

THE TAXONOMY AND NOMENCLATURE OF SOME  
NORTH AMERICAN BEES OF THE GENUS *CENTRIS*  
WITH DESCRIPTIONS OF NEW SPECIES

(Hymenoptera: Anthophoridae)

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ABSTRACT: In the current paper representatives of six subgenera are considered. *Trichocentris*: The female characteristics of this subgenus are given, based upon *Centris vanduzeei*, which is redescribed. *Paracentris*: *C. pallida*, *C. tiburonensis*, *C. californica*, *C. hoffmanseggiae*, *C. subhyalina* and *C. mexicana* are recorded from new areas. The males of *C. californica* and *C. subhyalina* are fully described and *C. birkmanii* is synonymized with the latter. Previously considered by me to be a synonym of *C. lanosa*, *C. lanosa resoluta* is reinstated as a subspecies. The following new species are described: *C. angustifrons* (United States), *C. zacateca* (Mexico, United States), *C. anthracina* (Mexico to Ecuador) and *C. laevibullata* (Mexico). A key to North American species is given. *Centris s. str.*: *C. inermis pallidifrons* is synonymized under *C. i. gualanensis*. *C. eisenii*, *C. decolorata* and *C. flavofasciata* are recorded from the United States for the first time. *Xanthemis*: *C. aethiops* is assigned to this subgenus and *C. armillatus* formally synonymized with it. *C. carolae* is described as a new species from Mexico. *Hemisiella*: *C. lanipes subtarsata* is considered a subspecies of *C. trigonoides*, and *C. transversa* is recorded from the United States. *Melanocentris*: three aberrant species are described as new: *C. strawi* (Mexico), *C. ruthannae* (United States) and *C. anomala* (Mexico).

During the course of my preliminary studies on these bees, many new and significant distributional records have been discovered. The primary objective of this paper is to make these data available for the forthcoming Second Supplement to the Catalog of Hymenoptera of America north of Mexico. The opportunity is taken, also, to present the descriptions of several new species as well as observations on the taxonomy and nomenclature of certain other species.

Although some of the material recorded below is from my personal collection (now in the Los Angeles County Museum of Natural History, and indicated by LACM), the bulk of it has been made available from the collections of several institutions. For their generosity in making these specimens available to me, I wish to express my deep gratitude to the following: W. L. Brown, Jr., Museum of Comparative Zoology (MCZ); G. D. Butler, Jr., University of Arizona (UA); H. R. Dietrich, Cornell University (CU); P. D. Hurd, Jr. and J. A. Powell, California Insect Survey, University of California,

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Berkeley (CIS); K. V. Krombein, U.S. National Museum (USNM); A. T. McClay, University of California, Davis (UCD); C. D. Michener, University of Kansas (KU); T. B. Mitchell, North Carolina State College (NCSC); J. G. Rozen, American Museum of Natural History (AMNH); P. H. Timberlake, Citrus Experiment Station, University of California, Riverside (UCR). I am especially indebted to J. S. Moure for reviewing the manuscript and making certain corrections based on his own extensive knowledge of these bees, much of which is still unpublished.

### Subgenus *TRICHOCENTRIS* Snelling

The present definite assignment of *Centris vanduzeei* Cockerell to this subgenus has made it possible to provide a diagnosis of the female of *Trichocentris*.

Probably the most noticeable and interesting features of the females are the primitive nature of the basitibial plates and the complete absence of modified setae on the front and middle tibiae. These two characters, coupled with the sparse scopa and pubescent abdomen seem to confirm the view that this is a primitive group.

The following combination of characters should aid in recognizing the females of *Trichocentris*: Mandibles long, slender, quadridentate; first flagellar segment longer than scape; front and middle basitarsi lacking modified setae; basitibial plate with poorly developed secondary plate; scopal hairs conspicuously shorter and sparser than in *Paracentris*; abdominal tergites with long, erect pubescence, not concealing surface; apices of tergites with distinct pubescent fasciae.

*Centris morsei* Cockerell, provisionally assigned by me (Snelling, 1956: 3) to *Trichocentris* should be placed in *Paracentris* since it shows undeniable relationships with *C. (Paracentris) caesalpiniae* Cockerell.

### *Centris (Trichocentris) vanduzeei* Cockerell

*Centris vanduzeei* Cockerell, 1923. Proc. Calif. Acad. Sci. (4) 12:75-76. ♀ ♂. Snelling, 1956. Pan-Pacific Ent. 32:4. ♀ ♂.

Recently I was able to critically examine a cotype female and a male of this species, and confirmed my earlier conjecture (Snelling, 1956:4) that *C. vanduzeei* should be assigned to this subgenus.

Since Cockerell failed to designate an allotype when he described this species, I am taking this opportunity to do so. I have selected and designated as Lectoallotype an original cotype male from San Jose Island, Gulf of California, Mexico, May 28, 1921 (E. P. Van Duzee). This male has been returned to the California Academy of Sciences. In his original description Cockerell (1923:75) remarked that the pubescence of the female labrum was brownish, but it is whitish and therefore concolorous with the rest of the facial pubescence.

The following redescription is based upon these cotypes and is intended to give a better picture of the many peculiarities of this species.



**FEMALE:** Integument of head, thorax, legs and abdomen black; all basitarsi and hind tibiae dark ferruginous; tibial spurs, medio- and distitarsi, and tarsal claws light ferruginous; tegulae ferruginous; wings hyaline, yellow-tinged, veins and stigma ferruginous. Pubescence of head, thorax, legs and abdomen pale whitish; that of thoracic dorsum tinged pale fulvous; anterior tarsi, apical fourth of middle tibiae, middle tarsi, scopa of hind tibiae and basitarsi, apical tarsal segment and broad apical band on fifth tergite with bright orange-fulvous pubescence. Abdominal tergites with abundant erect, whitish pubescence (not obscuring surface), forming distinct apical fasciae on first four segments; ventrites II to IV with whitish apical fasciae; discs of ventrites I to III, and VI, with long erect fulvous hairs, IV and V, with whitish hairs on discs.

**Head:** Broader than long, mandibles long, slender, the two inner teeth much smaller than the outer, and on a plane at right angles to that of the outer teeth. Maxillary palpi five-segmented, third segment longest, penultimate segment longer than basal, but shorter than apical. Labrum rugosely punctate, with shining interstices between punctures; apex broadly pointed. Clypeus slightly protuberant, apical middle slightly flattened, apex evenly, broadly concave; shiny, with broad median area tapering slightly toward apex with a few scattered punctures, lateral areas with punctures rather coarse, close. Frons rather finely, sparsely punctate, with impunctate areas before anterior ocellus and laterad of posterior ocelli; vertex and genae sparsely punctate, the punctures a little finer than those of frons. First flagellar segment longer than scape, slightly longer than following five segments combined. Eyes converging slightly above. Distance between posterior ocelli greater than distance between ocelli and eyes; distance from ocelli to posterior margin of vertex greater than distance between posterior ocelli. Clypeus half as long as lower transfacial distance (at level of extreme lateral angle of clypeus).

**Thorax:** Mesoscutum rather coarsely, closely punctate, the punctures about one-half times their diameters apart; meso- and metapleura a little more finely punctate, with the punctures about their own diameters apart; mesoscutellum with punctures equal to those of mesoscutum, becoming distinctly closer apically until they are almost touching; metanotum impunctate, indistinctly tessellate; basal area of propodeum shiny, impunctate; lateral areas finely, sparsely punctate. Anterior margin of third submarginal cell about one-third as long as posterior margin. Basitibial plate elongate, with poorly differentiated secondary plate, with longitudinal median depression; scopal pubescence rather short and sparse, not forming heavy compact mass, not concealing surface of tibiae and basitarsi; distitarsi teardrop shaped, one-third as broad as long, shorter than preceding segments combined.

**Abdomen:** With fine, piliferous punctures on discs of all segments; pubescence forming distinct, white, apical fasciae on tergites one to five.

**Measurements:** Body length (front of vertex to apex of second tergite), 10.0 mm.; forewing length, 9.5 mm.

**MALE:** Integument black, except all tarsal segments, tibial spurs, and



apical half of tegulae. Tibial spurs and all tarsi light ferruginous, the tarsal claws fuscous. Apical half of tegulae yellowish. Pubescence mostly pale whitish; that of tarsi and seventh tergite and ventrite fulvous. Wings lighter than in female, veins and stigma ferruginous. Pubescence very long and dense on face and abdomen, erect on the latter.

*Head*: Broader than long. Mandibles long, slender, tridentate; inner tooth smallest and on a different plane than the two outer teeth. Labrum moderately shiny, finely, closely punctate, the punctures almost touching; the surface obscured by long dense pubescence; apex broadly pointed. Clypeus strongly protuberant, slightly flattened on each side of median line; shiny, with a median longitudinal impunctate area, the lateral punctures a little coarser than those of labrum, more widely spaced, with shining interstices. Frons shiny, finely punctate, the punctures a little closer than those of clypeus; an impunctate area in front of anterior ocellus and posterior ocelli. Vertex finely and closely punctate, the punctures about their own diameters apart, except posteriorly where they become a little less crowded. Genae finely punctate, the punctures about their own diameters apart, except posteriorly where they become a little more crowded. Antennal scape short, about half as long as first flagellar segment, which is slightly shorter than the following five segments combined. Distance from lower margin of anterior ocellus to base of clypeus about two-thirds the breadth of face at level of base of clypeus; distance between antennal sockets much greater than distance between sockets and eyes; distance between posterior ocelli much greater than distance between sockets and eyes; distance between posterior ocelli much greater than distance between ocelli and eyes, the ocelli about twice an ocellar diameter apart and removed from eyes by about one-third an ocellar diameter; distance between posterior ocelli about two-thirds distance from ocelli to posterior margin of vertex. Vertex slightly concave between tops of eyes as seen from front.

*Thorax*: Mesoscutum and mesoscutellum dull, closely, finely, punctate, the punctures separated by less than a puncture diameter. Mesopleura finely, sparsely punctate anteriorly, the punctures becoming coarser, closer posteriorly. Metanotum shinier than mesoscutum, impunctate tessellate. Entire propodeum shiny, finely, sparsely punctate, the punctures for the most part separated by two or more times their diameters. Anterior half of tegulae finely, closely punctate, the posterior half with punctures much finer and somewhat sparser. Front and middle distitarsi as long as mediotarsi. Posterior femora strongly swollen, about half as broad as long. Wings as in female.

*Abdomen*: Dull, all segments finely, closely, piliferously punctate. Sixth tergite with a dense brush of long pubescence on each side of the median line, concealing seventh which has a small patch of short pubescence on each side, and its apex slightly emarginate.

*Measurements*: Body length (front of vertex to apex of second tergite), 11.5 mm.; forewing length, 11.3 mm.

The only additional male known is from Ruffo Ranch, Isla Cerralbo, Gulf



of California, Mexico, March 22, 1953 (P. H. Arnaud; Sefton Orca Expedition to Gulf of California; LACM). Many maps show this as "Isla Cerralvo."

Subgenus *PARACENTRIS* Cameron

Padre J. S. Moure has informed me (*personal communication*) that the correct name for this subgenus, formerly known as *Penthemisia* Moure, is *Paracentris* Cameron (1903:235; type species: *Paracentris fulvohirta* Cameron). He has examined Cameron's type and found it to be close to *C. (Penthemisia) bucholzi* Friese.

*Centris (Paracentris) pallida* Fox

*Centris pallida* Fox, 1899. Proc. Acad. Nat. Sci. Phila. 51:66 ♀. Snelling, 1956. Pan-Pacific Ent. 31:6. ♀ ♂

*Centris pallida callognatha* Cockerell, 1923. Proc. Calif. Acad. Sci. (4) 12:78. ♀. Synonymy of Snelling, 1956. *Op. cit. supra*.

*Centris trichosoma* Cockerell, 1923. Proc. Calif. Acad. Sci. (4) 12:78. ♂. Synonymy of Snelling, 1956. *Op. cit. supra*.

Dr. P. D. Hurd provided a single female of this species collected on Santa Catalina Island, Los Angeles County, CALIFORNIA, June 7-9, 1954, by R. Ryckman, R. Lee and C. Christianson (CIS). This seems at first an unusual record, but when one considers that a number of anthophorids and other bees, common to the desert regions on the mainland, occur there also, it is not too surprising. The fact that the species has not been collected there before may be due, in part, to the natural swiftness and alertness of these bees, coupled with the fact that this species probably is not common on the Island.

Four males from Arizona are noteworthy in that the hind femora are greatly swollen, being one-half as broad as long in the more extreme cases. This condition is superficially similar to the subgenus *Trichocentris*. Because of this femoral development, and certain differences in punctuation and the hidden ventrites, this form at first was regarded as a new species. However it is now evident that these variations are met within the range of variation of these characters in *C. pallida*, although the cline from the typical form, with slender femora, to the swollen form is not complete.

*Centris pallida* is an anomalous form of *Paracentris*, and is very close to the more primitive *Trichocentris*, as evidenced by the abundant pale pubescence of the abdomen, four-segmented maxillary palpi, lack of modified setae on the anterior basitarsi of the female, and the occasionally swollen hind femora of the males. However, because of the *Paracentris*-like basitibial plate and scopa of the female, and the genitalia of the male, it seems best for the time being to retain *C. pallida* in *Paracentris*. An additional reason for the present treatment is the relationship with *C. tiburonensis* Cockerell, a more typical *Paracentris*. Separation of these species into different subgenera would serve only to obscure the relationship between them, and to render more tenuous the division between the two subgenera.



*Centris (Paracentris) tiburonensis* Cockerell

*Centris tiburonensis* Cockerell, 1923. Proc. Calif. Acad. Sci. (4) 12:78, ♀. Snelling, 1956. Pan-Pacific Ent. 31:6. ♀ ♂.

A recent collection extends the range of this species to Arizona.

NEW RECORDS. BAJA CALIFORNIA: 2 ♀ ♀ Sierra de los Cocopas, 35 kilo. SW Mexicali, July 6, 1953 (R. R. Snelling; LACM); on *Dalea spinosa*. CALIFORNIA: Imperial Co.: 25 ♀ ♀, 4 ♂ ♂, 4.5 mi. E. Coyote Wells, June 10, 1956 (R. R. Snelling; LACM), on *D. spinosa*. Riverside Co.: 1 ♀ Palm Springs, June 25, 1941 (E. C. Van Dyke; CAS); 2 ♂ ♂, Palm Springs, June 24, 1952 (P. H. Timberlake; UCR), on *D. spinosa*; 1 ♀, 2 ♂ ♂, same data (R. H. and L. D. Beamer, W. LaBerge, A. Wolf, C. Liang, C. Weiner; KU); 16 ♀ ♀, 6 ♂ ♂, Indio, June 7, 1956 (M. Wasbauer; CIS), on *D. spinosa*; 15 ♀ ♀, 1 ♂, 20 mi. E. Indio, June 21, 1958 (C. D. MacNeill; CAS); 1 ♀, Desert Center, June 16, 1947 (G. H. and J. L. Sperry; LACM); 1 ♀, 1 ♂, 20 mi. W. Blythe, June 10, 1956 (M. Wasbauer; CIS), on *D. emoryi*; 16 ♀ ♀, 9 ♂ ♂, Shaver's Well, June 15, 1963 (R. R. Snelling; LACM), on *D. spinosa*. San Bernardino Co.: 1 ♀, 3 ♂ ♂, 8 mi. SE Needles, June 5, 1938 (P. H. Timberlake; UCR), on *D. spinosa*; 4 ♀ ♀, 2 ♂ ♂, 5 mi. W. Essex, June 30, 1952 (R. H. and L. D. Beamer, W. LaBerge, A. Wolf, C. Liang, C. Weiner; KU); 5 ♀ ♀, 10 ♂ ♂, Essex, July 2, 1953 (E. S. Ross; CAS), 3 ♀ ♀, 2 ♂ ♂ on *Dalea*. ARIZONA: Mojave Co.: 87 ♀ ♀, 7 mi. NE Topock, June 24, 1959 (R. R. & M. D. Snelling; LACM), on *Dalea*.

*Centris (Paracentris) lanosa resoluta* Cockerell

*Centris cockerelli resoluta* Cockerell, 1923. Proc. Calif. Acad. Sci. (4) 12:76-77. ♀ ♂.

*Centris lanosa resoluta*, Michener, in Muesebeck, et al., 1951. U. S. D. A., Agr. Monog. 2:1241.

*Centris lanosa*, Snelling, 1956. Pan-Pacific Ent. 32:7 (in part).

In my paper on California *Centris* (Snelling, 1956:7), the form described by Cockerell as *C. cockerelli resoluta* was placed in synonymy with *C. lanosa* Cresson, because of the occurrence of certain individuals in Arizona and Sonora, Mexico, which were similar to typical specimens from Texas and New Mexico. At the time of my original decision, adequate material from the latter states was not available. The intermediate specimens are from an overlapping area in the range of the two subspecies which leads me to regard them now as hybrids. The range of *C. lanosa lanosa* (with yellow clypeus in the female) as now understood includes Texas, New Mexico and Tamaulipas, Nuevo Leon and Chihuahua, Mexico, while *C. l. resoluta* (with ferruginous clypeus in the female) inhabits Arizona, California, Nevada and Sonora, and Baja California, Mexico. The intermediate specimens are found in western New Mexico and Chihuahua and eastern Arizona and Sonora in certain areas where the ranges of the two forms overlap.



*Centris (Paracentris) californica* Timberlake

*Centris californica* Timberlake, 1940. Pan-Pacific Ent. 16:139. ♀. Snelling, 1956. Pan-Pacific Ent. 31:7. ♀.

Shortly after the proofs for the above paper were returned to the printer, I secured a single male of this rare species in Kings County, CALIFORNIA. During subsequent seasons, additional specimens of both sexes were taken in other areas.

The male of *C. californica* is very similar to that of *C. hoffmanseggiae* Cockerell. A few slight differences have been noted in the eighth and ninth ventrites, but these seem to intergrade so completely as to be worthless. However, the structural differences in the females seem to be great enough to warrant separation on the species level. The males appear to be best separated by the more densely pubescent abdomen with whitish apical fringes on the tergites, the entirely light pubescence of the apical tergites, and maculate antennal scape of *C. californica*. In the following description of the *C. californica* male, no structural characters are used, since in all important respects the two species seem to be identical.

MALE: Black, with creamy-yellow macula as follows: outer side of mandibles mostly; labrum; clypeus, except extreme upper lateral margins; triangular supraclypeal mark; linear mark on underside of antennal scape (greatly reduced in some specimens). Legs, except darkly ferruginous tarsi, dark rufescent, tarsal claws darkly rufescent, with apices lighter; tibial spurs light ferruginous. Tegulae lutescent. Wings clear hyaline, veins and stigma ferruginous. All pubescence whitish, except on inner side of tarsal segments where it is light ferruginous. Tegulae with very short, dense, fine appressed pubescence in addition to the usual longer, sparser pubescence. Discs of tergites with distinct whitish apical fasciae of slightly longer denser pubescence; ventrites with discal pubescence sparser, longer, with distinct apical fasciae on segments two to five.

*Measurements*: Body length (front of vertex to apex of second tergite), 9.5 to 12.5 mm.; forewing length, 8.5 to 11.5 mm.

The distribution of this species overlaps that of *C. hoffmanseggiae* in the Mojave and Great Basin areas of California. There is, however, a discrete separation of the two in flight periods and floral visitations; *C. hoffmanseggiae* flies from mid-April to mid-June, frequenting chiefly leguminous plants. The flight period of *C. californica* apparently extends from late June to early October, and the species appears to restrict itself to the plants of the family Capparidaceae, if the "mustard" record of the holotype be disregarded.<sup>2</sup>

<sup>2</sup>The probability is strong that the holotype was actually collected on *Wislizenia* rather than mustard. The two are somewhat similar in general appearance. Furthermore, the residents of the area around Kerman, Fresno County, commonly refer to *Wislizenia* as "alkali mustard" or merely "mustard." I have collected specimens of *C. californica* in the Kerman area, all on *Wislizenia*, even though mustard was available at most sites.



New records for the distribution of *californica* are: CALIFORNIA: Tulare Co.: 1 ♀, 1 ♂, 6 mi. N. Alpaugh, Sept. 17, 1959. Kings Co.: 1 ♂, 12 mi. S. Hanford, Sept. 28, 1955. Fresno Co.: 10 ♀♀, 82 ♂♂, 5 mi. E. San Joaquin, Aug. 22, 23, 30, 1960; 4 ♀♀, 8 ♂♂, Kerman, Aug. 25, 31, 1960; 4 ♂♂, 8 mi. W. Kerman, Aug. 22, 1960; 4 ♀♀, 8 ♂♂, Raisin City, Aug. 24, 1960; 10 ♀♀, 68 ♂♂, Helm, Aug. 24, 29, 1960; 1 ♀, Mendota, Aug. 25, 1960 (all R. R. Snelling; LACM), all on *Wislizenia refracta*; 4 ♀♀, 10 ♂♂, 10 mi. SW. Carruthers, Aug. 31, 1960 (S. M. Fullerton, in the collection of Mr. Fullerton), on *W. refracta*. Madera Co.: 2 ♀♀, 9 mi. SW. Madera, Aug. 30, 1960; 6 ♀♀, 14 mi. SW. Madera, Sept. 2, 1960 (all R. R. Snelling; LACM) all on *W. refracta*. Merced Co.: 1 ♀, Stevenson, Aug. 31, 1960; 1 ♀, 4 ♂♂, 4 mi. SE. El Nido, Sept. 4, 6, 1956 (all R. R. Snelling; LACM), all on *W. refracta*. Inyo Co.: 3 ♀♀, Olancho, Sept. 3, 1956 (R. M. Bohart; UCD). NEVADA: Washoe Co.: 1 ♂ Southern Pyramid Lake, July 27, 1957 (D. C. Rentz; LACM). Humboldt Co.: 1 ♀, Winnemucca, Aug. 30, 1956 (T. R. Haig; UCD). Pershing Co.: 1 ♀, 3 ♂♂, Lovelock, Aug. 30, 1956 (T. R. Haig; UCD); 1 ♀, 8 mi. S. Lovelock, Aug. 4, 1956 (T. R. Haig; UCD).

*Centris (Paracentris) hoffmanseggiae* Cockerell

*Centris hoffmanseggiae* Cockerell, 1897. Annals and Magazine of Natural History (6) 19:395. ♂ (not ♀). Snelling, 1956. Pan-Pacific Ent. 38:8. ♀ ♂.

*Centris hoffmanseggiae* var. *davidsoni* Cockerell, 1904. Bul. So. Calif. Acad. Sci. 3:160. ♂. Synonymy of Snelling, 1956. *Op. cit. supra*.

A single female of this species collected at Yuma, ARIZONA, May 4, 1955, on flowers of alfalfa by D. Tuttle (UA), apparently is the first recorded occurrence of the species on the lower Colorado Desert. An additional Arizona specimen is from the Santa Rita Range Reserve, April 10, 1957 (A. W. Woodrow; UA), one male on *Cercidium*.

*Centris (Paracentris) subhyalina* Fox

*Centris subhyalina* Fox, 1899. Proc. Acad. Nat. Sci. Phila. 51:69. ♀.

*Centris birkmanii* Friese, 1900. Termesztudományi Füzetek, 23:44. ♂ ♀.

NEW SYNONYMY.

*Centris lanosa lanosa*, Mitchell, 1962. N. C. Exp. Sta. Tech. Bul. 152: 334-335. ♀, ♂. (misidentification).

In discussing this species, Fox (1899:69) stated that it might eventually prove to be the female of *C. lanosa*, which, however, is now known to be a very different species only remotely related to *C. subhyalina*. On the other hand, *C. subhyalina* matches perfectly the species which has been called *C. birkmanii*, also described from Texas. In the First Supplement to the Catalog of Hymenoptera (Krombein, 1958:257), this species is indicated as the op-



posite sex of *C. lanosa lanosa* Cresson, on the authority of P. H. Timberlake. I have discussed (*in litt.*) this matter with Mr. Timberlake, and he has indicated that the synonymy is probably not correct. He further concurs with my view that *C. birkmanii* is a probable synonym of *C. subhyalina*.

Mitchell (1962:334-335) has recorded and described this species, as *C. l. lanosa* Cresson, from Florida. I have examined two of the males, from Inverness, Florida, Charles Robertson Collection, and find them inseparable from *C. subhyalina*. Admittedly, the seventh and eighth tergites are not perfectly typical, but these appear to fall within the range of variation which I attribute to this species. It should be pointed out that Mitchell's illustration of the genitalia of this species (1962:336, Fig. 97) is in error, failing to show the branched setae on the gonocoxites; the specimen from which the figure was made has the setae conspicuously branched.

Although little is presently known of the distribution of this species, I regard the Inverness record as questionably valid. Since the easternmost valid record seems to be at Giddings, Washington County, Texas, almost 500 miles west of Inverness, in a very different habitat, I feel that the Florida record should be considered a result of mislabeled specimens. However, it should be pointed out that according to Prof. Mitchell (*personal communication*) other material, similarly labeled, represents species of bees known to occur in central Florida.

The male of this species is described here in order to distinguish it from the superficially similar *C. lanosa*, from which it differs by the more protuberant clypeus, presence of a clearly defined, very narrow median impunctate line on the clypeus, the presence of lateral face marks and different apical ventrites.

**MALE:** Integument black. Bright lemon-yellow maculae as follows: mandibles basally; labrum; clypeus; lateral face marks, ending at level of antennal sockets; narrow transverse supraclypeal mark; underside of antennal scape. Apex of first flagellar segment, entire second segment, dull ferruginous; remainder of antennae brownish. Tegulae dull yellow. Wings hyaline, veins and stigma brownish to piceous. Coxae, trochanters, femora, middle and hind tarsi darkly rufescent; anterior tibiae and tarsi ferruginous; tibial spurs and tarsal claws darkly rufescent to blackish. Pubescence of head, thoracic dorsum, propodeum, upper half of meso- and metapleurae, anterior legs mostly, outer surface of middle tibiae, narrow postero-basal fringe on hind tibiae, first abdominal tergite, all pale fulvous; that of inner side of anterior tarsi bright fulvous, appearing almost golden; pubescence of legs, except as noted above, darkly fuscous-brown; that of abdomen, except first tergite, fuscous-brown to black. Abdominal tergites reflecting deep, dull blue-black, apical margins of tergites and ventrites testaceous. Pubescence of underside of thorax fuscous.

**Head:** Mandibles tridentate, very similar to *C. lanosa*. Labrum rugosely punctate, with shining interstices between the rather close punctures; apex broadly rounded; apical brush poorly developed to almost absent. Punctures of



clypeus slightly finer than of labrum, with shining interstices between, somewhat sparser laterally; median impunctate longitudinal line elongate, very narrow. Frons, sides of face, and genae shiny, finely closely punctate, the punctures barely separated. Punctures of vertex posteriorly coarser than of frons, dense, laterally about a puncture diameter apart; areas laterad of posterior ocelli and in front of anterior ocellus shiny, impunctate. Posterior ocelli about twice an ocellar diameter apart, separated from eyes by slightly more than an ocellar diameter, separated from posterior margin of vertex by about two and two-fifth times an ocellar diameter. Distance from anterior ocellus to base of clypeus equal to breadth of face at level of face of clypeus. First flagellar segment about as long as scape, slightly longer than following two segments combined; median segments of flagellum about two-thirds as wide as long.

*Thorax*: Punctures of mesoscutum, mesoscutellum, metanotum and propodeum comparable in size to those of vertex, separated by about one-third to three-fifths a puncture diameter, integument between slightly tessellate, moderately shiny; punctures of meso- and metapleura about same as those of vertex, crowded, almost touching, interstices moderately shiny; tegulae impunctate, minutely tessellate. Second submarginal cell receiving first recurrent vein slightly before middle; third submarginal cell receiving second recurrent at its apex.

*Abdomen*: All tergites and ventrites with dense, piliferous punctures, with moderately shiny interstices between; apical margins impunctate. Pubescence of discs of tergites dense, somewhat obscuring surface, becoming progressively longer caudally; of ventrites, a little less dense. Pseudo-pygidial area poorly defined, almost hidden by dense pubescence on both sides.

*Measurements*: Body length (front of vertex to apex of second tergite), 8.0 to 10.5 mm.; forewing length, 9.0 mm.

New records of distribution of this species are as follows: KANSAS: 5 ♀ ♀, Morton County, June, 1902 (F. H. Snow; KU). TEXAS: 1 ♀, Lee County (NCSC); 1 ♀, Lee County, May 25, 1906, *Malvacea* (NCSC); 1 ♀, Fedor, April 27, 1909 (NCSC); 1 ♀, Reeves County, June 15, 1940 (T. B. Mitchell; NCSC); 1 ♀, 1 ♂, Bexar County, May 1, 1929 (H. B. Parks; NCSC); 1 ♂, Giddings, May 15, 1953 (R. H. Beamer; KU), on *Brazoria truncata*; 1 ♀, 1 ♂, Giddings, May 9, 1954 (R. H. Beamer; KU), ♀ on *Monarda*, ♂ on *Gaillardia*.

*Centris (Paracentris) mexicana* F. Smith

*Centris Mexicana* F. Smith, 1854. Cat. Hym. Brit. Mus. 2:378. ♀.

A male of this species has been submitted by G. D. Butler from the Chiricahua Mountains, Cochise County, ARIZONA, 7000-8000 feet, September 7, 1953 (G. D. Butler; UA), on thistle.

This is the first record of *C. mexicana* in the United States, although it is a very common species during the summer months in Sonora and Chihuahua.



**Centris (Paracentris) zacateca** Snelling, new species

Figure 1, a and f

*Diagnosis:* Although this species is superficially similar to *C. mexicana*, both sexes of *C. zacateca* may be recognized by their smaller size and the pale pubescence on the vertex and pronotal lobes. The female has the clypeus with a definite median impunctate line, while that of *C. mexicana* has the clypeal punctures sparse, but evenly distributed so that no median impunctate line is formed. In the male of *C. zacateca* the first flagellar segment is from 2.59 to 3.10 times the length of the second; in *C. mexicana* it is from 3.83 to 3.87 times the length of the second.

**FEMALE:** Integument of head, thorax and abdomen black, that of abdomen without bluish reflections; of legs, very dark rufescent appearing black, tarsi a little lighter; tibial spurs and basitibial plates dark rufescent; tarsal claws rufescent to dark ferruginous; tegulae lutescent; pygidial plate dark rufescent; antennae dark rufescent, a little lighter beneath. Pubescence black except pale fulvous as follows: top of vertex, not extending beyond lateral ocelli; occipital margins, immediately behind vertex; dorsum of mesoscutum; mesoscutellum; post-scutellum; upper lateral corners of propodeum; lateral lobes of pronotum and immediately adjacent upper mesopleura.

*Head:* Mandibles quadridentate, apical tooth longest, teeth progressively smaller toward the inner. Maxillary palpi five-segmented, second and third segments subequal, fourth about  $\frac{1}{3}$  as long as third, fifth about  $\frac{2}{3}$  as long as fourth. Scape and first flagellar segment subequal; second and third flagellar segments combined  $\frac{3}{5}$  as long as first; labrum rounded apically, with very dense preapical brush of hairs; punctures a little finer than those of clypeus, with shining interstices. Clypeus shining, with broad impunctate median line, tapering slightly toward apex, ending slightly before apical rim, punctures becoming denser laterally; disc bare medially, with abundant moderately long pubescence laterally; paraocular areas and sides of face finely punctate, the punctures about  $1\frac{1}{2}$  times their diameters apart; supraclypeal area medially impunctate, laterally like sides of face; frons a little more densely punctate, the punctures becoming larger above; usual impunctate triangular area before anterior ocellus; area before lateral ocelli very finely, rather closely punctate; vertex between eyes and ocelli sparsely punctate to impunctate except narrow band close to eyes; vertex finely, sparsely punctate posteriorly. Antennal sockets about twice their diameter apart, removed from eyes about  $1\frac{1}{2}$  times their diameter. Distance from anterior ocellus to base of clypeus about  $\frac{4}{7}$  of distance between eyes at base of clypeus; inner orbits parallel. Distance between lateral ocelli slightly greater than that between ocelli and eyes; lateral ocelli separated from posterior margin of vertex by about twice an ocellar diameter.

*Thorax:* Punctures of mesoscutum a little larger than those of sides of face, about their own diameters apart; the interstices moderately shiny, not



tessellate. Punctures of mesopleura slightly larger, distance between punctures averaging about twice their diameters; interstices moderately shiny, not tessellate. Punctures on anterior one-fourth of mesoscutellum as on mesoscutum, interstices becoming slightly tessellate. Post-scutellum moderately shiny, impunctate, tessellate. Upper medial two-thirds of propodeum moderately shiny, impunctate; punctures appearing laterally, equal in size and spacing to those of mesopleura, interstices a little less shining. Basitibial scoop of middle legs present, well-developed.

*Abdomen*: Moderately shiny, tessellate, setigerously punctate; apical ventrite without median carina; pygidial plate apically truncate.

*Measurements*: Body length (front of vertex to apex of second tergite), 12.5 to 14.5 mm.; forewing length, 10.8 to 12.2 mm.

MALE: Pubescence, integument and wings colored as in female.

*Head*: Clypeus evenly rounded basally, apical third of disc slightly flattened; punctation essentially as in female, with distinct median longitudinal impunctate line. Punctures of frons and vertex as in female. Ocellar-clypeal distance 0.59 to 0.60 times transfacial distance at level of clypeal base. Scape and first flagellar segment subequal; second and third segments combined 0.67 to 0.68 times first flagellar. Distance between lateral ocelli a little greater than distance between eyes and ocelli; lateral ocelli separated from posterior margin of vertex by about twice an ocellar diameter.

*Thorax and abdomen* as described above for female.

*Measurements*: Body length (front of vertex to apex of second tergite), 11.4 to 13.7 mm.; forewing length, 11.2 to 12.4 mm.

*Holotype* male and *allotype* female (Los Angeles County Museum of Natural History), 32 miles west of Piños, 7100 feet, Zacatecas, MEXICO, August 9, 1958 (R. M. Straw, #1486), on *Penstemon tenuifolius*. *Paratypes*: 5 ♂♂, 1 ♀, same data as holotype; 1 ♂, Zacatecas, Zac., July 16, 1954 (J. W. MacSwain: CIS); 1 ♂, Guadalupe, Zac., June 28, 1953 (C. & P. Vaurie; D. Rockefeller Mex. Exp., AMNH); 8 ♀♀, 9 mi. S. Fresnillo, Zac., Aug. 9, 1954 (E. G. Linsley, J. W. MacSwain, R. F. Smith; CIS); 2 ♀♀, Peñudas, Aguas Calientes, July 17, 1954 (J. W. MacSwain; CIS); 1 ♂, 1 ♀, Encarnacion de Diaz, Jalisco, Aug. 18, 1953 (C. & P. Vaurie; D. Rockefeller Mex. Exp., 1953, AMNH); 1 ♀, Ojuelos, Jalisco, June 25, 1953 (C. & P. Vaurie; D. Rockefeller Mex. Exp., 1953, AMNH); 1 ♂, 21-23 mi. W. Ojuelos, 7000 feet, Jalisco, July 29, 1958 (R. M. Straw, #1446; LACM); on *Penstemon tenuifolius*; 5 ♂♂, 5 ♀♀, 20 mi. S. Durango, 6300 feet, Durango, Aug. 12, 1958 (R. M. Straw, #1514; LACM), on *P. tenuifolius*; 1 ♀, 9.5 mi. N. Chihuahua, 5000 feet, Chih., Aug. 18, 1952 (C. D. MacNeill and E. E. Gilbert; CIS); 1 ♀, Llano de Rio Santa Clara, 27 mi. W. Parrita, Chih., Aug. 12, 1950 (R. F. Smith; AMNH); 6 ♂♂, Cañon de Santa Clara, 5 mi. W. Parral, Chih., July 6, 1954 (J. W. MacSwain and E. I. Schlinger; CIS), on *Baccharis*; 1 ♀, Rodeo, Hidalgo Co., N. Mex., Aug. 22, 1958 (R. M. Bohart; UCD).



**Centris (Paracentris) angustifrons** Snelling, new species

This species, currently known only from the unique type, does not seem to be closely related to any species known to me. Superficially it somewhat resembles *C. subhyalina*, with which it has in common a black clypeus and similarly colored pubescence, but differs from that, and all similar species, in the much narrower face. Until the male is discovered, the affinities of *C. angustifrons* will remain uncertain.

**FEMALE:** Integument blackish-ferruginous, abdomen without iridescent or metallic reflections; legs ferruginous, tibial spurs, apical tarsal segments and tarsal claws darker. Wings hyaline, with distinct brownish tinges, veins and stigma blackish-brown. Pubescence of head, dorsum of thorax, upper half of meso- and metapleurae, propodeum (except sides) and first tergite ochraceous, that of thoracic dorsum slightly tinged with fulvous at the tips; elsewhere light to rather dark brown (as in *C. subhyalina*).

**Head:** Mandibles quadridentate, apical tooth longest, median teeth approximately equal in size to each other, inner tooth a little longer, broader than median teeth. Maxillary palpi five-segmented, second segment the longest, third a little shorter, but longer than combined length of last two, apical segment the shortest. Labrum moderately shiny, disc coarsely rugoso-punctate; apical margin broadly rounded. Clypeus duller than labrum, with raised median impunctate area, laterad of raised portion with a few, variably spaced, coarse punctures. Punctures of frons fine, dense, integument somewhat shining; punctures of sides of face conspicuously coarser than those of frons, but finer than those of clypeus, mostly separated by a puncture diameter or more, especially between the eyes and ocelli where they are quite sparse. Punctures of vertex, behind ocelli, fine, dense. Facial quadrangle slightly longer than broad. Distance from anterior ocellus to clypeal base 0.53 times breadth of face at level of clypeal base; distance between lateral ocelli about 2.1 times an ocellar diameter, about 1.6 times distance between ocelli and eyes; distance between ocelli and posterior margin of vertex about 2.7 times an ocellar diameter. First flagellar segment slightly longer than scape, longer than following three segments combined.

**Thorax:** Punctures of mesoscutum finer than those of mesopleurae, separated by about a puncture diameter on both areas, mesopleural punctures equal in size to those of sides of face; mesoscutellar punctures a little larger, denser, than those of mesoscutum, interstices more distinctly tessellate; propodeum shiny, posterior face with scattered fine punctures, lateral faces with punctures a little coarser, separated by slightly more than puncture diameter. Anterior basitarsi with two or three elongate, spatulate setae on posterior ventral margin (lacking in all other species of *Paracentris*); the usual row of coarse, flattened setae present on anterior ventral margins of anterior and middle basitarsi. Secondary basitibial plate poorly defined (evidently due to wear).



*Abdomen*: Punctures of tergites rather dense, finest on basal segments, becoming progressively coarser on succeeding segments.

*Measurements*: Body length (front of vertex to apex of second tergite) 10.3 mm.; forewing length, 10.6 mm.

*Holotype*: Female (Los Angeles County Museum of Natural History), Huachuca Mountains, Arizona, August 19, 1903 (Oslar).

***Centris (Paracentris) anthracina* Snelling, new species**

Figure 1, b and g

*Centris clypeata*, Cockerell, 1948. Proc. U.S. Natl. Mus. 98:474. ♀ ♂.  
(=*clypeata* Friese, 1900?)

This is the species which has long been known as *C. clypeata* Friese; *C. clypeata* Friese is a junior homonym of *C. clypeata* Lepeletier. A new name is therefore necessary for Friese's species. Unfortunately two species have been confused as Friese's and until the type can be critically examined it cannot be determined which of the two was before him when he described *C. clypeata*. I have therefore elected to describe both of the species involved as new, since one is presumably identical with Friese's species and the other is undescribed. In the event that either proves to be a synonym of *C. clypeata* Friese (a junior homonym) the name applied here, although a synonym, then becomes available for the species as the next validly proposed name. This method is advantageous in that type specimens (*C. anthracina* or *C. laevibullata*, as the case may be) are then located in American museums available to those who are most directly concerned with the genus.

*Diagnosis*: This handsome species belongs to a small group which includes *C. nigerrima* Spinola and more remotely, *C. laevibullata* Snelling, new species. From *C. laevibullata*, the male of which is unknown, the female differs by having the first flagellar segment 5.14 to 5.28 times the length of the second (3.5 times the second in *C. laevibullata*), the narrower face (TFD 2.26 X OCD in *C. anthracina*, TFD 1.87 to 2.02 X OCD in *C. laevibullata*) and by the median impunctate line which extends to the clypeal apex (Median impunctate line extending about  $\frac{2}{3}$  of distance toward apex in *C. laevibullata*.)

**FEMALE**: Integument of head, thorax and abdomen black, that of abdomen with vaguely bluish reflections; of medio- and distitarsi, rufescent; tibial spurs black; basitibial and pygidial plates very darkly rufescent. Tegulae dark brownish. Wings light brownish, reflecting dull violaceous tints, stigma and veins dark brownish. Long, erect black or blackish pubescence as follows: Face, vertex except laterally, genae, thorax except propodeum, legs and abdomen (progressively longer on tergites, reaching greatest length on fourth, that of fifth shorter, not so dense, sixth sparsely pubescent on basal half; discs of ventrites with pubescence sparser, apical margins of last four segments with long, erect pubescence). Tegulae with sparse, erect black pubescence.



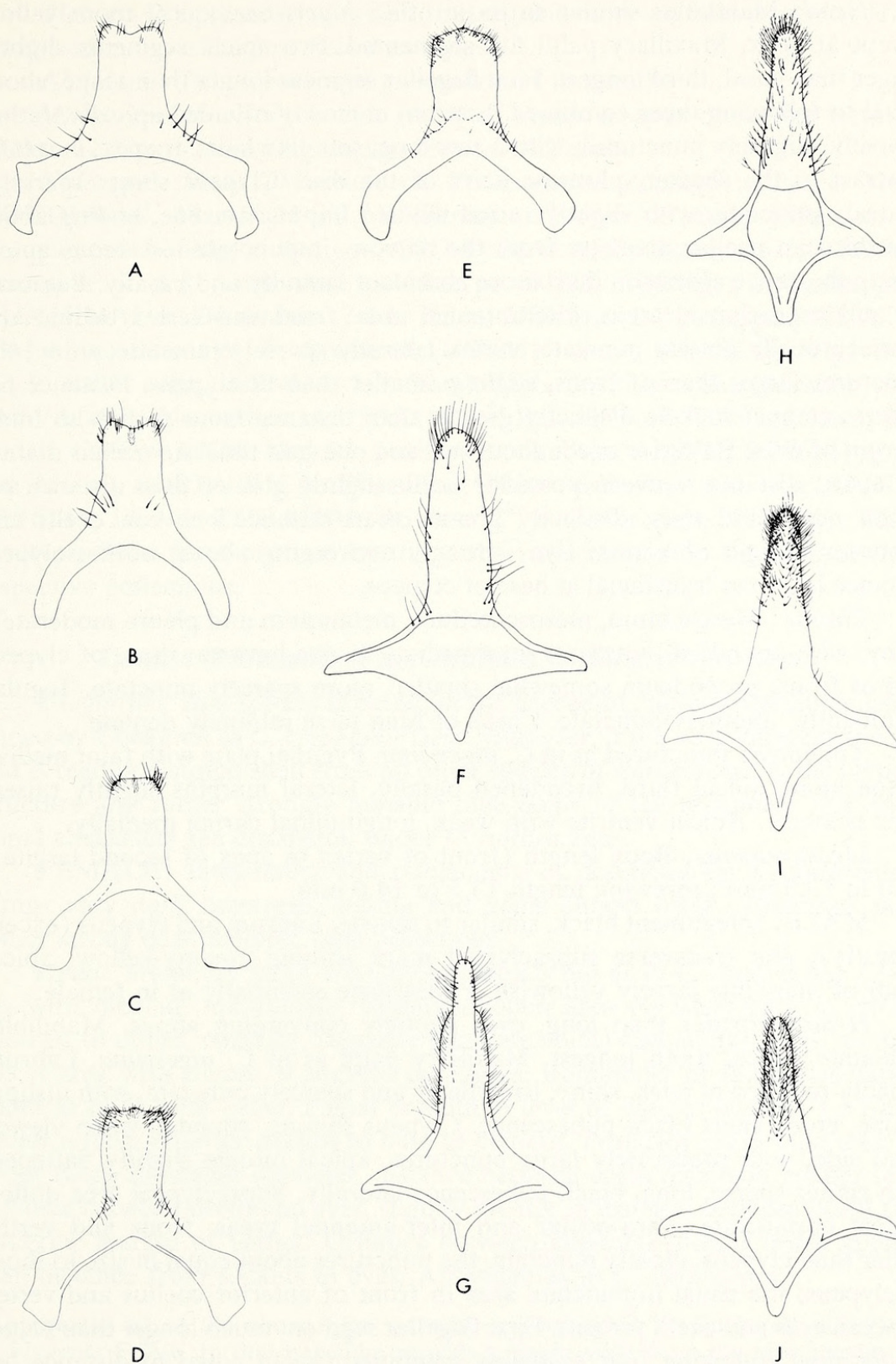


Figure 1. a-e, ventrite VIII and f-j, ventrite IX, respectively of males: a & f, *C. (Paracentris) zacateca*; b & g, *C. (P.) anthracina*; c & h, *C. (Melanocentris) strawi*; d & i, *C. (M.) ruthannae*; e & j, *C. (M.) anomala*.



*Head*: Mandibles similar to those of *C. nigerrima*, apical tooth yellow except at apex. Maxillary palpi five-segmented, two apical segments slightly longer than basal, third longest. First flagellar segment longer than scape, about equal to following three combined. Labrum narrowly rounded apically, rather coarsely, rugosely punctured, with a few long, seta-like hairs at apex, in strong contrast to the shorter, plumose hairs of the disc. Clypeus shiny, sparsely, coarsely punctate, with slightly raised median impunctate line, ending about one-third an ocellar diameter from the narrow, impunctate testaceous apical rim; pubescence sparse on disc, more abundant laterally and basally. Paraocular and supraclypeal areas, interantennal area, frons and vertex behind and between ocelli densely punctate; vertex laterally sparsely punctate, shiny, the punctures larger than of frons, slightly smaller than of clypeus. Distance between antennal sockets distinctly greater than distance from sockets to inner margin of eyes. Posterior ocelli about two and one-half times an ocellar diameter apart; distance between posterior ocelli slightly greater than distance between ocelli and eyes, distinctly greater than distance between ocelli and posterior margin of vertex. Eyes strongly converging above; ocellar-clypeal distance less than transfacial at base of clypeus.

*Thorax*: Mesoscutum, mesoscutellum, metanotum and pleura moderately shiny, with abundant punctures intermediate in size between those of clypeus and of frons; propodeum somewhat smaller, more sparsely punctate. Tegulae abundantly, minutely punctate. Claws of hind tarse minutely dentate.

*Abdomen*: Punctured as in *C. nigerrima*. Pygidial plate with faint median carina along apical third, broadened basally, lateral margins slightly raised, apex truncate. Apical ventrite with weak, longitudinal carina medially.

*Measurements*: Body length (front of vertex to apex of second tergite), 13.0 to 13.5 mm.; forewing length 13.5 to 14.0 mm.

**MALE**: Integument black, similar to female. Labrum and clypeus (except laterally), and transverse supraclypeal mark shining creamy-yellow; apical tooth of mandible largely yellowish. Pubescence essentially as in female.

*Head*: Broader than long, eyes strongly converging above. Mandibles tridentate, apical tooth longest. Maxillary palpi as in *C. nigerrima*. Labrum broadly rounded at apex, shiny, irregularly and sparsely punctate, with distinct sparse, erect, short black pubescence. Clypeus shining, rounded when viewed from side, with moderately large punctures, apical middle slightly flattened; with rather sparse, long, black pubescence laterally. Supraclypeal area duller, almost impunctate. Para-ocular and inter-antennal areas, frons and vertex duller than clypeus, closely punctate, the punctures about equal in size to those of clypeus; the usual impunctate area in front of anterior ocellus and vertex between eyes and ocelli present. First flagellar segment much longer than scape, longer than following four segments combined, about equal to distance between eyes at vertex. Greatest facial breadth less than distance between anterior ocellus and base of clypeus; posterior ocelli about twice an ocellar diameter apart, separated from eyes by slightly more than an ocellar diameter.



*Thorax*: Punctured as in female, but tegulae more sparsely punctate. Hind femora about one-third as broad as long.

*Abdomen*: Pubescence and punctuation as in female.

*Measurements*: Body length (front of vertex to apex of second tergite), 12.0 to 12.7 mm.; forewing length, 13.4 to 14.2 mm.

*Holotype*: Male (Museum of Comparative Zoology); Uyaca Mtn., HONDURAS, March 23 (R. Williams). *Allotype*: Female (Museum of Comparative Zoology); Antigua, GUATEMALA, December 26 (A. Pelén). *Paratypes*: 2 ♂♂, same data as Allotype (MCZ, AMNH); 1 ♀, Antigua, GUATEMALA, December 17 (A. Pelén; USNM); 1 ♂, Antigua, GUATEMALA, no date (W. P. Cockerell; USNM)<sup>3</sup>; 1 ♀, MEXICO, July, 1935 (C. F. Baker colln.; USNM); 1 ♀, Santa Tecla (= Nuevo San Salvador), EL SALVADOR, November 11, 1955 ("P. A. B." #648.47; USNM); 1 ♀, San Mateo, COSTA RICA, May 21, (collector unknown; AMNH, #25614); 1 ♂, San Mateo, COSTA RICA, December, 1920 (collector unknown; AMNH, #25614); 12 ♂♂, ECUADOR, no date (C. F. Baker colln.; USNM). Three paratypes have been retained by the author, the remainder returned to their respective collections.

### **Centris (Paracentris) laevibullata** Snelling, new species

*Diagnosis*: This species is based, as the preceding, upon a specimen determined by Cockerell as *C. clypeata* Friese. However, it is a very different species and is readily distinguished from all other species of *Paracentris* by the clypeal structure and rather strongly metallic blue color of the abdomen. For additional characters see discussion under *C. anthracina*.

**FEMALE**: Integument and pubescence as described for *C. anthracina*. Wings very dark brownish, stigma and veins almost black. Abdomen with rather strong dark metallic blue reflections.

*Head*: Maxillary palpi, mandibles and labrum as in *C. anthracina*. Clypeus with median, impunctate, slightly swollen area on basal half, in strong contrast to duller, coarsely, rugosely punctate apical and lateral areas; median apical area with rugose, elongated punctures. Remainder of facial punctuation about as in *C. anthracina*. Facial breadth at level of base of clypeus 1.8 times distance from anterior ocellus to base of clypeus. Posterior ocelli separated by about twice an ocellar diameter, distance between ocelli distinctly greater than distance between ocelli and eyes, slightly greater in distance between ocelli and posterior margin of vertex. Distance between antennal sockets much greater than distance from sockets to eyes. Antennae as in *C. anthracina*.

<sup>3</sup>Apparently all of the above type material was recorded by Cockerell (1949) as *C. clypeata* Friese. In that paper he records a single male from the type locality as having been taken on the flowers of *Wigandia*. Whether or not this is the specimen here selected as type of *C. anthracina* is not known, as there is nothing on the labels to indicate this. He also records a female from Escuintla, Guatemala, which I have not seen.



*Centris laevibullata* is otherwise similar to *C. anthracina*, but the pygidial plate has the sides converging to a broadly rounded apex, and the surface is a little more roughened.

*Measurements*: Body length (front of vertex to apex of second tergite), 13.5 mm.; of forewing, 13.0 mm.

*Holotype*: Female (Los Angeles County Museum); Orizaba, Veracruz, MEXICO, June 29, 1933. *Paratype*: female, 14 mi. NW. Zitacuaro, Michoacan, MEXICO, Aug. 24, 1959 (L. A. Stange, A. S. Menke; UCD).

The following key may prove useful in identifying the species of *Paracentris* now known to occur in America north of the Panama Canal Zone. Body lengths are measured from the posterior margin of the anterior ocellus to the apical margin of the second tergite, with the head and abdomen in normal position. The ocellar-clypeal distance (OCD) is measured from the base of the clypeus to the anterior margin of the anterior ocellus; the transfacial distance (TFD) is the breadth of the face measured at the level of the base of the clypeus.

#### KEY TO NORTH AND CENTRAL AMERICAN SPECIES OF *PARACENTRIS*

Antennae with twelve segments; abdomen with six segments . . . females  
Antennae with thirteen segments; abdomen with seven segments . . . males

#### FEMALES

1. Pubescence of head, thorax and legs entirely or predominantly black (that of mesopleura entirely black) . . . . . 2  
     Pubescence of head, thorax and legs entirely or predominantly pale (that of mesopleura light in part or entirely so) . . . . . 7
- 2(1). Pubescence of thoracic dorsum entirely black . . . . . 3  
     Pubescence of thoracic dorsum pale, at least in part . . . . . 5
- 3(2). First flagellar segment 3.5 times length of second (median impunctate area of clypeus extending about  $\frac{2}{3}$  of distance toward apex; TFD 1.87 to 2.02 x OCD) (Mexico) . . . . . *laevibullata* Snelling  
     First flagellar segment at least 5.0 times second . . . . . 4
- 4(3). First flagellar segment 6.0 times second; TFD 1.12 to 1.23 x OCD; median impunctate line of clypeus extending toward apex as a very narrow, slightly raised line (ending about  $\frac{1}{2}$  an ocellar diameter from apical margin) (s. Ariz., n. Mex.) . . . . . *aterrima* F. Smith  
     First flagellar segment 5.14 to 5.28 times second; TFD 2.26 x OCD; median impunctate area of clypeus broad over entire length (s. Mex. to Ecuador) . . . . . *anthracina* Snelling



- 5(2). Clypeus protruding very nearly as far in front of eye as eye is wide when viewed in profile; pubescence of thoracic dorsum usually dark fox-red (Calif.) ..... *rhodomelas* Timberlake  
 Clypeus no more than half as wide as eye when viewed in profile, usually much less; pubescence of thoracic dorsum whitish ..... 6
- 6(5). Large species, 14.5 to 18.5 mm. long; pubescence of vertex and pronotal lobes black; clypeal punctures sparse, becoming obscure apically; apical middle of clypeus slightly roughened (s. Ariz., n. Mex.) .....  
 ..... *mexicana* F. Smith  
 Smaller, 12.5 to 14.5 mm. long; pubescence of vertex and pronotal lobes pale; clypeus with median impunctate line widest above, punctures arranged in oblique rows (s. N.M., n. Mex.) ..... *zacateca* Snelling
- 7(1). Maxillary palpi four-segmented *and* pubescence mostly pale whitish; surfaces of tergites obscured by short, appressed pubescence ..... 8  
 Maxillary palpi five-segmented; if four-segmented, abdominal tergites beyond second with pubescence entirely dark, not obscuring surface .. 9
- 8(7). Mandibles tridentate; abdominal ventrites three to five with distinct apical fringes of moderately long white pubescence (N. Mex., Ariz., Calif., Nev., n. Mex.) ..... *pallida* W. Fox  
 Mandibles quadridentate; ventrites without pale apical pubescent fringes (nw. Mex., Calif., Ariz., Nev.) ..... *tiburonensis* Cockerell
- 9(7). Clypeal integument entirely black, immaculate ..... 10  
 Clypeal integument at least partially yellow, orange or red ..... 13
- 10(9). Clypeus sparsely punctate, with broad median impunctate line; pubescence of second tergite variable ..... 11  
 Clypeus coarsely, closely punctate, median impunctate line, when present, very narrow, sharply defined, slightly raised; no pale pubescence on second tergite (Tex., Kans.) ..... *subhyalina* W. Fox
- 11(10). Pubescence of second tergite and lower half of mesopleura pale, at least in part; facial quadrangle at least as broad as long, usually slightly broader ..... 12  
 Pubescence of second tergite and lower half of mesopleura dark; facial quadrangle slightly longer than broad (Ariz.) .... *angustifrons* Snelling
- 12(11). Eye, viewed laterally, wider than gena; clypeus distinctly bulging basally; pubescence of second tergite entirely pale; ventrites three to five with pale apical fringes; vernal to early summer (N. Mex., Ariz., Calif., Nev., n. Mex.) ..... *hoffmanseggiae* Cockerell  
 Eye, viewed laterally, no wider than gena; clypeus weakly bulging basally; at least some discal pubescence of second tergite black; ventrites three to five lacking pale fringes; late summer to autumnal (Calif., Nev.) .....  
 ..... *californica* Timberlake



- 13(9). Large species, 15.5 to 18.5 mm.; clypeal punctures sparse, fine; TFD 2.14 to 2.17 x OCD (Tex., Colo., N. Mex., Ariz., n. Mex.) ..... *caesalpiniae* Cockerell  
 Smaller, 8.5 to 13.5 mm.; clypeal punctures denser, separated by less than two times a puncture diameter ..... 14
- 14(13). Inner orbits distinctly convergent above; small species, 8.5 to 10.5 mm.; TFD 1.71 to 1.74 x OCD; integument of legs dark rufescent to fuscous, never ferruginous ..... 15  
 Inner orbits barely, if at all, convergent above; size variable; TFD at least 1.90 x OCD; integument of legs variable, frequently ferruginous ..  
 ..... 16
- 15(14). Clypeal maculation pale yellow (Tex., N. Mex., e. Ariz., ne. Mex.) ..  
 ..... *lanosa lanosa* Cresson  
 Clypeal maculation yellow-orange to light ferruginous (Ariz., Nev., Calif., nw. Mex.) ..... *lanosa resoluta* Cockerell
- 16(14). TFD 1.90 to 1.95 x OCD; sternal pubescence dark brown or blackish, contrasting sharply with ochraceous pubescence of mesopleurae; pubescence of middle and hind legs entirely blackish; inner orbits diverging above; (first flagellar segment shorter than following three combined) (Tex., N. Mex., Ariz., Calif., n. Mex.) ..... *atripes* Mocsary  
 TFD at least 2.0 x OCD; sternal pubescence variable, but never so strongly contrasting; inner orbits almost parallel ..... 17
- 17(16). Clypeus sparsely punctate, with median area pale yellowish; legs dark rufescent; paraocular areas black; TFD 2.10 to 2.21 x OCD (N. Mex., Ariz., Nev., Calif., n. Mex.) ..... *hoffmanseggiae* Cockerell  
 Legs and clypeus bright ferruginous; paraocular areas and stripe along inner orbits yellowish; TFD 2.09 to 2.13 x OCD (Tex., N. Mex., Ariz., Calif., Nev., n. Mex.) ..... *rhodopus* Cockerell

### MALES

1. Clypeus either entirely black, or with two small, widely separated apical maculae ..... 2  
 Clypeus largely or entirely yellow, white or orange-yellow ..... 5
- 2(1). Pubescence of thoracic dorsum white or fulvous ..... 3  
 Pubescence of thoracic dorsum black ..... *aterrima* F. Smith
- 3(2). Pubescence of posterior pronotal lobe, and usually entire lateral pronotal area, pale; first flagellar segment 2.6 to 3.1 times second .....  
 ..... *zacateca* Snelling



- Pubescence of lateral pronotal area, including pronotal lobe, black; first flagellar segment 3.8 to 3.9 times second . . . . . *mexicana* F. Smith
- 4(1). Pubescence of head and thorax at least partially pale . . . . . 5  
 Pubescence of head, thorax and abdomen black . . . . *anthracina* Snelling
- 5(4). Maxillary palpi four-segmented; antennal scape black beneath; abdominal pubescence pale, dense, suberect . . . . . 6  
 Maxillary palpi five-segmented; if four, *then* tergites with pubescence sparse, dark, or antennal scape with yellow stripe beneath . . . . . 7
- 6(5). Face narrow, inner orbits strongly convergent above; distance between eyes and ocelli about  $\frac{1}{2}$  diameter of lateral ocelli . . . . . *pallida* W. Fox  
 Face broader, inner orbits almost parallel; distance between eyes and ocelli about equal to diameter of lateral ocelli . . . *tiburonensis* Cockerell
- 7(5). Face broad, inner orbits not or scarcely convergent above; TFD at least 1.82 x OCD . . . . . 8  
 Face narrower, inner orbits usually strongly convergent above; TFD no more than 1.72 x OCD . . . . . 10
- 8(7). Integument of posterior femora and tibiae ferruginous; pubescence of hind basitarsi black, contrasting with pale tibial pubescence; paraocular area and underside of scape bright lemon-yellow; apical margins of tergites with thin, medially interrupted pubescent fasciae (TFD 1.82 x 2.0 x OCD) . . . . . *rhodopus* Cockerell  
 Integument of posterior femora and tibiae black or darkly rufescent; pubescence of hind basitarsi and tibiae concolorous; paraocular areas and underside of scape black; tergites without apical pubescent fasciae . . . 9
- 9(8). Large species, 13.5 to 12.4 mm.; TFD 1.92 to 1.97 x OCD; posterior femora with one-half or more of pubescence pale . . . . .  
 . . . . . *caesalpiniae* Cockerell  
 Smaller, 10.0 to 12.4 mm.; TFD 1.82 to 1.88 x OCD; posterior femora usually with pubescence all dark, occasionally with a light stripe along posterior margin. . . . . *atripes* Mocsary
- 10(7). Clypeus not at all strongly protuberant, only half as far in front of mandibular base as eye is wide; first flagellar segment length variable . 11  
 Clypeus strongly protuberant, as far in front of mandibular base as eye is wide when viewed laterally; first flagellar segment shorter than following four combined (pubescence of thoracic dorsum fulvous to fox-red) . . . .  
 . . . . . *rhodomelas* Timberlake
- 11(10). Abdominal tergites with abundant erect or suberect pale discal pubescence . . . . . 12  
 Abominal tergites beyond first without pale erect discal pubescence . . 13



- 12(11). TFD 1.35 to 1.38 x OCD; underside of scape with pale spot or narrow stripe; pubescence of tergites IV–VI entirely pale; late summer and autumnal ..... *californica* Timberlake  
TFD 1.49 to 1.53 x OCD; underside of scape black; pubescence of tergites IV–VI usually at least partly fuscous; vernal to early summer ..  
..... *hoffmanseggiae* Cockerell
- 13(11). Paraocular area and underside of scape yellow; clypeus coarsely, closely punctate, with narrow median impunctate line .....  
..... *subhyalina* W. Fox  
Paraocular area and underside of scape black; clypeus sparsely punctate, with very broad median impunctate area ..... *lanosa* Cresson

### Subgenus *CENTRIS* Fabricius

#### *Centris (Centris) inermis gualanensis* Cockerell

*Centris inermis gualanensis* Cockerell, 1912. Annals and Magazine of Natural History (8) 9:568. Schwarz, 1934. Amer. Mus. Nov. 722:12. Michener, 1954. Bul. Amer. Mus. Nat. Hist. 104:138-139.

?*Centris inermis* Friese, 1900. Annalen des K. K. Naturhistorischen Hofmuseums, Wien, 15:314 (*part*). Cockerell, 1928. Psyche, 35:173; 1949. Proc. U. S. Natl. Mus. 98:479.

*Centris inermis pallidifrons* Cockerell, 1949. Proc. U. S. Natl. Mus., 98: 479. ♂. NEW SYNONYMY

The form described from Zamorano, Honduras, by Cockerell as *C. i. pallidifrons* does not seem sufficiently distinct from his *C. i. gualanensis* to warrant separation. The duller clypeus of the former seems to be a matter of personal appreciation and is not consistent throughout any series. Two *C. i. pallidifrons* cotypes have the clypeus much brighter than Cockerell's description would allow. Furthermore, the two forms are not geographically separable, and so it seems best to reduce this form to the synonymy of *C. i. gualanensis*.

The male recorded by Cockerell in the same paper as *C. inermis* has the inner tooth of the mandibles obscurely bidentate, which would seem to be the reason for his statement that they are quadridentate. Normally the males of this species have tridentate mandibles.

#### *Centris (Centris) eisenii* W. Fox

*Centris eisenii* Fox, 1894. Proc. Calif. Acad. Sci., 4:22. ♀. Cockerell, 1923. Proc. Calif. Acad. Sci. (4) 12:75. ♀.

This species is recorded from the United States for the first time.

NEW RECORDS: ARIZONA: 1 ♀, Nogales, August (Osler; E. P. Reed colln.; CAS); 2 ♀ ♀, Nogales, June 1, 1903 (Osler; CU); 1 ♀, Picacho, Pinal Co., June 18, 1961 (F. D. Parker; UCD). SONORA: 1 ♀, San Bernardo,



Rio Mayo, July 6, 1935 (H. S. Gentry; LACM); 2 ♀♀, Guaymas, April 11, 1921 (E. P. Van Duzee; CAS); 1 ♀, Guaymas, July 2, 1952 (W. H. Lange; UCD). MORELOS: 1 ♀, 18 ♂♂, Lake Tequesquitengo, 2800 ft., March 16, 22, June 5, 1959; 1 ♀, 3-6 mi. S. Cuernavaca, 4000 ft., April 1, 1959; 1 ♂, Huajintlán, 2800 ft., April 11, 1959; 1 ♂ Cañon de Lobos, Yautepec, 4000 ft., April 13, 1959; 1 ♀, 3 mi. N. Alpuyeka, 3400 ft., April 18, 1959 (*all* H. E. Evans; CU). PUEBLA: 6 ♀♀, 11 mi. SE Acatlán, July 10, 1952 (E. E. Gilbert, C. D. MacNeill; CIS). SINALOA: 1 ♀, 14 mi. SE Elota, May 5, 1953 (R. C. Bechtel, E. I. Schlinger; CIS); 3 ♂♂, 2 mi. N. San Miguel, June 17, 1956 (R. P. Allen; CIS).

*Centris (Centris) decolorata* Lepeletier

*Centris decolorata* Lepeletier, 1841. *Historie Naturelle des Insectes, Hymenopteres*, II, p. 160. ♂. Friese, 1900. *Annalen des K. K. Naturhistorischen Hofmuseum, Wien*, 15:325-326. ♂ ♀.

Material now at hand indicates that this species occurs in the extreme southern portion of Texas, on the off-shore islands.

NEW RECORDS: TEXAS: Cameron Co.: 1 ♀, 2 ♂♂, Pt. Isabel, June 23-27, 1956; 1 ♂, Boca Chico, June 26, 1956; 5 ♂♂, Padre Isl., June 25, 1956 (*all* H. E. Evans and E. G. Matthews; CU). VERACRUZ: 2 ♂♂, Vera Cruz, June 12, 1959 (H. E. Evans; CU); 1 ♀, 2 ♂♂, Vera Cruz, no date (C. F. Baker colln., 1 ♂ with #8257; CU).

*Centris (Centris) flavofasciata* Friese

*Centris flavifrons* var. *flavofasciata* Friese, 1899. *Termesztarajzi Füzeték*, 22:46. ♂. 1900, *Annalen des K. K. Naturhistorischen Hofmuseums, Wien*, 15:318. ♂.

*Centris flavofasciata* Michener, 1954. *Bull. Amer. Mus. Nat. Hist.*, 104: 137. ♂.

This species is added to the United States fauna for the first time.

NEW RECORDS: ARIZONA: 2 ♀♀, Nogales, July 10, 1903 (Osler; CU). MORELOS: 6 ♂♂, L. Tequesquitengo, March 16, 22, 1959 (H. E. Evans; CU). GUERRERO: 1 ♀, Xalitla, 1500 ft., March 19, 1959 (H. E. Evans; CU). SONORA: 1 ♀, 16 mi. S. Empalme, May 7, 1953 (E. I. Schlinger; CIS).

Subgenus *XANTHEMISIA* Moure

*Centris (Xanthemisia) aethiops* Cresson

*Centris aethiops* Cresson, 1865. *Proc. Ent. Soc. Phila.* 4:193. ♀. Friese, 1900. *Annalen des K. K. Naturhistorischen Hofmuseums, Wien*, 15:268, ♀.

*Centris armillatus* Cresson, 1865. *Trans. Amer. Ent. Soc.* 2:298. ♂. Friese, 1900. *Annalen des K. K. Naturhistorischen Hofmuseums, Wein*, 15: 268-269. ♂. NEW SYNONYMY.



NEW RECORDS: CUBA: 1 ♂, no further data (AMNH, No. 26426); 1 ♂, Guantanamo, June, 1921 (C. T. Ramsden; AMNH); 1 ♀, San Carlos Est., Rio Seca, Guantanamo, April 17, 1914 (C. T. Ramsden; AMNH).

Although the synonymy of *C. armillata* with *C. aethiops* has been known for many years, there seems to have been no formal publication of this fact, and I am taking the opportunity to do so at this time. This species is here assigned to *Xanthemisia* on the basis of the mandibular structure of the female and the ventrites and genitalia of the male. Although the males of this and the following species have entirely black faces, unique for the subgenus, this character is not considered significant. The female of *C. aethiops* differs most obviously from other *Xanthemisia* in having the thoracic pubescence entirely dark.

**Centris (*Xanthemisia*) *carolae* Snelling, new species**

**MALE:** Integument black; that of legs rufescent; abdominal tergites dull metallic greenish-bronze, the apical margins lutescent; ventrites dull metallic greenish-bronze, with very broad lutescent apical margins. Pubescence mostly black or very dark brownish; anterior one-fourth and posterior one-fourth of mesoscutum, the mesoscutellum and metanotum with pubescence bright lemon-yellow; of abdomen mostly golden, suberect, becoming longer and denser on successive segments, very dense on four apical segments, especially laterally; ventrites with pubescence long, golden. Labrum densely pubescent, but clypeus mostly nude, except laterally. Tegulae with pubescence sparse, very short, erect. Longest hairs of hind tibiae much longer than greatest tibial width; longest hairs of hind basitarsi almost equal to length of that segment. Tegulae black; tibial spurs blackish; tarsal claws yellowish, with rufescent apices. Segments two to basal half of thirteen of flagellum ferruginous beneath, flagellum otherwise darkly infuscated. Mandibles black, with reddish preapical mark.

**Head:** Mandibles tridentate, apical tooth long and slender, middle tooth slightly larger than inner; two inner teeth acute, triangular, both well separated from apical. First flagellar segment distinctly longer than scape, about equal to the following three combined. Labrum broadly rounded apically, rugosely punctate, moderately shining. Clypeus much duller than labrum except in basal middle; disc with punctures large, shallow, well separated, becoming denser laterally; median line from apex to base broadly, shallowly concave, nearly impunctate. Paraocular area, supraclypeal area, frons (except shiny impunctate triangular area in front of anterior ocellus) densely, rather coarsely punctate, but the punctures distinctly smaller than of clypeal disc, the punctures somewhat less approximate in ocellar-ocular area. Distance from anterior ocellus to base of clypeus about equal to breadth of face at level of base of clypeus; posterior ocelli separated from eyes by slightly more than diameter of ocelli; distance between ocelli and eyes much less than distance from ocelli to posterior margin of vertex; eyes slightly converging above.

**Thorax:** Mesoscutum, mesoscutellum and metanotum very closely punc-



tate, punctures about equal to those of lateral margins of clypeus; pleurae closely, more coarsely punctate; propodeum less closely punctate, the punctures about equal to those of mesoscutum; basal area large, tessellate, sparsely punctate. Wings strongly infuscated with brownish, less strongly so beyond the cellular area, reflections violaceous; stigma and veins blackish. Hind femora about one-half as broad as long, with weakly developed longitudinal carina beneath; greatest width of hind tibiae about one-fourth their length.

*Abdomen:* Discs of segments very sparsely punctate, surface moderately shining, the few punctures piliferous. Pseudopygidial area distinct, apex subtruncate, disc slightly depressed so that lateral margins appear carinate.

*Measurements:* Body length (front of vertex to apex of second tergite), 14.6 mm.; forewing length, 14.7 mm.

*Holotype:* Male (Los Angeles County Museum of Natural History); Tuxtla Chico, 875 m., Chiapas, MEXICO, March 14, from the duBois collection.

I am very happy to be able to dedicate this outstandingly attractive species to Miss Carol Bumgardner, a true and honest friend. The combination of black, yellow and greenish-bronze is very striking, the bronze taking on subtle undertones beneath the golden abdominal pubescence.

#### Subgenus *HEMISIELLA* Moure

##### *Centris (Hemisiella) trigonoides subtarsata* Cockerell

*Centris lanipes subtarsata* Cockerell, 1949. Proc. U. S. Natl. Mus., 98: 476-477: ♀ ♂.

An examination of a long series of both sexes of this form, including two cotypes from Honduras, indicates that this bee is distinct from *C. lanipes* Fabricius, but is inseparable, structurally, from *C. trigonoides* Lepeletier (= *C. hoplopoda* Moure). The latter is a widely distributed species in South America, and typical material has been recorded from the Canal Zone, Panama. The male genitalia and hidden ventrites of *C. subtarsata* offer no characters by which it can be separated from *C. trigonoides*.

The populations from Mexico, Guatemala and Honduras, however, differ consistently from those farther south in that most of the pubescence of the abdominal tergites is light ferruginous to yellow-ferruginous, rather than fuscous to black. The females further differ in that the two apical maculae of the clypeus are somewhat smaller and less approximate in the northern populations. The Guatemala males have the dark infuscations of the tergites more restricted, and in some cases entirely lacking except on the base of the first segment, and the legs somewhat less extensively infuscated. Therefore, I regard *C. subtarsata* as a subspecies of *C. trigonoides*.

The following description of the chromatic characteristics is given in order to separate this from the nominate form. For the structural characteristics of the species, refer to the original description of *C. hoplopoda* by Moure (1943; 160).



**FEMALE:** Structurally inseparable from nominate form, apparently differing principally in that the suberect pubescence of the tergites is light fuscous to yellow-ferruginous, rather than dark fuscous; pubescence on inner side of hind basitarsi ferruginous instead of blackish; labrum with a large brownish median infuscation; facial macula light yellowish, clypeal marks well separated medially; legs variable, but generally with front and middle coxae, trochanters, femora, tibiae and basitarsi rufescent; hind legs entirely and all post-basitarsal segments ferruginous.

**MALE:** Structurally inseparable from nominate form; apical tooth of mandibles dull orange-yellow, narrow transverse ferruginous band separating this area from the dull creamy-yellow basal two-thirds of mandible (apical tooth dark in *C. t. trigonoides*); facial maculae pale yellowish (somewhat darker in *C. t. trigonoides*); legs lightly rufescent or brownish (darkly rufescent or blackish in *C. t. trigonoides*); abdomen mainly light ferruginous (tergites usually strongly infuscate in *C. t. trigonoides*); pubescence of second to fourth tergites light fuscous (darker in *C. t. trigonoides*), in some individuals entirely pale yellow-ferruginous.

One female from Chichén-Itzá, one from Santa Emilia and two from Costa Rica have the pubescence of the tergites mostly blackish, but all have the hairs of the inner side of the hind basitarsi ferruginous and the clypeal maculae well separated, except in the Chichén Itzá specimen in which they are almost contiguous. The two Costa Rican specimens have the front femora darkly rufescent, with a dorsal light ferruginous stripe from base to apex. A female, here assigned to *C. t. trigonoides*, from Nova Teutonia, BRAZIL, has the abdominal pubescence light fuscous instead of black, but that on the inner side of the hind basitarsi is black and the clypeal maculae are large, almost touching medially.

Since no additional specimens of this form have been recorded since it was originally described, the following are made known. All specimens are from the collection of the Museum of Comparative Zoology.

**NEW RECORDS:** MEXICO: 1 ♀, Chichén-Itzá, June 29; 1 ♀, 1 ♂, Acapulco (A. Agassiz). BRITISH HONDURAS: 7 ♂ ♂, Banque Viejo (Father Stanton). GUATEMALA: 5 ♀ ♀, 5 ♂ ♂, Santa Emilia, Pochuta, 1000 m., Feb.-March, 1931 (J. Bequaert); 1 ♀, Ciudad de Guatemala (J. Bequaert); 2 ♂ ♂, Los Amates (Kellerman); 1 ♂, Sanerate (Kellerman). NICARAGUA: 14 ♀ ♀, Polvon (J. McNeill Exped.). COSTA RICA: 2 ♀ ♀, Palmar, Puntarenas.

*Centris (Hemisiella) transversa* Perez

*Centris transversa* Perez, 1905. Bulletin Muséum Histoire Naturelle, Paris, 11:39: ♀ ♂.

Dr. Butler has submitted a single female of this species which he had collected at the Boyce Thompson Arboretum, near Superior, ARIZONA, on August 23, 1953, on flowers of tamarisk.



This record adds another subgenus to the United States, and it is certainly surprising to find a species of this group, which is so decidedly tropical in distribution, in the southwestern deserts. I know of no records of any species of *Hemisiella* in any of the northern Mexican states, and it is almost a certainty that this is an accidental intrusion. It would be interesting to know if the species is now established in the Nearctic Region.

For the identification of this specimen I am indebted to Padre Moure.

#### Subgenus *MELANOCENTRIS* Friese

The three new species described below are all anomalous members of this subgenus, and each presents peculiarities which are difficult to reconcile with current concepts of *Melanocentris*. In the males of all three the mandibles are tridentate (as usual in *Melanocentris*), but the upper inner mandibular carina ends at the base of the innermost tooth, rather than at the base of the second tooth (the usual condition in *Melanocentris*). In none of the three new species does the scutellum show any indication of the rounded lobes characteristically present in *Melanocentris*. Finally, all are unique in the metallic color of the abdomen (especially pronounced in the first two species). The female of one species lacks the large, spatulate setae on the anterior basitarsi which are present in all other species of this subgenus. While all three of these species agree in their divergence from typical *Melanocentris*, they are not closely related to one another.

#### ***Centris (Melanocentris) strawi* Snelling, new species**

Figure 1, c and h

*Diagnosis:* This highly distinctive species is not closely allied to any described species of *Melanocentris* and may be readily recognized by the following combination of characters: the pubescence of the thoracic dorsum is white, black elsewhere; the abdomen has strong metallic blue reflections; the labrum and clypeus are pale whitish; the body length is much less than that of other *Melanocentris*.

**MALE:** Integument black, that of abdomen with strong metallic blue reflections; labrum entirely and clypeus, except black lateral and basal borders, pale whitish; underside of flagellar segments three to eleven lighter than flagellum elsewhere. Pubescence largely black; of labrum, whitish, except for marginal dark hairs; a few pale hairs on dorsum of pronotum and on pronotal lobes; all pubescence of mesoscutum, mesoscutellum and tegulae whitish; intermixed whitish pubescence present on summit of first tergite, more abundant laterally.

**Head:** Mandibles tridentate, upper inner mandibular carina ending at base of third tooth. Maxillary palpi four-segmented, second and third segments approximately equal in length, fourth about half as long as third. Labrum



shining, closely, moderately coarsely punctate. Clypeus duller than labrum, median area of disc slightly raised, disc with scattered obscure punctures laterally. Punctures of frons and sides of face closer, finer than those of clypeus, interspaces a little more roughened. Vertex, laterad of ocelli, shining, impunctate; post-ocellar area with dense punctures larger than those of frons. Distance from anterior ocellus to clypeal base about 0.6 times breadth of face at level of clypeal base; distance between posterior ocelli a little more than twice the distance between ocelli and eyes, the latter equal to an ocellar diameter; distance between ocelli and posterior margin of vertex about twice the distance between the ocelli. First flagellar segment slightly longer than scape, shorter than following three segments combined.

*Thorax*: Punctures of mesoscutum, mesoscutellum, meso- and metapleurae uniformly dense, about equal to those of vertex, interstices moderately shiny, slightly roughened; propodeal integument moderately shiny, minutely roughened, with sparse, fine punctures. Tarsal claws slightly flattened, bifid, posterior femora about one-third as broad as long. First recurrent vein of forewing entering second submarginal cell at end of basal third.

*Abdomen*: Discs of tergites with punctures distinct, fine, separated by about a puncture diameter; tergites I-III with narrow impunctate apical margins; impunctate apical margins of tergites IV-VI about three times as broad as that of tergite III; ventrites with lateral punctures finer than those of tergites, those of discs about equal to tergal punctures. Pygidial plate bare, apex truncate, with strong longitudinal depression.

*Measurements*: Body length (front of vertex to apex of second tergite), 11.0 mm; forewing length, 12.0 mm.

*Holotype*, male (Los Angeles County Museum of Natural History), 25 mi. E. San Luis de la Paz, 7300 ft., Guanajuata, MEXICO, July 31, 1958 (R. Straw, No. 1463A), on *Penstemon potosinus*.

This species is dedicated to Dr. Ralph Straw, California State College at Los Angeles, who has kindly consented to have the type deposited in the Los Angeles County Museum.

### ***Centris (Melanocentris) ruthannae* Snelling, new species**

Figure 1, d and i

*Diagnosis*: Although superficially similar to the following species, *C. ruthannae* may be recognized by the more pronounced metallic blue reflections of the abdomen. The female has the mandibles tridentate, rather than quadridentate as in other *Melanocentris*. The male mandibles have the upper inner carina ending at the base of the innermost tooth; this, together with the metallic abdominal reflections and the bright lemon yellow clypeus and labrum should be sufficient for its recognition.

**MALE**: Integument, except as noted below, of head, thorax and ab-



domen black, that of tergites and ventrites with strong deep blue reflections. Labrum, clypeus (except lateral infuscations along margins); paraocular areas and transverse supraclypeal mark dull lemon-yellow. Tegulae, medio- and distitarsi darkly rufescent. Pubescence black, except for triangular patch of appressed pale pubescence on base of mandibles and that of labrum which is whitish. Wings hyaline, with strong brownish infuscation, reflecting purplish, veins and stigma darkly rufescent.

*Head*: Broader than long, inner orbits slightly converging above. Maxillary palpi five-segmented, third segment longest, almost as long as second plus fourth; fourth segment twice as long as fifth. Mandibles tridentate, apical tooth longest; inner larger than middle, broadly triangular. First flagellar segment about equal to scape, equal to following three segments combined. Labrum dull, coarsely, closely punctate. Clypeus dull, coarsely (sometimes striately) punctate; disc with narrow median impunctate raised line. Paraocular and supraclypeal areas almost impunctate, shiny. Frons and vertex finely punctate, with shining interstices, except for narrow, sparsely punctate band along inner orbits, beginning at level of posterior ocelli and running to tops of eyes. Distance between antennal sockets about one and one-half times a socket diameter; Ocellar-clypeal distance less than transfacial distance at level of clypeal base. Distance from posterior ocelli to eyes equal to an ocellar diameter; posterior ocelli separated by two and one-half times an ocellar diameter; distance between posterior ocelli about four-fifths distance between ocelli and posterior margin of vertex.

*Thorax*: Mesoscutum and mesoscutellum coarsely, closely punctate, with shining interstices. Mesopleura discally closely punctate, the punctures equal to those of mesoscutum; punctures becoming finer and a little sparser posteriorly, closer, larger and shallower sternally, appearing almost rugose. Metanotum dull, impunctate, tessellate; basal area of propodeum dull, impunctate, tessellate; lateral areas finely punctate dorsally, shining, ventrally roughened, with scattered punctures. Tegulae finely, closely punctate. Distitarsi slender, elongate, equal to first and second mediotarsal segments combined.

*Abdomen*: Discs of tergites shining, with sparse, piliferous punctures. First tergite with pubescence long, erect; discs of second to fourth with abundant short, suberect pubescence, not concealing surface; pubescence progressively longer on succeeding segments. Pseudopygidial area converging slightly toward the broadly rounded apex, disc slightly concave. Ventrites with pubescence and punctuation similar to those of tergites. Terminalia as illustrated.

*Measurements*: Body length (front of vertex to apex of second tergite) 12.6 to 15.0 mm.; forewing length, 13.0 to 15.0 mm.

**FEMALE**: Integument black, of abdomen with strong bluish reflections; most of apical tooth, spots on other two mandibular teeth, yellow-orange. Wings strongly infuscated with brownish, veins and stigma black. Pubescence entirely dark brownish; coarse erect seta-like hairs shining black.



*Head*: Mandibles long, strongly curved at apical three-fifths, distinctly tridentate, apical tooth longest, the broad inner tooth smallest, inner mandibular carina ending at base of inner tooth. Maxillary palpi four-segmented, second segment a little shorter than third, fourth about equal to basal. Labrum shining, densely, coarsely punctate, apical margin rounded. Clypeus with disc dull, roughened, with large scattered punctures, apico-median portion especially strongly tessellate and dulled; lateral and basal areas shining, with coarse, close punctures, from which arise long, slender, simple seta-like hairs, especially laterally. Face shining, with punctures finer than those of clypeus, densest on frons, laterally separated by about a puncture diameter. Facial quadrangle about as broad as long. Distance from anterior ocellus to clypeal base 0.5 times breadth of face at level of clypeal base; interocellar distance 2.8 times diameter of a lateral ocellus, about 1.5 times ocellar-ocular distance; distance from lateral ocelli to posterior margin of vertex 2.5 times an ocellar diameter. First flagellar segment longer than scape, a little longer than following three segments combined.

*Thorax*: Mesoscutum and mesoscutellum dull, the integument strongly roughened, obscuring the coarse punctures; meso- and metapleurae shinier, with coarse, close punctures; mesoscutellum not at all bilobed; metanotum dull, strongly tessellate, with a few scattered punctures. Basal area of propodeum tessellate, somewhat shining, with scattered punctures; disc with coarser, denser punctures; lateral areas densely tessellate, with dense, obscure, minute punctures. Legs normal for the subgenus. Second recurrent vein of forewing entering second submarginal cell at end of basal third.

*Abdomen*: Tergites I, apical half of II, III–V with integument shining, with abundant piliferous punctures, the punctures becoming progressively sparser and coarser on succeeding segments; basal half of tergite II conspicuously duller, integument slightly roughened, with contiguous shallow, poorly defined punctures from each of which arises a short, plumose hair, rendering a somewhat velvety appearance. Ventrites dull, granulate, with moderately coarse, dense punctures; apical margin of ventrite III slightly produced medially; ventrite VI with strong, high, longitudinal carina on apical half. Pygidial plate essentially flat, surface dull, apex truncate.

*Measurements*: Body length (front of vertex to apex of second tergite), 14.8 to 15.2 mm.; forewing length, 13.2 to 13.5 mm.

*Holotype* male, *allotype* female (Los Angeles County Museum of Natural History), Madera Canyon [Santa Rita Mts.], ARIZONA, no date (J. A. Comstock). *Paratypes*: 1 ♂, Baboquivari Cyn., west end of Baboquivari Mts., Arizona, July 25–27, (H. B. Leech and J. W. Green; CAS); 1 ♀, 5 mi. E. Continental, Arizona, August 29, 1961 (F. G. Werner; UA), on *Kallstroemia*. Paratypes returned to their respective institutions.

I am very happy to be able to dedicate this remarkable and distinctive new species to my wife.



**Centris (Melanocentris) anomala** Snelling, new species

Figure 1, e and j

*Diagnosis:* This species, although superficially similar to *C. ruthannae*, differs radically from this and all other *Melanocentris* in that the female lacks the long, spatulate setae on the anterior basitarsi. Both sexes may be immediately recognized by the five-segmented maxillary palpi (four-segmented in other *Melanocentris*).

**FEMALE:** Integument black, of abdomen faintly reflecting dark metallic blue. Wings strongly infuscated with brownish, reflecting purple, veins and stigma black; all pubescence black.

*Head:* Mandibles quadridentate, two inner teeth about equal in size, dull orange-yellow. Maxillary palpi five-segmented, apical segment a little shorter than basal, second and third longest, each longer than combined length of last two. Labrum shining, rugosely punctate, punctures close; apex broadly rounded. Clypeus strongly protuberant, with slight bulge along median line, apical one-fifth flattened; median basal area quite shiny, impunctate; discal punctures coarse, elongated, well separated, with area of median bulge a little more shiny than disc, punctures round, sparse. Punctures of face finer, sparser than of clypeus; of frons finer than of clypeus, close, except for median impunctate line; supraclypeal area very shiny, sparsely punctate; punctures of vertex close, finer than of clypeus; ocellar area shiny, sparsely punctate. Distance from anterior ocellus to base of clypeus about one-half breadth of face at level of clypeal base; distance between posterior ocelli equal to distance between ocelli and eyes, about twice an ocellar diameter. First flagellar segment longer than scape, longer than following three segments combined.

*Thorax:* Punctures of mesoscutum, mesoscutellum, meso- and metapleura, uniformly close, about equal to those of vertex, interstices moderately shiny; mesoscutum with impunctate median line which broadens slightly, in front of posterior margin. Metanotum and basal area of propodeum moderately shiny, tessellate, much more sparsely punctate than lateral areas of propodeum, where punctures are about a diameter apart, becoming a little denser laterobasally. Front and middle tibiae and tarsi very densely covered with short, compact hairs, the setae of these tibiae sparse, not flattened. Scopa of hind legs very dense and compact, completely obscuring surface; basitibial plate twice as long as greatest breadth, disc distinctly depressed beyond the transverse margin of the secondary plate, the depression shining, in contrast to duller areas.

*Abdomen:* Punctures fine, close, piliferous, interstices moderately shiny, discs strongly pubescent, pubescence not obscuring surface, except on last segment. Pygidial plate narrowly rounded at apex, with triangular raised area on basal third.

*Measurements:* Body length (front of vertex to apex of second tergite), 13.5 to 15.0 mm.; forewing length, 13.5 to 15.0 mm.



**MALE:** Integument as in female. In some males there are two separated, cuneiform pale yellow maculae on apical margin of clypeus. Pubescence of head, thorax and abdomen very dark brown, appearing black, except lighter areas on genae, behind vertex, basal tergite, underside of abdomen, and on legs; dirty-white pubescence on posterior surfaces of front and middle femora, anterior and posterior surfaces of hind femora; pseudopygidial area fringed with golden brown pubescence.

*Head:* Broader than long, eyes slightly converging above. Mandibles long, slender, tridentate; inner tooth broad, truncate. Labrum, clypeus and rest of face punctured as in female. Maxillary palpi five-segmented, apical segment about as long as basal, last two together a little shorter than second, which is subequal to the third. Distance from anterior ocellus to base of clypeus less than breadth of face at level of clypeal base; distance between antennal sockets about twice distance between sockets and eyes; posterior ocelli about twice an ocellar diameter apart, separated from eyes by about an ocellar diameter; distance between posterior ocelli slightly greater than distance from ocelli to posterior margin of vertex.

*Thorax:* Punctuation as in female. Posterior femora one-third as broad as long; apical tarsi a little more than twice as long as greatest breadth. Cellular area of wings densely pubescent.

*Abdomen:* Punctuation as in female. Apical tergite with pseudopygidial area distinct, well developed.

*Measurements:* Body length (front of vertex to apex of second tergite), 14.0 to 15.5 mm.; forewing length, 14.0 to 15.5 mm.

*Holotype* male, *allotype* female. (California Academy of Sciences), 8 mi. S. Guadalajara, Jalisco, MEXICO, late September, 1954 (F. X. Williams). *Paratypes:* 16 ♂♂, 7 ♀♀, same data as Holotype; 1 ♂, Tizapan, Jalisco, MEXICO, Sept. 15, 1963 (D. H. Janzen; LACM). Paratypes are in the collections of the California Academy of Sciences and the Los Angeles County Museum of Natural History.

One of the males bears a label with the following note by Dr. Williams: "These *Hemisia* ? bees common, flying often low and swiftly over ground and at times alighting to seek ♀."





Snelling, Roy R. 1966. "The taxonomy and nomenclature of some North American bees of the genus *Centris* with descriptions of new species (Hymenoptera: Anthophoridae)." *Contributions in science* 112, 1–33.  
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