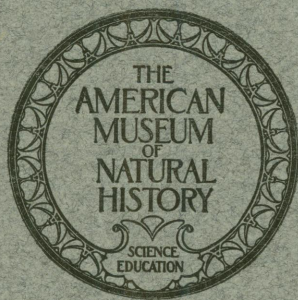


AMERICAN MUSEUM NOVITATES

No. 24

WESTERN BEES OBTAINED BY THE AMERICAN MUSEUM EXPEDITIONS

By T. D. A. COCKERELL



Issued December 7, 1921

By ORDER OF THE TRUSTEES
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY

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59.57,99(78)

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This is the third report¹ upon the bees obtained in the course of the American Museum's entomological survey of the Western States. It includes parasitic bees and Panurgidæ. Unless otherwise stated, the specimens were collected by Frank E. Lutz and the field notes are by him.

NOMADA Scopoli

Nomada crucis Cockerell

UTAH: 1 ♀, 2 ♂, Salt Lake City, about 5000 ft. alt., near Fort Douglas, July 28, 1920, collected by Mrs. F. E. Lutz. COLORADO: 1 ♀, Grand Junction, about 4500 ft. alt., in a vacant lot near the Fair Ground, August 3, 1920.

Described from the Mesilla Valley of New Mexico, and considered a Middle Sonoran species. The specimens from Utah and Colorado are quite typical. Swenk records it from Arizona. In Texas it intergrades with *N. texana* Cresson.

Nomada vincta Say

COLORADO: 5 ♀, 7 ♂, Wray, about 3700 ft. alt., both sexes at *Helianthus*, one male taken by evening sweeping in a relatively moist place along the river, some collected by Pearce Bailey, Jr., August 17, 1919; 1 ♀, Boulder, about 5500 ft. alt., in a vacant lot in town, August 8, 1919.

Common in Eastern Colorado, but I did not take it in New Mexico.

Nomada vincta heterochroa, new variety

COLORADO: 2 ♂, Wray, about 3700 ft. alt., one taken with the typical form in evening sweeping and one in a moist place at the head of Dry Willow Creek, August 17 and 18, 1919.

Mesothorax red, with a large cuneiform black mark, having its base on posterior margin; mesopleura red, except for the yellow patch; base of abdomen and bands red instead of black, sometimes with black at bases of second and third segments.

A color-variety, not a race, but very distinct in appearance.

¹For the preceding reports see American Museum Novitates, No. 21, December 1, 1921, and No. 23, December 5, 1921.

Nomada zebrata Cresson

COLORADO: 1 ♂, 1 ♀, Wray, about 3700 ft. alt., in more xerophytic places than were *vineta*, the female at *Helianthus*, August 18, 1919; 1 ♀, Boulder, about 5500 ft. alt., in town, August 8, 1919.

Extends southward to the White Mountains of New Mexico.

Nomada gutierreziae Cockerell

COLORADO: 1 ♀, Pueblo, in a vacant lot in town, August 9, 1920.

Previously known from the Mesilla Valley, New Mexico. The anterior coxæ have very short but distinct spines.

Nomada morrisoni Cresson

COLORADO: 2 ♀, South Fork, about 8200 ft. alt., near the junction of the two headwaters of the Rio Grande, June 17, 1919.

One differs from the type in having the spots on metathorax entirely red and yellow band on first abdominal segment broadly interrupted. The other has the spots on metathorax yellow.

Nomada civilis Cresson

IDAHO: 1 ♂, Montpelier, about 6100 ft. alt., near town, July 6, 1920.

There are two large yellow spots on scutellum, but in some examples of *N. civilis* (for example, from Florissant, Colorado) these are absent.

Nomada cymbalariae Cockerell

COLORADO: 1 ♂, Mineral County, about 37° 27' N., 106° 54' W., near the junction of Wolf and Fall Creeks, about 7900 ft. alt., vegetation of oak, Engelmann spruce, etc., June 20, 1919.

This falls with the male which I have, without having definite proof, regarded as belonging to *cymbalariae*. It differs from a Florissant specimen in lacking the upper (somewhat enlarged) ends of lateral face-marks, in not having distinctly red hair on scutellum, in the smaller and entirely yellow scutellar spots, and in the more obscure band on first abdominal segment. These differences might all fall within the limits of variation.

Nomada eiwardsii Cresson

IDAHO: 1 ♀, Victor, about 6300 ft. alt., vegetation of aspens, roses, etc., July 11, 1920.

This is a member of the Pacific Coast fauna, extending inland to Idaho. The same is true of the next species, *N. citrina*. The Californian *N. coquilbetti* Cockerell also reaches Idaho.

Nomada citrina Cresson

IDAHO: 1 ♀, Bear Lake, about 6200 ft. alt., along Fish Haven Creek, July 9, 1920.

In my table in 1903, Proc. Acad. Nat. Sci. Phila., LV, p. 582, this runs to *citrina* var., based on a specimen from Grangeville, Idaho.

Nomada pecosensis (Cockerell)

COLORADO: 2 ♀, Pagosa Springs, about 7700 ft. alt., in the U. S. forest reservation, June 21, 1919.

A little larger than the type. Previously known from Pecos, New Mexico, and Palisades, Colorado, taken in May and June.

Nomada accepta Cresson

COLORADO: 1 ♀, Aspen, about 8300 ft. alt., along Castle Creek, July 15, 1919, collected by Herbert F. Schwarz.

Nomada alpha Cockerell

This species differs from *morrisoni* in the red legs (with hardly any yellow), narrower face, and other characters (see Swenk, Univ. of Nebraska Studies, XII, p. 73), but both are very variable and I now incline to the opinion that they represent diverse forms of a single species. The matter will only be settled when we have larger series, including males. Typical *alpha* is from Fort Collins, Colorado, 4980 ft. alt.

Further confusion is introduced by the discovery of two additional forms of *alpha*, as follows.

Nomada alpha paralpha, new variety

COLORADO: 1 ♀, Walden, about 8400 ft. alt., among sagebrush on hillside, June 17, 1920.

♀.—Differs thus: length fully 10 mm.; mandibles not yellow basally; labrum yellowish, but clypeus and other face-markings pale red; red lateral face-marks continuous with stripes along posterior orbits, and with a swelling or lobe opposite the frontal spot; yellow behind eyes indistinct; scape red, with a black stripe behind; third antennal joint hardly longer than fourth; mesothorax with a very broad median black stripe, and narrower lateral ones, inclined to be slightly interrupted in middle, or one may say, black with four red stripes, the outer marginal; middle of pleura red, and a red spot beneath the wings; scutellum entirely red; anterior femora with a large black mark behind; first abdominal segment largely black at base; venter light red.

Nomada alpha dialpha, new variety

COLORADO: 2 ♀, Walden, about 8300 ft. alt. on the more mesophytic river-bottom among willows, cottonwood, Iris, etc., June 17, 1920.

♀.—Length, 9.3–10.3 mm.; similar to *paralpha*, the venter red, or with an obscure yellow band on fourth segment, but mesothorax red with a black triangle on

anterior margin. There is more red on front, the larger specimen having a broad red band right across. Red band behind eyes broader, without any yellow. Scape entirely red. Mesopleura almost entirely red, contrasting with the yellow tubercles. Anterior femora without black. First abdominal segment red, without black base or yellow spots.

These forms have some resemblance to *N. collinsiana* Cockerell, but are quite distinct.

***Nomada calloxantha*, new species**

WYOMING: 1 ♀, Stewart Ranger Station, in the Jackson Hole country at about 43° 42' N., 110° 45' W., about 6700 ft. alt., lodgepole pine, Engelmann spruce, etc., July 18, 1920.

♀.—Length about 12 mm.; bright sulphur yellow, marked with red and black; head broad, orbits somewhat converging below; eyes pale grayish, suffused with reddish, but on the upper third greenish; hair of head and thorax scanty, dorsum of thorax almost entirely nude; mandibles simple, yellow, black at end; lateral face-marks broad, extending over eyes to a broad stripe down posterior orbits, but interrupted by a large red patch on upper part of front; black marginal spots on clypeus, connected by a line with base of antennæ; region above and between antennæ blackened, but a transverse red band across front; vertex and posterior part of head black, a little red on occiput; antennæ stout; scape thick, yellow, partly red behind; flagellum entirely bright ferruginous; third antennal joint about as long as fifth, but conspicuously shorter than fourth; mesothorax coarsely rugose and dull, red, with yellow stripes over tegulæ and behind, and a median black band, narrow and faint in middle, triangularly expanded posteriorly, and less so in front; prothorax black, with the swollen upper margin and tubercles yellow; a small black area below wings; mesopleura yellow, with a transverse reddish stain on upper part, and a large red patch below; a broad black area behind mesopleura, bordered with red at sides of metathorax; metathorax with a broad median black band, the sides of the basal area having large yellow patches; scutellum and postscutellum yellow, the former strongly bigibbous; tegulæ pale yellowish, semitransparent; wings reddish, stigma and nervures ferruginous; basal nervure going a considerable distance basad of transverse median; third submarginal cell broad below; legs yellow; anterior trochanters and marks at base of femora red; middle coxæ mainly black, their trochanters red with a yellow spot, and their femora largely red at base; hind coxæ marked with red and black, their trochanters red, their femora mainly black on inner side, and with a red basal patch above, their tibiæ red on inner side except at base, their basitarsi with dense short light red hair on inner face; abdomen bright yellow; basal half of first segment red, with a median black mark; four rather narrow dark bands, the first two reddish, on apices of segments and adjoining bases; venter yellow, with two narrow dark bands, failing laterally.

A member of the subgenus *Xanthidium*, running in my tables to *N. morrisoni flagellaris* Cockerell, but certainly distinct. In Swenk's table of Nebraska species it runs to the much smaller *N. citrina flavo-marginata* Swenk, and in his further table of the same group (Univ. of Nebraska Studies, XII, p. 68) it runs nearest to *N. rufula* (Cockerell),

which was described as a variety of *citrina*. It differs from *rufula* in the venation and other characters and is, I think, certainly distinct. *N. rufula* is from Idaho.

***Nomada melanoptera*, new species**

COLORADO: 1 ♀, Wray, about 3700 ft. alt., on a dry hill near town, July 17, 1919.

♀.—Length about 11 mm., broad and robust; head black and red, thorax and abdomen black and bright lemon-yellow; mandibles simple; anterior coxæ without spines; third antennal joint long, much longer than fourth or fifth, but not as long as the two together; basal nervure meeting transverse median; abdomen strongly punctured. Head broad, facial quadrangle broader than long; eyes pale red; mandibles (except apex), labrum, lower margin and broader corners of clypeus, and entire sides of face ending obliquely a little above antennæ, bright ferruginous; face and front very coarsely punctured, clypeus with a smooth area on lower middle, supraclypeal area with very large sparse punctures; posterior orbits with a narrow red stripe, flushed with yellow at its upper end; antennæ with the first three joints bright red, the next three reddish, the rest black; mesothorax entirely black, very coarsely and densely punctured; prothorax black, with the thick upper border and the tubercles yellow; pleura very coarsely punctured, entirely black; metathorax all black; scutellum bigibbous, with two very large round yellow spots; postscutellum yellow; tegulæ bright red; wings dark fuliginous, with an irregular hyaline area in the subapical region, but the apical very dark; stigma ferruginous, nervures fuscous; legs bright red; hind tibiæ with a pointed posterior apical lobe, on the outer margin of which are four equal spines; abdomen broad, black, the first five segments with broad yellow bands, that on second very broad, that on fifth broadly emarginate posteriorly; sides of apex with dark fuscous hair; venter black, with a red transverse line on first segment, not extending to sides.

A remarkable species, which persistently falls with *N. (Holonomada) superba* Cresson in the tables, but is actually very different and closely related to *N. (Micronomada) arenicola* Swenk, but without coxal spines, or yellow on face or pleura. The hind tibiæ are very distinctive.

***Nomada crawfordi lachrymosa*, new variety**

WYOMING: 1 ♀ (type): Jackson, about 6300 ft. alt., along Cache Creek, among vegetation of moderately moist pasture-land type, July 15, 1920; 1 ♀, Rawlins, about 6800 ft. alt., among sagebrush on a hill near town, June 23, 1920; 1 ♀, Medicine Bow, about 6600 ft. alt., among sagebrush on the ridges having a few *Pinus scopulorum*, June 23, 1920.

♀.—Length about 11 mm.; general color of head, thorax and legs bright ferruginous, of abdomen bright yellow; eyes pale reddish gray; mandibles simple, black at end; labrum yellow; lower border of clypeus and sides of face suffusedly yellow; face broad; cheeks with pale red hair; front red; antennæ entirely bright ferruginous or darkened apically, third joint long, but shorter than fourth; mesothorax dull and densely punctured, dull red, with a black mark posteriorly; tubercles and upper border of prothorax yellow; pleura red, with a small yellow mark, not always present;

scutellum strongly bigibbous, it and the postscutellum red; metathorax with a pair of dull pale yellow spots, and often a black shade in center of basal area; tegulae orange, with a yellow spot; wings reddish, stigma bright ferruginous, nervures fuscous; basal nervure going a little basad of transverse median; anterior tibiae faintly suffused with yellow at base; hind femora with a broad black area behind; hind tibiae with an apical outwardly projecting emarginate lobe; hind basitarsi with shining golden hair on inner side; abdomen yellow with four narrow red bands, first segment red at base; venter yellow with bases of segments red, and first segment all red; second segment broadly emarginate posteriorly.

A *Xanthidium*, running in the tables near to *zebrata* and *rufula*, but quite distinct. It closely resembles *N. crawfordi* Cockerell, differing by the broad continuous yellow band on first abdominal segment, whereby it resembles *N. rhodoxantha* Cockerell. The proportions of the antennal joints are as in *crawfordi*, and after close comparisons I must regard it as a race or variety of that species, rather than an independent species. Swenk refers to a form of *crawfordi* from Nebraska, with a complete yellow band on first abdominal segment. Swenk suggests that the males which I described as *N. gillettei* and *N. ednæ* represent variations of *crawfordi*. I have no *gillettei* but, on comparing the type of *ednæ*, it seems to me to be specifically distinct, though very closely allied.

The name of this variety is in allusion to the tear-like yellowish suffusion on anterior orbits.

***Nomada concinnula*, new species**

COLORADO: 2 ♀, Electra Lake (type locality), near Durango, about 8400 ft. alt., June 29, 1919; 2 ♀, Pagosa Springs, about 7400 ft. alt., in U. S. forest reservation, San Juan valley, June 23, 1919. Both of these regions contained oaks, *Pinus scopulorum*, etc.

♀.—Length about 9 mm.; head, thorax and legs clear red, almost without yellow; sides of face suffusedly lemon-yellow; tubercles and postscutellum inclining toward orange; mandibles simple, black at end; eyes pale reddish; clypeus closely and finely punctured; antennae long, bright ferruginous, third joint considerably shorter than fourth, but more than half as long; mesothorax finely granular, entirely red; scutellum strongly bigibbous; lower part of pleura deeper, less yellowish, red than the rest; a little black about bases of coxae, and hind femora variably suffusedly blackened on inner side; tegulae yellowish red, shining but punctured; wings reddened, stigma dull ferruginous, nervures fuscous; basal nervure going a little basad of transverse median; abdomen light red with bright yellow bands, on first segment broken into two spots, on second broad at sides but thin and flexuous in middle, varying to much broader; on third, fourth and fifth broad, the last with a pair of pellucid spots; venter with first segment red, the next three with broad yellow bands the fifth with a pair of large round yellow spots, containing a small reddish spot near margin.

A pretty little *Xanthidium*, perhaps related to *rufula*. Superficially it looks exactly like *N. vallesina* Cockerell; but that has the fourth antennal joint much shorter, lacks the yellow at sides of face, etc.

***Nomada carinicauda*, new species**

COLORADO: 1 ♀, along the South Fork of the Rio Grande at about 37° 36' N., 106° 43' W., about 5800 ft. alt., among *Pinus scopulorum*, *Pseudotsuga mucronata*, *Picea pungens*, etc., June 17, 1919.

♀.—Length about 9 mm., red, similar to *N. depressicauda* Cockerell (to which it runs in the table in Entom. News, 1908, p. 323), but with the flattened caudal area much larger (describing about half a circle), with a minutely granular or tessellate bare surface, and three longitudinal keels, the keels and the margin briefly and microscopically pubescent. It also differs by the darker red of head and thorax; the longer third antennal joint (still, however, not quite so long as fourth); scutellum more strongly bigibbous. The only yellow markings on abdomen are large spots on second segment, and very small ones on third.

***Nomada vicinalis* Cresson, variety *infrarubens* Cockerell**

COLORADO: 1 ♂, Telluride, about 10,000 ft. alt., along Cornet Creek trail, July 9, 1919; 1 ♂, South Fork of Rio Grande between Pass and Hope Creeks, about 9300 ft. alt., June 18, 1919; 1 ♂, Electra Lake near Durango, about 8400 ft. alt., June 29, 1919. All of these localities are in forest regions.

These agree with Cresson's description, except that the venter is without yellow, except a suffused spot near apex. The mesothorax appears wholly black, but in the Rio Grande and Telluride specimens it is possible to see a pair of very faint red lines. The scutellum has two red spots, but no yellow. The variety *infrarubens* was described from Oregon, but the Colorado specimens cannot be separated. On the other hand, I find that *N. vicinalis aldrichi* Cockerell, from Idaho, is distinct. Compared with *aldrichi*, the present insect differs by the shorter third antennal joint and the deep emargination of the black mark on first ventral segment. I think the Idaho insect must stand as *N. aldrichi*, a separate species. It is a comparatively large form.

***Nomada illinoënsis* Robertson**

COLORADO: 1 ♀, Camp Creek Ranger Station in the Medicine Bow Range about 41° N., 106° 12' W., about 8700 ft. alt., lodgepole pine and sagebrush, June 19, 1920.

This is referred to *illinoënsis* because it appears to agree with the Nebraska form so referred by Swenk, though it has the third antennal joint considerably longer than in what I had considered to be *illinoënsis*, from Oklahoma. It appears legitimate, for the present, to interpret *illinoënsis* in a rather broad sense, recognizing that when the sexes, habits, and genitalia are known, in all probability several valid species will be segregated.

Nomada (Gnathias) orophila, new species

COLORADO: 2 ♂, 1 ♀, Camp Creek Ranger Station in the Medicine Bow Range about 41° N., 106° 12' W., about 8700 ft. alt., lodgepole pine and sagebrush, June 19, 1920.

♂ (Type).—Length about 8 mm.; head and thorax black, with coarse long white hair, slightly yellowish dorsally; face broad, orbits converging below; eyes gray; mandibles bidentate, bright yellow with dark apex; labrum, clypeus (except upper border), mark beneath eyes, and narrow lateral face-marks (ending on orbits about level of antennæ) all bright yellow; scape yellow in front; flagellum bright red, the first few joints blackened above; third antennal joint almost as long as fourth; upper border of prothorax obscurely marked with yellowish; tubercles yellow, anteriorly reddish; scutellum red, flattened, not bigibbous, densely covered with long hair; pleura with a yellow mark, bordered with reddish, in front; tegulæ shining ferruginous; wings brownish, stigma ferruginous, nervures fuscous; basal nervure going far basad of transverse median; legs red, anterior knees yellowish, hind femora black behind and beneath, except at apex; abdomen bright red, with narrow black bands, which are in the main on the extreme bases of the segments; very large spots on second segment, smaller ones on third, but no other yellow markings; first dorsal segment black basally, and first ventral black in middle.

♀.—Length about 8 mm.; head and thorax rather dusky red, abdomen bright chestnut red, polished; hair of top of head and scutellum strongly reddish; face red with no yellowish tint; middle of front and region of ocelli black, and a black band passes downward from each antenna, invading sides of clypeus; eyes gray; antennæ entirely bright red, third joint perhaps a little longer than fourth; mesothorax red with a broad median black band, and narrow lateral ones, failing posteriorly; metathorax red at sides of middle but broadly black in middle and extreme sides; cheeks black with a red postorbital band; legs bright red, the femora with a black spot at base beneath; abdomen with spots on second segment round and rather small, on third nearly obsolete; first ventral with a large bifid black mark, the lobes of which are very broad and obtuse.

In *Gnathias*, the Rocky Mountain males usually differ from those of the Eastern and Northwestern States in the more or less red mesothorax; but *N. orophila*, from high in the mountains, has it black. The male *orophila* falls near *N. cuneata* Robertson, but is much more robust in every way. The female also falls next to *cuneata*, but has less yellow on the abdomen.

Nomada bella Cresson

IDAHO: 1 ♀, Victor, about 6300 ft. alt., July 11, 1920; 1 ♀, Giveout, near Montpelier, about 6700 ft. alt., July 7, 1920. COLORADO: 1 ♀ (a variation with basal area of metathorax black), along the South Fork of the Rio Grande at about 37° 36' N., 106° 43' W., about 8500 ft. alt.

Specimens from Costilla County, Colorado, which Swenk in 1912 placed under *bella*, were transferred by him to *schwarzi* in 1915. The type of *schwarzi* is a male from Veta Pass. The female described by me

under *schwarzi* was *lepida*. At present, I probably have the ♀ of *schwarzi* mixed with Rocky Mountain *bella* and do not know how to separate it.

***Nomada carolinæ* Cockerell**

COLORADO: 2 ♀, Julesburg, at *Salix* flowers along the river, about 3460 ft. alt., June 7, 1920.

Compared with a Nebraska specimen, one of these differs by lacking the black band down middle of metathorax, and the somewhat longer third antennal joint. On comparing specimens from Virginia and Texas, I find enough variation to include the Julesburg insect, unless *carolinæ* as at present accepted should prove capable of subdivision. The other specimen with exactly the same data has the metathoracic band well developed, and in general agrees well with the Nebraska specimen.

***Nomada perplexa* Cresson**

WYOMING: 1 ♀, Jackson, about 6300 ft. alt., among vegetation of moderately moist pasture-land type, July 14, 1920.

The form without yellow spots on abdomen. *N. perplexa* is common in the Northern Atlantic States (Pennsylvania, for example), but I did not expect to see it from Wyoming.

***Nomada siouxensis* Swenk**

WYOMING: 1 ♀, Jackson, about 6600 ft. alt., among blue spruce, aspen, and other mesophytic plants along Cache Creek, July 15, 1920.

Differs from the original description in having small and inconspicuous orange spots at sides of second abdominal segment, but evidently this species. It was described from Sioux County, Nebraska.

***Nomada (Gnathias) heterosticta*, new species**

IDAHO: 1 ♀, Victor, about 6300 ft. alt., among aspens, roses, etc., on the hills across the river from the town, July 11, 1920.

♀.—Length about or nearly 10 mm.; bright ferruginous red, not dark; mandibles bidentate, black at end; a dusky shade between antennæ, region between (but not around) ocelli blackened, and cheeks black behind, leaving a red band as broad as the black; eyes pale red; antennæ entirely clear ferruginous, third joint about as long as fourth; mesothorax with a narrow median black band; femora without black, except that the hind femora have a dusky stripe beneath, not conspicuous; tegulæ dull pale reddish, strongly punctured; wings dilute reddish fuliginous, stigma ferruginous, nervures dark fuscous; basal nervure going far basad of transverse median, third submarginal cell unusually broad above; abdomen clear red, without black marks at base above or below; sides of second segment with small yellow spots, but on third, in place of yellow marks, are dusky dots.

In my table this runs nearest to *N. grayi* Cockerell, but it differs in a number of characters and is especially recognizable by the markings of the abdomen.

***Nomada* (*Gnathias*) *clarescens*, new species**

COLORADO: 1 ♀, Walden, about 8300 ft., on the sagebrush hills near town, June 17, 1920.

♀.—Length nearly 10 mm.; clear red, the antennæ entirely red, the flagellum with a fine pruinose pubescence; eyes red; mandibles bidentate, black at end; a blackish W-like mark about bases of antennæ, and the region between ocelli blackened; cheeks black behind, leaving a very broad red band; third antennal joint about as long as fourth; mesothorax with a narrow black band; middle of metathorax with an elongate black spot; pleura with abundant long pale hair (short scanty hair in *N. heterosticta*); scutellum strongly bigibbous (so also in *heterosticta*); tegulæ ferruginous, rather shining; wings dusky with the usual hyaline space; stigma dusky reddish (smaller and narrower than in *heterosticta*); basal nervure going far basad of transverse median, third submarginal cell greatly narrowed above; femora marked with black beneath at base; inner face of hind basitarsi with very pale hair; first abdominal segment with a round black spot on each side near base; second with small yellow spots, the rest without yellow; first ventral with a blackish shade, but no well-defined mark.

The first ventral segment and other characters readily distinguish it from *N. grayi*.

***Nomada* (*Gnathias*) *vulpis*, new species**

WYOMING: 1 ♀, Foxpark, about 9100 ft. alt., in the Medicine Bow Range, lodgepole pine, and sagebrush, June 15, 1920 (snow still lying in patches nearby).

♀.—Length nearly 10 mm.; red, with the aspect of *N. clarescens*, but a little less robust. It is certainly distinct, by the following characters: black about antennæ and ocelli much more extensive, and continuing as sutural lines half-way down sides of clypeus; flagellum more slender, and dusky above, toward base strongly blackened; median band of mesothorax broader, and a broad median black band down middle of metathorax, including basal area; extreme sides of metathorax broadly black; red band along posterior orbits much narrower; second submarginal cell not so broad, receiving first recurrent nervure about beginning of last third; second abdominal segment with large clear-cut yellow marks; third wholly without spots; first ventral with a black fish-tail mark.

Allied to *N. bella*, but I think certainly not a variety of it. Compared with a specimen of *N. maculata* Cresson (♀ of *bella*) from Franklinville, Pa., it is considerably less robust, with smaller head, much more black on face, cheeks mainly black (in the *maculata* red, with a black patch posteriorly, covered with hair and inconspicuous), yellow on abdomen reduced to a pair of spots, surface of abdomen less shining, etc. It evidently approaches Swenk's interpretation of female *N. schwarzi* Cockerell, but the probabilities are against its reference to that species.

Nomada packardiella Cockerell

COLORADO: 1 ♀, Ouray, about 8500 ft. alt., among oak and *Pseudotsuga*, July 12, 1919; 1 ♀, Tennessee Pass, about 10,500 ft. alt., August 7, 1920; 1 ♀, Leadville, about 10,300 ft. alt., August 3, 1919, collected by Pearce Bailey, Jr..

The type of *packardiella*, from Boulder, has the fourth and fifth abdominal segments each with a pair of yellow spots. The Ouray specimen has the spots faintly indicated on the fifth segment, but in those from above 10,000 ft. they have entirely disappeared, though the lateral spots on second and third segments remain. Contrary to expectation, the antennæ of these high-altitude forms are of a clearer red than those of the type.

The above species of *Nomada* may be separated by the following table.

Scutellum yellow or with yellow markings	1.
Scutellum without yellow	14.
1. Mesothorax red, with a median black band or mark	2.
Mesothorax black, usually red or yellow on lateral margins	6.
2. Scape swollen, largely yellow; face lemon-yellow	3.
Scape not swollen	4.
3. Pleura behind tubercles yellow; fourth antennal joint long.	
..... <i>calloxantha</i> Cockerell, ♀.	
Pleura behind tubercles red, with at most a yellow line; fourth antennal joint much shorter	<i>vincta heterochroa</i> Cockerell, ♂.
4. Sides of face with broad cream-colored stripes; a very dark cloud in apical field of anterior wings	<i>gutierrezæ</i> Cockerell, ♀.
Sides of face not so marked	5.
5. Smaller; supraclypeal region black with a quadrate or subtriangular red area.	
..... <i>morrisoni</i> Cresson, ♀.	
Larger; supraclypeal region red	<i>zebrata</i> Cresson, ♀.
6. Clypeus shining black; small species	<i>crucis</i> Cockerell, ♀.
Clypeus black, with lower margin and corners red	<i>melanoptera</i> Cockerell, ♀.
Clypeus red; facial quadrangle longer than broad	<i>vincta</i> Say, ♀.
Clypeus yellow	7.
7. Region below antennæ black, the black ending in a point next to clypeal margin; scutellum black with two yellow spots; males	8.
No such black areas ending in a point at sides of clypeus	9.
8. Larger; legs mainly yellow	<i>civilis</i> Cresson.
Smaller; legs red and black	<i>cymbalaræ</i> Cockerell, var.
9. Smaller; face pale yellow or cream-color; a conspicuous apical dark cloud on wings	<i>crucis</i> Cockerell, ♂.
Larger; face bright lemon-yellow	10.
10. Anterior corners of mesothorax yellow	11.
Anterior corners of mesothorax red or black	13.

11. Lateral face-marks following anterior orbits (which are parallel) to top of eyes; scape swollen.....*zebrata* Cresson, ♂.
Lateral face-marks not following orbits to top of eyes.....12.
12. Larger; face broader; orbits conspicuously diverging above; lateral face-marks not curved mesad at upper end.....*edwardsii* Cresson, ♀.
Smaller; face not so broad; orbits nearly parallel; lateral face-marks curved mesad at upper end.....*citrina* Cresson, ♀.
13. Area of metathorax with a short yellow band on each side; third antennal joint long.....*pecosensis* Cockerell, ♀.
Area of metathorax all black.....*vincta* Say, ♂.
14. Mesothorax black (often with a pair of very narrow and obscure red lines in *vicinalis infrarubens*); scutellum red or marked with red.....15.
Mesothorax red, or red and black.....17.
15. Lateral face-marks curving away from orbit at top; mandibles simple.
vicinalis infrarubens Cockerell, ♂.
Lateral face-marks not curving away from orbit.....16.
16. Mandibles simple; basal nervure going very little basad of transverse median.
illinoënsis Robertson, ♂.
Mandibles bidentate; basal nervure going far basad of transverse median.
orophila Cockerell, ♂.
17. Abdomen with cream-colored bands, continuous on fourth and fifth segments; clypeus red.....*accepta* Cresson, ♀.
Abdomen with continuous lemon-colored bands, at least on one of the first three segments.....18.
Abdomen without such bands; clypeus not yellow.....21.
18. First abdominal segment with a broad continuous yellow band.
crawfordi lachrymosa Cockerell.
First abdominal segment without such a band.....19.
19. Mesothorax black with four red bands; front black except sides broadly, and a spot below middle ocellus; tubercles and postscutellum yellow.
alpha paralpha Cockerell, ♀.
Mesothorax red.....20.
20. Larger; region of ocelli broadly black.....*alpha dialpha* Cockerell, ♀.
Smaller; region of ocelli red, with at most a little black.
concinnulla Cockerell, ♀.
21. A transverse black patch above or between antennæ.....22.
No black patch above or between antennæ; mandibles bidentate.
carolinæ Cockerell.
22. Abdomen with narrow black bands; mandibles simple.
packardiella Cockerell, ♀.
Abdomen without distinct black bands, or only on one or two segments....23.
23. A small black spot at each side of third segment near base; no black spots on fourth segment; mandibles bidentate.....*heterosticta* Cockerell, ♀.
No such black spots on third segment.....24.
24. Abdomen with a large highly modified caudal area, with three keels.
carinicauda Cockerell, ♀.
Abdomen without such an area; mandibles bidentate.....25.

- COLORADO: 2 ♂, Denver, August 28, 1919, collected by Barbara M. and Marjorie D. Schwarz; 1 ♂, Wray, about 3700 ft. alt., in moist place near the head of Dry Willow Creek, August 18, 1919; 2 ♀, 9 ♂, Boulder, about 5600 ft. alt., between the town and Orodell, August 11, 1919; 1 ♀, 1 ♂, Ward, about 9300 ft. alt., near town, August 9, 1919, collected by Pierce Bailey, Jr.; 5 ♀, 7 ♂, Meeker, about 6200 ft. alt., in town July 21, 1919, collected by Herbert F. Schwarz and Pearce Bailey, Jr. WYOMING: 1 ♀, near the Thumb of Yellowstone Lake, Yellowstone National Park, about 7750 ft. alt., July 20, 1920. UTAH: 4 ♀, 6 ♂, Salt Lake City, about 5000 ft. alt., near Fort Douglas, July 28, 1920, collected by Mrs. F. E. Lutz.

***Calliopsis coloradensis fedorensis* (Cockerell)**

The female has the disc of first abdominal segment beset with fine punctures, but I cannot find good characters for the male. One female (Boulder, COLORADO, on the plains at about 5300 ft. alt., August 12, 1919) had the clypeus black except the lower corners and a T-shaped mark. It is only a variant, as three typical *fedorensis* females were taken at Boulder, with the same data. One female from Salt Lake City, UTAH, at about 5000 ft. alt., July 28, 1920, collected by Mrs. F. E. Lutz, can be referred here, but the punctures on the first segment are much coarser, and it is presumably an independent mutation from *coloradensis*.

Professor O. A. Stevens has taken *fedorensis* at flowers of *Grindelia squarrosa*, at Fargo, North Dakota. He obtained, with normal females, a variant in which the clypeus is entirely black, except a slender line across its upper border.

Calliopsis chlorops Cockerell, 1899, is not to be separated from *coloradensis*. The male differs from Cresson's description in having the tibiae brown or piceous posteriorly, but this is not even a good racial character.

C. coloratipes (Cockerell) is at least a good subspecies; the male has the face creamy white or very pale yellowish, instead of lemon-yellow, and the female lacks the black bars on clypeus. *C. coloratipes* occurs in New Mexico and Arizona, in the Middle and Lower Sonoran Zones.

***Calliopsis rhodophilus* (Cockerell)**

This is the western representative of *C. andreniformis* Smith. Two males from Ouray, about 8500 ft. alt., July 11, 1919, and three males from Pagosa Springs, about 7400 ft. alt., June 23, 1919, are typical. One female from Estes Park, August 13, 1919, collected by Herbert F. Schwarz, is a variation with face-marks reduced, the lateral marks reduced to small spots. It thus approaches *C. teucriti* Cockerell, which may be an extreme form of *rhodophilus*; but the mandibles are entirely dark, not bright ferruginous in middle as in *teucriti*. The abdominal venter lacks the light reddish bands seen in *teucriti*. The localities just mentioned are in COLORADO.

***Calliopsis verbena nebrascensis* Crawford**

COLORADO: 1 ♂, Wray, about 3700 ft. alt., dry hills near town, August 17, 1919.

HYPOMACROTERA Cockerell and Porter**Hypomacrotera callops** Cockerell and Porter

COLORADO: 5 ♂, Regnier, near the state border south of Lamar, about 4400 ft. alt., at *Quincula lobata*, June 8, 1919.

PSEUDOPANURGUS Cockerell**Pseudopanurgus æthiops** (Cresson)

COLORADO: 8 ♀, 5 ♂, Wray, about 3700 ft. alt., some at *Helianthus*, August 18, 1919; 3 ♀, 10 ♂, La Junta, about 4100 ft. alt., August 12, 1920. UTAH: 5 ♀, 5 ♂, Ogden, August 29-30, 1916.

One male is stylopidised, and differs from normal males in having the clypeus broadly black at sides, the supraclypeal yellow broader than high, the dog-ear marks much shorter, the lateral face-marks and yellow marks on scape wholly wanting. Also, the anterior and middle tibiæ have the apical half black, and the sculpture of the abdomen is weaker. The stylopid is undescribed.

BOMBOMELECTA Patton**Bombomelecta fulvida** (Cresson)

COLORADO: 1 ♀, South Fork (near the headwaters of the Rio Grande), about 8200 ft. alt., near the town, June 17, 1919. ARIZONA: 1 ♀, Grand Canyon, May 24, 1918.

Bombomelecta pacifica (Cresson)

COLORADO: 1 ♂, Cheyenne Pass, near Laramie, about 8500 ft. alt., limber pine-Douglas fir country, June 13, 1920; 1 ♂, Julesburg, about 3460 ft. alt., near the river, at *Pentstemon radicosus*, June 7, 1920.

PSEUDOMELECTA Radoszkowski**Pseudomelecta rociadensis** (Cockerell)

COLORADO: 1 ♀, Gardner, September 1918, collected by Walter Granger (?); 1 ♀, Wray, about 3700 ft. alt., at head of Dry Willow Creek, August 18, 1919. Both specimens much worn.

Pseudomelecta miranda (Fox)

COLORADO: 1 ♂, La Junta, about 3100 ft. alt., along the roadside, August 12, 1920, collected by Mrs. F. E. Lutz.

AMERICAN MUSEUM NOVITATES

FRANK E. LUTZ, Editor

Issued, as occasion requires, for the publication of preliminary announcements, descriptions of new forms, and similar matters.

The articles are numbered serially but paged independently. An index will be provided for each 300 (approximately) pages.