

## Article XXV.—THE BEES OF FLORISSANT, COLORADO

By T. D. A. COCKERELL.

Florissant, in Teller County, Colorado, has an altitude of a little over 8000 feet. The collection now reported on was obtained during the months of June and July, 1906, and consists of 119 identified species, of which 34 are supposed to be new, two representing new genera. This remarkably fine series is principally due to the industry of Mr. Sievert A. Rohwer (whose name is abbreviated to R. in the list); but material was also collected by my wife (W. P. C.), Dr. W. M. Wheeler and myself (C.). All the records pertain to Florissant proper, except when the contrary is indicated. Topaz Butte (or Crystal Mountain) is a mountain near Florissant, and the material from thence is mostly from an altitude near 9000 feet. Lake George is a little lower than Florissant, and while only a few miles away, is in Park County. The numerous records from "East of Lake George" are from between the lake and Florissant, but nearly all, at least, in Park County.

Only two lists of bees from such an altitude in the Rocky Mountains have been published. The first (Trans. Amer. Ent. Soc., 1893, pp. 337-340) is from Wet Mountain Valley, Colorado, which has about the same altitude as Florissant, and is nearly sixty miles almost due south of it. This is an open valley, with xerophytic features, and should have a fauna similar to that of Florissant; but unfortunately only 38 definitely determined species have been recorded, though others were collected. Of the 38, only 11 are in the Florissant list, but some of those not definitely determined are probably the same.<sup>1</sup> That the number of species in common is not greater is partly explained by the fact that several of the Wet Mountain Valley species are such as fly early in the year, and would be over or scarce by June; it is also probable that there are some erroneous identifications. That the Florissant list, though large, is by no means complete even for the midsummer months, is evident from the large number of species represented only by one or two specimens.

The other list — a much more important one — is from Beulah, New Mexico (Viereck, Trans. Amer. Ent. Soc., 1903, pp. 44-66).

<sup>1</sup>*Bombus ternarius* and *Anthophora bomboides* of the Wet Mountain Valley list are doubtless *B. huntii* and *A. neomexicana*. "*Habropoda* sp." is probably *Emphoropsis mucida*. *Agapostemon* sp. is doubtless *A. texanus*. The supposed *Megacilissa* is doubtless wrongly determined, and the four species of "*Cilissa*" belong to *Andrena*. *Nomia nortoni* I regard with some doubt.

Allowing for various changes and additions I have been able to make the Beulah list numbers 104 species, of which 32 were new. Beulah, in the Las Vegas Mountains, has an altitude of about 8000 feet, but it is really more boreal than Florissant, being situated in a narrow, densely wooded cañon. Its fauna and flora are strictly those of the Canadian Zone; while Florissant, open, sunny, and comparatively dry, has many austral elements.<sup>1</sup> The following genera are in the Beulah list, but not in that from Florissant; the number of species is given in parenthesis after each:

*Triepeolus* (1), *Heriades* (1), *Ashmeadiella* (2), *Coelioxys* (2). Of these, it is safe to say that three certainly must exist at Florissant, although they were not found; the fourth (*Ashmeadiella*) is an austral type, and may be expected at Florissant.

The following genera, found at Florissant, were not observed at Beulah:

<i>Emphoropsis</i> (1),	<i>Alcidamea</i> (1),	<i>Ceratina</i> (1),
<i>Dianthidium</i> (1),	<i>Spinoliella</i> (1),	<i>Chelynia</i> (2),
<i>Agapostemon</i> (2),	<i>Calliopsis</i> (2),	<i>Stelis</i> (1).
<i>Titusella</i> (1),	<i>Oreopasites</i> (1),	

These are, in the main, characteristically austral types; it is thus apparent that Florissant possesses the typically boreal genera, and at the same time many austral ones, a combination which explains the great richness of its bee-fauna. The following genera, while occurring both at Beulah and Florissant, have no species in common: *Nomada*, *Anthidium*, *Halictoides*, *Sphecodes*. Of the genera in common, the following have more species in the Beulah list than in the Florissant one (the excess is given after each): *Bombus* (1), *Megachile* (3), *Halictoides* (1), *Panurginus* (5), *Colletes* (1), *Prosopis* (6). It will be seen at once that these are in the main boreal types; and it seems that Beulah, while no richer in boreal genera than Florissant, is markedly richer in boreal species. Against this, however, is an unexplained excess (9) of *Osmia* at Florissant.

It appears that there are 37 species common to the Beulah and Florissant lists; 64 at Beulah but not at Florissant; 81 at Florissant but not at Beulah. Perhaps the most characteristic species common at Beulah and absent at Florissant is *Halictus aquila* Ckll.

Comparing the recent with the fossil bee-fauna of Florissant, it is to be noted that of the nine fossil genera reported, three are extinct, but five of the remaining six still live at Florissant. The sixth

<sup>1</sup> See Dr. F. Ramaley, University of Colo. Studies, Vol. III, p. 179. As a characteristic austral plant common at Florissant, we may cite *Yucca glauca*.

(*Heriades*) is in the Beulah list, and doubtless will be found at Florissant.

As far as possible, the flower-visiting records are given. The principal flowers visited are the following:

*Iridaceæ.*

*Iris missouriensis* Nutt. Visited by many species. Compare 'American Naturalist,' Vol. XXXVI, p. 815, and 'Entomological News,' 1901, p. 38

*Polygonaceæ.*

*Eriogonum umbellatum* Torrey. Has an oligotropic *Perdita*.

*Ranunculaceæ.*

*Halerpestes cymbalaria* (Pursh) Greene. Visited by various species. See also 'Zoologist,' 1898, p. 79.

*Cruciferæ.*

*Erysimum*: a species with yellow flowers, probably *asperum*, but perhaps one of the recent segregates. Visited by various species.

*Draba* sp. Several species.

*Capparidaceæ.*

*Peritoma* (or *Cleome*) *serrulatum* (Pursh). This plant is not very abundant at Florissant, but seems well established. It is an austral type. For a long list of visitors see 'Entomological News,' 1901, p. 40.

*Crassulaceæ.*

*Sedum stenopetalum* Pursh. Flowers yellow.

*Hydrangeaceæ.*

*Edwinia americana* (T. and G.) Heller. Common, and proved a good bee-plant.

*Grossulariaceæ.*

*Ribes longiflorum* Nutt. Several species. See also 'American Naturalist,' XXXVI, 812.

*Rosaceæ.*

*Argentinia anserina* (L.) Rydb. Various species. For a long list of European visitors, see Knuth, 'Blütenbiologie,' Vol. II, part 1, p. 369.

*Chamærhodos erecta* (L.) Bunge, det. A. Nelson. East of Lake George; a good bee-plant, notwithstanding the smallness of the flowers. The plant goes north to Alaska.

*Dasiphora fruticosa* (L.) Rydb. Several species. For a good

list of visitors in Europe, see Knuth, 'Blütenbiologie,' Vol. II, part 1, p. 374.

*Leguminosæ.*

*Aragallus* sp. or spp. of the *lambertii* group.

*Linaceæ.*

*Linum lewisii* Pursh. Several species on this magnificent blue flax.

*Malvaceæ.*

*Sidalcea neomexicana* A. Gray. A species of a western and southwestern genus.

*Asclepiadaceæ.*

*Asclepias speciosa* Torrey. Not many bees.

*Polemoniaceæ.*

*Polemonium* sp. The common species at Florissant, to which all our records refer, is the large one formerly referred to the Old World *P. cæruleum*, which it certainly resembles very much. Whether it is the more recent segregate *P. occidentale* Greene, I cannot positively state.

*Hydrophyllaceæ.*

*Phacelia alba* Rydberg. Has an oligotropic *Perdita*. *P. congesta* Hook., in New Mexico, also has a *Perdita*, but it is an entirely different species (cf. Amer. Nat., XXXVI, 811).

*Boraginaceæ.*

*Lappula floribunda* (Lehm.) Greene. A beautiful blue-flowered species, like a sort of gigantic forget-me-not.

*Scrophulariaceæ.*

*Scrophularia occidentalis* (Rydb.) Bickn. Especially visited by *Prosopis*.

*Pentstemon secundiflorus* Benth. This splendid species occurred in large patches, and was much visited by bees.

*Synthyris* (or *Besseya*) *plantaginea* Benth. Unexpectedly, this was quite freely visited by certain species.

*Pedicularis crenulata* Benth., det. A. Nelson. Common in marshy places, the flowers deep pink.

*Compositæ.*

*Hymenoxys ligulæflora* (A. Nelson). I have treated this (Bull. Torr. Bot. Club, 1904, p. 474) as a subspecies of *H. richardsoni*, but after seeing it alive, I am willing to provisionally regard it as a species,

including in it the *H. macrantha* (A. Nels.) Rydb. It is very common at Florissant, and is the only *Hymenoxys* I found there. Rydberg, in his newly published 'Flora of Colorado', treats *macrantha* as a species, and leaves *ligulæflora* out of the list. I feel assured, however, that they are not separable, and *ligulæflora* is the older name. I still incline to the view that *ligulæflora*, *pumila*, etc., are completely confluent with *richardsoni* to the northward, but the case should be established with more material and particularly studies in the field. The species reported and figured in a recent (1906) 'Bulletin' of the Colorado Experiment Station as *H. floribunda* is evidently *ligulæflora*.

The following abbreviations are used in the list: s. m. = submarginal cell. b. n. = basal nervure. r. n. = recurrent nervure. t. c. = transverso-cubital nervure. t. m. = transverso-medial nervure. fls. = at flowers of.

1. **Prosopis basalis** *Smith.* 1 ♂, Topaz Butte, June 17 (R.).
2. **Prosopis antennata** *Cress.* 2 ♂, July 11 and 19, the latter at flowers of *Lappula floribunda* (C.).
3. **Prosopis tridentula** *Ckll.* 1 ♂, July 19 (C.).
4. **Prosopis divergens** *Ckll.* 1 ♂, July 10 (R.).
5. **Prosopis varifrons** *Cress.* 17 ♀, July 12 to 25. These run to *varifrons* in my table in 'Entomologist,' Oct. 1898, but seem rather large. It is probable that the insects recorded at various times as *varifrons* include more than one species, but I cannot point to any satisfactory means of separation, in the absence of the males. The Florissant specimens visited various flowers: *Scrophularia* (C., R.), *Lappula* (R.), *Cleome serulata* (C.), *Linum lewisii* (C.), *Dasiphora fruticosa* (C.), and *Pentstemon secundiflorus* (C). Most were taken on the *Scrophularia* and *Pentstemon*.
6. **Prosopis pygmæa** *Cress.* 1 ♀, July 11 (C.). It represents a variety (or closely allied species) with the lateral face-marks reduced to a small spot on each side.

7. **Prosopis tuertonis**, sp. nov.

♀. Length about 5 mm. Black; head and thorax densely punctured; light markings cream-color or slightly yellow; clypeus dull, with shallow punctures; *lateral face-marks narrow*, broadest opposite upper part of clypeus, slightly indented below antennæ, the upper end slightly divergent from the eye; flagellum ferruginous beneath; mesothorax densely and strongly punctured; small spot on tegulæ, large spot on tubercles, and broken band on hind border of prothorax pale yellow; pleura rugoso-punctate; area of metathorax with a strong subcancellate sculpture; wings hyaline, beautifully iridescent, stigma and nervures.

very dark brown; first r.n. entering first s.m. just before its apex; b.n. falling a little short of t.m.; abdomen shining, *first segment very delicately punctate*; knees yellow, the yellow extending a little way down anterior and hind tibiae.

Type from Tuerto Mountain, near Santa Fé, New Mexico, 8550 feet, at flowers of a Crucifer, Aug. 7 (*Cockerell*). Also from Florissant.

1. ♀, July 12, fls. *Lappula* (R.). This is the species mentioned, without a name, in 'Entomologist,' 1898, p. 217.

8. *Colletes nigrifrons* Titus. 7 ♀, July 9 to 23. At flowers of *Linum lewisii* (C.), *Ranunculus* (R.), *Argentinia* (W. P. C.), and *Dasiphora* (R.).

9. *Colletes kincaidii* Ckll. 2 ♂, July 9 and 11, one at fls. *Polemonium* (R.).

10. *Colletes oromontis* Vier. 3 ♀, June 21 and 22, two at *Mertensia*, one at *Senecio* (R.).

11. *Colletes phaceliæ* Ckll. 1 ♀, June 18 (R.).

12. *Colletes salicicola geranii* Ckll. 2 ♂, June 16, fls. *Synthyris plantaginea* (C.), June 22, fls. *Senecio* (R.).

13. *Colletes sieverti*, sp. nov.

♂. Length about 8½ mm. Black, with abundant dull white pubescence, which has a faint yellowish tint on the head and thorax above; head broad, eyes converging below; face densely covered with very long hair; *labrum with a small but very distinct median pit*; mandibles strongly bidentate; *malar space broader than long, but not greatly so*; *antennæ long*, the joints of the flagellum longer than broad, wholly dark; mesothorax shining, but very strongly and rather closely punctured; scutellum with large strong punctures, becoming very sparse anteriorly; *thorax above wholly without dark hair*; *area of metathorax with a strong transverse ridge*, above which are about eight quadrangular pits; below the ridge the area is shining, the upper part with a longitudinal ridge; lateral faces dullish, roughened; tegulæ dull testaceous; wings hyaline, nervures and stigma very dark reddish brown; second s.m. very broad, receiving r.n. about its middle; legs normal, the tarsi black; spurs yellowish white; abdomen shining, very strongly and quite closely punctured, all the segments with entire white hair-bands; first segment and middle of second with much erect white hair.

Type from Florissant, Colo., July 19, at flowers of *Geranium* (R.). In my table in *Psyche*, Oct. 1905, this runs to *C. spurcus* Vier., but it differs from that species in being somewhat larger, the first r. n. not joining second s. m. before the middle, and the total absence of dark hairs on the abdomen. In Robertson's table it runs nearest to *eulophi*, but it is not that. It has a strong superficial resemblance to the European *C. hylæiformis* Ev., but that insect has the abdomen very much more coarsely punctured. The following table separates it from several western males which show a very close superficial resemblance:

Thorax above with some dark hair . . . . .	<i>skinneri</i> Vier.
Thorax above without dark hair . . . . .	1
1. Hair of face perfectly white, contrasting with the yellowish of the mesothorax; area of metathorax, below the transverse keel, obliquely plicate at sides . . . . .	<i>gaudialis</i> Ckll.
Hair of face colored like that of mesothorax . . . . .	2
2. Face narrower below; hair of face and thorax above ochreous . . . . .	<i>ciliata</i> Path.
Face broader below; hair of face and thorax above yellowish-white . . . . .	<i>sieverti</i> Ckll.

#### 14. *Colletes florissantia*, sp. nov.

♂. Length 8 mm. or slightly more. Black, with abundant dull white hair, faintly yellowish on head and thorax above, but shining and pure white over clypeus; head broad, eyes converging below; mandibles reddened apically; labrum shining, with no distinct pit; *malar space very short*, at least twice as broad as long; antennæ only moderately long, *the joints of flagellum not much longer than broad*; flagellum faintly brownish beneath; mesothorax shining, with small punctures, rather dense at sides, but lacking entirely in middle; scutellum well punctured; area of metathorax coarsely sculptured, the transverse keel scarcely evident, the lower part of the area covered with large wrinkles, except the lower end, which is occupied by a large shining hollow; lateral faces coarsely roughened; tegulæ dark, wings hyaline, nervures and stigma dark; second s.m. twice as broad below as above, *receiving the first r.n. a little before its middle*; no dark hair on thorax above; legs normal, tarsi black; abdomen shining, the hind margins of the segments with dense white hair-bands; first segment with small but distinct punctures, second more closely punctured, third still more closely, the following segments becoming finely rugoso-punctate; hind margins of ventral segments finely ciliate rather than fasciate.

Type from Florissant, June 22 (R.). In my table it runs to *C. paniscus*, in Robertson's near to *C. willistoni*. It differs from *paniscus* by having the third antennal joint shorter than the fourth, the first r. n. entering second s. m. before the middle, and especially the sculpture of abdomen. It was taken on the same day as a ♀ *oromontis*, and I thought it might be the unknown male of that species. However, the sculpture of the metathorax and abdomen seem too different, and I think it much more likely that *C. paniscus* is the true ♂ of *oromontis*, in which case the latter name would fall, *paniscus* having priority of place. The types of *paniscus* and *oromontis* were taken at Beulah, N. M., on the same day.

#### 15. *Colletes polemonii*, sp. nov.

♂. Length 7½-8 mm. Black, shining, with long white hair, dullish but not yellow on thorax above, shining and very white over clypeus; labrum shining, the pit rudimentary; malar space extremely short; flagellum dark brownish beneath, the joints not greatly longer than broad; mesothorax finely punctured at

sides, but smooth and impunctate in the middle; metathorax much like that of *florissantia*, but the shining hollow extends further up; tegulæ piceous; wings hyaline, nervures and stigma very dark reddish-brown; second s.m. broad, but twice as broad below as above, receiving the first r.n. a little before its middle; legs normal; tarsi black, spurs piceous; abdomen shining, finely punctured, punctures weaker and less dense on the first segment than on the second; hind margins of segments with dense white hair-bands, that on first weak in the middle; ventral segments finely ciliate.

Type from Florissant, June 27, fls. *Polemonium* (R.). Also July 11, fls. *Ranunculus* (R.). In my table it runs to *C. gypsicolens*, in Robertson's near to *C. willistoni*. From *gypsicolens* it is known at once by the short antennæ; from *willistoni*, which I have not seen, it appears to differ in the metathorax. *C. willistoni* is said by Robertson to collect its pollen from *Physalis*; it is known only from Illinois and Nebraska. From *C. florissantia*, the present species is readily known by its smaller size, and the lack of a yellow tint in the hair of the thorax above.

16. ***Sphecodes pecosensis*** Ckll. 1 ♀, June 29, fls. *Edwinia* (R.).

17. ***Sphecodes eustictus*** Ckll. 6 ♀. Previously known only by the unique type, from Prospect Lake, Colorado Springs. The mandibles vary, being distinctly dentate, or merely with an inner angle. Topaz Butte, June 17 (R.); Lake George, July 5 and 18, one by a nest of *Spinoliella scitula* (W. P. C.); Florissant, June 15–July 24, fls. *Argentinia* (R.).

18. ***Sphecodes sulcatulus***, sp. nov.

♀. Length about  $6\frac{1}{2}$  mm. Head and thorax black, shining; head broad, facial quadrangle distinctly broader than long; clypeus with a rather dense but somewhat irregular punctation; mandibles dentate, the apical part reddened; labrum shining, with a row of feeble pits; cheeks striate; front with rather sparse punctures; flagellum brown beneath; vertex not tuberculate, transversely wrinkled behind the ocelli; mesothorax very shiny, with sparse but distinct punctures, and a prominent median sulcus; pleura coarsely roughened; area of metathorax semilunar, with irregular radiating wrinkles; posterior face malleate; tegulæ with a reddish spot and pallid margin; wings reddish, the nervures and stigma dark reddish-brown; first r.n. joining second s.m. very near its end; legs black, the tarsi and anterior tibiæ in front dark reddish; abdomen of the usual shape, extremely shiny, hardly punctured; the first three segments brilliant chestnut red, the others black, except that the fourth is red at the sides of the base; no depression between first and second segments in lateral view.

Type from Florissant, July 1 (R.). In Robertson's table it runs to *S. minor*, but is quite different by the sulcate mesothorax and black apex of abdomen. The following table separates it from two rather similar western species:



- Apex of abdomen not darkened; area of metathorax coarsely irregularly reticulated . . . . . *sophiæ* Ckll.  
 Apex of abdomen more or less darkened . . . . . 1  
 1. Abdomen broad, the first segment with a short longitudinal sulcus on the disc; area of metathorax plicatulate . . . . . *sulcatulus* Ckll  
 Abdomen narrower, the first segment wholly without such a sulcus; area of metathorax coarsely irregularly wrinkled . . . . . *washingtoni* Ckll

19. **Agapostemon texanus** Cress. 4 ♀. Eyes in life pea green. Sculpture of metathorax remarkably variable. June 15–July 18, fls. *Senecio* and *Polemonium* (R.).

20. **Agapostemon coloradensis** Crawford. 2 ♀, June 18 and 21, both fls. *Senecio* (R.). Also occurs at Boulder; fls. *Carduus*.

21. **Halictus sisymbrii** Ckll. Very abundant. One ♂, east of Lake George, June 18 (R.). The following records relate to females: east of Lake George, June 18, several, one at fls. *Halerpestes cymbalaria* (R.). Florissant, June 15–July 22, fls. *Lappula floribunda* (C.) *Linum lewisii* (C.), *Polemonium*, many (R., C.), *Edwinia* (R.), and *Epilobium* (R.). Also found at Boulder.

22. **Halictus trizonatus** Cress. 6 ♀. This is the western species usually referred to *coriaceus* Smith; Mr. Crawford tells me that it is distinct from *coriaceus*, being easily separated in the male. Mr. Crawford has not seen the real *coriaceus* from further west than Michigan and Illinois. June 15–July 22; fls. *Polemonium*, three (C.), *Edwinia* (R.), and *Scrophularia* (R.).

23. **Halictus lerouxii** Lep. 1 ♀. Rather small, bands of abdomen very white. June 16, fls. *Synthyris plantaginea* (C.).

24. **Halictus armaticeps** Cress. 1 ♀. Rather small, with large head. July 1, fls. *Senecio* (R.). I took a ♂ at Colorado Springs, June 20.

25. **Halictus cooleyi** Crawford. 5 ♀, July 18–25; fls. *Crepis runcinata*, two (R.), *Pentstemon* (R.), *Geranium* (R.), and *Scrophularia* (C.).

26. **Halictus aberrans** Crawford. 5 ♀. June 20–July 20; fls. *Geranium*, two (R.), *Senecio* (R.), *Linum* (C.), and *Sidalcea neomexicana* (R.). Also two males, presumed to belong here, June 16, fls. *Iris missouriensis*, and E. of Lake George, June 18, fls. *Senecio*. Mr. Crawford writes that *H. galpinsiae* and *aberrans*, so similar in the ♀, are widely different in the ♂.

27. **Halictus (Evyllæus) synthyridis**, sp. nov.

♀. Length about 6½ mm. Entirely black, with rather scanty dull white pubescence, the abdomen not banded; head rather narrow, the clypeus produced,

with large punctures; front very minutely and closely punctured; flagellum obscure brownish beneath; mesothorax shining, with sparse minute but distinct punctures; punctures on scutellum still sparser; posterior face of metathorax distinct, but sharp lateral margin failing on upper third; area semilunar, concave, very delicately sculptured with raised lines, the margin obtuse and shining; tegulæ reddish, not punctured; wings slightly dusky, very iridescent, stigma and nervures dull testaceous; second s.m. large; legs black, small joints of tarsi becoming reddish; an orange brush at end of first joint of hind tarsi; hind spur pectinate with about three spines; abdomen rather broad, with sericeous surface showing vague purplish tints; first segment except apically smooth and shining; hair of abdomen thin, rather long and white.

♂. Slender, black; antennæ very long, the flagellum dull yellowish-brown beneath; clypeus with or without a small apical pale yellowish band; legs dark.

Females June 16–July 9; the type June 16, fs. *Synthyris plantaginea* (C.); one from the same place at the same time, fs. *Iris missouriensis* (C.). One, June 17, from Topaz Butte (R.).

Males July 1–22; fs. *Polemonium* (C., R.) and *Crepis runcinata* (R.).

In Robertson's table (Canad. Entom., Sept. 1902) the ♀ runs to *pectoralis*, which is not especially allied. The ♂, runs to 3, but has not the metathorax of *foxii*, nor the subbilobed scutellum and whitish tarsi of *arcuatus* and *truncatus*. From *H. dasiphora* Ckll., the new species is easily known by the color of the stigma, and the very shiny anterior part of scutellum and posterior middle of mesothorax. *H. dasiphora* also has a narrower, distinctly pruinose abdomen. The male *synthyridis* is very like that which I have presumed to belong to *H. angustior* Ckll., but is smaller, with the area of metathorax conspicuously shorter.

## 28. *Halictus (Chloralictus) scrophulariæ*, sp. nov.

♀. Length 5–5½ mm. Head and thorax green, with rather abundant pubescence, white on face, cheeks, and pleura, slightly yellowish on head and thorax above; head normal, face bluish-green, clypeus and supraclypeal area with a brassy or even slightly coppery tint, the anterior margin of clypeus broadly black, ciliate beneath with golden hairs; mandibles reddish except at base, front minutely and densely punctured; flagellum ferruginous beneath except at base; mesothorax and scutellum brassy-green, metathorax darker, pleura dark bluish-green; mesothorax shining, with a sericeous surface, the punctures very minute, the median groove distinct; metathorax with posterior face distinctly margined, the area semilunar, rugulose, without conspicuous plicæ and without a sharp margin; tegulæ shining reddish, not punctured; wings hyaline, splendidly iridescent, stigma and nervures amber-color; stigma large; first s. m. about equal to second and third combined; first r. n. joining second s. m. at apex; second r. n. and third t. c. weakened; legs black, the knees more or less and the tarsi (except for some blackish clouds) ferruginous; abdomen translucent orange-amber, a large black spot on each side of first

segment, a small one on each side of base of third, and a smaller one on fourth; abdomen with delicate pruinose pubescence, but no hair-bands; hind spur with a few small teeth. The specimen from *Dasiphora* is somewhat smaller, and the abdomen has a transverse blackish line near the hind margins of the first three segments.

Type from Florissant, July 25, fls. *Scrophularia* (C.). Also July 16, fls. *Dasiphora fruticosa* (C.).

The following table separates this species from several which resemble it:

Metathorax dark, with a bluish-green tint, the area very feebly sculptured; tegulae not brightly colored . . . . .	<i>scrophulariae</i> Ckll.
Metathorax yellowish-green, the area with a rather strong plicate sculpture basally; tegulae bright apricot-color . . . . .	<i>pictus</i> Crawford.
Metathorax with the area roughened with minute wrinkles . . . . .	1
1. Abdomen rather broad, the apical part more or less infuscated . . . . .	<i>mesillensis</i> Ckll.
Abdomen narrow, the apical part not infuscated; size smaller than in <i>H. scrophulariae</i> . . . . .	<i>clematisellus</i> Ckll.

The second s. m. is much more narrowed above in *clematisellus* than in *scrophulariae*. Seen with a compound microscope, the front of *scrophulariae* is covered with minute, dense, contiguous punctures; the punctures of the mesothorax are hardly so strong as in *clematisellus*. The sculpture of the second abdominal segment consists of fine transverse lineolation, with sparse punctures on the basal half. The pruinose pubescence of the fourth abdominal segment is conspicuous, whereas in *clematisellus* it is very thin and hardly noticeable.

29. **Halictus ruidosensis** Ckll. 13 ♀, Topaz Butte, June 17 (R.). Florissant, June 18–July 25; fls. *Edwinia* (R.), *Polemonium* (C.), *Linum lewisii* (C.), *Aragallus* (R.), *Scrophularia* (C., R.), *Carduus* (R.), and *Geranium* (R.). Also at Colorado Springs, June 20 (C.).

30. **Halictus pruiniformis** Crawford. 2 ♀, July 12 and 18, fls. *Polemonium* (R.).

31. **Halictus veganus** Ckll. 5 ♀, June 14–21; fls. *Draba*, two (R.), *Senecio* (R.), and small white flowered *Lappula* (W. P. C.). One was at Fossil Stump Hill.

32. **Halictus (Chloralictus) sp.** 1 ♂. Head and thorax dark shining green; abdomen piceous; clypeus without yellow; legs without yellow. July 16, fls. *Dasiphora fruticosa* (C.).

#### ***Andrena Fabricius.***

In order to facilitate identification, I give a table of the females.

Abdomen largely red . . . . .	<i>prunorum gillettei</i> Ckll.
Abdomen not red . . . . .	1

1. Area of metathorax very coarsely sculptured and distinctly margined; punctures of mesothorax extremely large and strong . . . *cyanophila* Ckll.  
Area not so . . . . . 2
2. Abdomen black without bands, the hair beyond the first segment all black; large species . . . . . 3  
Abdomen with at least some pale hair beyond first segment; species mostly smaller . . . . . 4
3. Hair of thorax above bright ferruginous; hair of face black  
*micranthophila* Ckll.  
Hair of thorax above ochreous; hair of face not black  
*vicina argentinæ* Ckll.
4. Hair of hind tibiæ black or dark chocolate color . . . . . 5  
Hair of hind tibiæ light (largely dark in *runcinata*, then mesothorax with much black hair) . . . . . 7
5. Large species; abdomen very hairy, hair of upper part of cheeks black . . . . . *ribesina* Ckll.  
Medium sized species; abdomen not very or not hairy . . . . . 6
6. Clypeus little punctured . . . . . *topazana* Ckll.  
Clypeus well punctured. . . . . *birtwelli* Ckll.
7. First r.n. joins second s.m. very near its end; hair-bands of abdomen thin, the hairs long . . . . . 8  
First r.n. joins second s.m. at or near middle; mesothorax without black hair . . . . . 9
8. Mesothorax with much black hair . . . . . *runcinata* Ckll.  
Mesothorax without black hair . . . . . *lewisii* Ckll.
9. Facial foveæ, seen from above, chocolate color; wings greyish; stigma brown . . . . . *atala* Viereck  
Differs from the last by the reddened wings, ferruginous stigma, etc.  
*fragiliformis* Ckll.  
Facial foveæ, seen from above, light . . . . . 10
10. Abdominal bands very feeble; facial foveæ narrow . . . . . *synthyridis* Ckll.  
Abdominal bands very distinct . . . . . 11
11. Wings darker; hair of thorax above reddish . . . . . *medionitens* Ckll.  
Wings not so dark; hair of thorax above not reddish . . . . . *sieverti* Ckll.

33. *Andrena prunorum gillettei* Ckll. 2 ♂, 2 ♀. Both sexes fls. *Edwinia*, June 29 (R.). East of Lake George, June 18, ♀ fls. *Erysimum* (W. P. C.), ♂ fls. *Halperstes cymbalaria* (R.).

34. *Andrena birtwelli* Ckll. 2 ♀, July 14 and 19 (C.).

35. *Andrena atala* Viereck. 16 ♀, 3 ♂, July 10-18, fls. *Polemonium* (C., R.). A male was taken as early as June 27 (R.). Described from two females collected at Beulah, N. M.; I have two other females, taken at Beulah on the same day, and also a male from that locality. The male has the hair at the sides of the face black; the antennæ long and dark. In Robertson's table it appears to run near to *A. nasonii*, but it is not that species.

36. *Andrena medionitens* Ckll. 7 ♀, Topaz Butte, June 17 (R.);

six from east of Lake George, June 18 (R., C., W. P. C.); fls. *Euphorbia* and *Chamærhodos erecta*.

### 37. *Andrena cyanophila*, sp. nov.

♀. Length about  $9\frac{1}{2}$  mm. Black; with rather coarse pubescence, dull white on pleura and cheeks, yellowish-white on face, ochreous on thorax above; facial quadrangle about square; clypeus shining, with very dense large punctures and a median smooth line; process of labrum rather broad, truncate; front coarsely roughened; sides of vertex with very large punctures, giving way to minute ones on cheeks; facial foveæ seen from above cream-colored, rather broad, occupying more than half the distance between eye and antennæ, below narrowing and ending a little below level of antennæ, with no noticeable space between them and the eyes; apical part of flagellum brown beneath; third antennal joint hardly as long as 4 + 5; mesothorax and scutellum shining, with exceedingly large punctures; area of metathorax well-defined, covered by strong ridges, the adjacent sides of metathorax dull and rough; tegulæ red-brown; wings dusky, rather red; stigma and nervures dark ferruginous; first r.n. joining second s.m. a little beyond middle; abdomen broad, strongly punctured, punctures on first segment sparse; second segment in middle depressed nearly or quite three fourths; no continuous hair-bands, but patches of white hair at sides of segments; fimbria pale golden; legs black, small joints of tarsi dark reddish, basal joint of middle tarsi broadened; scopa of hind tibiæ white, fuscous above at base; hair on inner side of basal joint of hind tarsi pale sooty.

Type from Florissant, July. The series contains a ♀ taken July 11 (C.), and three July 12 (R.); fls. *Polemonium*; one from *Pentstemon*. A male *Trachandrena* from Topaz Butte, June 17 (R.), is closely allied, but probably belongs to a different species.

*A. cyanophila* is exceedingly close to *A. salicifloris*, but differs by the more strongly sculptured metathorax and the color of hair on hind tarsi within. The color of the hair of thorax above is the same.

In Bruner's table it seems to run near *A. radiatula*; it differs by the color of the fimbria, etc. In Robertson's table (Tr. Amer. Ent. Soc., XXVIII, p. 189) it runs to 9, and comes in thus:

Abdomen with margins of segments pale testaceous; enclosure ridged

*claytoniæ*

Abdomen without fasciæ, black.

Enclosure ridged . . . . . *cyanophila*

Enclosure without sharp ridges . . . . . *cratægi*

The punctures of the thorax are very much larger in *cyanophila* than in *cratægi*.

In Viereck's table of northwestern species (Canad. Entom., 1904, p. 159) our insect runs to 10, and comes in thus:

Pubescence white; stigma black . . . . .	<i>semipunctata</i>
Pubescence ochraceous.	
Stigma pale . . . . .	<i>striatifrons</i>
Stigma dark reddish . . . . .	<i>cyanophila</i>

*A. striatifrons* is much larger than *cyanophila*, and has no smooth line on clypeus.

*A. cyanophila* shows much resemblance to *A. multiplicata*, but differs thus:

<i>A. multiplicata.</i>	<i>A. cyanophila.</i>
Hair on inner side of basal joint of hind tarsi . . . . .	Hair (etc.) pale sooty.
pale ochraceous.	
Sculpture of metathorax throughout coarser; sides more coarsely rugose, area with coarser plications.	
Pubescence of facial foveæ grayish-white.	Pubescence (etc.) tawny.
Hair of thorax above very pale cinereous.	Hair (etc.) pale fulvous.
Clypeus with no smooth median line.	Clypeus with a very distinct median line.

### 38. *Andrena vicina argentinæ*, subsp. nov.

♀. Similar to *vicina*; area of metathorax the same; but pleura usually with black or partly black hair (in one specimen it is all pale); clypeus more strongly and closely punctured; process of labrum very broadly rounded; hair of cheeks largely black; last joint of maxillary palpi longer. Compared with *A. carlini*, the area of metathorax forms a broader angle behind; the clypeus is more closely punctured, with the median ridge much less prominent.

♂. More robust than that of *carlini*; hair on inner side of basal joint of hind tarsi black; hind tibiæ with much black hair on inner side.

Type (♀) from Florissant, June 15; fls. *Argentina* (R.); also two from east of Lake George, June 18, fls. *Senecio* (R.). Four males are from east of Lake George, June 18 (R., C.), fls. *Senecio* and *Geranium*.

### 39. *Andrena micranthophila*, sp. nov.

♀. Length nearly 12 mm.; black, with the long pubescence all black except that on mesothorax, scutellum, and tubercles, which is bright ferruginous, and on the upper middle of first abdominal segment, where there are some ferruginous hairs, and a tuft containing some reddish hairs on each side of antennæ, not very conspicuous; head normal, facial quadrangle much broader than long; black hair of face and cheeks long, not thick enough to conceal surface of face; clypeus shining, with close, rather ill-defined punctures, and a not very distinct median ridge; process of labrum narrow and emarginate; third antennal joint about as long as 4 + 5; flagellum dark, very faintly brownish beneath; pleura densely rugosopunctate, mesothorax about the same, with a very distinct median smooth line on its anterior half; metathorax rough and dull, the area a nearly equilateral triangle, with the corners attenuated, defined by a raised line and sculptured with irregular wrinkles; tegulæ dark, the

margins reddish; wings dusky reddish; stigma and nervures dull reddish-brown, not very dark; first r.n. joining second s.m. beyond the middle; legs black, with coarse black hair; abdomen smooth and shining, with only hair-punctures; not in the least banded; fimbria black. Second abdominal segment in middle depressed about one-third; facial foveae dark, short and narrow, not separated from eye, and reaching very little below level of antennæ.

♂. Similar to ♀; occiput with fulvous hair; flagellum dull brown beneath; face without light markings.

Type from east of Lake George, June 18, fls. *Chamærhodos erecta* (W. P. C.); also three males at same time and place (W. P. C., C., R.), two at fls. *Senecio*.

Runs in Robertson's table to *carlini*, and in Viereck's table of northwestern species apparently to *pluvialis*, but it is quite different from these. Superficially, it is exactly like *berberidis* (Ckll.), but it differs at once by the sculpture of the clypeus. It is close to *A. merriami* Ckll., but differs in color of stigma, sculpture of clypeus and of area, and color of thoracic pubescence. It is easily known from *milwaukeeensis* Graenicher, by the absence of conspicuous light hair at base of abdomen and denser punctures of clypeus. It is much too small for *perimelas*, and otherwise different; smaller than *lupinorum* and distinct by color of hair of face, etc.; easily known from *nivalis* by the black hair of pleura and face.

#### 40. *Andrena ribesina*, sp. nov.

♀. Length nearly 12 mm.; black, the small joints of the tarsi dark ferruginous; hair of head and thorax abundant and rather long, pale ochreous dorsally, dull white on face and lower part of cheeks and pleura, black on upper part of cheeks, vertex (but not occiput), and more or less just beneath and behind wings; facial quadrangle broader than long; clypeus with strong rather close punctures, and a strong shining median smooth stripe; process of labrum broad, emarginate; front dull, striate-punctate; facial foveæ velvety-black, short, reaching scarcely below level of antennæ, not widely separated from eye; cheeks broad, sparsely punctate; antennæ dark, third joint longer than 4 + 5; thorax throughout dull and granular, the area of metathorax merely granular, and ill-defined; tegulæ dark, covered with hair; wings dusky, somewhat violaceous at apex; stigma and nervures rather pale brown, stigma not large; first r.n. joining second s.m. beyond its middle, second s.m. not narrowed above; anterior and middle femora with long yellowish-white hair, hind with black; hair of tibiæ fuscous, as also that of tarsi except the ferruginous brushes at the apices of the segments; abdomen broad, rather shining, not punctured, with rather long erect ochreous hair on segments 1 and 2, and broadly on apical margins of the following two, the hair otherwise, including that of apex, black; second abdominal segment depressed about one-third or slightly more (in all my descriptions the proportion given refers only to the *visible* part of the segment)

[Dec., 1906]

Type from Florissant, June 13, fls. *Ribes*; the specimen is styloplized.  
The following table separates three allied species:

Pubescence dull, with much black hair on upper part of head	<i>ribesina</i> Ckll.
Pubescence bright yellow, without black hair on upper part of head.	
Clypeus closely punctured . . . . .	<i>hirticincta</i> Provancher
Clypeus shining, sparsely punctured . . . . .	<i>mentzeliae</i> Ckll.

*A. mentzeliae* occurs as far north as Fort Collins, Colorado, where it has been taken by Mr. Titus.

In Mr. Viereck's tables of northwestern species, *A. ribesina* runs to *A. saccata*, but that has the pubescence of face black. It is not in Robertson's tables.

41. ***Andrena topazana***, sp. nov.

♀. Length about 10 mm.; black; head and thorax with long hair, which is pale fulvous dorsally, yellowish-white below, but blackish on cheeks and on face below antennæ; facial quadrangle broader than long; clypeus with distinct but sparse punctures, shining in middle; front finely striate; process of labrum broad and truncate; antennæ dark, faintly brown at apex, third joint about as long as 4 + 5; facial foveæ with brownish-black tomentum, broad, extending a little below level of antennæ, and upwards to level of lateral ocelli, not separated from eye; thorax dull and granular, area of metathorax merely granular and scarcely defined; tegulæ dark; wings dusky, stigma pale brown, nervures darker; first r.n. joining second s.m. much beyond middle; legs black, the femora with long white hair; curled floccus on hind trochanters very large and white; hair of tibiæ and tarsi dark fuscous, a little redder on inner side of the broad basal joint of hind tarsi; abdomen dull, not punctured, with sparse pale hair, long on first segment; a certain amount of inconspicuous black hair on third and fourth segments; fimbria black; ventral segments with long fringes of pale hair; second dorsal segment depressed at least one-half in middle.

Type from Topaz Butte, June 17 (R.).

Not in Robertson's or Viereck's tables. It is somewhat allied to *A. dunningi*.

42. ***Andrena runcinatæ***, sp. nov.

♀. Length about 10 mm.; black; head and thorax with coarse hair, black on mesothorax and scutellum, largely on vertex, and to some extent on sides of face overlapping foveæ, but otherwise white, with no ochreous tint; facial quadrangle broader than long; clypeus shining, with sparse strong punctures, the anterior middle smooth, but no median ridge; process of labrum very broad, low and rounded; cheeks swollen, shining, with very fine punctures; facial foveæ dark, not separated from eye, and not very long; antennæ dark, third joint longer than 4 + 5, the latter are very short; thorax dull and granular, the scutellum only shining; area of metathorax merely granular, ill-defined; tegulæ piceous; wings dusky, stigma rather pale brown, nervures darker; second s.m. rather narrow, receiving first r.n. near its end; third s.m. very long; legs black, the hair on femora white, on tibiæ and tarsi fuscous; spurs pale yellowish:



abdomen shining but not punctured, rather narrow; second segment depressed about one-third; second to fourth segments with thin bands of rather long white hair; fimbria black.

Type from Florissant, July 22, fls. *Crepis runcinata* (R.). Two females were taken, and with them a male which is provisionally referred to *A. runcinatae*. This is much smaller than the ♀, length about 7 ½ mm.; hair of head and thorax long and all white; head large; cheeks broad and flat, with a not very conspicuous posterior angle somewhat below level of middle of eye; face black, with much white hair; antennæ all dark; legs black, the small joints of tarsi brownish; hind margins of abdominal segments 2 to 4 with bands of long white hair, copious and conspicuous. In Robertson's table this would run to 13, but it agrees neither with *erythronii* nor *platyparia*. In Viereck's table it would run to *viburnella*; I possess only the ♀ of *viburnella*, which is very different from ♀ *runcinatae*. The latter is not in Robertson's or Viereck's tables.

43. ***Andrena lewisii***, sp. nov.

♀. Length 10½ mm.; hair of head and thorax dull white, not dense; clypeus bare, the disc very shiny, with strong well separated punctures, a smooth region in the middle, but no ridge; process of labrum broad, truncate; facial foveæ broad, light seal-brown, extending about as low as upper level of clypeus not separated from eye; antennæ dark, flagellum faintly brown, third joint about as long as 4 + 5; mesothorax dull, minutely roughened, with shallow punctures; area of metathorax granular, ill-defined, with vestiges of wrinkles at base; tegulæ dark brown; wings dusky, stigma rather small, dilute brown, nervures rather darker; first r. n. joining second s.m. far beyond its middle; legs black, with white pubescence, pale reddish on inner side of tarsi; abdomen with a sericeous surface, not punctured; segments 2 to 4 with apical bands of long white hair, not very dense; fimbria pale ochreous; second segment in middle depressed rather more than one third, but much less than half.

Florissant, July 15, two at fls. *Linum lewisii* (C.); also July 11, fls. *Polemonium* (R.), and July 6 (R.).

This is not in Viereck's tables; in Robertson's it runs to *A. salicacea*, except as to joint 3 of antennæ. It may be compared with *A. clypeonitens*, which has the fimbria quite a different color; and is much like *A. macgillivrayi*, but differs from that by the dull first abdominal segment and broader facial foveæ.

44. ***Andrena fragiliformis***, sp. nov.

♀. Length about 9 mm.; black, even to tarsi; hair of head and thorax dull white, rather scanty; clypeus dullish, convex, with numerous rather shallow punctures; process of labrum very broad, truncate; front minutely striate; facial foveæ short and inconspicuous; antennæ dark, flagellum faintly brownish

beneath; joint 3 about as long as 4 + 5; hair of legs dull white, pale reddish on inner side of tarsi; thorax dull and roughened, area of metathorax scarcely defined; tegulæ rufopiceous; wings yellowish; stigma large, ferruginous, the nervures browner; first r.n. joining second s.m. near middle; abdomen sericeous, not punctured, with very thin bands of long white hair on the margins of second and following segments; fimbria pale, with a yellowish tint; second segment depressed about one third; margins of segments narrowly subhyaline.

Florissant, June 29 (C.). Very close to *A. fragilis* Sm. (*platyparia* Rob.), but the metathorax and the basal segment of the abdomen are much broader, and the hair of the thorax above is differently colored. It seems also to resemble *A. arabis*, but it is too small, and the process of labrum is different.

45. *Andrena synthyridis*, sp. nov.

♀. Length about 10 mm.; black; head and thorax with long dull white hair; clypeus bare and prominent, shining, with strong well-separated punctures, no median line; process of labrum broad, rather narrowly truncate, with sloping sides; cheeks rather small; facial foveæ seen from above pure white, narrow, scarcely reaching below level of antennæ; third antennal joint slightly longer than 4 + 5; flagellum faintly brownish; mesothorax and scutellum rather shiny, with small but distinct irregularly-placed punctures; area of metathorax rather small, ill-defined, granular; legs black with pale hair, more or less stained with fuscous on tibiæ and tarsi, that on inner side of hind tarsi pale yellowish; tegulæ dark; wings almost clear, stigma and nervures rather light reddish brown; first r.n. joining second s.m. at middle; abdomen shining but sericeous, with hair-punctures; lateral hind margins of second and third segments with shining white hair; fimbria dull pale brownish; second segment in middle depressed hardly one third, and less than one fourth at sides.

Florissant, June 16. Three at fls. *Synthyris plantaginea* (C.). Much like *A. sapellonis*, but facial foveæ narrower.

46. *Andrena sieverti*, sp. nov.

♀. Length 10 mm. or slightly over; robust, with broad abdomen; black, the small joints of tarsi becoming brownish; head and thorax with dull white hair; clypeus very shiny, with sparse punctures; process of labrum small and inconspicuous, narrow; facial foveæ white with a brownish tint, narrow, extending a little below level of antennæ; antennæ dark, third joint slightly longer than 4 + 5, these latter short; thorax dullish, with scattered punctures, scutellum shining; area of metathorax dull, granular, hardly defined; legs with white hair, faintly yellowish on inner side of hind tarsi; basal joint of middle tarsi broad; tegulæ dark reddish; wings nearly clear, stigma rather small, reddish brown; first r.n. joining second s.m. at or beyond middle; abdomen moderately shiny, with very small punctures; hind margins of segments 2 to 4 with dense bands of pure white hair; fimbria slightly yellowish; second segment depressed about one-third.

Florissant, July 24 (R.); probably at fls. *Erysimum*.

Runs in Bruner's tables to *imitatrix* Cress., which however (*vide* Viereck) is a *Trachandrena*. It is closely similar to *A. bridwelli* Ckll., but easily separated by the shining clypeus, and more feebly punctured abdomen.

47. *Andrena lappulæ*, sp. nov.

♂. Length a little over 8 mm.; black, with abundant long white hair on head and thorax, faintly yellowish on scutellum; face transversely oblong, facial quadrangle conspicuously broader than long; clypeus shining, creamy white with two black dots, and sparse feeble punctures; lateral marks small, subpyriform, on each side of clypeus; cheeks rounded; process of labrum rather narrow, truncate-emarginate; front dull, finely striate; antennæ black, joint 3 about as long as 4 + 5, 5 conspicuously longer than 4; mesothorax sparsely and feebly punctured, very shiny in middle, dull near margin; scutellum very shiny in front; area of metathorax scarcely defined, with almost microscopical striæ at base; tegulæ whitish with a brown spot; wings hyaline, slightly yellowish; stigma and nervures dark ferruginous; first r.n. joining second s.m. a little beyond the middle; legs black with white hair, small joints of tarsi ferruginous; spurs yellowish white; abdomen shining but with a rather sericeous surface and minute hair-punctures; hind margins of second and following segments with white hair-bands; second segment depressed about one-quarter.

Florissant, five, July 19, fls. *Lappula floribunda* (C.).

Runs in Bruner's table (this part based on an earlier one of mine) to *A. capricornis*, but it is not that species. Of all the females from Florissant, it could belong only to *A. sieverti*; that it may be the male of that species cannot be denied, but in the absence of any proof, it is given a separate description and name.

**Andrena** spp. Ten species, represented only in the male sex, are put aside for treatment at some later date. Some are doubtless new, but others may belong to described females. Four are from Topaz Butte, June 17 (R.), one of these from flowers of *Heuchera bracteata*. One visits *Sidalcea neomexicana*, one *Edwinia*, one *Polemonium*, one *Dasiphora*, one *Chamærhodos erecta*, and one (a small species near *A. salicinella*) was flying round a *Ribes* bush not in flower.

48. *Nomada ornithica* Ckll. 1 ♂, June 29, fls. *Edwinia* (R.). The specimen is larger than the type, and the metathorax has a large yellow mark on each side, but it is otherwise the same.

49. *Nomada taraxacella* Ckll. 1 ♀, June 21, fls. *Senecio* (R.).

50. *Nomada crawfordi* Ckll. 14 ♂, 2 ♀. The females are from east of Lake George. June 18 (C., R.), fls. *Senecio*. The males are eleven from east of Lake George, June 18 (C., R., W. P. C.), fls. *Senecio*, and one *Halerpestes cymbalaria*; three at Florissant, June 20 and 21, fls. *Senecio* (two) and *Draba* (R.). The species was previously known

by a single female. The male runs in my tables of Rocky Mountain *Nomada* to *N. superba*, but is smaller than that, yet not nearly so small as *luteopicta*. The tegulæ are yellow; the apical plate of abdomen is variable, notched or truncate. Eyes of ♂ in life pea-green.

51. ***Nomada ruidosensis* Ckll.** 4 ♂, and one ♂ var. Eyes in life dark red (R.). Two June 21, fls. *Senecio* (R.); one July 10 (R.); one east of Lake George, June 18, fls. *Chamærhodos erecta* (R.). One, June 21, fls. *Senecio* (R.), is a large variety, with much yellow on the scutellum. This species is curiously like *N. fragilis*, but certainly distinct. They show some variation from the type:—scutellum with a pair of minute yellow spots, or (in one) quite large ones; first abdominal segment with an interrupted yellow band, more or less developed; venter of abdomen often largely yellow.

#### 52. ***Nomada rohweri*, sp. nov.**

♀. Length about 10 mm.; head and thorax densely punctured, black marked with red, the scanty pubescence also red; clypeus except upper border, lateral face-marks (broad below, narrowing a little below level of antennæ, then broadening, ending in a point not very far from top of eye), labrum, mandibles except tips, vaguely indicated stripe behind eye, two large marks on prothorax, tubercles, tegulæ, rather obscure mark on pleura, and scutellum, all ferruginous; postscutellum with a deep orange band; first joint of labial palpi at least three times as long as second; antennæ entirely red, third joint above about as long as fourth, flagellum stout; mesothorax very rough, with contiguous punctures, it and the metathorax entirely black; scutellum prominent, only moderately bilobed; tegulæ large, punctured; wings rather dusky, especially at apex, which is quite dark, with a contrasting colorless area beyond the cells; stigma bright ferruginous; nervures mostly fuscous, the more basal ones ferruginous; b.n. meeting t.m.; second s.m. exceedingly broad, receiving first r.n. at about beginning of last third; third s.m. much narrowed above; legs red, the coxæ black, middle and hind trochanters partly black, middle femora and tibiæ with some black spots behind, hind femora black behind and strongly suffused with black in front; hind tibiæ with a large black mark behind; hair on inner side of hind tarsi orange-golden; anterior coxæ with a strong red spine; abdomen with exceedingly minute punctures, hardly noticeable with a lens; first segment red with a small black spot on each side; remaining segments very pale yellow or cream-color, the second with the basal middle red, pointed posteriorly, and the extreme base at sides black; third black at base, the hind margin of third and fourth narrowly red; lateral base of fifth narrowly black; venter red, stained with black.

♂. Length about 8 mm.; much like the ♀, but smaller; clypeus except upper margin, labrum, mandibles except apex, lateral face-marks (ending abruptly about level of antennæ), tubercles and two small spots on prothorax very pale yellow; scape rather swollen, pale yellow in front; third antennal joint about half as long as fourth; joints 5 and 6 black above, the joints beyond except the last with more or less of a black mark above; both middle and hind femora

black behind, the hind femora also black in front, but the apex broadly pale yellowish and the upper edge reddish; all the tibiæ pale yellowish at apex; basal half of first abdominal segment black; apical plate conspicuously notched.

Eyes in life deep red in ♀, light red in ♂.

Type (♀) east of Lake George, June 18, fls. *Senecio* (R.). One male east of Lake George, June 18, fls. *Geranium* (W. P. C.), and one male Florissant, June 30, fls. *Sedum stenopetalum* (R.).

The ♀ is near *N. snowi*, but differs by lack of light lateral face-marks, etc.

The ♂ in the tables of Rocky Mountain *Nomada* runs to *snowi*, but differs by having the pleura all black, etc.

### 53. *Nomada cymbalarix*, sp. nov.

♀. Length 8 mm.; red head; and thorax strongly punctured; mandibles simple; face broad, black between and a little above antennæ, also between ocelli and on posterior part of cheeks, as well as the usual small mark on each side of clypeus; antennæ entirely red, third joint a little shorter than 4; mesothorax with a black median stripe; region between wings and hind legs black; meta-thorax with a broad black median stripe; scutellum not very prominent; wings strongly dusky apically, stigma ferruginous, nervures fuscous; b.n. a moderate distance basad of t.m.; second s.m. large, much higher than its breadth on marginal, receiving r.n. a little beyond middle; legs red, the femora black beneath at base, the black extending over most of the posterior face of hind femora, its edge not defined; hind tibiæ blackish behind; hind tarsi with hair on inner side somewhat dusky; abdomen minutely punctured; first segment with a black mark in the middle at base and one at each side, its hind margin also blackened, as are the hind margins of the following three segments to a less extent; segments 2 to 4 with bright yellow lateral marks; 5 with a pair of large yellow dorsal marks, 6 with similar marks, but joined in the middle line; venter red, slightly stained with black.

Type from east of Lake George, June 18, fls. *Halerpestes cymbalaria* (R.).

In the table of Rocky Mountain *Nomada* this runs to *N. luteopicta*, from which it differs by the black at base of abdomen, etc. There is no yellow whatever at lower corners of face. The median black mark at base of abdomen is transversely oblong, with a small band extending from its middle to the base.

54. *Halictoides harveyi* Ckll. 1 ♀, 4 ♂. The ♀ July 15, fls. *Dasiphora* (R.). Males July 11-16; three at flowers of *Dasiphora fruticosa* (C., R.), one at *Polemonium* (R.).

55. *Panurginus cressoniellus* Ckll. 9 ♂, 15 ♀. Males July 8-20, at flowers of *Dasiphora fruticosa* (C., R.), *Linum lewisii* (C.), *Sidalcea neomexicana* (W. P. C.) and *Polemonium* (R.).

Females, Topaz Butte, June 17 (R.), and Florissant July 16-24,

at flowers of *Dasiphora* (R., C.), *Argentina* (R.), *Anogra coronopifolia* (R.), *Geranium* (R.), *Polemonium* (R.) and *Sidalcea neomexicana* (R.).

56. **Spinoliella scitula** Cress. 26 ♂, 23 ♀. ♂ eyes in life light bluish gray. 24 ♂ and 20 ♀ were from a colony nesting at Lake George, discovered by Dr. W. M. Wheeler, and excavated by my wife and Mr. Rohwer, July 5. The pollen-masses were found to be globular, in small cells in the ground; the diameter of the masses, when dry, is a little over 2 mm.

At Florissant, males were taken July 17 and 22, one fls. *Scrophularia* (R.). Three females were taken July 22 (R.), probably at *Argentina*.

57. **Calliopsis coloradensis** Cress. 1 ♀, 1 ♂, both July 17 (C.). Eyes of male in life pea-green.

58. **Calliopsis rhodophilus** Ckll. 2 ♂, July 17 (C.); one fls. *Potentilla*. Eyes of male in life pea-green. I also took 2 ♂ at Colorado Springs, June 20.

59. **Perdita zebrata** Cress. 1 ♂, a form with face-markings creamy-white. At flowers of *Cleome serrulata*, July 21 (C.).

#### 60. **Perdita tortifoliae**, sp. nov.

♀. Length 4½ mm.; head and thorax very dark green, abdomen black without spots or bands; maxillary palpi 6-jointed; mandibles cream-color on basal half, ferruginous on apical; clypeus black, shining, very sparsely punctured; lateral marks (the only light marks on face) cream-color, very small, subquadrate, on each side of clypeus; front dullish, minutely granular; flagellum testaceous beneath; mesothorax very smooth and shiny, with very little hair; scutellum the same, but metathorax dullish; tegulae cream-color; wings clear, very iridescent, stigma colorless with brown margin; nervures brown, the outer ones distinct; marginal cell rather obliquely truncate; second s.m. large; legs black, the anterior knees, anterior tibiae except somewhat behind and their tarsi pale lemon yellow; middle tibiae yellow on outer side; apical plate of abdomen unusually long and narrow.

Florissant, July 25, two at flowers of *Bigelovia* (or *Chrysothamnus*) *tortifolia*. Flying with them, I caught two specimens of what I supposed to be the male of *P. tortifoliae*, but they proved to be females of *P. florissantella*. On July 22, Mr. Rohwer took a single ♀ *tortifoliae* at *Ranunculus eremogenes* Greene.

In my Proc. Phila. Acad. table this runs to *P. semicærulea*; it is like that species as to face-marks, but is easily distinguished by the much less hairy head and thorax, with nude shining dark green mesothorax, etc.

#### 61. **Perdita florissantella**, sp. nov.

♂. Length about 3½ mm.; head and thorax very dark green; mesothorax and scutellum smooth and very shiny, front dull and granular; face below

level of antennæ all yellowish-white or creamy, except that clypeus has the usual dots, and the supraclypeal region is mostly shining black; maxillary palpi 6-jointed; scape cream-colored in front, flagellum black; nervures and margin of stigma brown; marginal cell obliquely truncate; legs black, anterior and middle tibiæ and knees pale yellow, their tarsi with the first joint white and the small joints pale brownish; abdomen black, with a broadly interrupted yellow band at base of second segment, and sometimes some yellow at sides of the following three.

♀. Length 5 mm.; similar to male, but abdomen without yellow marks, and face-marks different; clypeus except the usual dots, labrum, rather large hemispherical lateral marks and a reniform supraclypeal mark all yellowish-white.

Florissant, July 19, many at flowers of *Eriogonum umbellatum* (C.). Two females were taken at *Bigelovia tortifolia*, as related above.

The male in my Proc. Phila. Acad. table runs to 26, and runs out because the abdominal marks are yellow. The ♀ runs to *asteris* var., or if without supraclypeal mark to *californica* var. It is quite distinct from these species.

### 62. *Perdita wilmattæ*, sp. nov.

Length nearly 5 mm. ♂. Head and thorax dark green; face-marks white including clypeus, broad supraclypeal mark notched above, dog-ear marks, and large lateral marks shaped like the mainsail of a schooner and ending on orbital margin at an angle of about 50° at the level of the antennæ; antennæ cream-color beneath, except the last three joints, which are blackened; front dullish blue rather than green; mesothorax very shiny, with little hair; wings clear, nervures and stigma pale yellowish; marginal cell very short and broad; second s.m. much narrowed above; second r.n. practically obsolete; anterior and middle knees broadly and their tibiæ in front light yellow, their tarsi whitish; hind knees very broadly yellowish white; abdomen black with six broad very pale yellow bands, the first notched in front and not reaching lateral margins; none of the bands are joined on lateral margins; venter pale yellowish, marked with fuscous.

♀. Similar, but with only five abdominal bands; no dog-ear marks; supraclypeal mark reduced to two spots; lateral marks more triangular; apical joints of antennæ not dusky beneath.

Florissant, July 21-22, very many at flowers of *Phacelia alba*; first found by W. P. C., also collected by R. and C. The name of the *Phacelia* has been kindly confirmed by Prof. Aven Nelson.

Close to *P. zebrata* (from which it presumably evolved); the ♂ is easily known from *zebrata* by the white face-marks and shape of lateral marks; the banding of abdomen also differs. The male in my tables runs to *bakeræ* or *zebrata*. The female in the tables runs near *bigeloviæ* or *nitidella*, or if having a supraclypeal mark to *zonalis*. It differs from *bigeloviæ* by its smaller size, shape of

lateral face-marks, etc.; it is also quite different from the other two. The New Mexico *Perdita* table suggests affinity with *P. mentzeliarum*, but that has the abdomen entirely different. From *P. snowi* it is easily known by the shining mesothorax.

63. *Epeolus beulahensis* *Ckll.* One of each sex, east of Lake George, June 18 (R., C.).

64. *Phileremus americanus* *Cress.* 7 ♀, east of Lake George, (R., C., W. P. C.); one at *Senecio*, one at *Geranium*. 4 ♂, Florissant, June 21-22 (R.); two at *Senecio*, two at *Erigeron*.

#### **Oreopasites**, gen. nov. (Philereminae.)

Mandibles simple; tongue long, broadly linear, surpassing lateral palpi-labial palpi 4-jointed, first two joints long, the first nearly twice as long as second; galea long and narrow; paraglossæ hyaline, linear, reaching a little beyond middle of first joint of labial palpi; maxillary palpi minute, hardly half length of first joint of labial palpi; 6-jointed, first joint a mere tubercle, second longest, then third, then 4 and 5 equal, sixth oval, rather more than half length of second; lab; rum larger, oblong, elongated, the broadest part about one fourth from base; third antennal joint nearly as long as 4 + 5, the latter broader than long; thorax with fine white copiously plumose hair, and long bristle-like hairs; claws simple (♀); hind spur microscopically serrate-denticulate (♀); stigma well formed; marginal cell broadly obliquely truncate, with a small appendicular nervure; b.n. meeting t.m.; first s.m. much shorter than second (which is morphologically 2 + 3); second receiving both recurrent nervures, the first not nearly so close to its beginning as the second to its end.

The first s. m. shorter than second recalls *Biastes*. The insect runs in Ashmead's table to *Chilicola*, which differs entirely in the venation. The labrum is quite different from that of *Phileremus americanus* (which has it short and transverse); the maxillary palpi are also entirely different, and the tongue is longer.

#### 65. *Oreopasites scituli*, sp. nov.

♂. A little over 5 mm. long; rather slender; black, the first abdominal segment with broad apical margin and a pair of spots near base obscure ferruginous; ventral surface of abdomen dark brown; apical half of the sharp and slender mandibles bright ferruginous; hair of head, thorax and legs rather scanty, silvery white; second and following abdominal segments with the lateral hind margins fringed with rather long white hair, on the fifth and sixth this forms a band right across the segment; head round seen from in front; eyes parallel; anterior margin of clypeus very shiny; ocelli prominent, in a curve; malar space short but distinct; antennæ dark; flagellum stout, thickest near apex; thorax small, mesothorax shiny, sparsely punctured; tegulæ piceous; wings hyaline, stigma and costal nervure dark brown, the other nervures pallid; first r.n. joining second s.m. about as far from its base as from the insertion of second r.n.; legs black, including spurs; abdomen shining, with very fine punctures; apical plate rounded.



♀. Nearly 5½ mm. long; more robust; first two abdominal segments dull ferruginous, with a large transverse black mark, that on the second more distinct; sides of third segment more or less ferruginous; apex terminating in a small emarginate process.

Lake George, July 5 (W. P. C.). When the nest of *Spinoliella scitula* was excavated, the male was found in it, along with numerous specimens of *Spinoliella*. The pollen-balls of the *Spinoliella* were found by my wife to have attached to them certain quite large larvæ, with the dorsum strongly tuberculate. These were placed in a small bottle, with their food, and were supposed to belong to the *Spinoliella*. Later, however, it was found that a ♀ *Oreopasites* had hatched, while two or three others had perished when just on the point of hatching, and already colored.

66. ***Anthophora neomexicana* Ckll.** 2 ♀, 2 ♂. Eyes of ♀ in life black. Females, June 15 (R.) and July 11, fls. *Polemonium* (R.). Males, June 14 (R.) and June 16, fls. *Iris missouriensis* (C.).

67. ***Anthophora simillima* Cress.** 2 ♀. Eyes in life sea-green. June 15 and 20 (R.), one at fls. *Pentstemon*.

68. ***Anthophora (Micranthophora) flexipes* Cress.** 2 ♂. Eyes in life green, bluer in middle, yellower at top and bottom. July 17 (C.)

69. ***Clisodon terminalis* Cress.** 2 ♀, 2 ♂. Eyes of male in life olive green. Females, July 20-21, fls. *Pentstemon* (R.). Males, July 6, fls. *Mertensia* (R.), and July 15, fls. *Linum lewisii* (C.).

70. ***Emphoropsis mucida* Cress.** 1 ♀. June 16, fls. *Ribes longiflorum* (C.).

71. ***Melissodes pallidicincta* Ckll.** 9 ♀. Eyes in life blue-gray. June 15-July 22; fls. *Iris missouriensis* (W. P. C., C.), *Polemonium* (R.), *Crepis runcinata* (R.), and east of Lake George, June 18, fls. *Senecio* (W. P. C.).

72. ***Melissodes menuacha* Cress.** 1 ♂, July 23, fls. *Sidalcea neomexicana* (W. P. C.). This is not typical *menuacha*; it has the hair of the head and thorax white, like that of a form I have taken at Santa Fé, New Mexico, visiting *Grindelia*; but the latter differs somewhat in the antennæ and venation. There are perhaps two or three species mixed under *menuacha*.

73. ***Melissodes confusa* Cress.** 1 ♀, July 2, fls. *Pentstemon* (R.).

74. ***Melissodes hymenoxidis*, sp. nov.**

♀. Length about 10 mm.; eyes in life blue-gray. Related to *M. perplexa*, but differing as follows: hair of lower part of face mainly black, of mesothorax pale ochreous, except posteriorly where there is a large, shining, sparsely punctured area, with rather sparse black hairs; scutellum less strongly punctured,

and black hair less conspicuous; *hair of pleura black*; second s.m. larger; marginal cell more pointed; abdominal bands slightly yellowish.

Compared with *M. confusa* it is more shining and not so large, and is easily distinguished by the black hair of pleura, etc.

Compared with the Mexican *M. raphaelis* it differs by the black hair of cheeks; the much larger amount of pale hair before the black on mesothorax dark flagellum, etc.

In my table in *Trans. Amer. Ent. Soc.*, 1906, p. 113, it runs to *M. simillima*, from which it is easily known by the black hair of pleura and the much less conspicuous patch of black hair on thorax above.

The hair of the labrum is black; clypeus extremely densely punctured, with a little space in middle shining and not so closely punctured; spurs ferruginous.

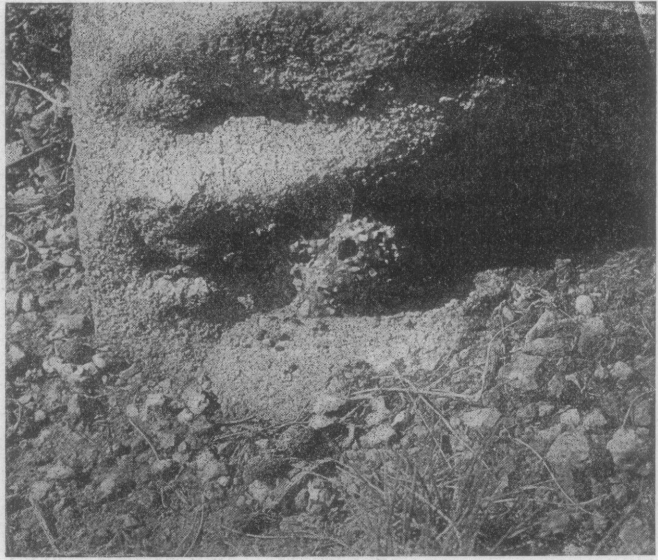


Fig. 1. Nest of *Dianthidium cressonii*, built of resin and pebbles on the surface of a stone.

Three females, July 17 (C.). Two were seen to visit successively *Hymenoxys ligulæflora* (*Hymenopappus ligulæflorus*, A. Nelson, 1896) and *Chrysopsis*.

75. *Ceratina neomexicana* Ckll. 1 ♀, July 1, fls. *Senecio* (R.).

76. *Anthidium emarginatum* Say. 5 ♂, 8 ♀. Eyes of male in life sea-green; of female sea-green, with the basal quarter black. Females, June 15–July 22, fls. *Sedum* (R.), *Gilia* (R.), and *Phacelia* C.). Males, June 15–July 22, fls. *Sedum* (R.) and *Pentstemon* (W. P. C.).

77. *Anthidium maculosum* Cress. 1 ♀, June 15 (R.). Eyes in life with the anterior three fifths black, posterior two fifths sea-green.

78. *Dianthidium cressonii* D. T. 1 ♀, July 22 (C.). It was at a large resin nest on a granite boulder; this nest was found and photographed by Dr. Wheeler.

79. *Chelynia elegans* Cress. 2 ♂, July 1 and 12 (R.). One was probably at *Helianthella parryi*. This and the next species were described under *Stelis*.

80. *Chelynia monticola* Cress. 2 June 21, one at fls. *Senecio*, (R.).

81. *Stelis montana* Cress. 2 ♂, June 21, one at fls. *Draba* (R.). 2 ♀, July 1, one fls. *Senecio*, the other probably *Helianthella parryi* (R.).

82. *Alcidamea simplex* Cress. 2 ♂, June 21, fls. *Erigeron* (R.). 1 ♀, July 12 (R.).

#### *Titusella*, gen. nov. (Heriadinæ.)

♀. Small bees, with a very large head; clypeus smooth and shining, emarginate; mandibles very broad, with a long cutting edge, on which are three teeth, and (basally) a long somewhat undulating edge representing a fourth tooth; maxillary palpi 4-jointed, joint 2 longest, 3 and 4 subequal, but 3 a little the longer; first joint of labial palpi a little shorter than second (first about 675  $\nu$ . second about 750  $\nu$ ); claws simple; pulvillus distinct; no malar space; venation resembling *Ashmeadiella*; spurs dark; scopa light orange. Named after Mr. E. S. G. Titus, in recognition of his work on this group. Its position is best defined by the following table:

Maxillary palpi 3-jointed . . . . .	<i>Heriadis</i> and <i>Chelostoma</i>
“ “ 5-jointed . . . . .	<i>Andronicus</i> , <i>Alcidamea</i> , and <i>Hoplitis</i>
“ “ 4-jointed.	

First joint of labial palpi less than one-third as long as second; clypeus (♀) broadly emarginate; first abdominal segment rounded at base, with a narrow sulcus . . . . . *Prochelostoma* Rob.

First joint of labial palpi not quite half length of second; clypeus truncate; first abdominal segment rounded at base, with a narrow sulcus . . . . . *Robertsonella* Titus

First joint of labial palpi two-thirds length of second; ♀ unknown; second s.m. shorter than first . . . . . *Proteriades* Titus

First joint of labial palpi longer than second or about equal with it; clypeus (♀) normal, punctured; first segment at base with a wide impunctate concavity . . . . . *Ashmeadiella* Ckll.

First joint of labial palpi nine tenths length of second; clypeus (♀) smooth and shining, deeply emarginate; first abdominal segment at base with a wide impunctate concavity; second s.m. not shorter than first; first s.m. on marginal cell longer than stigma on marginal . . . . . *Titusella* Ckll

In Robertson's table (Trans. Am. Ent. Soc. 1903, p. 166-167) it runs to *Ashmeadiella*, from which it has presumably been derived.

83. *Titusella pronitens*, sp. nov.

♀. Length about 8 mm.; black; head and thorax shining, with strong, well separated punctures; head very large, larger than thorax, the cheeks and vertex very broad; hair of head and thorax rather scanty, dull white; anterior

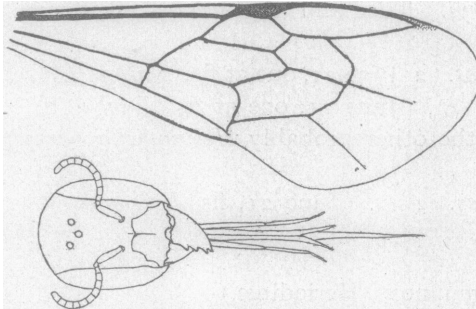


Fig. 2. *Titusella pronitens*, gen. et. sp. nov.  
Fore wing and head.

face of mandibles near apical margin with appressed golden hair; clypeus smooth, shining, not punctured, its anterior edge broadly emarginate in middle the edge on each side of the emargination undulated; antennæ rather short, black; a small smooth depressed line proceeds backwards a short distance from the outer margin of each posterior ocellus; tegulæ shining black; wings slightly dusky, nervures black; legs black, including spurs, their hair white, that on inner side

of hind tarsi orange; abdomen above with the first four segments very shiny, each with a narrow band of white hair on the apical margin; last two segments duller and punctate; ventral scopa entirely light fulvous or orange.

3 ♀, June 11, fls. *Senecio* (R.); June 22, fls. *Senecio* (R.); June 29, fls. *Edwinia* (R.).

84. *Monumetha albifrons* Kirby. 12 ♀, 14 ♂. Females, June 15-July 21, fls. *Edwinia* (R.), *Polemonium* (R.), a white-flowered *Carduus* (Wheeler), *Sidalcea neomexicana* (W. P. C.) and *Pentstemon secundiflorus*, six (C.). Males, June 15-July 12, fls. *Halerpestes cymbalaria* (R.), *Erigeron* (R.), *Senecio* (R.), *Draba* (R.), *Edwinia* (R.), *Sedum* (R.), and *Polemonium* (R.). East of Lake George, June 18.

*Osmia* Panzer.

The brilliant green species, *O. fulgida* and *bruneri*, are easily recognized, but the others require a table. I insert in the table *Stelis montana*, which is likely to be mixed with the species of *Osmia*.

	Small species, entirely black	<i>abjecta</i> Cress.	1
	At least the abdomen blue or green		1
1.	Males		2
	Females		6
2.	Large and robust, abdomen deep blue, legs entirely black, antennæ not moniliform	<i>cyaneonitens</i> Ckll.	
	Smaller		3

- 3. Hair of pleura black; small species, with much erect black hair  
*Stelis montana* Cress.  
 Hair of pleura white . . . . . 4
- 4. Legs entirely black; antennæ conspicuously moniliform; abdomen  
 beyond second segment with much erect black hair *O. faceta* Cress.  
 Legs at least partly submetallic; apical part of abdomen without  
 erect black hair . . . . . 5
- 5. A little larger; basal joint of hind tarsi longer, and obviously  
 broader apically than basally . . . . . *chlorops* Ckll. and Titus  
 A little smaller; basal joint of hind tarsi shorter, and not much  
 broader apically than basally . . . . . *wheeleri* Ckll.
- 6. Scopa orange . . . . . *hypochrysea* Ckll.  
 Scopa black . . . . . 7
- 7. Largest (at least 15 mm. long); hair of thorax above conspicuously  
 fulvous; of pleura black . . . . . *florissanticola* Ckll.  
 Smaller; hair of thorax above not fulvous . . . . . 8
- 8. Clypeus smooth and shining; cheeks with a tooth beneath  
*armaticeps* Cress.  
 Not so . . . . . 9
- 9. Large; hair of face mixed black and white, of pleura light; first  
 abdominal segment with conspicuous light hair . . . . . *densa* Cress.  
 Much smaller; or if only somewhat smaller, hair of face not so . . . . . 10
- 10. Rather large; hair of face all black, very coarse, of pleura black  
*nigrifrons* Cress.  
 Rather large; hair of face largely black, but conspicuous white hair  
 at sides; legs all black . . . . . *albolateralis* Ckll.  
 Small slender species, with very coarse black hair on face; hair of  
 pleura light . . . . . *pentstemonis* Ckll.  
 Hair of head and thorax all black; hair of ventral surface of abdomen  
 scanty; form compact . . . . . *Stelis montana* Cress.  
 Hair of head and thorax not all black; scopa normal; size smallish,  
 form compact . . . . . 11
- 11. Hair of face and vertex black; of pleura black but scanty; abdomen  
 blue . . . . . *O. wilmattæ* Ckll.  
 Hair of face black; of pleura black, abundant; of vertex and meso-  
 thorax mainly yellowish . . . . . *subtrevoris* Ckll.  
 Hair of face black; of vertex white; of pleura black, abundant  
*giliarum* Ckll.

85. *Osmia fulgida* Cress. 3 ♀, June 19–July 12, fls. *Polemonium* (R.).

86. *Osmia bruneri* Ckll. 5 ♀, June 15–July 21, fls. *Pentstemon secundiflorus* and *Pentstemon* sp. (R., C.).

87. *Osmia armaticeps* Cress. 2 ♀, June 21 and July 1, both fls, *Senecio* (R.).

88. *Osmia abjecta* Cress. 3 ♀, June 19–July 1, all fls. *Pentstemon* (R.). Described many years ago from a single example and apparently not reported since.

89. *Osmia faceta* Cress. 1 ♂, June 18, fls. *Senecio* (R.).<sup>\*</sup>

90. *Osmia densa* Cress. 2 ♀, July 12, fls. *Polemonium* (R.); July 21, fls. *Pentstemon secundiflorus* (C.).

91. *Osmia nigrifrons* Cress. 1 ♀, a small variety. June 21, fls. *Senecio* (R.).

92. *Osmia wilmattæ* Ckll. 2 ♀, July 21, fls. *Pentstemon secundiflorus* (C.).

93. *Osmia cyaneonitens*, sp. nov.

♂. Length 10 mm.; robust, with a short subglobose abdomen; head and thorax densely punctured, dullish, blue with green tints; abdomen brilliant steel blue, very shiny; hair of head and thorax dull white, quite long, especially abundant on scutellum; mandibles black, with the apical tooth sharp, the inner one truncate; edge of clypeus normal; antennæ black, the flagellum not moniliform; cheeks somewhat flattened; tegulæ large, piceous; wings a little stained with brown; legs black, the hair of anterior femora white, forming a long fringe behind, of middle and hind femora rather dilute black; hair of tibiæ and tarsi black, some white hair on anterior tibiæ and tarsi behind, and hair on inner side of anterior tarsi ferruginous; hind spurs black; first abdominal segment with very little pale hair; apical segment with inconspicuous erect black hair, with very few pale hairs intermixed; sixth segment with hind margin reddish and strongly (sometimes feebly) notched in the middle; seventh bidentate; venter black, first ventral segment entire.

2 ♂. June 15 and 19, both fls. *Pentstemon* (R.). In Robertson's tables it runs to *O. major* when the sixth segment is strongly notched; when it is feebly notched to *O. pumila*, except as to color. It is, of course, much larger than *pumila*. It resembles *O. integra* Cress., but the venter of the abdomen is quite different.

94. *Osmia chlorops* Ckll. and Titus.

♂. Length 9 mm.; olive green, apical part of abdomen with a bluish tint; head and thorax densely punctured, with long dull white hair; mandibles black, the outer tooth sharp, the inner truncate; clypeus normal; antennæ long and black, the flagellum moniliform; tegulæ piceous, anteriorly and on outer margin broadly green and punctured; wings faintly dusky; legs black, the femora with very faint metallic tints; hair of femora and tibiæ white, of basal joints of tarsi fuscous; basal joint of hind tarsi twice as broad at apex as at base; hind spurs black, strongly hooked; abdomen shining, the scanty pubescence white, long on first segment; sixth segment feebly notched; seventh strongly bidentate; first ventral entire.

Var. *a.* Flagellum ferruginous beneath; second s.m. shorter; sixth segment of abdomen strongly notched.

June 16, fls. *Iris missouriensis* (W. P. C.); var. *a.*, June 19, fls. *Pentstemon* (R.).

Runs in Robertson's tables to his genus *Monilosmia*. I give a new description from the Florissant material. The var. *a.* may be a distinct species.

95. *Osmia wheeleri*, sp. nov.

♂. Length 8 mm. or slightly more; olive green, slightly shaded with bluish, the apical part of abdomen strongly bluish; head and thorax densely punctured, with long dull white hair; mandibles black, the outer tooth pointed, the inner truncate; anterior edge of clypeus faintly crenulate; antennæ black, not moniliform; tegulæ piceous with a ferruginous spot in middle and a greenish punctured area in front; wings rather dusky; legs black the hind coxæ, femora and tibiæ more or less metallic; basal joint of hind tarsi normal; hind spurs not hooked; hair of femora scanty, mostly white, of tibiæ partly white and partly dark; the hair on inner side of basal joint of hind tarsi purplish-fuscous, contrasting with a short fringe of white hair on apex of hind tibiæ within; small joints of hind tarsi whitish-pruinose; abdomen shining, the very scanty hair partly light and partly dark; sixth segment strongly notched; seventh bidentate; first ventral entire.

Var. *a.* Sixth segment of abdomen feebly notched; second s.m. receiving the recurrent nervures nearly as far from apex as from base, whereas in the type the second r.n. is only half as far from apex as the first from base.

Florissant; June 15 (R.); June 19, fls. *Pentstemon* (R.). Var. *a.*, Cripple Creek, June 25 (R.). The var. *a.* is possibly a distinct species; Cripple Creek is more than a thousand feet higher than Florissant.

In Robertson's tables this runs to *O. atriventris* Cress., described originally from Connecticut. Cresson described only the female; Robertson (1902) held that *O. proxima* Cress., from Maine and British America, was its male; but Mr. Titus states that *O. proxima* is *canadensis* Cress., a species of Robertson's group *Monilosmia*. No description of ♂ *atriventris* has been published, but I do not believe our insect can belong there.

96. *Osmia hypochrysea*, sp. nov.

♀. Length 9 mm.; dark bluish green; head and thorax densely punctured, with long dull white hair; mandibles broad, with three pointed teeth; outer face of mandibles, near apical margin, with a broad band of orange hair, and similar hair also beneath margin of clypeus; anterior margin of clypeus with a median tridentate elevation; clypeus with a delicate longitudinal raised line; antennæ black; tegulæ shining black; wings dusky; b.n. meeting t.m.; the recurrent nervures join second s.m. about equally distant from its base and apex; legs black, with pale hair; hair on inner side of basal joint of hind tarsi black, but that on its hind margin becoming orange; spurs black; abdomen shining, strongly punctured, the scanty pubescence white; scopa entirely pale orange.

1 ♀, July 12 (R.). In Robertson's tables, runs to his genus *Xanthosmia*. *O. subfasciata* Cress. has a yellowish scopa, but has

not the clypeal structure of our insect. The female of *O. cordata* Rob. has not been fully described, but it must differ from *subfasciata* and *hypochrysea* by its larger size; it presumably has a normal clypeus. *O. coloradensis* Cress. is in many ways similar to our insect, but it is said to be "black, tinged with blue," which cannot possibly apply.

97. *Osmia florissanticola*, sp. nov.

♀. Length 15 mm.; head with shades of blue and green; thorax brassy green; abdomen greenish blue; head and thorax densely punctured; hair of thorax above, and of head above antennæ pale fulvous; hair of face below antennæ, cheeks, pleura, metathorax and legs black; a slight admixture of pale hairs at sides of metathorax; clypeus mostly black, its anterior edge straight; mandibles broad, with two large teeth; antennæ black; tegulæ black, closely punctured near margin; wings dusky; legs black, including spurs; abdomen shining, first two segments with light hair except at sides, where there is some black; remaining segments with black hair; scopa black.

2 ♀. June 16, fls. *Iris missouriensis* (C.); June 19, fls. *Aragallus* (R.).

In Robertson's arrangement this would be a *Centrosmia*. It differs from *O. novomexicana* Ckll., by the larger head and broader face, as well as the much less red color of the hair of thorax above. It is known from *O. grandior* Ckll., by the dark (not at all reddish-fulvous) hair of first four tarsi, and the color of hair on first abdominal segment, etc. From *O. longula* Cress., it differs by the straight (not subemarginate) anterior margin of clypeus, and strongly green and blue colors. From *O. juxta* Cress., it differs also by the bright colors, and by the elongated (not subglobose) form of the abdomen.

98. *Osmia albolateralis*, sp. nov.

♀. Length 11 mm.; dark blue green, the abdomen shining; head and thorax densely punctured, with mostly dull white hair, but that of the clypeus is black that of the cheeks dusky, the vertex has long black bristles, and the scutellum has a few black hairs mixed with the white; mandibles obscurely tridentate, none of the teeth long; clypeus normal; antennæ black; tegulæ dark fuscous, green in front; wings rather dusky; b.n. going basad of t.m.; first r.n. joining second s.m. fully three times as far from its base as the second r.n. from its apex; legs black, with scanty black hair; pale hair on anterior femora behind; basal joint of hind tarsi rather broad; hind spurs large.

2 ♀. June 21, fls. *Senecio* (R.); July 21, fls. *Pentstemon secundiflorus* (C.). Runs in Robertson's tables to *O. brevis*, but it is not that species. It may possibly be the ♀ of *O. cyaneonitens*. The type is the one from *Pentstemon*.



99. *Osmia pentstemonis*, sp. nov.

♀. Length about 9 mm.; dark blue, the mesothorax blackish; head and thorax densely punctured; head not unusually large; face and vertex with exceedingly long and coarse black hair; cheeks with very scanty short pale hair; thorax with white hair, long black bristles intermixed on dorsum; clypeus and mandibles normal; antennæ black, the flagellum dull reddish beneath; tegulæ piceous, blue in front; wings somewhat dusky, especially in marginal cell; first r.n. joining second s.m. about twice as far from base as the second from apex; legs black, the hind femora perhaps slightly metallic; hair of legs short and brownish-black, white on anterior femora behind; abdomen parallel sided; white hair on first segment, the others with very scanty black hair; apical segment with white pruinosity; scopa black.

4 ♀. June 15 (R.); June 19, fls. *Pentstemon* (R.); July 20, fls. *Pentstemon* (R.); July 21, fls. *Pentstemon secundiflorus* (C.).

In Robertson's table runs to *O. brevis*, but is not that species. It may prove to be the female of *O. wheeleri*.

100. *Osmia subtrevoris*, sp. nov.

♀. Length about 9 mm.; head dark blue; thorax and abdomen bluish-green, the latter subglobose, shining; head and thorax densely punctured; hair of thorax above pale yellowish, of vertex pale yellowish mixed with black; other hair of head and thorax all black, that of face long; head large; mandibles with two large sharp teeth; clypeus normal, with two little brushes of orange hair beneath anterior margin; antennæ black; tegulæ piceous, greenish in front; wings rather dusky; b.n. falling a little short of t.m.; first r.n. joining second s.m. about twice as far from base as second r.n. from apex; legs black, with black hair, including that of anterior femora behind; first abdominal segment with light hair, the others with black, but some light hairs at sides of second segment, and a very few on third and fourth; scopa black.

1 ♀. East of Lake George, June 18; fls. *Chamærhodos erecta* (R.).

Runs in Robertson's tables nearest to *O. brevis*, but is not that species. It is close to *O. trevoris* Ckl., but differs in the hair of tarsi and of thorax.

101. *Osmia giliarum* sp. nov.

♀. Length about 8 mm.; head and thorax dark green; abdomen greenish-blue; head and thorax densely punctured, their hair above dull white, as also at sides of metathorax, but otherwise it is black; mandibles and clypeus normal; antennæ black; tegulæ piceous; wings dusky; b.n. falling short of t.m.; first r.n. joining second s.m. not quite twice as far from base as second r.n. from apex; legs black, with black hair, including that of anterior femora behind; basal joint of hind tarsi rather broad; abdomen broad and convex, first segment and middle of second with white hair, the others with black; scopa black.

2 ♀. June 28, fls. *Gilia* (R.); July 12 (R.).

Runs in Robertson's tables to *O. brevis*, which it is not.

**Megachile Latr.**

I give a table for the separation of certain males:

Anterior tarsi simple; hair of face tawny . . . . .	<i>montivaga</i> Cress.
Anterior tarsi peculiar . . . . .	1
1. Larger; anterior tarsi white, the basal joint not boat-shaped	<i>latimanus</i> Say
Smaller; anterior tarsi with basal joint boat-shaped . . . . .	2
2. Boat-shaped scale with a black brush on inner margin at base	<i>pugnata</i> Say
Boat-shaped scale without such a brush . . . . .	<i>gilie</i> Ckll.

102. **Megachile gilie**, sp. nov.

♂. Length about 10½ mm.; black, with long erect dull white hair, fourth and following abdominal segments with some black on disc (rarely a little black on third); hair of face dense and very white; mandibles with the usual large tooth beneath; cutting edge with a large apical tooth, then two small ones, and the inner angle merely forming a right angle; edge of clypeus neither crenulate nor emarginate; antennæ black, the flagellum crenulate above, though not very strongly, last joint somewhat broadened; mesothorax closely punctured; tegulæ black; wings slightly dusky; anterior coxæ with a strong but blunt spine, and a patch of shining fulvous hair just above; anterior femora above pale fulvous, except the apex broadly and the apical half of the hind margin; behind, these femora are black, with long white hair; their tibiæ black with a broad pale band above, their tarsi yellowish white, the basal joint hollowed (boat-shaped), but little produced, the margins of the hollow fringed with fuscous hair; the hair-fringe behind white; second joint of anterior tarsi with an elongated black spot on inner side; the other legs normal; spurs light ferruginous; claws bifid at end, no basal tooth; hind margins of fourth and fifth abdominal segments with conspicuous white hair-bands; sixth concave, its projecting edge strongly emarginate; apex (beneath) with three short teeth, the middle one a little longer than the others.

3 ♂. June 19, fs. *Gilia* (R.); July 9, fs. *Gilia* (R.); July 15 (W. P. C.).

In Robertson's arrangement it would form a genus near to *Cerantias*. It has some resemblance to *M. wootoni*, but is easily distinguished by the bands on apical part of abdomen, lack of dark hair on thorax above, etc. From *M. gemula* Cress., it is easily known by the light hair of mesothorax; from *M. manifesta* Cress., by the structure of sixth abdominal segment; from *M. amica* Cress., by the structure and hair of anterior tarsi; from *M. legalis* Cress., by the form of sixth abdominal segment.

103. **Megachile wootoni** Ckll. 3 ♀, 5 ♂. Females July 14-20, fs. *Polemonium* (R.). One was seen to visit successively *Polemonium* and *Aragallus*. Males, July 9-20, fs. *Polemonium* and *Aragallus* (R.).

104. *Megachile wootoni rohweri*, subsp. nov.

♀. Smaller (length 11-12 mm.); cheeks with white hair; abdominal segments beyond the second with hair not all black, the margins of the segments fringed with light hairs, only conspicuous when seen from the side.

July 18, fls. *Polemonium* (R.); July 22, fls. *Pedicularis* (R.). This looks like a distinct species, and might even be thought to be the ♀ of *M. gilix* (which is abundantly distinct from *wootoni* in the ♂) but for the existence of intermediates. On July 18, fls. *Polemonium*, and July 21, fls. *Pedicularis*, Mr. Rohwer took females of the normal size of *wootoni*, with the hair of cheeks partly pale.

105. *Megachile pugnata* Say. 3 ♀, 6 ♂. Females, July 17-26, fls. *Hymenoxys ligulæflora* (C.), *Epilobium* (R.) and *Asclepius speciosa* (R.). Males, June 19-July 12 (R.), fls. *Senecio*, *Gilia* and *Pentstemon*.

106. *Megachile latimanus* Say. 4 ♀, 1 ♂, the latter not quite typical. Females, June 14-July 22 (R.), at flowers of *Crepis runcinata*, *Polemonium* and *Iris*; also east of Lake George, June 18, fls. *Erysimum* (C.). The male June 16, fls. *Iris missouriensis* (W. P. C.).

107. *Megachile vidua* Smith 1 ♂, July 18, fls. *Polemonium* (R.).

108. *Megachile montivaga* Cress. 1 ♀, June 19, fls. *Gilia* (R.); 1 ♂, July 1, fls. *Senecio* (R.).

109. *Psithyrus insularis* Smith. 2 ♀, June 15 (R.); June 16, fls. *Iris missouriensis* (C.).

110. *Bombus juxtus* Cress. 1 ♀, June 14, fls. *Iris missouriensis* (R.). Also a worker from Four Mile (on the Cripple Creek road) July 14 (Jean Bentley).

111. *Bombus dorsalis* Cress. 1 ♀, July 22, fls. *Capnoides* (R.).

112. *Bombus edwardsii* Cress. 1 ♀, June, fls. *Edwinia* (R.).

113. *Bombus dubius* Cress. 2 ♀, June 16, fls. *Iris missouriensis* (C.); July 15, at white *Carduus* flowers (Wheeler).

114. *Bombus appositus* Cress. June 16-July 13 (R.). One at fls. *Scrophularia*.

115. *Bombus huntii* Greene. ♀, June 15-16, fls. *Ribes longiflorum* (C.). Workers, July 11-22, fls. *Polemonium* (R.), *Pentstemon secundiflorus* (C.) and *Pedicularis* (R.).

The synonymy of this species will be explained elsewhere by Mr. Franklin.

116. *Bombus morrisoni* Cress. June 15 (R.).

117. *Bombus nevadensis* Cress. July 11, fls. *Polemonium* (R.).

118. *Bombus rufosuffusus* Ckll. June 16, fls. *Ribes longiflorum* (C.); Topaz Butte, June 17 (R.).

119. **Bombus iridis phaceliæ** *Ckll.* June 16, three at fls. *Iris missouriensis* (C.); July 18, fls. *Polemonium* (R.); July 22, fls. *Pedicularis* (R.). Following a suggestion from Mr. Franklin, I now incline to the view that *iridis* and *phaceliæ* are both forms of *B. rufocinctus* Cress.; *iridis* being the darkest, and *rufocinctus* the lightest, of the series. I have, however, no means of proving the correctness of this view, and I leave the settlement of the matter to Mr. Franklin.

At *Polemonium*, July 11, Mr. Rohwer took a dark ♀, which might almost be called *iridis* proper.

120. **Apis mellifera ligustica** *Spinola.* July 11-12, three at fls. *Polemonium* (R.). Honey-bees are not common at Florissant.

## APPENDIX.

Mr. Rohwer returned to Florissant in August, and on the tenth of that month took seven species of bees from flowers of *Senecio*. These included *Agapostemon texanus* Cress. (2 ♀); *Melissodes confusa* Cress. (1 ♀); *Megachile montivaga* Cress. (1 ♂, a variety with the black hair as usual, but the light hair of head, thorax and abdomen all white instead of yellowish), and the following four species new to Florissant:—

121. **Megachile relativa** *Cress.* 2 ♀.

122. **Megachile manifesta** *Cress.* 1 ♀, 3 ♂. Mr. Rohwer notes that the eyes in life are "shining yellow-green" in the male, "gray-green, with black," in the female.

123. **Halictus** sp. 2 ♂. A rather large black species, not known to me in the male sex, but perhaps belonging to some described female.

124. **Andrena colletina**, sp. nov.

1 ♂. Length about or nearly 14 mm.; anterior wing a little over  $8\frac{1}{2}$ ; body black, with very abundant long light yellow hair; process of labrum strongly emarginate; facial quadrangle much broader than long; cheeks rounded, not angular; antennæ long; flagellum stout, only faintly brownish beneath; third antennal joint a little longer than fifth, not nearly as long as 4+5; front dull, but vertex shining; mesothorax dull and granular, as also is the scarcely defined area of metathorax; tegulæ dark; wings perfectly clear, the stigma and nervures light ferruginous; first r.n. joining second s.m. at or beyond middle; legs black, with hair like that of the body, all the tarsi ferruginous, the basal joint of middle and anterior ones a little stained with black; hair on inner side of basal joint of tarsi orange; spurs very pale reddish; abdomen rather long, with long hair, forming dense but suberect apical bands on segments 2 to 4, and to a less extent on 5; segments 4 and 5 with conspicuous black hair on the disc.

Close to *A. hirticincta* Provancher, ♂, but much larger, and differing also by the clear wings and black hair on abdomen above. The color of the pubescence is of the same tint of yellow. Also close to *A. mentzeliae* Ckll. (which Mr. Titus has taken in Colorado—at Fort Collins) but distinguished from that also by the large size, quite clear wings, etc. On account of the wings and time of flight it cannot be the unknown ♂ of *A. ribesina*. *A. colletina* has a remarkable resemblance to a *Colletes*, and when I first saw it I supposed it to belong to that genus. Such resemblances have been noted before; *Andrena colletiformis* was originally described by Morawitz as *Colletes parvulus*.

