—Length 9 mm.; face slightly longer than distance between eyes above; eyes slightly convergent below; foveae, if actually present, short and indistinct, represented by a slightly smoother area of face; vertex rounded behind ocelli, punctures fine and well separated, surface shining; cheeks about equal to eyes in width; clypeus rather flat, apical margin straight, abruptly depressed, punctures deep, distinct and rather coarse, close, becoming more widely separated above; labrum with a transverse ridge in place of the usual process; segment I of flagellum about equal to 2nd and 3rd combined; pubescence of head and thorax white, but vertex, scutum and scutellum with fuscous to blackish hairs; dorsum of thorax shining, finely but deeply punctate, interspaces 2 or 3 times diameter of punctures, more sparse on scutellum anteriorly; pleura shining, punctures fine and well separated, but deep and distinct; triangle of propodeum smooth but rather dull, with a few fine transverse striations, lateral and posterior faces of propodeum shining, with only minute, scattered, sparse punctures; hind tibiae slender, only slightly broader than basitarsi, scopa of elongate, densely plumose, whitish hairs; scopal hairs on hind femora and trochanters, as also hairs of propodeal corbicula, poorly developed; wings hyaline, stigma reddish-piceous,

veins testaceous; basal abdominal tergum polished and impunctate, terga 2-4 shining, with minute, well-separated punctures, impressed apical margin of each tergum broad and impunctate, yellowish-hyaline, tergum 2 with an incomplete apical fascia, 3 and 4 with entire white fasciae, discal pubescence very thin and whitish.

DISTRIBUTION—Florida.

This is a very puzzling specimen, and the writer was at first inclined to place it in the Melittidae rather than in *Andrena*. Several of its characters are very unusual in *Andrena* and include the practical absence of the facial foveae, the presence of but one pair of subantennal sutures, the transverse ridge of the labrum in place of the usual more triangular or elongate labral process, and the poor development of scopal hairs on the propodeum, hind tro-

chanters and femora. In the hind wing the jugal lobe is three-fourths the length of the vannal lobe, as would be expected in *Andrena*, but would be unusual in *Melitta*. The specimen has a long and conspicuous pre-episternal suture, and this is quite unlike either *Andrena* or *Melitta*.

Recognizing the fact that this cannot be placed with confidence in any other group, it is being left in *Andrena*. It is hoped that the species will be rediscovered and a more adequate series of specimens, including males, collected. The type was collected by Edward Doubleday at St. John's Bluff (Duvall Co.), Florida, some time during the spring months of the year 1838.

The writer is indebted to Dr. Wallace E. LaBerge and to Padre J. S. Moure for additional notes on this specimen, made during visits to the British Museum.

Table 7—Distribution of species of *Simandrena*, *Opandrena*, *Taeniandrena*, *Scaphandrena*, *Iomelissa* and unassigned species by states.

	New England					North Central					Mid Atlantic					South-eastern											
	Maine	New Hampshire	Vermont	Massachusetts	Rhode Island	Connecticut	Wisconsin	Michigan	Illinois	Indiana	Ohio	Kentucky	New York	New Jersey	Pennsylvania	Maryland	Delaware	West Virginia	Virginia	Dist. Columbia	Tennessee	North Carolina	South Carolina	Mississippi	Alabama	Georgia	Florida
<i>Simandrena</i>																											
<i>nasonii</i>	X	X		X	X	X		X			X		X	X	X		X	X	X	X	X	X				X	
<i>uvulariae</i>																X											
<i>wheeleri</i>	X	X					X	X				X		X								X					
<i>Opandrena</i>																											
<i>cressoni</i>	X	X		X	X	X	X	X	X	X	X	X		X	X				X	X		X	X	X	X	X	X
<i>c. ivanensis</i>																			X			X					
<i>c. tallahasensis</i>																						X					X
<i>Taeniandrena</i>																											
<i>wilkella</i>	X	X	X	X		X	X	X		X	X	X	X	X				X				X					
<i>Scaphandrena</i>																											
<i>arabis</i>						X		X	X		X		X	X				X				X					
<i>Iomelissa</i>																											
<i>violae</i>								X	X			X		X						X		X					
<i>unassigned</i>																											
<i>aliena</i>																											X
<i>banksi</i>													X		X							X	X				X
<i>cerebrata</i>																						X					

Panurginus Nylander

(Fig. 58)

Panurginus Nylander, 1848. Notiser Sällskapet Flora Fauna Fenn. 1, p. 223.

Type: *Panurginus niger* Nylander. Monob.

Greeleyella Cockerell, 1904. Entomologist 37, p. 235. Type: *Greeleyella beardleyi* Cockerell. Monob. and orig. desig.

Birkmania Viereck, 1909. Ent. Soc. Wash. Proc. 11, p. 50. Type: (*Birkmania andrenoides* Viereck) = *Panurginus polytrichus* Cockerell. Monob. and orig. desig.

Panurginus Crawford, 1926. Ent. Soc. Wash. Proc. 28, pp. 207-214. Revision, with key to males.

Panurginus is a genus of small black bees very similar in appearance to those in *Pseudopanurgus*. In all species so far recorded in the eastern states, the clypeus of the male is yellow, but there are no lateral face marks of that color. The first recurrent vein is nearly interstitial with the first transverse cubital vein, and the second recurrent enters the second submarginal before its apex. The apical margin of sternum 6 in the male is thickened, sclerotized, and has a shallow median emargination.

KEY TO SPECIES

1. Clypeus yellow, at least in part (males) 2
Clypeus entirely black (females) 4
2. Scutum dull, punctures exceedingly minute and obscure
..... *potentillae* Crawford (p. 262)
Scutum to some degree shining, with distinct, though fine punctures 3
3. Clypeus, except for the lateral angles, entirely yellow
..... *polytrichus* Cockerell (p. 260)
Upper part of clypeus black
..... *atromontensis* Crawford (p. 259)
- 4(1). Face broad, distance between eyes below greater than length of eye; mandibles long and slender, with a low median inner angle; clypeus and lower part of face shining and sparsely punctate; front tibiae with a small, basal, yellow spot
..... *polytrichus* Cockerell (p. 260)
Face no broader than long 5
5. Abdomen shining, with minute but distinct punctures ^{has}
..... *atromontensis* Crawford (p. 259) ^{spe}
Abdomen relatively dull, the punctures ^{4, bi}
obscure ^u
..... *potentillae* Crawford (p. 262) ^m

5mm

atromontensis & *polytrichus* ♀'s (from TX) appear to be the same

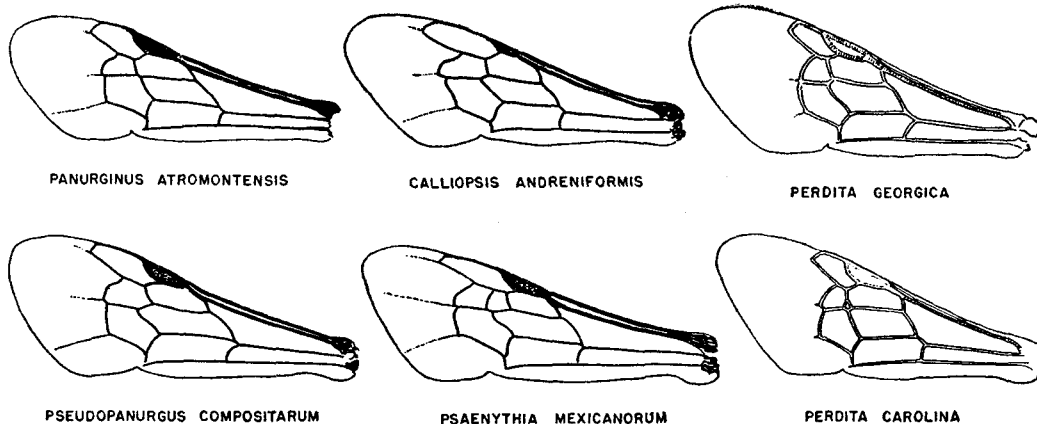


Figure 58—Wing venation in the *Panurginae*.

Panurginus atromontensis Crawford

(Figs. 59-61)

Panurginus atromontensis Crawford, 1926.
Ent. Soc. Wash. Proc. 28, p. 210. ♂ ♀.

FEMALE—Length 6 mm.; black; length of face subequal to distance between eyes above; eyes subparallel; cheeks slightly broader than eyes; process of labrum large, nearly as long as the basal width, broadly rounded apically; facial foveae very shallow and obscure, narrow and elongate, terminated below about at level of antennae; space between margin of vertex and lateral ocelli only very slightly exceeding their diameter; median segments of flagellum very slightly longer than broad; surface of head smooth and shining, punctures deep and distinct, but rather sparse in general, somewhat closer between antennae and ocelli, becoming more widely separated on vertex laterally, minute and very sparse on cheeks, coarse and sparse on clypeus, supra-clypeal area and lateral areas of face below antennae; pubescence of head and thorax short, entirely pale, rather copious, but not at all hiding surface; tubercles black, tegulae brownish-hyaline; wings subhyaline, the veins testaceous, stigma more brownish; 2nd recurrent vein entering 2nd submarginal cell very near the apex; legs dark, except for the yellowish, apical, tarsal segments; spurs yellow; scutum shining, punctures rather deep, well separated, somewhat closer along anterior margin but quite sparse toward center posteriorly, those on scutellum quite sparse, the surface polished; pleura rather dull, punctures fine and well separated, but hardly sparse; apical margins of abdominal terga rather broadly and evenly depressed, these areas microscopically pebbled, disc of basal segment polished and very sparsely and minutely punctate, 2nd segment shining, more distinctly but still rather sparsely punctate, terga 3 and 4 somewhat less shining, but very minutely and quite sparsely punctate, discal pubescence short, very thin and obscure, entirely pale, forming a rather dense, apical, brownish fimbria on tergum 5.

MALE—Length 6 mm.; black; face very slightly longer than distance between eyes above; eyes subparallel; cheeks subequal to eyes in width; lower half of clypeus yellowish, the upper and lateral margins broadly blackish; labrum, mandibles and all other areas of head black; process of labrum large, nearly as long as the basal width, broadly rounded apically; facial foveae very shallow and obscure, hardly visible, narrow and elongate, space between margin of vertex and lateral ocelli subequal to their diameter; median segments of flagellum considerably longer than

broad; face between antennae and ocelli rather dull, punctures fine, rather shallow, well separated, becoming somewhat more deep and distinct, rather close on vertex laterally, but very minute and obscure on the shining cheeks; face below antennae shining, punctures quite sparse and fine, especially on lower portion of clypeus; pubescence of head and thorax short, entirely pale, rather copious, but not at all hiding surface; tubercles black; tegulae brownish-hyaline; wings subhyaline, veins testaceous to brownish, stigma more brownish; 2nd recurrent vein entering 2nd submarginal cell very near apex; front and mid tarsi and spurs yellow, the hind tarsi yellow anteriorly, the hind border dark, front tibiae yellow anteriorly, otherwise dark, the mid and hind tibiae entirely dark except for a small yellow basal spot; dorsum of thorax shining, punctures fine, distinct and quite widely separated except along the narrow anterior margin of scutum, those on pleura very fine, and rather sparse; apical margins of abdominal terga rather narrowly but deeply depressed, somewhat shining, discs of the terga somewhat shining, very closely and microscopically punctate, with deeper and more distinct, sparse and fine punctures superimposed upon this field, discal pubescence very short, thin and obscure, entirely pale; sternum 6 strongly narrowed apically, the lateral apical angles somewhat prolonged and subacute; sternum 7

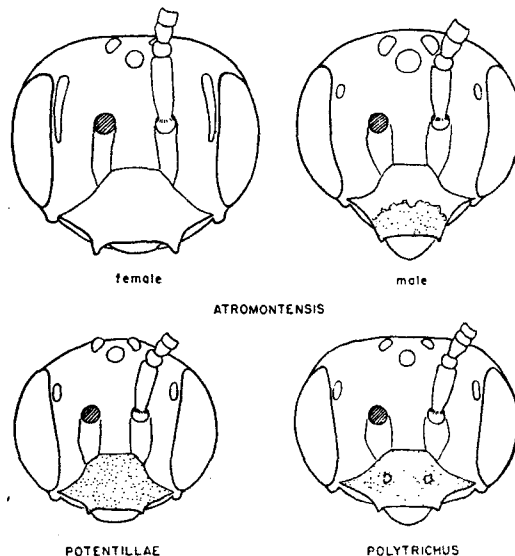


Figure 59
Facial view of head in species of *Panurginus*.

with a quite broadly truncate apical margin, bearing a pair of elongate, compressed processes in the center; apical process of sternum 8 abruptly and strongly dilated at apex, this process broadly truncate, basal two-thirds of the process rather broadly expanded laterally; gonostyli quite small in comparison with the gonocoxites, slender at base, the apical two-thirds slightly expanded, narrowly rounded apically; penis valves somewhat more robust, slightly flexed toward base, otherwise slender and parallel-sided with a quite dense inferior fringe of setae toward the apex.

DISTRIBUTION — Maryland to Mississippi; April to June.

FLOWER RECORDS — Collected at Raleigh, N. C., in April, on *Polycodium*.

Panurginus polytrichus Cockerell

(Figs. 59-61)

- Panurginus polytrichus* Cockerell, 1909. Ann. Mag. Nat. Hist. (8) 4, p. 28. ♂.
Birkmania andreoides Viereck, 1909. Ent. Soc. Wash. Proc. 11, p. 50. ♀.
Greeleyella resinata Cockerell, 1910. Ann. Mag. Nat. Hist. (8) 5, p. 361. ♀.
Panurginus polytricha Crawford, 1926. Ent. Soc. Wash. Proc. 28, p. 209. (key)

FEMALE—Length 8 mm.; length of face about equal to distance between eyes above; eyes very slightly convergent below; hind margin of vertex broadly incurved, lateral ocelli separated from its hind margin by slightly more than their diameter; cheeks somewhat swollen, considerably broader than eyes (ratio of about 3:2); process of labrum broadly rounded, extensive, covering most of surface of labrum; facial foveae narrow, extending from level of antennae to near top of eye; basal segment of flagellum only slightly shorter than segments 2 and 3 combined; surface of head shining, punctures fine but rather distinct, rather close on vertex between eyes and ocelli and on sides of face, but becoming quite sparse on clypeus and supraclypeal area, those on cheeks very fine, evenly distributed and quite sparse above, but becoming very sparse on either side of hypostomal carinae beneath; pubescence of entire head, thorax and legs pale ochraceous, erect but rather thin and short; tegulae yellowish-hyaline; wings faintly yellowish, veins and stigma testaceous; legs entirely dark; spurs pale testaceous, hind tibial scopa of rather elongate, simple, loose hairs; dorsum of thorax shining, scutum doubly punctate, with numerous very fine and somewhat close punctures, with coarser and much more sparse punctures

interspersed, those on scutellum rather close and irregular, the metanotum also somewhat shining, with very minute and rather close punctures; pleura less shining, the punctures somewhat coarser but quite shallow and well separated; dorsal area of propodeum quite short, finely subrugose across base, the outer margin becoming smooth, almost shining, lateral and posterior faces quite smooth; basal abdominal tergum smooth and shining, almost polished, with exceedingly minute and obscure, scattered punctures, those on segments 2-4 more distinct but still very fine and quite close, the surface less shining, apical margins of the terga impressed for about one-third the median length, this area slightly yellowish toward rim, nearly impunctate, discal pubescence very short, thin, erect, entirely pale, apical fimbria somewhat yellowish.

MALE—Length 7 mm.; black, clypeus entirely yellow; length of face nearly equal to distance between eyes above; clypeus short and broad, protruding about one-third below suborbital line; hind margin of vertex strongly incurved, lateral ocelli removed from its hind margin by somewhat more than their diameter; cheeks somewhat swollen, considerably broader than eyes; process of labrum large, semicircular, shining, occupying most of upper surface of labrum; facial foveae small but distinct; basal segment of flagellum slightly longer than segment 2; face smooth and shining, punctures shallow, fine and rather obscure, but quite close on vertex between eyes and ocelli, becoming somewhat deeper and more distinct towards sides of face below, rather sparse below antennae and over most of clypeus; punctures of cheeks fine, close, rather distinct, becoming quite sparse beneath, surface shining; pubescence of entire head, thorax and legs whitish-ochraceous, rather thin and short but erect; tegulae yellowish-hyaline; wings faintly yellowish, veins and stigma more testaceous; legs piceous or blackish basally, front tibiae anteriorly and all tarsi yellowish; spurs yellowish; dorsum of thorax shining beneath loose pubescence, punctures rather shallow and indistinct, variable, rather well separated over most of scutum, but hardly sparse; pleura not so shining, punctures very fine, shallow, rather sparse; dorsal area of propodeum dull but relatively smooth, lateral and posterior faces tessellate, with a few shallow, obscure punctures; abdominal terga somewhat shining, punctures exceedingly minute and obscure, rather close in general, apical margins of plates impressed for about one-third their median length, these areas impunctate, shining, becoming yellowish along rims, discal pubescence very short, thin, obscure, entirely pale; sternum 6 rather

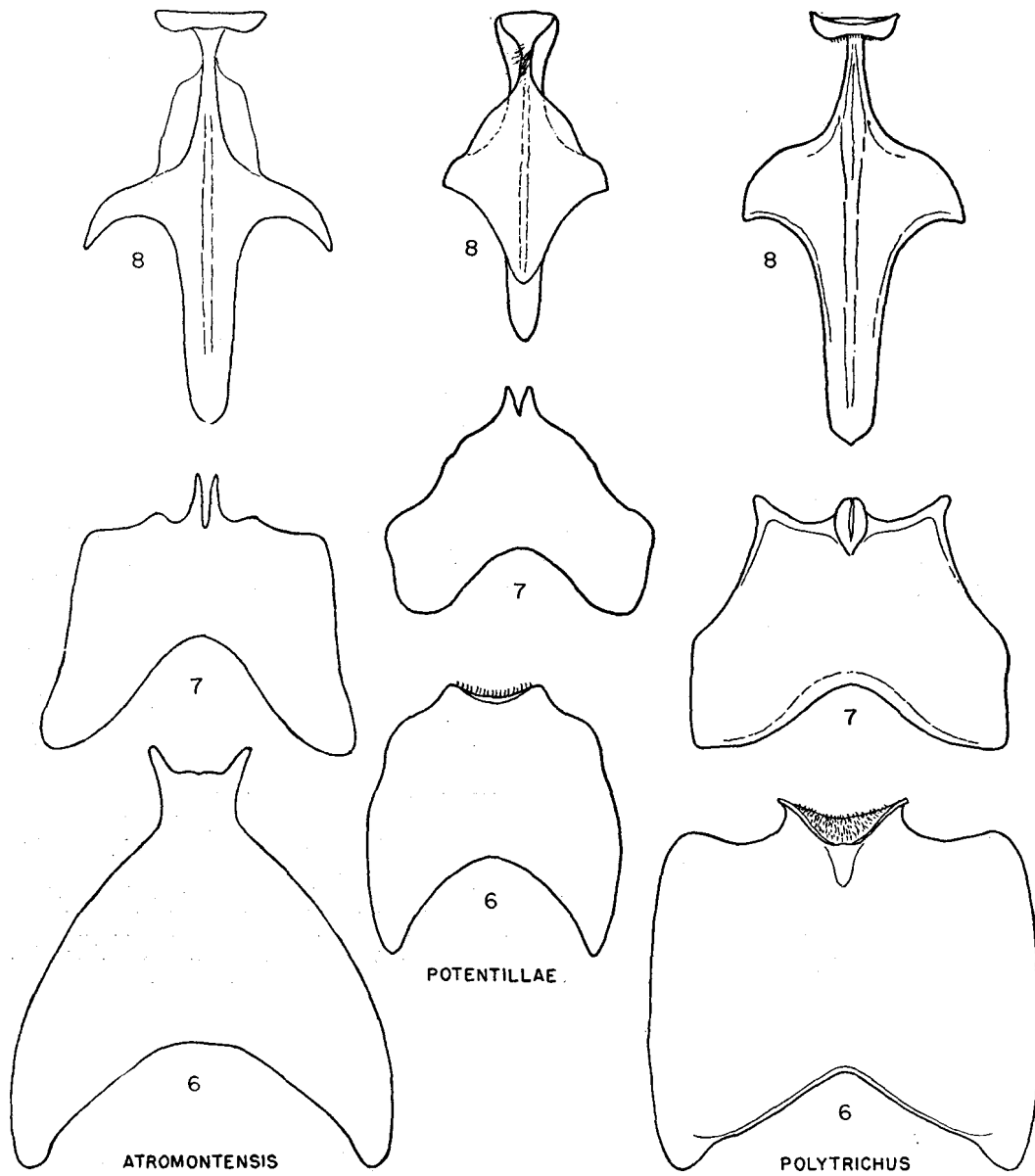


Figure 60— Sterna 6-8 in males of *Panurginus*.

abruptly narrowed apically, this margin slightly incurved, densely short setose; apical margin of sternum 7 slightly incurved, with a ventrally directed and somewhat bulbous median projection; apical process of sternum 8 abruptly dilated and flexed ventrally; gonostyli slender, parallel-sided except for the somewhat constricted base, setose toward base, about attaining tips of penis valves, these strongly constricted at base, slightly flexed medially, flattened, tips very slightly bulbous, bearing a rather strong fringe of hairs beneath near center.

DISTRIBUTION—Texas to Mississippi; April.

Panurginus potentillae (Crawford)

(Figs. 59-61)

Greeleyella potentillae (Crawford), 1916. Insecutor Inscitiae Menstruus 4, p. 104. ♂ ♀.
Panurginus potentillae Crawford, 1926. Ent. Soc. Wash. Proc. 28, p. 210.

FEMALE—Length 5 mm.; black; face slightly longer than distance between eyes above; eyes subparallel; cheeks subequal to eyes in width; process of labrum about half as long as the basal width, very broadly rounded apically; facial foveae very shallow and obscure, narrow and elongate, terminated below about at level of antennae; space between margin of vertex and lateral ocelli only slightly exceeding their diameter; apical two-thirds of flagellum ferruginous, median segments slightly broader than long; face above antennae rather dull, punctures minute and obscure, well separated but hardly sparse, becoming slightly more distinct on shining cheeks, area below antennae more shining, punctures somewhat more coarse but quite regularly sparse; pubescence of head and thorax short, entirely pale, rather copious but not hiding surface; tubercles black; tegulae testaceous-hyaline; wings subhyaline, veins brownish to testaceous; 2nd recurrent vein entering 2nd submarginal cell about one-fourth from apex; the more apical tarsal segments somewhat reddened, legs otherwise dark, spurs yellow; dorsum of thorax rather dull, punctures very fine, rather shallow, well separated but hardly sparse, scutellum somewhat more shining; pleura quite dull, finely tessellate, punctures shallow, obscure and very sparse; apical margins of abdominal terga rather narrowly depressed, these areas slightly reddened, finely pebbled, discs of the terga finely pebbled, punctures minute and indistinct, well separated on median segments, very sparse and obscure on basal segment; abdominal pubescence very short, thin and sparse,

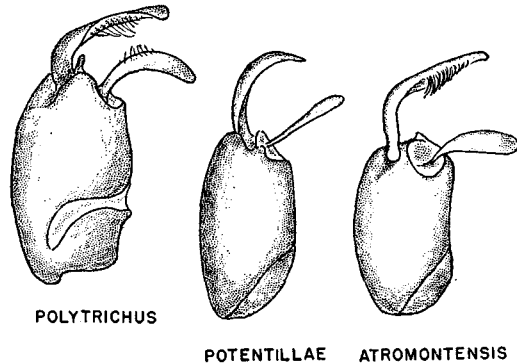


Figure 61

Genital armature in males of *Panurginus*.

entirely pale, forming a rather dense, apical, brownish fimbria on tergum 5.

MALE—Length 5 mm.; black; face very slightly longer than distance between eyes above; eyes somewhat convergent below; clypeus entirely yellow, face otherwise black, including labrum and mandibles; cheeks slightly narrower than eyes; process of labrum slightly broader than long, apical margin broadly rounded or subtruncate; facial foveae very shallow and obscure, narrow and somewhat elongate; space between margin of vertex and lateral ocelli subequal to their diameter; flagellum testaceous beneath, median segments about as broad as long; face above antennae rather dull, punctures very minute and obscure, rather close, becoming somewhat more distinct and sparse on vertex laterally, close and rather deep on the shining cheeks, very minute and obscure on supra-clypeal area, the surface rather dull, becoming more deep and distinct on the lateral portions of face below antennae, punctures of clypeus rather coarse, well separated, but obscure; pubescence of head and thorax rather short but quite dense, obscuring but not hiding surface, entirely pale; tubercles dark; tegulae reddened; wings subhyaline, veins and stigma brownish to testaceous; 2nd recurrent vein entering 2nd submarginal cell about one-fourth from apex; tarsi and spurs yellow, front tibiae yellow anteriorly, otherwise dark, mid and hind tibiae dark except for a very small and obscure basal yellow spot; surface of thorax rather dull, punctures of scutum fine and obscure, rather close anteriorly, becoming more sparse posteriorly, those on scutellum somewhat deeper and more distinct, quite close; pleura tessellate and almost impunctate; apical margins of abdominal terga rather narrowly depressed, these areas slightly reddened, finely pebbled, discs of the terga minutely and

obscurely pebbled, somewhat shining, punctures very minute and well separated but hardly sparse; abdominal pubescence very short, thin and obscure, entirely pale; sternum 6 rather strongly narrowed apically, the restricted apical margin with a rather deep, triangular, median emargination; sternum 7 narrowed apically, the apex produced medially into a pair of elongate, flattened processes, separated by a deep, median emargination; apical process of sternum 8 rather short, somewhat expanded apically, the apex subtruncate, basal portion somewhat expanded; gonostyli very small, slender and simple; penis valves slender, slightly more robust, fringed beneath toward base.

DISTRIBUTION — Maryland, Virginia and North Carolina; March to May.

FLOWER RECORDS — *Potentilla* and *Fragaria*. Males have been collected on *Ranunculus*.

Pseudopanurgus Cockerell

(Fig. 58)

Pseudopanurgus Cockerell, 1897. *Canad. Ent.* 29, p. 290. Type: *Panurgus aethiops* Cresson. Orig. desig.

Pseudopanurgus Cockerell, 1898. *Amer. Ent. Soc. Trans.* 25, pp. 195-198.

Anthemurgus Robertson, 1902. *Canad. Ent.* 34, p. 321. Type: *Anthemurgus passiflorae* Robertson. Monob. and orig. desig.

Protandrenopsis Crawford, 1903. *Canad. Ent.* 35, p. 337. Type: (*Protandrenopsis fuscipennis* Crawford) = *Panurgus aethiops* Cresson. Monob. and orig. desig.

Heterosarus Robertson, 1918. *Ent. News* 29, p. 91. Type: *Calliopsis parvus* Robertson. Monob. and orig. desig.

Anthemurginae Robertson, 1922. *Psyche* 29, pp. 163-165.

Panurginus (in part) Cockerell, 1922. *Amer. Mus. Novitates* 36, pp. 1-10.

This is a genus of small black bees, closely related to *Panurginus*. The front wings have a large stigma, the marginal cell is truncate apically, there are two submarginal cells, and the second recurrent vein reaches the second submarginal nearer its apex than the first does to the base. The males have a yellow clypeus and more or less well developed lateral face marks, as well as various other yellow markings on the legs. Sternum 6 in the males becomes thin or membraneous apically, with a deep median cleft.

KEY TO SPECIES

Females

1. Face with prominent yellow maculae . . . 2
Face entirely lacking yellow maculae . . . 3
2. Scutellum and metanotum bright ferruginous, abdomen largely ferruginous, the punctures quite distinct; punctures of pleura quite coarse and distinct . . .
 *abdominalis abdominalis* Cresson
Scutellum, metanotum and discs of abdominal segments 2-5 black; abdominal terga slightly more closely and finely punctate; pleura tessellate, punctures shallow and obscure, especially over posterior half
 *abdominalis tricolor* Cockerell (p. 270)
- 3(1). Pleura very coarsely rugoso-punctate, the scutum with equally coarse and deep punctures, but these not crowded even though close over entire disc *rugosus* Robertson (p. 269)
Pleura and scutum much less coarsely sculptured 4
4. Scutum dull, densely and rather coarsely rugoso-punctate
 *compositarum* Robertson (p. 273)
Scutum either shining and sparsely punctate or very closely and minutely punctate 5
5. Mesopleura with distinct and rather deep punctures over most of surface, even posteriorly 6
At least posterior portions of mesopleura relatively smooth, the punctures either obscure, shallow or sparse 12
6. Large (7-8 mm.); clypeus and supra-clypeal area dull, densely rugose; scutum smooth, punctures exceedingly minute and close over entire disc
 *passiflorae* Robertson (p. 265)
Usually smaller; face more shining, punctures of scutum either more coarse and distinct, or much more widely separated, at least in center of disc . . . 7
7. Punctures of scutum minute 8
Punctures of scutum deep, distinct and rather coarse 9
8. Larger (8 mm.); punctures of scutum sparsely scattered over entire disc; process of labrum subtriangular, narrowly truncate at apex
 *helianthi* new species (p. 267)

- Smaller (6 mm.); punctures of scutum rather close laterally and anteriorly, becoming sparse near center of disc; process of labrum only slightly narrowed, broadly truncate at apex *rudbeckiae* Robertson (p. 279)
- 9(7). Punctures of scutum well separated over most of disc, even along anterior margin, the surface shining 10
Punctures of scutum close and deep, although possibly somewhat sparse in center of disc 11
10. Abdominal terga sparsely and very minutely punctate, those on 2nd tergum widely separated even across base *labrosus* Robertson (p. 286)
Abdominal terga much more coarsely, deeply and distinctly punctate *albitarsis* Cresson (p. 266)
- 11(9). Process of labrum quadrate, broader than long, apical margin broadly truncate *solidaginis* Robertson (p. 280)
Process of labrum about as long as the basal width . . . *labrosiformis* Robertson (p. 274)
- 12(5). Dorsum of thorax with a quite dense covering of short, brownish pubescence, more evident when viewed at an angle *illinoiensis* Cresson (p. 274)
Dorsum of thorax without evident pubescence on scutum and scutellum 13
13. Second recurrent vein reaching 2nd submarginal before apex of cell, distance between it and tip of cell about half that between 1st recurrent and base of cell *aestivalis* Provancher (p. 271)
Second recurrent vein reaching 2nd submarginal at, or very close to tip, the 1st widely removed from base of cell 14
14. Posterior half of scutum shining, sparsely and very finely punctate *nebrascensis nebrascensis* Crawford (p. 275)
Scutum more coarsely or closely punctate 15
15. Scutum and scutellum very finely, closely and uniformly punctate throughout, interspaces not exceeding diameter of punctures 16
Punctures of scutum more coarse and deep, to some degree separated in center of posterior half of disc, or those on scutellum more irregular and to some degree separated 18
16. Abdominal terga rather sparsely punctate, punctures of third tergum being minute, obscure and widely separated *pauper* Cresson (p. 278)
Abdominal terga more closely punctate, punctures of third tergum almost crowded 17
17. Process of labrum broader than its median length; punctures of scutellum slightly coarser than those of scutum *parvus* Robertson (p. 277)
Process of labrum fully as long as its basal width; punctures of scutum and scutellum uniformly fine and close *virginicus* Cockerell (p. 281)
- 18(15). Clypeus shining, the punctures distinctly separated; posterior half of discs of abdominal terga 2 and 3 very sparsely and minutely punctate *nebrascensis mueesebecki* Michener (p. 276)
Clypeus rather dull, the punctures coarse and confluent or nearly so; abdominal terga 2 and 3 more uniformly punctate *andrenoides* Smith (p. 272)

Males

1. Clypeus largely black, with a small, median, pale yellow maculation; small yellow spots between clypeus and inner orbits . . . *passiflorae* Robertson (p. 265)
Clypeus entirely yellow 2
2. Supraclypeal area yellow at least in part 3
Supraclypeal area usually entirely black, but sometimes with a narrow yellow border along clypeal suture 9
3. Abdomen largely or entirely red; tubercles, spot on scape, and femora in large part, yellow *abdominalis abdominalis* Cresson
Abdomen and femora in large part, black or piceous 4
4. Scutum dull, finely and densely rugose *compositarum* Robertson (p. 273)
Scutum to some degree shining between the distinctly separated punctures 5
5. Scape to some degree yellow-maculated 6
Scape entirely black 7
6. Yellow maculation of face and scape more extensive, the yellow lower half of face often separated from the black upper half by a nearly straight line just beneath antennae *nebrascensis nebrascensis* Crawford (p. 275)

- Maculation on scape reduced, and maculation of supraclypeal area distinctly separated from the lateral face marks *nebrascensis muesebecki* Michener (p. 276)
- 7(5). Basal abdominal tergum shining, very minutely and sparsely punctate throughout *labrosus* Robertson (p. 268)
- Basal abdominal tergum with close, deep and distinct, although possibly fine punctures 8
8. Dorsum of thorax covered with erect and rather dense ochraceous pubescence; penis valves and gonostyli equal in length *rudbeckiae* Robertson (p. 279)
- Pubescence of dorsum of thorax white; gonostyli much exceeding penis valves *solidaginis* Robertson (p. 280)
- 9(2). Cheeks broader than eyes, in lateral view; clypeus much wider than long; eyes subparallel *virginicus* Cockerell (p. 281)
- Cheeks narrower than eyes; clypeus little if any broader than long; eyes convergent below 10
10. Thorax very coarsely rugose *rugosus* Robertson (p. 269)
- Thorax distinctly or minutely punctate 11
11. Both labrum and mandibles entirely black *albitarsis* Cresson (p. 266)
- Mandibles, and usually labrum, yellow 12
12. Scutum with a quite dense covering of erect, yellowish pubescence, which does not obscure the close and fine, but deep and distinct punctures *illinoensis* Robertson (p. 274)
- Scutum practically bare 13
13. Lateral face marks very small, ending below level of upper margin of clypeus *pauper* Cresson (p. 278)
- Lateral face marks extending to some degree above level of upper margin of clypeus 14
14. Labrum black; mandibles yellow; basal abdominal tergum closely, deeply and distinctly punctate, being almost rugose *parvus* Robertson (p. 277)
- Mandibles and process of labrum yellow; basal abdominal tergum shining between distinctly separated punctures 15

15. Space separating lateral ocelli from margin of vertex no greater than their diameter *labrosiformis* Robertson (p. 274)
- Lateral ocelli separated from margin of vertex by a space considerably greater than their diameter *andrenoides* Smith (p. 272)

Pseudopanurgus (Anthemurgus)
passiflorae (Robertson)

(Figs. 62, 65 & 66)

Anthemurgus passiflorae Robertson, 1902.
Canad. Ent. 34, p. 321. ♀ ♂.

FEMALE—Length 7 mm.; black; length of face subequal to distance between eyes; eyes subparallel; cheeks slightly narrower than eyes; process of labrum shining and impunctate, in contrast to the closely and deeply punctate lateral areas of labrum, strongly constricted medially because of the incurved lateral margins, apex truncate; facial foveae narrow and elongate, quite strongly divergent from eye margin above, narrowed below, terminating at level of antennae; distance between lateral ocelli less than that separating ocelli from edge of vertex; median segments of flagellum slightly broader than long; punctures of head coarse and close, those on clypeus below rather shallow, and those on vertex laterally more widely separated; pubescence of head and thorax very short and thin, entirely whitish; tubercles dark; tegulae dark ferruginous; wings whitish basally, becoming lightly infuscated apically, veins reddish, stigma more piceous, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; legs entirely dark; anterior spurs yellowish, the mid and hind spurs somewhat reddened; dorsum of thorax shining, punctures of scutum very fine and quite close, quite uniform, those on scutellum slightly more coarse and very close, those on pleura much more coarse and quite close except near middle posteriorly where they are well separated but not sparse; apical margins of abdominal terga evenly depressed, smooth, shining and impunctate, slightly reddened, discs of the terga shining, deeply and rather finely punctate, punctures on basal tergum rather widely separated, becoming successively closer on the succeeding segments, discal pubescence extremely short, thin and obscure, becoming rather long and dense toward apex, tergum 5 with a distinct, dark brownish, apical fimbria.

MALE—Length 7 mm.; blackish to piceous; length of face subequal to distance between eyes above; eyes subparallel; face largely dark, clypeus with a median, elongate, yellow spot, and inferior inner orbits very narrowly yellow; cheeks subequal to eyes in width; process of labrum constricted medially due to the incurved lateral margins, apex rather broadly and deeply emarginate; mandibles ferruginous; facial foveae narrow and elongate, quite deep and distinct, slightly divergent from eye margin above; space between lateral ocelli slightly less than that separating them from margin of vertex; median segments of flagellum about as broad as long; head deeply and quite coarsely punctate, punctures rather widely separated on vertex laterally, otherwise quite close even on clypeus below; pubescence of head and thorax very short, thin and obscure, entirely whitish; tubercles slightly reddened; tegulae reddish-hyaline posteriorly, more piceous anteriorly; wings more hyaline basally, becoming slightly infuscated apically, veins testaceous, stigma more brownish, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; tarsi yellow, femora and tibiae largely dark, but front femora yellow anteriorly, otherwise reddened; spurs yellowish; dorsum of thorax shining, punctures of scutum very fine and quite close, quite uniformly distributed, with a few scattered larger punctures, being thus obscurely doubly punctate, those on scutellum slightly more coarse and close; pleura shining, much more coarsely punctate, the punctures close above, slightly separated posteriorly and below; apical margins of abdominal terga quite evenly and deeply depressed, these areas smooth and shining, impunctate, the discs deeply and distinctly punctate, basal tergum very sparsely so, 2nd and following terga quite closely punctate basally, the punctures becoming more sparse toward apical rim, discal pubescence very short, thin and obscure, entirely pale; apical margin of sternum 6 rather broadly and shallowly emarginate or incurved; wings of sternum 7 quite evenly semi-circular, tips rather narrowly rounded, bearing a few very short setae; process of sternum 8 elongate-triangular, narrowed apically, the tip slightly produced and more narrowly rounded; gonostyli simple, nearly straight, quite strongly compressed and slightly exceeding the rather robust penis valves.

DISTRIBUTION — Illinois to North Carolina, vernal.

FLOWER RECORDS — *Passiflora*.

Pseudopanurgus (Pseudopanurgus) albitarsis (Cresson) new combination

(Figs. 62, 65 & 66)

Panurgus albitarsis Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 260. ♀ ♂.

Panurgus picipes Cresson, 1872. Amer. Ent. Soc. Trans. 4, p. 261. ♂. New synonymy.

Panurginus picipes Cockerell, 1900. Canad. Ent. 32, p. 364. ♂.

Pseudopanurgus albitarsis Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).

Pseudopanurgus (Heterosarus) albitarsis, Michener, 1951. In Muesebeck, et al., Hym. Amer., U.S.D.A., Agr. Monog. 2, p. 1099.

FEMALE—Length 6 mm.; black; length of face subequal to distance between eyes above; eyes subparallel; cheeks very slightly narrower than eyes; process of labrum about as long as the basal width, somewhat narrowed apically, apex truncate; facial foveae rather short, broad and shallow, terminating slightly above level of antennae; lateral ocelli slightly nearer margin of vertex than to each other; median segments of flagellum about as broad as long; punctures of head deep and distinct, rather close and fine between antennae and ocelli, becoming quite coarse and more sparse on vertex laterally and on areas below antennae, cheeks shining, very finely and more sparsely punctate; pubescence of head and thorax entirely pale, very short and thin, rather copious on scutum anteriorly but not hiding surface; tubercles black; tegulae testaceous-hyaline; wings subhyaline, veins pale testaceous, stigma more brownish, 2nd recurrent vein entering 2nd submarginal cell somewhat nearer apex than 1st does to base; legs largely dark, but front and mid tibiae with a small, basal, yellow spot, hind tarsi yellow; spurs yellow; punctures of thorax deep and distinct, quite fine on scutum and scutellum, rather close but well separated anteriorly, becoming quite sparse toward center of disc posteriorly, those on scutellum widely separated except in median line, those on pleura much more coarse and deep medially, becoming somewhat finer and closer above, and almost rugose below; apical margins of abdominal terga rather broadly depressed, these areas smooth, shining and impunctate, slightly reddened, discs shining, finely but rather deeply and distinctly punctate, punctures

rather close on each disc basally, becoming somewhat more sparse toward the depressed rim, discal pubescence entirely pale, very short, thin and obscure, forming a rather dense, pale brownish, apical fimbria on tergum 5.

MALE—Length 6 mm.; black; length of face subequal to distance between eyes above; eyes slightly convergent below; clypeus yellow except for the apical margin on each side, the lateral yellow maculae subtriangular, terminating on eye margin slightly below level of antennae, mandibles, labrum, supraclypeal area and remainder of face black; cheeks considerably narrower than eyes; process of labrum nearly as long as basal width, slightly narrowed apically, apex truncate; facial foveae short and very small but distinct; space between lateral ocelli and margin of vertex nearly equal to distance between them; median segments of flagellum fully as broad as long; punctures of head quite deep and distinct, close between antennae and ocelli, becoming more distinctly separated on vertex laterally, fine and quite sparse on supraclypeal area but becoming rather coarse on maculated areas, those on cheeks rather fine and close; pubescence of head and thorax entirely pale, thin, but rather long and conspicuous, not at all hiding surface; tubercles reddened; tegulae yellowish-hyaline; wings hyaline, veins and stigma testaceous, 2nd recurrent vein entering 2nd submarginal cell considerably nearer apex than 1st does to base; tarsi and spurs yellow, tibiae largely dark, but front tibiae with a narrow, anterior, yellow stripe, mid and hind tibiae with a small, basal, yellow spot; thorax shining, punctures deep and distinct, well separated, coarse and rather close on extreme anterior margin of scutum, becoming rather sparse in center of disc posteriorly, those on scutellum sparse and slightly more coarse, those on pleura sparse in center, becoming closer below, finer above; apical margins of abdominal terga rather broadly, evenly and deeply depressed, these areas smooth, shining and impunctate, slightly reddened, basal tergum shining, punctures deep, distinct, rather coarse and well separated, becoming rather sparse toward the depressed rim, terga 2-4 rather broadly depressed basally, median portion of discs quite strongly rolled, with punctures deep and distinct but rather fine and close; discal pubescence short and thin, entirely pale, rather conspicuous on basal portions of terga; sternum 6 with a very narrow and deep, median emargination; wings of sternum 7 quite evenly ovoid, the apex devoid of setae; apical process of sternum 8 very broad basally, gradually narrowed to the narrowly truncate tip; gonostyli slender and

straight, slightly compressed, with an inferior fringe of short setae, slightly exceeded by the penis valves which are slender apically but broadly dilated basally.

DISTRIBUTION—Illinois to North Carolina and Georgia, west to Texas; May to September.

FLOWER RECORDS—Robertson (1929) records *albitarsis* on *Aster ericoides villosus*, *Brauneria pallida*, *B. purpurea*, *Coreopsis palmata*, *Helianthus divaricatus*, *H. mollis*, *Lepachys pinnata*, *Rudbeckia hirta*, *R. laciniata*, *R. subtomentosa* and *Verbesina helianthoides*.

In the Catalog of Hymenoptera (1951) both *albitarsis* and *picipes* are listed as species of the subgenus *Heterosarus*. However, the basal segment of the labial palpus is much longer than segments 2-4 combined, and the tibial scopa is distinctly plumose, indicating that they belong in *Pseudopanurgus* s. str.

The type of *albitarsis* is a female, that of *picipes* a male, and the common identity of the two seems definite.

Pseudopanurgus (Pseudopanurgus)
helianthi new species

FEMALE—Length 8 mm.; black; face much longer than distance between eyes; eyes subparallel; cheeks narrower than eyes; process of labrum very broad at base, occupying nearly the full width of the labrum, strongly narrowed and narrowly rounded at apex; facial foveae shallow, not much more than two-thirds the length of scape; lateral ocelli slightly nearer margin of vertex than to each other; basal segment of flagellum about equal to segments 2 and 3 combined, these broader than long, the more apical segments somewhat longer than broad; head shining, punctures rather irregular, shallow, well separated in general, quite close between anterior ocellus and antennae where they are quite distinct, somewhat more shallow and obscure below antennae and on clypeus where they are well separated but hardly sparse, those on cheeks shallow and indefinite; pubescence of entire head and thorax erect but short and thin, pale-ochraceous; tubercles black; tegulae yellowish-hyaline; wings whitish, veins pale yellow, stigma somewhat brownish, 2nd recurrent vein entering 2nd submarginal cell quite near apex, the 1st removed from base by about twice this distance; legs blackish, tarsi more or less yellowish; pubescence entirely pale

ochraceous, including the hind tibial scopa which is composed of long, loose, quite densely plumose hairs; spurs pale yellow; dorsum of thorax shining, punctures very fine, well separated, becoming rather sparse in center posteriorly, those on scutellum somewhat closer along mid line, the metanotum with shallow but rather distinct and close punctures; pleura somewhat shining, punctures quite coarse, close anteriorly and below, becoming more sparse and shallow posteriorly; dorsal area of propodeum very narrow, narrowly short-striate, lateral and posterior faces shining; abdominal terga rather broadly impressed apically, these areas yellowish-hyaline, smooth and impunctate, discs of the terga shining, extremely minutely and rather sparsely punctate, punctures somewhat closer toward base of terga 2-4, discal pubescence hardly evident but apparently entirely pale, somewhat more conspicuous toward sides, and forming a brownish, apical fimbria on tergum 5.

TYPE—Holotype: Female, Tippecanoe Co., Indiana, Aug. 21, 1955 (B. E. Montgomery, on *Helianthus annuus*) [Purdue Univ.].

Pseudopanurgus (Pseudopanurgus) labrosus (Robertson) new combination

(Figs. 62, 65 & 66)

Calliopsis labrosus Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 122. ♀ ♂.

Panurginus labrosus Robertson, 1898. Acad. Sci. St. Louis, Trans. 8, p. 48. ♀ ♂.

Pseudopanurgus labrosus Robertson, 1922. Psyche 29, p. 171.

Pseudopanurgus labrosus Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records).

Pseudopanurgus (Heterosarus) labrosus, Michener, 1951. In Muesebeck, et. al., Hym. Amer., U.S.D.A., Agr. Monog. 2, p. 1100.

FEMALE—Length 6 mm.; black to piceous; distance between eyes about three-fourths length of face; eyes subparallel; cheeks considerably narrower than eyes; process of labrum about as long as basal width, narrowed to about one-half at truncate apex; facial foveae distinct, terminating about at level of antennae; lateral ocelli subequally distant from each other and margin of vertex; median segments of flagellum very slightly longer than broad; punctures of head deep and distinct, fine and close above antennae, becoming more distinctly separated laterally and on vertex, quite sparse below antennae and on cheeks

below; pubescence of head and thorax entirely pale, short, thin and obscure; tubercles yellow; tegulae yellowish-hyaline; wings sub-hyaline, veins pale testaceous, stigma more brownish, 2nd recurrent vein entering 2nd submarginal cell considerably nearer apex than 1st does to base; legs entirely dark, tibial scopa loose and rather thin, but distinctly plumose; spurs yellow; thoracic integument shining, punctures of scutum rather fine and irregular, quite sparse except along narrow anterior margin, those on scutellum rather close and fine anteriorly, becoming coarser and more sparse posteriorly, those on pleura coarser and closer; apical margins of abdominal terga rather broadly and shallowly depressed, these areas reddened, shining and impunctate, discs of the terga shining, very finely and sparsely punctate, punctures somewhat closer along basal margins of discs and at extreme sides, discal pubescence entirely pale, very thin, sparse and obscure, forming a quite dense, pale brownish, apical fimbria on tergum 5.

MALE—Length 6 mm.; black to piceous; distance between eyes above about three-fourths length of face; eyes subparallel; lateral apical margins of clypeus blackish, clypeus otherwise yellow; process of labrum, mandibles, a spot on supraclypeal area and lateral maculae, all yellow, the facial maculae triangular, extending along eye margin about to level of antennae; cheeks considerably narrower than eyes; length of process of labrum subequal to its basal width, considerably narrowed to the truncate tip; facial foveae small but distinct; lateral ocelli subequally distant from each other and from margin of vertex; median segments of flagellum considerably longer than broad; punctures of head quite deep and distinct, close above antennae and on cheeks, becoming somewhat more sparse laterad of ocelli and below antennae; pubescence of head and thorax entirely pale, very short, thin and sparse; tubercles yellow; tegulae yellowish-hyaline; wings sub-hyaline, veins pale testaceous, stigma somewhat more brownish; 2nd recurrent vein entering 2nd submarginal cell somewhat nearer apex than 1st does to base; tarsi and spurs yellow, tibiae yellow at extreme apex, front tibiae yellow anteriorly, mid tibiae yellow over basal fourth, and hind tibiae over nearly the basal half; punctures of thorax quite deep and distinct, rather coarse, well separated but hardly sparse over scutum and scutellum, those on pleura considerably coarser and somewhat more sparse above, becoming close beneath; apical margins of abdominal terga rather deeply and evenly depressed, these areas smooth and shining, impunctate, discs shining, that of basal tergum being very minutely and sparsely punctate,

punctures on 2nd and following terga deeper and more distinct, quite close toward base, becoming sparse apically, discal pubescence very short, thin and sparse, entirely pale; sternum 6 deeply and narrowly emarginate medially; wings of sternum 7 sub-acute apically, tips slightly recurved, with a fringe of rather short setae; apical process of sternum 8 very short, tip truncate and slightly expanded, bearing a double tuft of setae; gonostyli very slender, somewhat recurved, with a submedian inferior angle, tip abruptly flexed and very slender, bearing a subapical tuft of rather long setae; penis valves quite slender, about attaining tips of gonostyli.

DISTRIBUTION — Minnesota to New York, south to North Carolina; August and September.

FLOWER RECORDS — *Heliopsis*, *Rudbeckia lanceolata*. Robertson (1929) records this on *Helianthus divaricatus*, *H. tuberosus* and *Rudbeckia triloba*.

In the Catalog of Hymenoptera (Michener, 1951) *labrosus* is listed under the subgenus *Heterosarus*. The elongate basal segment of the labial palpus and the distinctly plumose tibial scopa indicate a closer relationship with the species of *Pseudopanurgus* s. str.

***Pseudopanurgus* (*Pseudopanurgus*)
rugosus (Robertson)**

(Figs. 62, 65 & 66)

Calliopsis rugosus Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 121. ♀ ♂.

Pseudopanurgus rugosus Robertson, 1922. Psyche 29, p. 171.

Pseudopanurgus rugosus Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

FEMALE—Length 7 mm.; black; face very slightly longer than distance between eyes above; eyes subparallel; cheeks subequal to eyes in width; process of labrum quadrangular, very slightly longer than broad, broadly truncate apically; facial foveae narrow and deep, diverging from eye margin above, terminated below at about level of antennae; space between margin of vertex and lateral ocelli somewhat less than distance between them; median segments of flagellum considerably broader than long; punctures of head rather coarse and deep, close below ocelli, somewhat more widely separated but not sparse below antennae, quite close on cheeks and on vertex laterally, vertex with a pronounced lateral tubercle above each eye; pubescence of head and thorax extremely short and obscure, hardly evident, but posterior margin of pronotum and

tubercles fringed with pale, flattened, scale-like hairs; tubercles dark; tegulae yellowish-hyaline; wings lightly infuscated, veins and stigma brownish to piceous, 2nd recurrent vein entering 2nd submarginal cell very close to apex, the 1st widely removed from base; legs including tarsi dark except for a small basal yellow spot on front and mid tibiae; spurs yellow; punctures of thorax extremely coarse and deep, close but distinct on scutum, almost crowded on scutellum, irregular and somewhat finer on pleura above, becoming very coarsely rugoso-punctate below; apical margins of abdominal terga distinctly depressed, rather widely so medially, but becoming narrow laterally, these areas very finely, closely and regularly punctate, somewhat reddened, discs of the terga deeply, closely and rather coarsely and regularly punctate, otherwise shining, discal pubescence extremely thin and obscure, hardly evident except on tergum 5 where a quite conspicuous, pale brownish, apical fimbria is formed.

MALE—Length 6 mm.; black; face slightly longer than distance between eyes above; eyes slightly convergent below; clypeus yellow except for the broad apical margins laterally, the lateral facial maculae rather narrow, extending up inner orbits nearly to level of antennae, where they are rather abruptly truncate; supraclypeal area, mandibles and labrum entirely black; cheeks slightly narrower than eyes; process of labrum quadrate, nearly as long as broad, truncate apically; facial foveae quite deep and distinct, extending nearly to level of antennae below; lateral ocelli separated from margin of vertex by a space about equal to distance between them; median segments of flagellum about as broad as long; punctures of head deep and coarse, quite close between antennae and ocelli, somewhat more widely separated but not sparse below antennae and on vertex laterally, vertex with a pronounced lateral tubercle above each eye, cheeks somewhat more finely punctate, the punctures well separated but not sparse; pubescence of head and thorax extremely short, thin and obscure, surface almost bare, but pronotum and tubercles with a posterior fringe of short, scalelike tomentum; tubercles dark; tegulae yellowish-hyaline; wings lightly infuscated, veins and stigma more brownish, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; tarsi and spurs yellowish, femora piceous to black, the front tibiae yellowish-ferruginous, somewhat darkened apically and beneath, mid and hind tibiae mainly dark, somewhat reddened toward base; thoracic puncturation extremely coarse, close and deep, almost crowded on dorsum of thorax, punctures of pleura very coarse and close above, becoming somewhat

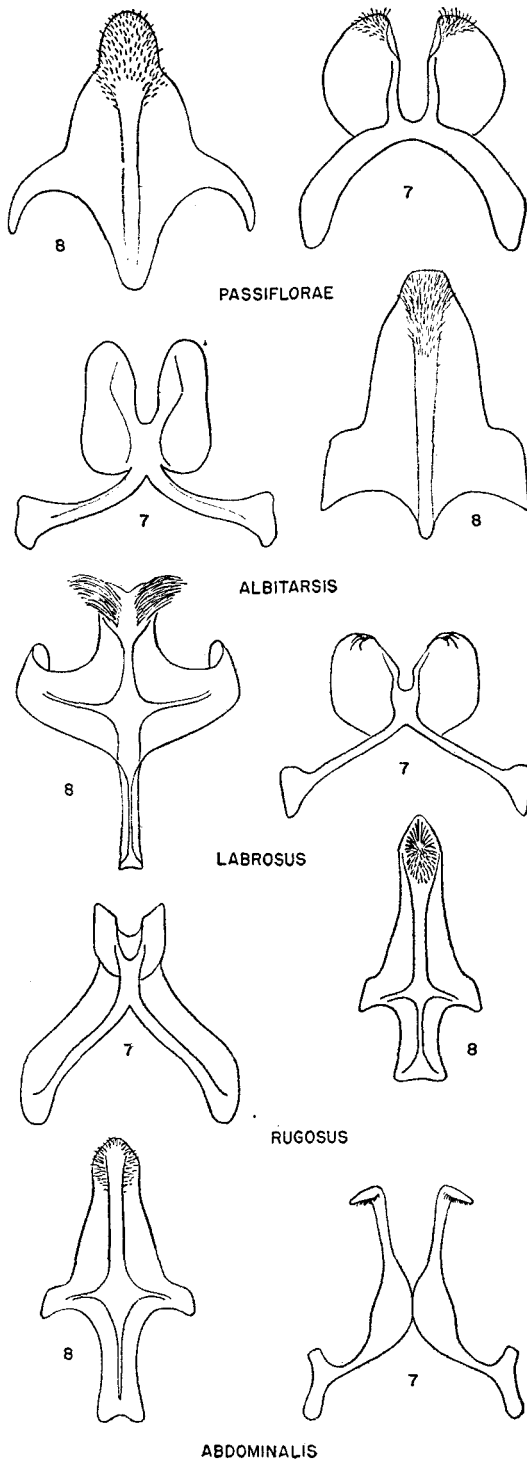


Figure 62

Sterna 7 and 8 in males of *Pseudopanurgus*.

more distinctly separated but very coarse below; apical margins of abdominal terga narrowly and quite deeply depressed, these areas minutely and closely punctate, somewhat reddened, discs of the terga very deeply, closely and quite coarsely and uniformly punctate, discal pubescence extremely short, thin and obscure, hardly evident; sternum 6 with a broadly triangular median emargination; wings of sternum 7 extremely small, subtriangular apically, entirely bare; apical process of sternum 8 narrow and elongate, slightly pointed apically and bearing a short, ventral, subapical tuft of setae; gonostyli simple but rather robust, somewhat flattened, narrowly rounded apically and bearing a quite pronounced, ventral fringe of quite long setae, penis valves slender and simple, about equalling gonostyli in length.

DISTRIBUTION — Maryland to Georgia, west to Illinois, Kansas and Texas; August and September.

FLOWER RECORDS — Recorded by Robertson (1929) on *Bidens aristosa*, *Helianthus divaricatus*, *H. mullis*, *H. tuberosus*, *Heliopsis helianthoides*, *Rudbeckia laciniata*, *R. triloba* and *Silphium perfoliatum*.

***Pseudopanurgus (Heterosarus) abdominalis tricolor* (Cockerell)**

(Figs. 62, 63 & 66)

Calliopsis abdominalis Fox, 1892. Ent. News 3, p. 29.

Calliopsis tricolor Cockerell, 1897. Amer. Ent. Soc. Trans. 24, p. 151. ♀.

Calliopsis abdominalis Bradley, 1942. Ent. News 53, p. 190.

FEMALE—Length 8 mm.; head and thorax piceous to blackish, basal segment of abdomen bright ferruginous; length and breadth of face subequal; eyes very slightly convergent below; median and upper portion of clypeus, lower half of supraclypeal area and adjacent lateral areas yellow maculated; mandibles yellow at base, reddish apically; labrum dark; cheeks subequal to eyes in width; process of labrum broad, quadrangular, shining; facial foveae shallow, rather broad above, acuminate below, terminating at about mid point of inner margin of eye; space between lateral ocelli and margin of vertex subequal to distance between them; median segments of flagellum very slightly shorter than their width; punctures deep, distinct, rather fine and close on upper part of head and on cheeks; becoming quite sparse on maculated areas below antennae; pubescence of head and thorax very short,

thin and obscure, entirely pale; tubercles bright yellow; tegulae pale testaceous-hyaline, with a small, anterior, yellow spot; front and mid tibiae yellow over basal two-thirds, dark apically; spurs ferruginous; wings lightly infuscated, somewhat more darkly so apically, veins and stigma pale ferruginous; punctures of dorsum of thorax fine and close, but quite deep and distinct, surface somewhat shining; pleura relatively dull, punctures close and rather coarse anteriorly, but becoming fine, shallow and obscure posteriorly; apical margins of abdominal terga quite broadly and deeply depressed, these areas pale yellowish-hyaline, contrasting sharply with the darker discs of terga 2-5, discs finely, closely and deeply punctate, discal pubescence short, rather obscure, somewhat more dense along basal margins of terga 2 and 3, more erect and conspicuous on tergum 5, forming a quite dense, apical, pale brownish fimbria; venter of abdomen with thin, erect, pale pubescence.

MALE—Length 8 mm.; head and thorax piceous to black, with yellow maculae, abdomen mainly ferruginous; face slightly longer than distance between eyes above, eyes slightly convergent below; labrum, mandibles and lower portion of face entirely yellow, upper border of this area forming a straight line at level of antennae; scape yellow maculated; cheeks much narrower than eyes; process of labrum broad, subquadrangular, lower margin very slightly curved; facial foveae very small, narrow and elongate but distinct; space between margin of vertex and lateral ocelli about equal to distance between ocelli; median segments of flagellum about as long as broad; punctures of head above deep and distinct, fine and rather close but not crowded, becoming slightly more sparse on cheeks below and on lower maculated area of face; pubescence of head and thorax very short but rather dense, not at all obscuring surface, entirely pale ochraceous; tubercles and an anterior spot on tegulae yellow, tegulae otherwise pale yellowish-hyaline; wings lightly infuscated, somewhat more darkly so apically, veins and stigma pale ferruginous; legs mostly yellow except for basal half of front femora and posterior half of hind femora, hind tibiae somewhat darkened apically; spurs yellow; dorsum of thorax shining between deep and distinct but fine and close punctures, pleura somewhat shining, punctures coarser and more widely separated but not sparse; apical margins of abdominal terga quite deeply but narrowly depressed, these areas yellowish-hyaline, discs ferruginous, quite closely, deeply and finely punctate, the more apical terga more or less infused with blackish, discal pubescence very short and inconspicuous, entirely pale ochraceous; apical margin of sternum 6 rather

deeply incised medially; wings of sternum 7 very narrow and elongate, abruptly recurved at tip; sternum 8 elongate triangular, tip rather broadly rounded; gonostyli rather robust, straight and simple, bearing an elongate fringe of short setae ventrally, slightly exceeding penis valves.

DISTRIBUTION — Pennsylvania and New Jersey to North Carolina and Georgia; August and September.

FLOWER RECORDS — *Monarda punctata* is the only host plant on which this has been collected.

The typical form of *abdominalis* occurs in Texas and Kansas, and differs from this eastern form in the female, in having the scutellum, metanotum, propodeum in part, and most of the abdominal terga ferruginous.

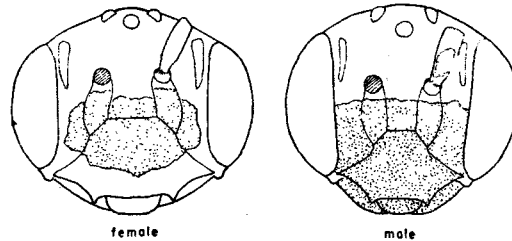


Figure 63

Facial view of head in male and female of *Pseudopanurgus abdominalis*.

Pseudopanurgus (Heterosarus) aestivalis (Provancher)

Panurgus aestivalis Provancher, 1882. Nat. Canad. 13, p. 205. ♀ ♂.

No specimens of *aestivalis* have been collected by the author, and none have appeared in any of the collections received for identification. A male identified as *aestivalis* and borrowed from the U. S. National Museum appears to be synonymous with *P. nebrascensis muesebecki* Crawford. The type of *aestivalis* is a female, located in the Provincial Museum of Quebec under the name *Calliopsis aestivalis*. There is no doubt, however, that it is a *Pseudopanurgus*, probably in the subgenus *Heterosarus*. The following descriptive note was made from this specimen:

FEMALE—Process of labrum truncate, apex about half width of base; facial foveae very short; scutum shining, punctures minute, close but not crowded; punctures minute, obscure but quite close on scutellum; pleura anteriorly with deep and coarse punctures, posterior por-

tion dull and impunctate; punctures of abdominal terga exceedingly minute and close, barely distinguishable.

Pseudopanurgus (Heterosarus)
andrenoides (Smith) new combination

(Figs. 64-66)

Scrapter Andrenoides Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 121. ♀.

Calliopsis asteris Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 121. ♀ ♂. New synonymy.

Pseudopanurgus andrenoides Cockerell, 1904. Canad. Ent. 36, p. 303. ♀.

Pseudopanurgus asteris Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

FEMALE—Length 6 mm.; black; face somewhat longer than distance between eyes above; eyes subparallel; cheeks subequal to eyes in width; process of labrum about as long as broad, slightly narrowed apically, apex truncate; facial foveae shallow but distinct, narrowed below; lateral ocelli considerably nearer margin of vertex than to each other; median segments of flagellum about as long as broad; punctures very close and rather fine between ocelli and antennae, becoming somewhat more widely separated, coarse and shallow below antennae and on vertex laterally, rather close and coarse on cheeks, fine and close along edge of vertex medially, area between ocelli shining and nearly impunctate; pubescence of head and thorax entirely pale, very short and thin; tubercles obscurely reddened; tegulae yellowish-hyaline, somewhat darkened apically; wings slightly infuscated, veins and stigma brownish to piceous, 2nd recurrent vein entering 2nd submarginal cell very much nearer apex than 1st does to base; legs entirely dark except for a very small yellowish spot at extreme base of front and middle tibiae; spurs yellowish; dorsum of thorax shining, punctures of scutum rather deep and distinct, well separated but not sparse medially, becoming quite close and fine anteriorly, punctures of scutellum very slightly coarser, well separated on each side of middle; pleura dull, rather coarsely and closely but shallowly punctate anteriorly, punctures becoming more sparse and obscure posteriorly; apical margins of abdominal terga rather broadly and shallowly depressed, these areas somewhat reddened, relatively smooth, discs rather closely and finely punctate, those on basal tergum very fine and quite sparse, the surface shining, discal pubescence very short, thin and obscure, entirely pale, forming a pale brownish, apical fimbria on tergum 5.

MALE—Length 6 mm.; black; face slightly longer than distance between eyes above; eyes rather strongly convergent below; cheeks much narrower than eyes; clypeus yellow except for the black apical margin laterally; mandibles and process of labrum yellow, lateral portions of labrum black; area between clypeus and eyes yellow, this extending slightly above upper margin of labrum along inner margin of eyes; process of labrum about as long as broad, very slightly narrowed apically, truncate; facial foveae small but deep and distinct, slightly narrowed below, terminating slightly above level of antennae; space between lateral ocelli and margin of vertex about equal to distance between them; median segments of flagellum about as long as broad; area between ocelli and antennae rather finely rugoso-punctate, punctures more distinct, widely separated and rather coarse below antennae, rather coarse, irregular and close on vertex laterally and on cheeks; pubescence of head and thorax entirely pale, very short and obscure; tubercles yellow; tegulae pale ferruginous-hyaline, somewhat darkened anteriorly; wings slightly infuscated, veins and stigma brownish to piceous, 2nd recurrent vein entering 2nd submarginal cell somewhat nearer apex than 1st does to base; femora blackish, basal third or fourth and extreme apex of tibiae yellow, otherwise blackish, tarsi and spurs yellow; dorsum of thorax shining, deeply and closely punctate, punctures becoming very close on scutum anteriorly, those on scutellum slightly more coarse, well separated on each side of middle; pleura dull and tessellate, punctures rather close and coarse anteriorly, becoming quite sparse and shallow posteriorly; apical margins of abdominal terga rather evenly and deeply depressed, these areas slightly reddened, discs rather closely and finely punctate, much more densely so toward base of discs, punctures rather sparse toward depressed rims, discal pubescence very short, thin and obscure, entirely pale; sternum 6 with a deep, circular, median emargination; wings of sternum 7 ovoid, bearing a few short setae at extreme tip; sternum 8 gradually narrowed to the narrowly truncate tip; apical portion of gonostyli slender and elongate, bearing a few short, inconspicuous setae toward apex laterally, subacute, rather abruptly flexed with respect to the robust basal portion; penis valves slightly exceeding tips of gonostyli; volsella conspicuous, strongly flattened, rounded apically.

DISTRIBUTION — Minnesota to the New England states and New Brunswick, south to North Carolina; August and September. One May record seems doubtful.

FLOWER RECORDS — *Solidago*. Robertson (1929) records *asteris* on 4 species of *Solidago*, 3 species of *Aster*, and on *Rudbeckia triloba*.

The types of both *andrenoides* and *asteris* have been examined, and there seems little doubt that they are the same.

Pseudopanurgus (Heterosarus) compositarum (Robertson) new combination

(Figs. 64-66)

Calliopsis compositarum Robertson, 1893. Amer. Ent. Soc. Trans. 20, p. 274. ♀.

Calliopsis compositarum Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 123. ♂.

Pseudopanurgus compositarum Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Pseudopanurgus (Pseudopanurgus) illinoiensis Bradley, 1942. Ent. News 53, p. 190.

FEMALE—Length 7 mm.; black; face very slightly longer than distance between eyes; eyes sub-parallel; cheeks somewhat narrower than eyes; process of labrum considerably broader than long, apex truncate; facial foveae quite deep and distinct, narrow, terminating about at level of antennae; lateral ocelli somewhat nearer margin of vertex than to each other; median segments of flagellum slightly longer than broad; area between ocelli and antennae rather finely rugoso-punctate, punctures becoming coarser and much more sparse on shining surface below antennae, quite coarse on clypeus, fine and close on vertex laterally, becoming rather coarse and more widely separated on cheeks; pubescence of head and thorax quite dense and conspicuous but not hiding surface, that on dorsum of thorax yellowish, becoming whitish laterally and below; tegulae yellowish-hyaline; wings lightly infuscated, veins and stigma brownish, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; legs entirely dark except for a small basal yellow spot on front and mid tibiae; spurs yellowish; scutum and scutellum very closely and rather coarsely punctate, scutum almost sub-rugose except in center posteriorly, punctures of pleura more shallow and obscure, surface posteriorly somewhat shining; apical margins of abdominal terga rather broadly and evenly depressed, these areas minutely and closely punctate or pebbled, the discs closely, finely and deeply punctate, punctures becoming somewhat more widely separated toward the depressed apical rims, discal pubescence very short, thin and sparse toward base, becoming longer and more conspicuous apical-

ly, forming a rather dense, whitish, apical fimbria on tergum 5.

MALE—Length 6 mm.; black; face considerably longer than distance between eyes above, eyes slightly convergent below; lower portion of face, including clypeus, labrum, mandibles, most of supraclypeal area, and lateral portions of face yellow, upper margin of this area forming a nearly straight line just beneath antennae; process of labrum somewhat broader than long, apical margin truncate; facial foveae narrow, elongate, quite small but deep and distinct; lateral ocelli slightly nearer margin of vertex than to each other; median segments of flagellum much longer than broad; punctures of black areas of head close and rather fine, becoming somewhat coarser and more sparse on cheeks, those on maculated areas coarse, rather sparse and shallow; pubescence of head and thorax entirely pale, short but rather dense, not hiding surface; tubercles dark; tegulae yellowish-hyaline; wings subhyaline, veins and stigma brownish to piceous, 2nd recurrent vein entering 2nd submarginal cell much closer to apex than 1st does to base; femora yellow apically, otherwise dark, tibiae yellow except for a median posterior dark spot, the tarsi and spurs entirely yellow; scutum rather finely rugoso-punctate, punctures of scutellum coarser deeper and more distinctly separated; pleura more shining, punctures coarse, deep, and well separated; apical margins of abdominal terga evenly and rather deeply depressed, these areas somewhat reddened, relatively smooth, discs very closely, deeply and finely punctate, becoming more rugose toward base, punctures distinct toward the depressed rims, discal pubescence very short and obscure, entirely pale; sternum 6 with a deep median emargination; wings of sternum 7 rather broad, elongate, triangular apically, with a very small apical tuft of setae; apical portion of sternum 8 narrow, with parallel sides, apex slightly expanded and thickened, depressed medially at tip; apical portion of gonostyli slender and elongate, slightly recurved, considerably exceeding tips of penis valves, tips abruptly flexed and with a conspicuous subapical fringe.

DISTRIBUTION — Maryland to Georgia, west to Indiana and Illinois; September and October.

FLOWER RECORDS — *Aster*. Robertson (1929) records this on 6 species of *Aster* and on *Bidens aristosa*, *Boltonia asteroides*, *Polygonum scandens*, *Rudbeckia triloba*, *Solidago nemoralis* and *S. ulmifolia*.

Bradley (1942) placed *compositarum* in synonymy with *illinoiensis*, but, in the opinion of the author, was in error. Sufficient material of both sexes of both spe-

cies is at hand to indicate that they are distinct, and the types of both have been studied.

Pseudopanurgus (Heterosarus)
illinoiensis (Cresson)

(Figs. 64-66)

Calliopsis illinoiensis Cresson, 1878. Amer. Ent. Soc. Trans 7, p. 66. ♂.

FEMALE—Length 6 mm.; black; length and breadth of face subequal; eyes subparallel; cheeks subequal to eyes in width; process of labrum subquadrate, truncate apically; facial foveae shallow but distinct, terminating below about at level of antennae, only slightly narrower below; lateral ocelli much nearer margin of vertex than to each other; median segments of flagellum slightly broader than long; surface shining between ocelli and antennae, punctures very fine and rather widely separated, becoming somewhat closer just below antennae, but more sparse medially, laterally and on clypeus where they become progressively coarser toward the apical margin, those on cheeks fine, shallow and obscure; pubescence of head short and thin, entirely pale, somewhat yellowish on vertex, that on scutum short and rather dense, yellowish, becoming more whitish laterally and beneath, tegulae yellowish-hyaline; wings subhyaline, veins and stigma brownish to piceous, recurrent veins entering 2nd submarginal cell subequally distant from base and apex; legs dark except for a small, basal, yellow spot on front and middle tibiae; spurs yellowish; surface of dorsum of thorax shining between the uniformly fine but deep, distinct and close punctures, those on scutellum slightly coarser than those on scutum; pleura less shining, punctures somewhat coarser but very shallow and obscure; apical margins of abdominal terga broadly and deeply depressed, these areas smooth and shining, somewhat reddened, discs of terga very finely punctate, punctures close basally, becoming sparse and very minute and obscure toward the apical depressed rims, discal pubescence short, thin and sparse toward base, becoming longer and more conspicuous apically, forming a quite dense, pale brownish, apical fimbria on tergum 5.

MALE—Length 5 mm.; black; length of face subequal to distance between eyes above; eyes somewhat convergent below; clypeus except apical margin at extreme sides, process of labrum, base of mandibles and areas between clypeus and eyes, yellow maculated, upper border of lateral maculae terminating at about upper margin of clypeus; cheeks very slightly narrower than eyes; process of labrum quadrangular, slightly broader than long, apex broadly truncate; facial foveae narrow, elongate, distinct, terminating about at level of antennae; lateral ocelli considerably nearer margin of vertex than to each other; median segments of flagellum considerably broader than long; face below anterior ocellus closely and rather finely punctate, punctures becoming somewhat coarser and more sparse above on vertex laterally and on lateral areas of face, very fine and distinctly separated below antennae, becoming somewhat coarser and rather sparse on maculated areas; cheeks shining, minutely and sparsely punctate; pubescence of head and thorax short but rather dense, pale ochraceous on vertex and dorsum of thorax, becoming whitish laterally and beneath; tubercles yellow; tegulae yellowish-hyaline; wings lightly infuscated, veins and stigma brownish to piceous, recurrent veins entering 2nd submarginal cell subequally distant from base and apex; femora yellow at extreme apex, otherwise blackish, front tibiae dark posteriorly, otherwise yellow; mid tibiae dark, except for basal and apical yellow areas; hind tibiae dark, over apical half, basal half and tip yellow; tarsi and spurs entirely yellow; dorsum of thorax shining between fine, deep, distinct and quite close punctures, those on scutellum slightly coarser than those of scutum; pleura not so shining, punctures shallow and obscure, rather sparse; apical margins of abdominal terga evenly and rather deeply depressed, these areas shining, not much reddened, punctures of discs of terga close, deep and fine basally, becoming quite sparse and more obscure toward depressed apical margins, discal pubescence very short fine and obscure, entirely pale; sternum 6 with a deep, triangular, median emargination; wings of sternum 7 small, triangularly angulate laterally, with a narrowly rounded tip, bearing only one or two very short, inconspicuous setae; gonostyli flattened, rather narrow, tip slightly incurved, gradually narrowed to a slender apex, bearing a dense fringe of rather short setae on outer margin; penis valves very slender, about attaining tips of gonostyli.

DISTRIBUTION—Quebec to Illinois, south to Florida and Texas; May.

FLOWER RECORDS — This has been collected by Banks in Virginia on daisy (*Chrysanthemum leucanthemum*).

Pseudopanurgus (Heterosarus) labrosiformis labrosiformis (Robertson)

(Figs. 64-66)

Panurginus labrosiformis Robertson, 1898. Acad. Sci. St. Louis, Trans. 8, p. 49. ♀ ♂.
Pseudopanurgus labrosiformis Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

FEMALE—Length 5.5 mm.; piceous; face slightly longer than distance between eyes above; eyes subparallel; cheeks subequal to eyes in width; process of labrum nearly as long as its basal width, much narrowed apically, apex narrowly truncate and slightly emarginate; facial foveae shallow but distinct, narrow, terminating at level of antennae; lateral ocelli slightly nearer margin of vertex than to each other; median segments of flagellum about as broad as long, apical ones somewhat longer; punctures of head rather coarse and shallow, rather widely separated below antennae, quite close above but not crowded, becoming very fine and sparse on the shining cheeks below; pubescence of head and thorax short, thin, entirely pale; tegulae yellowish-hyaline; wings hyaline, veins yellowish, stigma more brownish, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; legs dark, spurs yellowish; punctures of scutum and scutellum somewhat coarser and deeper than those of face, well separated but not sparse, surface shining; pleura shining, punctures more shallow and sparse; apical margins of abdominal terga rather broadly and shallowly depressed, these areas quite smooth, somewhat reddened, discs of terga smooth and shining, very minutely and rather closely punctate except toward the depressed apical rims, discal pubescence very thin and sparse, forming a rather dense, yellowish, apical fimbria on tergum 5.

MALE—Length 5 mm.; piceous; face considerably longer than distance between eyes above; eyes slightly convergent below; most of clypeus, process of labrum and mandibles except tips, yellow, the apical, lateral margins of clypeus dark; face with triangular, lateral maculae, which extend along eye margins considerably above upper margin of clypeus; cheeks considerably narrower than eyes; process of labrum nearly as long as its basal width, strongly narrowed apically, apex narrowly truncate and slightly emarginate; facial foveae distinct but very small, terminating considerably above level of antennae; lateral ocelli somewhat nearer margin of vertex than to each other; median segments of antennae very slightly longer than broad; punctures of head rather coarse and deep, close over antennae, becoming rather sparse below antennae, and very shallow and sparse on cheeks below; pubescence of head and thorax thin, short, entirely pale; tegulae yellowish-hyaline; tubercles somewhat reddened, but thorax otherwise dark; wings hyaline, veins yellowish, stigma more brownish, recurrent veins entering 2nd submarginal cell subequally distant from base and apex; tarsi yellow, mid and hind tibiae piceous except for yellow base and apex, the front tibiae yellow over anterior

face, dark posteriorly; spurs yellow; punctures of scutum and scutellum deep and distinct, rather coarse, well separated but not sparse; pleura shining and more sparsely punctate above, punctures becoming close and rather fine beneath; abdominal terga rather narrowly and deeply depressed apically, these areas smooth and impunctate, disc of tergum 1 smooth, rather sparsely and finely punctate, those of 2nd and following segments very finely roughened basally but becoming distinctly and rather finely and closely punctate toward the depressed rims; discal pubescence very short, thin and sparse, entirely pale; sternum 6 with a narrow and deep, median, apical emargination; wings of sternum 7 semi-circular, bearing a small apical tuft of setae; apical process of ternum 8 parallel-sided, rather narrowly truncate apically, with a few apical setae; gonostyli carinate beneath basally, this carina bearing a fringe of short setae, the apex narrowly acute and abruptly flexed, bearing a sub-apical tuft of long setae; penis valves rather slender, about equal in length to gonostyli.

DISTRIBUTION—Illinois, North Carolina and Georgia; August.

FLOWER RECORDS—Robertson (1929) records this on *Actinomeris alternifolia*, *Bidens aristosa*, *Coreopsis tripteris*, *Helianthus divaricatus*, *H. tuberosus*, *Heliopsis helianthoides*, *Rudbeckia laciniata*, *R. triloba*, *Silphium perfoliatum* and *Solidago canadensis*.

A subspecies, *P. labrosiformis distractus* Cockerell, described from Nebraska, does not appear to occur east of the Mississippi.

Pseudopanurgus (Heterosarus) nebrascensis nebrascensis (Crawford)

(Figs. 64-66)

Panurginus nebrascensis Crawford, 1903.
Canad. Ent. 35, p. 335. ♂ ♀.

Panurginus nebrascensis Crawford, 1912.
Canad. Ent. 44, p. 368.

Pseudopanurgus (Heterosarus) nebrascensis Michener, 1951. In Muesebeck, et. al., Hym. Amer., U.S.D.A., Agr. Monog. 2, p. 1100.

FEMALE—Length 5 mm.; blackish; length of face slightly greater than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; process of labrum about as broad as long, slightly narrowed and rather broadly truncate apically; facial foveae shallow and rather short; diameter of lateral ocelli subequal to distance separating them from margin of vertex; median segments of flagellum about as broad as long; face shining,

punctures rather coarse and sparse below antennae, closer on vertex laterally, finer and closer between antennae and ocelli and on cheeks above, becoming somewhat coarser below; pubescence of head and thorax very short, thin and sparse, entirely pale; tubercles slightly reddened; tegulae yellowish-hyaline; wings sub-hyaline, veins testaceous, stigma slightly darker, 2nd recurrent vein entering 2nd submarginal very close to apex, the 1st widely removed from base; legs dark except for a small basal yellow spot on front and mid tibiae; spurs yellow; thoracic integument shining, punctures of scutum and scutellum very fine, irregular and sparse, those on pleura above more coarse, close and deep, becoming rugose below; apical margins of abdominal terga rather broadly and deeply depressed, these areas finely pebbled but shining, discs of the terga shining, that of tergum 1 very sparsely and minutely punctate, 2nd and following terga finely and closely punctate toward base, becoming sparsely punctate toward the depressed rims, discal pubescence very short, thin and sparse, entirely pale, forming a rather dense, pale yellowish, apical fimbria on tergum 5.

MALE—Length 6 mm.; black to piceous; face slightly longer than distance between eyes above; eyes slightly convergent below; scape anteriorly, labrum, mandibles and lower half of face yellow, the upper margin of this area often forming a nearly straight line just beneath antennae; cheeks narrower than eyes; process of labrum poorly demarked, broader than long at base, smooth and polished, the lateral areas of labrum closely and deeply punctate; facial foveae very small but distinct; lateral ocelli separated from margin of vertex by a space slightly greater than their diameter; median segments of flagellum considerably longer than broad; punctures of head quite coarse and deep, rather sparse below antennae, well separated on vertex laterally and on cheeks above, close and fine between antennae and ocelli, and on vertex medially; pubescence of head and thorax very short and fine, pale yellowish, rather copious on dorsum of thorax but not at all hiding surface; tubercles yellow; tegulae yellowish-hyaline; wings sub-hyaline, veins and stigma testaceous to brownish, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; femora dark with tips yellow, front tibiae yellow anteriorly, mid and hind tibiae yellow at base and apex, otherwise dark, the tarsi entirely yellow; spurs yellow; thoracic integument shining, punctures on dorsum of thorax rather fine and deep, very close and fine on scutum anteriorly, becoming more sparse and coarse toward center of disc posteriorly, those on scutellum somewhat coarser, well separated, those on pleura quite coarse

and deep, well separated above; apical margins of abdominal terga rather narrowly but deeply depressed, these areas shining and somewhat reddened, minutely pebbled but hardly punctate, disc of basal tergum quite deeply and closely punctate except along narrow apical margin before the depressed rim, 2nd and following terga finely rugose basally, becoming rather deeply and distinctly punctate toward the depressed rims, discal pubescence very thin and obscure, entirely pale; sternum 6 with a deep, sub-triangular, median emargination; wings of sternum 7 rather elongate, subacute apically, the tips slightly reflexed, and bearing 2 or 3 elongate setae; apical process of sternum 8 parallel-sided, the tip slightly reflexed, subtruncate, with a dense tuft of setae; gonostyli subcarinate beneath toward base, the tip much narrowed and abruptly reflexed, with a dense subapical tuft of setae; penis valves short, not nearly attaining tips of gonostyli.

DISTRIBUTION — Colorado to Alberta, in the west, east to the New England states; August and September, this typical form of the species having been identified from Minnesota, Illinois, Michigan, Maine, Massachusetts, Connecticut and New Jersey.

FLOWER RECORDS — *Aster* and *Solidago*.

Pseudopanurgus (Heterosarus) nebrascensis muesebecki Michener

(Fig. 65)

Pseudopanurgus nebrascensis timberlakei Michener, 1947. Amer. Midland Nat. 38, p. 446. ♂ ♀ (preoccupied).

Pseudopanurgus (Heterosarus) nebrascensis muesebecki Michener, 1951. In Muesebeck, et. al., Hym. Amer. U.S.D.A., Agr. Monog. 2, p. 1100.

This is a southeastern form of *nebrascensis* and very similar to the typical form structurally. In the female the only difference seems to be the somewhat coarser puncturation, especially of the scutum and scutellum. In the male there is some reduction in the extent of yellow maculation of the face. The following description was made from the holotype male:

MALE—Black; wings hyaline basally, becoming darker apically, veins and stigma piceous, 1st recurrent vein meeting 2nd submarginal cell nearly a third from base, 2nd recurrent nearly interstitial with 2nd transverse cubitus; tegulae yellowish-hyaline; punctures of head and thorax close and deep, somewhat coarser on pleura and between eyes and ocelli, some shining spaces evident on the

latter, punctures of scutellum slightly coarser than those on scutum, propodeum densely rugose, dorsal area narrow, with very short, fine striae; facial foveae well developed, about equal to scape in length; yellow maculations as follows: entire clypeus and labrum, mandibles except base, lower half of supraclypeal area, triangular lateral face marks ending more or less acutely on eye margin at level of antennae, tubercles, tibiae in part, and tarsi; mid tibiae black over median half, hind tibiae with an elongate subapical black mark; basal abdominal tergum punctured about as scutum, punctures becoming very fine and close on the more apical terga, depressed apical margins of the terga impunctate.

DISTRIBUTION — North Carolina to Florida and Mississippi; September and October. (all ♀ records).

FLOWER RECORDS — *Aster*, *Chrysopsis*, *Haplopappus*.

Michener (1947) considered females collected in New England to be representative of this form, but this writer believes that they agree more nearly with the typical form. There is a marked difference in degree of coarseness in the punctures of the scutum between the females, those in *muesebecki* being quite coarse and close, those in *nebrascensis* s. str. very fine and sparse. All of the females at hand from North Carolina and southward have the coarse punctures. All of those from the northern states, from New England to Nebraska, have the fine punctures. Males from this northern area show a considerable range of variation, some of them fitting the description of *muesebecki* very well, but we have no males from the southeast for comparison, other than the notes made of the type.

Pseudopanurgus (Heterosarus) parvus
(Robertson)

(Figs. 64-66)

Calliopsis parvus Robertson, 1892. Amer. Nat. 26, p. 273. ♀ ♂.

Heterosarus parvus Robertson, 1922. Psyche 29, p. 169. (flower records)

Heterosarus parvus Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Pseudopanurgus gerardiae Crawford, 1932. Ent. Soc. Wash. Proc. 34, p. 77. ♂ ♀. New synonymy.

FEMALE—Length 5 mm.; black; face much longer than distance between eyes above; eyes slightly convergent below; cheeks slightly narrower than eyes; process of labrum somewhat broader than the median length, the sides parallel, apical margin very slightly outcurved; facial foveae shallow but quite distinct, nearly as long as scape; space between margin of vertex and lateral ocelli about equal to their diameter; median segments of flagellum about as broad as long, basal segment considerably longer; punctures of vertex and of face below ocelli very fine, uniform and close, almost crowded, becoming more distinctly separated below antennae, those on clypeus somewhat coarser and more sparse, those on cheeks below becoming rather shallow and indefinite, but still close; pubescence of head and thorax extremely short and inconspicuous, barely evident, apparently entirely pale; tubercles testaceous; tegulae yellowish-hyaline; wings subhyaline, veins and stigma pale brownish-testaceous, 2nd recurrent vein nearly interstitial with 2nd transverse cubitus, the 1st considerably removed from base of cell; legs dull brownish-testaceous basally, becoming somewhat more yellowish apically, pubescence entirely pale, hind tibial scopa of rather loose, simple hairs; spurs pale yellow; dorsum of thorax with very fine and close, uniformly distributed punctures; pleura dull, tessellate, punctures hardly evident except for scattered, very shallow punctures anteriorly; dorsal area of propodeum quite narrow, with a few irregular rugosities along base, lateral and posterior faces quite smooth but dull; apical margins of abdominal terga quite broadly impressed, these areas finely pebbled, dull yellowish-hyaline, discs of terga very finely, closely and uniformly punctate to the rim of the depressed area, discal pubescence hardly evident, apparently entirely pale.

MALE—Length 6 mm.; black; length of face considerably greater than distance between eyes above; eyes slightly convergent below; clypeus, except apical margins laterally, mandibles, and triangular lateral face marks yellow, the labrum black, lateral maculae terminating on eye margin slightly above upper margin of clypeus; cheeks slightly narrower than eyes; process of labrum quadrangular, considerably broader than long, apical margin truncate; facial foveae quite deep and distinct, terminating considerably above level of antennae; space between margin of vertex and lateral ocelli slightly less than distance between these ocelli; median segments of flagellum about as broad as long; punctures of head rather fine, but deep and distinct, close above antennae, somewhat more distinctly separated below antennae where surface is shining, vertex laterally and cheeks subrugose; pubescence of head and thorax

extremely short, thin and obscure, entirely pale, visible only at certain angles on dorsum of thorax, but hind margin of pronotum and tubercles with a quite dense fringe of short, scale-like tomentum; tubercles ferrugineous; tegulae ferrugineous-hyaline; wings subhyaline, strongly violaceous, veins testaceous, stigma somewhat more brownish, second recurrent vein entering second submarginal cell much nearer apex than first does to base; tarsi and spurs yellow; femora dark with yellow tips, front tibiae reddish-yellow anteriorly, dark posteriorly, the mid and hind tibiae largely dark, narrowly yellow at base and apex; punctation of dorsum of thorax fine, close and deep, but distinct, that of scutellum slightly coarser than on scutum, pleura posteriorly more tessellate, with only a few scattered obscure punctures, becoming rather coarsely and shallowly punctate anteriorly and below; apical margins of abdominal terga rather narrowly and evenly depressed, these areas very minutely and closely punctate, somewhat reddened, discs very closely and finely punctate, punctures becoming slightly more distinct toward depressed margins; abdominal pubescence extremely short, thin and obscure, entirely pale, sternum 6 with a deep, triangular, median emargination; wings of sternum 7 rather narrow, the tips somewhat reflexed, subacute, bearing a small tuft of short setae; apical process of sternum 8 elongate, narrow, somewhat constricted just before the apex which is rather broadly truncate and bears a dense fringe of very short setae; gonostyli rather elongate, slightly expanded toward apex, tips obliquely flexed toward median line where they nearly meet, with a quite dense fringe of setae toward the tips beneath; penis valves very slender, simple, not quite attaining tips of gonostyli.

DISTRIBUTION—Missouri, Illinois and North Carolina; June to September.

FLOWER RECORDS—The type series of *P. gerardiae* was collected on *Gerardia tenuifolia*. Robertson (1922 and 1929) records *parvus* on *Aster*, *Eulophus*, *Geranium*, *Gillenia*, *Monarda*, *Solidago* and *Thaspium*. Some of Robertson's records, however, may refer to *P. pauper* Cresson.

The evidence indicates that Robertson failed to distinguish between two closely related species, the one he described as *parvus* and that described by Cresson as *pauper*. Crawford based his determinations on specimens identified by Robertson, but apparently did not see the type series of *parvus*. The writer has seen the lectotype of *parvus* and found it to agree with *gerardiae* rather than with *pauper*.

***Pseudopanurgus (Heterosarus) pauper*
(Cresson)**

(Figs. 64-66)

Calliopsis pauper Cresson, 1878. Amer. Ent. Soc. Trans. 7, p. 66. ♀ ♂.

Pseudopanurgus pauper Crawford, 1932. Ent. Soc. Wash. Proc. 34, p. 77.

FEMALE—Length 5.5 mm.; black; face slightly longer than distance between eyes above; eyes very slightly convergent below; cheeks subequal to eyes in width; process of labrum very slightly broader than long, slightly narrowed to the truncate apex; facial foveae rather shallow and broad, terminating below at level of antennae; diameter of lateral ocelli equal to space separating them from margin of vertex; median segments of flagellum about as broad as long; punctures of face above antennae rather close and fine, somewhat more widely separated on vertex laterally, surface rather dull, punctures becoming shallow and obscure on cheeks below, those on face below antennae much more sparse, rather coarse on clypeus; pubescence of head and thorax very short, thin and obscure, entirely pale; tubercles black; tegulae ferruginous-hyaline; wings hyaline, veins and stigma brownish-testaceous, 2nd recurrent vein nearly interstitial with apex of 2nd submarginal cell, the 1st rather widely removed from base; legs dark, spurs yellow; punctures of dorsum of thorax very fine and quite close, minute and almost crowded on scutum anteriorly, becoming more distinct, deep and well separated in center of disc posteriorly, surface dull anteriorly, becoming somewhat smoother posteriorly, scutellum shining, with distinct, deep and rather fine punctures; pleura dull and tessellate, punctures very shallow and obscure, well separated but not sparse; apical margins of abdominal terga rather broadly and evenly depressed, these areas very closely, microscopically punctate, discs rather dull, very finely punctate, punctures on basal tergum close except along area just anterior to the depressed rim, discs of 2nd and following terga finely rugose along base, becoming sparsely and minutely punctate toward rims, discal pubescence extremely short, thin and obscure, forming a rather short, dense, brownish, apical fimbria on tergum 5.

MALE—Length 5 mm.; black; face slightly longer than distance between eyes above; eyes slightly convergent below; cheeks considerably narrower than eyes; process of labrum, mandibles, clypeus except lateral apical margins, and small lateral maculae, pale ivory-yellow, the lateral maculations not extending above upper margin of clypeus; facial foveae short and shallow, but quite distinct; space between margin of vertex and lateral ocelli subequal to their diameter; median segments of flagellum

slightly longer than broad; punctures of head above very fine, close and deep, becoming somewhat more shallow and more widely separated on cheeks below, very fine and well separated but not sparse below antennae, those on maculated areas coarser but rather shallow and obscure; pubescence of head and thorax very short, thin and obscure, entirely pale; tubercles reddened posteriorly; tegulae yellowish-hyaline; wings hyaline, veins and stigma brownish-testaceous, 2nd recurrent vein very close to apex of 2nd submarginal, the 1st widely removed from base; femora dark, narrowly yellow at extreme tip, front tibiae yellow anteriorly and on outer surface, dark posteriorly, mid and hind tibiae yellow at base and apex, otherwise dark, tarsi and spurs yellow; dorsum of thorax very finely and closely punctate, surface somewhat shining; pleura rather dull, punctures coarser, shallow and more widely separated but not sparse; apical margins of abdominal terga evenly and rather deeply depressed, these areas shining but microscopically pebbled, discs of terga rather dull, punctures of basal tergum very fine and well separated but quite distinct, those of 2nd and following segments minute and obscure, barely evident, discal pubescence very short, thin and obscure, entirely pale; sternum 6 with a median, triangular, apical emargination; wings of sternum 7 semicircular, tips slightly recurved, bearing a very small brush of short setae; apical process of sternum 8 quite strongly flexed ventrally, tip truncate and bearing a quite dense apical tuft of setae; gonostyli rather robust, median portion with an inner, dorsal carina, tips slightly flexed toward median line and bearing a conspicuous tuft of rather short setae; penis valves slender, shorter than gonostyli.

DISTRIBUTION—Missouri to the New England states, south to Georgia; June to August.

FLOWER RECORDS—*Ceanothus* and *Rubus*.

Pseudopanurgus (Heterosarus) rudbeckiae (Robertson)

(Figs. 64-66)

- Calliopsis rudbeckiae* Robertson, 1895. Amer. Ent. Soc. Trans. 22, p. 122. ♀.
- Panurginus rudbeckiae* Graenicher, 1911. Milwaukee Publ. Mus. Bul. 1, p. 237.
- Pseudopanurgus rudbeckiae* Robertson, 1922. Psyche 29, p. 171.
- Pseudopanurgus rudbeckiae* Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

FEMALE—Length 6 mm.; black; length of face subequal to distance between eyes above; eyes subparallel; cheeks slightly narrower than eyes; process of labrum about as long as its basal width, quite strongly constricted to the truncate tip; facial foveae very shallow, rather obscure, terminating about at level of antennae; space between margin of vertex and lateral ocelli not much exceeding their diameter; median segments of flagellum somewhat broader than long; punctures of face fine and very close between antennae and ocelli, becoming slightly coarser and more definitely separated on vertex laterally, fine and sparse on supraclypeal area, becoming coarse and somewhat closer on face laterally and on clypeus, punctures of cheeks fine and close, but deep and distinct; pubescence of head and thorax short, entirely pale yellowish, rather dense on dorsum of thorax but not hiding surface; tubercles obscurely reddened; tegulae yellowish-hyaline; wings subhyaline, veins testaceous, stigma somewhat more brownish, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; legs mainly dark, but front and mid tibiae with a small, basal, yellow spot, and hind tarsi yellowish; spurs yellow; dorsum of thorax shining, minutely punctate, punctures rather close along extreme anterior margin of scutum, becoming more widely separated but not sparse in center of disc, those on scutellum slightly coarser and quite sparse; upper portions of pleura shining, finely punctate, punctures well separated but hardly sparse, area just below this much more coarsely and closely punctate, becoming fine, close and irregular beneath; apical margins of abdominal terga broadly and rather shallowly depressed, these areas shining and impunctate, obscurely reddened, disc of tergum 1 shining, very minutely and sparsely punctate, the punctures barely evident with high magnification, disc of 2nd and following terga rather closely and minutely punctate basally, becoming quite sparsely punctate toward apical rims, discal pubescence very short, thin and obscure, entirely pale, tergum 5 with a rather dense, pale brownish, apical fimbria.

MALE—Length 5.5 mm.; black to piceous; length of face very slightly longer than distance between eyes above; eyes slightly convergent below; clypeus, except for apical margins laterally, labrum, mandibles, a small spot on supraclypeal area, and triangular lateral maculae, yellow, the lateral maculae extending slightly above upper margin of clypeus, but not reaching level of antennae; cheeks much narrower than eyes; process of labrum slightly broader than long, only slightly narrowed apically, apex very slightly emarginate medially; facial foveae small but distinct, rather

narrow; lateral ocelli slightly nearer margin of vertex than to each other; median segments of flagellum considerably longer than broad; punctures of face between antennae and ocelli very close and rather fine, becoming quite sparse on vertex laterally and very sparse on lower half of face, cheeks shining, finely punctate, punctures well separated, becoming quite sparse below; pubescence of head and thorax short, entirely yellowish, rather dense on dorsum of thorax but not hiding surface; tubercles yellow; tegulae yellowish-hyaline; wings subhyaline, veins pale testaceous, stigma somewhat more brownish; 2nd recurrent vein entering 2nd submarginal cell considerably nearer apex than 1st does to base; tarsi and spurs yellow; femora dark but with the tip narrowly yellow, front tibiae yellow anteriorly, more ferruginous on outer surface, mid and hind tibiae dark with yellow base and apex; dorsum of thorax shining, punctures of scutum deep and distinct, rather close and fine anteriorly, becoming slightly deeper and more sparse in center of disc posteriorly, punctures of scutellum slightly coarser, rather sparse on each side of middle; pleura shining, finely and quite sparsely punctate above, becoming somewhat more coarsely and closely punctate below; apical margins of abdominal terga rather narrowly and deeply depressed, these areas somewhat reddened, disc of tergum 1 shining, deeply, distinctly and rather finely punctate, the punctures close basally, becoming very sparse toward the depressed rim, terga 2, 3 and 4 very finely subrugose, and somewhat depressed basally, a more elevated median portion becoming finely and closely punctate, punctures becoming sparse along narrow, apical area just before the depressed rim, discal pubescence very short, thin and obscure, entirely pale; sternum 6 with a very narrow and deep median emargination; wings of sternum 7 quite evenly ovoid, the tips rounded and lacking setae; apical portion of sternum 8 rather narrow, parallel-sided, tip slightly flexed and bearing an obscure tuft of very short and fine setae; gonostyli very slender and short compared to the gonocoxites, nearly straight except for the abruptly flexed apex, with a fine pencil of rather elongate, subapical setae; penis valves about equal in length to gonostyli, acute apically, rather broad toward base.

DISTRIBUTION—Illinois and Wisconsin; autumnal.

FLOWER RECORDS—*Aster* and *Solidago*. Robertson (1929) records this on *Bidens aristosa*, *Helianthus divaricatus*, *Rudbeckia hirta*, *R. laciniata*, *R. subtomentosa* and *R. triloba*.

Pseudopanurgus (Heterosarus)
solidaginis (Robertson)

(Figs. 64-66)

- Calliopsis solidaginis* Robertson, 1893. Amer. Ent. Soc. Trans. 20, p. 274. ♀.
Panurginus solidaginis Robertson, 1898. Acad. Sci. St. Louis Trans. 8, p. 50. ♂.
Pseudopanurgus solidaginis Robertson, 1922. Psyche 29, p. 171.
Pseudopanurgus solidaginis Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

FEMALE—Length 6 mm.; piceous to black; length of face subequal to distance between eyes above; eyes subparallel; cheeks subequal to eyes in width; process of labrum considerably broader than long, slightly narrowed, but the apex very broadly truncate; facial foveae rather small and shallow, terminated slightly above level of antennae; space between margin of vertex and lateral ocelli considerably less than distance between them; median segments of flagellum slightly longer than broad; punctures of face above antennae fine and very close, somewhat coarser and more sparse below antennae, quite coarse on clypeus, somewhat coarser but still close on vertex laterally, and close on cheeks except beneath; pubescence of head and thorax short, entirely pale, rather dense above but not hiding surface; tubercles dark; tegulae pale yellowish-hyaline; wings subhyaline, veins and stigma testaceous, 2nd recurrent vein entering 2nd submarginal cell much nearer apex than 1st does to base; spurs and hind tarsi yellow, legs otherwise dark except for small basal yellow spots on front and mid tibiae; scutum shining, punctures fine and well separated but not sparse, those on scutellum slightly coarser, quite close; pleura shining medially, but closely and rather finely punctate above, below and anteriorly; apical margins of abdominal terga rather shallowly and broadly depressed, these areas reddened, very minutely and quite closely and obscurely punctate or reticulate, discs of the terga shining, minutely punctate, the first tergum sparsely so, the others more closely so except apically toward the depressed rims, discal pubescence short, thin and obscure but evident, entirely pale, forming a pale brownish, apical fimbria on tergum 5.

MALE—Length 5 mm.; piceous to black; face considerably longer than distance between eyes above; eyes slightly convergent below; entire clypeus, except for narrow apical borders laterally, labrum, mandibles, a quadrangular spot on supraclypeal area and triangular lateral maculae, yellow, maculae ending acutely on eye margin at about level of

antennae; cheeks slightly narrower than eyes; process of labrum broader than long, lateral margins obscure, apparently somewhat narrowed apically to the truncate apex; facial foveae extremely small but distinct, located considerably above level of antennae; space between margin of vertex and lateral ocelli only very slightly greater than their diameter; median segments of flagellum slightly longer than broad; punctures of face above antennae fine and close, rather shallow, those below antennae deep, distinct and more widely separated, becoming quite coarse on clypeus where they are almost sparse, close on vertex laterally, becoming slightly more sparse on cheeks below; pubescence of head and thorax short, thin, entirely pale, rather copious above but not hiding surface; tubercles slightly reddened; tegulae yellowish-hyaline; wings subhyaline, veins yellowish, stigma somewhat more testaceous, 2nd recurrent vein entering 2nd submarginal cell only very slightly nearer apex than 1st does to base; tarsi and spurs yellow, the femora dark except for small, apical, yellow spots, front tibiae yellow anteriorly, dark posteriorly, the mid and hind tibiae dark medially with yellow base and apex; punctures of dorsum of thorax quite deep and distinct, rather fine, close along narrow anterior margin of scutum, becoming somewhat more widely separated posteriorly, somewhat more coarse and sparse on scutellum laterally, but close along mid line, sparse, shallow and rather coarse on pleura medially, becoming somewhat closer above and below; apical margins of abdominal terga rather narrowly and deeply depressed, these areas quite smooth, shining, somewhat reddened, discs shining, quite deeply and finely punctate, punctures on tergum 1 rather sparse medially and toward the apical depressed rim, punctures of terga 2 and 3 closer, becoming finely rugose along basal margins, somewhat sparse toward apical rims, discal pubescence very short, thin, sparse, entirely pale; sternum 5 with a narrow and rather obscure, median, apical emargination; wings of sternum 7 rather broad, subacute apically, and bearing a few abruptly recurved apical bristles; apical portion of sternum 8 rather broad, sides nearly parallel, slightly flexed apically and bearing a double tuft of very short apical setae; gonostyli rather short and robust, slightly curved, tip abruptly flexed and very slender, bearing a quite dense, subapical tuft of quite long setae; penis valves slightly shorter than gonostyli, rather slender and simple.

DISTRIBUTION—Illinois, east to the New England states and south to Mississippi, during the fall.

FLOWER RECORDS—Robertson (1929) records this on *Bidens aristosa*, *Boltonia asteroides*, *Coreopsis tripteris*, *Helianthus grosse-serratus*, *H. tuberosus*, *Rudbeckia subtomentosa* and *Solidago canadensis*.

Pseudopanurgus (Heterosarus)
virginicus (Cockerell)

(Figs. 64-66)

Panurginus virginicus Cockerell, 1907. Entomologist 40, p. 137. ♂.

Pseudopanurgus virginicus Crawford 1932. Ent. Soc. Wash. Proc. 34, p. 77.

FEMALE—Length 5 mm.; black to piceous; face slightly longer than distance between eyes above; eyes sub-parallel; cheeks subequal to eyes in width; process of labrum quadrangular, about as long as broad, apex truncate; facial foveae rather shallow but distinct, terminating slightly above level of antennae; space between margin of vertex and lateral ocelli subequal to distance between them; median segments of flagellum slightly longer than broad; punctures of head fine and shallow, very close above antennae and on supraclypeal area, somewhat coarser and more distinct on lateral portions of face below antennae and much more coarse on clypeus, very minute, close and indistinct on vertex laterally, becoming somewhat coarser and more distinct but quite shallow on cheeks below; pubescence of head and thorax very short, thin and obscure, barely evident on dorsum of thorax, but pronotum with a rather dense posterior fringe of short, scale-like pubescence; tubercles dark; tegulae yellowish-hyaline; wings subhyaline, veins pale testaceous, stigma somewhat darker, 2nd recurrent vein entering 2nd submarginal cell very close to apex, the 1st widely removed from base; front and mid tibiae with a small, yellow, basal spot, legs otherwise dark; spurs yellow; puncturation of dorsum of thorax uniformly fine and close, that on pleura obscure over posterior portion, this being more tessellate but with some shallow and somewhat coarser punctures over anterior portion; apical margins of abdominal terga rather broadly and shallowly depressed, these areas very closely and minutely punctate, somewhat reddened, discs very finely and rather evenly punctate, the punctures quite close toward base, more sparse toward apex of each tergum, discal pubescence very short, thin and obscure, entirely pale, forming a quite dense, brownish, apical fimbria on tergum 5.

MALE—Length 5 mm.; black; length of face slightly greater than distance between eyes above; lower end of eyes strongly divergent, clypeus much broader than long; cly-

peus, except for the narrow apical margins laterally, labrum, mandibles and small lateral maculae, yellow, the maculae not extending above upper margin of clypeus; cheeks broader than eyes; process of labrum subtriangular, slightly broader than long; facial foveae quite broad, deep and distinct, terminating slightly above level of antennae; vertex broad, lateral ocelli much nearer each other than to margin of vertex; median segments of flagellum much longer than broad; punctures of head fine but quite deep and distinct, close between antennae and ocelli, more widely separated but not sparse below antennae, considerably coarser on clypeus, more distinct and widely separated between eyes and ocelli, becoming shallow and obscure on vertex laterally and upper portion of cheeks, lower portion of cheeks shining and very obscurely punctate; pubescence of head and thorax very short, thin and obscure, entirely pale, hardly visible except at certain angles on dorsum of thorax; tubercles yellowish; tegulae yellowish-hyaline; wings subhyaline, veins testaceous to brownish, stigma rather dark brown, 2nd recurrent vein entering 2nd submarginal cell very close to apex, the 1st rather widely removed from base; tarsi and spurs yellow; femora dark except for yellow tips, front tibiae yellow anteriorly over basal two-thirds, dark posteriorly,

mid and hind tibiae largely dark with yellow base and apex; punctures of dorsum of thorax uniformly very fine and close, pleura more tessellate, but somewhat shining over anterior portion, with shallow and rather coarse, well separated punctures; apical margins of abdominal terga rather broadly and shallowly depressed, these areas very minutely and closely punctate, somewhat reddened, discs of terga very finely but quite distinctly punctate, the punctures close toward base, more sparse toward depressed margin of each tergum, discal pubescence extremely short, thin and obscure, entirely pale; sternum 6 with a deep, triangular, median emargination; wings of sternum 7 quite broad, semicircular, tips very slightly reflexed, bearing a small tuft of short setae; apical process of sternum 8 rather strongly flexed ventrally, quite narrow, tip bearing a tuft of short setae; gonostyli slightly flexed toward median line apically, apex acute, apical half bearing a strong and conspicuous fringe of long curved setae; penis valves simple, slender, not quite attaining tips of gonostyli.

DISTRIBUTION—Georgia to Maryland and West Virginia; May and June.

FLOWER RECORDS—*Ceanothus* and *Houstonia purpurea*.

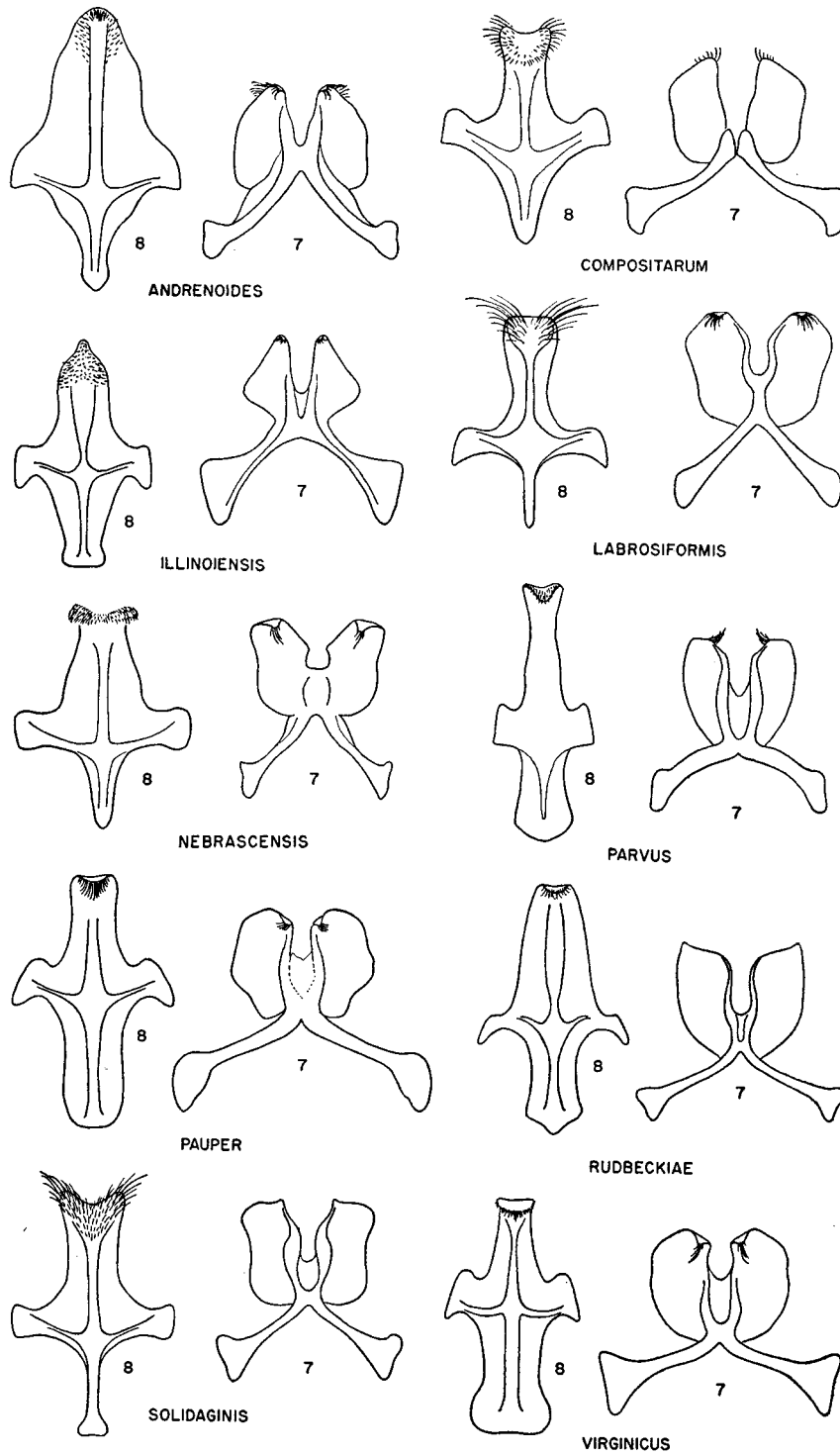


Figure 64—Sterna 7 and 8 in males of *Pseudopanurgus*.

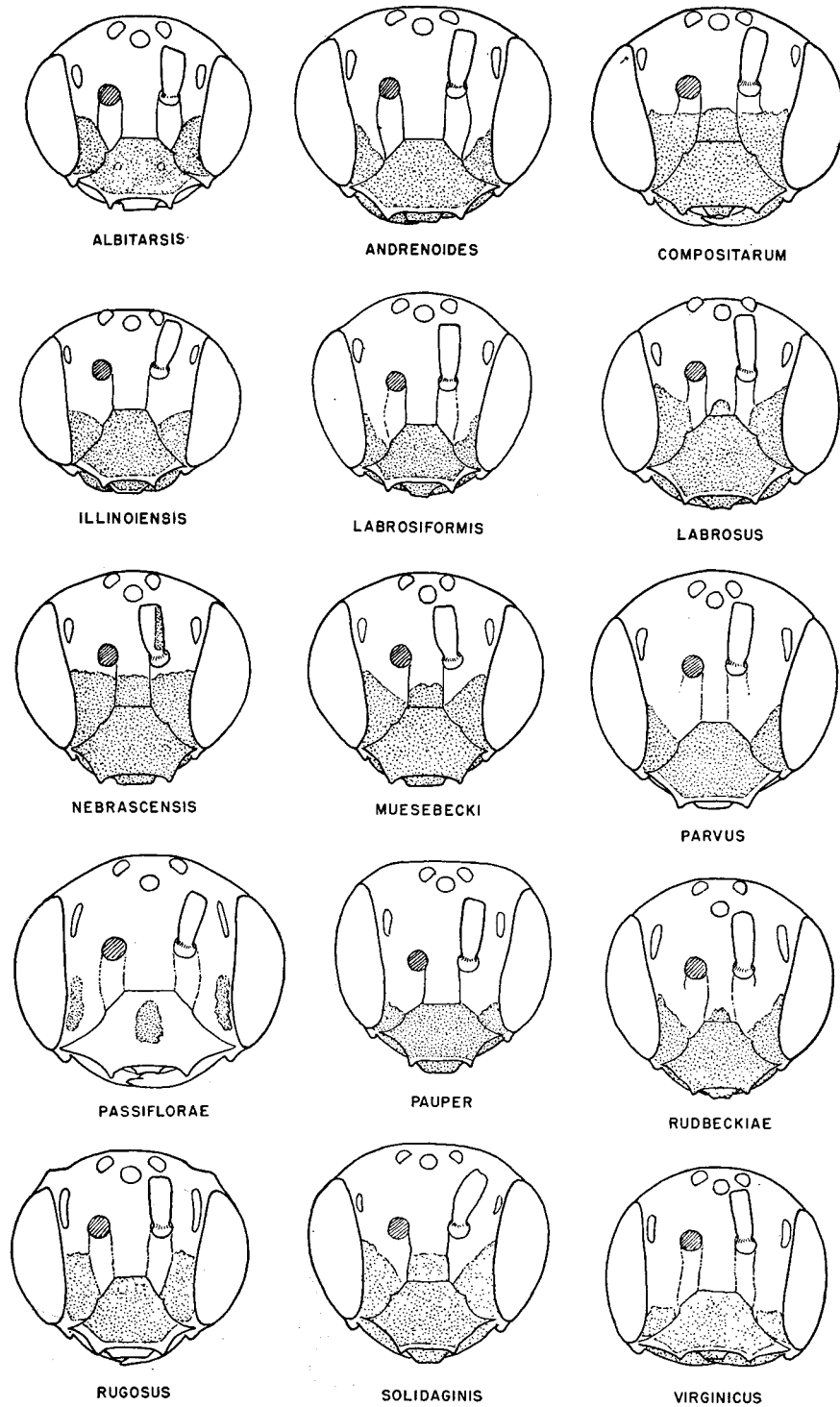


Figure 65— Facial view of head in males of *Pseudopanurgus*.

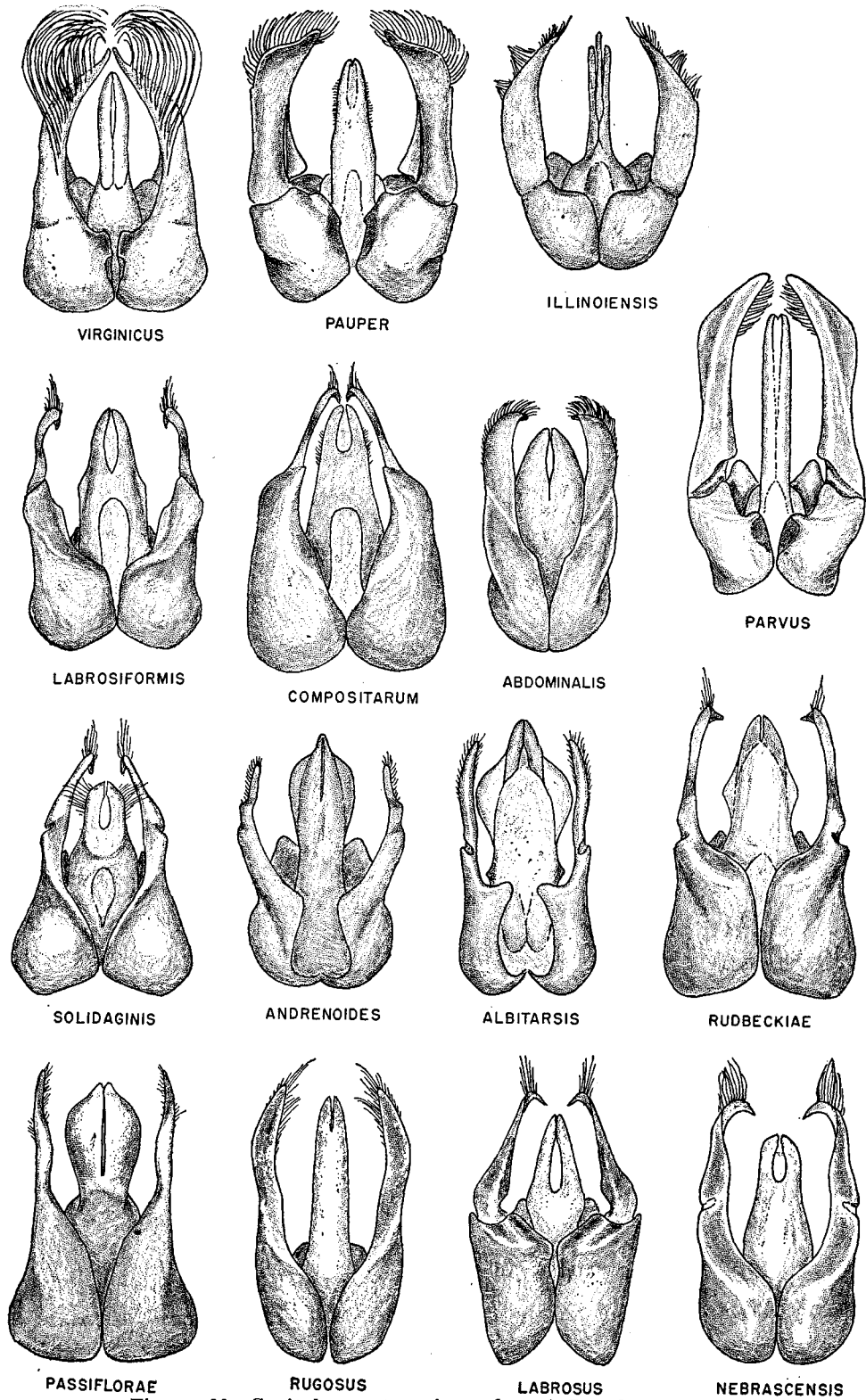


Figure 66—Genital armature in males of *Pseudopanurgus*.

Psaenythia Gerstaecker

(Fig. 58)

Psaenythia Gerstaecker, 1868. Arch. f. Naturgesch. 34, p. 111. Type: *Psaenythia philanthoides* Gerstaecker. Desig. by Sandhouse, 1943.

Protandrena Cockerell, 1896. Ann. Mag. Nat. Hist. (6) 18, p. 91. Type: *Andrena maurula* Cockerell. Desig. by Sandhouse, 1943.

Protandrena Cockerell, 1896. Canad. Ent. 28, p. 184.

Protoandrena Cresson, 1928. Amer. Ent. Soc. Mem. 5, p. 58. Emend.

Psaenythia Timberlake, 1955. Lab. Ent. gen. e agra. Boll. 33, pp. 398-409.

Species of *Psaenythia* are typical panurgids in their appearance, but differ from any of the other related genera in having three distinct submarginal cells, the second one being quadrate in form. It is of rare occurrence in the Eastern United States, being more neotropical in distribution, ranging northward chiefly into the western states. All of the nearctic species belong in the subgenus *Protandrena*.

Psaenythia (*Protandrena*) *mexicanorum* (Cockerell)

Figs. 67 & 68

Andrena mexicanorum Cockerell, 1896. Ann. Mag. Nat. Hist. (6) 18, p. 85. ♀.

Protandrena Cockerelli Dunning, 1897. Canad. Ent. 29, p. 47. ♀.

Protandrena cockerelli Cockerell, 1899. Ent. News 10, p. 3. ♂.

Psaenythia mexicanorum Timberlake, 1955. Lab. ent. gen. e agra. Boll. 33, pp. 399-401.

FEMALE—Length 11 mm.; black; facial maculae, tubercles, anterior spot on tegulae, and base of front tibiae yellow; face slightly longer than space between eyes; eyes subparallel; cheeks very slightly narrower than eyes; labrum black, about twice as broad as median length, process broadly truncate; facial foveae deep and distinct, much shorter than scape, acute below; vertex rounded, lateral ocelli slightly nearer its hind margin than to eyes; median segments of flagellum somewhat broader than long, basal and apical segments considerably longer, brownish beneath, piceous above; punctures of head deep and distinct, interspaces shining, rather shallow on maculated areas below antennae, coarser and more distinct on apical portion of clypeus, quite densely crowded around anterior ocellus, well separated but not sparse on vertex and

cheeks; pubescence of head and thorax very short and thin, entirely pale, more whitish below, somewhat yellowish above; wings subhyaline, veins and stigma yellowish to pale testaceous; 2nd submarginal cell shorter than 1st or 3rd, slightly narrowed anteriorly, receiving 1st recurrent vein toward apex; legs entirely black, with pale pubescence, hind tibial scopa rather elongate and dense, of simple hairs; spurs finely pectinate along posterior side, pale testaceous; thorax shining between deep and distinct punctures, these rather fine and close on scutum anteriorly, becoming more widely separated posteriorly, and somewhat coarser on scutellum, those on pleura very close below, becoming slightly less so above, propodeum quite densely short pubescent along line dividing posterior and lateral faces; abdominal terga entirely black, posterior margins rather widely and deeply depressed, these areas reddened and impunctate, discs with deep, distinct and rather coarse punctures, these more sparse and irregular on basal tergum, becoming somewhat closer on the more apical segments, tergum 5 with a rather dense, brownish, apical fimbria.

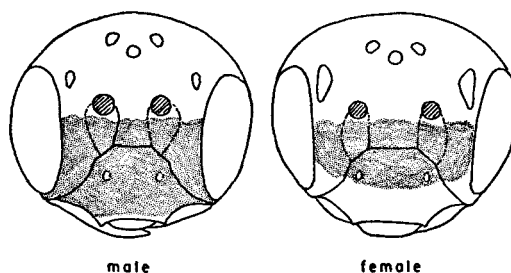


Figure 67
Facial view of head in male and female of *Psaenythia mexicanorum*.

MALE—Length 10 mm.; black; entire face below level of antennae, tubercles, spot on tegulae, front tibiae in large part, base of mid tibiae, front and mid tarsi and hind basitarsi, yellow; face somewhat longer than space between eyes above; eyes very slightly convergent below; cheeks subequal to eyes in width; vertex rounded, lateral ocelli nearer its hind margin than to eyes; labrum blackish, with a transverse, subtriangular process which is rather broadly truncate apically; mandibles dark in general, rather slender apically, with small, yellow, subbasal areas; facial foveae evident but very small and somewhat obscured by the surrounding puncturation; median segments of flagellum slightly longer than broad, basal and apical segments slightly longer, dull greyish-brown below, blackish above; head shining between deep and distinct punctures, these somewhat shallow but rather close on

lower half of face, those above antennae very close and rather fine but becoming more deep, distinct and less close on sides of face and ocelli, those on cheeks becoming finer and quite close below; pubescence of head and thorax very short, quite thin, entirely white; wings lightly infuscated, veins and stigma brownish to testaceous; pubescence of legs entirely whitish; spurs pale testaceous; surface of thorax shining between deep and distinct punctures, these well separated but hardly sparse on scutum, somewhat closer on scutellum, those on pleura above similar to those on scutum, becoming closer below; propodeum closely, deeply and distinctly punctate, dorsal triangle rather densely pubescent, obscuring the surface; abdominal terga shining, punctures deep and distinct, apical margins rather deeply and narrowly depressed, these areas impunctate, slightly reddened, punctures relatively sparse on the more basal terga, becoming quite close on the more apical terga, discal pubescence extremely short and thin, entirely pale; sternum 7 with a pair of apical, wing-like processes which are relatively narrow, truncate apically, with an apical fringe of short and rather stout setae; apical process of sternum 8 somewhat thickened, rounded, with some very short and inconspicuous pubescence; gonocoxites of genital armature with an inner, subapical, truncate process, gonostyli somewhat compressed, acute apically, inner surface with considerable seta-like pubescence, penis valves quite slender basally, tips somewhat enlarged and rounded, about equal in length to gonostyli, volsellae flattened and broadly rounded, without distinct cuspis and digitus.

Timberlake (1955) recognizes *cockerelli* as a subspecies of *mexicanorum*, and states that it has been recorded from New Jersey. The type locality of *mexicanorum* is Chihuahua, Mexico, and it has been recorded from Arizona, New Mexico, Texas and Colorado. *Cockerelli* was described from Kansas, and occurs also in Nebraska and Colorado, in addition to the New Jersey record. A female at hand, which answers to the description of *mexicanorum*, bears the following data: Newago Co., Michigan, May 13, 1956 (R. & K. Dreisbach). Another specimen at hand is a male bearing the following data: Marshall Co., Indiana, Aug. 9, 1954 (Montgomery No. 54B-69), on *Euphorbia corollata*. No characters separating the males of these two forms are given, but the females differ as follows:

Mexicanorum—Transfacial yellow band complete or nearly so, being in contact on each side with the inner margin of the eye; tubercles bright yellow; anterior half of tegulae yellow. The transfacial band includes the subantennal areas, the lower half of the su-

praeclypeal area, the upper half of the clypeus, and broad lateral facial maculae.

Cockerelli—Transfacial band incomplete, not reaching eye margins, the lateral facial maculae being smaller; tubercles dark; and tegulae not maculated.

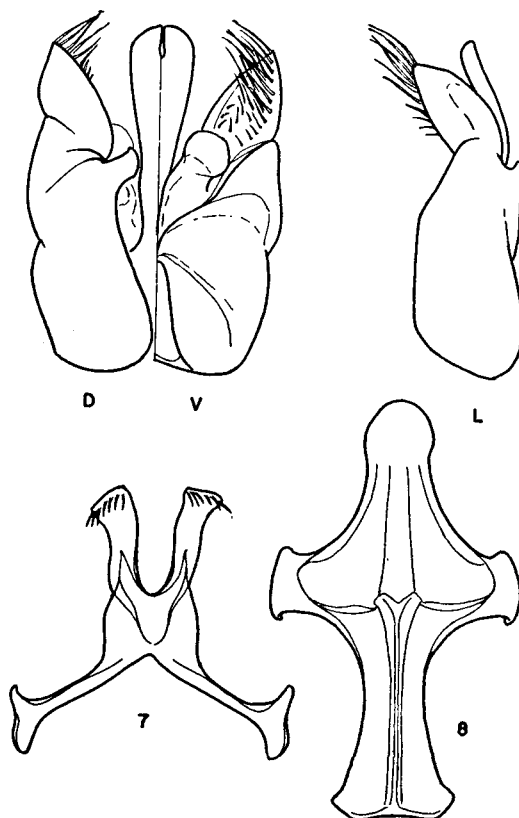


Figure 68
Dorsal (D), ventral (V) and lateral (L) aspects of genital armature, and sternum 7 and 8 in male of *Psaenythia mexicanorum*.

Calliopsis Smith

(Fig. 58)

Calliopsis Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 128. Type: *Calliopsis andreniformis* Smith
Calliopsis (verbenapis) Cockerell and Atkins, 1902. Ann. Mag. Nat. Hist. (7) 10, p. 44. Type: *Calliopsis verbenae* Cockerell and Porter.

Calliopsis is a genus of andrenid bees in which the front wings have but two submarginal cells and a very small stigma. In the females the face, and sometimes the pronotum, are variously ornamented with yellow or whitish maculae, while in the males the lower half of the face, at least, is wholly or in large part yellow or white.

These are ground nesting bees, and the biology of the three eastern species, *C. andreniformis*, *C. coloradensis*, and *C. nebraskensis* has been described.

KEY TO SPECIES

Females

1. Clypeus black laterally, with a median yellow stripe, rarely entirely black *andreniformis* Smith (p. 288)
Clypeus either yellow laterally or with some form of maculation other than a median stripe 2
2. Clypeus yellow laterally, the median third black; face without conspicuous lateral yellow maculae (?) *maculata* Smith (p. 293)
Clypeus to some degree maculated across median third; face with conspicuous lateral maculae 3
3. Yellow area of clypeus extending fully to lateral angles and contiguous with the large lateral maculae which reach the foveae; collar yellow *coloradensis* Cresson (p. 289)
Apical half of clypeus cream-colored medially, not reaching lateral margins and thus separated from the rather small lateral maculae which do not reach the foveae; collar black *nebraskensis* Crawford (p. 291)

Males

1. Supraclypeal and subantennal areas black *nebraskensis* Crawford (p. 291)
Entire face below level of antennae yellow 2
2. Clypeus relatively flat; lateral face marks elongate, triangular above, terminating in an acute angle on eye margin far above antennae *coloradensis* Cresson (p. 289)
Clypeus strongly protuberant; lateral face marks obliquely truncate or broadly rounded just above antennae *andreniformis* Smith (p. 288)

Calliopsis (Calliopsis) andreniformis Smith

(Figs. 69-71)

- Calliopsis andreniformis* Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 128. ♀.
Calliopsis flavipes Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 128. ♂.
Calliopsis lepidus Cresson, 1878. Amer. Ent. Soc. Trans. 7, p. 68. ♀. New synonymy.
Panurgus vernalis Provancher, 1882. Nat. Canad. 13, p. 204. ♀ ♂.

- Calliopsis andreniformis* Graenicher, 1905. Wis. Nat. Hist. Soc. Bul. 3, p. 159. (biology)
Calliopsis andreniformis Robertson, 1929. Flowers and Insects. Science Press. (flower records)
Calliopsis andreniformis Ainslee, 1937. Canad. Ent. 69, P. 97 (biology)
Calliopsis (Calliopsis) andreniformis Michener, 1953. Kans. Univ. Sci. Bul. 35, p. 1038. (larva)

FEMALE—Length 7 mm.; black; face considerably longer than distance between eyes; eyes subparallel; cheeks considerably narrower than eyes; a spot on supraclypeal area, a narrow, median line on clypeus, and lateral facial maculae yellow, the lateral maculae obliquely truncate above at level of antennae; process of labrum somewhat broader than long, apical margin broadly rounded; facial foveae quite distinct, slightly broadened toward lower end, but this abruptly narrowed, terminating slightly above level of antennae; space between margin of vertex and lateral ocelli subequal to distance between them; flagellum becoming pale ferruginous apically, median segments about as broad as long; face shining, punctures between antennae and ocelli close, deep and distinct, rather fine, becoming rather sparse, irregular and obscure on vertex laterally, minute and quite sparse on the shining cheeks, very sparse and obscure below antennae but quite coarse and deep on clypeus; pubescence of head and thorax rather long and copious but not hiding surface, dark on dorsum of thorax and vertex, pale on thorax laterally and beneath, on upper portion of face and cheeks, with a few coarse, erect, dark hairs on clypeus; tubercles and an interrupted marginal line on pronotum yellow; tegulae fuscous; wings subhyaline, veins and stigma brownish; 1st recurrent vein entering 2nd submarginal cell very slightly nearer base than 2nd does to apex; legs dark except for a small, basal, testaceous spot on front and mid tibiae; spurs ferruginous; dorsum of thorax shining, punctures of scutum very fine but deep and distinct, very close and exceedingly fine on scutum anteriorly, becoming slightly more widely separated and coarse posteriorly and on scutellum, pleura less shining, punctures rather coarse but shallow and rather sparse; apical margins of abdominal terga rather narrowly depressed, rather deeply so laterally, more or less hyaline, occupied by rather dense, pale, apical, pubescent fasciae these somewhat interrupted on the more basal segments, discs of the terga with very fine and close punctures, these becoming obscure on the more apical segments, discal pubescence very short, but rather dense, fuscous, longer and more erect on tergum 5 where a quite dense, fuscous, apical fimbria is formed.

MALE—Length 6 mm.; black; length of face subequal to distance between eyes above; eyes slightly convergent below; cheeks much narrower than eyes; labrum, mandibles, scape and entire face below a transverse line slightly above antennae, entirely yellow; process of labrum somewhat broader than long, apical margin broadly rounded; facial foveae narrow and somewhat elongate, quite obscure, terminated at margin of facial maculation; space between margin of vertex and lateral ocelli subequal to distance between them; flagellum largely yellow, median segments about as broad as long; puncturation of face between antennae and ocelli very close, minute and obscure, becoming very sparse and minute on vertex laterally, and on the shining cheeks where they are somewhat closer, those on maculated areas hardly evident; pubescence of head and thorax rather long and erect, somewhat dense, yellowish in large part; tubercles and an interrupted marginal line on pronotum yellow; tegulae fuscous, with an anterior yellow spot; wings subhyaline, somewhat clouded apically, strongly violaceous, veins and stigma brownish, 1st recurrent vein entering 2nd submarginal cell slightly nearer base than 2nd does to apex; legs, including even coxae and spurs, entirely yellow; dorsum of thorax shining, quite deeply and distinctly but very closely punctate, punctures on scutum anteriorly becoming minute and crowded, pleura somewhat shining, punctures very fine and quite sparse; apical margins of abdominal terga rather broadly depressed, quite deeply so laterally, with thin, whitish, apical, pubescent fasciae, these slightly interrupted on the more basal segments, discs of terga very closely and finely but quite distinctly punctate, punctures becoming more minute, close and obscure on the more apical segments, discal pubescence very short and rather dense, fuscous, not at all hiding surface; sternum 5 produced medially into an elongate, spine-like process which bears a tuft of short setae at tip; apical margin of sternum 6 produced into a pair of elongate, widely separated and compressed spine-like processes which are acute apically; sternum 7 subtriangular medially, with a bilobed process on each side at base; apical portion of sternum 8 broadly dilated, but this portion about twice as long as broad, subparallel laterally, apex very slightly incurved and rather densely pubescent beneath; gonocoxites subtriangular, rather narrowly rounded apically, penis valves very broad, prolonged medially into a sharply pointed tip with a narrow lateral process; gonostyli inevident.

DISTRIBUTION—Generally distributed over the entire Eastern United States and

Southern Canada, ranging west to Texas, Colorado and North Dakota; April to September.

FLOWER RECORDS—This species is a common visitor to a wide range of host plants which include *Asclepias*, *Castanea*, *Ceanothus*, *Chrysanthemum*, *Coreopsis*, *Eriogonon*, *Oenothera*, *Oxalis*, *Pentstemon*, *Rubus* and *Trifolium*. Roberston (1929) records it from the following additional genera: *Ammannia*, *Amorpha*, *Aster*, *Bidens*, *Blephilia*, *Cryptotaenia*, *Desmodium*, *Dianthera*, *Eryngium*, *Gerardia*, *Geum*, *Gillenia*, *Hedeoma*, *Houstonia*, *Iysanthes*, *Lespedeza*, *Lippia*, *Lycopus*, *Lythrum*, *Malva*, *Melilotus*, *Nepeta*, *Polygala*, *Polygonum*, *Portulaca*, *Potentilla*, *Prunella*, *Psoralea*, *Pycnanthemum*, *Rudbeckia*, *Spiranthes*, *Stachys*, *Strophostyles*, *Stylosanthes*, *Verbena* and *Verbesina*.

Calliopsis (Calliopsis) coloradensis
Cresson

(Figs. 69-71)

- Calliopsis coloradensis* Cresson, 1878. Amer. Ent. Soc. Trans. 7, p. 63. ♀ ♂.
Calliopsis coloradensis Cockerell, 1908. Canad. Ent. 40, p. 147. ♂.
Calliopsis coloratipes fedorensis Cockerell, 1909. Ann. Mag. Nat. His. (8) 4, p. 28. ♀.
Calliopsis coloradensis Hicks, 1926. Colo. Univ. Studies 15, p. 223. (biology)
Calliopsis coloradensis Robertson, 1929. Flowers and Insects. Science Press. (flower records)

FEMALE—Length 7 mm.; black; length of face slightly less than distance between eyes above; eyes subparallel; cheeks slightly narrower than eyes; supraclypeal area, triangular lateral maculae and much of clypeus yellow, a pair of dark blotches on each side of clypeus sometimes merging along apical margin, process of labrum dark, apical margin sometimes yellow, the lateral maculae extending narrowly up eye margin much above level of antennae; process of labrum about twice as broad as long, broadly rounded apically; facial foveae deep and distinct, extending slightly below upper point of facial maculae; space between margin of vertex and lateral ocelli slightly less than distance between them; flagellum ferruginous beneath, median segments slightly broader than long; surface of head shining between deep, distinct punctures, these fine and close between antennae and ocelli, becoming slightly finer and more irregular on vertex laterally, more sparse on cheeks, slightly more coarse and deep below antennae, but obscure on maculated areas;

pubescence of head and thorax short but rather dense, somewhat longer on vertex and cheeks, entirely pale, somewhat yellowish on vertex and dorsum of thorax; tubercles reddened; posterior margin of pronotum yellow except for a short median interruption; tegulae yellowish-hyaline, with a small but distinct, yellow, anterior spot; wings subhyaline, rather strongly violaceous, veins and stigma testaceous; 2nd recurrent vein entering 2nd submarginal cell about twice as near apex as 1st does to base; legs piceous, front and mid tibiae with a conspicuous basal yellow spot; spurs yellow; scutum rather dull due to the fine and deep but very close puncturation, this becoming somewhat more sparse on each side of middle of scutellum which is slightly grooved medially, the groove being densely and finely rugoso-punctate; pleura shining, with coarse, deep, well separated punctures; apical margins of abdominal terga depressed, rather deeply so laterally, these areas yellowish-hyaline, microscopically and closely punctate but somewhat shining, discs of terga deeply, closely and finely punctate, those on basal segments slightly more coarse; 2nd and following segments with rather dense, apical, whitish, pubescent fasciae which are more or less interrupted medially on the more basal segments, discal pubescence very short and obscure, but quite dense, fuscous, tergum 5 with a quite dense, pale brownish, apical fimbria.

MALE—Length 7 mm.; black; face slightly shorter than distance between eyes above; eyes slightly convergent below; cheeks much narrower than eyes; entire face below level of antennae, including labrum and mandibles, yellow, lateral maculae extending narrowly up eye margin, much above level of antennae, and scape with an elongate yellow macula anteriorly; process of labrum much broader than long, rounded apically; facial foveae quite shallow and obscure but rather distinct, terminating near the acute upper tip of facial maculae; space between margin of vertex and lateral ocelli much less than distance between them, only slightly exceeding their diameter; flagellum yellowish beneath, median segments slightly broader than long; face shining, punctures above antennae deep and distinct, close and rather fine, becoming rather minute, irregular and obscure on vertex laterally, very fine and quite sparse on shining cheeks, punctures of maculated areas rather sparse and irregular, quite obscure; pubescence of head and thorax rather long and erect, quite dense but not hiding surface, whitish laterally and beneath but becoming brownish or fuscous on vertex and dorsum of thorax; tubercles slightly reddened; posterior margin of pronotum yellow, this slightly interrupted medially; teg-

ulae yellowish-hyaline, with a small, obscure, yellowish, anterior spot; wings subhyaline, rather strongly violaceous, veins and stigma brownish, 2nd recurrent vein entering 2nd submarginal cell slightly nearer apex than 1st does to base; tibiae, tarsi and spurs entirely yellow, femora largely dark but with yellow apex, the yellow on front femora extending about half way up anterior face; punctures of scutum and scutellum deep and distinct, rather coarse but close, pleura more coarsely and deeply punctate, punctures well separated, intervening spaces shining; apical margins of abdominal terga rather broadly and evenly depressed, these areas microscopically, closely punctate, somewhat shining, becoming narrowly hyaline along rims, discs of terga deeply, distinctly and closely punctate, rather coarsely so on basal tergum but becoming fine on the more apical segments; abdominal terga with whitish apical pubescent fasciae, these rather broadly interrupted medially, discal pubescence very short, but quite dense, fuscous; sternum 5 with an elongate, median, apical protuberance which is paralleled and rather abruptly truncate apically, with a double tuft of very short, inconspicuous setae; sternum 6 with a rather broad, median, apical emargination, the two lateral angles thus formed, produced and slightly recurved, bearing a tuft of short setae, a rather deep emargination separating this area from the lateral areas; sternum 7 produced medially into a pair of acuminate lobes which are obscurely divided medially toward apex, these separated from lateral portions of base by a slender pedestal; sternum 8 very much elongated, the slightly broader basal half, abruptly narrowed to form a slender pedestal bearing a spatulate apical projection which is rather densely pubescent; penis valves much elongated, slender, abruptly flexed at tip; gonostyli apparently represented by a pair of broad, apically rounded lobes at base of penis valves; gonocoxites produced apically beneath to form a subacute lobe opposed to the gonostyli.

DISTRIBUTION—This is primarily western in its range, but extends eastward to Illinois, in the north, and through Louisiana and Georgia to North Carolina in the South. It is in flight from May until October.

FLOWER RECORDS—Collected on *Aster* and *Haplopappus* in North Carolina. Robertson records it on *Bidens aristosa*, *Boltonia asteroides*, *Coreopsis tripteris*, *Rudbeckia triloba* and *Solidago canadensis*.

Calliopsis (Verbenapis) nebraskensis
Crawford

(Figs. 69-71)

- Calliopsis verbenae* *Nebraskensis* Crawford, 1902. *Canad. Ent.* 34, p. 240. ♀ ♂.
Verbenapis verbenae Robertson, 1914. *Ent. News* 25, p. 72. (biology)
Calliopsis nebraskensis Rau and Rau, 1916. *Jour. Anim. Behavior* 6, p. 368. (biology)
Verbenapis verbenae Robertson, 1922. *Psyche* 29, p. 171. (biology)
Calliopsis nebraskensis Rau, 1922. *Acad. Sci. St. Louis, Trans.* 24 (7), p. 33. (biology)
Verbenapis verbenae Robertson, 1929. *Flowers and Insects*. Lancaster, Pa., Science Press. (flower records)

FEMALE—Length 8 mm.; black; face slightly shorter than distance between eyes above; eyes subparallel; cheeks slightly narrower than eyes; lower half of clypeus, an apical spot on process of labrum, basal spots on mandibles, and small lateral facial maculae creamy yellow, the spot on clypeus interrupted above by the intrusion of black medially, lateral maculae not extending above upper margin of clypeus; process of labrum somewhat broader than long, rounded apically; facial foveae very shallow and obscure, rather broad, terminated slightly above level of antennae; space between margin of vertex and lateral ocelli about half the distance between them; flagellum obscurely reddened beneath, median segments about as broad as long; face shining, area between ocelli and antennae doubly punctate, the fine punctures exceedingly minute and quite close, with much coarser, more shallow and sparse punctures superimposed upon this field, cheeks and area between eyes and ocelli shining and almost impunctate, punctures below antennae somewhat more coarse and deep, well separated on black areas, very sparse and obscure on maculated areas; pubescence of head and thorax rather dense but not hiding surface, elongate on vertex and dorsum of thorax, where it is mostly yellow, becoming more whitish below; tubercles and tegulae dark; wings subhyaline, quite strongly violaceous, veins and stigma brownish-testaceous; recurrent veins entering 2nd submarginal cell subequally distant from base and apex; legs dark, but front tibiae with a small, basal, yellow spot, spurs testaceous; dorsum of thorax shining, punctures of scutum quite deep and distinct, rather close anteriorly, becoming very sparse posteriorly and on scutellum, pleura shining, with coarse, deep, distinct, well separated punctures; apical margins of abdominal terga rather evenly depressed, these areas becoming yellowish-hyaline toward rims, very minutely and rather

sparsely punctate, discs of terga shining, that of the 1st almost impunctate, but 2nd and following terga rather closely, deeply and distinctly, although finely, punctate; apical margins of abdominal terga with rather obscure, whitish, apical fasciae, interrupted to some degree medially on the more basal segments, discal pubescence very short, thin and obscure, more fuscous, tergum 5 with a quite pronounced, apical, brownish fimbria.

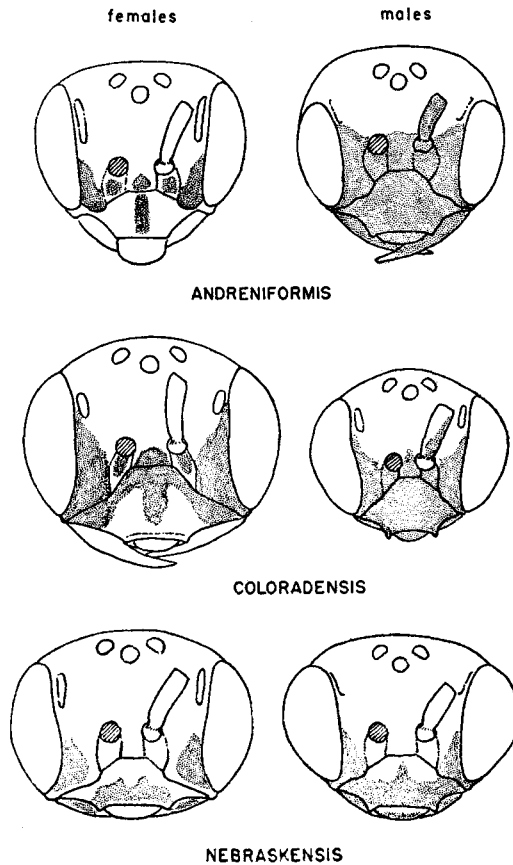


Figure 69
Facial view of head in males and females of *Calliopsis*.

MALE—Length 7 mm.; black; length of face slightly shorter than distance between eyes above; eyes somewhat convergent below; cheeks much narrower than eyes; clypeus except the very narrow upper border, apical half of process of labrum, base of mandibles, and lateral facial maculae yellow, the maculae extending up inner margin of eye slightly beyond level of antennae, acute above; process of labrum considerably broader than long, broadly rounded apically; facial foveae very shallow and obscure, barely visible; space between margin of vertex and lateral ocelli very slightly less than distance between them; flagellum

dull reddish, median segments nearly as broad as long; space between antennae and ocelli dull, punctures very fine and close, subrugose, becoming rather sparse and irregular between eyes and ocelli, minute and well separated on the shining cheeks, blackened areas below antennae quite closely, finely and deeply punctate, the punctures becoming quite coarse but rather obscure on clypeus, the lateral maculae finely but obscurely punctate; pubescence of head and thorax yellowish above, more whitish below, rather long and dense but not hiding surface; tubercles and tegulae dark; wings subhyaline, rather strongly violaceous, veins and stigma brownish-testaceous; recurrent veins entering 2nd submarginal cell subequally distant from base and apex; tarsi dull testaceous, spurs yellowish, legs otherwise dark except for a yellow anterior stripe on front tibiae, and basal yellow spots on front and mid tibiae; dorsum of thorax shining, punctures deep and distinct, rather coarse, quite close on scutum anteriorly, becoming very sparse in center posteriorly and on scutellum, pleura shining, with deep, coarse, well separated punctures; apical margins of abdominal terga rather broadly depressed, these areas becoming reddish-hyaline along rims, rather smooth, with only microscopic punctures, discs of the terga shining, with rather deep and distinct but fine punctures, these well separated on basal tergum but close on the others; apical margins of abdominal terga with thin, obscure, pale yellowish, apical fasciae, the discal pubescence very short but very dense, not at all hiding the surface, brownish in color; sternum 6 broadly incurved apically, the median portion of this produced into a bilobed process, each lobe bearing a small pencil of short, fine setae; sternum 7 strongly, transversely bowed, the apical margin medially produced into a bilobed process, the 2 lobes rather slender, narrowly rounded apically, separated by a deep emargination, the outer margins fringed with very short, inconspicuous setae; apical process of sternum 8 originating at center of broad basal part, very slender toward base, gradually expanded toward tip which is prolonged into an acute projection; penis valves robust, strongly compressed, the tips abruptly flexed ventrally, completely bare; gonocoxites forming a broad basal shield, the outer angle of which is slightly produced, gonostyli entirely invident.

DISTRIBUTION—Colorado and North Dakota, east to Illinois, Wisconsin and Michigan, June to August.

FLOWER RECORDS—Robertson (1922 & 1929) records this on three species of *Verbena*, *V. hastata*, *V. stricta* and *V. urticaefolia*.

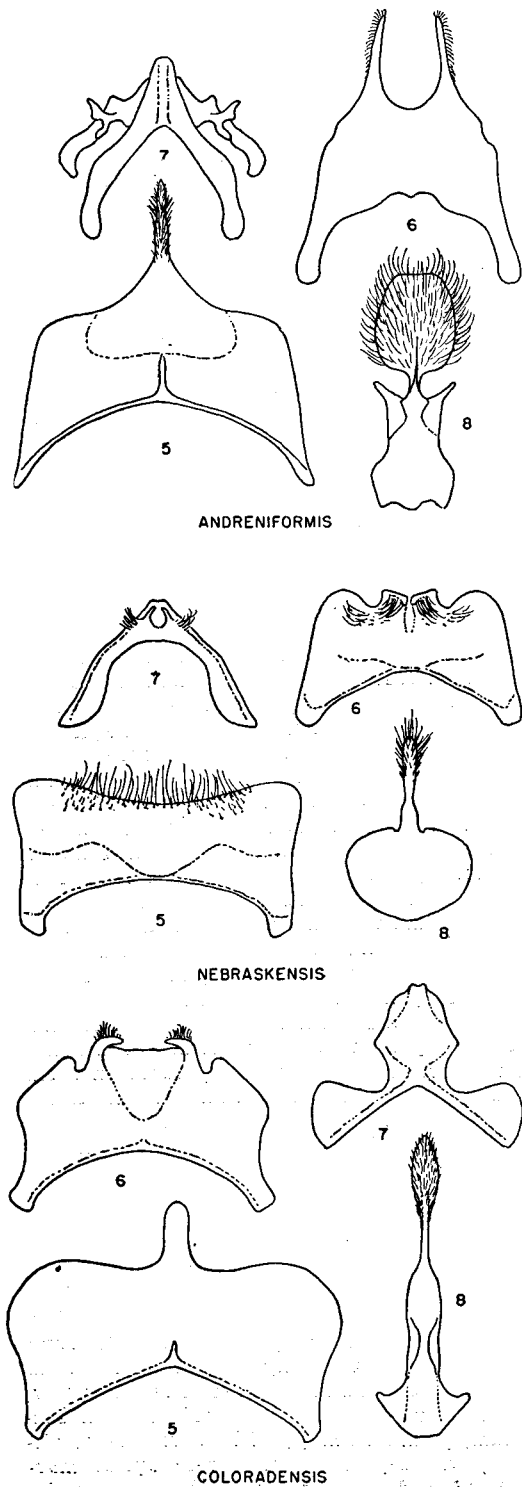


Figure 70
Sterna 5-8 in males of *Calliopsis*.

***Calliopsis (?) maculata* Smith**

Calliopsis maculatus Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 129. ♀.

Calliopsis maculatus Cockerell, 1905. Amer. Ent. Soc. Trans. 31, p. 321. ♀.

The following description was made from the type specimen at the British Museum. No other specimens have been seen.

FEMALE—Length 9 mm.; black, with yellow maculae as follows: each side of clypeus, dividing it about equally into thirds, the middle third black, supraclypeal area and adjacent areas between the two antennal sutures, a very narrow line adjacent to upper margin of clypeus on each side, base of mandible, a small spot at base of each front and mid tibia; head broader than long; cheeks about equal to eyes in width, surface of face and cheeks shining, punctures exceedingly minute, hardly visible; median dark portion of clypeus with deep, distinct and rather close punctures; facial foveae shallow, rather broad medially, narrowed almost to an acute angle above and below; thorax shining; punctures of scutum and scutellum very fine but close, deep and distinct; thoracic pubescence copious but rather short, whitish; dorsal area of propodeum very narrow, polished; abdominal terga shining, punctures minute but close, apical margins broadly depressed, yellowish-hyaline, with broad, medially interrupted, white fasciae, discal pubescence thin, suberect, dark in part.

No specimens other than the type are known of this species. It has been examined by Padre J. S. Moure, at the request of A. F. Shinn, and they are of the opinion that it is a South American species, probably in the genus *Acamptopoeum*. Possibly it was mislabelled, and thus both its identity and distribution are in doubt.

***Calliopsis flavifrons* Smith**

Calliopsis flavifrons Smith, 1853. Cat. Hym. Brit. Mus. 1, p. 129. ♂.

Calliopsis flavifrons Cockerell, 1905. Amer. Ent. Soc. Trans. 31, p. 321. ♀.

The type of this species could not be found in the British Museum, nor is it among the Smith types at the Hope Museum in Oxford. The description is of the male, and it agrees in all the characters

mentioned with the male of *C. coloradensis* Cresson. Cockerell (1905) found a female in the British Museum collection bearing a *flavifrons* type label, but the difference in sex, and the fact that his description bears very little resemblance to that of Smith, indicates that two different specimens were involved. Cockerell's description seems to agree with the female of *andreniformis*, and it may be that a specimen of that species erroneously received the *flavifrons* label, and the true type of *flavifrons* was lost. Cockerell does not mention *andreniformis* in his paper (1905), but the close agreement of his description with that species suggests the possibility that it was that type which he had before him.

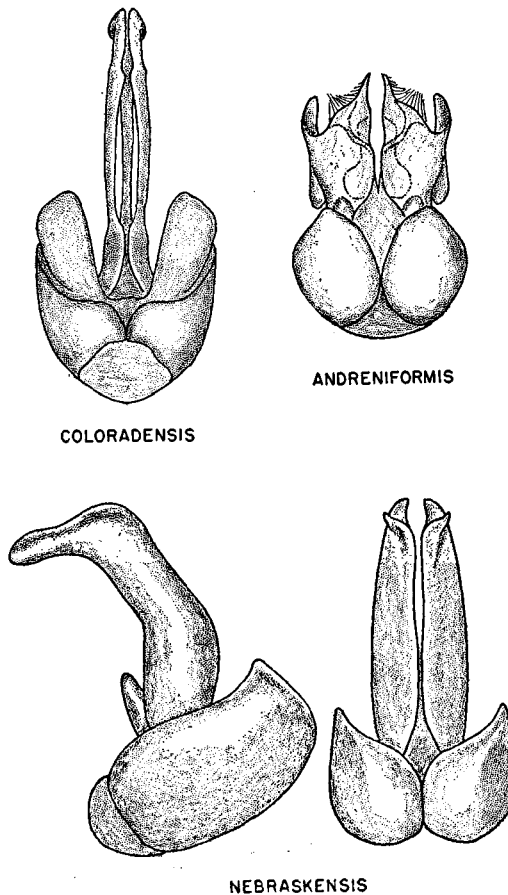


Figure 71
Genital armature in males of *Calliopsis*.

Perdita Smith

(Fig. 58)

- Perdita* Smith, 1853. Cat. Hym. Brit. Mus., 1, p. 128. Type: *Perdita halictoides* Smith. Monob.
- Macrotera* Smith, 1853. Cat. Hym. Brit. Mus., 1, p. 130. Type: *Macrotera bicolor* Smith. Monob.
- Perdita* Cockerell, 1896. Acad. Nat. Sci. Phila. Proc. 48, pp. 25-107. (revision)
- Cockerellia* Ashmead, 1898. Psyche 8, p. 284. Type: (*Perdita hyalina* Cresson) = *Perdita albipennis hyalina* Cresson. Monob. and orig. desig.
- Philoxanthus* Ashmead, 1898. Psyche 8, p. 25. Type: *Perdita heata* Cockerell. Monob. and orig. desig.
- Macroteropsis* Ashmead, 1899. Amer. Ent. Soc. Trans. 26, p. 85. Type: *Perdita latior* Cockerell. Monob. and orig. desig.
- Neoperdita* Ashmead, 1899. Amer. Ent. Soc. Trans. 26, p. 85. Type: *Perdita zebra* Cresson. Monob. and orig. desig.
- Perdita* subg. *Pentaperdita* Cockerell and Porter, 1899. Ann. Mag. Nat. Hist. (7) 4, p. 415. Type: *Perdita albivittata* Cockerell. Monob.
- Perdita* subg. *Tetraperdita* Cockerell and Porter, 1899. Ann. Mag. Nat. Hist. (7) 4, p. 415. Type: *Perdita sexmaculata* Cockerell. Monob. and orig. desig.
- Perdita* subg. *Geoperdita* Cockerell and Porter, 1899. Ann. Mag. Nat. Hist. (7) 4, p. 415. Type: *Perdita chamaesarachae* Cockerell. Monob.
- Perdita* subg. *Perditella* Cockerell, 1899. Psyche 8, p. 312. Type: (*Perdita laneae* Cockerell) = *Perdita larreae* Cockerell. Orig. desig.
- Glossoperdita* Cockerell, 1916. Pomona Jour. Ent. Zool. 8, p. 43. Type: *Glossoperdita pelargoides* Cockerell. Monob.
- Perdita* subg. *Alloperdita* Viereck, 1917. Amer. Mus. Nat. Hist. Bul. 37, p. 241. Type: *Perdita novae-angliae* Viereck. Monob.
- Zaperdita* Robertson, 1918. Ent. News 29, p. 91. Type: *Perdita maura* Cockerell. Monob. and orig. desig.
- Perdita* Cockerell, 1922. Amer. Mus. Novitates 33, p. 14. (partial key)
- Perdita* subg. *Lutziella* Cockerell, 1922. Amer. Mus. Novitates 47, p. 1. Preocc. Type: *Perdita (Lutziella) opuntiae* Cockerell. Monob. and orig. desig.
- Xerophasma* Cockerell, 1923. Amer. Mus. Novitates 66, p. 1. Type: (*Xerophasma bequaerti* Cockerell) = *Perdita bequaertiana* Cockerell. Monob. and orig. desig.
- Perdita* subg. *Cockerellula* Strand, 1932. Folia Zool. Hydrobiol. Riga 4, p. 196. N. name for *Lutziella*.
- Perdita* Timberlake, 1947. Ent. Soc. Wash. Proc. 49, p. 83. (partial key)
- Perdita* Timberlake, 1952. Ent. Soc. Wash. Proc. 54, p. 204. (list of eastern species)
- Perdita* subg. *Cockerellia* Timberlake, 1953. Univ. Kans. Sci. Bul. 35, p. 971. (key to species)
- Perdita* Timberlake, 1954. Ent. News 65, p. 15. (partial key)
- Perdita* Timberlake, 1954. Univ. Calif. Pub. Ent. 9, pp. 345-432. (Revision—part 1)
- Perdita* Timberlake, 1956. Univ. Calif. Pub. Ent. 11, pp. 247-350. (revision—part 2)
- Perdita* Timberlake, 1958. Univ. Calif. Pub. Ent. 14, pp. 303-398. (revision—part 3)

The marginal cell of the front wing in *Perdita* is very short, little if any longer than the stigma, and is abruptly truncate apically. Usually there are but two submarginal cells, but in the subgenus *Alloperdita*, the vein separating the two cells is more or less forked, forming a small, triangular, intercalary cell. In size, these bees are quite small, from 4 to 8 mm. They are colorful, usually greenish or bluish, with yellowish, ferruginous or whitish maculations. In some species the entire abdomen, or even the entire body, is bright testaceous.

This group is associated with a xerophytic type of vegetation, and species are much more numerous in the West, while in the East they occur chiefly in the sandy Coastal Plain areas of the South. Only one species is recorded from Eastern Canada, and two from New England. Sixteen species, however, have been recorded from Florida and fourteen from North Carolina. They are quite numerous in the Midwestern States, also, and it seems probable that sand dunes along the lakes and sandy stretches along the rivers are the chief habitat.

Dr. P. H. Timberlake of Riverside, California is the recognized authority on this group of bees, and he is at present (1958) writing a revision of the nearctic species. Consequently most of the collections made in the East have been sent to him for determination, and he has described all of the new species discovered. Two recently discovered eastern species are described by him in the following pages (pp. 324-328).

KEY TO SPECIES

Females

1. Apical third of mandible flexed nearly at a right angle to the basal portion (*Cockerellia*) 2
Mandible not flexed as above 4
2. Wings pale fuliginous or subhyaline, veins and stigma brownish or testaceous 3
Wings paler, whitish or milky, veins and stigma yellowish or nearly colorless ..
.. *albipennis pallidipennis* Graenicher (p. 302)
3. Wings faintly dusky, radial vein almost piceous; median, triangular, yellow area of clypeus merging with yellow lateral areas, apical half of clypeus being largely yellow
bequaerti bequaerti Viereck (p. 300)
Wings more nearly hyaline, veins and stigma more yellowish; clypeus with a narrow median yellow line or stripe, this usually separated from the lateral yellow areas
..... *bequaerti indianensis* Cockerell (p. 302)
- 4(1). Hind tibial scopa composed of copious and closely set, fine hairs (*Hexaperdita*) 5
Scopa composed of long, robust, widely spaced, seta-like hairs 13
5. Abdomen entirely dark, without pale maculations, or with at most a single pair of widely separated and very small spots on tergum 2 6
Abdomen usually with whitish or yellowish transverse spots or bands 9
6. Dorsum of thorax rather densely covered with short, erect, plumose, ochraceous pubescence; facial maculae extending narrowly up eye margin to level of antennae *georgica* Timberlake (p. 307)
Pubescence of dorsum of thorax less dense and more whitish; facial maculae not reaching above upper margin of clypeus 7
7. Wings hyaline or nearly so, veins brownish-testaceous 8
Wings milky-white, veins and stigma nearly colorless
..... *nubila* Timberlake (p. 309)
8. Clypeus entirely yellow; mandibles and labrum mostly yellow; facial maculae largely filling space between clypeus and eyes .. *bishoppi* Cockerell (p. 303)
Clypeus dark in part; mandibles and labrum dark; facial maculae small, not nearly filling space between clypeus and eyes
..... *boltoniae chrysopsina* Timberlake (p. 305)
- 9(5). Abdominal terga 2-4 with conspicuous, lateral, transverse, yellow maculae, those on 2 only slightly separated medially *graenicheri* Timberlake (p. 308)
Abdominal maculations limited to terga 2 and 3, and either very narrow and inconspicuous, or widely separated.. 10
10. Lateral facial maculae extending narrowly along eye margin to level of antennae; clypeus with dorso-lateral dark areas 11
Facial maculae whitish, reduced, not extending above upper margin of clypeus; clypeus usually entirely whitish .. 12
11. Wings milky-white, stigma very pale yellow, and veins nearly colorless
..... *foveata* Timberlake (p. 307)
Wings hyaline, veins relatively dark, brownish or testaceous
..... *blatchleyi* Timberlake (p. 304)
- 12(10). Clypeus narrower and more protuberant, its median length about equal to width of its apical margin
..... *bishoppi* Cockerell (p. 303)
Clypeus broader and less protuberant, its width at apical margin considerably exceeding its median length
..... *boltoniae boltoniae* Robertson (p. 304)
- 13(4). First intercubital vein usually branched toward base, forming a small intercalary cell (*Alloperdita*) 14
First intercubital vein simple (*Perdita*) 18
- 14(12). Abdominal terga entirely dark, without pale maculations
..... *mitchelli* Timberlake (p. 314)
Abdominal terga with conspicuous, transverse, yellowish maculae 15
15. Length of face slightly less than distance between outer margin of eyes 16
Length of face somewhat exceeding distance between outer margin of eyes 17
16. Clypeus with a broad, median, yellow stripe, sometimes entirely yellow; pronotum with a pair of yellow maculae; glossa and maxillae very short
..... *bradleyi* Viereck (p. 310)

- Clypeus either entirely dark or with a very narrow, median, yellow line; pronotum without maculae; glossa and maxillae elongate .. *obscurata* Cresson (p. 313)
- 17(15). Face narrow and more elongate, length much greater than distance between eyes; lateral facial maculae small, not extending above upper margin of clypeus; pronotum not maculated *novae-angliae* Viereck (p. 312)
- Face somewhat broader; lateral facial maculae extending narrowly along eye margin nearly to level of antennae; pronotum with a pair of yellow maculae *floridensis* Timberlake (p. 311)
- 18(13). Head and thorax ferruginous or testaceous in large part 19
- Head and thorax largely dark, usually with more or less conspicuous yellowish maculae 21
19. Distance between antennae subequal to that between each antenna and the eye; wings whitish, veins and stigma pale yellow *perpallida citrinella* Graenicher (p. 322)
- Antennae much nearer each other than to eyes; wings hyaline, veins more testaceous; stigma yellow, margined with testaceous 20
20. Face with only a small greenish maculation above each antennae; greenish area of thorax confined to sternum *gerhardi gerhardi* Viereck (p. 317)
- Greenish facial maculae more extensive, and ocelli united by a greenish band; scutum with lateral darkened areas *gerhardi arenicola* Timberlake (p. 318)
- 21(18). Entire abdomen pale testaceous *polygonellae* Timberlake (p. 323)
- Abdomen dark at least in part 22
22. Abdominal maculations very small and inconspicuous or entirely lacking, if present, limited to terga 2 or 3 .. 23
- Abdominal terga 2-4 with distinct yellowish or whitish, lateral maculations .. 26
23. Face, including clypeus, entirely dark 24
- Clypeus more or less extensively cream-colored 25
24. Clypeus protuberant, nearly as long as broad; mandibles bright yellow *halictoides* Smith (p. 318)
- Clypeus only slightly protuberant, length much less than breadth; mandibles rufo-testaceous *drymariae* Timberlake (p. 324)
- 25(23). Small (4 mm.); clypeus entirely whitish; lateral facial maculae very small and inconspicuous, or lacking *nubila* Timberlake (p. 309)
- Large (7 mm.); clypeus whitish in large part, dark along upper margin; lateral facial maculae broad but very small *gerardiae* Crawford (p. 317)
- 26(22). Stigma broad and very short, brownish-piceous, resulting in a conspicuous spot on anterior margin of wing 27
- Stigma normal in form, not conspicuously spotted 28
27. Scutum entirely greenish, not maculated *maculigera maculipennis* Graenicher (p. 320)
- Scutum with a pair of longitudinal, narrow, yellow lines, each one dilated at posterior end to form an L-shaped mark on left and a reversed form on right *maculigera bilineata* Timberlake (p. 321)
- 28(26). Supraclypeal and subantennal areas entirely yellow, and yellow facial maculae extensive, entirely filling lateral area of face below level of antennae .. *gerhardi monardae* Viereck (p. 318)
- Facial maculae not so extensive; subantennal areas dark 29
29. Thorax entirely lacking maculae, but front tibiae with an anterior yellow stripe 30
- Tubercles and a pair of spots on pronotal collar bright yellow 31
30. Scutum polished, punctures very minute and rather sparse .. *bradleyi* Viereck (p. 310)
- Scutum densely tessellate *discreta* Timberlake (p. 316)
- 31(29). Fifth abdominal tergum without maculae, and scape entirely dark *octomaculata* (Say) (p. 321)
- Fifth abdominal tergum conspicuously maculated, and scape yellow anteriorly 32
32. Scutum less densely tessellate, with sparse, shallow punctures evident; abdominal maculae forming almost com-

- plete bands, being only very slightly interrupted medially, if at all
 *swenki* Crawford (p. 324)
- Scutum very densely tessellate, punctures fine and close, visible only at certain angles; abdominal maculae on terga 2 and 3 rather widely separated 33
33. Supraclypeal area dark or with a pair of small, yellow spots, and clypeus with a pair of rather large, elongate, oblique, dark bands
 . . . *consobrina consobrina* Timberlake (p. 315)
- Supraclypeal area yellow, the facial maculae larger, broadly truncate above, and clypeus almost entirely yellow, the dark bands reduced
 *consobrina lepida* Timberlake (p. 315)
- Males**
- on front*
2
1. Cheeks beneath tuberculate or spinose 2
 Cheeks at most only slightly protuberant beneath 7
2. Entire clypeus and conspicuous lateral facial maculae pale yellow
 *bishoppi* Cockerell (p. 303)
- Either the clypeus dark in part, or facial maculae absent 3
3. Clypeus entirely dark; labrum constricted and somewhat cylindrical apically
 *mitchelli* Timberlake (p. 314)
- Clypeus yellow at least in part, labrum broad, of the usual flattened form . . 4
4. Head unusually large, much broader than thorax, cheeks swollen, much broader than eyes, with a rounded angle above and the lower angle produced and rounded . . *foveata* Timberlake (p. 307)
- Head only slightly broader than thorax, if at all; ventral angle of cheek more distinctly tuberculate or spinose . . . 5
5. Clypeus more yellow, face with small but distinct lateral maculations adjacent to clypeus; scape rufo-testaceous or yellow 6
- Clypeus darker, sometimes without yellow; lateral facial maculations usually absent; scape piceous or blackish
 . . . *boltoniae chrysopsina* Timberlake (p. 305)
6. Wings whitish-hyaline; femora and tibiae relatively pale, rufo-testaceous, not sharply contrasting with the yellow tarsal segments
 *boltoniae boltoniae* Robertson (p. 304)
- Wings milky-white; femora and tibiae more piceous, markedly contrasting with the yellow tarsal segments
 *nubila* Timberlake (p. 309)
- 7(1). First intercubital vein usually branched toward base, forming a small intercalary cell (*Alloperdita*) 8
 First intercubital vein simple 11
8. Face entirely yellow below level of antennae, and scape entirely yellow
 *bradleyi* Viereck (p. 310)
- At least the supraclypeal area in large part greenish 9
9. Face broader, its median length considerably less than width to outer margin of eyes; cheeks above subequal to eyes in width . . *obscurata* Cresson (p. 313)
- Face more elongate, its median length equal to or greater than width to outer margin of eyes; cheeks narrower than eyes 10
10. Clypeus entirely yellow; lateral facial maculae large and conspicuous, reaching level of antennae on eye margin
 *floridensis* Timberlake (p. 311)
- Clypeus dark in large part, and face without lateral yellow maculae
 *novae-angliae* Viereck (p. 312)
- 11(7). Head and thorax largely yellow . . 12
 General aspect of head and thorax dark, usually greenish 13
12. Wings whitish, veins and stigma pale yellow or colorless
 *perpallida citrinella* Graenicher (p. 322)
- Wings hyaline, veins brownish or testaceous, stigma pale yellow, with brown margins . . *gerhardi gerhardi* Viereck (p. 317)
- 13(11). Cheeks much broader than eyes, more or less angulate below 14
- Cheeks rounded posteriorly, usually but little broader than eyes 17
14. Clypeus ivory, the lateral maculae broad and extensive, ending acutely on eye margin at level of antennae
 *georgica* Timberlake (p. 307)
- Clypeus largely dark; lateral maculae broad but very short, not reaching level of upper margin of clypeus . . 15

15. Wings subhyaline or slightly darkened, veins and stigma brownish or testaceous 16
 Wings whitish, veins and stigma pale yellow or colorless
 .. *albipennis pallidipennis* Graenicher (p. 302)
16. Wings faintly dusky; abdominal tergum 2 usually with a pair of very small, lateral, yellow spots
 .. *bequaerti bequaerti* Viereck, (p. 300)
 Wings more nearly hyaline; abdomen entirely lacking yellow maculae
 .. *bequaerti indianensis* Cockerell (p. 302)
- 17(13). Entire abdomen pale testaceous ..
 *polygonellae* Timberlake (p. 323)
 Abdomen dark, with or without pale maculae 18
18. Abdomen dark, with at most one pair of very small and inconspicuous pale maculae 19
 Abdomen conspicuously maculated .. 23
19. Entire face below level of antennae white
 *drymariae* Timberlake (p. 324)
 At least some portions of face below level of antennae dark 20
20. Lower half of clypeus yellow, the upper half dark; lateral facial maculae absent *graenicheri* Timberlake (p. 308)
 Clypeus largely yellow or ivory; with conspicuous facial maculae 21
21. Larger (6 mm.); supraclypeal area not maculated; clypeus and face marks ivory, the latter filling area between clypeus and each eye, abruptly truncate above and not extending above upper margin of clypeus
 *gerardiae* Crawford (p. 317)
 Smaller; supraclypeal area maculated; clypeus largely yellow; facial maculae filling area between clypeus and eyes, and extending nearly or quite to level of antennae 22
22. Face broad, eyes slightly divergent below; facial maculae ending acutely on eye margin slightly above level of antennae
 *halictoides* Smith (p. 318)
 Face not so broad, eyes subparallel; facial maculae broadly truncate above, ending at level of lower margin of antennal fossa *krombeini* Timberlake (p. 327)
- 23(18). Stigma broad and very short, brownish-piceous, resulting in a conspicuous spot on anterior margin of wing 24
 Stigma normal in form, yellowish-hyaline except the bounding veins 25
24. Scutum green except for a yellow line on each side adjacent to pronotal tubercle and tegula
 .. *maculigera maculipennis* Graenicher (p. 320)
 Scutum with a pair of narrow, longitudinal, yellow lines on each side of mid line, these connected at posterior end by a narrow transverse line adjacent to scutellum
 *maculigera bilineata* Timberlake (p. 321)
- 25(23). Supraclypeal and subantennal areas largely greenish 26
 Entire face below level of antennae yellow or ivory 27
26. Hind tibiae yellow in part; abdominal maculae larger, reaching lateral margins of terga *octomaculata* (Say) (p. 321)
 Hind tibiae entirely dark; abdominal maculae less extensive, not nearly attaining lateral margins of terga
 *discreta* Timberlake (p. 316)
- 27(25). Mesopleura and lateral faces of propodeum largely yellow
 .. *gerhardi monardae* Viereck (p. 318)
 Mesopleura green, with at most some very limited areas of yellow ventrally; propodeum entirely green 28
28. Scutum polished, with sparse, minute punctures .. *bradleyi* Viereck (p. 310)
 Scutum densely tessellate 29
29. Line of division between yellow and green areas of face considerably above level of antennae; abdominal terga 2-4 with complete, transverse, yellow bands
 *swenki* Crawford (p. 324)
 Line of division between yellow and green areas of face just at level of antennae; abdominal maculae composed of distinctly separated, lateral spots 30
30. Transverse yellow maculae well developed on abdominal terga 1-4
 *consobrina consobrina* Timberlake (p. 315)
 Maculae well developed only on terga 2-3
 *consobrina lepida* Timberlake (p. 315)

Perdita (Cockerellia) bequaerti
bequaerti Viereck

(Figs 72-74 & 79)

Perdita (Cockerellia) bequaerti Viereck, 1917,
Amer. Mus. Nat. Hist. Bul. 37, p. 241. ♂ ♀.

Perdita bequaerti Timberlake, 1928. Hawaiian
Ent. Soc. Proc. 7, p. 152.

Perdita bequaerti Timberlake, 1928, Amer.
Mus. Novitates 321, p. 2.

Perdita bequaerti Robertson, 1929. Flowers
and Insects, Lancaster, Pa., Science Press.
(flower records)

Perdita bequaerti Michener, 1947, Amer. Mid-
land Nat. 38, p. 446.

Perdita (Cockerellia) bequaerti bequaerti
Timberlake, 1954. Univ. Calif. Pub. Ent. 9,
pp. 338 & 397. (key)

FEMALE—Length 8 mm.; head and thorax greenish, abdomen piceous, maculae lemon yellow; length of face somewhat greater than distance between eyes above; eyes slightly convergent below; cheeks subequal to eyes in width; vertex quite broad, lateral ocelli slightly nearer its posterior margin than to eyes; foveae rather elongate, somewhat narrowed below, quite deep and distinct; mandibles robust, the apical 3rd abruptly flexed, yellowish, becoming reddish apically; labrum dark; clypeus rather strongly protuberant, considerably broader than long, yellow except for a pair of triangular darkened areas above and the narrowly darkened apical margin; facial maculae filling area between clypeus and eye, truncate above, not extending above upper margin of clypeus; scape yellow anteriorly, flagellum piceous; lower portion of face shining, more brassy green except for the maculae, punctures very fine, rather close and quite distinct, upper part of face more olive green, dull and tessellate, punctures exceedingly minute and obscure, cheeks somewhat shining, but closely and minutely punctate; pubescence of head and thorax short but rather dense, ochraceous; posterior margin of pronotum yellow except for a slight median interruption, tubercles yellow, thorax otherwise brassy green; tegulae yellowish-hyaline; wings subhyaline, veins brownish-testaceous, stigma more yellowish but margined with brownish; legs dark except for small, basal, yellow spots on front tibiae; scutum and scutellum shining between very fine, close, deep and distinct punctures, pleura somewhat darker green, not so shining, punctures more sparse, minute and obscure; discs of abdominal terga 2-5 with transverse yellow, basal bands that are strongly narrowed or interrupted medially, basal tergum with a pair of very small lateral spots; integument of basal tergum rather dull, without distinct

punctures, the more apical terga somewhat more shining, with fine and rather obscure punctures toward the slightly depressed apical rims.

MALE—Length 7 mm.; head and thorax greenish, abdomen piceous; length of face about equal to distance between eyes; eyes subparallel; cheeks much broader than eyes, with rounded angles opposite upper and lower ends of eye; vertex broad, lateral ocelli subequally distant from its hind margin and eyes; foveae very short, shallow and obscure, hardly evident; mandibles slender and elongate, tip of one reaching base of the other when closed, yellow, with fuscous, slender tip; labrum yellowish, somewhat swollen; clypeus rather small and flat, greenish, with yellow maculae on each side apically; lower margin of face between clypeus and eyes margined with yellow; scape yellow anteriorly, flagellum piceous above, brownish beneath; face below antennae shining, more brassy green, with fine, rather close, deep and distinct punctures, face above more olive green, dull and tessellate, face with hardly evident punctures, cheeks somewhat shining, with very minute, indistinct and rather close punctures; pubescence of head and thorax rather dense, yellowish above, becoming paler below; thorax brassy green, without maculae; tegulae yellowish posteriorly, darker anteriorly; wings subhyaline, veins testaceous, stigma more yellowish, margined with testaceous; legs largely dark, front tibiae with a small, basal, yellow spot, tarsi becoming yellowish apically; scutum and scutellum shining, with fine and rather close but deep and distinct punctures, pleura less shining, punctures more sparse and obscure; abdominal terga dull, with scattered, minute and very sparse punctures, tergum 2 and sometimes 3 with small lateral yellow spots; sternum 7 with a broad and deep, quadrangular, median emargination; apical process of sternum 8 rather narrow and elongate, tip compressed and acute, bearing a tuft of short hairs, basal part parallel-sided; gonostyli of moderate length, broadly and strongly compressed, tips acute, penis valves of about equal length, parallel-sided and rather robust, volsellae compressed, with a slender, distinct digitus, gonocoxites produced apically into a pair of slender, acute lobes.

DISTRIBUTION—Minnesota to New Jersey, south to Mississippi and Florida; June to September.

Flower records—*Bidens* and *Helianthus divaricatus*. Robertson records this on *Phytalis lanceolata* and *P. virginiana*.

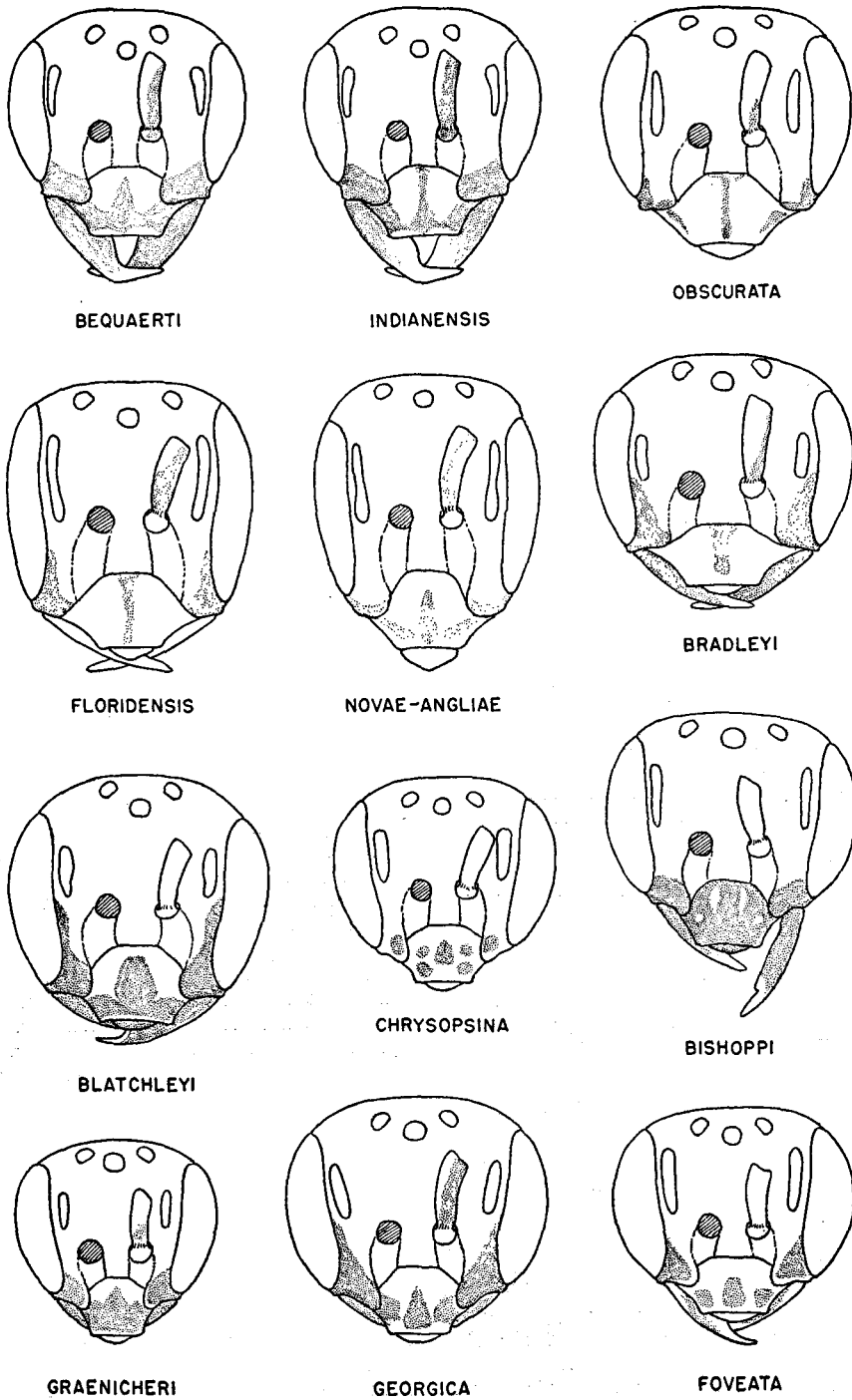


Figure 72—Facial view of head in females of *Perdita*.

*Perdita (Cockerellia) bequaerti
indianensis* Cockerell

(Fig. 72)

- Perdita pallidipennis indianensis* Cockerell, 1922. Amer. Mus. Novitates 33, p. 2. ♂ ♀.
Perdita (Cockerellia) wickhami Cockerell, 1922. Amer. Mus. Novitates 33, p. 13. ♀.
Perdita bequaerti Timberlake, 1928. Amer. Mus. Novitates 321, p. 2. (part)
Perdita (Cockerellia) bequaerti indianensis Timberlake, 1953, Univ. Kans. Sci. Bul. 35, p. 976. (key)
Perdita (Cockerellia) bequaerti indianensis Timberlake, 1954, Univ. Calif. Pub. Ent. 9, pp. 388 & 397. (key)

Timberlake separates *indianensis* from typical *bequaerti* by the somewhat paler wings, with the veins more yellowish. In the female the clypeus is darker, with a median yellow stripe that broadens below but is separated from the lateral yellow areas by intrusions of darker color. In the male, the abdomen is entirely dark, lacking any maculae on terga 2 and 3.

DISTRIBUTION—Oklahoma to Indiana.

*Perdita (Cockerellia) albipennis
pallidipennis* Graenicher

- Perdita pallidipennis* Graenicher, 1910. Canad. Ent. 42, p. 101. ♀ ♂.
Perdita pallidipennis Graenicher, 1911. Milwaukee Pub. Mus. Bul. 1, p. 238.
Perdita pallidipennis Graenicher, 1914. Canad. Ent. 46, p. 52.
Perdita lacteipennis Timberlake, 1928. Hawaiian Ent. Soc. Proc. 7, p. 152.
Perdita (Cockerellia) lacteipennis pallidipennis Timberlake, 1953. Univ. Kans. Sci. Bul. 35, p. 978.
Perdita (Cockerellia) lacteipennis pallidipennis Timberlake, 1954. Univ. Calif. Pub. Ent. 9, pp. 388 & 397. (key)

FEMALE—Length 7 mm.; head and thorax greenish, abdomen piceous, the maculae lemon yellow; length of face somewhat greater than distance between eyes above; eyes slightly convergent below; cheeks subequal to eyes in width; vertex quite broad, lateral ocelli slightly nearer its posterior margin than to eyes; foveae rather elongate, somewhat narrowed below, quite deep and distinct; mandibles robust, the apical third abruptly flexed, yellowish, becoming reddish apically; labrum dark; clypeus rather strongly protuberant, considerably broader than long, yellow, with a pair of triangular dark areas above which meet at midline, and apical margin darkened; facial maculae filling area between clypeus and eye, truncate above, not extending above upper margin

of clypeus; scape yellow anteriorly, flagellum piceous above, testaceous beneath; lower portion of face shining, more brassy green except for the maculae, punctures very fine, rather close and quite distinct, upper part more olive green, dull and tessellate, punctures exceedingly minute and obscure, cheeks somewhat shining but very closely and minutely punctate; pubescence of head and thorax short but rather dense, pale fulvous above, becoming whitish below; posterior margin of pronotum and tubercles yellow, thorax otherwise brassy green; tegulae yellowish-hyaline; wings milky-white, veins and stigma pale yellowish or nearly colorless; legs brown except for small, basal, yellow spots on front and mid tibiae; scutum and scutellum shining between very fine, close, deep and distinct punctures, the pleura somewhat darker green, not so shining, punctures more minute and obscure, propodeum somewhat bluish; discs of abdominal terga 2-5 with transverse, yellow, basal bands, those on 2 and 3 slightly interrupted medially, basal tergum with a pair of very small lateral spots; integument of basal tergum rather dull, without distinct punctures, the more apical segments somewhat more shining, with fine, sparse, obscure punctures toward the slightly depressed apical rims.

MALE—Length 7 mm.; head and thorax greenish, abdomen piceous; face slightly shorter than distance between eyes above; eyes very slightly convergent below; cheeks much broader than eyes, with rounded angles opposite upper and lower ends of eye; vertex broad, lateral ocelli only very slightly nearer its hind margin than to eyes; foveae very short, shallow and obscure, hardly evident; mandibles slender and elongate, the tip of one reaching base of the other when closed, yellow, with fuscous slender tip; labrum yellowish, somewhat swollen; clypeus not strongly produced, rather small, greenish, with latero-apical yellow maculae; lower margin of face between clypeus and eye narrowly yellow; scape yellow anteriorly, flagellum piceous above, testaceous beneath; face below antennae shining, more brassy green, with fine, sparse, distinct punctures, cheeks and face above more olive green, dull and tessellate, face with hardly evident punctures, cheeks with very minute, indistinct and rather sparse punctures; pubescence of head and thorax rather dense, yellowish, becoming whitish on thorax below; thorax brassy green, without maculae; tegulae yellowish-hyaline; wings milky-white, veins and stigma pale yellow or nearly colorless; legs largely dark, front and mid tibiae with a small, basal, yellow spot; scutum and scutellum shining, with fine and rather sparse, distinct punctures, pleura less shining, punctures minute and sparse; basal

abdominal terga dull, with hardly evident punctures, the more apical terga becoming somewhat more distinctly punctate, terga 2 and 3 with small, lateral, yellow marks; sternum 7 with a broad and deep, quadrangular, median emargination; apical process of sternum 8 rather narrow and elongate, the tip compressed and acute, bearing a tuft of short hairs, the basal part parallel-sided; gonostyli of moderate length, broadly and strongly compressed, the tips acute, penis valves slightly exceeding gonostyli, parallel-sided and rather robust, volsellae compressed, with a slender, distinct digitus, gonocoxites produced apically into a pair of slender, acute lobes.

DISTRIBUTION—Kansas and Nebraska to Wisconsin and Indiana; June to September.

FLOWER RECORDS—*Helianthus*.

The typical form of *albipennis* (Cresson, 1868. Amer. Ent. Soc. Trans. 1, p. 386) is western in distribution, and according to Timberlake does not occur east of Kansas and Nebraska. Females differ from the eastern *pallidipennis* in the small size of the lateral facial maculations, which may be entirely lacking. In the male also the face is much darker, lacking the lateral maculae, and the clypeus nearly or entirely dark.

***Perdita (Hexaperdita) bishoppi*
bishoppi Cockerell**

(Figs. 72-74 & 79)

Perdita bishoppi Cockerell, 1906. Entomologist 39, p. 148 & 179. ♀ ♂.

Perdita bishoppi Cockerell, 1922. Amer. Mus. Novitates 33, p. 7.

Perdita chrysopsina Michener, 1947. Amer. Midland Nat. 38, p. 447. (in part)

Perdita bishoppi Timberlake, 1952. Ent. Soc. Washington, Proc. 54, p. 201.

Perdita (Hexaperdita) bishoppi bishoppi Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 261.

FEMALE—Length 5 mm.; head and thorax dark greenish, abdomen piceous, maculae yellowish; face considerably longer than distance between eyes; eyes slightly convergent below; cheeks subequal to eyes in width; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae elongate, rather shallow and obscure; clypeus somewhat broader than long, entirely pale yellow except for a pair of small, lateral, blackish dots; mandibles yellow basally, becoming red apically, labrum yellowish-ferruginous;

lateral, facial maculae occupying most of area between clypeus and eyes, truncate above, not extending above upper margin of clypeus; scape entirely dark, flagellum yellowish beneath, more brownish above; cheeks and lower half of face somewhat shining, with very fine and sparse punctures, upper half of face and vertex dull tessellate, with somewhat more distinct and close punctures; pubescence of head and thorax short and rather dense, entirely pale; hind margin of pronotum with a pair of small, lateral, yellow maculae, tubercles yellow in part, thorax otherwise entirely dark; tegulae yellowish-hyaline; wings whitish-hyaline, veins and stigma pale yellowish, stigma margined with brown; legs brown, tarsi becoming yellow apically, fore and mid tibiae with a small, basal, yellow spot; scutum and scutellum tessellate, very minutely, obscurely and rather sparsely punctate, pleura dull and nearly impunctate above, becoming somewhat more shining and more distinctly punctate beneath; abdominal terga 2 and 3 with narrow, transverse, lateral maculae which are rather widely separated medially, the more basal terga rather dull, without distinct punctures, the more apical ones becoming somewhat more shining and with fine and close but rather indistinct punctures.

MALE—Length 3.5-4.0 mm.; head and thorax dark greenish, maculae pale yellow, abdomen piceous and immaculate; face slightly longer than distance between eyes above; eyes very slightly convergent below; cheeks subequal to eyes, with a quite distinct, acute tubercle beneath; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae short, quite shallow and obscure; clypeus somewhat broader than long, entirely yellow; mandibles and labrum yellow; lateral facial maculae filling most of area between clypeus and eyes, not extending above upper margin of clypeus; scape yellow anteriorly, flagellum testaceous beneath, becoming more reddish above; lower portion of face and cheeks somewhat shining, punctures barely visible, upper portion not quite so shining, with exceedingly minute and sparse punctures; pubescence of head and thorax short, thin, quite sparse, entirely pale; thorax without maculae; tegulae yellowish-hyaline; wings whitish-hyaline, veins and stigma pale yellow and very obscure, stigma margined with brownish posteriorly; femora and tibiae largely brownish, front tibiae yellow anteriorly, mid tibiae with a narrow, anterior, yellow stripe, tarsi yellow; scutum and scutellum somewhat shining, punctures exceedingly minute and obscure, pleura somewhat shining above, becoming more distinctly so below, with punctures barely visible; the

more basal abdominal terga rather dull and impunctate, the more apical terga becoming more shining and with very minute and rather indistinct punctures; sternum 7 with a broad, deep, rounded, median emargination; apical portion of sternum 8 narrow, somewhat compressed, with an obscure ventral keel, rounded apically, about three times longer than broad; gonostyli rather short, strongly compressed, acute apically, subequal in length to the narrow, elongate penis valves, volsellae short, compressed, digitus poorly developed.

DISTRIBUTION — North Carolina to Florida and Texas; September.

FLOWER RECORDS — *Heterotheca* and *Isopappus*.

Another subspecies of *bishoppi*, *planorum* Timberlake, occurs in Kansas and Texas, but there are no records of its occurrence in the eastern states.

Perdita (Hexaperdita) blatchleyi
Timberlake

(Fig. 72)

Perdita blatchleyi Timberlake, 1952. Ent. Soc. Washington Proc. 54, p. 201. ♀.

Perdita (Hexaperdita) blatchleyi Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 258.

FEMALE—Length 5-6 mm.; head and thorax green, abdomen piceous, maculae pale yellow; head somewhat longer than distance between eyes; cheeks slightly narrower than eyes; vertex narrow, its hind margin rounded, lateral ocelli slightly nearer eyes than to each other; foveae elongate, rather narrow but quite deep and distinct; mandibles whitish basally, becoming reddish apically; labrum dull testaceous; clypeus pale yellow, upper margin narrowly piceous and with a narrow, transverse, dark, apical band; facial maculae rather large and conspicuous, occupying entire area between clypeus and eye and extending narrowly up lower margin to level of antennae; lower portion of face somewhat shining, punctures exceedingly shallow, minute and obscure, cheeks and upper part of face less shining, punctures very minute, well separated; pubescence of head and thorax very short and thin, entirely white; posterior margin of pronotum with a pair of conspicuous, ivory maculae, tubercles yellowish, thorax otherwise entirely green; tegulae yellowish-hyaline; wings hyaline, veins and stigma pale testaceous, stigma margined with darker brown; legs largely dark, front tibiae somewhat whitish at extreme base; scutum and scutellum finely tessellate, punctures very fine and obscure, well separated; pleura somewhat shining below, punctures exceedingly minute; abdominal ter-

ga 2-3 or 2-4 with transverse basal maculae, tergum 1 sometimes with a pair of very small and widely separated spots, the remainder slightly separated medially, discs of terga somewhat shining, punctures on the more basal segments exceedingly sparse and obscure, becoming somewhat closer and more distinct on the more apical segments.

DISTRIBUTION—Florida; October and November.

FLOWER RECORD—*Chrysopsis*.

Perdita (Hexaperdita) boltoniae
boltoniae (Robertson)

(Fig. 73)

Perditella boltoniae Robertson, 1902. Canad. Ent. 34, p. 321. ♀ ♂.

Perditella boltoniae Robertson, 1914. Ent. News 25, p. 69.

Perditella boltoniae Robertson, 1922. Psyche 29, p. 161 and 169.

Perditella boltoniae Robertson, 1929. Flowers and Insects, Lancaster, Pa. Science Press. (flower records)

Perdita chrysopsina Michener, 1947. Amer. Midland Nat. 38, p. 447. (not Timberlake 1928)

Perdita (Hexaperdita) boltoniae boltoniae Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 265.

FEMALE—Length 4.5 mm.; head and thorax greenish, with cream-colored maculae, abdomen piceous, terga 2 and 3 with transverse yellow maculae; face slightly longer than distance between eyes above; eyes very slightly convergent below; cheeks slightly narrower than eyes; vertex rounded, hind margin indefinite, lateral ocelli slightly nearer eyes than to each other; foveae rather short, but quite deep and distinct; mandibles ferruginous, basal half, more or less, yellow; labrum dark; clypeus entirely pale yellow; lateral face marks small, adjacent to clypeus and rather widely removed from lower end of eye; scape entirely dark, flagellum testaceous beneath, somewhat darker above; lower half of face shining, with very minute but rather close and distinct punctures except on clypeus medially, upper half of face and cheeks less shining, punctures very minute but rather distinct; pubescence of head and thorax, short, thin, entirely whitish; thorax green, a spot on each tubercle and a pair of marks on pronotum yellow; tegulae yellowish-hyaline; wings hyaline, veins and stigma pale testaceous, stigma margined with brownish; legs dark, but the more apical tarsal segments becoming yellowish, front tibiae yellow anteriorly; scutum and scutellum rather dull, with fine but

quite distinct, well separated punctures; pleura rather dull above, very minutely and indistinctly punctate, becoming somewhat more shining beneath; abdominal terga rather dull, punctures very minute and obscure, transverse maculae of 2 and 3 slightly interrupted medially.

MALE—Length 4.5 mm.; head and thorax bluish-green, clypeus and mandibles pale yellow, abdomen brownish, without maculae; length of face subequal to distance between eyes above; eyes slightly convergent below; cheeks above subequal to eyes in width, narrowed below and with a prominent spine-like tubercle; vertex rounded, its hind margin indefinite, lateral ocelli subequally distant from eyes and from each other; foveae very short, rather shallow but quite distinct; mandibles yellowish, with ferruginous tips; labrum yellowish; clypeus yellowish, upper margin with darker areas; lateral face marks extremely small and obscure, adjacent to clypeus; face and cheeks somewhat shining, punctures exceedingly minute, well separated, obscure; pubescence of head and thorax short, thin, entirely white; thorax without maculae; tegulae yellowish-hyaline; wings whitish-hyaline, veins and stigma very pale yellowish, stigma margined with testaceous; legs testaceous basally, front tibiae yellow anteriorly, all tarsi yellow; scutum and scutellum shining, punctures quite sparse and exceedingly minute; pleura dull, punctures even more obscure; abdominal terga somewhat shining, whitish-hyaline apically, the more basal terga practically impunctate, but the more apical terga becoming very finely but quite distinctly punctate; apical margin of sternum 6 broadly incurved; sternum 7 with a deep, rounded, median emargination, apical margin on each side of this obliquely truncate; basal portion of sternum 8 broad, apical process narrow and elongate, slightly bulbous and expanded apically; gonostyli very broadly compressed, subtriangular, tips narrowly rounded, considerably shorter than the slender penis valves, volsellae short, compressed, digitus not in evidence, gonocoxal lobes well developed, rather narrowly rounded apically.

DISTRIBUTION—Illinois to Mississippi and Louisiana; September and October.

Perdita (Hexaperdita) boltoniae
chrysoptina Timberlake

(Figs. 72 & 74)

Perdita halictoides Viereck, 1917. Amer. Mus. Nat. Hist. Bul. 37, p. 241. (not Smith, 1853)
Perdita chrysoptina Timberlake, 1928. Hawaiian Ent. Soc. Proc. 7, p. 155. ♀ ♂.

Perdita (Hexaperdita) boltoniae chrysoptina Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 265.

FEMALE—Length 5 mm.; head and thorax greenish, with cream-colored maculae, abdomen almost black, without maculae; face slightly longer than distance between eyes above; eyes very slightly convergent below; cheeks slightly narrower than eyes; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae rather short, but quite deep and distinct; mandibles variable, often bright yellow, or dark, infused with ferruginous apically; labrum dark; clypeus variable, usually whitish, at least in part, but largely dark in some specimens; lateral face marks very small or absent, adjacent to clypeus and rather widely removed from lower end of eye; scape entirely dark, flagellum testaceous beneath, somewhat darker above; lower half of face shining, with very minute but rather close and distinct punctures except on clypeus medially, upper half of face and cheeks less shining, punctures very minute but rather distinct; pubescence of head and thorax short, thin, entirely whitish; thorax entirely green, without maculae; tegulae testaceous-hyaline; wings hyaline, veins and stigma pale testaceous, stigma margined with brownish; legs dark, but the more apical tarsal segments becoming yellowish; scutum and scutellum rather dull, with fine but quite distinct, well separated punctures; pleura rather dull above, very minutely and indistinctly punctate, becoming somewhat more shining beneath; basal abdominal terga rather dull, punctures very minute and obscure, the more apical segments becoming more shining and more distinctly, closely and deeply punctate, apical margins of the terga narrowly whitish-hyaline.

MALE—Length 5 mm.; head and thorax greenish, abdomen piceous, without maculae; face slightly longer than distance between eyes above; eyes very slightly convergent below; cheeks very slightly narrower than eyes, with a distinct, ventral, acute tubercle, posterior margin slightly angulate opposite upper part of eye; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae small, extremely shallow and obscure, barely evident; mandibles testaceous, tips becoming ferruginous; labrum pale testaceous; clypeus darker, obscurely reddened, about twice as broad as long; facial maculae lacking, scape entirely dark, flagellum testaceous beneath, becoming somewhat darker above; face below antennae shining, with very fine, well separated punctures, cheeks and upper part of face less shining, punctures somewhat more sparse and shallow; pubescence of

head and thorax short, thin, entirely white; thorax entirely bluish-green, without maculae; tegulae yellowish-hyaline; wings hyaline, veins and stigma pale testaceous, stigma margined with brownish; legs brownish-testaceous, tarsi becoming yellowish; scutum and scutellum somewhat shining, with exceedingly minute and quite sparse punctures; pleura rather dull above, becoming somewhat more shining below, punctures very minute and obscure; abdominal terga smooth but rather dull, punctures very sparse, minute and obscure, somewhat closer on the more apical terga, apical margins of the discs narrowly whitish-hyaline; sternum 7 with a broad, deep,

rounded emargination apically; apical portion of sternum 8 narrow and elongate, tip compressed, carinate beneath, sides parallel, much longer than broad; gonostyli rather short, strongly and broadly compressed, tips subacute, slightly exceeded by the narrow, elongate penis valves, volsellae rather short, strongly compressed, digitus not evident.

DISTRIBUTION—New Jersey to Florida; July to October.

FLOWER RECORDS—*Chrysopsis*, *Coreopsis*, *Erigeron*, *Gerardia* and *Haplopappus*.

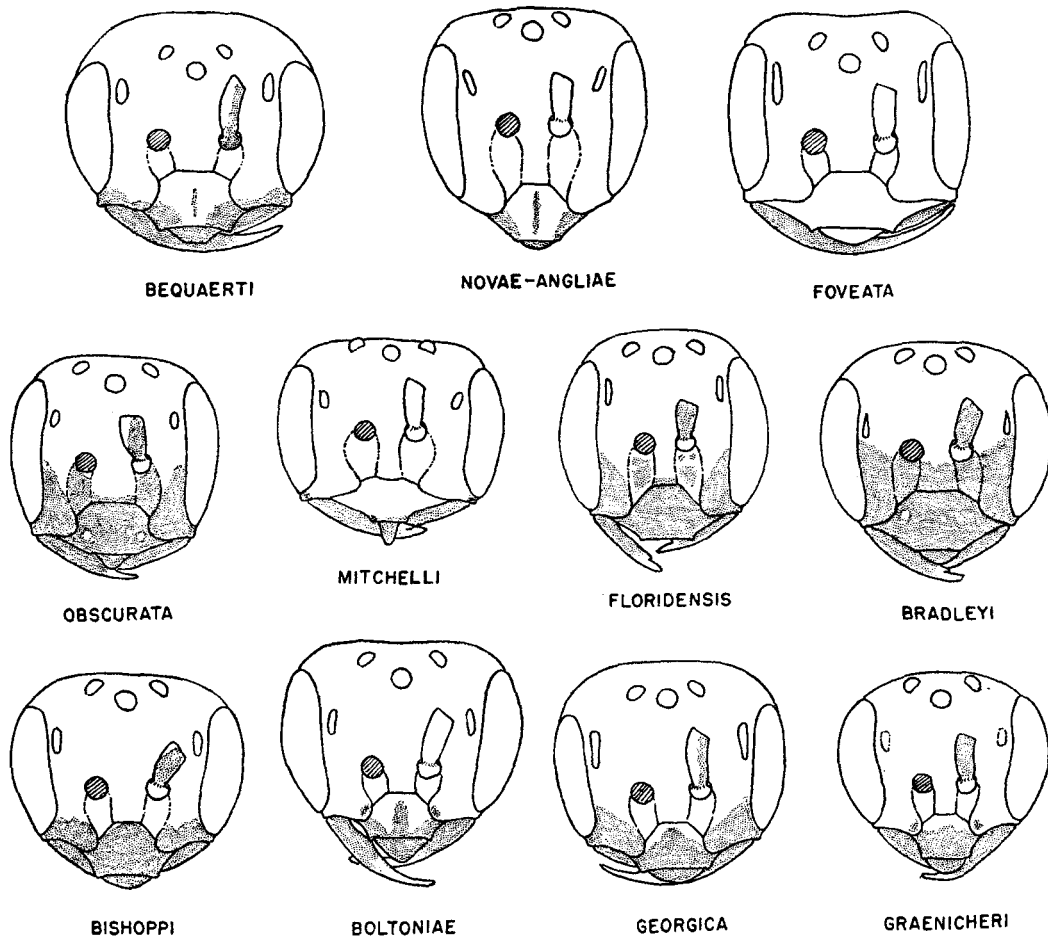


Figure 73—Facial view of head in males of *Perdita*.

Perdita (Hexaperdita) foveata
foveata Timberlake

(Figs. 72-74 & 79)

Perdita (Hexaperdita) foveata foveata Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 265. ♀ ♂.

FEMALE—Length 5 mm.; head and thorax green, abdomen piceous, with small yellow maculations; face slightly longer than distance between eyes above; eyes slightly convergent below; cheeks subequal to eyes in width; vertex rounded, rather narrow, lateral ocelli subequally distant from eyes and each other; facial foveae shallow, elongate, slightly narrowed below; mandibles slightly curved, yellowish, somewhat darker at base and apex; labrum piceous; clypeus moderately convex, piceous, with a median and a pair of lateral yellow maculations; lateral facial maculae filling most of area between clypeus and eyes, extending narrowly up eye margin to level of antennae; scape entirely dark, flagellum piceous above, somewhat more brownish beneath apically; face above brassy green, somewhat shining, with minute, well separated punctures; cheeks somewhat shining, punctures exceedingly minute, obscure and quite sparse; pubescence of head and thorax rather short but copious, not hiding surface, pale ochraceous; pronotum with a pair of small, lateral, yellow maculae, thorax otherwise greenish; scutum and scutellum somewhat shining, punctures fine but distinct, rather widely separated and evenly distributed; pleura somewhat more olive green, less shining, punctures very minute and obscure; propodeum almost blue, shining, without evident punctures; tegulae pale yellowish hyaline; wings milky white, stigma pale yellow, veins practically colorless; legs dark basally, tarsi becoming yellow apically, pubescence entirely pale ochraceous; abdominal terga smooth but rather dull, apical margins narrowly depressed and impunctate, discs with rather fine and sparse, scattered punctures, terga 2 and 3 with a pair of small, transverse, rather widely separated, basal maculae.

MALE—Length 5 mm.; head and thorax bluish-green, abdomen piceous, without maculations; head very large, conspicuously wider than thorax, length about equal to distance between eyes, these subparallel; cheeks much broader than eyes, with a rounded, obscure angle opposite upper third of eye, and lower angle produced and rounded; vertex broad, lateral ocelli subequally distant from eyes and each other; foveae shallow and elongate, evident chiefly by the darker color; mandibles slender and elongate, slightly curved, apex of one reaching base of other when closed, yellow,

with ferruginous tip; labrum swollen, yellowish-testaceous; clypeus very short but quite broad, brownish medially, becoming pale yellowish toward lateral apical angles, with rather close, deep and distinct, although fine, punctures; face brassy-green above, becoming somewhat yellowish-brown below, without definite maculations; scape entirely dark; vertex rather narrow, surface below ocelli becoming more shining, punctures very fine, well separated but hardly sparse, becoming more coarse and distinct below; cheeks more brownish, quite smooth, punctures hardly evident; pubescence of head and thorax rather short, entirely whitish; thorax entirely bluish-green, without maculations; tegulae yellowish-hyaline; wings milky-white, veins and stigma practically colorless; legs dark, tarsi becoming yellowish; abdominal terga smooth but rather dull, very finely and quite sparsely punctate, apical depressed rims short; apical margin of sternum 6 broadly emarginate; sternum 7 with a very deep, circular emargination; apical process of sternum 8 somewhat compressed, more or less keeled beneath, short pubescent; gonostyli compressed, rather short, acute apically, much shorter than the narrow, elongate, parallel-sided penis valves, volsellae compressed, digitus not evident.

DISTRIBUTION—Kansas and Arkansas to Florida; May and June.

Another subspecies, *brachycephala* Timberlake, has not been recorded from the eastern states.

Perdita (Hexaperdita) georgica
Timberlake

(Figs. 72-74)

Perdita georgica Timberlake, 1928. Hawaiian Ent. Soc. Proc. 7, p. 158. ♀ ♂.

Perdita georgica Timberlake, 1928. Amer. Mus. Novitates 321, p. 1.

Perdita georgica Michener, 1947. Amer. Midland Nat. 38, p. 447.

Perdita (Hexaperdita) georgica Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 257.

FEMALE—Length 5.5 mm.; head and thorax greenish, with small, pale yellow maculae, abdomen entirely piceous, without maculae; face slightly longer than distance between eyes; clypeus somewhat protuberant, narrow and elongate; cheeks slightly narrower than eyes; lateral ocelli subequally distant from eyes and each other; foveae elongate, quite deep and distinct; mandibles testaceous; labrum brownish-testaceous; upper half of clypeus dark, lower half occupied by three large whitish blotches, these often meeting along apical margin; facial maculae broad, extending very narrowly up margin of eye to about

level of antennae; scape narrowly yellowish anteriorly, flagellum yellowish beneath, dark above; lower portion of face somewhat shining, with very minute and rather close, indistinct punctures, upper half of face dull and tessellate, punctures exceedingly minute and barely visible; pubescence of head and thorax short but rather dense, entirely ochraceous; anterior margin of pronotum yellow, and a pair of yellow maculae along hind margin; tubercles yellowish; tegulae whitish-hyaline; wings subhyaline, veins and stigma very pale testaceous, stigma margined with brownish; front tibiae anteriorly and front tarsi yellowish, legs otherwise dark; scutum and scutellum dull and tessellate, with exceedingly minute, well separated but not sparse punctures; pleura somewhat more shining, with rather close and exceedingly minute and obscure punctures; abdominal terga rather dull, basal tergum impunctate, the second and following terga becoming increasingly closely but very finely punctate.

MALE—Length 5.5 mm.; head and thorax greenish, with whitish or pale yellow maculae, abdomen entirely piceous; length of face subequal to distance between eyes, these subparallel; cheeks much broader than eyes, with obscure rounded angles opposite upper and lower end of eyes; vertex broad, lateral ocelli subequally distant from eyes and each other; foveae short, quite shallow and obscure; clypeus small and widely separated from eyes; mandibles yellowish, elongate, narrow tip of one nearly reaching base of the other when closed; labrum entirely yellowish; upper portion of clypeus more or less darkened, otherwise entirely yellowish; facial maculae very broad but quite short, ending abruptly on eye margin at about level of antennae; scape yellowish anteriorly and flagellum yellowish beneath, piceous above; lower portion of face and entire cheeks shining, punctures exceedingly minute and obscure, rather close, upper portion of face dull, with exceedingly minute punctures; pubescence of head and thorax short, rather thin, entirely pale; pronotum and tubercles entirely dark; tegulae yellowish-hyaline; wings hyaline, veins and stigma very pale testaceous, stigma bordered with brownish; all femora narrowly yellowish apically, front tibiae and the front and mid tarsi yellowish, mid tibiae obscurely yellowish anteriorly; scutum and scutellum dull, minutely tessellate, with rather sparse and very minute punctures; pleura somewhat more shining and more obscurely punctate; abdominal terga smooth but rather dull, apical margins narrowly yellowish-hyaline, 2nd and following terga with indefinite but rather close, exceedingly minute punctures; apical margin of sternum 6 broadly and rather deeply incurved;

sternum 7 with a very broad and deep, median, apical emargination; sternum 8 with a rather short, median, apical projection which is rounded apically, length about twice its breadth, sides parallel; gonostyli rather short, strongly compressed, slightly exceeded in length by the slender, parallel-sided penis valves, the gonocoxi slightly angulate apically, volsellae strongly compressed, with a short but distinct digitus.

DISTRIBUTION—North Carolina to Florida and Mississippi; August to October.

FLOWER RECORDS—*Aster*, *Chrysopsis*, *Haplopappus* and *Heterotheca*.

Perdita (Hexaperdita) graenicheri
Timberlake

(Figs. 72 & 73)

Perdita sp., Graenicher, 1930. Ent. Soc. Washington, Proc. 23, pp. 158, 168 170 and 173.

Perdita graenicheri Timberlake, 1947. Ent. Soc. Washington, Proc. 49, p. 82. ♀ ♂.

Perdita (Hexaperdita) graenicheri Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 264.

FEMALE—Length 4.5 mm.; head and thorax greenish, abdomen piceous, maculae pale yellow; face slightly longer than distance between eyes above; eyes very slightly convergent below; cheeks narrower than eyes; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae elongate, rather shallow and indistinct; clypeus protuberant, somewhat broader than long, upper third dark, remainder pale yellow; mandibles and labrum yellow; lateral face marks not quite filling area between clypeus and lower orbits; scape brownish, not maculated, flagellum yellowish beneath, somewhat darker above; lower portion of face and cheeks somewhat shining, with sparse and exceedingly minute and obscure punctures, upper part of face less shining, with somewhat closer and more distinct but very minute punctures; pubescence of head and thorax short and rather thin, entirely pale; anterior margin of pronotum yellow, and posterior margin with a pair of rather widely separated, yellow maculae; tubercles yellow in part, thorax otherwise entirely green; tegulae yellowish-hyaline; wings whitish, stigma pale yellow, veins nearly colorless and obscure; legs pale brownish, apical tarsal segments becoming yellowish and front tibiae yellow anteriorly over basal half; scutum and scutellum dull, very minutely and rather sparsely punctate; pleura somewhat more shining, punctures minute and well separated; abdominal terga 2-4 with transverse yellow maculae which are separated medially, discs of the terga smooth but rather dull, minutely and obscurely punctate, sparsely so

on the more basal segments, becoming somewhat closer apically; basal tergum with a small yellow spot on each extreme side.

MALE—Length 4 mm.; head and thorax greenish with pale yellow maculae, abdomen piceous and immaculate; face slightly longer than distance between eyes above; eyes slightly convergent below; cheeks slightly narrower than eyes, ventral tubercle evident, but poorly developed; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae short, shallow and indistinct; clypeus protuberant, somewhat broader than long, upper half dark, lower half yellow; mandibles and labrum yellow; lateral face marks lacking; scape yellow anteriorly, flagellum testaceous; lower half of face somewhat shining, punctures hardly visible, upper part and cheeks rather dull, with exceedingly minute and obscure punctures; pubescence of head and thorax short, thin, rather sparse, entirely pale; thorax without distinct maculae; tegulae yellowish-hyaline; wings whitish, and stigma pale yellow, margined with testaceous, veins nearly colorless; legs brownish, femora at tips and tibiae at base narrowly yellow, tarsi entirely yellow and front tibiae yellow anteriorly; scutum and scutellum dull, very finely tessellate, punctures hardly evident, pleura somewhat more shining and without evident punctures; abdominal terga somewhat shining, discs of the more basal terga nearly impunctate; apical margin of sternum 6 with a broad, shallow, median emargination; sternum 7 with a broad and deep, rounded emargination; gonostyli quite short, strongly compressed, acute apically, much exceeded by the narrow, elongate penis valves, the volsellae compressed, digitus not evident.

DISTRIBUTION—Florida, in October.

FLOWER RECORD—*Chrysopsis tracyi*.

Perdita (Hexaperdita) nubila
Timberlake

(Figs. 74, 76, 77 & 79)

Perdita (Hexaperdita) nubila Timberlake, 1958. Univ. Calif. Pub. Ent. 14, p. 392. ♀ ♂.

FEMALE—Length 4 mm.; head and thorax bluish-green, abdomen piceous; face considerably longer than distance between eyes above; eyes slightly convergent below; cheeks slightly narrower than eyes; vertex rounded, lateral ocelli subequally distant from eyes and each other; foveae narrow and elongate, quite deep and distinct; mandibles yellow, tip slightly curved, becoming ferruginous; labrum testaceous, slightly convex, with a rather deep, median, basal impression; entire clypeus

ivory, with a pair of very small, dark spots on each side; face with a pair of very small, yellow maculae adjacent to clypeus; scape brownish, not maculated; vertex rather dull, face below ocelli somewhat more shining, punctures very fine, rather sparse and obscure, becoming polished and practically impunctate on supra-clypeal area; pubescence of head and thorax erect, rather copious, entirely whitish; pronotum narrowly ivory along posterior margin at each extreme side, tubercles somewhat brownish, thorax otherwise entirely bluish-green; scutum, scutellum and pleura finely pebbled, punctures exceedingly minute and obscure, hardly visible; propodeum somewhat more shining, without evident punctures; tegulae whitish-hyaline; wings whitish, veins and stigma almost colorless, but the latter narrowly margined with testaceous; legs brownish, front tibiae anteriorly and all tarsi yellow; abdominal terga smooth but rather dull, with exceedingly minute and rather sparse punctures, these becoming somewhat closer on the more apical segments, apical margins of terga narrowly depressed, whitish-hyaline.

MALE—Length 4 mm.; head and thorax bluish-green, abdomen piceous, without maculations; face broad, not much longer than distance between eyes above; eyes slightly convergent below; cheeks slightly broader than eyes, posterior margin somewhat carinate, with an obscure, rounded angle at upper end of this carination, lower angle produced, more or less spine-like; vertex rounded, lateral ocelli subequally distant from eyes and each other; foveae exceedingly small, narrow and obscure, barely evident; mandibles slender and elongate, slightly curved, yellow except for the more testaceous tip, tip of one reaching base of other when closed; labrum very slightly produced, entirely pale yellow; clypeus transverse and very short, entirely pale yellow except for a pair of lateral dark spots and a very slight intrusion of dark color along upper margin; lateral facial maculae very small, adjacent to clypeus; scape bright yellow anteriorly; vertex smooth and rather dull, without evident punctures, face below ocelli becoming shining, with shallow and rather sparse but distinct punctures, area below antennae practically impunctate; pubescence of head and thorax erect, rather thin, entirely whitish; thorax entirely bluish-green, without maculae; tegulae yellowish-hyaline; wings whitish, veins and stigma nearly colorless; all femora brownish, more or less tinged with green, tibiae brownish, with basal yellow spots, front tibiae yellow anteriorly, all tarsi yellow; scutum and scutellum smooth and shining, with exceedingly minute, sparse and indistinct punctures, those on shining pleura even more obscure; propodeum smooth, somewhat

shining, entirely impunctate; abdominal terga whitish-hyaline apically, these depressed rims becoming broader on the more apical terga, discs of the more basal terga nearly impunctate, with only exceedingly minute and very sparse punctures, these becoming closer and more distinct on the more apical segments; apical emargination of sternum 7 exceedingly deep, dividing it almost into two separated parts; apical process of sternum 8 somewhat compressed and boat-shaped, with a tuft of short, whitish pubescence; gonostyli broadly compressed, acute apically, subequal to penis valves in length, these somewhat constricted basally, gonocoxites produced apically to form a pair of rather conspicuous lobes; volsellae compressed, digitus not evident.

DISTRIBUTION—Florida; April to July.

FLOWER RECORD—*Erigeron ramosus*.

Perdita (Alloperdita) bradleyi
Viereck

(Figs. 72 & 73)

Perdita bradleyi Viereck, 1907. Ent. News 18, p. 393.

Perdita obscurata Timberlake, 1928. Amer. Mus. Novitates 321, p. 7.

Perdita (Alloperdita) obscurata Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 274.

FEMALE—Length 6 mm.; head and thorax greenish, abdomen piceous, maculae yellowish; length of face slightly greater than distance between eyes above; eyes very slightly convergent below; cheeks narrower than eyes; vertex rounded, hind margin indefinite, lateral ocelli at top of head, slightly nearer eyes than to each other; foveae elongate, quite deep and distinct; mandibles yellowish, reddened apically; clypeus yellow in large part, or piceous except for a median, elongate, yellow stripe and obscure infusions of yellow apically toward the sides; lateral facial maculae elongate, narrowly acute above, terminated at lower end of foveae; scape yellow anteriorly, flagellum brownish above, yellowish beneath; surface of head shining, punctures sparse and exceedingly minute; pubescence of head and thorax rather short and thin, entirely whitish; anterior margin of pronotum yellow, posterior margin with a pair of narrow, lateral maculae, and tubercles yellow, thorax otherwise greenish; tegulae yellowish-hyaline; wings whitish-hyaline, veins and stigma nearly colorless and very obscure, stigma margined with pale brownish; coxae, trochanters and femora entirely dark, hind tibiae largely dark, mid tibiae dark posteriorly, yellow anteriorly, front

tibiae largely yellow, with a dark posterior stripe, tarsi and spurs entirely yellow; scutum and scutellum polished, with sparse and very minute punctures, pleura less shining, with closer and quite obscure punctures; abdominal terga 1-4 with transverse, lateral maculae, these only slightly interrupted medially, the terga smooth and somewhat shining, punctures evident only on the more apical segments.

MALE—Length 5 mm.; head and thorax greenish, abdomen piceous, maculae yellowish; length of face slightly greater than distance between eyes; eyes subparallel; cheeks narrower than eyes, lacking tubercles; vertex rounded, hind margin indefinite, ocelli located at top of head, slightly nearer eyes than to each other; foveae short, rounded, located near top of eye; mandibles, labrum, scape and entire face below level of antennae, yellow; flagellum brownish above, yellow beneath; cheeks and maculated areas of head smooth and shining, with minute, rather sparse but quite distinct punctures, upper greenish portion of face rather dull, without distinct punctures; pubescence of head and thorax quite thin, entirely white; tubercles and posterior margin of pronotum yellow; pleura with a yellow anterior spot just posterior to front coxae; tegulae yellowish-hyaline; wings whitish-hyaline, veins nearly colorless and very obscure, stigma whitish, margined with brown; hind tibiae brownish posteriorly and hind femora with a brown apical spot, legs otherwise entirely yellowish; scutum and scutellum polished, with minute and rather sparse punctures; pleura rather dull, punctures more obscure; abdominal terga 2-5 with transverse, basal maculae, these not or only slightly interrupted medially; discs of the more basal terga smooth but rather dull, punctures hardly evident, those of the more apical terga somewhat more shining, with rather sparse but more distinct, minute punctures evident; apical margin of sternum 6 slightly incurved; sternum 7 with a broad and deep, median, rounded emargination; apical margin of sternum 8 deeply incurved, broad, only slightly narrower than greatest width of plate; gonostyli rather short, somewhat acute, apically compressed, considerably exceeded by the slender penis valves; volsellae very slender and elongate, nearly equalling gonostyli in length and deeply incised to form a distinct digitus and cuspis.

DISTRIBUTION—New Jersey to Florida; March to May.

FLOWER RECORDS — *Batodendron*, *Crataegus*, *Ilex*, *Nyssa*, *Pyracantha* and *Sarracenia flava*. Also recorded in literature on *Hydrocotyle*.

There is a close resemblance between *bradleyi* and *obscurata* Cresson. Both sexes may be separated easily if the proboscis is visible, the glossa and labial palpi being short in *bradleyi*, much elongated in *obscurata*. In *bradleyi* the glossa is little more than twice as long as its greatest width. That of *obscurata* is several times longer than broad.

Perdita (Alloperdita) floridensis
Timberlake

(Figs. 72-74 & 79)

Perdita floridensis Timberlake, 1928. Amer. Mus. Novitates 321, p. 7. ♀ ♂.

Perdita (Alloperdita) floridensis Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 274.

FEMALE—Length 6 mm.; head and thorax green, abdomen piceous, maculae yellow; face about one-third longer than distance between eyes; eyes parallel; upper portion of cheeks subequal to eyes in width, becoming very narrow below; vertex very narrow, space between its hind margin and lateral ocelli less than their diameter, foveae narrow and elongate, quite deep and distinct; mandibles yellowish, becoming ferruginous apically; labrum dark; clypeus protruding about one-half below suborbital line, dark except for a narrow, median, yellow stripe, sometimes with a pair of very small maculae at extreme lateral angles; facial maculae distinct, extending narrowly up inner margin of eye nearly to level of antennae; cheeks and lower portion of face polished, punctures very minute and rather sparse but quite distinct, upper portion of face less shining, punctures minute and somewhat closer, barely evident; pubescence of head and thorax short, thin, entirely white; posterior margin of pronotum with a pair of conspicuous, lateral, yellow maculae, thorax otherwise without maculae; tegulae whitish-hyaline; wings whitish, veins and stigma nearly colorless and obscure, first transverse cubitus more or less forked; legs mainly dark, but front tibiae yellow anteriorly and all tarsi yellow; scutum and scutellum shining, punctures quite deep and distinct, well separated but not sparse; pleura rather dull above, punctures somewhat more obscure but quite close, becoming somewhat more shining and distinctly punctate below; abdominal terga 2 and 3 with narrow, transverse, yellow maculae which are not, or only very slightly, separated medially; basal terga with hardly visible punctures, the more apical segments becoming more distinctly but very minutely punctate.

MALE—Length 6 mm.; head and thorax green, abdomen brownish-piceous, maculae yellow; face about one-fourth longer than dis-

tance between eyes; upper part of cheeks subequal to eyes in width, narrower below; vertex very narrow, space between its hind margin and lateral ocelli much less than their diameter; foveae small and shallow but rather distinct, mandibles yellow, becoming ferruginous at extreme tips; labrum and clypeus entirely yellow; facial maculae large and conspicuous, triangular, terminated in an acute angle on eye margin at level of antennae, a pair of smaller maculae in subantennal areas, and lower margin of supraclypeal area very narrowly yellow; scape very short, yellow, flagellum testaceous beneath, becoming piceous above; cheeks and lower portion of face shining, very minutely and obscurely punctate, upper portion rather dull, punctures somewhat more distinct but very minute and quite sparse; pubescence of head and thorax short, thin, entirely white; posterior margin of pronotum with a pair of very small, lateral, yellow maculae, thorax otherwise greenish; tegulae whitish-hyaline; wings whitish, veins nearly colorless and very obscure, stigma more yellowish with a testaceous margin, 1st transverse cubitus forked below; legs mainly dark, but front and mid tibiae yellow anteriorly, and all tarsi yellow; scutum and scutellum shining, punctures very minute but rather distinct, rather sparse; pleura dull, punctures more minute; abdominal terga 2 and 3 with a pair of very obscure, lateral, brownish-yellow maculae, otherwise without maculae, the more basal terga without evident punctures, the more apical terga becoming minutely and quite sparsely punctate; apical margin of sternum 6 very slightly emarginate medially, sternum 7 with a very broad and shallow, median emargination; sternum 8 broad apically, apical margin occupied by a rather deep triangular emargination; gonostyli short, compressed, tips rounded and nearly equalling penis valves in length, the latter acute apically, volsellae quite robust, with a slender elongate digitus and a broad, more or less flattened cuspis.

DISTRIBUTION—North Carolina to Florida; April and May.

FLOWER RECORDS—*Batodendron*, *Ilex glabra* and *Leucothoe*.

Perdita (Alloperdita) mitchelli
Timberlake

(Figs. 73 & 74)

Perdita mitchelli Timberlake, 1947. Ent. Soc. Washington, Proc. 49, p. 81. ♀ ♂.

Perdita mitchelli Michener, 1947. Amer. Midland Nat. 38, p. 447.

Perdita (Alloperdita) mitchelli Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 274.

FEMALE—Length 4.5 mm.; head and thorax dark bluish-green, abdomen piceous, maculae absent; length of face very slightly greater than distance between eyes; eyes subparallel; cheeks narrower than eyes; vertex rounded, its hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae elongate, narrow, quite deep and distinct; mandibles pale yellow, tip piceous; labrum, clypeus and entire face greenish, without maculae, face and cheeks shining, very minutely and obscurely punctate; pubescence of head and thorax very short and thin, entirely white; thorax entirely dark, without maculae; tegulae yellowish-hyaline; wings whitish-hyaline, veins nearly colorless and very obscure, stigma somewhat more testaceous; legs dark, tarsi becoming yellowish apically; scutum and scutellum shining, sparsely and very minutely punctate; pleura rather dull, punctures even more obscure; abdomen entirely dark, without maculae, apical rims narrowly depressed, the more basal terga impunctate, the more apical terga becoming very minutely, sparsely and obscurely punctate.

MALE—Length 4 mm.; head and thorax bluish-green, abdomen piceous to almost black, without maculae; face almost as broad as its median length; eyes very slightly convergent below; cheeks subequal to eyes in width, with a ventral, rounded tubercle or protuberance; vertex rounded, its hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae small, shallow and obscure; mandibles pale yellow, tips becoming pale ferruginous, not greatly elongated; labrum pale testaceous, subtriangular with cylindrical apex, length about equal to basal width; face entirely greenish, without maculae, clypeus short and very broad, width fully twice its median length; scape dark brown, becoming somewhat yellowish toward base, flagellum testaceous beneath on the more apical segments, piceous above; face below ocelli shining, punctures very minute and sparse on clypeus where they are distinct, hardly evident on other areas of face; pubescence of head and thorax rather short and thin, entirely white; thorax entirely green, without maculae; tegulae whitish-hyaline; wings whitish-hyaline, veins and stigma nearly colorless and very obscure, stigma narrowly margined with brown, first inter-cubitus forked to form a small intercalary cell; legs piceous in large part, front tibiae yellow anteriorly, and all tarsi yellow; scutum and scutellum shining, punctures sparse and exceedingly minute and inconspicuous, hardly visible; pleura somewhat shining, punctures quite sparse and obscure; abdominal terga somewhat shining, apical rims rather narrowly depressed but dark, the more apical segments with very minute, sparse punctures; sterna 7

and 8 much as in *floridensis* (fig. 79); gonostyli short, compressed, more or less rounded apically, not equalling in length the slender penis valves, cuspis of volsellae compressed, nearly equalling the gonostyli in length, digitus slender, well developed.

DISTRIBUTION—North Carolina, Florida, Alabama and Mississippi, in June.

FLOWER RECORDS—*Ceanothus*, *Cyrilla* and *Oxydendrum*.

Perdita (Alloperdita) novae-angliae
Viereck

(Figs. 72 & 73)

Perdita novae-angliae Viereck, 1907. Ent. News 18, p. 394. ♀ ♂.

Perdita novae-angliae Viereck, 1917. Amer. Mus. Nat. Hist. Bul. 37, p. 241.

Perdita novae-angliae Cockerell, 1923. Amer. Mus. Novitates 66, p. 2.

Perdita novae-angliae Timberlake, 1928. Amer. Mus. Novitates 321, p. 7.

Perdita (Alloperdita) novae-angliae Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 275.

FEMALE—Length 6 mm.; head and thorax green, abdomen piceous, maculae pale yellow; face about one-fourth longer than distance between eyes; eyes subparallel; upper portion of cheeks subequal to eyes in width, but becoming very narrow below; vertex very narrow, space between its hind margin and lateral ocelli less than their diameter; foveae narrow and elongate, deep and distinct; mandibles rather slender and elongate, pale yellow, becoming ferruginous at tip; labrum dark; clypeus protruding more than one-half below suborbital line, with a median yellow stripe and a pair of lateral, subapical maculae, otherwise dark; facial maculae small, adjacent to clypeal margin and quite remote from lower margin of eye, or in some specimens extending from clypeus to eye, not attaining level of upper margin of clypeus; lower portion of face and cheeks polished, punctures exceedingly minute and quite sparse, upper portion less shining, punctures minute and rather sparse; scape yellow anteriorly, flagellum piceous above, brownish-testaceous beneath; pubescence of head and thorax rather short and thin, entirely white; thorax without maculae; tegulae whitish-hyaline, wings whitish, veins and stigma very pale yellow, first transverse cubitus forked, resulting in a small, triangular, intercalary cell; legs largely dark, front tibiae yellow anteriorly and front tarsi yellow, mid basitarsi rather dark but mid and hind tarsi otherwise yellowish; scutum and scutellum polished, punctures minute but quite distinct, rather sparse; pleura less shining, punctures about as those of scutum; abdom-

inal terga 2-4 with transverse, lateral, yellow maculae, well separated medially, those on tergum 4 very small and widely separated; punctures of basal terga very minute and obscure, hardly evident, the more apical terga more distinctly punctate.

MALE—Length 5 mm.; head and thorax green, abdomen brownish, maculae much reduced or absent; face about one-fourth longer than distance between eyes; eyes subparallel; cheeks above subequal to eyes in width, but becoming very narrow below; vertex very narrow, space between lateral ocelli and its hind margin subequal to their diameter; foveae very short, located near top of eye, quite deep and distinct; mandibles yellow, becoming ferruginous at extreme tip; labrum yellow; clypeus protruding quite strongly below suborbital line, with a small, subapical, median, yellowish macula, sometimes absent, and latero-apical angles yellow, otherwise dark; facial maculae entirely lacking; scape yellowish anteriorly, flagellum brownish below, becoming somewhat darker above; cheeks and lower portion of face polished, punctures exceedingly minute, sparse and indistinct, upper portion less shining, punctures somewhat closer but still very minute; pubescence of head and thorax short and thin, entirely white; thorax without maculae; tegulae whitish-hyaline; wings whitish, veins and stigma very pale yellow and obscure, stigma margined with somewhat brighter yellow, first transverse cubitus forked, resulting in a small, triangular, intercalary cell; legs mainly dark, front tibiae yellow anteriorly and all tarsi yellow; scutum and scutellum polished, punctures very minute but quite distinct, rather sparse; pleura less shining, punctures somewhat closer; abdomen without maculae, the basal tergum impunctate, the more apical terga with barely visible punctures; apical margin of sternum 6 very slightly emarginate medially; sternum 7 with a large, semicircular, median, apical emargination; sternum 8 quite broadly truncate and incurved apically (much as in *obscurata*, fig. 79); gonocoxites bulbous, broadly truncate apically, the gonostyli rather short, compressed, apex more or less rolled, penis valves long and slender, volsellae nearly equalling gonostyli in length, only partially separated into cuspis and digitus.

DISTRIBUTION — Massachusetts to Florida; May to July.

FLOWER RECORDS—*Batodendron*, *Lyonia* and Huckleberry.

Perdita (Alloperdita) obscurata
Cresson

(Figs. 72-74 & 79)

Perdita obscurata Cresson, 1878. Amer. Ent. Soc. Trans. 7, p. 70. ♀ ♂.

Perdita obscurata Cockerell, 1896. Acad. Sci. Phila. Proc. 48, p. 59.

Perdita carolina Timberlake, 1952. Ent. Soc. Washington, Proc. 54, p. 199. ♀ ♂. New synonymy

Perdita (Alloperdita) carolina Timberlake, 1956. Univ. Calif. Pub. Ent. 11, p. 274.

FEMALE—Length 7 mm.; head and thorax green, abdomen piceous, maculae bright yellow; face considerably longer than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; vertex very narrow, lateral ocelli located practically on its hind margin; foveae narrow and elongate, somewhat broader at lower end; mandibles bright yellow, becoming ferruginous at tip; labrum piceous; clypeus protruding fully two-thirds below suborbital line, largely piceous, but with a fine, median, interrupted, yellow line and small inconspicuous maculae at extreme sides; facial maculae small, not extending much above upper margin of clypeus; scape brownish, becoming somewhat yellowish at base; punctures of face below antennae sparse and fine but distinct, surface above antennae less shining, punctures somewhat closer but rather shallow, those on cheeks above minute and quite sparse, becoming somewhat more distinct below; pubescence of head and thorax erect, rather thin, entirely white; thorax entirely green, without maculae; tegulae yellowish-hyaline; wings whitish-hyaline, veins and stigma pale yellow, 1st intercubitus more or less forked to form a small intercalary cell, but this sometimes lacking; legs dark, the front tibiae yellow anteriorly, and all tarsi yellow; scutum and scutellum shining, punctures fine and distinct, quite sparse on scutum posteriorly but becoming somewhat closer otherwise; pleura less shining, punctures somewhat closer but rather shallow; terga 2-4 with conspicuous, bright yellow, transverse, basal maculae, these slightly interrupted at mid line; the more basal terga impunctate, punctures on the more apical terga becoming more distinct although fine.

MALE—Length 7 mm.; head and thorax green, abdomen piceous, maculae bright yellow; face slightly longer than distance between eyes; eyes subparallel; cheeks slightly broader than eyes; vertex very narrow, ocelli located practically on its hind margin; foveae small and shallow, located near top of eyes; mandibles bright yellow, becoming ferruginous at tip; labrum and clypeus entirely bright yellow; facial maculae large and conspicuous,

filling area between clypeus and margin of eye, terminating acutely on eye margin at level of antennae; subantennal areas and lower margin of supraclypeal area yellow; scape entirely yellow, flagellum testaceous beneath, more brownish above; punctures of face below antennae very sparse and fine, area above antennae rather dull, punctures closer but much more obscure, those on cheeks above very fine and sparse, becoming more close, coarse and deep below; pubescence of head and thorax very fine, erect and thin, entirely white; thorax green except for small yellow maculations on pronotal tubercles; tegulae yellowish-hyaline; wings whitish-hyaline, veins and stigma pale yellowish or testaceous, stigma margined with dark brown; legs largely yellow, but hind coxae dark on outer surface, mid and hind femora with dark posterior blotches, and hind tibiae dark posteriorly, otherwise bright yellow; scutum and scutellum polished, very finely but distinctly punctate, punctures sparse on scutum posteriorly but becoming rather close otherwise; pleura less shining,

punctures rather shallow but somewhat closer; abdominal terga 2-4 with basal, transverse, bright yellow maculae which are slightly interrupted at mid line; basal terga with very minute punctures, these becoming somewhat more distinct but still rather sparse on the more apical segments; apical margin of sternum 6 slightly incurved; sternum 7 with a very broad and deep emargination, the central part being practically linear in form; sternum 8 rather broad apically, with a rounded and rather deep emargination; gonocoxites bulbous, rounded apically, gonostyli compressed, tips narrowly rounded, more or less recurved, considerably shorter than the slender, elongate penis valves, volsellae much shorter than gonostyli, separated into a somewhat compressed cuspis and slender, elongate digitus.

DISTRIBUTION—North Carolina to Texas, in May.

FLOWER RECORDS — *Batodendron*, *Diospyros* and *Stillingia*.

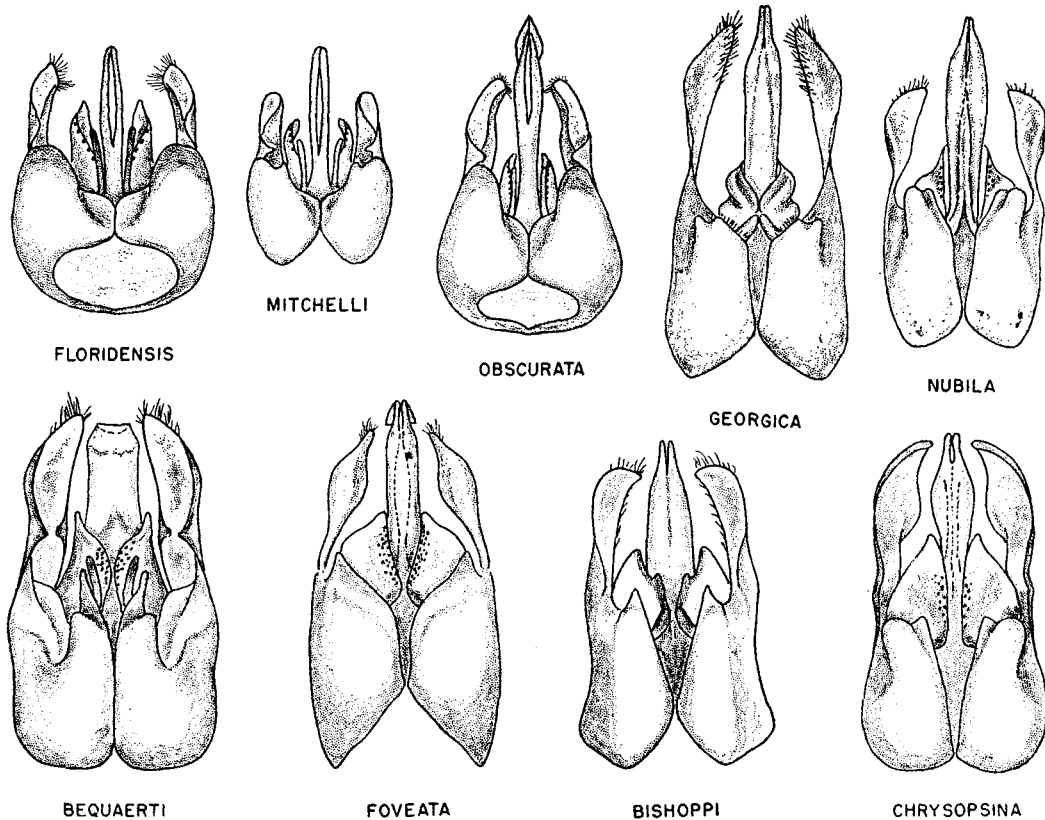


Figure 74—Genital armature in males of *Perdita*.

Perdita (Perdita) consobrina
consobrina Timberlake

(Figs. 76-79)

Perdita consobrina Timberlake, 1928. Amer. Mus. Novitates 321, p. 3. ♀.

Perdita consobrina consobrina Timberlake, 1952. Ent. Soc. Washington, Proc. 54, p. 202. ♂.

FEMALE—Length 6 mm.; head and thorax green, abdomen brownish-piceous, maculae yellow; face somewhat longer than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; vertex rather broad, lateral ocelli slightly nearer its hind margin than to eyes; foveae obscure, being extremely narrow, but elongate; mandibles yellow, becoming ferruginous at tips; labrum dark across base, yellow apically; clypeus yellow, with a pair of elongate, oblique, subbasal, dark bands; lateral face marks filling area between eye and clypeus below, extending narrowly up inner margin of eye to level of antennae where they are truncate; scape narrowly yellow anteriorly, otherwise dark, flagellum testaceous beneath, rather dark brownish above; cheeks below and lower portion of face somewhat shining, punctures very fine, well separated in general but quite faint, upper portion of face and vertex densely tessellate, without evident punctures; pubescence of head and thorax short, thin, whitish below, becoming more yellowish above; posterior margin of pronotum with a pair of small, lateral, yellow maculae, tubercles yellow, thorax otherwise green; tegulae yellowish-hyaline; wings subhyaline, veins and stigma pale testaceous, stigma margined with darker brown; legs dark in general, but femora narrowly yellow apically, front and mid tibiae yellow anteriorly, hind tibiae dark, front tarsi somewhat yellowish, but others largely dark; scutum and scutellum dull, densely tessellate, more olive green, punctures close, exceedingly minute and obscure, hardly visible; pleura and propodeum more bluish-green, pleura somewhat shining, punctures exceedingly minute and rather close, but visible; discs of abdominal terga 1-5 with lateral yellow maculae, those of 2 and 3 rather widely separated medially, those on 1, 4 and 5 separated but very slightly, discs somewhat shining, with hardly visible punctures toward base, but with more distinct punctures on the more apical terga.

MALE—Length 5 mm.; head and thorax green, abdomen piceous with greenish reflections, maculae yellow; face slightly longer than distance between eyes; eyes subparallel; cheeks very slightly broader than eyes; vertex broad, lateral ocelli subequally distant from its hind margin and from eyes; foveae very

short, rather shallow and obscure; mandibles, labrum, clypeus and entire face below a line just at level of antennae, yellow; scape yellow anteriorly, darker posteriorly, flagellum yellowish beneath, darker above; cheeks and lower portion of face somewhat shining, with very shallow and indistinct, barely visible punctures, upper part of face and vertex densely tessellate and without evident punctures; pubescence of head and thorax very short, thin, entirely pale, somewhat yellowish above; posterior margin of pronotum with a pair of very small, lateral, yellow maculae, and tubercles yellow, thorax otherwise green; tegulae yellowish-hyaline; wings subhyaline, veins and stigma pale testaceous, stigma margined with darker brown; femora narrowly yellow apically, coxae and trochanters largely yellow, front and mid tibiae yellow anteriorly, hind tibiae dark, front and mid tarsi yellowish, hind tarsi dark; scutum and scutellum dull, densely tessellate, punctures exceedingly minute and obscure, hardly visible; pleura and propodeum more bluish-green, pleura somewhat shining, punctures exceedingly minute and indistinct, but visible; discs of terga 1-3 with narrow, transverse, yellow maculae which are very slightly separated medially, punctures of basal terga hardly visible, these becoming somewhat more distinct but still very minute on the apical terga; apical margin of sternum 6 broadly emarginate; sternum 7 with a pair of acute lateral projections, delimiting a broad and deep, rectangular, apical emargination; apical portion of sternum 8 subtriangular in form, apex very narrowly rounded; gonostyli slender, rounded apically, the slender penis valves only very slightly longer, slightly dilated medially but not angulate, cuspis of volsellae slightly longer than digitus, these quite slender and rather short, gonocoxites somewhat produced apically to form short, rounded lobes.

DISTRIBUTION—North and South Carolina; September and October.

FLOWER RECORDS—*Chrysopsis*, *Gerardia*, *Haplopappus*, *Heterotheca* and *Kuhnistera*.

Perdita (Perdita) consobrina lepida
Timberlake

Perdita consobrina lepida Timberlake, 1952. Ent. Soc. Washington, Proc. 54, p. 203. ♀ ♂.

This form is very similar to typical *consobrina*, showing only minor differences in coloration. In the female the supraclypeal area is yellow and the facial maculae are larger, the dark markings of the clypeus being reduced. In the male the pronotum

has a pair of quite distinct yellow maculae, and the lateral face marks extend obliquely up the inner margin of the eye to somewhat above the level of the antennae.

DISTRIBUTION—Florida; September to November.

Perdita (Perdita) discreta Timberlake

(Figs. 76 & 77)

Perdita discreta Timberlake, 1954. Ent. News 65, p. 14. ♀.

FEMALE—Length 6 mm.; head and thorax green, abdomen piceous, maculae ivory; face considerably longer than distance between eyes; eyes subparallel; cheeks slightly narrower than eyes; vertex quite broad, but lateral ocelli considerably nearer its hind margin than to eyes; foveae elongate and very narrow, deep and distinct; mandibles pale yellow, becoming ferruginous apically; labrum dark; clypeus protruding about one-half below sub-orbital line, rather strongly convex, piceous, with a median, ivory, longitudinal band and a pair of lateral, transverse, subapical bands; facial maculae filling most of area between clypeus and lower orbits, extending narrowly up eye margin to level of antennae, nearly touching foveae; scape entirely dark, flagellum piceous above, becoming somewhat more brownish apically beneath; face below antennae somewhat shining, punctures of supra-clypeal area distinct but very fine and rather sparse, those on clypeus about fine and sparse, face above antennae densely tessellate, without visible punctures; cheeks somewhat shining, with very minute and rather sparse punctures; pubescence of head and thorax rather short, thin, erect, somewhat yellowish above, becoming whitish beneath; thorax without pale maculations; scutum and scutellum densely tessellate, punctures extremely minute and vague, hardly visible, pleura somewhat more shining, with minute and rather sparse, evenly distributed punctures; propodeum finely tessellate and impunctate; tegulae yellowish-hyaline; wings faintly dusky, veins and stigma testaceous; legs dark, front tibiae with an anterior yellow stripe, and apical tarsal segments on front legs somewhat yellowish; abdominal terga 2-4 with lateral, widely separated, basal, whitish maculations, basal tergum with a pair of submedian, transverse, narrow stripes, apical margins of the terga rather narrowly depressed, these areas somewhat paler in color, discs of the terga with exceedingly minute and rather vague punctures, these somewhat closer on the more apical segments.

MALE—Length 5 mm.; head and thorax green, abdomen reddish-piceous, maculations

bright yellow; face considerably longer than distance between eyes; eyes subparallel; cheeks very slightly narrower than eyes; vertex rather broad, but hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae very small but deep and distinct; mandibles, labrum and clypeus bright yellow, mandibles becoming ferruginous apically; facial maculae large and conspicuous, filling area between lower portion of clypeus and eyes, extending up margin of eye to level of antennae, where they terminate obliquely; scape yellow anteriorly, flagellum yellowish-testaceous beneath, more brownish-piceous above; face below antennae quite smooth but without evident punctures, area above antennae densely tessellate, dull and impunctate, cheeks more shining, with minute and rather close punctures; pubescence of head and thorax very short, rather thin and entirely white; thorax entirely green, without maculations; scutum and scutellum densely tessellate, punctures exceedingly minute and obscure, hardly visible; pleura more shining, with a few scattered, minute and vague punctures, propodeum rather smooth, finely tessellate and impunctate; tegulae testaceous-hyaline; wings subhyaline, veins and stigma pale testaceous, stigma margined with brown; coxae and trochanters yellow, but hind coxae with dark, basal areas, femora piceous over most of length, but with yellow base and apex, front pair yellow anteriorly; front and mid tibiae yellow anteriorly, piceous posteriorly, hind tibiae and tarsi entirely dark, front and mid tarsi entirely yellow; abdominal terga 1-5 with transverse, subbasal, narrow maculae, those rather widely separated along mid line, the pair on 5th tergum quite small; discs of terga quite smooth, the more basal plates impunctate, but with exceedingly minute and rather sparse punctures becoming evident on the more apical segments, apical rims very narrowly depressed; apical margin of sternum 6 rather narrowly and deeply emarginate medially; sterna 7 and 8 much as in *polygonellae* (fig. 00); gonocoxites of genital armature somewhat bulbous, narrowly truncate apically, gonostyli rather slender apically, but the base compressed, about attaining tip of penis valves which are slender apically, broadly dilated toward base where they are angulate laterally, volsellae with distinct, somewhat compressed cuspis and slightly shorter digitus.

DISTRIBUTION — Coastal Plain and Sandhills of North Carolina; September and October.

FLOWER RECORDS—*Haplopappus*.

Perdita (Perdita) gerardiae Crawford

(Figs. 76-79)

Perdita gerardiae Crawford, 1932. Ent. Soc. Washington Proc. 34, p. 75. ♀ ♂.

FEMALE—Length 7 mm.; head and thorax dull greenish, abdomen piceous, maculae ivory; face slightly longer than distance between eyes; eyes parallel; cheeks slightly broader than eyes; vertex broad, lateral ocelli only slightly nearer its hind margin than to eyes; facial foveae narrow and elongate, very shallow; mandibles ivory basally, becoming reddened near middle and toward apex; labrum blackish; clypeus ivory except for the rather broad upper margin and a pair of obscure lateral spots; facial maculae very short, truncate above, barely attaining level of upper margin of clypeus; antennae entirely dark; surface of face dull and tessellate, clypeus and supraclypeal area with scattered, very shallow and rather fine punctures, face above antennae densely tessellate, punctures shallow and obscure, cheeks somewhat shining; pubescence of head and thorax very short and thin, entirely pale, being somewhat yellowish above; dorsum of thorax olive green, pleura and propodeum more bluish green, tubercles more piceous; tegulae dull yellowish-hyaline; wings subhyaline, stigma testaceous bordered with piceous, veins testaceous to piceous; legs piceous, front and hind basitarsi slender, mid basitarsi more robust, front tibiae yellowish anteriorly and mid tibiae with a basal yellow spot; dorsum of thorax tessellate, very minutely, closely and obscurely punctate; pleura somewhat more shining, with more sparse and distinct punctures; abdominal terga 2 and 3 with small, widely separated, yellowish, lateral maculae, those on 3 more or less reduced or absent; discs of terga smooth, somewhat shining, punctures exceedingly minute, obscure and quite sparse.

MALE—Length 6 mm.; head and thorax green, abdomen piceous, maculae ivory; face slightly longer than distance between eyes; eyes parallel; cheeks much broader than eyes, not tuberculate; vertex broad, lateral ocelli subequally distant from its hind margin and the eyes; facial foveae small, shallow and very vague; mandibles rather short, ivory, becoming reddened at tips; labrum ivory; clypeus ivory, quite short, projecting about one-half below suborbital line, upper margin slightly infused with brown; lateral maculae entirely filling area between clypeus and eye margin, subtruncate above, terminated about at level of upper margin of clypeus; scape entirely dark, flagellum testaceous beneath, piceous above; face above antennae densely tessellate, without evident punctures, area be-

low antennae with very fine and obscure punctures, vertex and cheeks somewhat more shining, punctures inevident; pubescence of head and thorax thin and rather short, entirely pale, becoming somewhat more dense on cheeks below and venter of thorax; thorax entirely greenish; tegulae pale testaceous-hyaline; wings subhyaline, stigma testaceous, bordered with piceous, veins testaceous to piceous; legs piceous, front and mid tarsi entirely and tibiae anteriorly yellow; dorsum of thorax dull tessellate, more olive green, with very minute and close punctures; pleura and propodeum bluish-green, more shining, pleura with minute and relatively sparse punctures; abdominal terga 2 and 3 with small, widely separated, lateral maculae, those on 3 more or less reduced or absent; discs of abdominal terga somewhat shining, rather smooth, punctures exceedingly minute, sparse and obscure; apical margin of sternum 6 broadly and deeply emarginate; sternum 7 with a very deep median emargination, lateral angles of this area produced to form two elongate spinose processes; apical portion of sternum 8 broadly triangular, acute apically, with a rather slender pedicel separating it from the broadened base; gonostyli rather short and robust, somewhat compressed, short-setose beneath toward tip, penis valves quite slender, not quite attaining tips of gonostyli, cuspis and digitus of volsellae distinct.

DISTRIBUTION—North Carolina to Florida and Mississippi; September and October.

FLOWER RECORD—*Gerardia*.

Perdita (Perdita) gerhardi gerhardi Viereck

(Figs. 76-79)

Perdita gerhardi Viereck, 1904. Ent. News, 15, p. 21. ♀ ♂.

FEMALE—Length 5 mm.; head and thorax ferruginous, base of abdomen dark ferruginous basally, becoming piceous apically; length of face slightly greater than distance between eyes; eyes parallel; cheeks very slightly broader than eyes; vertex rounded, hind margin indefinite, ocelli located at top of head, lateral ocelli slightly nearer eyes than to each other; foveae elongate, quite deep and distinct, infused with greenish, as also an adjacent spot between ocelli and antennae; mandibles, labrum and clypeus yellowish-ferruginous; scape entirely yellowish-ferruginous, flagellum yellowish beneath, piceous above; cheeks and lower portion of face somewhat shining, with very minute and indistinct but visible punctures, surface above antennae rather dull, without evident punctures; pubes-

cence of head and thorax short, thin and entirely pale; surface of entire thorax rather dull but smooth, without evident punctures; tegulae yellowish-hyaline; wings subhyaline, veins and stigma very pale yellowish; legs entirely ferruginous, spurs yellow; abdomen without distinct maculae, discs of the more basal terga smooth but rather dull, impunctate, the more apical terga somewhat shining, with very minute and indistinct punctures.

MALE—Length 4.5 mm.; entire body rather pale yellow; length of face subequal to distance between eyes; eyes slightly convergent below; cheeks slightly broader than eyes, lacking tubercles; vertex rounded, hind margin indefinite, lateral ocelli subequally distant from eyes and each other; foveae small, rounded but quite distinct, fuscous in contrast to the otherwise yellow integument; mandibles, labrum, and entire face below antennae whitish; scape yellow and flagellum beneath yellowish-testaceous, very slightly darker above; lower portion of face with some barely visible, shallow punctures, but head otherwise impunctate; pubescence of head and thorax short, thin and entirely white; tegulae yellowish-hyaline; wings whitish, with pale yellowish veins and stigma, the stigma margined with pale brown; legs entirely yellow; thoracic integument smooth but rather dull, without visible punctures; abdominal terga smooth but rather dull toward base, discs of the more apical terga somewhat shining, punctures inevident; sternum 7 with a very narrow and deep, median, apical emargination, apex on each side acute; apical portion of sternum 8 triangular in form, apex attenuated to form an elongate, slender tip, basal and apical parts connected by a rather narrow pedicel; gonocoxites somewhat bulbous, rather narrowly truncate apically, basal part of gonostyli compressed and dilated, apical part slender, elongate and slightly curved, tip acute, penis valves very slender and elongate, about equal in length to gonostyli, volsellae partially divided to form a distinct, compressed cuspis and a short, inconspicuous digitus.

DISTRIBUTION—Wisconsin and Indiana; July and August.

FLOWER RECORD—*Monarda punctata*.

***Perdita (Perdita) gerhardi arenicola*
Timberlake**

Perdita gerhardi arenicola Timberlake, 1929.
New York Ent. Soc. Journ. 37, p. 119. ♀ ♂.

This form of *gerhardi* differs from the typical form primarily in coloration. In the female the head and thorax are yellow in large part, the legs entirely so. There are large green blotches on the face adjacent to the foveae, a greenish-piceous area just anterior to each mid coxa, and some darker infusions on the scutum laterally, with all

other areas of head and thorax bright yellow. The abdomen also is yellow in large part, with only the depressed apical rims of the terga brownish-ferruginous, forming quite conspicuous transverse bands on a yellow field. The male resembles that of typical *gerhardi* rather closely, but differs in having large green blotches on the face above the antennae, and the scutum is yellow medially, with extensive green areas on each side, dividing the plate into three nearly equal parts.

DISTRIBUTION—Illinois; August.

***Perdita (Perdita) gerhardi monardae*
Viereck**

(Figs. 76 & 77)

Perdita monardae Viereck, 1904. Ent. News 15, p. 22. ♀ ♂.

Structurally this subspecies is very similar to typical *gerhardi* but differs from it conspicuously in coloration. In both sexes the upper portion of the face and cheeks, and the thorax in large part, are dark greenish, with the abdomen having prominent transverse yellow maculae on an otherwise dark brownish field. In the female the cheeks are almost entirely greenish, having but a small yellow macula at lower end back of eye, and the pleura are greenish except for a small yellow spot just beneath wing bases. The posterior margin of the pronotum and tubercles are yellow in both sexes. In the female the femora are dark, and the tibiae dark at least posteriorly. In the male the lower half of the cheeks are yellow, and the pleura have a large median yellow blotch, while the femora are largely yellow.

DISTRIBUTION—New Jersey; August.

FLOWER RECORD—*Monarda*.

***Perdita (Perdita) halictoides* Smith**

Figs. 76-79

Perdita halictoides Smith, 1853. Cat. Hym. Brit. Mus. 5, p. 128. ♀.

Perdita maura Cockerell, 1901. Entomologist 34, p. 191. ♂ ♀. New synonymy.

Perdita maura Crawford, 1903. Canad. Ent. 35, p. 335.

Perdita halictoides Cockerell, 1904. Canad. Ent. 36, p. 303.

Perdita bisignata Cockerell, 1922. Amer. Mus. Novitates 33, p. 11. ♀.

Perdita maura Cockerell, 1922. Ann. Mag. Nat. Hist. (9) 10, p. 268.

Perdita maura Timberlake, 1928. Hawaiian Ent. Soc. Proc. 7, p. 151.

Perdita halictoides Timberlake, 1928. Hawaii. Ent. Soc. Proc. 7, p. 155.

Perdita maura Timberlake, 1928. Amer. Mus. Novitates 321, p. 7.

Perdita maura Timberlake, 1929. N. Y. Ent. Soc. Journ. 37, p. 122.

Zaperdita maura Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press. (flower records)

Perdita maura Timberlake, 1958. Univ. Calif. Pub. Ent. 14, p. 370.

Perdita halictoides Timberlake, 1958. *Ibid.*, p. 371.

FEMALE—Length 4 mm.; head and thorax bluish-green, abdomen piceous, without conspicuous maculae; face slightly longer than distance between eyes; eyes parallel; cheeks subequal to eyes in width; vertex rather broad, lateral ocelli subequally distant from its hind margin and from eyes; foveae elongate, rather broad, quite deep and distinct; mandibles yellow with ferruginous tips; labrum dark ferruginous; clypeus rather narrow and elongate, protruding considerably below suborbital line, entirely piceous, with shallow, fine, well separated and rather inconspicuous punctures; facial maculae absent; scape obscurely yellowish at extreme base anteriorly, otherwise dark, the flagellum pale brownish beneath, somewhat darker above; face and cheeks rather dull, the punctures barely evident; pubescence of head and thorax extremely short and thin, entirely white; thorax entirely dark, without maculae; tegulae yellowish-hyaline; wings subhyaline, veins pale testaceous, the stigma rather dark brownish; legs dark brownish, front tibiae yellow anteriorly and front tarsi entirely yellow; scutum and scutellum dull, almost black, the punctures very fine and indistinct, rather sparse, pleura more bluish-green, dull above, but somewhat shining below, with very fine but somewhat closer punctures; abdomen piceous, tergum 3 with a pair of very small, lateral, yellow maculations, but these sometimes absent, depressed apical margins of the terga concolorous with discs, the more apical terga with some fine, scattered, inconspicuous punctures.

MALE—Length 5 mm.; head and thorax dark greenish-piceous, abdomen entirely piceous, face with yellow maculae; face slightly shorter than distance between eyes; eyes parallel; cheeks considerably broader than eyes, without tubercles; vertex quite broad, but lateral ocelli considerably nearer its hind margin than to eyes; foveae somewhat elongated, rather deep and quite distinct, located near top of eyes; mandibles yellow, with ferruginous tips; labrum yellow; clypeus yellow except for a pair of small, lateral, brownish spots above; face marks broad and conspicuous, filling area between clypeus and lower margin of eye, extending about to level of antennae on inner margin of eye, supraclypeal area yellow; scape yellow anteriorly,

dark posteriorly, flagellum testaceous beneath, slightly darker above; lower portion of face and cheeks somewhat shining, upper portion rather dull, punctures hardly evident; pubescence of head and thorax extremely short, thin, entirely white; thorax without distinct maculae, but tubercles somewhat brownish; tegulae yellowish-hyaline; wings subhyaline, veins pale testaceous, stigma somewhat more brownish; femora brownish, narrowly yellowish at tips, all tarsi and front tibiae entirely yellow, mid and hind tibiae brownish, becoming somewhat yellowish at base; scutum and scutellum dull, very dark green, punctures exceedingly minute, barely visible, rather sparse; pleura somewhat more shining, but with punctures even more indistinct; basal abdominal terga entirely impunctate, the more apical terga with barely evident, very minute and sparse punctures, surface of all somewhat shining; apical margin of sternum 6 broadly and shallowly incurved; apical margin of sternum 7 with a deep, broad, rounded, median emargination; apical portion of sternum 8 gradually narrowed to the rather abruptly and narrowly truncate tip, slightly compressed laterally, forming an obscure median longitudinal carina, tip with some short pubescence; gonostyli broad basally, rather short, somewhat curved and slender apically except for a dorsal, sharply compressed, rounded flange, penis valves slender apically, broadened toward base, slightly exceeding tips of the gonostyli, volsellae composed of a slender elongate cuspis and a considerably longer and much flattened digitus, the gonocoxites produced apically to form broadly rounded lobes.

DISTRIBUTION—Colorado to Illinois and Michigan, south to Florida; April to September.

FLOWER RECORDS—*Physalis*.

Timberlake (1958) in his revision of *Perdita* did not synonymize *maura* with *halictoides*, but indicated their close relationship, expressing the opinion that they probably are no more than forms of a single species. After his manuscript was submitted for publication, two males, apparently typical *maura*, came to hand which had been collected in Florida. These were sent to him, and he concurs in the opinion that they constitute strong evidence for the common identity of the two. Since these males were collected in the same general region in which typical *halictoides* females have been collected, it would seem that the differences between the two are due to individual variability rather than to any

geographic racial distinction. The type of *halietoides* in the British Museum has been compared with a female collected in Florida and no differences could be found.

Perdita (Perdita) maculigera maculipennis Graenicher

(Fig. 75 & 77)

Perdita maculipennis Graenicher, 1910. Canad. Ent. 42, p. 102. ♀.

FEMALE—Length 6 mm.; head and thorax green, abdomen piceous, maculae lemon yellow; length of face very slightly greater than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; lateral ocelli somewhat nearer the rather indefinite posterior margin of vertex than to eyes; foveae narrow and elongate, rather shallow and obscure; mandibles yellow with ferruginous tips; labrum dark; clypeus broadly convex, considerably broader than long, yellow except for a pair of longitudinal dark blotches on each side of middle; facial maculae quite extensive, rather broadly truncate above, terminated slightly above level of antennae; scape yellow anteriorly, flagellum testaceous beneath, fuscous above; lower portion of face somewhat shining, with very fine and rather close, indistinct punctures, upper portion and cheeks dull, without visible punctures; pubescence of head and thorax rather short and thin, entirely pale; posterior margin of pronotum with a pair of very small, lateral, yellow maculae, tubercles yellow, thorax otherwise green; tegulae yellowish-hyaline; wings whitish-hyaline, veins very pale yellowish and obscure, stigma piceous in large part, resulting in a conspicuous wing spot; femora narrowly yellow at tips, front and mid tibiae yellow anteriorly, front tarsi entirely so, legs otherwise piceous; scutum and scutellum somewhat shining, very minutely and rather closely punctate; pleura rather dull above, with sparse, minute and obscure punctures, becoming somewhat more shining and more closely punctate below; abdominal terga 2-4 with narrow, transverse, maculae which are rather widely separated medially and do not attain lateral margin of plates; basal tergum rather dull, very minutely, obscurely and sparsely punctate, the more apical terga becoming shining and somewhat more distinctly but still very minutely punctate.

MALE—Length 5.5 mm.; head and thorax green, abdomen brownish-piceous, maculae yellow; length of face very slightly greater than distance between eyes; eyes subparallel;

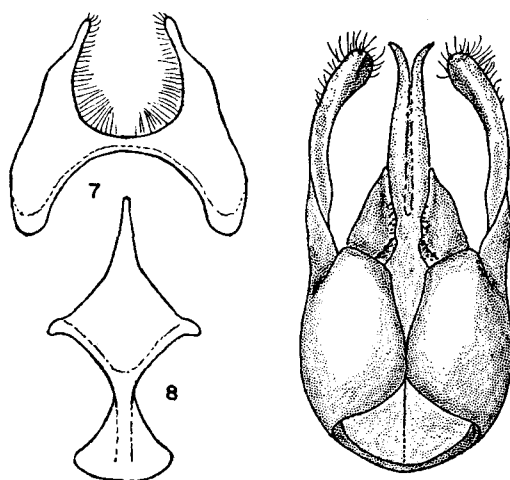


Figure 75
Genital armature and sterna 7 and 8 in males of
Perdita maculigera maculipennis.

cheeks subequal to eyes in width; lateral ocelli slightly nearer margin of vertex than to eyes; foveae inevident; mandibles, labrum, scape anteriorly, and entire face below a line slightly above level of antennae, yellow; flagellum yellow beneath, becoming piceous above; lower portion of face shining, with minute, obscure and rather sparse punctures, cheeks and upper part of face rather dull, punctures inevident; pubescence of head and thorax rather short and thin, entirely pale; posterior margin of pronotum largely yellow, extending onto and including tubercles; scutum yellow at extreme sides anteriorly, pleura with a small yellow spot beneath wing bases, and a large one posterior to front coxae; propodeum with a pair of small, lateral, yellow spots; tegulae yellowish-hyaline, with a rather large yellow spot; wings whitish-hyaline, veins pale yellowish and obscure, stigma largely piceous, resulting in a conspicuous wing spot; legs, including coxae, largely yellow, but femora and tibiae piceous in large part posteriorly, hind tarsi dark; scutum and scutellum shining, very minutely and quite sparsely punctate; pleura rather dull, with punctures more obscure; abdominal terga 2-5 with narrow, transverse, lateral maculae which are rather widely separated medially and do not attain lateral margin of plates; punctures of basal tergum hardly evident, the more apical terga becoming more shining, more distinctly and deeply although very finely punctate; sternum 6 deeply emarginate apically, width of emargination about a third total width of plate; sternum 7 with an extremely large, semicircular emargination which nearly divides the plate into two parts, angles on each side elon-

gate and slender; apical portion of sternum 8 triangular, apex attenuated, slightly flexed and strongly compressed; gonocoxites swollen, produced and subtruncate apically, gonostyli slender and elongate, somewhat club-shaped apically, penis valves slender and elongate, equalling gonostyli in length, volsellae very short, partially divided to form a compressed cuspis and a short, poorly developed digitus.

DISTRIBUTION—Minnesota to Illinois and Michigan; June and July.

Perdita (Perdita) maculigera bilineata Timberlake

(Figs. 76 & 77)

Perdita maculipennis var. *bilineata* Timberlake, 1929. N. Y. Ent. Soc. Journ. 37, p. 121. ♀ ♂.

This form differs from the other eastern form, *maculipennis*, chiefly in the more extensive yellow coloration. In both sexes there are a pair of longitudinal yellow lines near the center of the scutum, yellow blotches on the lateral faces of the propodeum, and the abdominal maculae are much more extensive, nearly meeting along the mid line of the abdomen and reaching practically to the extreme sides of each tergum. In the female the labrum is yellow in part, and in the male the pleura are in large part yellow. These are all in contrast to the condition in *maculipennis* which lacks the yellow lines on the scutum, and the abdominal maculae are relatively small and restricted.

DISTRIBUTION—Kansas, Missouri and Illinois.

Perdita (Perdita) octomaculata (Say)

(Figs. 76-79)

Panurgus 8-maculatus Say, 1824. In Keating, Narr. Long's 2nd Exped., 2. p. 350. ♀ ♂.

Perdita octomaculata Dalla Torre, 1896. Cat. Hym. 10, p. 173 (Emend.).

Perdita octomaculata Robertson, 1929. Flowers and Insects, Lancaster, Pa., Science Press (flower records)

FEMALE—Length 7 mm.; head and thorax green, abdomen piceous, maculae bright yellow; length of face slightly greater than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; vertex rather broad, lateral ocelli slightly nearer its rounded hind margin than to eyes; foveae narrow, rather deep and distinct; mandibles yellow basally, becoming ferruginous at tip; labrum

entirely dark; clypeus piceous, with a median, longitudinal, yellow stripe and a pair of small, subapical, lateral, yellow spots; facial maculae quite extensive, extending narrowly along inner margin of eyes to level of antennae; scape entirely dark, flagellum testaceous beneath, piceous above; lower portion of face and cheeks somewhat shining, punctures fine, very shallow and indistinct, well separated but hardly sparse on face, cheeks nearly impunctate, upper portion of face tessellate and impunctate; pubescence of head and thorax short, thin, sparse, whitish below, becoming more yellowish above; posterior margin of pronotum with a pair of rather large, yellow maculae laterally, tubercles yellow, thorax otherwise dark olive-green; tegulae yellowish-hyaline, with a rather large yellow spot anteriorly; wings subhyaline, veins and stigma brownish to testaceous, margin of stigma somewhat darker; legs mostly dark, femora narrowly yellow apically, front tibiae yellow anteriorly and mid tibiae toward the base anteriorly; scutum and scutellum dull, tessellate, punctures exceedingly minute and obscure, hardly visible; pleura dull and tessellate above, becoming somewhat shining below, minutely and very obscurely punctate; abdominal terga 1-4 with lateral yellow maculae, distinctly separated medially, integument rather dull, without distinct punctures.

MALE—Length 6 mm.; head and thorax green, abdomen brownish-piceous, maculae bright yellow; length of face somewhat greater than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; vertex rather broad, lateral ocelli slightly nearer its hind margin than to eyes; foveae short, but rather broad; mandibles yellow, becoming ferruginous at extreme tips; labrum yellow; clypeus yellow except for a pair of very small, lateral, dark spots; facial maculae large and conspicuous, obliquely truncate above at level of antennae; scape yellow anteriorly, piceous posteriorly, flagellum testaceous beneath, becoming piceous above; lower portion of face somewhat shining, punctures very shallow and obscure, well separated, cheeks somewhat shining, with minute and indistinct punctures, upper part of face tessellate and impunctate; pubescence of head and thorax very short, thin, entirely pale, somewhat yellowish above; pronotum with a pair of small, lateral, yellow maculae, and tubercles yellow, thorax otherwise dark olive-green; tegulae testaceous posteriorly, becoming darker anteriorly; wings subhyaline, veins and stigma brownish to testaceous, margin of stigma somewhat darker; femora and tibiae mostly piceous posteriorly, yellow anteriorly, front and mid tarsi entirely yellow, hind tarsi darker; scutum and scutellum finely tessellate, punctures hardly evident;

pleura dull above, becoming somewhat shining below, without distinct punctures; abdominal terga 1-5 with lateral, transverse, yellow maculae, rather widely separated medially except on the 1st, integument somewhat shining, with scattered, minute and obscure punctures; sternum 6 broadly and shallowly incurved apically; sternum 7 with a rather deep, rounded, median emargination apically, sides acute apically; sternum 8 rather broadly rounded apically; gonostyli rather slender, slightly curved, compressed, slightly exceeded by the narrow, elongate penis valves, cuspis and digitus of volsellae rather short, nearly equal in length, the gonocoxites produced apically to form rather broadly rounded lobes.

DISTRIBUTION—New Brunswick to Georgia, west to Minnesota and Mississippi; July to October.

FLOWER RECORDS—*Aster*, *Euthamia*, *Monarda* and *Solidago*. Robertson (1929) records this species also on *Bidens*, *Boltonia*, *Eupatorium* and *Lycopus*.

Perdita octomaculata terminata is a western form described by Cockerell (1922, Amer. Mus. Novitates 33, p. 8). He based the distinction on the paler markings on the abdomen of the female, and in the presence of a supraclypeal maculation in the male. There is a considerable range of variation with respect to this character in the male, occasional specimens collected in the East having more or less well developed supraclypeal marks, and in consequence there is some doubt concerning the validity of this subspecies.

*Perdita (Perdita) perpallida
citrinella* Graenicher

(Figs. 76 & 78)

Perdita citrinella Graenicher, 1910. Canad. Ent. 42, p. 103. ♀.

Perdita citrinella Crawford, 1912. Canad. Ent. 44, p. 359. ♀ ♂.

FEMALE—Length 6 mm.; entire body yellowish-testaceous, with piceous maculae; face slightly longer than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; vertex rather broad, lateral ocelli subequally distant from its hind margin and from eyes; foveae narrow and elongate, dark fuscous; face with a pair of large fuscous blotches between antennae and ocelli, otherwise testaceous; mandibles, labrum, clypeus and lower inner orbits more whitish-testaceous; outer surface of scape testaceous, inner surface fuscous, flagellum testaceous beneath, slightly more reddish above; cheeks below with a large

fuscous blotch; surface of head smooth but rather dull, punctures hardly visible; pubescence of head and thorax extremely short, thin and sparse, entirely white; thorax mainly testaceous, but central portion of mesothorax fuscous, scutellum and metanotum pale yellow; tegulae whitish-hyaline; wings whitish-hyaline, veins and stigma pale yellow; legs largely yellow, but femora fuscous beneath; thoracic integument smooth but rather dull, with exceedingly minute, well separated punctures; abdominal terga 1-3 largely pale yellowish, but with narrow, subapical bands of fuscous, tergum 4 largely fuscous medially, becoming testaceous toward sides, all terga with narrow, apical, hyaline margins; abdominal integument smooth, but rather dull, punctures hardly visible.

MALE—Length 5 mm.; entire body yellow, more or less tinged with ferruginous above, with limited area of fuscous; face slightly longer than distance between eyes; eyes subparallel; cheeks slightly broader than eyes; vertex broad, lateral ocelli subequally distant from its hind margin and eyes; foveae very short, fuscous in color; mandibles, labrum, clypeus and lower inner orbits pale whitish-yellow, upper portion of face and cheeks more lemon-yellow, with rounded fuscous blotches between ocelli and eyes and somewhat larger blotches above antennae; lower portion of cheeks fuscous; scape reddish-testaceous on outer side, more or less infused with fuscous on inner side, flagellum reddish-testaceous; entire head smooth but rather dull, punctures hardly visible; pubescence of head and thorax exceedingly short, thin and sparse, entirely white; scutum reddish-testaceous, with a pair of longitudinal fuscous stripes on each side, scutellum and metanotum more definitely yellow, with small piceous spots laterally; pleura yellowish-testaceous above, piceous below; tegulae whitish-hyaline; wings whitish, veins and stigma pale yellow or nearly colorless; front and middle legs largely testaceous, tibiae piceous on inner surface and femora on their lower surface, hind legs mainly piceous; thoracic integument smooth but rather dull, punctures hardly visible; abdominal terga with broad, transverse, testaceous bands, more or less narrowly piceous apically, basal tergum piceous at extreme base, apical margins of all terga narrowly hyaline, surface smooth and impunctate; sternum 7 with a rather narrow, deep, rounded, median emargination, the two side produced to form acute spinose processes; apical portion of sternum 8 triangular, broader than long; gonostyli quite slender, strongly compressed, tips narrowly subacute, about equal in length to the slender penis valves, volsellae very short, divided to form a compressed cuspis and a shorter, slender digitus.

DISTRIBUTION—Alberta to Wisconsin; July.

FLOWER RECORD—*Petalostemon*.

There is considerable variation of color in this species, with the piceous areas much reduced, if not entirely absent, and the ground color becoming pale yellow.

Perdita (Perdita) polygonellae
Timberlake

(Figs. 76-79)

Perdita polygonellae Timberlake, 1954. Ent. News 65, p. 12. ♀ ♂.

FEMALE—Length 5—5.5 mm.; head and thorax green, abdomen bright yellowish-testaceous, maculae pale yellow; face somewhat longer than distance between eyes above; eyes very slightly convergent below; cheeks somewhat narrower than eyes; vertex narrow, lateral ocelli separated from its hind margin by about their own diameter; facial foveae shallow and rather obscure, elongate, located very close to margin of eye; mandibles pale yellow, becoming ferruginous at tip; labrum yellow, with a median dark blotch; clypeus entirely yellow except for a pair of small dark spots; facial maculae large and conspicuous, terminating narrowly on eye margin slightly above level of antennae; apical half of supraclypeal area yellow; scape yellow anteriorly, flagellum dull testaceous beneath, becoming somewhat more brownish above; face below antennae smooth and somewhat shining, punctures scattered, very fine and obscure, area above antennae dull and tessellate, punctures very minute and obscure; cheeks somewhat shining, with extremely minute but rather close punctures, especially below; pubescence of head and thorax short, thin, entirely whitish; pronotum with a pair of conspicuous lateral maculae, and tubercles yellow, thorax otherwise entirely green; scutum and scutellum rather dull, very finely tessellate, punctures minute, rather sparse, but visible with sufficient magnification; pleura somewhat more shining, punctures about as on scutum; propodeum more shining, entirely impunctate; tegulae yellowish-hyaline; wings hyaline, veins and stigma pale testaceous to yellowish, stigma margined with darker brown; all femora largely dark posteriorly, yellow anteriorly and apically, trochanters and in part the coxae also, yellow, front and mid tibiae yellow anteriorly, piceous posteriorly, hind tibiae entirely piceous, front tarsi yellow, mid and hind tarsi dark; abdomen basally yellowish, becoming somewhat reddish-testaceous on the more apical segments, rims of terga rather narrowly depressed, these yellowish-hyaline, punctures evident only on the more apical segments.

MALE—Length 4 mm.; head and thorax green, abdomen yellowish-testaceous in large part, thoracic maculae yellow, facial maculae more ivory; length of face equal to distance between eyes above; eyes subparallel; cheeks slightly narrower than eyes; vertex rather narrow, lateral ocelli separated from its hind margin by somewhat more than their own diameter; foveae very small and short but quite conspicuous; mandibles ivory, becoming pale ferruginous at tip; labrum, clypeus, subantennal areas, supraclypeal area and lateral face marks ivory, resulting in most of the face below antennae being of that color; clypeus rather flat, located high on face, its lower margin about on the suborbital line; scape bright yellow, flagellum pale testaceous beneath, becoming somewhat more brownish-ferruginous above; face below antennae smooth, punctures scattered and sparse, barely visible, area above antennae densely tessellate, punctures somewhat closer, exceedingly shallow and obscure, those on the more shining cheeks hardly visible; pubescence of head and thorax short, very thin, entirely whitish; pronotum with small, lateral, yellow maculae on posterior margin, and tubercles yellow, thorax otherwise green; scutum and scutellum finely tessellate and somewhat shining, punctures exceedingly minute and obscure, hardly visible; pleura slightly more shining, but punctures very obscure; propodeum somewhat shining but impunctate; tegulae yellowish-hyaline; wings subhyaline, veins and stigma pale testaceous, stigma margined with darker brown; legs largely yellow, but femora with considerable dark areas posteriorly and front and mid tibiae somewhat less so, the hind tibiae yellow anteriorly, dark posteriorly, front and mid tarsi entirely yellow, hind tarsi dark; abdominal terga yellowish-testaceous, apical rims narrowly depressed and somewhat more reddish in color, punctures evident only on the more apical segments; sternum 7 very deeply and rather narrowly emarginate apically, the two apical angles much produced and spine-like; apical portion of sternum 8 subtriangular, tip acute, the narrower basal part connected to the apical part by a rather narrow pedicel; gonocoxites somewhat bulbous, acute apically, gonostyli somewhat compressed, rounded apically, the slender penis valves of about equal length, these slightly angulate toward base laterally, volsellae short, distinctly separated into a compressed cuspis and a more slender and elongate digitus.

DISTRIBUTION—Coastal plain of North Carolina; September and October.

FLOWER RECORD—*Polygonella polygama*.

This is a handsome little bee, unique among the eastern *Perditas* in the coloration of the abdomen.

***Perdita (Perdita) swenki* Crawford**

(Figs. 76-78)

Perdita swenki Crawford, 1915. Insecutor Inscitiae Menstruus 3, p. 109. ♀ ♂.

FEMALE—Length 6 mm.; head and thorax green, abdomen piceous, maculae yellow; face slightly longer than distance between eyes; eyes subparallel; cheeks subequal to eyes in width; vertex rather broad, lateral ocelli slightly nearer its hind margin than to eyes; foveae short, very narrow, rather shallow and obscure; mandibles yellow, becoming ferruginous at tip; labrum mostly yellow, but with a small, median, dark spot; clypeus yellow but with a pair of triangular, basal, dark spots, supraclypeal area yellow; lateral face marks yellow, upper end obliquely truncate on inner margin of eye slightly above level of antennae; scape yellow anteriorly, narrowly piceous posteriorly, flagellum yellowish beneath, somewhat darker above; face and cheeks shining below, punctures rather sparse, shallow and obscure, upper part of face densely tessellate, punctures exceedingly minute and barely visible; pubescence of head and thorax short, thin, entirely whitish; posterior margin of pronotum with a pair of narrow, yellow maculae, these continuous with the yellow tubercles, thorax otherwise brassy green; tegulae yellowish-hyaline; wings subhyaline, veins and stigma pale yellowish, stigma margined with darker brown; legs dark, femora narrowly yellowish apically, front and mid tibiae yellow anteriorly, front tarsi yellow, mid and hind tarsi dark; scutum and scutellum dull and tessellate, with rather sparse and exceedingly minute and obscure punctures; pleura above dull, more shining below, punctures about as those of scutum; abdominal terga 1-5 with broad, transverse, basal, yellow maculae, these sub-interrupted medially, discs of the terga somewhat shining, punctures indistinct basally, the more apical terga becoming somewhat more distinctly and closely punctate.

MALE—Length 6 mm.; head and thorax green, abdomen piceous, with greenish reflections, maculae yellow; length of face greater than distance between eyes; eyes subparallel; cheeks subequal to eyes, somewhat swollen behind; vertex broad, lateral ocelli subequally distant from eyes and its hind margin; foveae very small, shallow and obscure, mandibles yellow, becoming ferruginous at extreme tips; labrum, clypeus, entire face below a line slightly above antennae, and lower outer orbits and cheeks bright yellow; scape bright yellow,

with only a very small dark spot toward apex posteriorly, flagellum yellow beneath, becoming brownish above; face and cheeks below shining, punctures very shallow and obscure, upper portion of face and vertex dull tessellate, punctures hardly visible; pubescence of head and thorax very short, thin, entirely white; posterior margin of pronotum with a pair of yellow maculae which extend onto and include the tubercles, thorax otherwise brassy green; tegulae yellowish-hyaline; wings subhyaline, veins and stigma yellowish, stigma margined with testaceous; front and middle legs yellow, but posterior surface of their femora and tibiae in large part piceous, hind trochanters, coxae apically, a narrow line on upper margin of hind femora, and base of tibiae yellow, hind legs otherwise dark; scutum and scutellum densely tessellate, punctures exceedingly minute and obscure, quite sparse; pleura dull above, becoming somewhat more shining below, punctured about as scutum; abdominal terga 1-4 with basal, transverse maculae which are interrupted only on the basal tergum, discs of the terga somewhat shining, punctures exceedingly minute, sparse and obscure, clearly evident only on the more apical segments; apical margin of sternum 6 broadly emarginate; sternum 7 with a pair of acute, lateral projections, delimiting a broad and deep, rectangular, apical emargination; apical portion of sternum 8 subtriangular in form, apex very narrowly rounded; gonostyli slender, rounded apically, slightly exceeded in length by the slender penis valves, these slightly angulate laterally, cuspis and digitus of volsellae distinct, rather slender, about equal in length, terminating at lateral angles of penis valves, gonocoxites somewhat produced apically to form short, rounded lobes.

DISTRIBUTION—Alberta to Michigan, Illinois and New York; July and August.

FLOWER RECORD—The type material of this species was collected on *Solidago rigida*.

The following two descriptions have been received from P. H. Timberlake:

***Perdita drymariae* Timberlake**
new species

FEMALE—Head and thorax dark blue, the labrum, clypeus, disk of mesoscutum, the scutellum and metanotum blackish; tubercles more or less brownish, mandibles rufotestaceous, becoming brighter red at apex. Abdomen brownish fuscous, without markings, the pygidial plate rufotestaceous. Legs concolorous with abdomen, the extreme apex of front femora, and anterior side of front tibiae yellowish. Antennae blackish, the flagellum more brownish beneath. Tegulae brown at base, and broadly nearly clear hyaline on outer margin.

Wings hyaline, with a whitish opacity and iridescent in some lights, the nervures testaceous, the subcosta and margins of stigma brownish.

Head slightly broader than long, with the cheeks very narrow and strongly receding. Proboscis rather short, with the galeae about half as long as the stipites; maxillary palpi not exceeding the galeae, six-jointed, with the joints approximately twice as long as wide. Mandibles with a small inner tooth and reaching nearly to far margin of proboscival fossa. Disk of clypeus as high as wide, broadly subtruncate above, the lateral extensions very broad and reflexed. Facial foveae short, well impressed, about twice their width from margin of eyes and about one-third as long as distance between antennal sockets and anterior ocellus. Pterostigma rather large but not quite equaling width of first submarginal cell, the part of marginal cell beneath it longer than the part beyond; second submarginal cell narrowed more than half above. Pygidial plate about twice as long as wide at base, the sides straight and the apex acute. Frons and vertex finely tessellate and somewhat dullish; face below antennae and thorax shining, the latter weakly tessellate including anterior third of mesoscutum, and a narrow prescutellar band which remain blue, the remainder of scutum polished, and the scutellum faintly tessellate; punctures of face very fine and remote, most numerous and distinct on sides of face at and below level of antennae and on clypeus, those of frons, together with those of anterior third of mesonotum, faint, and the polished disc of scutum impunctate. Pubescence whitish, very thin, fine and rather short, the upper part of frons nearly nude and the polished part of mesoscutum entirely so, with short, erect, sparse hair on anterior part of the segment. Length, about 3.5-4 mm.; anterior wing, about 2.7-2.9 mm.

MALE—Colored much like female, but mandibles except red tips, labrum and face below level of antennae white; lateral marks broadly truncate at lower level of antennal sockets, the blue of frons slightly intruding between them and subantennal marks. Antennae, legs and abdomen dark, the front knees, anterior side of front tibiae and front tarsi pale yellow, the middle and hind tarsi and under side of flagellum pale brownish yellow. Tegulae and wings as in female.

Head broader than long, the cheeks broad, receding and unarmed (some of the related species have a variably developed blunt process near anterior end of cheeks). Mandibles slender, tapering, acute, and reaching the far margin of fossa. Facial foveae close to margin of eyes and twice as long as wide. Flanks of pronotum moderately, deeply, impressed and

the disc normal. Abdomen ovate, about twice as long as wide, convex above, the apical lobe of tergite 7 rounded at apex and hardly longer than wide. Sculptures and pubescence about as in the female. Subgenital plates triangular, slightly longer than wide at base, the margins slightly convexly arcuate, the apex subacute, the disc convex. Caulis of aedeagus a little longer than wide, with a very small basal orifice, the dorsal lobes restricted to somewhat less than the apical half, divergent, rounded at apex, and projecting only a short distance beyond base of parameral lobes; the latter lobes inserted high on sides of caulis and as seen from side, narrow at base, moderately widened before the middle and thence acuminate, and as seen from above moderately wide basally and narrow and very acute on apical half; fused body of sagittae moderately thickly fusiform, and tapering from middle to acute apex, similar also in lateral view and straight except for the curved basal rods; volsellae small, mostly exposed in lateral view, the superior pair nearly vertical in position. Length, about 3 mm.; anterior wing, 2.4 mm.

TYPES—Holotype: Female, El Huisache, 4500 feet, San Luis Potosi, Mexico, Aug. 22, 1954 (Univ. Kansas Mexican Expedition) [Univ. Kans.]. Allotype: Topotypical [Univ. Kans.]. Paratypes: MEXICO: 8♀♀, topotypical. NEW MEXICO: 2♀♀ Las Cruces, Dona Ana Co., Sept. 25, 1895 (Cockerell); 1♀, Jornada Experimental Range, Dona Ana Co., Sept. 13, 1935 (E. L. Little, Jr. on *Drymaria holosteoides*). MICHIGAN: 3♀♀, Baraga Co., June 25, 1955 (R. R. Dreisbach).

Paratypes are in the U. S. National Museum, the University of Kansas, the California Citrus Experiment Station, and in the collections of R. R. Dreisbach and T. B. Mitchell.

This bee belongs to a small group of species, all previously nondescript, which occur in the southwest, and which have been taken on *Euphorbia*, *Chamaesaracha*, *Lippia* and *Boerhaavia*. The Jornada specimen was determined by Grace Sandhouse as *P. aeneifrons* Cockerell and presumably the Las Cruces specimens were considered by Cockerell also as that species. At any rate in the description of *aeneifrons* he states that it was taken in some number on *Bigelovia wrightii* (now known as *Aplopappus heterophyllus*) on Sept. 23, together with *P. phymatae*, and that he thought at first that he had only one species. Apparently three species were involved instead of two! *P. aeneifrons* differs from *drymariae*

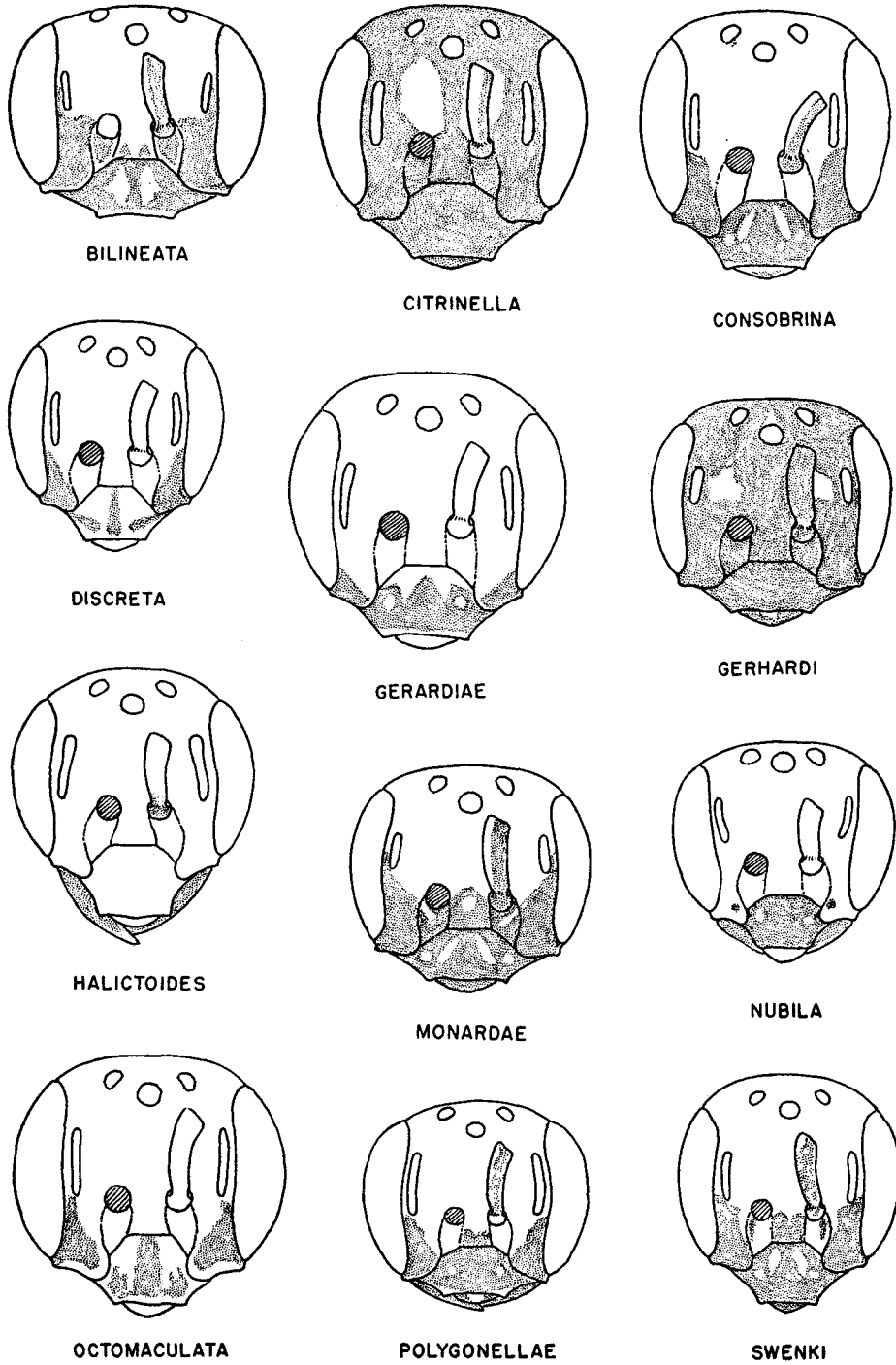


Figure 76—Facial view of head in females of *Perdita*.

in having the mandibles yellow at base, the pygidial plate much broader and obtuse at apex, and the proboscis and maxillary palpi comparatively long.

Perdita krombeini Timberlake,
new species

MALE—Head and thorax dark blue green, the thorax entirely dark. Mandibles except reddish apical third, labrum, clypeus, supraclypeal and lateral marks yellow; usual pair of dark dots on clypeus distinct; lateral marks varying from subtriangular, and hardly reaching above summit of clypeus, to subquadrate and nearly reaching level of antennae. Abdomen black, the two apical segments testaceous or rufotestaceous. Legs black, the anterior side of front tibiae and of front femora at apex yellow; tarsi brown, the anterior pair more yellowish. Antennae blackish, the scape

yellow beneath, the pedicel entirely dark, and the flagellum broadly brown beneath. Tegulae dark testaceous, becoming fuscous at base. Wings strongly dusky, the nervures fuscous, the stigma with a slender, central, paler streak.

Head not enlarged, somewhat broader than long, the cheeks unarmed and about as wide as the eyes. Mandibles short, tapering and acute. Proboscis rather short, not exceeding the proboscoidal cavity, the maxillary palpi six-jointed and as long as the galeae. Antennae ordinary, except the flagellum more strongly clavate than usual, with the joints much broader than long. Wings with a rather narrow stigma which is shorter than the first submarginal cell and about one-half as wide; part of marginal cell beneath the stigma somewhat shorter than the part beyond; second submarginal cell narrowed about one-half to radius; nervures closing apical side of second discoidal cell distinct, although finer than other

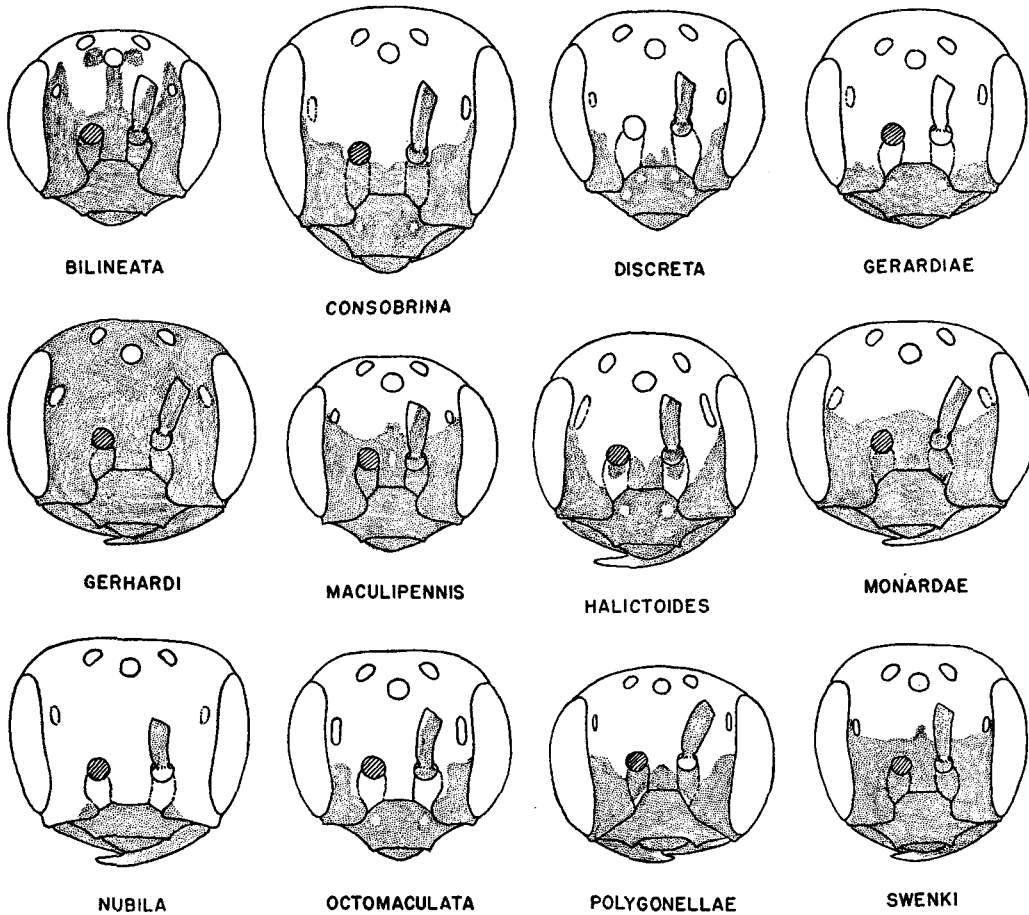


Figure 77—Facial view of head in males of *Perdita*.

nervures. Abdomen elongate oval, strongly convex above, the apical tergite narrowly truncate at apex. Subgenital plate quadrate, somewhat less than twice as long as wide, a little narrowed toward apex, which is truncated, with rounded corners; ventral surface of plate convex except rather broadly on lateral margins, and with very fine, short pile on apical part of the convexity. Caulis of aedeagus quadrate, somewhat longer than wide, the two dorsal lobes broadly rounded at apex and separated by a rather narrow but not deep emargination; parameral lobes inserted low on sides of caulis, appearing slender in dorsal view, and moderately narrow and acute at apex in lateral view; fused body of sagittae fusiform, abruptly narrowed apically and ending in two slightly separated sharp points, the thick part somewhat ovally swollen; volsellae well exerted

from caulis, the superior pair only a little shorter than the inferior pair.

Head and thorax tessellate and dullish, the face impunctate, the mesonotum with minute sparse punctures. Pubescence moderately long and sparse, fine, erect and whitish. Length, 4 mm.; anterior wing, 3 mm.

TYPES: Holotype: Male, on sand flats, Olga, Lee County, Florida, March 30, 1954 (K. V. Krombein) [U. S. National Museum]. Paratype: 1♂, topotypical [U.S. N.M.].

This species is not particularly close to any other known to me, but by the genitalia it is more or less related to *P. sphaeralceae*, *P. Calloleuca*, *P. tarda* and *P. sidae*, which occur in the southwest and were described by Cockerell.

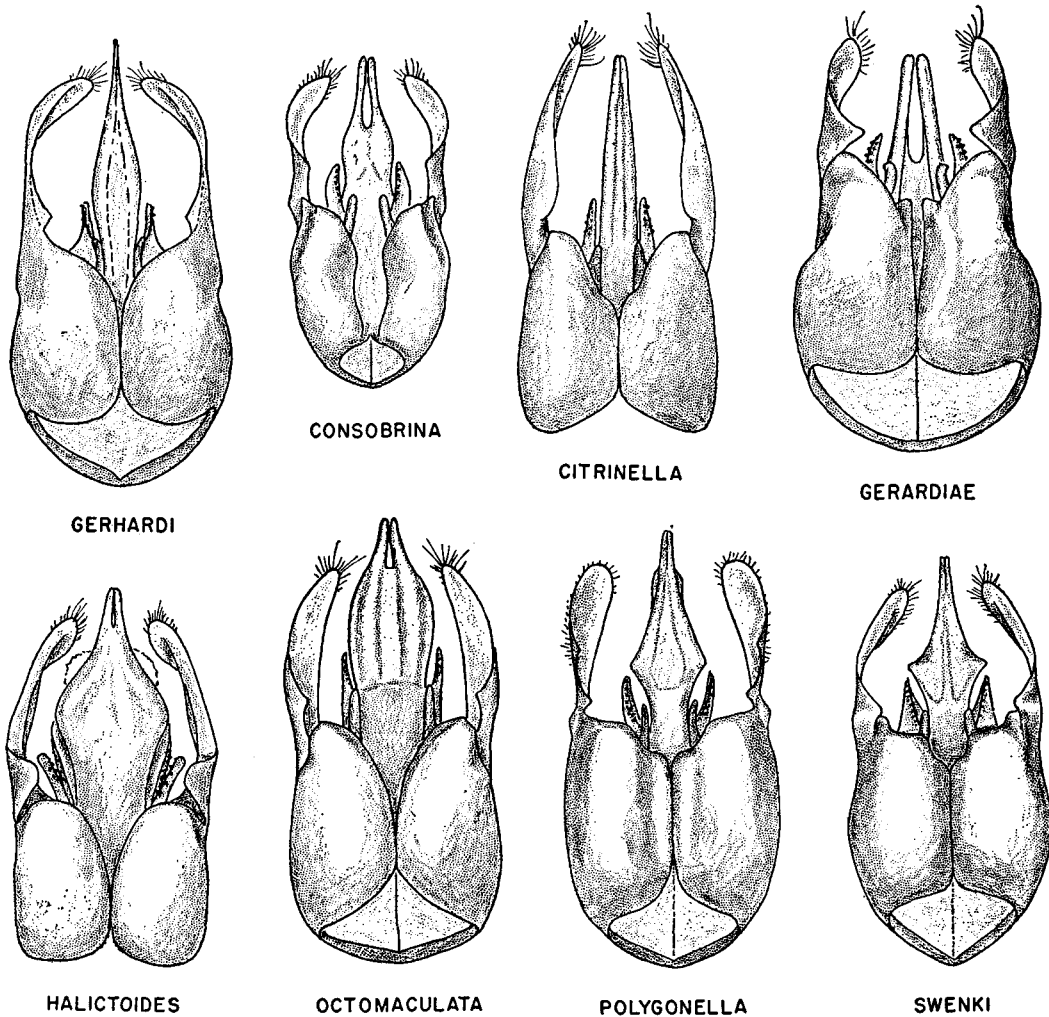


Figure 78—Genital armature in males of *Perdita*.

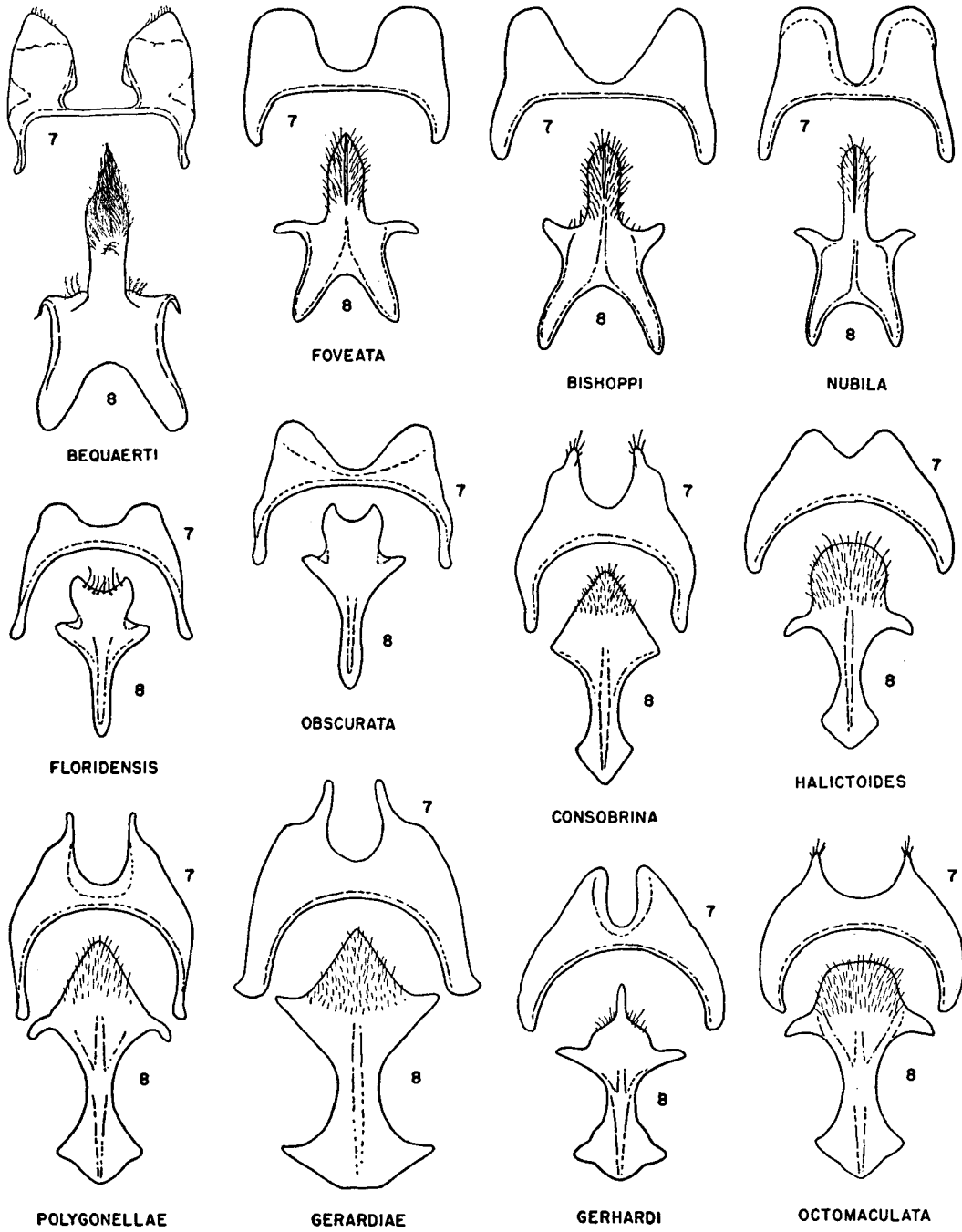
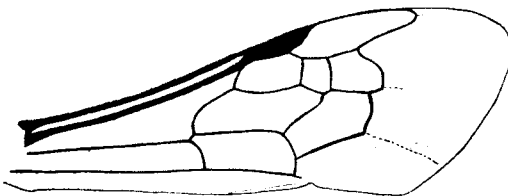


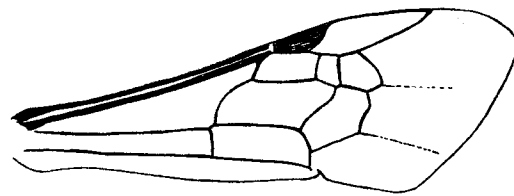
Figure 79—Sterna 7 and 8 in males of *Perdita*.

Table 9—Distribution of species of *Perdita* by states.

<i>Perdita</i>	New England					North Central					Mid Atlantic					South-eastern											
	Maine	New Hampshire	Vermont	Massachusetts	Rhode Island	Connecticut	Wisconsin	Michigan	Illinois	Indiana	Ohio	Kentucky	New York	New Jersey	Pennsylvania	Maryland	Delaware	West Virginia	Virginia	Dist. Columbia	Tennessee	North Carolina	South Carolina	Mississippi	Alabama	Georgia	Florida
<i>albipennis</i>							X	X																			
<i>a.pallidipennis</i>							X	X	X	X																	
<i>bequaerti</i>								X					X									X		X	X	X	X
<i>b.indianensis</i>										X																	
<i>bishoppi</i>																						X	X	X	X	X	X
<i>blatchleyi</i>																											X
<i>boltoniae</i>									X										X					X			
<i>b.chrysopsina</i>													X		X							X				X	X
<i>bradleyi</i>													X									X		X		X	X
<i>consobrina</i>																						X	X				
<i>c.lepida</i>																											X
<i>discreta</i>																						X					
<i>drymariae</i>								X																			
<i>floridensis</i>																						X					X
<i>foveata</i>																											X
<i>georgica</i>																						X	X	X		X	X
<i>gerardiae</i>																						X		X			X
<i>gerhardi</i>							X		X																		
<i>g.arenicola</i>								X																			
<i>g.monardae</i>													X														
<i>graenicheri</i>																											X
<i>halictoides</i>								X	X																		X
<i>krombeini</i>																											X
<i>maculigera (western)</i>																											
<i>m.bilineata</i>									X																		
<i>m.maculipennis</i>							X	X	X																		
<i>mittelli</i>																						X		X	X		X
<i>novae-angliae</i>				X	X	X							X		X							X					X
<i>nubila</i>																											X
<i>obscurata</i>													X									X	X		X		X
<i>octomaculata</i>	X		X	X		X		X				X										X		X		X	
<i>perpallida (western)</i>																											
<i>p.citrinella</i>							X																				
<i>polygonellae</i>																						X					
<i>swenki</i>								X	X			X															



HALICTUS



SPHECODES

Figure 80—Venation of front wing in *Halictus* and *Sphecodes*.