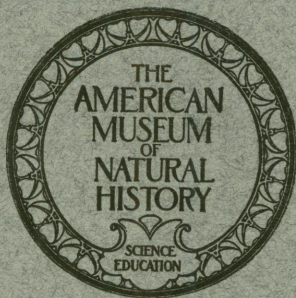


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THE EPEOLINE BEES OF THE AMERICAN MUSEUM ROCKY MOUNTAIN EXPEDITIONS

By T. D. A. COCKERELL



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THE EPEOLINE BEES OF THE AMERICAN MUSEUM ROCKY MOUNTAIN EXPEDITIONS¹

By T. D. A. COCKERELL

This collection constitutes the most remarkable series of Epeoline bees which has ever reached my hands in a single consignment. The *Triepeolus* number 22 species, of which 16 are new; the *Epeolus* four species, with two species and a variety new. It appears that the Rocky Mountains constitute the greatest center for Epeolines in the world. In addition to the species now recorded, the following have been taken in Colorado:

- Epeolus beulahensis* Cockerell. (Type from New Mexico).
- “ *interruptus* Robertson. (Type from Illinois).
- “ *eldoradensis* Cockerell. (Type from Eldora, Colorado).
- “ *compactus* Cresson. (Type from Texas).
- Triepeolus helianthi grandior* Cockerell. (Type from Florissant, Colorado).
- “ *martini* Cockerell. (Type from New Mexico).
- “ *grindelæ* Cockerell. (Type from Boulder, Colorado).
- “ *denverensis* Cockerell. (Type from Denver, Colorado).
- “ *rhoweri* (Cockerell). (Type from N. Boulder Creek, Colorado).
- “ *subalpinus* Cockerell. (Type from Eldora, Colorado).
- “ *gabrielis* Cockerell. (Type from California).

Colorado has in all 32 species of Epeolines. The whole Nearctic Region has 76; the Neotropical over 70. The Old World is not nearly so richly supplied. From Europe we know 15 species; from Palæarctic Africa, 7; from the Ethiopian region, 10. From Asia nine species are recorded; from the Australian region none. There are none in the Malay Islands; the Borneo record in Dalla Torre's Catalogue is an error. Two species occur in India (*E. peregrinus* Cockerell, *E. fervidus* Smith) and one (*E. assamensis* Meade-Waldo) in Assam. *E. ventralis* Meade-Waldo is found in China. In southern South America the genera *Isepeolus* Cockerell (9 species), *Doeringiella* Holmberg (6 species), and *Trophocleptria* Holmberg (2 species) represent a considerable diversification of the Epeoline fauna, but Bréthes considers that Holmberg's two genera should not be separated from *Epeolus*. Ducke in this matter follows Bréthes, but these authors take *Epeolus* in a broad sense, not separating

¹Unless otherwise stated, the bees reported upon in this paper were collected by Frank E. Lutz and the field notes are by him.

Triepolus. *Leiopodus* Smith, with two Neotropical species, is related to *Isepeolus*. These two genera are not very near to *Epeolus*.

I consider *Triepeolus* a very good genus, apparently confined to the New World. It appears to live in the nests of Anthophoridæ, whereas *Epeolus* lives with *Colletes*. Gribodo (1894) described a subgenus *Diepeolus* for the Algerian *E. giannellii* Gribodo, having two free joints to the maxillary palpi instead of one. In general, the species resembles *E. fallax* Morawitz. *Argyroselenis* Robertson appears to be a synonym of *Diepeolus*, but the type species of the Algerian and American groups should be compared.

***Triepeolus concavus* (Cresson)**

COLORADO: 2 ♂, 4 ♀, Wray, about 3700 ft. alt., some at *Helianthus*, August 17-19, 1919; 4 ♂, 2 ♀, La Junta, about 4100 ft. alt., along the edges of irrigated fields, August 12, 1920, collected by Mrs. F. E. Lutz; 1 ♂, Pueblo, in vacant lots in the city, August 9, 1920.

This species is new to Colorado.

***Triepeolus concolor* (Robertson)**

COLORADO: 3 ♀, La Junta, about 4100 ft. alt., along the edges of irrigated fields, August 12, 1920, collected by Mrs. F. E. Lutz.

This is the first record from Colorado.

***Triepeolus lunatus* (Say)**

COLORADO: 1 ♀, Wray, about 3700 ft. alt., in the moist valley of Dry Willow Creek, August 18, 1919; 3 ♀, 1 ♂, La Junta, about 4100 ft. alt., along the edges of irrigated fields, August 12, 1920, collected by Mrs. F. E. Lutz.

Not previously recorded from Colorado.

***Triepeolus pectoralis* Robertson**

COLORADO: 2 ♂, 1 ♀, Wray, about 3700 ft. alt., in the moist places (1 male taken by evening sweeping along the river), August 19, 1919; 1 ♂, Pueblo, in vacant lots in the city, August 9, 1920; 1 ♂, Boulder, about 5300 ft. alt., on the plains between the town and Boulder Lake, August 12, 1919; 1 ♂ (mesothoracic stripes pointed in front, not reaching margin of mesothorax), Grand Junction, about 4500 ft. alt., along an irrigating ditch, August 3, 1920.

The first records from Colorado.

***Triepeolus pænepectoralis* Viereck**

COLORADO: 2 ♂ (labrum red; clypeus without a median line; longitudinal bands of mesothorax widely separated from lateral patches), Wray, about 3700 ft. alt., dry, sagebrush country, August 17, 1919; 1 ♂ (labrum red; clypeus with a median shining line; longitudinal bands of mesothorax broad and not far distant from the large patches), Fruita, not far from Grand Junction, about 4500 ft. alt., at *Helianthus* along the road, July 16, 1919.

Not hitherto reported from Colorado. *T. pænepectoralis* from Washington State, as I have recognized it, is variable, and I am not able to separate the Colorado specimens as a distinct species. It is, however, quite possible that more material would justify the segregation of one or even two species.

***Triepeolus fortis*, new species**

COLORADO: 1 ♀, Wray (type locality), about 3700 ft. alt., in the cottonwood area at the head of Dry Willow Creek, August 18, 1919; 2 ♂, La Junta, about 4100 ft. alt., at the edge of an irrigated field, August 12, 1920, collected by Mrs. F. E. Lutz.

♀ (Type). Length about 14 mm.; robust, black, with cream-colored markings; first three antennal joints (except on inner side), labrum and mandibles dark red; legs bright chestnut red; tegulae dark reddish marked with black, the general effect dark; axillae black. Head broad; eyes purplish, with upper third green; clypeus very densely and minutely punctured, with some scattered shallow large punctures, and a smooth median line; third antennal joint much shorter than fourth; mesothorax dull and granular, with an ochreous border (except in middle anteriorly) and a pair of dagger-shaped well-separated bands, their broad bases resting on the anterior border and continuous with the ochreous margin laterad; scutellum bigibbous, axillae stout and rather long; pleura densely granular and dull, mainly naked, but with pubescence behind the tubercles and a lobe extending backward at level of lower end of tubercles; area of metathorax with two shining spaces, separated by a dull T; wings strongly brownish, stigma and nervures dark brown; spurs black; hair on inner side of hind basitarsi dark, the tarsi also conspicuously darker than tibiae; abdominal bands broad and entire, except the basal one on first segment; black area on first segment a transverse band, but its upper side convex, so that it is elongate-semilunar (but the lower side straight) and intermediate between the two types; lateral angles of black on second segment very acute; fifth segment without light hair at sides, its pygidial patch large and triangular; venter without pubescence; last ventral segment neither elongated nor concave in lateral profile.

♂. Smaller; clypeus not covered with hair, but dense white hair at sides of face; antennae black with third joint reddish on outer side; femora varying to mainly black; band at apex of first abdominal segment narrowly interrupted; apical plate broad and dark.

A very fine species, resembling *T. helianthi grandior* Cockerell but considerably larger and more robust, with longer axillae and broader apical plate of abdomen. The head is broader than in *grandior* and the pygidial patch is much broader apically.

***Triepeolus helianthi* Robertson**

The specimens separate into two lots, the larger or typical form, and a smaller variety or race, 8.5–9.5 mm. long. The latter is probably parasitic on a smaller host-species, but it seems to have no special character aside from size. Perkins observed that the British *Epeolus cruciger* Panzer lived with *Colletes succincta* and *C. marginata*, and those with the latter species were found to be of smaller average size.

Larger Race

COLORADO: 1 ♀, Wray, about 3700 ft. alt., at *Helianthus*, August 18, 1919; 3 ♀, La Junta, about 4100 ft. alt., along roadsides, August 12, 1920, collected by Mrs. F. E. Lutz; 1 ♀, Glenwood Springs, about 5800 ft. alt., among sweet-clover and sunflowers near town, August 5, 1920.

Smaller Race

COLORADO: 1 ♀, 1 ♂, Wray, about 3700 ft. alt., on dry upland near town, August 17, 1919; 2 ♀, La Junta, about 4100 ft. alt., along roadsides, August 12, 1920, collected by Mrs. F. E. Lutz; 1 ♀ (July 29, 1919), 1 ♂ (August 5, 1920), Glenwood Springs, about 5800 ft. alt., among sweet-clover and sunflowers near town; 1 ♀, Palisades, not far from Grand Junction, about 4740 ft. alt., July 18, 1919, collected by Pearce Bailey, Jr.; 1 ♀, Rifle, about 5400 ft. alt., at edge of swamp along R. R., July 20, 1919, collected by Herbert F. Schwarz; 1 ♀, 1 ♂, Boulder, about 5400 ft. alt., in town (collected by Pearce Bailey, Jr.) and on the plains near Boulder Lake, August 7-12, 1919.

The two races do not seem to have been living in different environments. The males run in my key in Journ. N. Y. Ent. Soc., XXVII, p. 300, to subspecies *pacificus* Cockerell, except that they are smaller, with more slender antennæ. They belong to the smaller race, whereas *pacificus* type is of the larger. I gather from Robertson's account that both sexes of his *helianthi* have the pleura marked alike; I have only a female from him. It remains to be decided whether I should not have separated *pacificus*, or whether all the Colorado specimens (excluding *grandior*) should be referred to it, as a distinct western subspecies.

***Tripeolus schwarzi*,¹ new species**

COLORADO: 3 ♂, Meeker, about 6200 ft. alt., at *Grindelia serrulata*, July 21, 1919.

♂. Length 8-9 mm.; black, with cream-colored ornaments; labrum and mandibles (except apex) red; face with dense snow-white hair; clypeus densely granular and dull without a smooth line; eyes very pale grayish-green; sides of vertex with large punctures; antennæ black, third joint obscurely reddish; mesothorax with hair-band round margin (except in anterior middle) and two very broad parallel well separated bands (not sharply defined) reaching beyond center, for half their length connected with lateral bands by a thin inconspicuous pubescence; scutellum flattened; axillæ small, black; pleura densely covered with creamy-white hair, except on area above middle coxæ; tegulæ dull apricot-color; wings hyaline, brownish apically, nervures and stigma piceous; legs clear bright ferruginous; spurs black; abdominal bands broad and entire, but that on first segment, or first three segments, notched in front; black area on first segment a transverse band, obtuse at sides; angles of black at sides of second segment rounded, but at end of a long sinus, the lobes of hair-bands being long and pointed, directed mesad; apical plate

¹Named after Mr. Herbert F. Schwarz, who was a member of the 1919 expedition, and has done much work on the bees collected.

red, very narrow; venter with appressed silvery-white hair, forming a broad triangle on first segment, and very broad bands (not emarginate posteriorly) on second and third.

A neat little species, running in my table in Ann. Mag. Nat. Hist., January 1904, to *T. isocomæ* Cockerell, but the markings are differently colored, the labrum is different, the scutellum different, etc. There is real affinity with the Californian *T. callopus* Cockerell, but the tubercles and clypeus are black, and there are other differences. It differs from *T. rohweri* Cockerell by the entirely red anterior femora and tibiæ (black in *rohweri*) etc.

***Triepeolus balteatus*, new species**

COLORADO: 1 ♂ (the type), Denver, August 28, 1919, collected by Barbara M. and Marjorie D. Schwarz; 1 ♂, White Rocks, an interesting cretaceous formation in the plains near Boulder, about 5200 ft. alt., at *Solidago*, August 13, 1919, collected by Mrs. T. D. A. Cockerell.

♂. Length about 9 mm.; black, including labrum, mandibles (except dark red band in middle), antennæ (third joint dark red on outer side), tubercles and axillæ; tegulæ pale testaceous; legs bright ferruginous, with black spurs; eyes entirely pea-green; face densely covered with silver-white hair, but pubescence in general cream-color; mesothorax covered with not very dense appressed hair, the two bands (parallel and reaching anterior margin) indicated by denser hair, but not very evident, posteriorly a dark semicircle (the concavity cephalad) indicates a nearly bare region; scutellum rather feebly bilobed, axillæ short; pleura densely covered with silvery-white hair; wings hyaline, faintly dusky, stigma and nervures piceous; hair on inner side of hind tarsi light orange (it is black in *T. isocomæ*); abdominal bands broad and entire; first segment with a transverse dark band, narrow, obtuse at ends; lateral angles of black on second segment right angles; apical plate dark reddish, broader than in *T. schwarzi*, its sides not parallel; second and third ventral segments with broad bands of silvery hair, not emarginate posteriorly.

Allied to *T. denverensis* Cockerell but much smaller, with the sides of the second abdominal segment entirely covered with light hair, the hair on pleura white instead of creamy, etc.

***Triepeolus rhododontus*, new species**

COLORADO: 1 ♂, Wray, about 3700 ft. alt., at the head of Dry Willow Creek, August 18, 1919.

♂. Length about 9.5 mm.; black, with labrum (except basal middle), mandibles (except apex), tubercles, ends of axillæ and legs ferruginous, the hind femora with a large blackish patch in front; clypeus bare, dully minutely rugosopunctate, without a median line or ridge; face otherwise densely covered with pure white hair; eyes pale gray; antennæ black; mesothorax dull and rough, margined with ochreous hair except in anterior middle, the stripes dagger-shaped but not sharply defined, with the broad base on anterior margin; scutellum moderately bilobed; axillæ dentiform, curved, acute; pleura with a crescentic transverse band of white hair, the space below it nearly bare and strongly punctured, with a shining median area; tegulæ apricot-

color, dull; wings brownish, stigma and nervures piceous, marginal cell rather unusually short and broad; spurs black; hair on inner side of hind tarsi fulvous; abdomen with pale ochreous bands, only that at base of first segment interrupted, but that at apex of first notched before and behind, almost interrupted; black area on first segment a transverse band, rounded at sides; lateral angles of black on second acute, the lateral hair-patches pointed mesad; apical plate red, parallel-sided; venter largely reddish, but second segment black except the broad margin, a crescent of thin whitish hair at each side of second and third segments.

Allied to *T. occidentalis* Cresson (a specimen from Cresson's collection compared) but distinguished by the red labrum, tubercles and axillæ, the smooth space on pleura, the narrow, parallel-sided apical plate, etc.

***Triepeolus* (*Synepeolus*, new subgenus) *insolitus*, new species**

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

♂. Length about 12 mm.; robust; black, including antennæ, tubercles and axillæ, but labrum and median band on mandibles red; legs chestnut red, the anterior femora black except at apex, spurs black, hair on inner side of basitarsi black; tegulæ piceous, dark rufous posteriorly. Head broad; eyes with lower half purplish, upper half green; clypeus exposed, very densely and minutely punctured, with a smooth median line and a few scattered large punctures; face at each side of antennæ with a longitudinal band of white hair, but on front and between antennæ it is dark grayish; third antennal joint obscurely rufous at end; thorax and abdomen with ochreous ornaments; black area on mesothorax anchor-shaped, the lateral arms or lobes very broad, the bands of ochreous hair pointed posteriorly (style of *T. fortis*, but stem of anchor more slender); scutellum bilobed, axillæ short and obtuse; wings brownish, stigma and nervures piceous; only two submarginal cells, the second transverse cubital absent, but first recurrent nervure joining second submarginal cell near base, the second submarginal cell not as long as if a typical *Triepeolus* had lost a nervure; the first transverse cubital is transverse, not oblique as in typical *Triepeolus*; pleura densely punctured, with a pale dull-ochreous L-shaped pubescent mark; abdomen with rather narrow ochreous bands, that at base of first segment broadly interrupted, that on apex of first emarginate anteriorly and posteriorly, that on second slightly emarginate posteriorly; dark area on first segment shaped nearly as in *T. fortis*, but not so broad, and truncate at sides, the pale pubescence at sides of segment nearly twice as broad as that at apex; angles of black at sides of second segment slightly acute, the lateral hair-patches broadly rounded; apical plate dark reddish, fairly broad, with concave margins; venter black, with a little white hair in middle of fringes on fourth and fifth segments, and sixth red in middle.

Resembles *T. fortis*, but smaller, with red middle and hind femora, much shorter fourth antennal joint, etc. From the position of the first transverse-cubital nervure, the condition of two submarginal cells is evidently normal and the insect falls in a new subgenus, which may be called ***Synepeolus***, from the united submarginal cells. *Phileremus americanus* Cresson is not related, but is an Epeoline with two submarginal cells. Ducke (1908) called it *Epeolus americanus*.

***Triepeolus brunneus*, new species**

COLORADO: 1 ♀, Lawn Lake, Rocky Mountain National Park, about 10,000 ft. alt., August 22, 1919, collected by Herbert F. Schwarz.

♀. Length about or a little over 9 mm.; rather robust; black, with cream-colored ornaments, but the usually black areas on mesothorax, scutellum, pleura and abdomen wood-brown from a covering of fine pile, but the area of metathorax exposed and black, the hair at sides of metathorax white; a large tuft of pale orange hair proceeding from behind each wing mesad over sides of postscutellum; cheeks with a strong abrupt keel behind. Labrum black; mandibles red in middle; clypeus very minutely and densely punctured, with scattered larger punctures, and no median smooth line; eyes purplish, greenish above; antennæ long, black, third joint red in front; prominence between antennæ strong; sides of face with white hair, becoming yellowish above; mesothorax with ochreous hair on lateral and posterior margins, and a pair of discal stripes, narrowed anteriorly but almost reaching anterior margin; scutellum faintly bilobed, axillæ very small, but pointed; tegulæ dark rufous, hairy; wings hyaline, slightly brownish apically; stigma and nervures rufous; marginal cell unusually short; upper part of mesopleura with white hair, lower part brown, the two colors not sharply separated; legs bright ferruginous, middle and hind spurs black; hair on inner side of hind tarsi pale orange; abdominal bands broad and entire, including basal one of first segment; brown area on first segment a transverse band with straight margins and obtusely rounded ends; lateral hair-patches rounded; pygidial area rather large, the segment covered with light hair on each side of it; venter brown without markings, the hind margins of the segments appearing very narrowly pallid; last ventral segment normal.

A very peculiar species, not close to any other, but similar brown pile may be seen in *Argyroselenis minima* Robertson, and to some extent in other Epeolines. It tends to be denuded as the specimens grow old.

***Triepeolus trilobatus*, new species**

COLORADO: 1 ♂, White Rocks (see above) near Boulder, about 5200 ft. alt., August 13, 1919.

♂. Length about or a little over 12 mm., robust; black, including labrum, mandibles (except red band in middle), antennæ, tubercles, axillæ and legs, the hind femora with a red spot behind near apex, and their tibiæ with a large red patch on inner side apically; hair on inner side of hind tarsi rather pale chocolate; spurs black; ornaments of head and thorax cream-color, but hair at sides of face (not covering clypeus) pure white; eyes green, lower third purplish; clypeus dull and minutely granular, without a smooth line, its upper corners covered with brown hair; fourth antennal joint longer than fifth; mesothorax dull, margined with ochreous except in middle anteriorly, the black area like a large trilobed leaf, but the middle lobe long and narrow and reaching margin, the bands of pubescence pointed and not very long; scutellum bilobed; axillæ stout-conical; upper part of pleura with dense ochreous hair, more or less L-shaped (the transverse band very broad), the lower part black and dull, shining between the punctures in middle; tegulæ piceous, the margin reddish posteriorly; wings brownish, stigma and nervures piceous, first recurrent nervure reaching second submarginal cell a little before middle; middle tibiæ with a stripe of shining fulvous hair on outer side; abdomen with broad entire bands, basal one on

first segment narrowly interrupted; black area on first segment a broad triangle; lateral corners of black on second segment acute, the edge of the pubescence above (cephalad of) them convex; band on sixth segment white; apical plate broad, very dark reddish; venter black, margins of third segment with silver-white hair laterally.

Resembles *T. concolor* Robertson, but differs greatly in ornamentation of mesothorax, which is similar to that of *T. fortis*. The apical plate is more narrowed apically than in *fortis*, but the relationship is very close, much like that of *concolor* to *lunatus*. Robertson described *concolor* in 1898 as a variety of *lunatus*, but in 1903 treated it as a distinct species.

***Triepeolus perelegans*, new species**

ARIZONA: 1 ♂, Comobabi Mts., about 32° 1' N., 111° 42' W., on the road from Haynes Well to the Indian village of Cobabi, about 3400 ft. alt., mesquite-acacia country, August 9, 1916.

♂. Length about 10 mm.; slender; black, with first three antennal joints and base of fourth, and all the legs, very bright ferruginous; spurs black (red in *T. hopkinsi* Cockerell), hair on inner side of hind tarsi orange; labrum red, mandibles suffusedly reddish; tubercles and axillæ black; ornaments very pale, with a creamy tint, hair of face, upper part of pleura and sixth abdominal segment white; eyes green, purplish at lower end. Clypeus with the disc flattened, shining, very minutely punctured, with scattered larger but not strong punctures; mesothorax glistening, black, with a pair of rather short, widely separated stripes, not reaching anterior margin; marginal band only along posterior side, and a patch before each tegula; scutellum bilobed, axillæ very inconspicuous; pleura with white hair above, below shining, with well-separated punctures; tegulæ bright ferruginous; wings hyaline, slightly brownish, stigma ferruginous, nervures fuscous; first recurrent nervure joining second submarginal cell beyond middle; abdomen with the bands very slightly yellowish, approaching pure white, basal and apical ones on first segment with linear interruptions, the others entire; black area on first segment a broad transverse band the ends oblique; lateral angles of black on second acute, the lateral hair-patches rounded; apical plate rather broad, very dark reddish; venter with bands of silver-white hair (successively narrower, and not emarginate posteriorly) on segments 2 to 4, the two fringes of curled hairs pale brown (the second darker than the first), some silver-white hair at sides of margin of fifth segment.

A pretty and distinct species, known from *T. hopkinsi* Cockerell, from the Grand Canyon of the Colorado, by the color of the spurs, the sparsely punctured lower part of pleura, etc. *T. pimarum* Cockerell, also from Arizona, has the clypeus red, and the mesothorax red with a broad median black band.

***Triepeolus sequior*, new species**

COLORADO: 1 ♂, Ridgeway, about 7000 ft. alt., sagebrush country, July 15, 1919, collected by Herbert F. Schwarz.

♂. Length about 9.5 mm.; black, including labrum, mandibles (except dark red median band), antennæ, tubercles, axillæ and spurs, but legs bright ferruginous,

with anterior femora (except knees) and their tibiae in front (except apex) black; hair on inner side of hind tarsi pale orange; ornaments cream-color, but face densely covered with silver-white hair, though the band on sixth abdominal segment is colored like the rest; eyes entirely dull pale green; fourth antennal joint conspicuously longer than fifth; mesothorax bordered with rather long and shaggy ochreous hair, the band very narrow along posterior middle, but not broken in middle anteriorly, the longitudinal bands pointed dentiform projections, the black area anchor-shaped; scutellum bigibbous; axillae small; mesopleura densely covered with creamy-tinted hair; tegulae piceous, with narrow obscure reddish margins; wings brownish, stigma and nervures (except basally) piceous; abdomen with all the bands broad and entire except that on apex of first, which is narrowly interrupted, the black area on first segment a transverse band; lateral angles of black on second acute (about 50°). The lateral patches of hair pointed, with the side above the angle straight (in *T. perelegans* it is convex); apical plate dark red, narrow; second and third ventral segments with very broad pure white hair-bands, slightly notched in middle posteriorly; fourth with white hair basally the two long curled fringes dull pale yellowish (dark fuscous at ends in *T. rhododontus*).

An ordinary-looking species, easily known from small examples of *helianthi* by the entirely hairy pleura, in the manner of *T. cressoni* Robertson. From *T. fraseræ* (Cockerell) it is easily known by the smaller size, the narrowly (instead of widely) interrupted apical band on first abdominal segment, the ochreous band along front of mesothorax not interrupted, and the much narrower apical plate. *T. fraseræ* also has the anterior tibiae entirely clear red. *T. fraseræ* is from Beulah, New Mexico, in the Canadian Zone. *T. sequior* is from the Transition Zone, about 7000 ft.

***Triepeolus rectangularis*, new species**

UTAH: 1 ♀, 1 ♂, Huntsville, near Ogden, July 26, 1920.

♀. (Type). Length about 11 mm., robust; black, including labrum, mandibles (except dark red median band), tubercles, axillae and legs, but small joints of tarsi red; third antennal joint (except basal two-thirds of inner side) and base of fourth bright chestnut red; tegulae piceous, the margin partly reddish; wings strongly dusky, stigma and nervures (except basally) piceous; outer transverse cubital angled and more or less appendiculate in middle; eyes dark purplish, the upper two-fifths light green; face at each side of antennae with appressed silvery hair; clypeus dull and minutely granular, with scattered large punctures, and a median ridge descending about three-fifths from the top; fourth antennal joint conspicuously longer than fifth; ornaments of thorax and abdomen cream-color; mesothorax with band along posterior and lateral margins, at anterior corners a quadrate patch of hair, emitting a nearly or quite obsolete bridge of hair to lateral stripes, thus enclosing a triangular black marginal area on each side; longitudinal stripes long and broad, diverging posteriorly, pointed, the base not quite reaching mesothoracic margin; scutellum bilobed, axillae short; pleura with a large L-shaped mark of light hair, but it is irregular, its upper part very broad, and extending beneath wings, while its lower edge is concave; lower part of mesopleura densely punctured but glistening; hair on inner side of hind tarsi

orange, on mid-tarsi tinged with coppery; spurs black; abdominal bands broad and entire, that on apex of first with a broken linear interruption; black area on first segment a transverse band, very obtuse laterally; lateral angles of black on second segment rectangles; false pygidium large, the segment on each side covered with pale hair; last ventral segment normal; venter without bands.

♂. Length about 8.5 mm., slender; red on antennæ reduced to apex of third segment and base of fourth; stripes on mesothorax shorter; mesopleura covered with pale hair; both bands on first abdominal segment narrowly interrupted, all the abdominal bands of the same color; apical plate piceous, narrow and parallel sided; second and third ventral segment with rather narrow bands of shining white hair, concave in middle and convex at sides, regarded from behind; the two fringes of curled hairs very dark; eyes entirely pea-green.

These look like different species but doubtless belong together. The sexual difference in the clothing of the pleura is similar to that in *T. cressoni* Robertson. This may be compared with *T. wyomingensis* Cockerell, a black-legged species with the lateral angles of black on second segment right angles. *T. wyomingensis* has a much larger male, without the red on antennæ, with a large part of pleura bare, and the white bands on venter very broad and quite different. It also has much longer, shaggy hair on mesothorax.

***Triepolus amandus*, new species**

COLORADO: 1 ♂, Meeker, about 6200 ft. alt., at *Grindelia serrulata*, July 21, 1919.

♂. Length about or nearly 10 mm., rather slender; black, with very pale creamy-tinted ornaments, the band on sixth abdominal segment clear white; labrum, mandibles (except red median band), antennæ (except third joint partly reddened), tubercles, axillæ and legs (with spurs) black; face densely covered with silver-white hair; fourth antennal joint very slightly longer than fifth; mesothorax with rather loose ochreous hair forming a complete band all around, the longitudinal stripes hardly differentiated, the spaces laterad of them, nearly to their posterior ends, filled with hair, while the space between them is largely filled, though all this hair is rather thin; scutellum bilobed; axillæ small; mesopleura covered with white hair, slightly creamy above; tegulæ small, chestnut red; wings hyaline, faintly brownish apically, stigma and nervures (except basally) piceous; tibiæ and basitarsi with brilliant silvery-white appressed hair, middle tibiæ with a stripe of orange hair; hair on inner side of hind tarsi dusky ferruginous; abdomen with all the bands entire; black area on first segment a narrow transverse band, rounded at ends and sharply defined; lateral angles of black on second segment right angles; apical plate dark red, pointed; second and third ventral segments with broad white hair-bands; curled fringes very dark brown.

Also to be compared with *T. wyomingensis*, differing in the pointed apical plate, the broadly rounded ends of black band on first segment, the red tegulæ, etc. The upper appendiculation of third transverse cubital is wanting, whereas it is very prominent in *wyomingensis*.

Triepeolus lestes, new species

COLORADO: 1 ♀, Glenwood Springs, about 5800 ft. alt., at edge of town, July 29, 1919, collected by Pearce Bailey, Jr.

♀. Length about 10 mm.; black, with black legs and cream-colored ornaments, small joints of tarsi obscurely pale reddish; eyes purplish with the upper third green; apex of third antennal joint on outer side dark red; fourth joint conspicuously longer than fifth. Similar to *T. rectangularis*, but differing thus: scattered punctures of clypeus fewer and much weaker, and no median ridge; stripes on mesothorax consisting of two elongated marks (style of *T. helianthi*), entirely isolated from the marginal band, which hardly goes mesad of the anterior corners; scutellum not distinctly bilobed; transverse band on pleura narrow and pointed; both hands on first abdominal segment narrowly interrupted; lateral hair-patches on second segment reduced to triangular projections from the band; transverse black band on first segment slightly bulbous at ends; false pygidium smaller.

Triepeolus dichropus, new species

COLORADO: 1 ♂, Glenwood Springs, about 5800 ft. alt., at edge of town, July 29, 1919, collected by Herbert F. Schwarz.

♂. Length about 11.5 mm., robust; black, including labrum, mandibles (except median dark red band), antennæ, tubercles and axillæ; tegulæ piceous, dark rufous on outer side; hind tibiæ and tarsi bright ferruginous; all the knees, hind femora behind, anterior tibiæ apically, and their tarsi, more dusky red; spurs black; hair on inner side of hind tarsi orange; ornaments cream-color. A little pure white hair at each side of antennæ; clypeus dull and granular, with no median line, the scattered larger punctures few and shallow, mainly confined to the apical region; cheeks with a strong posterior keel; mesothorax glistening in middle, the marginal band narrow and weak, failing in anterior middle, and at sides of middle arching away from margin, the longitudinal stripes indistinct and short, but reaching anterior margin; scutellum bilobed, axillæ moderate; mesopleura dull, rugose, with a broad band of pale ochreous-tinted hair down its anterior margin, this sending only a small, curved, tooth-like projection backward; wings hyaline, faintly brownish, stigma piceous, nervures fuscous, paler basally; marginal cell long and unusually parallel-sided; outer transverse cubital angular; abdomen with broad entire bands, all of the same color; black area on first segment a broad transverse band, somewhat pointed at sides; band on second segment having at sides lateral lobes shaped like the last joint of a finger, standing at right angles to the band; apical plate piceous, rather narrow; second and third ventral segments with rather narrow bands of white hair, not emarginate posteriorly; curled fringes ochreous with dark tips.

An ordinary form in general aspect, but with many distinctive characters.

Triepeolus maculiventris, new species

COLORADO: 1 ♀, Navajo Canyon in Mesa Verde National Park, about 6400 ft. alt., at *Helianthus petiolaris*, July 5, 1919.

♀. Length 10.3 mm.; black, with the labrum and mandibles dark red; tubercles and axillæ black; legs chestnut red, with the anterior femora black; spurs black; hair on inner side of hind tarsi orange, very short; tegulæ shining black; wings

hyaline, dusky apically, stigma and nervures black, the latter basally fuscous; ornaments cream-color, sharply defined, but face in region of antennæ with appressed white hair; clypeus finely and minutely punctured, but glistening, with scattered weak larger punctures, and a delicate smooth median line; antennæ black, third joint dusky reddish apically and on outer side; fourth joint longer than fifth; mesothorax with posterior marginal band broad behind tegulæ, but narrowing to a line in posterior middle; in front of tegulæ is a broad triangular-cuneiform patch, not joining posterior band or reaching anterior margin; longitudinal stripes distinct and clear-cut, lanceolate, parallel, not reaching anterior margin; scutellum feebly bigibbous, axillæ rather large, pointed; pleura with a clear-cut L-shaped mark, but it is excavated posteriorly behind tubercles, its lower (transverse) arm is parallel-sided and truncate; lower part of pleura densely punctured, but glistening between the punctures, except at upper end; abdomen with very distinct bands, both those on first segment narrowly interrupted, that on second slightly notched posteriorly; black area on first segment a broad band, obliquely truncate at ends; lateral angles of black on second segment broadly rounded, but the lateral marks are obliquely directed mesad, their outer face very convex, the inner straight; false pygidium moderate, with a large clear-cut triangular patch on each side; venter black, with a sharply-defined patch of white hair at each side of margin of third segment, and a pair of linear marks on fourth; eyes pale green, the lower third purplish.

Distinct by the pattern of the mesothorax, and white spots on venter, together with the red legs and dark tegulæ. The last ventral segment is normal, not concave in lateral profile.

***Triepeolus laticaudus*, new species**

COLORADO: 1 ♀, Cascade, Ute Pass, August 22, 1914, collected by D. M. Fisk.

♀. Length 9 mm., slender; black, including labrum (except a pair of obscure red spots), mandibles (except broad red band), antennæ (except reddish apex of third segment), tubercles and axillæ; tegulæ lively red, with a large black spot in front, and broad hyaline margins; legs bright red, but anterior femora black except apex and a stripe beneath, and middle femora black above, spurs black; hair on inner side of hind tarsi very pale yellowish; eyes pale green, with a grayish or purplish area below middle, but hind margins broadly green throughout; ornaments cream-color, but white hair around antennæ. Clypeus shining, very finely punctured, with scattered weak larger punctures, but no median smooth line, the basal two-thirds of middle flattened; fourth antennal joint longer than fifth; mesothorax rugose, with the marginal band feebly developed, the discal stripes long and narrow, parallel and wide apart, very nearly reaching anterior margin; scutellum strongly bigibbous; axillæ large; pleura with an L-shaped mark, but the broad lower arm curved, the convexity below; the ochreous hair extends down the front of mesopleura below the corner of the L; lower part of pleura densely and finely punctured, not shining; wings brownish hyaline, stigma and nervures black; abdomen with bands rather narrow, apical one on first segment rather widely interrupted in middle, that on second with a linear interruption; black area on first segment a very broad band, obliquely truncate at sides, but the outermost ends obtuse; lateral hair-marks on second segment reduced to isolated oblique spots, not united with the band; false pygidium very large; last ventral segment normal; venter with weak hair-bands on segments 2 to 4, and the fifth covered, except at sides, with pale appressed hair.

Known by the abdominal pattern, and especially the pale hair on last ventral segment; the tegulæ also are very distinctive.

***Triepeolus alpestris*, new species**

COLORADO: 1 ♀, Leadville, about 10,200 ft. alt., in vacant lots in town at *Lepidium alyssoides*, August 4, 1919, collected by Herbert F. Schwarz.

♀. Length 9 mm.; black, including labrum, mandibles (except obscure red band), antennæ (except red outer side and apex of third joint), tubercles and axillæ; tegulæ shining rather dark red; wings brownish hyaline, stigma and nervures black; marginal cell appendiculate at end; eyes with lower third purplish, upper two-thirds pale green; anterior legs black with small joints of tarsi red; middle femora black above and red beneath, their tibiæ black, except at apex; hind femora red, with a dusky band along anterior side, their tibiæ black, reddish on inner side; middle and hind basitarsi black, small joints red; spurs black; hair on inner side of hind tarsi appearing copper- ed seen from one direction, pale yellow seen from another; clypeus dully minutely punctured, with scattered very weak large punctures, and no median line; ornaments cream-color, but white hair at sides of face; mesothorax with anchor-shaped black area, the lateral bands in front pointed mesad, and only separated by a line from the broad-lanceolate discal marks, which do not reach anterior margin; scutellum convex, feebly bigibbous; axillæ small; pleura covered with hair, except the disc below, which is densely punctured and dull, the exposed area not distinctly defined; abdominal bands entire except the apical one on first segment, which has a linear interruption; black area on first segment a transverse band, evenly rounded at ends; lateral angles of black on second segment approximately right angles; pygidial area moderate; last ventral segment normal; venter with thin pale hair-bands on second and third segments. Known by the pattern of mesothorax and abdomen, combined with the color of legs and character of mesopleuræ.

It is allied to *T. townsendi* Cockerell, from the White Mountains of New Mexico, but easily separated by the much darker legs and the broad second submarginal cell. In *townsendi* the longitudinal stripes of mesothorax continue broadly to the anterior margin. Comparison may also be made with *T. concinnus* Cockerell from Northern Mexico, but that is larger, with yellower markings, and the middle and hind femora and tibiæ entirely bright red.

The above species of *Triepeolus* bees may be separated by means of the following table. I include also the few species of *Epeolus*.

Scutellum red.....	<i>E. bifasciatus</i> Cresson.
Scutellum black.....	1.
1. Legs black.....	2.
Legs at least mainly or largely red.....	9.
2. Large species, with mesothorax broadly ochreous-haired anteriorly, without longitudinal stripes; apical ventral segment of ♀ strongly concave in lateral profile.....	<i>T. concavus</i> (Cresson).
Mesothorax with two longitudinal stripes, or if these are indistinct, species small; apical ventral segment of known females not concave in lateral profile....	3.

3. Black area on first abdominal segment triangular or subtriangular 4.
 Black area on first abdominal segment a transverse band 6.
4. Length under 10 mm.; stripes on mesothorax not separated from light hair of
 margin *E. utahensis* Cockerell. 5.
 Length 10 mm. or more 5.
5. Stripes on mesothorax small and entirely isolated *T. concolor* (Robertson).
 Stripes on mesothorax continuous with marginal pubescence.
 T. trilobatus Cockerell, ♂.
6. Tegulae dusky red; no separate stripes on mesothorax *T. amandus* Cockerell.
 Tegulae black or almost; distinct stripes on mesothorax 7.
7. Venter with two very distinct white hair-bands *T. rectangularis* Cockerell. ♂.
 Venter without white hair-bands 8.
8. Clypeus with a median ridge, and very large scattered punctures.
 T. rectangularis Cockerell, ♀.
 Clypeus with no median ridge, and small scattered punctures.
 T. lestes Cockerell, ♀.
9. Dark area on first abdominal segment triangular or subtriangular 10.
 Dark area on first abdominal segment a transverse band 11.
10. Tegulae black or piceous; only two submarginal cells *T. insolitus* Cockerell.
 Tegulae dusky red; dark area on first segment somewhat intermediate in type;
 three submarginal cells *T. fortis* Cockerell.
 Tegulae clear red *T. lunatus* (Say).
11. Dark areas of abdomen entirely covered with brown pile; tegulae red; labrum
 black *T. brunneus* Cockerell.
 Abdomen normal 12.
12. Mesothorax without distinct stripes; small or smallish species; tegulae red or
 testaceous; pleura densely covered with light hair 13.
 Mesothorax with distinct stripes, but they reach anterior margin 14.
 Mesothorax with a pair of entirely isolated stripes 22.
13. Over 8 mm. long; lateral angles of black on second abdominal segment right
 angles or larger *T. balteatus* Cockerell.
 Less than 8 mm. long; lateral angles of black on second segment acute.
 E. lutzii Cockerell.
14. Longitudinal stripes of mesothorax joining marginal band of pale pubescence.
 15.
 Longitudinal stripes of mesothorax not joining marginal band 18.
15. Smaller; tegulae clear red 16.
 Larger; tegulae dusky red to piceous 17.
16. Lower part of pleura not covered with hair; axillae red at end.
 T. rhododontus Cockerell.
 Lower part of pleura covered with hair; axillae short and black.
 T. schwarzi Cockerell.
17. Lateral angles of black on second abdominal segment right angles; apical plate
 narrower *T. dichropus* Cockerell, ♂.
 Lateral angles of black on second abdominal segment acute; apical plate
 broader *T. fortis*, Cockerell, ♂.
 Much smaller than *fortis*, with shorter axillae and longer fourth antennal joint,
 and whole mesopleura densely covered with hair *T. sequior* Cockerell, ♂.
18. Axillae red *E. pusillus* Cresson.
 Axillae black; scape black 19.

forming an acute inner angle with band; apical plate narrow; second and third ventral segments with very broad hair-bands which in some lights appear silvery-white (not at all ochreous), that on second strongly emarginate, almost divided, in middle posteriorly.

Related to *E. hitei* Cockerell, but much less robust, and with black legs and antennæ.

***Epeolus lutzi*, new species**

COLORADO: 3 ♂, Walsenburg (type locality), about 6200 ft. alt., Sabina-pinyon country, June 14, 1919; 1 ♂, Regnier, along the state border south of Lamar, about 4400 ft. alt., pasture land, June 7, 1919. УТАН: 1 ♂, Salt Lake City, about 5000 ft. alt., near Fort Douglas, July 28, 1920.

♂. (Type) Length 6.5–7.5 mm.; black, with pale ochreous markings, the dense hair covering face pure silvery white; tegulæ apricot-color; mandibles broadly bright chestnut-red in middle; antennæ black, third joint obscurely rufous apically; legs bright ferruginous, with appressed white hair, but anterior femora black except apically, and anterior tibiæ broadly black in middle; eyes pale green, orbits strongly converging below; labrum black, reddish apically; mesothorax densely punctured, thinly covered with pale ochreous hair, which is denser along the margins, and shows anteriorly two nebulous broad converging bands, not reaching the center; scutellum moderately bigibbous, axillæ pointed; pleura covered with light hair; wings hyaline, dusky apically, stigma dark red; nervures fuscous, red basally; spurs clear red; abdomen with broad entire bands, but those on first two segments strongly emarginate anteriorly, their anterior margin on each side of the incision convex; black area on first segment a transverse band, very obliquely truncate at each side; band on second segment with large round lateral lobes, making an acute angle with the band; anterior (basal) margin of bands on third and fourth segments strongly undulate; apical plate very broad, bright red; venter broadly covered with pure white hair in middle, and also on hind margins of first three segments, leaving large black sublateral subquadrate areas.

♂. Similar, but differing thus: eyes dark purplish, green above; third antennal joint wholly black; mesothorax with the area not covered by the broad converging (basal) longitudinal bands and marginal pubescence black, not covered with pale hair, there is a black triangular area anteriorly, between the bands; fifth segment abdomen with the usual broad silvery lunule.

***Epeolus lutzi dimissus*, new race**

COLORADO: 1 ♀, Leadville, about 10,200 ft. alt., in a vacant lot in town, August 4, 1919.

Smaller, length 6 mm.; middle femora black, with the apex broadly red; hind femora somewhat dusky; bands on mesothorax shorter and less distinct; tegulæ smaller, shining; hair of abdomen whiter, the black area on first segment less sharply defined.

A race of high altitudes. *E. lutzi* is less coarsely punctured than *E. hitei* Cockerell, and differs in the color of the antennæ and other characters. It is larger than *E. humillimus* Cockerell, which has interrupted abdominal bands, and widely separated stripes on mesothorax.

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