

## NEW AND LITTLE-KNOWN NORTH AMERICAN BEES.

BY T. D. A. COCKERELL.

*Osmia viridimicans* n. sp.

♀. Length 12 mm., brilliant peacock-green, the pubescence entirely black. Head large, thorax ordinary, abdomen somewhat elongate, the straight sides almost parallel, but slightly diverging to the fourth segment; after which the sides rapidly converge, meeting at the apex at about a right angle. The light shines on the abdomen in such a way as to give the impression of deep sutures, which in fact do not exist. Punctuation ordinary, punctures of vertex and mesothorax distinct and separable. Basal area of mesothorax with its lower portion smooth and shining.

Lower part of face bluer than the vertex; cheeks broader than eyes; black pubescence of face tolerably abundant; front edge of clypeus black, straight, not produced at sides; mandibles 4-dentate; tegulæ green; wings smoky, hyaline, apical margin broadly darker, no dark streak in marginal cell; first recurrent nervure reaching second submarginal cell a very short distance from its base, second recurrent reaching it at the beginning of the apical fourth; legs bright green, the tarsi black; ventral scopa entirely black.

*Hab.*—Olympia, Wash., one ♀, June 5, 1895 (T. Kincaid). Readily known by its large size and the characters italicized. Mr. Fox sends me a Nevada example of *O. maura*, which though entirely black, has the same form as *viridimicans*, and agrees in having the second recurrent nervure reaching the second submarginal cell quite at the beginning of the apical fourth.

*Osmia cobaltina* Cresson, 1878.

Three ♀s from Pasco, Wash., May 25, 1896 (T. Kincaid), are of a very beautiful deep blue color, and agree with Cresson's description.

*Osmia kincaidii* n. sp.

♀. Length 6 to 8 mm., brilliant peacock-green, the pubescence very sparse, black and dirty white mixed. Head large, thorax subglobose, abdomen short and oval. Punctuation ordinary, punctures distinctly separated on mesothorax, closer and largely confluent on

vertex. Facial triangle higher than broad; the face may be all blue, or green with the lower portion blue; the thin pubescence, even on the clypeus, is black and pale intermixed; cheeks about as broad as eyes; antennæ wholly dark; anterior edge of clypeus a little produced, black, broadly truncate, sometimes a little depressed in middle; mandibles with two large teeth, the third tooth, if present, is not visible when they are closed; *thorax with mixed black and pale hairs*, especially long on scutellum; basal area of metathorax minutely granular, not shining; tegulæ punctured, green with sometimes a purple spot; wings smoky; nervures black; first recurrent nervure joining second submarginal cell a little less than one-third from its base, second joining it a little less than one-fourth from the apex; legs green, tarsi black, hind tarsi sometimes submetallic on basal joint; dorsal surface of abdomen almost nude, the sparse short pubescence mixed black and pale; ventral scopa wholly black.

♂. Length  $5\frac{1}{2}$  to 8 mm., bright bottle-green, that is, a much yellow-green than the ♀. Pubescence of head and thorax more copious, nowhere mixed with black; creamy white on clypeus, cheeks beneath, femora and lower part of thorax, pale ochreous on vertex and dorsum of thorax, especially scutellum; wings a little clearer; tarsi more distinctly metallic; the scanty pubescence of abdomen all light; sixth dorsal segment barely notched, seventh strongly emarginate; seventh ventral segment greenish-blue, large, its hind margin rounded, with pale pubescence.

*Hab.*—Olympia and Seattle, Wash. (T. Kincaid). The specimens can be separated into two general series, one larger, the other smaller and with more globose abdomen. After careful study, I fail to find specific characters separating these, but if it should be subsequently held that they are different, the type is to be considered the larger form. The females are, with one exception, of the larger size; the males are, with three exceptions, of the smaller; both forms were taken at the same time and locality.

The exact data are as follows:

Seattle: 1 ♀ May 14, 1897, on *Rubus ursinus*; 1 ♂ April 14, 1897, on sand bank; 1 ♂ April 18, 1897.

Olympia: 6 ♀, 3 June 1st, one June 2d, one June 21st, one July 1st. 13 ♂, one May 11th, two May 5th, one May 23rd, three May 25th, one May 28th, one June 13th, two April 25th, on *Fragaria*; two April 22d, on *Taraxacum*.

The female of *O. kincaidii* is easily separable from anything described, by its brilliant color, small size, and partly pale pubescence on thorax and face. The ♂ is not so easily separated, and should be compared with *exigua* from California, *bella* from Colorado, and *illinoensis* from Illinois. It agrees with Cresson's description of *exigua* except that none of the specimens are quite so small, and the tarsi are not testaceous, but black with a metallic tint, the last joint rufescent or wholly dark. From *bella* it will be known at once by the absence of black pubescence on the abdomen. From *illinoensis* it differs by the distinctly infuscated wings, the second submarginal cell not longer than first, the abdominal pubescence not subfuscous. It is quite possible that the present species may eventually prove to be a northern, larger and darker race of the Californian *exigua*, but it is desirable to distinguish it, whether as a species or as a race.

It is to be remarked that Provancher (Add. Faun. Hym., p. 330) records a male from Ottawa, attributed to *O. exigua*. I cannot think it likely that this identification is correct, but it is impossible to reach any definite conclusion, since Provancher's description appears to be simply a translation of Cresson's. It may be that he had *illinoensis* before him.

The body-colors of both sexes of *O. fulgida* (Colorado examples sent by Mr. Fox) agree with the colors of the corresponding sexes of *kincaidii*, but *fulgida*, while about as broad as *kincaidii*, is conspicuously longer, the abdomen being shaped more like that of *viridimicans*.

✓ *Osmia bella* Cresson, 1878.

A ♂ specimen from Olympia, Wash., June 19, 1895 (T. Kincaid), must be referred to *bella*, but it represents a variety with darker wings, and the apical pubescence of the second ventral segment pale. It is of a brilliant green color, and is conspicuously larger than the males of *kincaidii*. The black pubescence on the apical portion of the abdomen is very evident. The second submarginal cell is noticeably longer than the first on the cubital nervure. Robertson's *illinoensis* must be very near to *bella*. A Colorado *bella* from Cresson's series, lent by Mr. Fox, is somewhat smaller than the Olympia example, distinctly bluer, and the second submarginal cell is only about as long as the first on the cubital nervure.

*Osmia calla* n. sp.

♂. Length 8 to 9 mm., stoutly built, *Augochlora* green. This almost exactly resembles the Olympia form of *bella*, but is, perhaps, a very slightly yellower-green, while *the dorsal pubescence of the abdomen is entirely white, and the second submarginal cell is not longer than the first on the cubital nervure.* The ocelli are a little further apart, and the teeth of the seventh abdominal segment seem to average longer. The pubescence of the inner side of the basal joints of the tarsi is fuscous, not black.

Other distinguishing features of *O. calla* are as follows: Pubescence throughout dull white, sometimes perceptibly tinged with ochraceous, *nowhere mixed with black.* Antennæ entirely black; clypeus ordinary. Punctures of mesothorax very close; *tegulae wholly green*; basal area of metathorax ill-defined, minutely roughened, not shining; wings smoky-hyaline, first recurrent nervure joining second submarginal cell at about the end of the basal third, second not far from the apex; legs green, tarsi piceous; sixth abdominal segment notched feebly or quite distinctly, *but never entire*; second ventral segment large, purplish, rather densely fringed at apex with pale ochraceous-tinged pubescence.

*Hab.*—Olympia, Wash., 3 ♂, May 25th and June 17, 1894 (T. Kincaid). This has much the characters of ♂ *kincaidii*, but is conspicuously larger and bulkier than the largest males of that species. The antennæ in *kincaidii* are longer in proportion to the size of the head. While in color and length *O. calla* agrees with ♂ *fulgida* from Colorado, *calla* is much broader than *fulgida*, so that the two have quite a different appearance. The breadth of the abdomen in *calla* is 3 mm., in *fulgida* ♂ 2½.

*Osmia bruneri* n. sp.

♀. Length 9 mm., brilliant blue-green, the clypeus, legs and margins of abdominal segments shining purple. This may be only a race of *cobaltina*, from which it differs in being green instead of blue. The pubescence and ventral scopa are black, but dirty white hairs are intermixed slightly on the vertex, quite conspicuously on the dorsum of thorax, and also on the first abdominal segment. Compared with the Pasco *cobaltina*, the spurs of hind tibiæ are considerably larger and stouter, curved at the end, and the submarginal cells are both longer. The wings are strongly infuscated, and the second submarginal cell is, perhaps, a little longer than the first on the cubital nervure.

From the Colorado *O. fulgida*<sup>1</sup> and *viridis*, *O. bruneri* will be known by the green tegulæ, and the partly light pubescence of thorax. It may possibly be the unknown female of *O. bella*, but there is no way of determining whether this is the case at present.

*Hab.*—Colorado Springs, Colo. (L. Bruner, no. 19).

*Osmia inurbana* Cresson, 1878.

♂. 7 to 11 mm. long; *dark brassy-green*. *Sixth segment of abdomen distinctly notched*. Pubescence rather copious, tinged with ochraceous on dorsum. 37 examples, Olympia and Seattle, Wash. (T. Kincaid). There is some variation, but they seem to be all one species; the extremes of size are connected by intermediates. The Seattle specimens were taken on April 17th and 18th, one in May; eight are from Seattle, the rest from Olympia. The Olympia dates run from April 20th to May 25th. One was on *Fragaria* April 25th. A Colorado *inurbana*, sent by Mr. Fox, is like our medium sized examples.

*Osmia odontogaster* n. sp.

♂. Length 9 to 10 mm.; stoutly built, head of ordinary size, abdomen suboval; dark brassy-green, metathorax bluer; pubescence tolerably dense, ochraceous on head and thorax, very dense and cream color on clypeus, nowhere mixed with black, nigrofuscescent on inner sides of basal joints of middle and hind tarsi, ochraceous on base and apex of abdomen, *short and fuscous on second, third and fourth segments, and on the basal portion of fifth*, varying to griseous; third and following segments more or less distinctly fringed with pale or ochraceous hairs; punctuation of head and thorax strong but *extremely dense*, becoming sparser on middle of scutellum, which is thus a little shiny; basal area of metathorax with its lateral inferior margins shining; punctuation of abdomen less dense, ordinary, leaving the surface shining.

Face rather long and narrow; antennæ of only moderate length, flagellum dull rufous beneath; clypeus ordinary; mandibles with a large pointed terminal blade, and a broad rounded inner tooth; tegulæ black, shining, punctured; wings smoky-hyaline, a little darker on apical margin, no distinct cloud or streak in marginal cell; second submarginal somewhat shorter than the first on cubital

<sup>1</sup> A *fulgida* from Colorado, sent by Mr. Fox, has the thoracic pubescence pale brownish, probably faded. It is, however, a much narrower and longer insect than *bruneri*, the abdomen being of the elongate parallel-sided type, whereas *bruneri* has it of the oval type.

nervure; first recurrent nervure joining second submarginal cell nearly at the end of its basal third, second at the beginning of the apical fourth or a little beyond; legs black, basal joint of hind tarsus broad, truncate at the end; *sixth segment of abdomen with the margin entire*, seventh emarginate; second ventral segment with its hind margin fringed with long pale hairs, and *presenting medially a large and prominent tooth, directed backward, shaped like the terminal joint of a finger, but having a longitudinal groove.*

*Hab.*—Olympia, Wash., 5 ♂, May 10th and 25th, June 1st and 13, 1894 (T. Kincaid). This might be taken for *inurbana*, but its abdominal characters at once distinguish it.

*Osmia nanula* n. sp.

♀. Length 7 to 8 mm.; stoutly built, short, with the abdomen broad-oval. Color of head, thorax and abdomen *dark greenish-blue*; legs, mandibles and antennæ black. *Pubescence black, with ochraceous on sides of face, on occiput about tubercles, slightly on mesothorax, quite densely along hind border of scutellum, on sides of metathorax, on lateral hind borders of the first three abdominal segments, especially the first, thinly along whole hind borders of four and five, very sparsely on surface of sixth, and on first four tarsi behind.* The black hairs on the scutellum are considerably longer than the ochraceous ones, and are placed in front of them. Ventral scopa all black. Hairs on inner side of basal joint of hind tarsi dark fuscous. Pubescence of clypeus black, sparse, its anterior margin and the mandibles with some orange-rufous hairs. The ochraceous pubescence of the thorax, in fresh specimens, is quite bright, almost orange-rufous.

Punctuation ordinary, punctures of vertex and mesothorax large, very close, but not all confluent, the abdomen is quite shiny. Head fairly but not excessively large, clypeus ordinary, mandibles tridentate: tegulæ shining black, with a submetallic tinge in front: wings dusky, broad apical margin and upper half of marginal cell conspicuously darker: second submarginal cell noticeably shorter than first on cubital nervure; first recurrent nervure reaching second submarginal cell just before the end of its proximal third, second very near its tip.

*Hab.*—Seattle, Wash., 4 ♀, April 17th, May 11th and 19th (T. Kincaid); Olympia, Wash., 5 ♀, May 23rd, June 1st, 19th and 30th (T. Kincaid). A ♀ taken by Mr. Kincaid at Olympia,

Wash., differs by having a brassy-green abdomen; it appears to be only a variety of this species.

I have not described the ♂ of *O. nanula*, but I have before me a series of nine males, collected by Mr. Kincaid at Seattle and Olympia, which I believe belong here. They average slightly smaller than the females, and are of a brassy-green color. They might readily be confused with small examples of *inurbana*, but the *sixth abdominal segment is entire or very feebly notched*. The dorsal pubescence of the thorax and head is quite brightly colored, and not mixed with black. The smaller size and the absence of the ventral tooth at once separate them from *odontogaster*.

*Osmia tristella* n. sp.

♀. Length 7 to 8 mm., of ordinary build, the abdomen somewhat longer than in *O. nanula*. Head, thorax and abdomen *dark indigo blue*; legs, mandibles and antennæ black. Head of ordinary size, not so large as in *nanula*. *Pubescence black*, not dense, long on head and thorax, *white just behind wings and at sides of first abdominal segment subbasally*; there is also some obscure white or whitish pile on the last dorsal segment of the abdomen. *The pubescence of the face, vertex, thoracic dorsum and ventral scopa is wholly black*. The abdominal segments between the first and last are shining, and present some short pile, wholly black except for an occasional short pale hair. The pubescence of the legs is all black. Punctuation ordinary, very dense on vertex and mesothorax; basal area of metathorax minutely roughened, not shining. Clypeus ordinary; tegulæ black. Wings pale fuscous; second submarginal cell about as long as the first on the cubital nervure; first recurrent nervure joining second submarginal cell at the end of its basal sixth, second at the beginning of its apical sixth.

*Hab.*—Olympia, Wash., 2 ♀, one June 30th (T. Kincaid); Seattle, Wash., 4 ♀, April 18th and May 11th (T. Kincaid). This might be confused with *nanula*, but is easily separated by the characters italicized.

*Osmia cyanella* n. sp.

♀. Length 9 mm., stoutly built, *very broad*, with a large subquadrate head. The thorax is especially broad, *the distance between the wings being much greater than in tristella or nanula*. The abdomen is suboval. Color of head, thorax and abdomen *dark indigo blue*; legs, antennæ and mandibles black. Pubescence, including

ventral scopa, black, *but there are some shining pale hairs along the hind margin of the scutellum, and sparsely on the abdominal dorsum*; the extreme apex of the abdomen, the anterior edge of the clypeus, and the outer surface of the mandibles exhibit some orange pile; the pubescence of the tarsi, especially the anterior ones, is also more or less of a pale orange tint. *The hairs of the face and vertex are wholly black, and the tuft just behind the wings is black.* Punctuation ordinary, not quite so dense as in some related species; ocelli light yellowish, clypeus ordinary; tegulæ shining black; wings smoky; second submarginal cell perhaps a very little longer than first on cubital nervure; first recurrent nervure reaching second submarginal cell slightly before the end of its basal third, second very near its end.

*Hab.*—Olympia, Wash., May 23, 1894 (T. Kincaid). Resembles *tristella*, but easily known by the characters italicized.

*Osmia trevoris* n. sp.

♀. Length 8 mm., stoutly built, head quite large, abdomen short and broad. The thorax is by no means so broad as in *cyarella*. Head, thorax, and abdomen *very dark blue, the two latter a slightly greenish-blue*, yet bluer than in *nanula*; legs, mandibles and antennæ black. Pubescence of head black, except some fulvous on occiput, hairs of face long, *all black*; pubescence of pleura black, *of thoracic dorsum moderately dense, and orange-fulvous*, with a few dark hairs intermixed, not readily noticed; *tuft behind wings orange-fulvous*; hairs of femora and tibiæ short and black, or tarsi dull fulvous; dorsal pubescence of the abdomen entirely black, except a thin, pale fulvous fringe along the hind margins of the segments, only noticed in certain lights; ventral scopa all black. Punctuation ordinary, punctures of vertex and mesothorax close but separable. Clypeus ordinary; tegulæ black; wings dusky hyaline, with the broad outer margin and the upper part of the marginal cell conspicuously darker; second submarginal cell a little longer than first on cubital nervure; first recurrent nervure joining second submarginal cell at about the end of its basal third, second a very short distance before its tip.

*Hab.*—Seattle, Wash., May 19, 1896 (Trevor Kincaid). This is closely related to *O. nanula*, but it is somewhat broader, with a larger head, and lacks the pale pubescence at sides of face, while the pubescence of the thoracic dorsum is dense and much more highly colored; the abdomen, also, is less globose. *O. trevoris* re-

sembles a good deal in color and form *O. cerasi* from New Mexico, but it is smaller than that; the thoracic pubescence is by no means so bright, and the dorsal abdominal pubescence of *cerasi* is entirely black, except on the first segment, where it is pale fulvous, usually mixed with black.

*Osmia propinqua* Cresson, 1864.

I have before me 8 females, sent by Mr. T. Kincaid; two from Seattle, Wash., May 11 and 14, 1897, on *Rubus ursinus*; one from Comas I., Wash., June 18, 1896, collected by N. L. Gardner; five from Olympia, Wash., May 9 and 23, and June 1 and 2.

*Osmia subornata* n. sp.

♀. Length 14 mm., stoutly built, rather shiny, *pure black*; head large, subquadrate, abdomen short and broad; *pubescence of face and vertex entirely black, with sometimes a few pale hairs about the insertion of the antennæ*, of cheeks and pleura dark griseofuscous to almost black, of *thoracic dorsum black on disc, with a pale band before and behind*, the anterior band not very distinct, reaching from tubercle to tubercle, the posterior occupying the scutellum, and very distinct, but having black hairs intermixed. The color of these hair-bands is very pale ochraceous. A tuft of pale ochraceous hairs behind the wings. Pubescence of legs entirely black, or a little fuscous on anterior basis. Pubescence of abdominal dorsum black, some rather obscure pale hairs on sides of first segment, and the apex always noticeably clothed with appressed pale pubescence. Ventral scopa entirely black. Punctuation strong, but rather sparse for an *Osmia*. Inner orbits carinate; clypeus produced and very broadly truncate; mandibles very broad; tegulæ black; *wings pale fuscous*, second submarginal cell about as long as first on cubital nervure; first recurrent nervure reaching second submarginal cell a little before the end of the basal third, second near the tip; spurs of hind tibiæ stout and curved at tips.

*Hab.*—Olympia, Wash., June 1, 2 and 12 (T. Kincaid). This is a submelanic representative of *O. bucephala* and *O. megacephala*, having the same general structure and appearance. There is, however, no blue or green tint, and the pubescence is more black, and the wings are quite dark. The apical tooth of the mandibles is short.

*Osmia pascoensis* n. sp.

♀. Length about 15 mm., stoutly built; black, the abdomen *with a perceptible blue tinge*. Head large, but not so large as

thorax. Pubescence of head entirely black, except a yellowish-white fringe on occipital margin; of thoracic dorsum cream-colored, with longer black hairs intermixed; of sides of thorax black; a cream-colored tuft on tubercles and one behind wings, but the hairs of sides of metathorax below that black. Pubescence of legs black, shining fuscous on inner side of anterior tarsi. Pubescence of first abdominal segment cream color, not mixed with black, of the remaining segments black, scopa wholly black. Tegulæ black. Wings dull hyaline, with the broad apical margin and the marginal cell conspicuously darkened. Second submarginal cell a little longer than first on cubital nervure; first recurrent nervure joining second submarginal cell a little before the end of the basal third, second at the beginning of the apical sixth. Punctuation strong and quite dense on head and thorax; sparse on abdomen. Anterior margin of clypeus truncate, crenulated or ribbed, the sides of the truncation sloping away, the angle at the corners a very obtuse one. Apical tooth of mandibles very long, curved. Spurs of hind tibiæ rather slender and straight.

*Hab.*—Pasco, Wash., May 25, 1896 (T. Kincaid). Closely allied to several species. From *subornata* it may be known by the somewhat larger size, the blue tint of the abdomen, the long apical tooth of mandibles, the straight and more slender spurs of hind tibiæ, the absence of the black dorsal pubescence of the thorax, etc. From *bucephala* and *megacephala* by the smaller head, entirely black pubescence of face, etc.: from *nigrifrons* by the larger size. It agrees very nearly with Cresson's description of *nigrifrons*, and may represent a northwestern subspecies of that insect.

*Osmia grandior* n. sp.

♀. Length about 16 mm. Closely resembles *O. pascoensis* in all respects but the following: *Head smaller; clypeus dull and roughened* (in *pascoensis* shiny, with well separated punctures); apical tooth of mandibles shorter; *two conspicuous brushes of orange hair beneath the margin of the clypeus; vertex with smaller and closer punctures; vertex and whole of thoracic dorsum covered with pale fulvous hair, rather dense and not mixed with black; brush of hairs behind wings black; metathorax tinged with bluish; pubescence of first abdominal segment black with pale hairs intermixed; appressed pubescence of last segment fuscous; pubescence of first four tarsi shining reddish fulvous; marginal cell and second submarginal*

shorter; abdomen somewhat longer. The clypeus is quite ordinary, its margin straight.

*Hab.*—Olympia, Wash., May 10, 1894 (T. Kincaid). This would be easily confused with *pascoensis*, if attention were not paid to the details italicized. It is apparently the representative, in the north-west, of the Colorado *juxta* and *longula*. The blue tint and the color of the thoracic pubescence at once separates it from *subornata*.

*Osmia subpurpurea* n. sp.

♀. Length about 14 mm., relatively slender, *dark steel blue*, the legs, antennæ and mandibles black. Head subquadrate, rather large, at least as broad as the thorax. *Pubescence of face dull white with a slight yellow tinge, with numerous black hairs intermixed*; of cheeks pale; of vertex long, thin and mostly black; of thoracic dorsum white with a slightly yellowish tinge, with longer black hairs intermixed; of pleura sparse, dull white; of sides of metathorax copious, white; of legs short and black, with some dull white on femora behind, and dark fuscous on tarsi; of first abdominal segment dull white and quite abundant; of remaining segments very short, dark, hardly noticeable, except that *the hind margins of segments 2 to 5 present each a thin and narrow, but very visible, white hair-band*, and the short pile of the apical segment is pale. Ventral scopa entirely black. Punctuation of vertex strong, but not so close as to hide the shining surface; of mesothorax very close, the surface appearing roughened, dull and dark; of abdomen minute and sparse enough to leave a very shiny surface. Basal area of metathorax dullish, with no high lights. Cheeks nearly twice as broad as eyes; antennæ short; clypeus ordinary, anterior margin straight; apical tooth of mandibles moderately long; hind spur of hind tibia stout, and curved at tip; outer end of middle tibia ending in an outwardly projecting spine; the same with anterior tibiæ; tegulæ black; wings dusky; second submarginal cell about as long (perhaps a little shorter) as first on cubital nervure; first recurrent nervure joining second submarginal cell at about the end of its basal third, second nearly at its end.

*Hab.*—Olympia, Wash., May 25, 1894 (T. Kincaid). Larger than *O. faceta*, and differs by the formation of the clypeal margin, etc. It is also allied to *O. purpurea*, but differs in its much greater size and in the pubescence.

*Osmia atrocyanea* n. sp.

♀. Length about 11½ mm., moderately robust, sides of abdomen subparallel, head fairly large. Head, thorax and abdomen *indigo-*

blue, with a greenish tint on the dorsum of thorax and parts of the abdomen; legs, mandibles and antennæ black. Pubescence rather thin, entirely black except a very few scattered pale hairs near the tubercles, on scutellum, and sides of metathorax, and rather more on first abdominal segment. Ventral scopa entirely black. Punctuation ordinary, punctures of mesothorax dense but not confluent, of abdomen rather close but leaving a shining surface; median line of mesothorax distinct, basal area of metathorax moderately shiny; antennæ short; clypeus ordinary, anterior margin entire; apical tooth of mandibles very short; tegulæ black; wings smoky, paler along the nervures; second submarginal cell about as long as first on cubital nervure; first recurrent nervure reaching second submarginal cell a little before the end of its basal third, second just after the beginning of its apical sixth.

*Hab.*—Olympia, Wash., July 4, 1896 (T. Kincaid). Seems near to *O. brevis*, but differs in the color of the pubescence, larger size, etc.

*Osmia brevis* Cress.

An authentic Colo. ♀ specimen, sent by Mr. Fox, does not have the head as large as one would imagine from Cresson's description. The pubescence of the pleura is brownish-black. The abdomen is of a fine dark shining indigo-blue. The second submarginal cell is longer than the first on the cubital nervure; the first recurrent nervure joins the second submarginal cell somewhat before the end of its basal third, the second quite near its tip. At Pasco, Wash., May 25, 1896, Mr. T. Kincaid took a couple of ♀, agreeing with the Colorado insect, though having the second submarginal cell a little shorter. At Olympia, Wash., June 24, July 7, etc., Mr. Kincaid has taken in numbers a species like *brevis*, but with a more convex, very shiny, dark prussian green abdomen; I supposed it to be a different species, but leave it for the present with this allusion. It is quite possibly the ♀ of *inurbana* or *odontogaster*.

At Pasco, May 25, 1896, Mr. Kincaid also took a couple of males which it seems safe to refer to *brevis*, although the ♂ of that insect has not been described. The abdomen is indigo-blue like the ♀, but narrow and more shiny; antennæ wholly black, reaching about to scutellum; pubescence of face, vertex and thoracic dorsum yellowish-white, rather copious; of cheeks, pleura and sides of metathorax black; wings quite hyaline, except a slight stain in the upper part of the marginal cell; dorsal pubescence of abdomen all

black except on first segment; ventral pubescence black, a pale median patch just beyond apex of second segment; sixth dorsal segment entire. This ♂ is like *O. montana* from Pike's Peak, but is separated by the entire sixth segment of abdomen.

*Osmia proxima* Cresson.

This is considered to be the ♂ of *atriventris*; it was described from Maine and British America. At Olympia, Wash., June 24, 1895, Mr. T. Kincaid took a ♂ which is evidently conspecific with an authentic Canadian *proxima* sent by Mr. Fox. This insect will be recognized by its small size, large head, short subglobose thorax and abdomen, and shining dark blue-green color. The hind margins of the abdominal segments are inclined to be edged with testaceous—in the Olympia insect this is quite conspicuous. The antennæ are long, and the flagellum is more or less brownish or rufescent beneath. The tegulæ are greenish in front. The wings are hyaline. Sixth abdominal segment notched.

*Osmia faceta* Cresson.

♀. One collected at Olympia, Wash., June 2, by Mr. T. Kincaid, agrees with an authentic Canadian example lent by Mr. Fox. It is a little greener than that from Canada, but the specific characters are the same. It is especially to be noted that while the ventral scopa is black, there is white hair on the extreme lateral margin of the abdomen, which may run along the margins of the dorsal segments a little way, forming rudimentary bands. The mandibles have a conspicuous subapical band of orange rufous hair.

*Osmia densa* Cresson.

I have before me an authentic ♀ from Colorado, sent by Mr. Fox. It is much like *atrocyanea*, but the pubescence of the sides of the metathorax and of the tubercles is all white, while it is black in *atrocyanea*. In *densa* the pubescence of the pleura is scanty and white, in *atrocyanea* it is black. *O. atrocyanea* has a larger thorax and a somewhat larger head than *densa*. The following table separates a series of females having the general appearance of *densa*; in all, the ventral scopa is black.

- A. Pubescence of pleura, tubercles and sides of metathorax white.  
 a. Pubescence of clypeus and sides of abdomen white . . . *faceta*, Cr.  
 b. Pubescence of clypeus black, sides of abdomen without conspicuous white pubescence, though there are some white hairs,  
*densa*, Cr.

(*O. densa* was taken at Olympia, Wash., by Mr. T. Kincaid, June 19.)

B. Pubescence of pleura black.

a. Pubescence of scutellum black, with a few pale hairs intermixed, of sides of metathorax black; head strongly blue,

*atrocyanea*, Ckll.

b. Pubescence of scutellum light, with, at most, a few dark hairs intermixed; head less blue, clypeus black or almost so,

*nigrifrons*, Cr.

(An authentic specimen from Colorado, sent me by Mr. Fox; one from Colorado Springs, Colo., sent by Prof. L. Bruner; one from Olympia, Wash., May 25, sent by Mr. T. Kincaid.)

*Synhalonia edwardsii* (Cresson, 1878).

This is evidently common at Olympia, Wash., and is sent in numbers by Mr. T. Kincaid. Cresson describes only the ♂; the ♀ is from 14 to 16 mm. long, and differs from that of *S. frater* by its mouse-colored thoracic pubescence and by the abdominal bands, which, though very white, are reduced to two, on the third and fourth segments, that on the third interrupted in the middle. The second segment has a small white patch on each extreme side. A Seattle ♀ has the thoracic pubescence ochraceous as in *frater*, but the abdominal characters remain quite distinct. One Olympia ♀ has an interrupted band on the second segment. Within what must be considered the specific limits of *S. edwardsii* there are, in Washington State, two distinct types:—

(a.) Race *laticor.* ♂. Facial quadrangle not far from a square, sides of the clypeal yellow, gradually sloping above, distance between the yellow and the eyes quite considerable. Olympia and Seattle.

(b.) Race *angustior.* ♂. Face conspicuously longer than broad. Sides of clypeal yellow, above squarely notched, distance between the yellow and the eyes extremely small; pubescence somewhat paler. ♀. Smaller, with paler pubescence, abdomen with the white bands on the fourth and fifth (instead of third and fourth) segments, that on the fifth fuscous in the middle, but brilliant white at the sides, a white mark on each side of third, apical segment white at sides. Wings clearer. Pasco. The exact data are as follows:—

Race *laticor.* Olympia, 18 ♂, April 24, May 2, 10, 11, 17, 21, 23, 25; June 5; 19 ♀, June 1, 5, 11, 18, 19, 21, 24, 25, 29, July 4. Seattle, 3 ♂, April 17, May 3; 2 ♀, both May 19 (T. Kincaid). Two Olympian ♀s are from *Lupinus*.

Race *angustior*. Pasco, 5 ♂, 2 ♀, all taken May 25, 1896 (T. Kincaid).

*Synhalonia lycii* n. sp.

♀. Length 13 to 14½ mm.; general form, size and structure of *S. frater*, which might be readily confused with it on superficial examination. On comparing *lycii* with an Illinois example of *frater* received from Mr. Robertson, the following differences are at once apparent:—

*S. frater* ♀.

Segments 2-5 of abdomen with distinct light bands; apex with light brown pubescence.

Ventral surface of abdomen with light pubescence.

Wings noticeably brownish.

*S. lycii* ♀.

Segments 2 and 3 of abdomen with light bands; 4 and 5 sooty black, without light bands, or at most a very narrow apical gray band on 4; apex with black pubescence.

Ventral surface of abdomen with black pubescence.

Wings clear.

The above are conspicuous and constant distinctions; yet the head, thorax and legs of the two insects, with their pubescence, are virtually the same.

*Hab.*—*S. lycii* occurs in the Mesilla Valley, New Mexico, near the Agricultural College; on *Lycium torreyi*, on the College Farm, April 16; on flowers of plum, College Farm, April 9. Miss Jessie Casad took one on lilac in Mesilla, April 14.

*Calliopsis scitulus* Cresson, 1878.

Santa Fé, N. M., July 7 (Ckll. 1,356); Sta. Fé, July 25, on *Cleome serrulata* (Ckll. 3,747). Also Colorado, collected by Prof. C. F. Baker (No. 1,595=Fort Collins, Aug. 8, 1895, and 1,592=Fort Collins, Aug. 8, 1895, on *Cleome*).

In the specimens, Ckll. 1,356, the lateral marks of the clypeus are almost lacking; as also in Baker's 1,592, which has only two spots on the fifth abdominal segment.

I am not sure about the ♂ of *C. scitulus*; the above records all pertain to females. At Sta. Fé, on the same day as 1,356, I took a ♂ which resembled, but was not identical with, *C. pictipes* Cresson. Prof. Baker sends a ♂ taken at the same time and place as his 1,595 above, and it agrees sufficiently with Cresson's description of *picti-*

pes to be conspecific. At all events, I think, one may say, that the ♂ of *scitulus* is either *pictipes* or closely similar to it.

A ♀ from Colorado (Baker 1,599=Fort Collins, Aug. 15, 1895, on *Solidago canadensis*) has the clypeus entirely black.

*Calliopsis australior* n. sp.

The ♀ of this so greatly resembles *scitulus* in every respect that it was long held to be a variety of it, and I only now separate it on observing that the differential characters are constant. The band on the third abdominal segment, usually entire in *scitulus*, is *always interrupted*, often quite widely; the band on the fourth segment is usually entire, being the only entire band; *the fifth segment is black, with neither band nor spots; the lateral face-marks are always much broader and shorter than in scitulus; the clypeus always has a pale stripe down the middle*; otherwise the two insects are about the same. It is to be remarked that *australior* partakes of the characters of the Californian *C. edwardsii*, which has the longitudinal clypeal mark but not the lateral marks on the clypeus, which are common to *australior* and *scitulus*. *C. edwardsii* is also a larger insect than *scitulus*, whereas *australior* is of the same size.

The ♀ of *australior* I found in numbers visiting the flowers of *Cleome serrulata* at Albuquerque, N. M., Aug. 16; I also found it on the sand hills at Mesilla, N. M., May 29, numerously visiting the flowers of *Dithyrea wislizeni* Engelm. It also comes from Colorado, collected by Prof. C. F. Baker (No. 1,592=Fort Collins, Aug. 8, 1895, on *Cleome*).

The Colorado form has the abdominal markings more yellow than that from New Mexico.

I am uncertain about the ♂ of *australior*, but Baker's 1,591 (Fort Collins, Aug. 3, 1895, on *Solidago canadensis*) may belong there. It has the first joint of hind tarsus yellow, not greatly broadened, and with no conspicuous tuft of hairs at the tip. The face is all white below the level of the antennæ, except a couple of black dots on clypeus, and one at apex of each dog-ear mark. The postscutellum and a transverse band on the scutellum are white. I took a closely similar ♂ at El Paso, Texas, May 13, 1897, three specimens. It has the face more narrowed below, and the abdominal markings more reduced than in the Colorado insect. It was flying round *Baccharis*.

*Calliopsis personatus* n. sp.

♀. Length 8 mm. This also is a sort of modified *scitulus*, but the modification is in a different direction. The most obvious char-

acter is that *the face is entirely black*, although there remains a white spot at the base of the mandibles. The abdomen has a spot on each side of the first two segments, a broadly interrupted band on the third, and an almost continuous one on the fourth, these markings being white. The fifth segment, as in *australior*, has neither band nor spots; the apical pubescence is entirely white. For the rest, the characters are practically as in *scitulus*.

*Hab.*—Pasco, Wash., May 25, 1896 (T. Kincaid).

*Calliopsis clypeatus* Cresson, 1878.

Cresson had only a single ♂. Prof. C. F. Baker has taken both sexes in Colorado (No. 1,581, on Laramie River, Larimer Co., 8,500 ft., July 19, 1895). The ♀ is like the ♂, except that the face is wholly dark: the antennæ shorter, with the flagellum, after the third joint, dull ferruginous beneath; the abdomen broader, the apical portion with white pubescence, and the extreme apex with a broad, dense, ochreous brush.

*Calliopsis boylei* Ckll., 1896.

This is not rare at Santa Fé, New Mexico. It is also found in Colorado, a specimen before me was collected by Prof. C. F. Baker (No. 1,600). The Colorado form has a yellow line on the scape, and a study of it leads me to believe that *C. boylei* is probably only a variety of *C. ornatipes* (Cress., 1872). In the typical *boylei* from Sta. Fé, the scape is entirely black.

*Calliopsis coloradensis* Cress., 1878.

Santa Fé, N. M., on flowers of *Grindelia squarrosa*, Aug. 1 (Ckll. 4,029); and in Mr. Boyle's garden, Aug. 10 (Ckll. 4,397). The face-marks are slightly tinged with pinkish, and the lateral marks do not go up so far as would seem to have been the case in Cresson's type; yet the identity is evident. The specimens are females.

*Calliopsis andreniformis* Smith, 1853, subsp. *rhodophilus* n. subsp.

♂. The legs, instead of being entirely yellow, have the femora with the basal two-thirds nearly all black, and all the tibiæ with a black patch behind; sometimes the four hind tibiæ have a dark shade in front; the scape is entirely black, or may have a narrow yellow line in front; the yellow is paler throughout; the thoracic pubescence is more scanty and grayish-white rather than ochraceous; otherwise there is little or no difference.

♀. The face-marks are cream-color; no rudiments of dog-ear marks. wings clearer. This subspecies is more distinct in the ♂ than ♀.

*Hab.*—Santa Fé, N. M.; females; July 27, 1895, at flowers of *Sphæralcea angustifolia*; Aug. 5, Aug. 14, Aug. 14, July 25 on *Sphæralcea angustifolia*; Aug. 19, 1894. Males: Aug., 1894; July 27, at flowers of *Sphæralcea angustifolia*; Aug. 5, July 30, burrowing in damp soil, I saw it enter, and dug it out from end of burrow.

*Andrena kincaidii* n. sp.

♀ 14 mm. long, black; head and thorax with short, dense, ochraceous pubescence; abdominal segments 2 to 4 with more or less broadly interrupted apical bands of pale ochraceous pubescence; apex densely fringed with orange-rufous pubescence. Femora black, *tibiæ and tarsi wholly ferruginous*. Process of labrum truncate, subemarginate. Clypeus with rather large, not very dense punctures, and a median smooth longitudinal ridge or line. Mesothorax and scutellum distinctly but not very densely punctured, the punctures unevenly distributed; basal area of metathorax rugose, ill-defined; *abdomen distinctly and quite closely, though not deeply, punctured*. Antennæ wholly black. Tegulæ rather dark testaceous. Wings strongly tinged with yellowish-ferruginous, the apical portion grayish, and the *apex conspicuously blackish*; nervures and stigma ferruginous. Mandibles notched at end.

♂. About 11 mm. long, more slender, pubescence paler, sometimes becoming whitish, no bands on abdomen; *clypeus lemon-yellow with two black spots*; antennæ wholly dark; tibiæ and tarsi all ferruginous as in the ♀. Hind-margins of abdominal segments becoming testaceous.

*Hab.*—Olympia, Wash., very numerous specimens of both sexes sent by Mr. Kincaid. The dates for the females run from May 9 to June 29, for the males from May 25 to June 12. It is a very distinct species, at once known by the characters italicized. Rarely the ♀ exhibits a yellow spot on the clypeus, in the median line not far from the anterior margin.

*Andrena salicifl<sup>o</sup>aris* n. sp.

♀. About 11 mm. long, black, the pubescence brownish-ochraceous. Head ordinary, face broad, facial quadrangle broader than long, pubescence of face fairly abundant; clypeus shining, but strongly and rather closely punctured, with a rather strawberry-like surface; basal process of labrum rounded; antennæ black; vertex with close shallow punctures, the surface minutely roughened; mesothorax dull, with tolerably close strong and very large punctures, median and parapoidal grooves distinct; scutellum with large

punctures, becoming smaller and very dense on its hindmost portion; enclosure of metathorax ill-defined, irregularly longitudinally wrinkled; pleura strongly and closely punctured; tegulæ piceous; wings smoky-hyaline; nervures and stigma very dark brown or piceous; legs with brownish-ochraceous pubescence; basal joints of middle and hind tarsi rather broad; *abdomen strongly punctured*, rather shiny, practically naked, except for some thin pubescence at base of first segment, *lateral grayish-white patches on hind margins of segments 2 to 4, representing very broadly interrupted bands, and dense reddish-orange pubescence at the apex.* Venter with three thin hair bands.

♂. Length 9 mm.; pubescence more abundant and *rufous throughout*, of quite a bright tint. Face an antennæ wholly dark; band on fourth segment of abdomen entire, but very thin in the middle, and, like the other abdominal markings, orange-rufous. Abdomen not so closely or deeply punctured.

*Hab.*—Olympia, Wash. (T. Kincaid). The ♀ May 9th; the ♂ April 4th, at willow blossom. In some respects this resembles *A. pruni* Rob., but it is quite distinct.

*Ceratina nanula* n. sp.

♂. Length 4½ mm., shining, very dark bluish-green, brassy-green on the mesothorax. Legs concolorous except the tarsi, which are dark brownish, the small joints of anterior tarsi dull ferruginous. Antennæ very dark brown; tegulæ brown. Wings hyaline, nervures piceous. Tubercles, median third of labrum (but none of mandibles) and clypeal mark cream color; the last is inversely T-shaped, *the upright portion very broad, and longer than the arms.* Punctuation ordinary, but the punctures of front and mesothorax large and sparse, *leaving shining impunctured areas in the middle of the mesothorax and above the antennæ.* Abdomen ending in a short point. *Hind femora produced beneath to an angle slightly greater than a right angle.*

*Hab.*—At flowers of *Sphæralcea angustifolia*, Las Cruces, New Mexico, April 25th.

*Ceratina submaritima* n. sp.

♂. Length about or nearly 6 mm.; differing from *nanula* in its larger size, longer antennæ (wholly black, or dull ferruginous beneath); *the tubercles dark; the clypeal mark with the upright portion short, much shorter than the long lateral portions; the tegulæ*

black; the wings somewhat dusky; the hind femora more produced below, the angle resulting less than a right angle.

*Hab.*—Olympia, Wash., May 10th; also April 25th, at *Fragaria* (T. Kincaid). I have also before me a couple from Seattle, Wash., May 13th, from Mr. Dunning, marked "Lot 214."

The two species described above differ at once from *dupla* and *tejonensis* in the ♂, by having the abdomen terminated by a point; the last ventral segment in both *tejonensis* and *dupla* is broadly rounded at the end. At one time I thought *nanula* might be *C. strenua* Smith, but that cannot be, as Smith expressly states of *strenua*, "seventh segment rounded at the apex."

As regards the females, the distinctions are not so obvious. I have what I suppose to be females of *nanula* from Juarez, <sup>Mexico</sup> Las Cruces and Santa Fé, New Mexico; but except in being smoother and more shining (like the ♂) they do not appreciably differ from *dupla*, and it may well be that some of the larger examples (8½ mm. long, Sta. Fé, July) belong really to *dupla*, though of this I cannot be sure until ♂ *dupla* has been caught at Sta. Fé.

The ♀ of *C. submaritina*, which Mr. Kincaid took in some numbers at Olympia, Wash., differs at once from the supposed ♀ of *nanula* in having the clypeus *entirely dark*, or at most with a very small and obscure spot. *C. acantha* Prov., from Los Angeles, Calif., is described only from the ♀; it is too small for *submaritina*, its clypeus is said to have a median testaceous line.

*Perdita sidæ* n. sp.

♂. Length 4½ to 5½ mm. Head and thorax very dark metallic blue, obscurer and more inclined to greenish on mesothorax and scutellum, shining; the white pubescence moderately abundant. *Head large, subquadrate, broader than thorax, and considerably broader than long*; cheeks unarmed, but occasionally produced below into a prominent angle or incipient tooth. Clypeus broad and low, of the Panama-hat type; mandibles, except their dark tips, labrum, and *face up to the level of antennæ light yellow*; supraclypeal yellow area broader than long; upper limit of the yellow immediately lateral to the antennæ not as high as the top of the supraclypeal mark, but only reaching to the lower level of the antennal sockets, but rising as it approaches the orbit, to end at an angle of about 45° slightly above the upper level of the antennal socket. *Antennæ wholly deep orange*; ocelli in a curve. Front above level of antennæ with tolerably sparse but very distinct punc-

tures; vertex shining, microscopically sculptured with very sparse punctures. Mesothorax sparsely punctured; tubercles, and hind border of prothorax, more or less pale dull yellowish; sometimes this is hardly noticeable. Tegulæ hyaline with a blackish spot; wings hyaline, *stigma* and *nervures white*; stigma long and well-formed, marginal cell with its post-stigmatal portion longest, squarely truncate at end, with a very fine appendicular nervure. Second submarginal high, narrowed rather more than half to marginal; third discoidal distinct. *Anterior tibiæ and tarsi wholly lemon-yellow*, anterior femora yellow suffused with brown; middle tarsi whitish; middle and hind femora and tibiæ, and hind tarsi, piceous; the middle femora in front, and the middle and hind knees, dull yellowish or whitish; middle femora angled below. *Abdomen pale brown*, the hind margins of the segments hyaline, the venter dull brownish-orange.

♀. Same size and form. *Face wholly dark, except that the upper edge of the clypeus is dull whitish*, this coloration very inconspicuous. Head not so large, transversely oval; antennæ shorter. *Scape black, flagellum dull brownish-orange, infuscated at the base*. Legs piceous, anterior tibiæ and tarsi obscurely dull yellow in front. *Abdomen piceous above and below, without markings*.

*Hab.*—Mesilla, New Mexico, June 7th and 9, 1897, on flowers of *Sida hederacea*. They fly actively about the flowers, and in dull weather I found the males at rest in the flowers. Six males were taken, but only one ♀.

*P. sidæ* ♂ runs in my table of *Perdita* (Proc. Phila. Acad., 1896) to the neighborhood of *P. semicrocea*, but it cannot be confused with anything described, if attention is paid to the characters italicized above. The ♀ is equally distinct. In the shape of the head, and the sexual difference in the color of the abdomen, *P. sidæ* recalls *P. latior*, but the marginal cell is entirely different. On June 7th, I took a single ♀ of *P. latior* in a flower of *Sida hederacea* in Mesilla; it had probably wandered from an adjacent *Sphæralcea*, as renewed search discovered no more of them.

*Perdita callicerata* Ckll.

♀. Larger than the ♂, length about 5½ mm., *clypeus entirely cream color*, with the usual two black specks; *lateral face-marks transversely subreniform*, white, extending about as high as level of top of clypeus; antennæ as in ♂; mesothorax darker and bluer; legs virtually as in ♂; lateral light marks of abdomen larger and squarer.

*Hab.*—Mesilla Valley, close to the Agricultural College, on flowers of *Baileya multiradiata*, May 21, 1897, both sexes taken. The ♂ I have described previously; the species is quite remarkable for having more light color on the face in the ♀ than in the ♂. The ♀ of *callicerata* closely resembles the ♂ of *albovittata*, but differs at once by the color of the antennæ, the yellow anterior tibiæ, etc.; the face marks of the two are almost exactly alike.

*Perdita larreæ* Ckll. var. *modesta*, n. var.

♂. Like the type, but head not nearly so large, being only about as big as the thorax.

*Hab.*—Mesilla Valley, close to the Agricultural College, May 21, 1897, two at *Larrea*.

*Centris morsei* n. sp.

♂. Length 21 mm., stoutly built, black, with pale ochraceous pubescence, very dense on thorax. Clypeus bright lemon-yellow, with anterior margin rufous; labrum yellow; mandibles dark rufous with black tips; scape without any yellow; eyes sage-green, suffused with crimson at the extreme base; facial quadrangle longer than broad, but of the broad type; wings dusky hyaline; tegulæ cream-color; first abdominal segment with abundant pale pubescence; remaining dorsal segments uniformly and completely delicately pruinose-pubescent, producing a grayish appearance; apical margins of segments colorless or rather whitish-hyaline, extreme base of third segment, and of second segment at sides ferruginous, this ferruginous portion being overlapped by the white margin of the segment before. Venter with dense yellowish-white hairs; apex with pale shining hairs, genitalia ferruginous.

Compared with the ♂ of *C. caesalpinia*, which it most resembles, *C. morsei* is considerably larger, the thoracic pubescence inclines more to mouse color, and the pruinose-pubescent abdomen with its two more or less defined reddish bands is very different. In *morsei* the hind tarsi have a black brush on the inner side, but the abundant long pubescence is all ochraceous, not at all fuscous or blackish. The long hairs of the anterior tarsi are blackish, though shining, and appearing golden in certain lights.

*Hab.*—Mesilla, New Mexico, bed of the Rio Grande, June 28, 1897. Taken by Mr. A. P. Morse.