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THE BEES OF BOULDER COUNTY, COLORADO

By T. D. A. COCKERELL

The bee-fauna of Boulder County has proved remarkably rich and interesting, yielding a considerable percentage of new species. It is, of course, very far from being exhausted, but the following tables are offered as a means of facilitating further progress. Various species, especially of the genus *Halictus*, are for the present omitted, as they cannot be identified until our studies of the genera they belong to have progressed further. Many species of *Halictus*, *Osmia*, and *Andrena* have been sent to Messrs. Crawford, Titus and Viereck respectively for investigation, but nothing has been learned concerning them. They will doubtless be discussed in forthcoming works by these apidologists.

The list, as it stands, numbers about 175 species. In the vicinity of Carlinville, Illinois, Robertson appears to have found about 275, after years of careful collecting. Owing to the varied conditions represented in Boulder County, it is not unlikely that the total number of species existing considerably exceeds 300. I have inserted in the tables a number of species likely to occur with us, but not yet actually found. These are distinguished by an asterisk. At some later date, I may offer a discussion of the families and genera of bees; but this does not seem very necessary at present, owing to the existence of several works covering the ground, more especially those of Robertson and Ashmead (*Trans. Amer. Entom. Society*, 1899; *Canadian Entomologist*, Feb., 1904, etc.). Cresson's *Synopsis* (1887), though old, is still very useful for determining the genera.

COLLETES Latreille

Comparatively large (length of anterior wing about 8 mm.), hair of thorax above fox-red, especially bright on scutellum, without any black intermixed (Boulder, fls. *Heuchera*) **andrewsi** Ckl. (**simulans**, Cress., in part)♀

Not so large; hair of thorax above not thus bright 1.

1. Hair of head and pleura black (Ward, July, fls. *Drymocallis*) . . **nigrifrons** Titus

Hair of head and pleura light. 2.

2. Some dark hair on thorax above, at least on scutellum 3.

No dark hair on thorax above 4.

3. Larger, antennæ of male long, the joints of flagellum much longer than broad (Boulder Canyon, June) **hydrophilus** Ckll.♂
 Smaller antennæ of male much shorter, the joints of the flagellum short; punctures of abdomen very strong (Boulder, fls. *Campanula*) **brevicornis** Rob., form **opuntiae** Ckll.
 4. Comparatively large and robust, with the hair of the thorax above yellowish or ochraceous; second submarginal cell very broad (Ward, July, fls. *Fraseria*) **kincaidii** Ckll.
 Smaller, with the hair pallid 5.
 5. Female; hair very pale, the abdomen with broad feltlike white apical hair-bands, and white hair on basal part of segments; malar space twice as broad as long (Ward, July, fls. *Phacelia*) **phaceliæ** Ckll.
 Males, with long antennæ; hair of face white (male *kincaidii*, if run to here, is separated by ochreous hair of face) 6.
 Males, with antennæ of the short type 7.
 6. Larger; hair of head and thorax yellowish-white (Florissant) . . . **sieverti** Ckll.*
 Smaller; hair of head and thorax clear white (Boulder) . . **salicicola geranii** Ckll.
 7. Larger; hair of thorax above a little yellowish (Florissant) . . . **florissantia** Ckll.*
 Smaller; hair of thorax above not yellowish (Florissant) . . . **polemonii** Ckll.*
 I had described *C. opuntiae* as a distinct species, but Mr. Swenk gives good reasons for supposing it only a form of *brevicornis*. He has the latter from as far west as Sioux Co., Nebraska, and Missoula, Montana.
 The flowers of *Petalostemon* in eastern Boulder County should be examined, with the hope of finding *C. aberrans* Ckll. and *C. wilmatte* Ckll. The latter has red legs.

PROSOPIS Fabricius

- Face entirely black; size relatively large **basalis** Smith♀
 Face not entirely black 1.
 1. Scape of antennæ heart-shaped, one side light 2.
 Scape not heart-shaped, all dark 3.
 2. Larger; anterior wing over 5 mm. **basalis** Smith♂
 Smaller; anterior wing under 5 mm.; face markings cream-color. (Florissant) **antennata** Cress.♂*
 3. Females; clypeus entirely dark 4.
 Males; clypeus light 5.
 4. Larger; anterior wing over 4 mm. (Boulder, May 1906, *Grant LeVeque*) **varifrons** Cress.
 Smaller; anterior wing under 4 mm. **tuertonis** Ckll.
 5. Lateral face marks curved above, receding from orbits (Florissant) **tridentula** Ckll.*
 Lateral face-marks not curved above, or receding from orbits 6.
 6. Upper part of lateral face-marks very broad **coloradensis** Ckll.
 Upper part of lateral face-marks narrow and pointed (Boulder) **universitatis** Ckll.
P. basalis was found at Ward, at flowers of *Drymocallis* and *Senecio*. In South Boulder Canyon, Aug. 9, 1906, my wife and I took two male *coloradensis* and three female *tuertonis* visiting the same plant of *Solidago*. This would appear to indicate that these are the sexes of one species, but the first abdominal segment is much duller and more conspicuously punctured in *coloradensis* than in *tuertonis*.

SPHECODES Latreille

All ours have the head and thorax black, the abdomen bright chestnut red. The table is based on females.

- Small, anterior wing much less than 5 mm.; wings clear; mandibles red (Colorado Springs, etc.). **eustictus** Ckll.*
- Larger, anterior wing slightly or greatly over 5 mm. long 1.
1. When the abdomen is viewed from the side, a strong and deep constriction seen between the first and second segments; size comparatively large: wings strongly smoky (Boulder) **pecosensis** Ckll.
- Abdomen without any, or any strong, constriction between first and second segments 2.
2. Larger, anterior wing about 7 mm. long; wings strongly dusky; mandibles bidentate (Boulder, fls. *Pulsatilla*, April). **hesperellus pulsatillæ** Ckll.
- Smaller, anterior wing not over 6 mm 3.
3. Wings practically clear; abdomen entirely red (Boulder) **sophiæ** Ckll.
- Wings dusky; apex of abdomen black (Florissant) **sulcatulus** Ckll.*

PROTERANER Robertson

Similar to *Sphecodes*, but the abdomen is narrow, and the males appear in the spring with the females, which is not the case with other Halictinæ. In Europe there is also a group of *Sphecodes* in which the males appear in the spring; thus the male of *S. rubicundus* v. Hag. has been taken in England in May, the male of *S. majalis* Perez in France in April. I do not possess specimens of these species, and cannot say whether they should be referred to *Proteraner*.

The Colorado species of *Proteraner* are as follows:

- Male about 9 mm. long, abdomen dark red, first segment black at base, and with a large black spot on disk, apex broadly rounded (Boulder, Manitou, fls. *Ribes*) **leptanthi** Ckll.
- Male about 8 mm.; abdomen narrower and lighter, the basal half of first segment black (Manitou) **rhois** Ckll.*

HALICTUS Latreille

The table is based on females.

- Head and thorax black 1.
- Head and thorax green or blue 8.
1. Abdomen red (Northern New Mexico, fls. *Castilleja*) **ovaliceps** Ckll.*
- Abdomen black, banded 2.
2. Hind tibiæ and tarsi clear red; size large; area of metathorax granular (Boulder, fls. *Odostemon* and *Opuntia*) **lerouxii ruborum** Ckll.
- Hind tibiæ and tarsi dark, at most a little reddish, but with light hair 3.
3. Cheeks broad, with a tooth beneath (Boulder, fls. *Odostemon* and *Senecio*) **armaticeps** Cresson.
- Cheeks not toothed beneath 4.
4. Area of metathorax with strong ridges; abdominal segments with strong white basal bands; wings very clear (Boulder) **sisymbrii** Ckll.
- Area of metathorax granular, or at most with minute feeble ridges or striæ. 5.

5. Large, fully 11 mm. long; abdominal hair-bands on apices of segments; third submarginal cell twice as broad as second (Boulder, fls. *Pulsatilla*; *G. Weston*, *E. Bethel*, *T. & W. Ckll.*) **lerouxii** Lep.
Smaller; hair bands wholly or mainly on bases of abdominal segments 6.
6. Wings clear, almost milky, large for size of insect; stigma amber color (Boulder, April 30, *T. & W. Ckll.*) **aberrans** Crawford
Wings smoky 7.
7. Larger; not shining (Boulder, fls. *Salix*, *Harry House*) . . . **trizonatus** Cresson
Smaller; shining (Florissant) **cooleyi** Crawford *
8. Abdomen broad, the hind margins of the segments with hair-bands; third submarginal cell more than twice as broad as second 9.
Abdomen not thus banded; third submarginal cell not so large in proportion to second 10.
9. Larger, abdominal bands very dense; head and thorax brassy-green (Boulder, fls. *Claytonia lanceolata*) **arapahonum** Ckll.
Smaller, abdominal bands usually less dense; head and thorax blue-green (Boulder, fls. *Phacelia*, *Claytonia lanceolata*) **meliloti** Ckll.
10. Abdomen amber-color (Florissant) **scrophulariæ** Ckll.*
Abdomen black 11.
Abdomen green or blue 12.
11. Smaller; area of metathorax with very fine delicate striæ on basal part (Halfway House, Pikes Peak, Sept., *Ckll.*, also Florissant) **ruidosensis** Ckll.*
Larger; area of metathorax with coarse strong ridges (Gregory Canyon, Apr. 16, fls. *Pulsatilla hirsutissima*) **cressonii** Robertson
12. Hair of abdomen, covering segments 3 to 5, pale ochraceous (Boulder, fls. *Pulsatilla hirsutissima*, May 1, *Marie Gill*) **pilosus** Smith, var.
Hair of abdomen white 13.
13. Head oval, face comparatively narrow (Boulder, fls. *Senecio*, May 17, *W. P. Ckll.*)
pruinus Robertson
Head round, face comparatively broad (Boulder, fls. *Odostemon*, April 6, *W. P. Ckll.*) **pruiniformis** Crawford
The following table, adapted from Crawford, will facilitate the determination of certain males.
Species without any green 1.
Species with more or less green; wings and nervures dark . . **cressonii** Robertson
1. Face and legs entirely dark **sisymbrii** Ckll.
Face and legs not entirely dark 2.
2. Species with hair-bands on the apical margins of abdominal segments . 3.
Species without such hair-bands 4.
3. Flagellum bright ferruginous beneath **armaticeps** Cresson
Flagellum darker beneath **lerouxii** Lep.
4. Tibiæ entirely dark **trizonatus** Cresson
Tibiæ not entirely dark **cooleyi** Crawford*
Mr. Crawford informs me that *H. colatus* Vachal, described from Colorado, is a male *trizonatus*.

DIALICTUS Robertson

Like the species of *Halictus* with green or blue head and thorax, but with only two submarginal cells. The table is based on the females.

Tegulae testaceous (Boulder, fls. *Phacelia*) **anomalus** Robertson
Tegulae dark 1.

1. Bluish; abdomen with metallic luster; face narrow (Las Vegas, N. M.)
theodori Crawford*

Greenish; abdomen without metallic luster; face broader (Boulder, fls. *Drymocalis*)
occidentalis Crawford

I have not now access to the type of *D. theodori*, but it occurs to me as just possible that it is an aberration of *Halictus semicæruleus*.

AUGOCHLORA Smith

Comparatively large and robust; hind margin of second abdominal segment finely ciliate (Boulder). **fervida** Smith.

Much smaller, not so robust (Boulder, fls. *Hydrophyllum*, May 18. Ckll. S. Boulder Canyon, fls. *Grindelia*, Aug 9, W. P. Ckll.) . **confusa coloradensis** (Titus)

A variety of the ♂ of *A. confusa coloradensis*, with the flagellum dark, was taken in S. Boulder Canyon, fls. *Aster laevis*, Aug. 9. (W. P. Ckll.)

AGAPOSTEMON Smith

Females 1.

Males 5.

1. Abdomen green or bluish 2.

Abdomen black 4.

2. Mesothorax with punctures of two sizes 3.

Mesothorax uniformly punctured or roughened (Colorado etc.) **splendens** Lep.*

3. Base of metathorax without a distinct triangular inclosure, the longitudinal ridges strong (Boulder, fls. *Carduus* oc.) **texanus** Cresson

Base of metathorax with a more or less evident triangular inclosure, the longitudinal ridges weaker (Boulder, April, fls. *Claytonia lanceolata* and *Pulsatilla hirsutissima*) **texanus subtilior** Ckll.

4. Larger, 12-14 mm. long; head and thorax bluish (Boulder, fls. *Carduus*, W. P. Ckll.) **coloradensis** Crawford

Smaller; head and thorax green (Boulder, fls. *Carduus*, *Linum lewisii* and *Tradescantia universitatis*) **viridulus** (Fabricius)

5. Hind femora greatly swollen or incrassate **splendens** Lep.*

Hind femora only slightly or not swollen 6.

6. Last ventral segment with a median carina **viridulus** (Fabricius)

Last ventral segment without a median carina **texanus** Cresson

The above table is adapted from that of Crawford. The males have the abdomen banded with black and yellow, and look very unlike the females.

NOMIA Latreille

Abdomen black, with light pearly-green bands (Colorado etc.) **foxii** Dalla Torre*

Abdomen without such bands; tibiae of male ferruginous; tegulae amber-color (Fort Collins, fls. *Solidago*, August) **bakeri** Ckll.*

DIANDRENA Cockerell

Similar to *Andrena*, but with only two submarginal cells.

Male 8 mm. long, olive-green; legs, antennæ and mandibles black; female just over 9 mm. long, olive-green to bluish-green (Boulder, in May) **nothocalaidis** Ckll.

ANDRENA Fabricius

- Females 1.
 Males 25.
1. Thorax and first four segments of abdomen above covered with bright fox-red hair (Boulder, *G. Hite*). **hitei** Ckll.
 Not so 2.
 2. Tegument of abdomen red, more or less marked with black 3.
 Tegument of abdomen not red 4.
 3. Pubescence fulvous; basal joints of antennæ more or less strongly ferruginous (Boulder, fls. *Pulsatilla*, May 2, *Marie Gill*) **prunorum** Ckll.
 Pubescence usually paler; antennæ entirely dark (Boulder, fls. *Pulsatilla* and *Odostemon*) **prunorum gillettei** Ckll.
 4. Black, with entirely black hair (Boulder, fls. *Ribes*) **porteræ** Ckll.
 At least some of the hair not black 5.
 5. Abdomen with a decided metallic (greenish or bluish) tint; rather small species, about 9 mm. long, with rather weak white hair-bands on abdomen 6.
 Abdomen not metallic 7.
 6. Stigma amber-color or ferruginous (Boulder, fls. *Salix*, *H. House* and *Ckll.*, also fls. *Odostemon*) **candida** Smith.
 Stigma dark (Boulder, fls. *Hydrophyllum*, May 22, *Ckll.*) **geranii** Robertson
 7. Hind tarsi clear-red; hind tibiæ largely or wholly red 8.
 Hind tarsi and tibiæ (excluding the hair) brown or black 10.
 8. Thorax above covered with fulvous hair; insect 8 mm. long (Boulder, June 4) **wilmattæ** Ckll.
 Thorax above with whitish hair 9.
 9. Larger; punctures of mesothorax small and rather feeble (Boulder, fls. *Cratægus colorado* Ashe=*C. coloradensis* Nelson,¹ May 20) **claytoniæ** Robertson
 Smaller; punctures of mesothorax exceedingly large and deep (Boulder, June, *W. P. Ckll.*) **perforatella** Ckll.
 10. Hair of face and pleura black 11.
 Hair of face wholly or mainly pale 12.
 11. Larger, about 11 mm. long; hair of thorax above fox-red; abdomen shining black, without bands (Boulder and Gregory Canyon, fls. *Odostemon*, April) **berberidis** Ckll.
 Smaller, about 8 mm. long; hair of thorax above brown; abdomen with feeble hair-bands (Boulder, fls. *Pulsatilla hirsutissima*, April 19, *Marie Gill*) **nigrihirta** (Ashmead)
 12. Very small species, about or little over 6 mm. long 13.
 Much larger 14.
 13. Flagellum bright red beneath (Boulder, fls. *Salix*) **salicinella** Ckll.

¹ *Cratægus colorado* has cream-colored anthers; those of *C. occidentalis* are pink.

- Flagellum dark (Boulder, fls. *Drymocallis*, May 24) . . . *fragariana*, Grænicher
14. Hair-bands of abdomen very conspicuous 15.
Hair-bands feeble or wanting 17.
15. Larger, about 11½ mm. long; hair of thorax very yellow (Ft. Collins)
mentzeliae Ckll.*
- Smaller, hair of thorax not thus yellow 16.
16. Punctures of abdomen stronger and closer; flagellum dark (Boulder, fls. *Pulsatilla*, April, *Marie Gill*) *bridwelli* Ckll.
Punctures of abdomen weaker and less close; flagellum largely bright red beneath (Boulder, June, *W. P. Ckll.*) *gardini* Ckll.
17. Mesothorax with few, widely scattered, strong punctures (Boulder, May 21, *G. Hite*) *nuda* Robertson
Mesothorax not so 18.
18. Stigma very small; large species visiting sunflowers in August (Boulder, *W. P. Ckll.*) *helianthi* Robertson
Stigma normal 19.
19. Abdomen with long erect grayish-white hair, not hiding the surface; hair of pleura white (Boulder, fls. *Salix*, *H. House*) *cockerelli* Grænicher
Abdomen without such hair 20.
20. Hair of pleura black; abdomen beyond second segment with coarse black hair; first two segments and thorax above with whitish hair (Ward, July, fls. *Edwinia*) *edwiniae* Ckll.
Hair of pleura black; abdomen beyond second segment with black hair; first two segments with very scanty dark hair; thorax above with bright fox-red hair. (Boulder, June, fls. *Lupinus*) *lupinorum* Ckll.
Hair of pleura at least mostly black; abdomen shining black, with scanty black hair; thorax above with pale ochraceous hair (Boulder, fls. *Pulsatilla hirsutissima*, April, *E. Bethel*) *carlini* Ckll.
Hair of pleura light 21.
21. Area of metathorax coarsely sculptured; abdomen strongly though finely punctured; hair at apex of abdomen red (Boulder, *S. A. Rohwer*) *cratægi* Robertson
Area of metathorax granular, or feebly plicatulate toward base 22.
22. Hair at apex of abdomen black or sooty, of thorax above whitish or ochraceous. 23.
Hair at apex of abdomen red 24.
23. Much larger, anterior wing about 10 mm., abdomen black without conspicuous hair (Castle Rock, Boulder Canyon, May, *S. A. Rohwer*) *vicina* Smith
Much smaller; first abdominal segment with some conspicuous light hair; vertex with black hair (Ward, fls. *Gilia* and *Drymocallis*) *birtwelli* Ckll.
24. Hair of thorax above orange-fulvous, bright on scutellum (Boulder, fls. *Rubus deliciosus*, May 22, *Ckll.*) *viburnella* Grænicher
Smaller; hair of thorax above gray, of apex of abdomen very bright red (Boulder, *W. P. Ckll.*) *pyrura* Ckll.
25. Tegument of abdomen partly red; clypeus yellow with two black dots
prunorum gillettei Ckll.
- Tegument of abdomen not red 26.

26. Hair of face long and entirely black **nigrihirta** (Ashmead)
 Hair of face not, or not entirely, black 27.
27. Clypeus and lower corners of face yellow **bridwelli** Ckll.
 Clypeus yellow, but not sides or corners of face 28.
 Clypeus not yellow 29.
28. Malar space very large (Boulder, fls. *Ribes*) . . . **leptanthi** Viereck & Cockerell
 Malar space rudimentary **helianthi** Robertson
29. Flagellum red beneath; small species **salicinella** Ckll.
 Flagellum dark 30.
30. Very small, little over 5 mm. long **fragariana** Grænicher
 Larger 31.
31. Abdomen with a purplish tint, and thin white hair-bands . . **geranii** Robertson
 Abdomen not metallic 32.
32. Abdomen with broad conspicuous hair-bands; hair of thorax above very yellow
mentzeliae Ckll.*
 Abdomen not thus banded 33.
33. Area of metathorax coarsely sculptured 34.
 Area of metathorax granular; sides of face with black hair . . . 35.
34. Flagellum conspicuously moniliform **claytoniae** Robertson
 Larger; flagellum hardly moniliform **cratægi** Robertson
35. Larger; hair of thorax wholly pale, slightly yellowish **carlini** Ckll.
 Smaller; hair of thorax grayish-white, with some black . . . **cockerelli** Grænicher
 A female of *A. prunorum gillettei*, taken at Boulder, May 11, at flowers of *Salix*,
 is peculiar for having the red on the abdomen confined to the hind margins of the
 segments, so that it looks like a very handsome new species.
 From an observation made by my wife, there is reason to believe that *A. porterae*
 and *A. leptanthi* are the sexes of one species, notwithstanding their entirely dif-
 ferent appearance. If so, the insect formerly cited as the female of *leptanthi* must
 represent an undescribed species.

HALICTOIDES Nylander

- Larger, at least 9 mm. long; intense black, face with black hair (Ward, fls. *Gilia*)
maurus (Cresson)
 Smaller, much less than 9 mm., hair of face not black (Ward, fls. *Drymocallis*)
harveyi Ckll.

The male *harveyi* has a dense brush of pure white hair covering the clypeus. *Halictoides* looks much like *Panurginus*, but the marginal cell is pointed, not truncate.

PANURGINUS Nylander

- Clypeus yellow, but no other yellow on face; first recurrent nervure almost or quite
 meeting first transverso-cubital; male (Ward, fls. *Drymocallis*) **cressoniellus** Ckll.
 Clypeus and a large mark on each side of face yellow; male . . . **innuptus** Ckll.
 Clypeus black, females 1.
1. First recurrent nervure entering second submarginal cell at a considerable distance
 from its base; nervures ferruginous (Boulder, fls. sunflower, Aug. 8, *W. P. Ckll.*)
innuptus Ckll.

First recurrent nervure meeting, or almost meeting, first transverso-cubital; nervures dark 2.

2. Flagellum ferruginous beneath *cressoniellus* Ckll.
Flagellum dark (Ward, fls. *Calochortus*) *cressoniellus calochorti* Ckll.
P. cressoniellus (clypeatus Cresson) was originally based on a male. As shown above, and in more detail in *Ann. Mag. Nat. Hist.*, Feb. 1906, there are two forms of the female. The one first made known was assumed to be true *cressoniellus*, but it is not certain which really belongs to the described male, nor whether the males corresponding to the two females can be distinguished.

SPINOLIELLA Ashmead

Clypeus all light except dots and edge, face densely bearded with white hair.

australior Ckll. ♂*

Clypeus only partly light; females 1.

1. Band on third abdominal segment always interrupted; fifth segment black, with neither lands nor spots (Fort Collins) *australior* Ckll.*
Band on third segment usually entire; fifth segment largely pale (Florissant)

scitula (Cresson)*

S. australior usually visits *Peritoma serrulatum*.

PERDITA Smith

Pale yellow (Denver, fls. *Nuttallia*, July, *S. N. Dunning*) *wootonæ* Ckll.*

At least head and thorax mainly dark 1.

1. Abdomen light yellow, with dark bands (Ft. Collins, fls. *Peritoma*)

zebrata Cresson*

Abdomen dark brown or black, with or without light marks 2.

2. No light supraclypeal mark 3.

The supraclypeal region yellow (Boulder) *affinis* Cresson ♂

3. Light markings of abdomen large, oblique, some reaching lateral margin

affinis Cresson ♀

Light markings of abdomen smaller, transverse, not reaching lateral margin, in female, absent in male; female with clypeus and lateral face-marks white; male with face hairy, and lateral face-marks reduced to dots; flagellum light orange beneath in both sexes (South Boulder Canyon, many at fls. *Grindelia*, Aug. 9, *T. & W. Ckll.*) *ignota* Ckll.

No doubt many more species of *Perdita* will eventually be found in Boulder county. *P. punctata* (Ckll.) and *P. rectangulata* Ckll. occur at flowers of *Solidago* at Ft. Collins.

GREELEYELLA Cockerell

Female about 9 mm. long, brown-black, very shiny; two submarginal cells; marginal cell broadly obliquely truncate; first recurrent nervure meeting, or almost meeting, first transverso-cubital; male with broad head and light yellow clypeus (Boulder, fls. *Malvastum*, June, *W. P. Ckll.*) *beardsleyi* Ckll.

NOMADA Fabricius

Abdomen chestnut red, without light bands 1.

Abdomen with conspicuous light bands 4.

1. Hind margins of abdominal segments black or blackish 2.
Hind margins of abdominal segments not darkened 3.
2. Hind margins very black; segments 4 and 5 each with two yellow spots (Boulder, June, *W. P. Ckll.*) *packardiella* Ckll.
Hind margins not very black; no yellow spots (Boulder, April, fls. *Pulsatilla*) *pulsatillæ* Ckll.
3. Basal nervure arising far basad of transverso-medial; mandibles bidentate (Boulder, fls. *Drymocallis*) *lepida* Cresson♀.
Basal nervure arising little basad of transverso-medial; mandibles simple; abdomen distinctly punctate (Boulder) *martinella* Ckll.♀
4. Scutellum black; tegulæ yellow, hair of thorax above fox-red (Boulder, fls. *Ribes*) *collinsiana* Ckll.♂
Scutellum red 5.
Scutellum yellow; tegulæ yellow; pleura with a large yellow mark; bands of abdomen bright yellow; scape bright yellow (Boulder, June, *W. P. Ckll.*) *ornithica* Ckll.
Scutellum spotted 6.
5. Face and antennæ red; hair of thorax above red *collinsiana* Ckll.♀
Clypeus and sides of face yellow; antennæ yellow beneath, flagellum above partly black and partly reddish (Boulder, fls. *Senecio*, June, *W. P. Ckll.*) *articulata dacotana* Ckll.
6. Tegulæ bright red; antennæ long, the flagellum black above and red beneath; male (Cheyenne Canyon, May, *W. P. Ckll.*) *fragilis* Cresson*
Tegulæ yellow, with a pale or reddish spot 7.
7. Abdominal bands cream-color; antennæ yellow beneath *martinella* Ckll.♂
Abdominal bands bright yellow 8.
8. Mandibles strongly bidentate *lepida* Cresson♂
Mandibles simple; flagellum red beneath (Boulder, fls. *Pulsatilla*, May 1, *Marie Gill*) *subrutula* Lovell & Ckll.
Other species will doubtless be found. *N. uhleri*, Ckll., *N. coloradella* Ckll., and *N. alpha* Ckll., were described from Fort Collins; *N. gillettei* Ckll. and *N. agynia* Ckll. from Golden.

EPEOLUS Latreille

Anterior middle of mesothorax with two clean-cut club-shaped ochraceous stripes; scutellum red (Boulder, fls. *Townsendia grandiflora*, July, *W. P. Ckll.*)

interruptus Robertson

Anterior middle of mesothorax washed with ochraceous, and with no clean-cut stripes; scutellum black (near Florissant) *beulahensis* Ckll.*

TRIEPEOLUS Robertson

Large, length over 13 mm.; legs black; upward extension of light band at sides of second abdominal segment forming an angle with the band (within) of about 45° (Boulder, Aug. 26, 1906, *Rohwer*) *martini* (Ckll.)

Much smaller; legs red 1.

1. Anterior femora bright red; lateral teeth of scutellum much smaller; apex of abdomen narrower, last ventral segment curved downward (Boulder, fls. *Grindelia*, Aug., *W. P. Ckll.*) *grindeliæ* Ckll.
Anterior femora black above; lateral teeth of scutellum much larger; apex of abdomen broader, last ventral segment not curved downward (South Boulder Canyon, Aug. 9, 1906, *W. P. Ckll.*) *helianthi* Robertson
Mr. Rohwer notes of *T. martini* ♀, "upper part of eyes in life lemon-yellow, rest black."

BOMBOMELECTA Patton

Thorax and basal segment of abdomen above with red hair, rest of abdomen black without spots (Boulder, fls. *Pulsatilla hirsutissima*, April, *W. P. Ckll.*)

fulvida (Cresson)

Abdomen with six conspicuous light spots (near Ft. Collins) . . . *johnsoni* Ckll.*

CÆLIOXYX Latreille

Female about 12 mm. long; legs red (Boulder, fls. *Grindelia*, Aug. 20, *W. P. Ckll.*)

deplanata Cresson

CHELYNIA Provancher

Abdomen black with ivory-colored bands (Florissant) . . . *monticola* (Cresson)*

Abdomen blue with whitish or very pale yellowish bands 1.

1. Larger, abdomen with four bands; hair of pleura black (Boulder, fls. *Astragalus*, June, *W. P. Ckll.*) *pulchra* (Crawford), var. ♀
Smaller, abdomen with five bands; hair of pleura light (Florissant)

elegans (Cresson) ♂*

STELIS Panzer

Blue, with black hair; no light markings; looks like a small *Osmia* (Florissant)

montana Cresson*

ANTHIDIUM Fabricius

Females 1.

Males 7.

1. Face all black 2.

Face with light markings 3.

2. Scutellum all black; scopa strongly stained with brown (Boulder, fls. *Psoralea tenuiflora*, Aug. 8, *W. P. Ckll.*) *tenuifloræ* Ckll.

Scutellum with light markings; scopa white (Ward, fls. *Phacelia*)

emarginatum (Say)

3. Clypeus black, but sides of face with pale marks; scopa white (Boulder, fls. *Psoralea*, Aug. 8, *W. P. Ckll.*) *porteræ personulatum* Ckll. *

Clypeus at least partly light 4.

4. Abdominal bands entire; size large; scutellum with two yellow spots (Boulder, fls. *Helianthus lenticularis*, Aug. 29, 1906, *Rohwer*) *occidentale* Cresson

Abdominal bands interrupted in the middle 5.

5. Lateral yellow face-marks extending above level of antennæ; large species with bright yellow markings; scopa pale reddish-yellow (Ward, fls. *Phacelia*)

conspicuum Cresson

- Lateral face-marks not extending above level of antennæ 6.
6. Larger; yellow on clypeus interrupted in middle (Boulder, fls. *Grindelia*, Aug. 7, *W. P. Ckll.*) *porteræ* Ckll.
Smaller; yellow on clypeus not interrupted in middle; upper part of clypeus with a large W-like black mark; sixth abdominal segment bright lemon-yellow (Boulder, June, *G. Hite*) *blanditum prædentatum* Ckll.
7. Smaller; scutellum all dark *tenuifloræ* Ckll.
Larger; scutellum at least with yellow dots 8.
8. Lateral face-marks extending above level of antennæ; large species; abdominal bands not interrupted in middle *occidentale* Cresson
Lateral face-marks not extending above level of antennæ 9.
9. Ground color of abdomen a more or less lively red; last segment red (Boulder, fls. *Psoralea*, Aug. 8, *W. P. Ckll.*) *porteræ amabile* Ckll.
Ground color of abdomen dark 10.
10. Apical segment red; size large *porteræ* Ckll.
Apical segment black 11.
11. Abdomen spotted, though some of the spots are united by lines; axillæ with light spots *porteræ personulatum* Ckll.
Abdomen banded, though the bands are partly interrupted; axillæ without light spots 12.
12. Markings of abdomen light yellow *emarginatum* (Say)
Markings of abdomen deep chrome yellow (Fort Collins) *titusi* Ckll.*

DIANTHIDIUM Cockerell

- Females 1.
Males 4.
1. Legs red 2.
Legs yellow and black, or black with yellow marks 3.
2. Smaller; clypeus all black; scopa white (Boulder, fls. *Psoralea*, Aug. 8, *W. P. Ckll.*)
concinnum (Cresson) var.
Larger; clypeus light at sides (Boulder, fls. sunflower, Aug. 8, *W. P. Ckll.*)
sayi Ckll.
3. Abdominal markings deep yellow; clypeus light at sides (Boulder, nesting in hole in brick wall at Kruger's house, Aug. 2. *Ckll.*, South Boulder Canyon, fls. *Grindelia*, Aug. 9, *W. H. Ckll.*) *parvum* (Cresson)
Abdominal markings very pale yellow (Boulder, September, *S. A. Rohwer*)
pudicum (Cresson)
4. Legs red (Boulder, fls. *Grindelia*, Aug. 7, *W. P. Ckll.*) *sayi* Ckll. (*interruptum* Say)
Legs yellow and black (Boulder, fls. *Grindelia*, Sept. 3, *Ckll.*, fls. *Grindelia* and *Chrysothamnus*, Sept., *Rohwer*; S. Boulder Canyon, fls. *Grindelia*, Aug. 9)
parvum (Cresson)

OSMIA Panzer

- Females 1.
Males 21.
1. Black without any metallic colors; looks like *Monumetha*, but eyes diverging above;

- clypeus with a strong, smooth and shining, longitudinal median ridge (Boulder, June, *W. P. Ckll.*) *hypocrita* Ckll.
 Very brilliant blue or green; scopa black 2.
 Dark blue or green, or black with blue or purple tints. 3.
2. Abdomen long and parallel-sided; tegulae piceous with a green spot in front (Ward, fls. *Edwinia*) *fulgida* Cresson
 Abdomen shorter; tegulae wholly green (Boulder) *bruneri* Ckll.
3. Large species; hair of thorax above bright fox-red; hair of clypeus and adjacent sides of face black; scopa black (Boulder, June, *W. P. Ckll.*) *novomexicana* Ckll.
 Hair of thorax above not thus brilliant 4.
4. Pubescence, including ventral scopa, white (Boulder, June, *W. P. Ckll.*)
hesperella Ckll.
 Ventral scopa reddish; edge of clypeus 4-dentate (Boulder, May, *Rohwer*)
hypochrysea rohweri Ckll.
 Ventral scopa black. 5.
5. Hair of pleura white 6.
 Hair of pleura black (white in lower part in one small species, *hypoleuca*) 9.
6. Hair of face all white (Boulder, June, *W. P. Ckll.*) *coloradella* Ckll.
 Hair of face not, or not all, white; small species 7.
7. Legs metallic; vertex and face with very coarse black bristles (Ward, July, fls. *Pentstemon*) *pentstemonis* Ckll.
 Legs black 8.
8. Scutellum with long black hairs among the white; front brightly colored (Ward, July, fls. *Phacelia*: Boulder, June, 17, *W. P. Ckll.*) *phaceliae* Ckll.
 Scutellum without black hairs; front black or very dark (Ward, July, fls. *Phacelia*)
melanotricha Lovell & Cockerell
9. Thorax above with white hair; large species 10.
 Thorax above with black hairs among the light 12.
10. Mandibles 4-dentate, massive; hair of pleura very short and scanty (Boulder, June 10, *W. P. Ckll.*) *brevihirta* Ckll.
 Mandibles 3-dentate; hair of pleura long 11.
11. Second abdominal segment with much hair; abdomen dark blue (Boulder, June 9, *Ckll.*; June 17, *W. P. Ckll.*) *nigrifrons* Cresson, var.
 Second abdominal segment with black hair; abdomen very shiny, green, with the hind margins of the segments purple (Arapahoe Peak, Sept. 1, *Rohwer*)
hendersoni Ckll.
12. Mandibles 3-dentate 13.
 Mandibles 4-dentate 16.
13. Large species 14.
 Small or rather small species 15.
14. (Colorado, etc.) *nigrifrons* Cresson
 Differing from *nigrifrons* by having the punctures of the third abdominal segment much more distinct and separate; the hair at sides of metathorax white; a tuft of long white hair on and around tubercles; and the sides of face greener. No appressed light hair on cheeks. Length about 11½ mm. (Boulder, fls. *Gaillardia*, July 6, *W. P. Ckll.*) *gaillardiae* Ckll.

15. Larger, length a little over 9 mm.; lower part of pleura without white hair; legs not metallic (Ward, July, fls. *Gilia*) *wilmattæ* Ckll.
Smaller; lower part of pleura with white hair; legs metallic (Boulder, June 9, *W. P. Ckll.*) *hypoleuca* Ckll.
16. Small species; hair of sides of face mixed black and white (Halfway House, Pike's Peak, fls. *Salix*, May 30) *pikei* Ckll.*
Large species 17.
17. Cheeks with a large tooth below; mandibles much produced; clypeus smooth and shining (Eldora, Aug. 31, fls. *Gaillardia*, *Rohwer*, Ward, fls. *Senecio* and *Fraseria*)
armaticeps Cresson
Cheeks without such a tooth below 18.
18. Mandibles with a large outstanding basal process; clypeus deeply emarginate. (Boulder, Ward, fls. *Phacelia*) *propinqua* Cresson
Mandibles without such a process 19.
19. Smaller; head and thorax strongly blue and green; base and sides of second abdominal segment with short white pubescence (Boulder, June 12, *W. P. Ckll.*)
senior Ckll.
Larger; head and thorax very dark; hair at base of second abdominal segment black 20.
20. Smaller; clypeus densely punctured (Ward, July, fls. *Senecio*) *wardiana* Ckll.
Very large and robust; clypeus with well-separated punctures (Boulder, fls. *Carduus*, *Ckll.*; Boulder, June 22, *G. Hite.*) *pascoensis* Ckll., var.
21. Black here should come the unknown ♂ of *hypocrita*
Dark blue or green 22.
22. Vertex with hair wholly pale 23.
Vertex with hair at least partly black 25.
23. Very small; hair of hind femora white; legs metallic; hind margins of abdominal segments dark; flagellum darker than in typical *proxima* (Boulder, fls. *Phacelia*, June 12, 1905, *W. P. Ckll.*) *proxima* Cresson, var.
Hair of hind femora black 24.
24. Small, green, with small ocelli and narrow face (Boulder, June 4, *W. P. Ckll.*)
wheeleri Ckll., var.
Larger, bluer, with large ocelli (Boulder, June 4, 9 and 10, *W. P. Ckll.*) *cyaneonitens* Ckll.
25. Hair of upper part of pleura largely, but not all, black; large species (Boulder, May 20, *Rohwer*) *viridior* Ckll.
Hair of upper part of pleura all black; flagellum moniliform; hind basitarsus toothed (Boulder, April 20, fls. *Pulsatilla hirsutissima* and *Claytonia lanceolata*) species agreeing with *lignaria* Say, but as the females of this group (*Ceratosmia*) taken at Boulder are all *propinqua*, I infer that they belong to that species, the two not being separable in the male.
Hair of upper part of pleura not black 26.
26. Larger; hair of face and thorax yellowish, the latter with long black hairs interspersed (Boulder, April 20, fls. *Pulsatilla hirsutissima*) *olivacea* Ckll.
Smaller 27.
27. Hair of face and thorax above white, the latter with black hairs interspersed; face

narrow (Boulder, fls. *Pulsatilla hirsutissima*, April 20, *W. P. Ckll.*) *pulsatillæ* Ckll.
 Hair of thorax without black hairs interspersed (Boulder, April 20, fls. *Pulsatilla hirsutissima*) *aprilina* Ckll.

MONUMETHA Cresson

Black with parallel-sided abdomen; face of male with appressed white hair (Ward, fls. *Phacelia* and *Fraseria*) *albifrons* Kirby (*argentifrons* Cresson)

ALCIDAMEA Cresson

Black, about 7 mm. long; male with very thick flagellum (Boulder, fls. *Phacelia*) *simplex* Cresson
 Grænicher found this species nesting in dry stems of blackberry, etc.†

ASHMEADIELLA Cockerell

Female length 6 to 7 mm.; head and thorax black; abdomen black, with first dorsal segment red except a central mark, second red at sides, third partly red (Fort Collins) *gillettei* Titus*

HERIADES Spinola

Length 8 mm. or over; black; mandibles of female with a tubercle on outer side; ventral scopa white (Boulder, fls. *Clematis ligusticifolia*, July, *W. P. Ckll.*) *gracilior* Ckll.

LITHURGUS Berthold

Large, *Megachile*-like; apex of female abdomen with red hair, of male abdomen sharply pointed (Boulder, fls. *Opuntia*) *apicalis* Cresson

MEGACHILE Latreille

Females. I.
 Males II.

1. Abdomen without bands; first two dorsal segments and base of third with light hair, the others with black; scopa red 2.
 Abdomen with more or less conspicuous hair-bands 3.
2. Little or no black hair on vertex and mesothorax (Boulder, Aug., *W. P. Ckll.*) *wootoni* Ckll.
 With conspicuous black hair on vertex and mesothorax (Ward, fls. *Lupinus*) *wootoni calogaster* Ckll.
3. Cheeks with an enormous tooth beneath; mandibles greatly elongated (Boulder, Ward, fls. *Geranium*, *Carduus*) *pugnata* Say
 Not so 4.
4. Ventral scopa largely or wholly red or orange 5.
 Ventral scopa white or creamy-white, with or without black at extreme apex 7.
5. Smaller, length less than 12 mm.; head and thorax above with some conspicuous black hair (Boulder, September, *Rohwer*) *relativa* Cresson
 Larger, length over 13 mm. 6.
6. Abdomen heart-shaped; hair of mesothorax mainly grayish-white (Ward, South Boulder Canyon, Boulder; fls. *Phacelia*, *Senecio*, *Psoralea*, *Grindelia*) *latimanus* Say

3. Very large; anterior wing about 10½ mm. long; nervures dark; hair on inner side of hind basitarsus black (Boulder, fls. *Grindelia*, Aug. 7, *W. P. Ckll.*; fls. *Chrysothamnus*, Sept., *Rohwer*) *mizeæ* Ckll.
Much smaller; nervures ferruginous (Boulder, fls. *Grindelia*, Aug. 21, *Ckll.*)
agilis Cresson
4. Head extremely broad; hind basitarsus with long white hair on outside, and black on inner (Boulder, fls. *Opuntia*) *pallidicincta* Ckll.
Head ordinary 5.
5. Tuft of hair on tegulæ in front black; abdominal bands with a strong orange tint (South Boulder Canyon, fls. *Grindelia*, Aug. 9, *W. P. Ckll.*) *grindeliæ* Ckll.
Tuft of hair on tegulæ in front light: abdominal bands grayish white, or only faintly yellowish (Boulder, fls. *Grindelia* and sunflower, Aug. 5 to 7, *W. P. Ckll.*; fls. *Chrysothamnus graveolens*, Sept. 12, *Rohwer*) *confusiformis* Ckll.
6. Large; about 14 mm. long; antennæ red beneath *obliqua* Say
Much smaller 7.
7. Mesothorax with a good deal of black hair; tegulæ with a tuft of black hair; labrum black *grindeliæ* Ckll.
Mesothorax without black hair; small species 8.
8. Labrum (exclusive of its hair) black; mandibles with no yellow spot; length 10 to 11 mm. (Boulder, fls. *Helianthus*, Aug. 26, *Rohwer*) *agilis semiagilis* Ckll.
Labrum black, with a very obscure light spot; spines at sides of last abdominal segment very short; hair of thorax above very pale ochreous; mandibles with a very small yellow spot (Boulder, fls. *Grindelia serrulata*, Sept. 5, *Ckll.*)
agilis Cresson, var. a.
Labrum with a large yellow spot; insect rather large, approaching *M. menuacha*, hair of thorax above practically white; mandibles with no yellow spot (Boulder, July 29, *Ckll.*, at sunflower, Aug. 7, *W. P. Ckll.*) *agilis* Cresson, var. b.
Labrum light except lateral corners; mandibles with a large yellow spot (Boulder, July 29, *Ckll.*, at sunflower, Aug. 7, *W. P. Ckll.*) *agilis* Cresson, var. c.

XENOGLLOSSA Smith

Thorax with reddish hair; male clypeus black with a large yellow spot; in flowers of Cucurbitaceæ *pruinosa* Say *

TETRALONIA Spinola

- Females 1.
Males 2.
1. Hind spur of hind tibia hooked at end (Boulder, *S. A. Johnson*) *dilecta* Cresson
Hind spur not hooked; abdomen shining black, with only one white hair-band, which is on fourth segment, but a white spot on each side of third *acerba* Cresson
 2. Hair of thorax above bright rufo-fulvous (Boulder, fls. *Astragalus*, June, *W. P. Ckll.*) *astragalina* Ckll.
Hair of thorax above pale or dull 3.
 3. Very large; the entirely black flagellum at least 11 mm. long (Fort Collins)
gillettei Ckll.*
Not so large 4.

4. Hair on second abdominal segment all black (Boulder, May 21, 1906, G. Hite)

acerba Cresson

Hair on second abdominal segment partly light; fifth segment with a light band (Boulder, fls. *Phacelia*, June 4, W. P. Ckll.) . . . *edwardsii vagabunda* Ckll.

The female *acerba* has not been taken in our region. It seems possible that the male assigned to *acerba* is after all a variety of *T. edwardsii*. The specimen of *acerba* taken by Mr. Hite has the peculiarity of possessing only two submarginal cells on both sides. This, if constant, would take it out of true *Tetralonia*, and place it in the old-world genus *Eucera*.

DIADASIA Patton

Hind spur of hind tibia strongly bent at end in female; basal joint of hind tarsus ending in a long process in male (Boulder, Aug. 5, fls. *Opuntia*) *australis* Cresson

EMPHOROPSIS Ashmead

Female with a patch of black hair in middle of thorax, and outer side of hind tibiae with orange hair; male with face-marks white (Boulder, fls. *Ribes*; Mrs. Bennett) *johnsoni* Ckll.

ANTHOPHORA Latreille

Abdomen with white bands not due to hair (Boulder, fls. *Psoralea* and *Solanum rostratum*) *smithii* Cresson

Abdomen without such bands 1.

1. Thorax above with black and pale hair intermixed, giving a gray effect; middle tarsus of male with copious red hair (Boulder, fls. *Ribes* and *Viola*) *simillima* Cresson
Thorax above without black hair intermixed 2.

2. Abdomen covered with grayish or fulvous hair; large species (Boulder, fls. *Carduus*, July 29, Ckll.) *occidentalis* Cresson

Thorax and abdomen with bright fox-red hair, but apex of abdomen with black (Ward, fls. *Gilia*, South Boulder Canyon, fls. white aster, Aug. 9, W. P. Ckll.)

neomexicana Ckll.

Thorax and first abdominal segment with dense fulvous hair; rest of abdomen black, with distinct narrow hair bands in male, and vestiges of bands in female (Boulder) *montana* Cresson

CERATINA Latreille

Small; apical portion of male abdomen narrow; hind femora of male triangular; female with a light mark on clypeus (Boulder, fls. *Calochortus* and *Phacelia*)

nanula Ckll.

Larger, more robust, female 7 to 8 mm. long; apex of male abdomen broadly triangular (Boulder, fls. *Platycodon*, *Calochortus*, *Argemone*, *Phacelia*)

neomexicana Ckll.

PSITHYRUS Lepeletier

Large; *Bombus*-like; hair of thorax above fulvous, broadly black between the wings; abdomen shining black, with some light yellow hair at sides toward apex (Ward, fls. *Lupinus*) *insularis* Smith

BOMBUS Latreille

- Abdomen with a very conspicuous red band 1.
 Abdomen without such a band 6.
1. The red band subapical, with a broad black band before it, and the base of the abdomen broadly pale (Arapahoe Peak, above timber-line, Aug. 31, 1906, *W. P. Ckll.*; Eldora, fls. *Delphinium*, Sept. 1, 1906, *S. A. Rohwer*) . . . *frigidus* Smith (Titus records *frigidus* from Ward as *oregonensis*. He also reports *B. couperi* Cresson, and *B. putnami* Cresson, from Ward. These are similar in most respects to *frigidus*. I examined the types in the Cresson collection, and noted as follows: "*B. putnami* and *couperi* are very similar, with fulvous pubescence, broad black thoracic band, and very broad black abdominal band, occupying the third and fourth segments. *B. putnami* is the larger.")
 The red band occupying the third and fourth segments, with no black band before it 2.
 The red band occupying the second and third segments, with a yellow or yellowish band following it 4.
2. Abdomen beyond the red band with yellow hair; only a little black, on apex of sixth segment (Eldora, fls. *Gaillardia*, Aug. 31, *Rohwer*) . . . *rufocinctus* Cresson
 Abdomen beyond the red with black hair 3.
3. Yellow hair of thorax above without black intermixed (Boulder) . . . *juxtus* Cresson
 Yellow hair of thorax above with much black intermixed (Ward, cf. Titus; Eldora, fls. *Gaillardia*, Aug. 31, *Rohwer*, Arapahoe Peak, above timber-line, Aug. 31, *W. P. Ckll.*) *flavifrons* Cresson
4. Yellow of scutellum and first abdominal segment divided into two spots; form compact (Ward, cf. Titus; Boulder, April and May, *Rohwer*) . . . *bifarius* Cresson
 Yellow of scutellum not divided 5.
5. Abdomen more elongate, face with fulvous hair (Ward, cf. Titus; Boulder, August etc. *W. P. Ckll.*, *Rohwer*) *huntii* Greene
 Abdomen heart-shaped, face with black hair, a little pale intermixed (Ward, fls. *Phacelia*) *rufocinctus phaceliæ* (Ckll.)
 (In recent years, the validity of *B. bifarius* has been questioned, but it is evidently a perfectly good species. I follow Mr. Franklin in treating *iridis*, *phaceliæ* and *astragali* as varieties of *rufocinctus*. He has accumulated a large amount of information on this group, which he will shortly publish. Mr. Titus has recorded *B. sylvicola* Kirby, and *B. mixtus* Cresson, from Ward; I have not met with them in Boulder County. *B. sylvicola* was originally described from Lat. 65° N.; the abdomen is yellow with a broad median red band; the apex is, I believe, *not* black, in which case there must be some doubt about the *sylvicola* of Mr. Titus' table (*Canad. Ent.*, 1902, p. 39). *B. mixtus* was described from Colorado; it has the black band between the wings ill-defined.)
6. Thorax black, with the anterior part broadly fulvous-haired; abdomen fulvous with the apex broadly black; large species (Boulder, *G. Weston*, at sunflower, Aug. 7, *W. P. Ckll.*; at *Melilotus alba*, Sept. 27, *Rohwer*) . . . *americanorum* Fabricius
 (*B. americanorum* is said by Mr. Franklin to be the same as *pennsylvanicus*, but there is much confusion about the latter; Robertson holds it to be *servidus*, while Pierce has given *auricomus* as *pennsylvanicus*.)

- Scutellum with yellow or fulvous hair 7.
7. No black band between the wings 8.
A distinct black band between the wings 12.
8. Abdomen black with first and part of second segment yellow-haired (Boulder, fls. sunflower, Aug. 9, *W. P. Ckll.*) *separatus* Cresson
Abdomen with the yellow covering first two segments, and at least part of third 9.
9. Lower edge of yellow strongly convex; large species (Boulder, *J. Henderson*, May 11, *Rohwer*) *morrisoni* Cresson
Lower edge of yellow straight. 10.
10. Face very narrow; apex of abdomen with reddish hair
nevadensis Cresson ♂ (*improbatus* Cr.)
Face normal; females 11.
11. Abdomen with first three segments yellow (near S. Boulder Creek, about 7 miles from Boulder, *Youngblood*, Boulder, August, *W. P. Ckll.*) . *nevadensis* Cresson
Abdomen with the first four segments yellow (Boulder, fls. *Helianthus*, Aug., *Rohwer*) *dorsalis* Cresson
(The male of *dorsalis* has the abdomen yellow-haired, with only the last segment and the sides of the penultimate black-haired.)
12. Thorax before the band white-haired; abdomen with the hair tawny, and no black band (Boulder, *Ckll.*, Arapahoe Peak, above timber-line, Aug. 31, *W. P. Ckll.*)
appositus Cresson
Thorax before the band yellow or tawny-haired 13.
13. Abdomen with the first four segments yellow-haired 14.
Abdomen with the basal half at least mainly black-haired 15.
14. Yellow of abdomen suffused with red, especially at sides; hair of face pale (Boulder, *W. P. Ckll.*) *rufosuffusus* Ckll.
Yellow of abdomen not suffused with red; hair of face black (Boulder, *G. Weston*, fls. sunflower, Aug. 6 and 7, *W. P. Ckll.*) *fervidus* Fabricius
15. Apex of abdomen with pale hair; hair of base black 16.
Apex of abdomen with coarse black hair, but yellow at sides of fifth segment; hair of first and part of second segment pale 17.
16. First two and fourth segments black, apex white (Boulder, May, *Rohwer*)
proximus Cresson
First two segments black, third yellow or tawny, fourth to sixth white (Boulder, fls. *Prunus*, May, *Chas. Sellers*) *proximus coloradensis* Titus
17. The broad black band of abdomen with coppery-red hairs intermixed (Eldora, fls. *Gaillardia*, Aug. 31, *Rohwer*) *rufocinctus iridis* (Ckll. & Porter)
The band entirely black; appearance of *B. edwardsii* (Boulder, Ward; fls. *Astragalus*, *Phacelia*) *rufocinctus astragali* Ckll.

APIS L. (domesticated)

- Abdomen dark (Boulder) *mellifera* L.
Abdomen very largely rufo-fulvous (Boulder, fls. *Pulsatilla*, etc.)
mellifera ligustica Spinola.

POSTSCRIPT

Since the above went to press, the following species have been added to the Boulder County fauna:

Andrena erythrogastra Ashm. Boulder, May 9, fls. *Taraxacum*; Mrs. Bennett.

A. bipunctata Cress. Boulder, fls. *Prunus*; G. Hite.

A. illinoensis Rob. Boulder, fls. *Taraxacum*; G. Hite.

A. pyrrhacita Ckll. Salina, W. & T. Ckll.; Boulder, G. Hite. A species with dense erect hair covering abdomen, orange-fulvous in color, except at base and apex; much black hair on face.

Nomada cuneata Rob. University Campus, fls. *Taraxacum*; Miss Edna Baker.

N. bella Cress., var. Boulder, fls. *Nothocalais*; Mrs. Bennett.

N. ednæ Ckll. Campus of University, fls. *Taraxacum*, April 10; Miss Edna Baker. In table of Rocky Mtn. *Nomada* runs to *superba*, but much smaller, and apical plate notched.

Osmia universitatis Ckll. University Campus, fls. *Taraxacum*, April 10; Miss Edna Baker. Male runs in table near *proxima*, but much larger, legs black, abdomen bright steel-blue, the hind margins of the segments dark purple.

O. leonis Ckll. University Campus, fls. *Taraxacum*, May 8; Miss Edna Baker. Near to *gaillardia*, but with a shining pit next to apical margin of clypeus; hair of thorax above light ochreous, with a little black.

O. gaudiosa Ckll. University Campus, fls. *Taraxacum*, April 10; Miss Edna Baker. A small bright-green species, with white pubescence; posterior part of abdomen dorsally with wholly light hair.

O. ednæ Ckll. University Campus, fls. *Taraxacum*, May 9; Miss Edna Baker. Allied to *gaudiosa*, but larger, pubescence very yellow; abdomen brilliant, shining golden.

O. bennettæ Ckll. University Campus, fls. *Taraxacum*, May 8; Mrs. C. Bennett. Allied to *O. bella*, but no dark hairs intermixed on thorax above. Easily known from *gaudiosa* and *ednæ* by larger size, and black hair on posterior dorsal region of abdomen.

Full descriptions of the new species are about to be published in *Annals & Mag. Nat. History*.