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Studies of North American Bees

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I.—STUDIES OF NORTH AMERICAN BEES

II. FAMILY STELIDIDAE

BY MYRON HARMON SWENK —

The present paper is the second of the series proposed in a previous contribution on the family Nomadidae (antea, XII, pp. 1-113), and aims to tabulate and list the bees of the family Stelididae occurring in Nebraska, together with annotations concerning their distribution, comparative abundance and season of flight. As in the previous study, records and descriptions of specimens from outside Nebraska before the writer are included where these seem to add anything to our knowledge of the species concerned.

MATERIAL

In the studies upon which this paper is based over four hundred specimens have been examined and determined. From the state of Nebraska fifteen species and subspecies are recorded, and of these three species are apparently new. From outside the state seven species and three subspecies are described as new, making a total of thirteen new forms here described as new.

CLASSIFICATION OF STELIDIDAE

The family Stelididae is here used in the sense proposed by Robertson (Canadian Entomologist, XXXVI, p. 37 and p. 40), but only the subfamilies Stelidinae (=Anthidiinae Robertson, part) and Anthidiinae are represented within our limits. The group is the same as Ashmead’s subfamily Stelidinae of his family
Stelidae (Transactions American Entomological Society, XXVI, p. 79), in which family he also included the subfamily Coelioxynae which is referred by the writer to Megachilidae. Cockerell refers both the Stelidinae and Anthidiinae, as here considered, as subfamilies of Megachilidae along with the subfamilies Megachilinae, Osmiinae, Coelioxynae and Dioxynae (University of Colorado Studies, VII, pp. 184–185), but the writer would restrict the Megachilidae to the four last named subfamilies.

The subfamily Stelidinae is composed of the parasitic bees referable to the old genus Stelis. Our American forms of this family fall into two groups, based on the venation, in one of which the second submarginal cell receives both recurrent nervures while in the other the second recurrent nervure is interstitial with or received beyond the second transverse cubital nervure. The first type of venation is confined to Nearctic species, while the second type is common to Palearctic and some Nearctic species. The chief objection to its employment as a generic character is that in some species, which usually have the second recurrent nervure before the second transverse cubital nervure, specimens occur in which these nervures are opposite each other (e. g., foederalis), while other species have these nervures either opposite or the second recurrent nervure beyond the second transverse cubital nervure (e. g., lateralis), so that there is no marked defining line between the two groups, and they had apparently better stand as subgenera. The first type of venation occurs in Robertson's alleged genus Stelidium (type S. trypetinum), and characterized Ashmead's genus Melanostelis (Psyche, VIII, p. 283, Nov. 1898), the type of which, M. betheli Ashmead, is a synonym of Stelis rubi Ckll. (Entomologist, July 1898, pp. 167–168). In 1888 Provancher proposed the monobasic genus Chelynia (Additions a la faune Hyménoptérologique du Canada, p. 321), and Titus, after examining Provancher's type of Chelynia labiata, found that it was the same as Cresson's species nitida, which he doubtfully referred to Stelis (Transactions American Entomological Society, VII, pp. 92–93, 1878). S. nitida Cresson and S. rubi Ckll. both have the first type of venation and are probably congeneric, although rubi shows a unique form of pygidium
in the female. Hence *Melanostelis* Ashmead is to be regarded as a synonym of *Chelynia* Provancher, the latter name having ten years priority, and the group is here recognized as a subgenus. The Nearctic species having the second type of venation have been commonly referred to the genus *Stelis*. This genus was described by Panzer in 1806 (Kritische Revision der Insektenfaune Deutschlands, II, p. 246), and the only included species was *S. atterima*, which is thus necessarily the type. But *S. atterima*, as well as several Palearctic species, have the mesoscutellum bearing lateral teeth behind, which are lacking in our Nearctic species, even when possessing the second type of venation, hence the two are probably not subgenerically identical. Robertson has proposed the genus *Microstelis*, with *S. lateralis* as the type, and this name might well be employed as a subgeneric group for the Nearctic species normally having the second recurrent nervure opposite or beyond the second transverse cubital nervure.

The subfamily Anthidiinae is composed within our limits of the bees of the genera *Anthidium* and *Dianthidium*. *Anthidium* was proposed by Fabricius in 1804 (Systema Pecatorum, p. 361) and in 1810 Latreille designated *A. manicatum* (L.), the first species included under the genus by Fabricius, as the type (Considérations générales sur l'ordre naturel des crustacés, arachnides et insectes, p. 433). *Dianthidium* was originally proposed by Cockerell as a subgenus of *Anthidium* (Annals and Magazine of Natural History, series 7, V, pp. 412-413), but it soon became evident that the group was well worthy of generic standing. Its type is *D. sayi*, which is a name proposed by Cockerell for the *Megacleris interrupta* of Say, 1824, referred to *Anthidium* in 1854 by F. Smith where it became a homonym of *A. interruptum* of Fabricius, 1804, and for the *A. curvatum* of Cresson and subsequent authors up to 1907 (not *A. curvatum* Smith, 1854). In addition to their structural differences, the nesting habits of *Anthidium* and *Dianthidium* are very different, the species of the former genus nesting in burrows and lining the nest with cottony material, while those of the latter genus make resinous nests on rocks, sides of cliffs, etc.

*Heteranthidium* Ckl. (Entomological News, XV, p. 292) was
proposed as a genus for its type species, *Anthidium dorsale* Lepeletier, for while it agrees with *Dianthidium* in the possession of pulvilli (though smaller than typical), it almost always has the venation of *Anthidium*; the second recurrent nervation being usually received opposite the second transverse cubital nervation instead of well beyond it as in typical *Dianthidium*. Later, Cockerell referred *A. occidentale* Cresson and *A. zebratum* Cresson to *Heteranthidium* (ibid., XX, p. 261), and still later *A. chippewaense* Graenicher (*Proceedings U. S. National Museum*, XXXIX, p. 643) was also referred to it. A critical examination of fifty-eight specimens of *zebratum* from Nebraska and South Dakota shows that while the great majority have the second recurrent nervation perfectly opposite the second transverse cubital nervation, an occasional specimen has it slightly but distinctly beyond that nervation, practically as far as in some species referred to *Dianthidium*. Hence the writer would for the present consider *Heteranthidium* as a subgenus of *Dianthidium*, owing to the insufficiency of the venation characters as a generic criterion, though there seem to be differences in the palpi and dentition of the mandibles which, if constant, may make it ultimately desirable to recognize *Heteranthidium* as a distinct genus.

*Anthidium* Ckl. (*Bulletin of the Southern California Academy of Sciences*, III, p. 3) is a well defined group of species of the general appearance of the type species, the European *D. striatum* (Panzer), and deserves recognition as a subgenus, as proposed by Cockerell.

**Family STELIDIDAE**

**KEY TO THE NEBRASKA SUBFAMILIES**

Scopae absent in both sexes; maxillary palpi one or two jointed, short, bare; mandibles 3-dentate; ornamentation usually whitish... **STELIDINAE**

Scopae present in female; maxillary palpi two or three jointed, joint 2 long and hairy; mandibles 2-7-dentate; ornamentation yellow or red. **ANTHIDIINAE**

**Subfamily STELIDINAE**

The genus *Stelis* is the only Nebraska representative of this subfamily, but the genus is represented within our limits by at least two groups or subgenera.
Genus Stelis Panzer, 1802

KEY TO THE NEBRASKA SUBGENERA

Second recurrent nervure received opposite or beyond the second transverse cubital nervure, rarely before it. .................Microstelis
(Type Stelis lateralis Cresson)

Second recurrent nervure received by the second submarginal cell before the second transverse cubital nervure, rarely opposite it. .......Chelynia
(Type Stelis nitida Cresson)

Subgenus Microstelis Robertson, 1903

KEY TO THE NEBRASKA SPECIES

Female
Abdomen 8-14 spotted, on tergites 1-5; color black; pubescence whitish; 6-7 mm..................lateralis

Male
Abdominal tergites 1-5 with lateral whitish spots, 4 and 5 sometimes 4 spotted, elsewhere wholly black; 5.5-6 mm.............lateralis

Stelis (Microstelis) lateralis Cresson.

Three females of this species were bred from a nest of Alcidaea simplex in a stem of Helianthus annuus collected at Lincoln, emerging in June along with three females of the host bee. Mr. J. C. Crawford collected this bee at the nest of the same host in rose bushes at West Point, Nebraska, June 10, 1901. The only occasion it has been collected in the field was at South Bend, May 18, 1911, when the writer captured a male at flowers of Erigeron philadelphicus.

Subgenus Chelynia Provancher, 1888

KEY TO THE NEBRASKA SPECIES

Female
Greenish blue; abdomen with four pale yellowish white bands; hair of
Harm on S'wenk
pleura black; valves of pygidium subuniformly rounded on apical margin, the dorsal valve distinctly exceeding the ventral valve; 10 mm. pulchra

(The male of S. pulchra is unknown.)

Stelis (Chelynia) pulchra Crawford.
1907. Chelynia pulchra Cockerell, Univ. of Colorado Studies, IV, p. 249. ♀

Known as a Nebraska bee only from the type, a female collected in Warbonnet canyon, Sioux county, June 28, 1901, by J. C. Crawford, and subsequently described by him. When captured the bee was flying over gravelly ground. Mrs. W. P. Cockerell has captured this species at Boulder, Colorado, on a small Astragalus.

SPECIES FROM OUTSIDE NEBRASKA

Stelis (Chelynia) subemarginata Cresson.

A female from the Big Horn mountains before the writer, taken at 8,000 feet in August 1894, agrees with Cresson's description of subemarginata in all essential details. The two cotypes of subemarginata came from Colorado.

Stelis (Chelynia) idahoensis n. sp.
♀. Length 10 mm. Shining black. Head and thorax closely punctured, the punctures rather coarse. Pubescence erect, rather thin, pale, on face above and on mesopleura copiously mixed with black. Antennal joint 3 above subequal to 4, below slightly exceeding 4. Wings slightly darkened, especially apically, nervures dark brown, second submarginal cell not over one-fourth longer than the first, both recurrent nervures received within this cell. Legs thinly clothed with black hairs, the inner sides of the tarsal joints with reddish golden pubescence. Abdomen shining black, sparsely punctured except along basal margins of the tergites, tergites 1-5 with transverse, narrow, complete, yellowish white bands, all narrowed medially and slightly but sharply incised medially on anterior margin on 3-5, on 1-4 attaining the sides of the tergite and laterally produced downward in a swollen termination while the lateral posterior margin is broadly emarginate, on 5 abbreviated and terminating acutely laterally. Tergites
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with long black bristles, becoming copious laterally on tergites 3-6. Pygidium coarsely punctured above, the dorsal valve terminally broadly rounded, the ventral valve much surpassing the dorsal valve and produced into a long, oval lobe on each side. Venter subopaque, minutely punctured.

_Type._—Moscow Mountain, Idaho, Q.

This species is a typical _Chelvnia_ and belongs to the _nitida_ group. It is closest to _S. (Chelvnia) subemarginata_ Cresson, but differs at once in the deeply bilobed ventral valve of the pygidium (in _subemarginata_ the ventral valve only slightly exceeds the dorsal valve, and is broadly truncate with the sides scarcely produced into lobes), and in having the second submarginal cell only about one-fourth longer than the first (fully one-third longer in _subemarginata_); from _S. (Chelvnia) nitida_ Cresson it differs in its close and rather coarse puncturation (_nitida_ is sparsely and finely punctured), and in having the bands on tergites 1-4 broadly emarginate laterally on the posterior margin; while from _S. (Chelynia) monticola_ Cresson it differs again in the close puncturation and also in the oblong ovate abdomen (the abdomen is short and subglobose in _monticola_). The pygidium is very different from that of _S. (Chelynia) rubi_ Ckll. From _S. (Chelynia) elegans_ Cresson, _subcaerulea_ Cresson, and _pulcra_ Crawford it differs in its wholly black ground color, without a trace of blue or green, and in the bilobed ventral valve of the pygidium; from _S. (Chelvnia) pavonina_ Ckll., _cusackae_ Ckll., and _calliphorina_ Ckll., in its black color and in the possession of creamy bands on tergites 1-5; from _S. (Microstelis) montana_ Cresson, _seneciofila_ Ckll., and _carnifex_ Ckll., in the black color and in the different venation. From _S. (Microstelis) obesa_ Say, _costalis_ Cresson, _rudbeckiarum_ Ckll., _louisae_ Ckll., and _laticincla_ Cresson, and from _S. (Stelidium) trypetinum_ Robertson, it may be distinguished at a glance by the complete lack of yellow ornaments on the head and thorax, while the red ornaments of _S. australis_ Cresson serve to easily distinguish that species. By its much larger size it may be easily separated from the other North American species of the genus, viz., _foederalis_ Smith, _birkeniani_ Ckll., _lateralis_ Cresson, _permaculata_ Ckll., _sevmaculata_ Ashmead and _interrupta_ Cresson.
Stelis (Chelynia) elegans Cresson.
1901. Chelynia elegans Cockerell, Univ. of Colorado Studies, IV, p. 249, ♂.

Before the writer are three females of this species from Colorado. Two were collected at Russell, June 24 and 25, 1907, by H. S. Smith and L. Bruner, respectively, while the third specimen is from Ward.

Stelis (Chelynia) rubi Cockerell.

A pair apparently referable to this species is before the writer, both collected at Ute creek, Costilla county, Colorado, by R. W. Dawson, at 9,000 feet, the female July 6, 1907, at flowers of Erigeron, the male July 17, 1907. This species has previously been collected only at Seattle and Olympia, Washington, on May 11 by Trevor Kincaid and on June 2 by L. Bethel, respectively, the former at flowers of Rubus ursinus. While agreeing with the descriptions of these Washington specimens in all structural characters, the Colorado female has the hair of the mesonotum and propodeum almost wholly pale and there is much pale hair on the face below, so that it may represent a distinct form. In the pale pubescence it resembles the recently described S. (Chelynia) ricordous Ckll., but it has the abdominal bands colored as in rubi. The dorsally medially keeled and ventrally apically tridentate pygidium of the female distinguishes the species in this sex at a glance, and it may eventually prove desirable to continue to recognize Melanostelis as a subgenus on this character. The species evidently belongs nearest to the nitida group. The male sex of this species is undescribed so the following diagnosis is given:
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♀. Length 6.5 mm. Black. Head and thorax subopaque, very densely and strongly punctured. Hair of head and thorax grayish white with a few black hairs intermixed on vertex and mesoscutellum. Legs densely punctured, very thinly clothed with pale pubescence and with sparse black bristles scattered on last four tibiae, the tarsi within with reddish golden hair. Bowl of enclosure on propodeum opaque, finely roughened, the neck shining. Venation as in 9. Abdomen somewhat shiny, the tergites closely punctured except on the cream-colored bands, especially basally, bands on tergites 1-5, all complete, those on 1-4 very feebly broadly submarginate laterally on posterior margin, those on 3-5 feebly incised medially on posterior margin nearly cutting through on 5. Tergite 5 coarsely punctured, its apical border broadly raised laterally. Pygidium crescentic in outline and with a slight marginal notch medially. Venter indistinctly roughened, sternite 5 with a dense fringe of ochreous hair, sternite 4 with a similar but paler and much thinner fringe.

Allotype.—Ute creek, Costilla county, Colorado, July 17, 1907 (R. W. Dawson).

Subfamily ANTHIDINAE

KEY TO THE NEBRASKA GENERA

Pulvilli absent; second recurrent nervure received opposite second transverse cubital nervure, or rarely a little beyond it; pygidium of male usually terminally spinous ........................................ Anthidium

Pulvilli present; second recurrent nervure received well beyond second transverse cubital nervure, or sometimes opposite it in a few species; pygidium of male usually truncated or lobed ............... Diantidium

Genus Anthidium Fabricius, 1804

KEY TO THE NEBRASKA SPECIES

Females

Cheeks wholly yellow and this color connected by a broad uninterrupted yellow line across the vertex; broad lateral face marks extending nearly to vertex, clypeus except a broad central band, mandibles except tips, four scarcely interrupted spots on mesoscutellum, lines on lateral and antero-lateral margins of thorax, tubercles and broad area beneath, spot on tegulae, legs except coxae and inner surface of femora and tibiae, broad medially interrupted bands on abdominal tergites 1-5 and all of tergite 6 except two depressed black spots, deep yellow; all pubescence whitish; 14 mm............................................. serratum

Cheeks black, or with a yellow band not connected by a band across the vertex; ornamentation not as above.........................
1. Margin of pygidium tridentate, the middle tooth largest, bifid at tip and bearing a median carina which extends across the pygidium; mesoscutellum with four or two yellow spots; tubercles black; legs wholly black; tegulae with a yellow spot, and a yellow spot on vertex behind each eye; abdominal tergites 1–5 with deep yellow bands, interrupted medially or nearly so, the lateral halves deeply emarginate, breaking through on first tergite and forming four spots; thorax above with pale ochreous hair; ventral scopa silvery; 10–11 mm. *psoraleae*

1. Margin of pygidium rounded with a weak tooth on each side laterally, or broadly truncate. 2

2. Mesoscutum with a yellow line over each tegula and usually with two yellow lines along anterior margin. 3

3. Legs wholly black; clypeus black; pygidium broadly truncate, medially carinate and with a median bifid tooth; 11 mm. *clypeodentatum*

3. Legs with yellow spots on the knees; clypeus with two yellow spots nearly confluent with large subtriangular facial spots; pygidium broadly rounded, notched laterally, not carinate or medially toothed; 11–12 mm. *porterae*

4. Mesoscutellum wholly black; tubercles black; tibiae with only a small knee spot; front of tegulae yellow; hair of thorax above pale grayish white; ventral scopa silvery gray mixed with blackish centrally; 8 mm. *tenuiflorae.*

4. Mesoscutellum spotted; tubercles yellow. 5

5. Clypeus and sides of face with large yellow spots; first abdominal tergite merely with lateral spots; legs more yellow; mesoscutellum with two yellow spots; 10 mm. *nebrascense*

5. Clypeus and sides of face entirely black; first abdominal tergite with a medially interrupted yellow band; legs with less yellow. 6

6. Mesoscutellum with two yellow spots; tibial stripes short and narrower; ventral scopa brownish white edged with fuscos; 9 mm. *emarginatum* var.

6. Mesoscutellum with four yellow spots; tibial stripes broader and extending nearly the length of the joint. 7

7. Hair of thorax above grayish white; ventral scopa whitish; 9 mm. *emarginatum*

7. Hair of thorax above deep brownish ochreous; ventral scopa golden brown and black; 9 mm. *astragali*

**Males**

A broad yellow line behind eyes slightly interrupted on vertex; 15.5 mm. *serranum*
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Only a small yellow spot or band behind the eyes......................1
1. Lobes of the pygidium long and terminating in an inwardly directed tooth; pygidium wholly black; mesoscutellum usually with two yellow lines; first abdominal tergite with two large lateral and usually two small discal spots; 12 mm................. *psoralea*
   Lo. Lobes of the pygidium evenly rounded, their apices not distinctly produced and directed inwardly......................2
2. Venter red; pygidium usually red, and sometimes the whole of tergum red (variety *amabile* Ckll.); 13-15 mm...................... *porterae*
2. Venter and pygidium black, the latter sometimes yellow spotted......3
3. Mesoscutellum black; scape black or with a small yellow terminal spot .................................................................4
3. Mesoscutellum with two linear spots..................................5
4. Middle and hind tibiae with large triangular yellowish apical areas as well as knee spots; band on first abdominal tergite reduced to small lateral spots sometimes with minute middle dots between; 11-12 mm. *nebrascense*
4. Middle and hind tibiae black except for the small yellow knee spots; first abdominal tergite always distinctly four spotted; 9-11 mm. *tenuihora*
5. Scape black; hair of thorax only slightly if at all tinged with ochreous; lobes of pygidium rather narrowly rounded; 10 mm. *emarginatum*
5. Scape with a broad yellow stripe in front; hair of thorax above strongly tinged with ochreous; lobes of pygidium broadly rounded; 9-10 mm........................ *astragali*

(The male of *clypeodentatum* is unknown or unrecognized.)

**Anthidium serranum** Cockerell.


A single female specimen before the writer labeled simply "Nebr.?" evidently belongs here rather than with *illustre* Cresson because of the color of the thoracic pubescence, which is white rather than fuscous; otherwise it agrees with Cresson's description of the female of *illustre*. It is extremely doubtful that this specimen was captured in Nebraska, as the known range of the species of this group, *A. illustre, serranum, conspicuum*, etc., is confined to California and Nevada, and it is most likely that the specimen came from the former state. It has seemed best, however, to include the species in the list with this expla-
nation. As the female of *serranum* has never been described this specimen becomes the allotype of the species, and may be easily recognized by the characters given in the synoptic table.

**Anthidium psoraleae** Robertson.


The writer captured a male of this species at Lincoln, June 23, 1912, at flowers of *Psoralea tenuifloria*. On June 17, 1902, J. C. Crawford captured a pair of this species in copula at Springview Bridge, Brown county, Nebraska, on the same flower, and later captured an additional male in the same locality, June 23, 1902, also on *Psoralea tenuifloria*. These are the only captures of this species in the state.

**Anthidium clypeodentatum** n. sp.

♀. Length 11 mm. Clypeus black, coarsely cancellately punctured with a central apical area of much coarser and more separated punctures, apical margin with about six distinct teeth forming a continuous row. Face coarsely closely punctured. Antennae black, the scape with lateral brushes of white hair, joint 2 or 4 about one-third shorter than 3. An oblong yellow mark on each side of vertex behind eye. Spot on tegulae, line above, a short broad line on each side of anterior margin of mesoscutum, spot on tubercles and four large oval spots on mesoscutellum, deep yellow. Legs wholly black, clothed with white pubescence except on inner surface of tarsi where it is rufous and black. Mesopleura with dense grayish white hair, that on thorax above very slightly tinged with ochreous. Abdomen closely punctured, tergites 1–5 with deep yellow bands, all interrupted medially and deeply emarginate on the anterior margin of each half laterally, except on the first tergite where the emargination is on the posterior margin. Pygidium wholly black, densely punctured above, its margin broadly truncate but with a stout, median, bifid, forwardly directed tooth from which arises a median carina which crosses the tergite transversely. Ventral scopal white. Wings subhyaline, slightly darkened apically.

*Type.*–Sioux county, Nebraska, ♀.

This species is allied to *psoraleae*, but differs in its differently shaped pygidium, sexdentate clypeal margin, lines on mesoscutum, paler wings and different abdominal maculation. From *porteræ*
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it differs at once by its black legs, immaculate and apically toothed clypeus and differently shaped pygidium.

**Anthidium porterae** Cockerell.
1904. *Anthidium porterae* var. *amabile* Cockerell, *The Entomologist*, XXXVII, p. 7, \( \odot \).
1907. *Anthidium porterae* Cockerell, *Univ. of Colorado Studies*, IV, p. 250, \( \odot \odot \).
1907. *Anthidium porterae* *amabile* Cockerell, *ibid.*, \( \odot \).

A common species in western Nebraska. Monroe canyon, Bad Lands, and Glen, Sioux county; Imperial, Chase county; Mitchell, Scottsbluff county, Haigler, Dundy county and Lexington, Dawson county, June 26 to August 17, at flowers of *Kuhnistera candida*, *Cleome serrulata* and *Helianthus petiolaris*. In Dundy county the writer has found the males commonly at flowers of alfalfa, while L. M. Gates found both sexes commonly visiting it in Scottsbluff county, and R. W. Dawson collected both sexes on these blossoms in Dawson county. Many of our Nebraska males have the ground color of the abdomen red, thus representing Cockerell's variety *amabile*, but none of the series at hand is referable to the subspecies *personulatum* Ckl., though some females have the clypeal spots very small and seem to approach that form. More probably *personulatum* will turn out to be a valid species. There are also before the writer two males of typical *porterae* from Costilla county, Colorado, one from Russell, July 12, 1907, collected by H. S. Smith, and the other from Ute creek, on sage flats, collected July 19, 1907 by R. W. Dawson. Another male representing the variety *amabile* is labeled simply Hecla, Wyoming (Clason). The species discussed as *A. maculifrons* Smith by Hungerford and Williams (*Entomological News*, XXIII, p. 256) is *A. porterae*, the writer having examined a typical specimen forwarded him by Mr. Williams.

**Anthidium tenuiflorae** Cockerell.
1907. *Anthidium tenuiflorae* Cockerell, *Canadian Entomologist*, XXXIX, p. 135, \( \odot \odot \).
A single female from Warbonnet canyon, Sioux county, Nebraska, collected on *Astragalus hypoglottis*, May 28, 1901, by M. Cary, seems referable here. Also before the writer is a series of three females and one male from Custer, South Dakota, a female collected at Newcastle, Wyoming, in June, by M. Cary, a female from Ward, Colorado, and an interesting series of eleven females and five males from Russell, Fort Garland and Ute Creek, Colorado, taken June 24 to July 19, 1907, by Messrs. H. S. Smith, L. Bruner and R. W. Dawson. All of these specimens seem to be conspecific and they agree too closely with the description of *A. tenuiflorae* to warrant any separation from that species; yet the scopa is often nearly wholly pale and the tegulae usually lack the pale posterior spot in the female, while in the male the scape is usually black or at best has only a short apical pale line, and the pygidal lobes, though variable, are usually broader than the space between them and the central spine.

**Anthidium nebrascense n. sp.**

♂. Length 11-12 mm. Black; the clypeus, broadly cuneate lateral face marks filling the space between clypeus and orbits, most of outer surface of mandibles, small dots on vertex behind summits of eyes, sometimes a spot on front of tegulae, spots on all of the knees, large triangular areas or stripes on outer side of tibiae apically, outer side of all the basitarsi, rounded or subquadrate spots on sides of tergite 1 with sometimes tiny discal spots, four spots on tergite 2, interrupted and deeply anteriorly emarginate bands on tergites 3-5, two cuneate spots on 6 and sometimes spots on the pygidium, yellowish white to chrome yellow. Head and thorax very densely and quite strongly punctured, the punctures distinct except on propodeum where they are shallow and poorly formed. Antennae wholly black. Pubescence wholly whitish except for the usual pale golden areas on the tarsi within, on vertex, mesoscutellum and pleura rather long and copious. Lobes of pygidium rather narrowly rounded, their width not greater than the distance between their bases and the central spine. Abdominal tergites finely and densely punctured except on the pale spots or bands, the punctures apically distinct but indistinct on the bases of the tergites. Wings very slightly darkened, the nervures and stigma blackish.

♀. Length 10 mm. Black; round spots on sides of clypeus, oval spots on sides of face nearly coalesced with the clypeal spots, outer side of mandibles except base and tip, oval spots on vertex behind summit of eye,
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tubercles, spot on tegulae in front, two linear spots on mesoscutellum, lines on first four femora beneath and an apical spot on posterior femora, broad stripes on the tibiae covering most of the outer face and nearly interrupted subbasally on anterior tibiae, outer side of basitarsi, spots on extreme sides of first abdominal tergite, broadly medially interrupted bands on tergites 2-5 which are deeply emarginate on anterior margin and all but cut through on 2 and 3, and lateral cuneate spots on 6, bright yellow. Apical tarsal joints reddish. Pygidium rounded, with short lateral spines. Clypeus coarsely punctured, its apical margin raised and bearing on each side two strong teeth, the margin between the teeth with a double curve. Antennae wholly black. Vertex and mesoscutum finely roughened by very close small punctures, the enclosure on pygidium opaque, densely and shallowly punctured on a broad basal area. Face with long pale hair, dense in two tufts above antennae, that on vertex strongly ochreous, that on mesoscutum thin and rather short, gray faintly tinged with ochreous. Ventral scopa white. Hair of tarsi within bright reddish or golden. Wings as in ♂ or perhaps slightly clearer.

Type.—Sowbelly canyon, Sioux county, Nebraska, June 23, 1911, on Trifolium repens (R. W. Dawson), ♂.

Allotype.—Newcastle, Wyoming, June (M. Cary), ♀.

Paratypes.—Type lot, 2 ♀.

This is a member of the emarginatum group. The male differs at once from A. emarginatum Cresson, A. titusi Ckll., A. tenuiflorae Ckll., etc., in the broad yellow stripes on the apical half of the tibiae. The Wyoming female seems to agree with what would be expected by analogy in the other sex of the Nebraska males, so that little hesitancy is felt in so considering it; only, one would rather expect the two sexes to agree in color of the tubercles, and, in fact, the males usually do have a small pale spot or band on the tubercles, though sometimes they are entirely black.

Anthidium emarginatum (Say).


Common in Sioux county, in Warbonnet and Monroe canyons, June 13 to August 6, at flowers of Pentstemon glaber and an
undetermined borage. The females agree exactly with Say's original description, but they differ from Cresson's description of his Kansas specimen in having the band on tergite 1 interrupted medially and not indented on the posterior margin, but sometimes enclosing a central black spot (which may break through on the anterior margin to form a narrow and deep diagonal emargination) as he described for *A. atrifrons*, which he later recognized as synonymous with *A. emarginatum* but which was described from four females from Colorado. From *A. tenuiflorae* Ckll., this species may be known in the female by the four yellow spots on the mesoscutellum, arranged in an arc, as contrasted with the wholly black mesoscutellum of *tenuiflorae*, the yellow tubercles (black in *tenuiflorae*) and the long conspicuous yellow stripe on the external faces of the tibiae (in *tenuiflorae* there are only the small knee spots). The male is distinguishable by the linear yellow spots on the mesoscutellum and the more narrowly rounded lobes of the pygidium, the emargination between the apices of the lobes and the median spine being twice as broad as deep (scarce­ly broader than deep in *tenuiflorae*).

**Anthidium emarginatum** (Say) var.

A female collected at Mitchell, Scottsbluff county, Nebraska, July 29, 1912, on flowers of alfalfa, by L. M. Gates, differs from the Sioux county females in the much darker scopa, paler maculations, less extensively pale tibiae, and especially in the lack of the outer pair of mesoscutellar spots. Possibly it may be distinct, but for the present is best considered merely a variety of *emarginatum*.

**Anthidium astragali** n. sp.

♂️ Length 9–10 mm. Clypeus, sides of face up to level of insertion of antennae, and broad stripe on front of scape, yellow; rest of head, except a yellow oblong mark on vertex behind the tops of the eyes and the yellow mandibles, black. Scape densely hairy. Clypeus with the apex sinuate but not dentate. Mesoscutellum with merely two narrow lines on posterior face. Yellow bands on abdominal tergites 1–6, usually interrupted medially and with very deep emarginations on the anterior margin, entirely cutting through on tergite 1 and dividing the band into four spots, the external segment wanting on 6, leaving comma-shaped marks. Pygidium
entirely black, or sometimes with small yellow spots, its lobes broadly and evenly rounded, semicircular. Legs with a yellow stripe on outer face of tibiae and whole of outer face of basitarsi yellow, the tibial stripe sometimes obliterated apically. Apical tarsal joints dark. In other characters as in the ♂.

♀. Length 8–9 mm. Entire face coarsely and very densely punctured, subcancellate on clypeus but separated and distinct on vertex, bearing long thin white hair which becomes dense in a tuft about each antennal base and on scape. Antennae wholly black, the scape conspicuously punctured, joint 3 slightly exceeding 4. Clypeus with its apical margin depressed, slightly sinuate, bidentate at each side, the inner tooth the larger. Cheeks coarsely and closely but very shallowly punctured, sparsely white hairy. A small yellow spot on vertex behind superior apex of eye. Entire thorax very coarsely and closely punctured, the vertex and thorax above with dense erect deep brownish ochreous hair, the pleura and legs with copious grayish white hair. Margins of tegulae broadly yellow, the central area brownish black, and wing bases with a yellow spot. Tubercles yellow. Mesoscutellum with four yellow spots arranged in an arc, the inner pair of spots twice as large as the outer pair. Legs black except for a broad yellow stripe on the anterior face of all of the tibiae, and sometimes a small yellow stripe on the outer face of the hind basitarsi. Inner face of tarsal joints with blackish hair, the outer surface largely fuscous and black but considerably intermixed with silvery hairs on the bases of the basitarsi. Ventral scopa usually pale golden brownish more or less mixed with blackish, sometimes wholly black. Abdominal tergites distinctly punctured, tergites 1–6 with broad yellow bands, narrowly interrupted medially, those on tergites 2–6 emarginate in the middle of each lateral half anteriorly. Sides and disk of abdomen with sparse erect pale hair. Wings very slightly darkened apically, nervures and stigma black.

Type.—Bad Lands at mouth of Monroe canyon, Sioux county, Nebraska, June 6, 1901, on Homalobus tenellus (M. Cary), ♂. Allotype.—Type lot, ♀.

Paratypes.—Type lot, 7 ♀, 1 ♂; type locality, May 28, 1901, on Homalobus tenellus (L. Bruner), 4 ♀; do. (M. A. Carricker), 1 ♂; Warbonnet canyon, Sioux county, May 28, 1901, on Astragalus hypoglottis (M. Cary), 1 ♀, 1 ♂; do., June 16, 1901, on Astragalus hypoglottis (M. Cary), 1 ♀, 1 ♂; Ute creek, Costilla county, Colorado, 9,000 feet, July 3, 1907 (L. Bruner), 1 ♀.

From A. tenuiflorae Ckll., this species is easily known by the spotted mesoscutellum and yellow tubercles in the female and by the spotted mesoscutellum and broad yellow stripe on the front of
the scape in the male. From *A. emarginatum* (Say), it is distinguishable by the deep ochreous color of the pubescence of the thorax above and the dark colored scopa in the female and by the yellow stripe on the scape and the more broadly rounded pygidial lobes in the male.

**SPECIES FROM OUTSIDE NEBRASKA**

*Anthidium praedentatum trianguliferum* n. subsp.

♀. Length to 10 mm. Belongs to the *placitum* group, the species of which have the pygidial tergite yellow or mostly yellow. Agrees with Cresson's description of the unique type of *A. placitum* from Nevada (*Trans. Am. Ent. Soc.*, VII, p. 206), except that there is no fuscous hair on mesonotum and very little on vertex (the pubescence being all whitish, becoming strongly tinged with ochreous on vertex), the median stripe on the clypeus is attenuated below so as to form a triangle of black subequal to the yellow triangles set off on either side, the band on the vertex is so broadly interrupted as to be practically reduced to elongate enneate lateral spots, the tegulae have a yellow spot on the posterior margin, the axillae are mostly yellow and are nearly confluent with the mesoscutellar lines, the yellow bands on tergites 1–4 are narrowly interrupted medially, and the abdomen is narrower, parallel-sided, and rather distinctly punctured. In the broadly interrupted band on the vertex, the yellow-banded axillae, and the interrupted bands on tergites 1–4, it agrees with *A. praedentatum* Ckl. (described originally as a subspecies of *A. blanditum* Cresson and later referred to as a subspecies of *A. placitum*, but probably a distinct species), from Boulder, Colorado (*The Entomologist*, XL, p. 99), but differs from that form in the triangular, not W-shaped, black clypeal mark. In the clypeal marking it agrees with the female of *A. poudreum* Titus (*Proc. U. S. Nat. Mus.*, XL, pp. 248–249), but the yellow lateral mesoscutal stripe is angulated anteriorly and the femora have broad yellow stripes. From *A. blanditum* Cresson and *A. blanditum pecosense* Ckl., it differs in the dark median band on the clypeus, that species having the clypeus yellow or mostly yellow.

*Type.*—Fort Garland, Costilla county, Colorado, July 18, 1907 (L. Bruner), ♀.

*Anthidium hesperium* n. sp.

♀. Length 9–10 mm. Form stout. Black; clypeus except a broad parallel-sided median band, triangular areas on sides of face extending up to level of insertion of antennae, mandibles except tips, small round spots on vertex behind eyes, large spots on front and hind margins of tegulae, spot on wing bases, line over tegulae, tubercles, four spots on mesoscu-
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tellum, broad stripes on first four femora beneath and a short stripe on apex of hind femora beneath, outer faces of all of the tibiae except sometimes a dark subapical spot, all the basitarsi externally, four spots on first abdominal tergite, broad medially interrupted bands on tergites 2-5 which are emarginate on the anterior margin, and all of tergite 6 except a narrow median band, orange yellow. Pygidium broadly rounded, without distinct lateral angles or teeth. Clypeal margin slightly concave between the pair of strong teeth on either side. Head and thorax opaque, roughened by a fine and very dense puncturation. Pubescence pale, dull gray on vertex and mesonotum, elsewhere longer and white except for the usual reddish hair on the inner side of the tarsi. Ventral scopae white. Wings subhyaline, slightly darkened on the apical margin, nervures black.

Type.—Palo Alto, California, July 2, 1891 (Lot 66, Leland Stanford Jr. Univ.), ♀.
Paratype.—Pacific Grove, California, July, 1894, ♀.

Differs from A. placitum, A. praedentatum and A. p. trianguliferum in lacking the angular yellow stripe on mesoscutum and in having the band on the pygidal tergite interrupted; from A. blanditum and its form pecosense in the largely dark clypeus; from A. poudreum in the banded femora and interrupted band on pygidal tergite; from A. monticagum Cresson in larger size and different maculation.

**Anthidium hesperium dentipygum** n. subsp.

♀. Length 10 mm. Similar to typical *A. hesperium*, but the sides of the broadly rounded pygidium have very distinct teeth, the yellow on the clypeus is reduced to large spots at the sides which are nearly confluent with the facial spots, and the spots on each lateral half of tergite 1 are sometimes connected.

Type.—Laramie, Wyoming, ♀.
Paratype.—Type locality, 1 ♀.

**Anthidium transversum** n. sp.

♀. Length 8.5 mm. Black; clypeus except two oval dots at base, triangular areas at sides of face between clypeus and orbits, mandibles except tips, oval spots on vertex behind eyes, front half of tegulae and a spot on hind margin, lines over tegulae, lines on anterior lateral margins of mesoscutum, tubercles, four spots on mesoscutellum of which the inner pair are much the larger, lines on first four femora behind, stripes on outer faces of all of the tibiae, four spots on first abdominal tergite, medially interrupted bands on tergites 2-5 which are more or less emarginate
on anterior margin, and large spots on tergite 6 which are irregularly emarginate externally, deep yellow. Clypeus with two strong lateral teeth on each side of the apical margin between which the margin is transverse and smooth. Inner faces of tarsi with reddish hair, otherwise pubescence wholly whitish. Ventral scopa white. Pygidium broadly rounded with weak lateral teeth or angulations. Wings slightly darkened, nervures dark brown.

_Type._—Pacific Grove, California, July, 1894, ♀.

Allied to _A. hesperium_ and _A. h. dentipygum_, just described, but differing in smaller size, yellow clypeus without a median black area, transverse intradental clypeal margin, yellow lines on anterior margin of mesoscutum, narrower yellow tibial stripes, lack of yellow stripe on hind femora, less extensively yellow pygidium, etc. It is of the same size as _A. monticagum_ Cresson, but differs at once in the mostly yellow clypeus, the band on tergite 1 divided into four spots, the deeper yellow color of the ornaments, etc.

_Anthidium sagittipictum_ n. sp.

♀. Length 7 mm. Black; two spots on sides of clypeus which are nearly confluent with two spots on lower corners of face, a sagittate spot in the trapezoidal median dark clypeal area, mandibles except tips, elongate marks on vertex which extend inward until opposite outer ocelli, spot on tegulae in front, narrow line over tegulae, tubercles, two elongate spots on mesoscutellum, basal yellow stripes on the outer faces of the tibiae which extend nearly the entire length of the joint on anterior pair, four spots on abdominal tergite 1, medially interrupted bands on tergites 2-6 which are broadly emarginate on anterior margin on 2-4 and involve most of the tergite on 6, yellow. Sides of apical margin of clypeus with a pair of prominent teeth, the margin between them concave and even. Head and thorax dull, roughened by an exceedingly close, fine puncturation. Pubescence all pale, dense on face above antennae, on pleura and sides of abdomen, very sparse and short on mesoscutum. Hair of legs pale except the pale reddish hair on tarsi within. Ventral scopa white. Pygidium broadly rounded or subtruncate on apical margin and with a very feeble tooth or angulation on each side. Wings hyaline, nervures brown.

_Type._—Pullman, Washington (C. V. Piper), ♀. (Washington Exp. Sta. No. 127.)

A distinct little species, scarcely needing comparison with its congeners of like size.
Anthidium maculosum Cresson.


Cresson described this species from two female cotypes, one of which was from California and one from Utah. Before the writer are two typical females, from two additional states; one from Colorado Springs, Colorado, and one from Custer, South Dakota. Cockerell has recorded the species from New Mexico, also.

Anthidium californicum Cresson.


A series of two females and three males from Pacific Grove, California, July, 1894, is before the writer. A fourth male without locality data is probably from California, and is labelled "June 30, 1892 (B)." These males agree with Cresson's description of the two male cotypes, and run to *californicum* in Cockerell's table, where the characters of the species are determined from five males from Los Angeles, so that with little doubt all are conspecific. The female assigned to *californicum* by Fowler, however, agrees more closely with *A. transversum*, described above, but almost certainly is not the female of *A. californicum*. The females before the writer, taken in company with male *californicum*, agree with the males except that the clypeus is black or has two very small lateral yellow clypeal dots subconfluent with two similar dots on the sides of the face, and the mandibles are black. The mesoscutum and mesoscutellum are black without any maculations whatever. The males of *californicum* before the writer all have black tubercles, while the yellow markings on the basitarsi are quite uniform, so that they probably represent a different species from the males determined as
californicum by Fowler; most likely his specimens belonged with the *transversum*-like females with which he associated them.

**Anthidium incurvatum** n. sp.

♂. Length 12 mm. Black; clypeus, lateral face marks ending truncate at lower level of insertion of antennae, mandibles except tips, two large round spots on vertex behind tops of eyes, large L-shaped marks on antero-lateral angles of mesoscutum which extend inward one-third across the anterior margin of mesoscutum and backward over tegulae, front half of tegulae or nearly that, tubercles, four spots on mesoscutellum, the outer and slightly smaller pair of which are on the axillae, outer faces of basitarsi, small spots on apices of last four tibiae, four spots on abdominal tergite 1, the inner pair of which are sometimes large and sagittate but often very small or subobsolete, tergites 2-6 with bands which are sometimes all complete (in type), but often medially interrupted on 2, 3 or 6, and always very deeply emarginate on anterior margins of 2-5 and medially greatly attenuated and incised on anterior margin, and sometimes lateral spots on pygidium above, yellow. Antennae deep black, joint 3 one and one-third as long as 4 in the shortest plane. Pubescence copious, long and white on face, pleura, legs and sides and venter of abdomen, on thorax above erect and pale ochreous. Hair on inner side of basitarsi reddish, deeper red on terminal joints. Wings slightly darkened basally and distinctly darkened beyond submarginals, nervures black. Outer lobes of pygidium broad and with their tips produced and incurved as in *californicum*, only even more acutely so, the middle lobe narrow, slightly curved, nearly as long as the outer lobes and continued across the tergite as a median carina. Tergite 6 with long curved lateral spines.

*Type.*—Ute creek, Costilla county, Colorado, on sage flats, July 19, 1907 (H. S. Smith), ♂.

*Paratypes.*—Type lot, 2 ♂.

Obviously allied to *A. californicum* Cresson but differing in the yellow tubercles, yellow marks on antero-lateral angles of mesoscutum, yellow spots on mesoscutellum, etc.

**Anthidium cognatum** Cresson.


Cresson described this species from Georgia, and later Cockerell recorded it from New Mexico and Robertson recorded it from
Illinois. Before the writer is a male from Texas, received years ago by the University from Theo. Pergande. This specimen has the pygidium red, as in *porterae*, but may be distinguished at once from that species by the broad yellow lines on scape and vertex, the greater amount of yellow on the tibiae, and especially by the armature of the pygidium, the outer lobes of which are much more slender, while the median spine on sternite 6 is short and not pointed as in *porterae*.

*Anthidium utahense* n. sp.


♂. Length 9-10 mm. Black; clypeus, lateral face marks up to lower level of insertion of antennae, mandibles except tips, elongate oval spots on vertex behind eyes, spots on tegulae in front, all of the tibiae at knees, spots on apices of first four tibiae externally, all the hasitarsi, four spots on abdominal tergites 1 and 2, medially interrupted bands on tergites 3-5, which are very deeply emarginate laterally on anterior margin, and comma-shaped spots on tergite 6, yellow. Pubescence short but rather copious, dull grayish white becoming pure white on pleura and legs. Head and thorax finely and very densely punctured. Wings subhyaline, slightly darkened on apical margin beyond the nervures, which are brown. Sides of tergite 6 with straight sharp spines, within which are two similar but slightly smaller spines on sides of sternite 6. Pygidium with the lateral lobes very broad and rounded, the short and blunt central lobe arising from the middle of a rather shallow sinus.

♀. Length 7-9 mm. Black; two spots on lateral margins of clypeus which are nearly confluent with spots on the sides of the face, large spots on the mandibles, oval spots on the vertex behind summits of eyes, tubercles, front half of tegulae, two elongate spots on mesoscutellum, stripes on external faces of all of the tibiae, four spots on first abdominal tergite, medially interrupted bands on tergites 2-5, which are deeply emarginate on anterior margin on 2 and 3 and slightly so on 4, and large spots on pygidium, yellow. Pygidium broadly rounded, slightly angled laterally. Hair of inner side of hasitarsi reddish, otherwise the pubescence is pale. Ventral scopa white. Otherwise as in ♂.

*Type.*—Logan, Utah, ♂.

*Allotype.*—Type locality, ♀.

*Paratypes.*—Type locality, 5 ♂, 1 ♀.

This species is the one which Cockerell hesitatingly referred to
*A. palliventre* Cresson as its unknown male, at least it is so far as the specimen from Logan, Utah (L. Bruner, No. 17) is concerned. The series of six males before the writer, one of which bears the Bruner No. 17, are accompanied by two females which are not *palliventre*, but differ at once in the yellow-spotted face and clypeus, yellow tubercles, yellow lines on mesoscutellum, and broad yellow lines on tibiae externally (these parts black in *palliventre*), the lack of a yellowish tinge on the pubescence of the head and thorax (present in *palliventre*), the reddish hair of hind basitarsi within (black in *palliventre*), etc. It is close to *A. emarginatum* (Say) and *A. astragali*, just described, but differs from both in the yellow spot on mandibles and yellow spots on the clypeus and face in the female, and in the immaculate mesoscutellum, triply interrupted bands of tergite 2 and often of 3, and quite differently shaped pygidial lobes in the male. It is also close to *A. tenuiflorae* Ckll., but differs in the yellow markings on clypeus and face, mandibles, mesoscutellum, tubercles and tibiae in the female, while the male is chiefly distinguishable by the shorter and broader pygidial lobes, the deeper yellow abdominal bands which are broken into four spots on tergite 2 and often on 3 as well as on 1, etc. From *A. maculosum* Cresson, it differs in the yellow spots on face, yellow stripes on tibiae, bands on tergites 4 and 5 interrupted only medially, etc.

**Genus Dianthidium** Cockerell, 1900

**KEY TO THE NEBRASKA SUBGENERA**

Pulvilli large; second recurrent nervure received well beyond the second transverse cubital nervure, rarely only a little beyond it; maxillary palpi 2-jointed; mandibles 3 or more dentate; smaller species with usually distinctly interrupted abdominal bands.

Hind edge of mesoscutellum not greatly produced or sharp-edged; hind coxae of male usually spined; more slender species. *Dianthidium* (Type *D. sayi* Cockerell)

Hind edge of mesoscutellum much produced and sharp-edged, the yellow marks on it in a straight line or nearly so; hind coxae not spined; small and very compact species. *Anthidium* (Type *D. strigatum* Panzer)

Pulvilli small; second recurrent nervure usually opposite the second trans-
verse cubital nervure, rarely a little beyond it; maxillary palpi 3-jointed; mandibles 2-dentate; large species with complete abdominal bands.

*Heteranthidium*
(Type *D. dorsale* Lepeletier)

Subgenus *Dianthidium* Cockerell, 1900

**KEY TO THE NEBRASKA SPECIES**

**Females**

Abdominal tergites 1–6 with yellow bands, widely interrupted on tergite 1, less widely interrupted on 2, narrowly interrupted on 3 and 4, hardly interrupted on 5 and complete on 6, none of the bands emarginate laterally; antero-lateral angles of mesoscutum with L-shaped yellow marks, which extend back over tegulae; mesoscutellum with two yellow lines; 9 mm ................................... *jugatorium*

Abdominal tergites 1–5 with yellow bands, complete or nearly so on tergite 1, narrowly interrupted on 2–5, and more or less emarginate on the posterior margin of the bands, at least on tergites 2 and 3. 6 usually with two yellow spots ................. 1

1. Legs red, suffused with blackish on coxae, trochanters and bases of femora; upper end of lateral face marks, sometimes sides of clypeus, a transverse line on vertex extending down upper cheeks behind summits of eyes, L-shaped marks on antero-lateral angles of mesoscutum which extend back over tegulae, tegulae, tubercles, mesoscutellum except extreme base medially, and apical and sometimes median suffusions on the basal abdominal tergites, red or reddish; 9–10 mm .................. *sayi*

1. Legs black, with stripes on first four femora beneath and outer faces of all of the tibiae and basitarsi or at least stripes on them, pale yellow; sides of clypeus, lateral face marks, often supraclypeal, median vertical and postocellar spots, stripes behind eyes, two spots on anterior margin of mesoscutum, tubercles, tegulae exteriorly, and four spots on the mesoscutellum, pale yellow; no reddish suffusions on the basal abdominal tergites; 8 mm ... *ulkei*

**Males**

Posterior coxae simple; pygidium black, obtusely conical with hyaline lateral basal teeth; abdominal tergites 1–6 with broad yellow bands, reduced to lateral spots on 1, very broadly interrupted on 2, gradually less interrupted on 3 to 5, complete on 6, none of the bands at all emarginate; legs yellow and black; a short line behind each eye, L-shaped yellow marks on the antero-lateral angles of mesoscutum, and two lines on mesoscutellum, yellow; 9 mm .................. *jugatorium*
Posterior coxae with long stout pale spines; pygidium wholly or largely yellow, truncate with a median tooth but no lateral teeth; bands on tergites 2-5 deeply emarginate.........................1

1. Legs red; a narrowly interrupted red band on vertex and upper cheeks; tubercles, lines on mesoscutum and mesoscutellum and spots on tegulae, red; tergites 1-5 with yellow bands, deeply emarginate laterally on 2-5 and nearly cutting through on 1, those on 1-3 margined posteriorly with reddish, 6 with lateral yellow spots; pygidium yellow except at base, sometimes more or less suffused with reddish, medially carinate and with distinct emarginations on either side of the median apical tooth; 10-11 mm...sayi

10-11 mm sayi

1. Legs yellow and black; a mark behind each eye, tubercles, spots on anterior border of mesoscutum, lines on mesoscutellum, and tegulae exteriorly, pale yellow; tergites 1-6 with clear pale yellow bands, deeply emarginate laterally on 2-5 and cutting through on 1 to form three spots; pygidium yellow, broadly truncate, not carinate nor with distinct emarginations on the sides of the median apical tooth; 9 mm.........................ulkei

Dianthidium (Dianthidium) jugatorium (Say).

1904. Dianthidium jugatorium Cockerell, Entomological News, XV, p. 84.  

This species was described by Say in the female sex only from specimens from “Missouri.” Graenicher has recognized it from Wisconsin, where he found both sexes on Helianthus strumosus and Heliopsis scabra, the females collecting pollen. Before the writer is a series of eight males collected at Weeping Water and Union, Cass county, Nebraska, July 20 and 21, 1906, at flowers of Helianthus divaricatus and Kuhnistera candida (H. S. Smith). The male sex, which has never been described, may be recognized by the characters given in the table. The allotype is from Weeping Water, July 20, 1906, on Helianthus divaricatus.
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Dianthidium (Dianthidium) sayi Cockerell.


1907. *Dianthidium sayi* Cockerell, Univ. of Colorado Studies, IV, p. 250. ♀ ♂.

Western edge of the state and east along the Niobrara valley to Rock county, flying abundantly from June 25 to September 9, at flowers of *Helianthus annuus, Helianthus petiolaris, Helianthus maximiliani, Gutierrezia sarothrae, Solidago missouriensis, Vernonia fasciculata, Cleome serrulata, Kuhnistera candida, Verbena stricta* and *Mentzelia nuda*. Before the writer is a series of ninety females and fifty-four males collected at Warbonnet and Monroe canyons, Hat creek, Bad Lands, Glen and Crawford, in the Pine Ridge of Sioux and Dawes counties; Bridgeport, Morrill county, and Carns, Rock county. A male specimen from Colorado bears Gillette's No. 2243. This is the species recently (Entomological News, XXIII, p. 257) recorded as *D. curvatum* Smith (syn. *interruptum* Say) by Hungerford and Williams from western Kansas, the writer having examined the Thomas county male specimen. The species doubtfully recorded by these authors as *D. concinnum* Cresson is without question that species.

Dianthidium (Dianthidium) ulkei (Cresson).


Abundant in the Pine Ridge of Sioux and Dawes counties, July 1 to August 20, at flowers of *Helianthus petiolaris*, *Gutierrezia sarothrae*, *Carduus plattensis*, *Vernonia fasciculata*, *Cleome serrulata* and *Monarda fistulosa*. A series of fifty-three females and twenty-four males is before the writer from Warbonnet and Monroe canyons, Glen and Crawford. In the clay buttes about Glen we found its resinous brood cells commonly in August, 1906, and bred the bees from them. A study of the series shows considerable variation, especially among the females, and in frequent cases there is a marked tendency to approach quite closely the maculations of *D. parvum* (Cresson). Typically and usually, the outer faces of the tibiae are bright yellow, but sometimes the black encroaches on the sides so as to reduce the yellow on the first four tibiae to mere broad stripes, while the posterior pair have large antero-median black areas, or, in the extreme of blackening, are black with the bases yellow and sending a yellow streak down the posterior face of the joint. Such specimens also have the emarginations of the band on tergite 1 cutting through and the spots on tergite 6 lacking, but as specimens of *ulkei* with the typical amount of yellow on the legs may also have tergite 1 three spotted and tergite 6 immaculate or with the spots much reduced, these differences are clearly within the individual variation within the species. None of the specimens have the yellow of the tibiae restricted to mere basal spots, as in *parvum* ♀, and the clypeus always has lateral yellow spots or bands, while in most specimens a yellow supracleveal, vertical, postocular or pleural spot or a yellow stripe on the anterior femora betray the insect at once as *ulkei*, all these markings being lacking in *parvum*. The male of *ulkei* differs at once from *parvum* ♂ in the quite different pygidium, *parvum* having distinct notches at the sides of the median apical tooth which are lacking in *ulkei*. We have
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taken *D. ulkei* in copula, both at Monroe canyon, Sioux county, Nebraska, and at Custer, South Dakota.

**SPECIES FROM OUTSIDE NEBRASKA**

*Dianthidium (Dianthidium) simile* (Cresson).


Two females collected at Port Hope, Ontario, July 28, 1895 (W. H. Harrington, Nos. 52 and 53) are evidently referable to *D. simile*, with which they agree in size (8 mm.), but the legs are darker than indicated in Cresson’s description for *simile*, as only the knees and narrow stripes on the outer face of the first four tibiae, and a basal spot, produced behind, on posterior tibiae are yellow, while in typical *simile* the knees and outer faces of the tibiae and tarsi, except oblong black spots, are yellow; thus in the color of the legs the Ontario females agree more closely with *D. parvum*.

*Dianthidium (Dianthidium) parvum* (Cresson).


A female from Laramie, Wyoming, agrees with Cresson’s description of *parvum* except that it is 8 mm. long and the three spots on tergite 1 are very narrowly connected to form a band; the clypeus and tergite 6 are entirely black. This specimen is ex-
Dianthidium (Dianthidium) perpictum coloradense n. subsp.

♀. Length 10 mm. Stout, black; clypeus except a large trapezoidal basal area, lateral face marks extending rather broadly nearly to summit of eyes, short lines behind eyes above, large L-shaped marks on antero-lateral margins of mesoscutum which extend inward one-third across anterior margin of mesoscutum and caudad along lateral margin to axillae, small spots on tubercles, spots on axillae, a narrowly medially interrupted band on mesoscutellum, lines on femora beneath, knees, short stripes on the outer face of first four tibiae and bands on abdominal tergites 1–5, which are rather broadly interrupted on 1 and 2, narrowly interrupted on 3, complete but medially incised anteriorly on 4 and 5 and including all of 6, yellow. Tegulae red. Legs, except yellow markings above mentioned, and black coxae, trochanters and femora, red. Head strongly but not densely punctured, mesoscutum shallowly subcancellately punctured, abdomen shallowly and rather closely punctured, the apical rims of tergites 1–5 reflexed. Wings fuliginous, nervures and stigma black. Pubescence very sparse and thin, all whitish. Ventral scopa white.

Type.—Colorado Springs, Colorado, ♀.

This form is larger than typical D. perpictum, and further differs in the clear red tibiae and tarsi (which are only faintly suffused with blackish on last four tibiae behind), more extensively yellow clypeus and yellow-spotted axillae; possibly it may prove to be distinct. It is too large for D. jugatorium (Say) or the female of D. lepidum (Cresson).

Subgenus Anthidiellum Cockerell, 1904

KEY TO THE NEBRASKA SPECIES

Female

Abdominal tergite 1 with large spots on extreme sides, 2 with a complete or very narrowly interrupted and posteriorly deeply emarginate band, 4–6 each with two more or less exteriorly emarginate discal spots, yellow; a triangular mark on each side of face, a transverse band across hind margin of vertex, two oblong spots on anterior edge of mesoscutum, tubercles, spot on tegulae, narrow post-tingular line, usually small spots on the axillae and always two large spots on the mesoscutellum, also yellow; apical half of tergite 6 medially carinate; tibiae and tarsi wholly yellow; 8 mm.......................... boreale

Male

Abdominal tergites 6 and 7 medially carinate, 7 broadly bilobed on apical margin and with its carina ending in a tubercle; face below antennae
wholly yellow and tergite 7 yellow except at base, otherwise ornamented as in the female; legs red, the anterior and middle knees and the basitarsi yellow or yellowish; antennae black; 8 mm.

**Dianthidium (Anthidiumellum) boreale** Robertson.


Found in Sioux county, Nebraska, and probably east along the Niobrara valley to Niobrara, Knox county, where specimens have been collected. Monroe canyon, Glen, and Niobrara, Nebraska, August 9–14, at flowers of *Kuhnistera purpurea* and *Cleome serrulata*. The species is not common and is represented by only two female and three male specimens. The female, which is undescribed, agrees exactly with Cresson's description of *D. notatum* (Latreille), but tergite 6 is carinate on the apical half and has two yellow spots (wholly black in *notatum*), the tibiae and tarsi are wholly clear red (exteriorly obfuscated in *notatum*), and the clypeus is wholly black (broadly yellowish red on lateral margins in *notatum*). The allotype is from Glen, Sioux county, Nebraska, 4,000 feet, August 14, 1906, and was taken on a day following the capture of a male in the same locality.

**Subgenus Heteranthidium** Cockerell, 1904

**Key to the Nebraska Species**

**Female**

Abdominal tergites 1–5 with broad deep yellow bands which are medially attenuated but not interrupted and not emarginate; clypeus and triangular lateral face marks which extend narrowly above level of antennae, whitish; broad lines behind eyes, four spots on mesoscutellum, large subtriangular areas on antero-lateral margin of mesoscutum which are sometimes reduced to small spots over tegulae, spot on front of tegulae, and spots on bases of all of the tibiae, deep yellow; 13–16 mm. *zebratum*

**Male**

Abdominal tergites 1–6 with broad deep yellow bands which are medially attenuated but not interrupted and not emarginate on the disk or but very feebly so on tergites 1–3; clypeus, mandibles except tips, and lateral
face marks which extend in a narrow line above level of antennae, whitish; sometimes lines behind eyes, always two large spots on mesoscutellum and usually two small dots just outside them, stripe on anterior femora beneath, bases and apices of the tibiae usually connected by a narrow stripe at least on posterior pair, and all of the basitarsi, yellow; pygidium with a yellow spot and terminating in a very stout short blunt spine; 13–16 mm..........................zebratum

Dianthidium (Heteranthidium) zebratum Cresson.


This handsome species was described from a single male from Texas, but was also recorded from Colorado at the time of description by Cresson. Later Cockerell has recorded it from Boulder, Colorado, where it visits Helianthus pumilus during latter August. Titus described cockerelli from two male cotypes taken at Rocky Ford and Virginia Dale, Colorado, August 10 and September 3, the latter specimen on Rudbeckia hirta. Numerous specimens in the large series of zebratum before the writer differ in no way from the description of this species, and probably cockerelli is a synonym of zebratum. D. zebratum occurs in western and central Nebraska, and is especially common in Sioux and Dawes counties, where it has been collected at Jim creek, Monroe canyon, Sowbelly canyon, Harrison, Glen, Crawford, and in the Hat creek Bad Lands, July 26 to August 27 at flowers of Helianthus annuus, Helianthus petiolaris and Gutierrezia sarothrae. Other Nebraska specimens come from Haigler, Dundy county, and from Halsey, Thomas county, at the latter locality on Helianthus petiolaris and Helianthus subrhomboideus. Also, eight brood cells, which from their large size almost certainly belong to this species, were collected in Cherry county by J. M. Bates and are now before the writer; they are elongate oval, resinous cells, possibly formed from the resinous exudations of the sunflowers which this bee seems so fond of visiting.

This species occurs also at Custer, South Dakota, and the male
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of a pair from that locality bears Bruner’s No. 18, and is the same as the male recorded as *D. occidentale* Cresson by Cockerell in *Annals and Magazine of Natural History*, series 7, V, p. 414. *D. zebratum* is, however, quite distinct from *D. occidentale*, averaging distinctly larger in both sexes (*occidentale* is only 10-12 mm. long), while the female further differs in the presence of four spots on the mesoscutellum the inner pair of which are very large and oval (only two round spots on the mesoscutellum in *occidentale* ♀), of distinct yellow spots externally on the tibial bases (wanting in *occidentale* ♀), and of continuous and not discally emarginate yellow abdominal bands (interrupted on tergite 1 and emarginate on disks 1-3 in *occidentale* ♀), while the male further differs in having the lateral face marks much more abruptly narrowed at level of insertion of antennae, being continued upward as a mere line contiguous to orbit (broadly so in *occidentale* ♂), in having always two large yellow spots on the mesoscutellum and usually also two smaller yellow dots outside this pair (mesoscutellum wholly black in *occidentale* ♂), in having the anterior femora almost always with an extensive yellow stripe or area beneath (lacking in *occidentale* ♂), in having the abdominal bands not emarginate on first four tergites or but very feebly so on first two or three (distinctly emarginated bands on tergites 1-4, deeply so on 1 and 2, in *occidentale* ♂), and having the pygidium usually with a yellow spot, subtriangular, and terminating in a stout, blunt median spine while the sides have prominent angles (*occidentale* ♂ has the pygidium black, medially carinate, and terminating medially in a broad shallow sinus).

The female of *D. zebratum* has never been described but may readily be known by the characters given in the above comparison with *occidentale*, and the diagnosis given in the table. The allo-type was collected by the writer at Glen, Sioux county, 4,000 feet, August 18, 1906 on *Gutierrezia sarothrae* in company with typical males.

Among the other *Heteranthidium*, *zebratum* is closest to *chippewaense* Graenicher, but differs in the male by the presence of the yellow spots on the mesoscutellum, the always complete band on tergite 1, the lack of distinct emargination anteriorly on
the bands of tergites 1–4, and the non-carinate pygidium; the female may be separated by the whitish color of the clypeus and lateral face marks and the presence of four yellow spots on the mesoscutellum instead of only two. *D. chipewaense* also visits *Rudbeckia hirta*. From *D. harbecki* Crawford, *zebratum* differs in the lack of yellow lines on the disk and sides of mesoscutum and on pleura, the complete band on tergite 1, the mostly dark tibiae, the shorter lateral face marks, etc. From *D. dorsale* (Lepeltier), it differs in the mostly black cheeks, wholly black scape, lack of reddish on the anterior and lateral margins of the mesoscutum and on mesoscutellum, etc. From *D. larreae* Ckl., it may be told at a glance by the mostly black cheeks and vertex.

**SPECIES FROM OUTSIDE NEBRASKA**

*Dianthidium (Heteranthidium) occidentale* Cresson.


This species was described from eight cotypes, four of each sex, collected in New Mexico by Dr. Samuel Lewis, and was also recorded from Colorado. Later, Cockerell recorded the capture of both sexes at Sapello canyon and San Ignacio, New Mexico, and still later at Boulder, Colorado. Before the writer are two typical males, one from Fort Garland, Colorado, August 9, 1907, on *Chrysothamnus* (L. Bruner), and the other from Ute creek, 9,000 feet, August 12, 1907 (R. W. Dawson).