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BEES FROM MESA VERDE, COLORADO, IN THE AMERICAN MUSEUM OF NATURAL HISTORY

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Last summer Mr. Paul Franke collected 27 species of bees in the Mesa Verde National Park, and to my astonishment, nine of these proved undescribed. The new species belong to *Andrena* (six), *Nomada* (one), *Anthophora* (one), and *Emphoropsis* (one). In view of these results, and the isolation of the locality from other well-collected regions, it has seemed advisable to make a report on a number of species from Mesa Verde obtained by Dr. F. E. Lutz several years ago. Dr. Lutz sent me 55 specimens and informed me that in addition to these there are in the Museum, obtained during his expedition, specimens of the following from Mesa Verde. Most of these were identified by me at various times, except the Anthidiinæ by Mr. H. F. Schwarz, and *Bombus* by Dr. Lutz.

Agapostemon texanus Cresson
Perdita lacteipennis Swenk and Cockerell
Diadasia diminuta Cresson
Tetralonia cordleyi Viereck (variety)
Melissodes aurigenia Cresson (typical and variety with rather dark flagellum)
Melissodes grindeliæ Cockerell
Melissodes confusa Cresson
Melissodes dagosa Cockerell
Osmia wilmattæ Cockerell
Lithurgus apicalis Cresson
Anthidium placitum mesaverdense Schwarz
Anthidium mormonum pecosense Cockerell
Dianthidium ulkei Cresson
Bombus appositus Cresson
Bombus huntii Greene
Bombus morrisoni Cresson

The altitude at which the following were collected was, except as noted, about 7500 feet.

Ceratina neomexicana Cockerell, 1 female, July 3–7.

Ceratina nanula Cockerell, 3 females, July 3–7. H. S. Smith, in his table of *Ceratina*, separates *C. nanula* females in part by the clear wings. In typical specimens, from the Mesilla Valley, New Mexico, this holds. In these northern mountain specimens the wings are more dusky. It is possible that, when males from both regions can be dissected, characters will be found indicating the existence of a third species, but at present this cannot be affirmed. The female *C. nanula* is about the size of male *C. neomexicana*.

Chelostomopsis lutzi, new species

FEMALE.—Length about 6.5 mm., anterior wing, 4 mm. Robust, with very large head, which is considerably larger than thorax; abdomen broad. Head and thorax black, closely and distinctly punctured; pubescence white, very dense and snow white along each side of face, next to eyes; long white hair on anterior and posterior margins of mesopleura; dense white hair above tubercles, and at sides of metathorax, and a band in scutello-mesothoracic suture, failing laterally. Mandibles broad, black, tridentate, the apical margin very faintly reddish; clypeus shining but closely punctured, with a transverse depression, the median apical process stout but rather short; flagellum very obscurely reddish beneath; cheeks very broad and rounded. Tegulæ light rufotestaceous; wings hyaline, stigma black, nervures fuscous; basal nervure falling considerably short of nervulus (the distance about equal to half of nervulus); first recurrent nervure joining second cubital cell far from the base (the distance about equal to two-thirds of intercubitus), but the second only about half as far from apex; outer side of second cubital cell bulging. Legs mainly black, with white hair (yellowish on inner side of tarsi); hind femora swollen, very bright ferruginous. Abdomen with narrow but very distinct white hair-bands, and the last tergite covered with white hair, as well as the one before to a considerable extent; punctures of tergites very distinct; the lateral thirds of the tergites are bright ferruginous (the base also of first), as far as the fourth, on the fifth the red is reduced; ventral scopa entirely white.

Mesa Verde, Colorado, July 3–7, 1919.

Nearest to the Californian *C. australis nanus* Cockerell, but smaller, with much more red on abdomen and clypeus less densely punctured. The genus is new to Colorado.

Hoplitis mesæ, new species

MALE.—Length about 8.5 mm., anterior wing about 5.8 mm., width of abdomen about 2.5. Black, with scanty white pubescence (the type is worn), long, dense and pure white at sides of face and on apical part of clypeus; mandibles black, the cutting edge oblique, strongly tridentate, the inner tooth small; clypeus minutely and excessively densely punctured, the margin straight; third antennal joint conspicuously longer than fourth, but not so long as fourth and fifth combined; flagellum rather short, bright ferruginous beneath, except at extreme base; cheeks broad and rounded, finely punctured, shining; front dull, more shining at sides, a fine groove next to orbital margin, and next to this (mesad) a smooth band. Parapsidal grooves very short but linear. Mesothorax and scutellum shining, finely but not very densely punctured; sides of thorax shining but well punctured. Tegulæ dark brown, with weak punctures; wings short, hyaline, faintly stained with brown, especially in and about end of marginal cell; nervures black, stigma very small; basal nervure meeting nervulus; recurrent nervures ending about equally distant from and not close to base and apex of second cubital cell. Legs black, dull ferruginous apically, hair on inner side of tarsi reddish; claws strongly bidentate; pulvilli well developed; spurs dark. Abdomen shining, very minutely and not densely punctured; hind margins of tergites rufescent; first sternite with an obtuse elevation or tubercle, not very large; sixth tergite with apical corners prominent, seventh with a pair of short lobes, the broad interval between them slightly convex in middle. Genitalia small and delicate,

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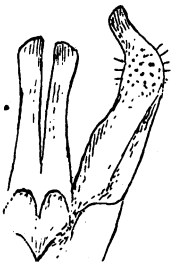

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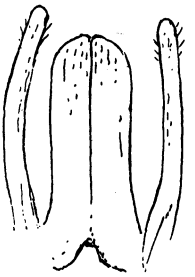

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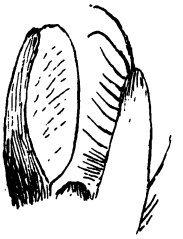

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Fig. 1. Caudal end of *Hoplitis mesæ*, new species.
Fig. 2. Caudal end of *Hoplitis adunca* (Panzer).
Fig. 3. Genitalia of *Hoplitis mesæ*, new species.
Fig. 4. Genitalia of *Heriades carinatus* Cresson.
Fig. 5. Clypeal margin of *Heriades carinatus* Cresson.
Fig. 6. Genitalia of *Colletes grisescens*, new species.
Fig. 7. Genitalia of *Colletes geranii* (Cockerell).

entirely pale ferruginous, the sagittæ straight, strap-shaped, the claspers stout, curved, with dark points and short bristles subapically.

Mesa Verde, Colorado, July 3–7, 1919.

I figure the caudal end of *H. adunca* (Panzer), the type of *Hoplitis*, for comparison. It will be seen that it is similar in principle yet very different in details. The flagellum of male *H. adunca* is distinctly compressed and broadened in the middle, which is not appreciably true of our insect. A male from California (Coffee Camp, June 11, collected at *Lotus glaber* by Timberlake), which is supposed to belong to *H. sambuci* Titus, has the caudal end like that of *H. adunca* and the flagellum modified. It also has a large thick scape, while the scape of the Colorado insect is quite ordinary. *H. truncata* (Cresson), from Georgia, also has the caudal end of the *H. adunca* type. *H. graceæ* Cockerell, from Sterling, Colorado (out on the plains), has tridentate mandibles, and the flagellum is ferruginous beneath. It is known from the female only, but differs in several respects from the species now described, and lives in a wholly different environment, so, I think the two cannot be sexes of one. In *H. mesæ* the distance from end of first recurrent nervure to first intercubitus is about half length of latter; in *H. graceæ* it is much more than half.

We must conclude that *H. sambuci* and *H. truncata* are veritable *Hoplitis;* but *H. graceæ* and *H. mensæ* form a group apart, which can be better diagnosed when both sexes of both species are known.

Heriades carinatus Cresson, 2 males, 1 female. I figure the genitalia of one of the males, and also the clypeal margin as seen obliquely from above. From another view, more directly in front, the clypeal margin appears straight, with a median semicircular depression beset with minute hairs. The case is similar to that of *Osmia californica* Cresson, in which the difference in the two aspects resulted in the synonymous name *O. pascoensis* Cockerell, as I learn from Miss Sandhouse.

Colletes grisescens, new species

MALE.—Length about 8 mm., anterior wing 6 mm. Black, rather slender, with narrow abdomen; hair of head and thorax very long, erect, grayish white, with a few long black hairs along inner orbits, but no black on thorax. Mandibles black, reddish at extreme tip; malar space about or almost twice as broad as long, minutely striate; labrum with a pair of curved (semilunar) sulci; face broad and head short; clypeus dull, very minutely punctured; antennæ ordinary, thick, reaching about to hind margin of mesothorax, flagellum very faintly brownish beneath; middle flagellar joints longer than broad; third antennal joint about as long as fourth, and the fifth very little longer; eyes dark brown; vertex at sides rather broad and flattened, very minutely punctured, somewhat shining. Mesothorax polished and sparsely punctured

on disc, otherwise dull; no visible prothoracic spines; base of metathorax coarsely rugosoplicate, the rugæ close together; mesopleura dull, with a broad shining elevation on upper part. Tegulæ very dark; wings strongly brownish; nervures and stigma dark brown; basal nervure falling short of nervulus; second cubital cell receiving recurrent nervure at middle. Legs black, with dull white hair. Abdomen shining, with excessively minute, sparse, piliferous punctures; depressed hind margins of tergites brown, with rather narrow grayish-white hair-bands; first two tergites with thin long erect hair; no band at base of second. Genitalia of the type of the European *C. fodiens* Kirby (Morice, 1904, Trans. Ent. Soc. London, Pl. VII, fig. 12). The middle joints of hind tarsi might be described as campanulate, about as Morice figures for *C. fodiens*.

Mesa Verde, Colorado, July 3–7, 1919, altitude 6600 ft.

In the Rocky Mountain fauna it appears to fall close to *C. paniscus* Viereck, which has dark hind spurs (in our species they are dusky reddish), and "wings hyaline, somewhat brownish," while the sculpture is evidently different. In my table it runs near *C. gypsicolens* Cockerell, which it does not closely resemble.

Colletes geranii (Cockerell), male, July 3–7, at *Sphæralcea coccinea*. I cannot separate this from *C. geranii*, which occurs at Boulder, Colorado, in the middle of June. I figure the genitalia of the Mesa Verde specimen; the structure is similar to that of *C. chobauti* Pérez, from France. I described *C. geranii* as a race of *C. salicicola* Cockerell, which occurs in New Mexico, but I now doubt the relationship. On the other hand, Gibson and Criddle (Canadian Ent. Record for 1919, p. 21) record *C. phaceliæ* Cockerell from Manitoba and Alberta, and consider *C. geranii* to be its male. On comparison, *C. geranii* differs from *C. phaceliæ* by the very pure white (not yellowish tinted) hair of thorax above, and much more shining abdomen. I am thus left in doubt as to the true female to associate with *C. geranii*.

The following table separates the similar light-haired females.

1.—Stigma pale yellowish with very dark margin; clypeus highly polished and sparsely punctured, not striate, and with no median sulcus.
petalostemonis Swenk.

Stigma much darker, deep rufous; clypeus striate or depressed in middle.....2.

2.—Second cubital cell very broad, receiving recurrent nervure about middle; clypeus coarsely sculptured, conspicuously striate, and depressed in middle.
phaceliæ Cockerell.

Second cubital cell narrower, receiving recurrent nervure considerably beyond middle; clypeus sparsely but strongly punctured, depressed in middle, but not striate..... *salicicola* Cockerell.

C. salicicola flies early in May, at Las Cruces, N. M. On the character of the second cubital cell, *C. geranii* would go with *C. phaceliæ*, not with *C. salicicola*. Both *C. geranii* and *C. phaceliæ* were published in

1906; the former in May (type-locality, Boulder), the latter in March (type-locality, Ward).

Halictus (Seladonia) meliloti Cockerell, 18 females, July 3–7, at *Pentstemon coloradensis, Sphæralcea coccinea,* and *Calochortus gunnisonii.*

Halictus farinosus Smith, 6 males, July 3–7, altitude 6600 ft. This is a species characteristic of the Pacific coast region.

Halictus niger Viereck, 6 females, July 3–7, at *Calochortus gunnisonii.* This is very close to *H. cooleyi* Crawford, and easily confused with it, but is smaller, with duller mesothorax.

Halictus sisymbrii Cockerell, 1 female, July 3–7, at *Calochortus gunnisonii.*

Halictus trizonatus Cresson, 3 males, July 3–7, altitude 6600 to 7900 ft.

Halictus heterorhinus, new species

FEMALE.—Length about 9 mm., anterior wing, 7.4 mm. Black, with the middle and hind tarsi dusky red, but the hind tibiæ black. Hair of head and thorax rather short, dull whitish, with a perceptible yellowish tint. Face very broad; clypeus short and transverse, the lower half polished, the upper half dull and granular, the middle with a distinct broad sulcus; sides of face somewhat glistening, perhaps very slightly metallic; supraclypeal area broad, with a dull minutely sculptured surface, but a smooth polished band on each side of it, extending down sides of clypeus; front dull; flagellum thick, obscurely brown beneath. Mesothorax dull, minutely and as closely punctured as possible, except on the posterior disc, where it is moderately shining, and the punctures are more separated; scutellum shining, closely and distinctly punctured, with a median sulcus; area of metathorax large, entirely dull, with very fine sculpture; posterior truncation dull, not defined at sides. Tegulæ large, black, with a hyaline border anteriorly; wings long and ample, strongly reddened; stigma large, ferruginous; nervures pale ferruginous; third cubital cell large and broad. Legs with pale hair; hind spur not pectinate. Abdomen dull, hind margins of tergites black; bases of tergites 2 to 4 with very broad dense bands of creamy-tinged felt-like tomentum. Under the microscope the supraclypeal area shows a minutely lineolate surface, with a few large scattered punctures; the front is excessively densely punctured.

Mesa Verde, Colorado, July 3–7, 1919.

Most nearly allied to *H. cyaneiceps* Cockerell, but distinguished by the longer, reddened wings, and the red middle and hind tarsi, and the broader hind basitarsi. The dull supraclypeal area and short clypeus distinguish it from most of the related species. It belongs to the subgenus *Curtisapis* Robertson.

Halictus pulveris, new species

FEMALE.—Length about 6 mm., anterior wing 5 mm. Black, rather slender, with abdomen relatively narrow (width 2 mm.). Hair of head and thorax scanty, dull white, abdomen without hair bands or patches, but covered with fine thin pruinose pubescence. Facial quadrangle much longer than broad, clypeus projecting; mandibles with apical half bright castaneous; clypeus shining, with distinct but sparse punctures, upper part minutely sculptured and with smaller punctures, lower part polished; supraclypeal area shining, with small sparse punctures; front excessively densely punctured, shining at sides of lower part; flagellum dull red beneath; cheeks with long white hair. Mesothorax dullish, more shining laterally than in middle, finely punctured, the punctures on disc, except in middle line, well spaced; no evident median groove; scutellum shining, finely punctured, without a median sulcus; area of metathorax large, dull, finely reticulate in middle, striate at sides, with an obtuse shining rim posteriorly; posterior truncation small, shining, with no sharp lateral borders. Tegulæ clear testaceous; wings hyaline, strongly iridescent; stigma large, light fulvous, nervures pale testaceous. Legs black, tarsi red at apex; spurs ferruginous, hind spurs with a few stout teeth or spines. Abdomen shining, very finely punctured, hind margins of tergites dark rufescent; first tergite with excessively minute punctures (visible under microscope), the middle polished and almost wholly impunctate; second and third tergites with very minute, fairly close punctures.

Mesa Verde, Colorado, July 3–7, 1919, altitude 6600 ft.

The following table compares this species with its allies.

1.—Front, below the ocelli, highly polished and shining; tarsi reddish brown; hind margins of tergites pallid.
arizonensis Crawford (*vanduzeei* Sandhouse and Cockerell.[1]
Front, below the ocelli, dull ..... 2.
2.—Tarsi pale red; head broad; margins of tergites colorless. . *subobscurus* Cockerell.
Tarsi dark, at most red at tips ..... 3.
3.—Clypeus short, dull, shining only at apex; abdomen broad; area of metathorax with vermiform rugæ ..... *foxii* Robertson.
Clypeus produced, shining ..... 4.
4.—Abdomen slender; tegulæ clear testaceous ..... *pulveris* Cockerell.
Abdomen broad; tegulæ dark rufous ..... 5.
5.—Hind margins of tergites conspicuously pallescent; stigma clear pale fulvous; second and third tergites dull ..... *synthyridis* Cockerell.
Hind margins of tergites at most faintly rufescent; stigma dusky; second and third tergites shining ..... *vaporellus* Cockerell.

Four males (Mesa Verde, July 3–7, 6600 ft. and 7300 ft.) are provisionally referred to *H. pulveris.* They are about 5 mm. long, very slender; antennæ very long, the flagellum ferruginous beneath; mandibles apically yellow (the end of the black area cuneate); labrum honey-

[1]Miss Sandhouse informs me of this synonymy, remarking that the abdomen of *H. arizonensis* is much less red than the description suggests. The reddish color described by Crawford is not at all present in the cotype of *H. vanduzeei* before me, so I am left rather perplexed.

color; clypeus strongly produced, beset with thin grayish-white hair, and having an apical yellow band; front dull; mesothorax and scutellum shining, the latter highly polished; sculpture of area of metathorax weak; tubercles with lower half reddish; tegulæ clear testaceous; wings quite clear; tarsi very pale reddish, and also anterior tibiæ at base and apex; abdomen shining; thinly hairy. The fourth antennal joint is about twice as long as the third. In Robertson's table it goes to *H. foxii*. In Crawford's table (1907), *H. foxii* is said to have antennæ short, hardly reaching the tegulæ; he seems to have had the wrong male, as Robertson refers to the long antennæ.

Halictus (Chloralictus) pruinosiformis Crawford, 1 female, at *Pentstemon coloradensis*. This widely distributed species varies in color. The present specimen has the mesothorax shining yellowish green.

There are three other species of *Chloralictus*, represented by single specimens, two females and a male. I have not tried to work these out, as Mrs. Ellis described eight and Miss Sandhouse 22 species of this group from Colorado, not to mention numerous others from different parts of North America. The types of all these are in the U. S. National Museum, though formerly belonging to my collection. I understand that Miss Sandhouse will eventually present a new revision of the group.