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ADDITIONAL NORTH AMERICAN BEES OF THE GENUS *ANTHIDIUM*

BY HERBERT F. SCHWARZ

In the present paper the report on the North American species of the genus *Anthidium*, as represented in the collections of the American Museum, is concluded by a consideration of those species that in the male sex have narrow, usually rather elongate lateral lobes on the pygidium, in contrast to those species having truncated, broadly rounded, or widely angulated lobes, which are brought together in a previous paper.¹ This grouping may possibly not apply to *longispinum*, the male of which is as yet unknown. Thanks to the courtesy of Mr. S. A. Rohwer certain hitherto unidentified specimens in the collections of the U. S. National Museum were submitted for study, and descriptions of such of these as proved to be new are included in this paper. The remaining material is largely in the American Museum. The paper also contains keys that cover, in addition to the species here discussed, those previously considered. Finally, there are a few concluding remarks, for the most part concerning species not discussed in the earlier papers.

Anthidium palmarum Cockerell

A male from San Diego County, California, acquired by the U. S. National Museum with the Coquillett collection, is in close agreement in all essentials with Cockerell's description. There are two small dots at the base of the clypeus of this specimen. The maculations on the knees extend upward to suffuse with reddish brown most of the apical half of the femora, and the maculations on the pygidium are dull red and barely traceable, not yellow as specified in Cockerell's description. These differences may, however, be looked upon as individual variations when in all other respects, including the structure of the pygidium, Cockerell's specimen from Palm Springs and the present specimen from San Diego County are alike. The insect was caught in April.

Of the characters associated with the male, two at least are unusual for *Anthidium*: the "very small lateral face marks (separated from

¹American Museum Novitates No. 252.

orbital margin)" and the ferruginous markings on the legs and tegulæ. Even such species as *tenuifloræ* and *atriventre*, the females of which have dark faces, show in the male sex no restriction of yellow in the maculation of the sides of the face. Ferruginous markings (or "apricot-color" as Cockerell's key rather temptingly suggests) on legs and tegulæ, while not uncommon in some of the other genera of the Anthidiinæ, are exceptional in *Anthidium* as represented at least by the American species.

Three females from San Diego County present the condition, unusual for *Anthidium*, of large, well-developed maculations on the clypeus without, however, the associated yellow on the sides of the face, or with merely a speck-like vestige of it. The fact that the mandibles, too, are yellow almost to their tips tends still more to emphasize the absence of the side-facial maculations. This unusual feature is what one might perhaps be inclined to expect in the female if one were told that the male sex was deficiently maculated on the sides of the face. When the female shows in addition the light reddish-brown markings—only more extensively—on legs and tegulæ, the black mesoscutum, the maculations on the scutellum, and the deeply emarginate bands of strong yellow to orange hue that characterize the male of *palmarum*, there seems little room for doubt that it belongs to the same species. Moreover, the size of the female, 8 mm., is very close to that of the male, 9 mm. In all three specimens the band on the first segment is broken up into four spots (as in the male), and in one of the specimens this condition is represented also on the second segment. In two of the specimens the tubercles are immaculate, in the third specimen they have a touch of yellow. Their ventral scopa is silvery-white.

There is a fourth specimen from San Diego County which is doubtfully associated with the above specimens. Like them, it has mandibles that are yellow except for the brownish-black teeth, and there is the trace of a spot, too, on each side of the clypeus. The mesoscutum and tubercles are black, but the axillæ have two faint marks in addition to the well-developed maculations on the scutellum. The emarginations of the abdominal bands are very deep, the first, second, and third segments all being four-spotted. The most disconcerting direction of variability is, however, evidenced by the legs, which, in contrast to the other specimens, have black where one would expect reddish brown. On the other hand, the tegulæ are reddish brown, broadly maculated with yellow in front. This specimen presents the further abnormality of having its ventral scopa silvery-white only on the sides, a broad median area being golden-brown. The yellow markings on its tibiæ are confined to the base. This

is true also of one of the females having reddish brown as the ground color of the tibiæ. Of the remaining two specimens above discussed, one has more developed yellow maculations on the tibiæ, the other lacks yellow maculations on this joint. In all of the specimens the flagellum beyond the second segment has a strong tendency toward ferruginous, not "entirely black" as described for the male.

***Anthidium maculosum* Cresson**

Two females from the Sabino Basin, Sta. Catalinas, Ariz., caught by Dr. F. E. Lutz, Aug. 15-21, and one from Eureka, Utah, taken by Mr. Tom Spalding, June 24, 1920, are somewhat larger and more robust than Cresson's type with which they agree in sculpturing and markings. Two males—one from Sycamore Canyon, Sta. Catalinas, and one from Eureka, taken by the same collectors on the corresponding dates—are even larger than the females, attaining respectively 14 and 14½ mm., and offer a striking contrast in size to the males originally described by Cockerell as *lupinellum* but more recently merged by him with *maculosum*.

The armature of the male seems to be similar to that of *A. americanum* Friese (*A. maculatum* Smith), while the markings of the head, thorax, and abdomen also agree substantially with those of Smith's description. Is it possible that *americanum* is the male of *maculosum* or, to give priority its due, that *maculosum* is the female of *americanum*? The specimen on which Smith based his description was secured from Mexico. More recently (1923) Cockerell recorded a specimen of "*lupinellum*" (*maculosum*) from San Francisquito Bay, Gulf of California. This is an indication that the southward range of *maculosum* may well extend into Mexico proper and that there is no geographical reason, at least, for supposing that *maculosum* may not be *americanum*. Whether or not the two are identical, the north and south range of *maculosum* is impressive, for among the specimens in the U. S. National Museum is one from Forest Grove, Oregon, collected by Mr. M. C. Lane, July 21, 1918, and yet another specimen from the same state, secured by Mr. Carl F. Baker.

***Anthidium cognatum* Cresson**

Five females (four from Southern Pines, N. C., taken by the Rev. A. H. Manee, June 2, 1909, August 3, 1918, and Sept. 2, 1918, and one from Great Falls, Va., by Mr. N. Banks, June 12) and thirteen males (nine from Southern Pines, N. C., taken by the Rev. A. H. Manee, Aug. 22-Sept. 4, 1918, one from Indian River, Fla., collected by Mr. E.

Daecke, one from De Funiak Springs, Fla., caught by Mr. F. E. Watson, Oct. 17-19, 1914, one from Royal Palm Park, Fla., captured by Dr. F. E. Lutz, April 12-18, 1923, and one from Biloxi, Miss., obtained by Mr. Frank Morton Jones, May 12, 1921). Of the males, one was caught on white goldenrod, and one toward evening in a hole about one-half inch deep and one-quarter inch broad in a sign post, where presumably it was taking refuge for the night.

In all the female specimens the first segment is four-spotted and usually also the second; but segments three to five, departing from Cresson's description, are not four-spotted though very deeply emarginate anteriorly on each half of the medianly interrupted band. The tubercles have in all cases a slight maculation, not mentioned by Cresson, and the sixth segment is in two instances two-spotted. One of the specimens is only 9 mm. in length as against approximately 11 mm. in the case of the others.

The males show considerable variability. Several of them have yellow marks on each side of the anterior margin of the mesoscutum in addition to those above the tegulae, and the greater number have maculations on the axillae as well as the scutellum. Yet one specimen has the mesoscutum wholly black. Most of the specimens have a faint maculation on the tubercles. As in the females the four-spotted condition is usually confined to the first two segments and in none of the specimens does it extend beyond the third segment. In all of the male specimens the scape is maculated and the sixth segment is two-spotted.

***Anthidium banningense* Cockerell**

A male from the Shasta District, Cal., acquired with the Henry Edwards collection, agrees in all respects with Cockerell's description except that it is rather smaller ($12\frac{1}{2}$ mm.) and has a maculation on the tubercles as well as the tegulae. The spines on the sixth segment are undeviatingly straight, not slightly incurved, as in a specimen from Meadow Valley, Plumas County, Cal., kindly sent by Professor Cockerell.

***Anthidium depressum*, new species**

MALE.—Length $12\frac{1}{2}$ mm. Black with yellow to orange maculations. Mandibles except apical teeth and extreme base, clypeus except narrow apical margin, lateral face marks, completely filling the space between the clypeus and inner margin of the eye and diagonally truncate just above the base of the antennae, small spots above the eyes, a faint spot on the tubercles, the tegulae broadly in front and more narrowly behind, wing bases, spot on hind coxae and at the knees of the middle and hind legs, broad stripes running from base to apex on the outside of all the tibiae,

very narrowly flanked by black on the front and middle tibiae, more encroachingly so along the front margin of the hind tibiae, the spines on the hind tibiae, and all the basitarsi, yellow. The long apical joint of the tarsi is red, but the other joints and the apical two-thirds of the claws are black. The yellow of the tibial stripes, which encloses a semitransparent blackish-brown spot near the apex, is deeper than that of the facial markings and serves as a transition to the rich orange-colored markings of the abdomen. These include a somewhat shapeless maculation at each lateral extremity of segment 1, four spots (the inner ones oval, the outer ones subquadrate) on segments 2 and 3, medianly divided bands on segments 4 and 5 that have a deep but rather triangular emargination above, and two sub-disclike spots on segment 6. Segment 7 immaculate. The clypeus convex but with a pronounced V-shaped depression, the base of the V being toward the middle of the clypeus and the arms extending downward to terminate on the apical margin. The apical margins of the abdominal segments just beyond the maculations depressed. The punctation of the rims smaller and denser than that of the rest of each segment, but not so dense as that of the head and thorax. Segment 6 with a strongly developed blackish-brown spine on each side. The lateral processes on segment 7 elongate, about twice as long as the median spine, and rather spear-shaped at the apex. Their width is about half that of the distance between their inner side and the median spine. The venter with two blackish-brown outcurved spines, one at each side, near the apex. Sternite 1 of a reddish transparency; the other sternites black. The pubescence grayish white except for the bronze-colored hairs on the under sides of the tarsi.

This description is based on a single specimen in the collection of the U. S. National Museum. It was secured by Mr. M. C. Lane, September 2, 1920, at Coulee City, Wash. This insect is differentiated by the distinctly-chiseled V-shaped depression on the anterior half of the clypeus. Only in male specimens of *bernardinum* and *bernardinum mesaverdense* do I find this condition adumbrated, but it is little more than an adumbration, lacking the rather sharp precision of outline that characterizes the excavation in *depressum*. The lateral processes of the pygidium, with their spear-shaped apical terminations, are wholly different from the broadly rounded lobes of *bernardinum* and its putative variety, but are very similar to those of *edwardsii*, which also has outpointing spines near the apex of the venter. The maculations on abdominal segments 4 and 5, with their deep V-shaped emarginations above, and the oval to disc-like spots on segment 6, are suggestive of those of the female of *porteræ*; but their orange color—another point of resemblance with *bernardinum*—is in contrast to the pale hue of the maculations of *porteræ*. From *cognatum* and *collectum*, which have elongated but apically more rounded pygidial lobes, *depressum* is differentiated by the merely two-spotted condition of abdominal segment 1, by the presence of oval rather than linear inner maculations on segments 2 and 3, and by the triangular rather than rectangular emarginations above on each side of segments

4 and 5. From *cognatum* it differs, in addition, in having the mesoscutum and scutellum immaculate. From *banningense*, another species with elongated lateral lobes, it is readily separated not only by the character and color of the abdominal maculations but by the presence of a broad continuous stripe on its tibiae instead of apical maculations.

***Anthidium longispinum*, new species**

FEMALE.—Length 11 mm. Black with yellow maculations. The face immaculate except for a spot at the summit of each eye; and the legs entirely black. The tubercles, tegulae (anteriorly), axillae and scutellum, maculated. The first abdominal segment with four spots, the outer ones subquadrate, the inner ones rather linear. The band on segment 2 slightly interrupted medianly, those on segments 3–5 continuous or subinterrupted. The emarginations on each side of the abdominal bands above rather quadrate, not very wide but fairly deep. Segment 6 two-spotted. The head and thorax densely and rather cancellately punctured, being especially coarse on the clypeus. The depressed apical rims of the abdomen, more closely, finely, and uniformly punctured than the more elevated region that coincides roughly with the extent of the maculations. Each side of segment 6 with an unusually well-developed sharp tooth, that is about twice as long as its width at the base. The sides of the segment apical to the lateral teeth slant to a rather obtuse point, being lower than the portion basal to the teeth, which is traversed by a somewhat ill-defined transverse ridge that stretches from near the base of one of the lateral teeth to near the base of the other, and is best developed at its starting point and terminus, flattening out and becoming vague toward the middle. The pile is white to cinereous except for the bronze to black hairs on the under side of the tarsi. The ventral scopa is glittering white, of the same pure quality as that which densely thatches the exterior of the basitarsi and even the tarsal joints beyond. At the apical tip of the venter are a few dark hairs.

The description is based on a female from San Bernardino County, California, in the collection of the U. S. National Museum. There is also a paratype from Walker Lake, California, taken on July 23, 1915, which has been placed in the collection of the American Museum.

From another black-legged species of California, *palliventre*, this species may be differentiated by the presence of maculations on the axillae and scutellum and by the strongly developed, acute spines on the sixth segment. Its relations seem to be closer to *clypeodentatum* and *psoraleæ*, both described from the Middle West. From both of these it differs in having maculations on the sixth segment (though these are weak in the paratype), and from *clypeodentatum* it differs in addition in having the mesoscutum immaculate, that area being characterized in *clypeodentatum* by maculations along each side of the anterior margin and above the tegulae as well. The immaculate condition of the mesoscutum is paralleled in one of Robertson's specimens assigned to *psoraleæ* but is apparently not shared by the other four females of his collection.

The "longitudinal stripe" on each side of the vertex specified for *psoraleæ* is in the present species replaced by an oval spot. Robertson speaks of the maculations of *psoraleæ* as "yellowish white"; those of the present species are distinctly yellow.

Nevertheless, it would be somewhat risky to attempt to establish the independence of *longispinum* from *psoraleæ* on the basis of these differences in the ornamentation. I place greater reliance on what seem to be structural differences. In neither Swenk's description of *clypeodentatum* nor in Robertson's description of *psoraleæ* do I find such emphasis given to the lateral teeth of the sixth segment as would seem to be justified if they were comparable to *longispinum*. Robertson speaks of a "longitudinal carina" on the sixth segment. There is a shiny (but not elevated) longitudinal line on the median apical half of this segment in the California specimens, but this is much less impressive than the transverse ridge that traverses this segment from lateral tooth to lateral tooth. Such a transverse ridge is specified by Swenk also for *clypeodentatum*. Robertson speaks of the apex of *psoraleæ* as "bidentate, strongly sinuate laterally, with a lateral tooth." The tip of the abdomen in the present species is entire, being formed by the junction of the sloping sides, the apex being widely triangular, not truncate. The clypeus of *psoraleæ* is quadridentate, that of *clypeodentatum*, sexdentate. In the type of the present species the anomalous condition is presented of three teeth on one side and four on the other side of the clypeus.

***Anthidium rohweri*, new species**

MALE.—Length 11 mm. Black with strong yellowish to orange markings as follows:—mandibles except teeth, entire clypeus, a narrow supraclypeal band, sides of face, (truncate at the level of the base of the antennæ), scape externally, a practically continuous band across the vertex from the summit of one eye to the summit of the other, broad L-shaped bands framing the mesoscutum and virtually confluent with the maculations on the axillæ and scutellum, tubercles except for the large pupil, spots on all the coxæ, extensive stripes on all the femora beneath, all of the tibiæ externally and the hind pair to some extent within, the tibial spines, the first four joints of the tarsi (the apical joint is ferruginous), and very broad bands on all of the tergites as well as on the first sternite, the remaining sternites having merely lateral spots that are virtually a continuation to the ventral side of the broad maculations on the dorsal side. The bands on the dorsal side of the abdomen are slightly interrupted on segment 1, 2, and 7, subinterrupted on segments 3–6. On each side of the band on segment 1 there is a slight posterior dent, and there is a bare trace of sinuosity on each side of segments 3 and 4 above. With these exceptions, the bands are unemarginate and rather uniform. Segment 7 is entirely yellow except for a narrow

median longitudinal stripe, the median spine, and the apical tips and contours of the lateral processes.

The wings are stained with fuscous; a dark streak traverses the upper half of the marginal cell from base to apex. The first recurrent nervure is virtually interstitial with (placed barely beyond) the first transverse cubital. The second recurrent nervure is interstitial with the second transverse cubital.

This insect is rather heavily covered with whitish pubescence from the level of the ocelli to the apex of the clypeus. There is heavy whitish hair also on the pleura, front femora beneath, and on all of the legs from the tibiae down, as well as on the ventral side of the abdomen. Coarse, rather bristle-like, white hairs, distinctly separated from one another, fringe the apical border of the bands on segments 4 and 5, and the presence of two or three such hairs on segment 3 suggests that a similar condition may have obtained on this and possibly also on the anterior segments. The thorax above as well as the vertex are covered with hair of an ochraceous tinge.

The punctation is dense but not coarse on the head and thorax, becoming fine and sparse on the abdomen except in the apical region beyond the bands, where the concentration of punctures is still relatively great. The lateral lobes of the pygidium are triangular, slightly produced at the tip. The lateral spines on segment 6 are straight. Near the apex of the venter are two broadly triangular outpointing teeth, one at each extremity of the anal opening, and between them at the very apex of this opening a forward-directed, rather horizontal spine.

The description is based on a single male specimen in the collection of the U. S. National Museum, caught by R. H. Peebles at Sacatan, Arizona.

This insect has been placed under *Anthidium* due to the fact that its second recurrent nervure is interstitial with the second transverse cubital, but in certain respects it seems to approach *Callanthidium*. Thus, the virtual confluence of the first recurrent nervure with the first transverse cubital is suggestive of *Callanthidium illustre* and is adumbrated in *C. conspicuum* and *C. formosum*. On the other hand, such a confluence or near confluence of these two veins is not confined to *Callanthidium* and, it would seem, is subject to variability even within a species. Thus, in the specimen from the summit of the Sierra Nevada somewhat doubtfully assigned to *pecosense fragariellum* in a previous paper, the two veins are interstitial, and such a condition obtains also in several of the specimens (but not all) assigned to *palmarum*. As all of these specimens of *palmarum* are from the same locality, the variability shown is the more impressive. The broad abdominal bands of *rohweri* are also suggestive of the *Callanthidium* group, though not very different from those of *Anthidium edwardsii*.

With the known species of *Callanthidium* I fail to identify it even when disregarding the venation. It is certainly not *formosum*, with the type of which it has been compared, the pygidial lobes being wholly

- 5.—The lateral face marks narrow, not filling the space between the clypeus and the inner margin of the eye. The tibiae suffused with light reddish brown in addition to having yellow maculations. The apical half of the femora above also sometimes light reddish brown. Tegulae light reddish brown. (California)..... *palmarum*.
- The lateral face marks wide, filling completely the space between the clypeus and the inner margin of the eye. The legs and tegulae without light reddish brown..... 6.
- 6.—The clypeus convex throughout, not medianly depressed, and with two small black spots near its base. The front and middle tibiae maculated at the apex. Segment 1 with four maculations, the inner ones minute. The bands on the subsequent segments with wide as well as deep rectangular emarginations on each side above. Segment 6 sometimes immaculate. (California).
banningense.
- The clypeus with a V-shaped depression, the base of the V resting on the middle of the clypeus and the arms extending to the apical margin; the clypeus yellow except for a narrow apical margin of black. The tibiae with broad yellow stripes externally. Segment 1 with a maculation at each lateral extremity but without inner spots. Segments 2 and 3 four-spotted, the outer spots subquadrate, the inner ones oval. The bands on segments 4 and 5 with deep but narrow triangular emarginations on each side above. Segment 6 with two oval maculations. The apex of the lateral processes on segment 7 rather spear-shaped. (Washington)..... *depressum*, new species.
- 7.—The region in front of the ocelli with relatively sparse and rather irregularly distributed, distinct punctures on a minutely tessellated ground. The scape black. Segment 3 of the antennae unusually long, rather exceeding in length segments 4+5 combined. The mesoscutum immaculate. The tibiae without stripes, merely spotted. Segments 1-5 of the abdomen each with four spots that are rather triangular in shape. The apical rims of the abdominal segments with dark pile. The lateral processes of the pygidium very long. (Lower California, California, Oregon, Utah, Arizona, New Mexico, Colorado, South Dakota)..... *maculosum*.
- The region in front of the ocelli closely and rugosely punctated. The scape with a strong yellow stripe. Segment 3 of the antennae shorter than segments 4+5. The mesoscutum usually with a short yellow line on each side of the anterior margin and a short line also above the tegulae. The front and middle tibiae striped. The inner maculations on abdominal segments 3 to 5 connected with the outer maculations by thin bands of yellow. The lateral processes on the pygidium shorter and not so narrow. (Mainly South-eastern; also reported from the Organ Mountains, New Mexico, and from Illinois)..... *cognatum*.
- 8.—The legs wholly black to the inclusion of the basitarsi. Thorax without maculations except for a yellow mark on the tegulae. On segment 1 merely two widely separated lateral spots. Segment 2 four-spotted, the inner spots small. Bands on segments 3-5 interrupted in the middle and with very wide emarginations above on each resulting half, the narrow connecting line between the outer and the inner spot of each half of the band being four or five times the length of the inner spot. (California).
palliventre (californicum).

- The legs with at least some maculations 9.
- 9.—The venter covered with golden-brown or black hair; the hair on the basitarsi within blackish. The spines on the hind tibiae black. The scape with a yellow stripe. The mesoscutum immaculate. Tubercles and scutellum maculated. All the tibiae with a broad yellow stripe (sometimes abbreviated on third pair) and all the basitarsi externally yellow. The abdominal bands beyond segment 1, which is variable, with deep rectangular emarginations on each side above. Segment 7 usually immaculate but sometimes maculated. (Wyoming, Oregon, California) *atriventre*.
- The venter covered with light hair, generally silvery white 10.
- 10.—A single prominent red spine with black tip on the under side of the abdomen near the apex. The venter fulvous or red. The band on segment 1 and often that on segment 2 subdivided into four spots. The lateral emarginations above on segments 3 to 5 very deep but not especially wide. The lateral processes of the pygidium very broadly rounded, approaching the truncate. Large species, 11 mm. to 15 mm. 11.
- Such a median spine near the apex of the venter lacking. The venter usually black. With one exception smaller species, rarely exceeding 12 mm. . . . 12.
- 11.—Ground color of abdomen above black. (Nebraska, Kansas, Colorado, New Mexico, Utah, Texas, and Calgary, Canada) *porteræ*.
- Ground color of abdomen above red. (Nebraska, Kansas, Colorado, and Wyoming) *porteræ amabile*.
- 12.—The lateral processes of the pygidium short and broad, two or more times the width of the space separating them from the central spine, black to reddish brown, and usually rather decidedly truncate; the central spine, rising from a shallow sinus, ending about on a level with the lateral processes. . . . 13.
- The lateral processes of the pygidium relatively long, extending beyond the apex of the central spine, and more or less rounded or angulated at the tip. 16.
- 13.—The maculations cream-colored 14.
- The maculations distinctly yellow 15.
- 14.—The tubercles maculated and the posterior margin of the scutellum with a widely interrupted maculation. (Colorado) *jocosum*.
- The tubercles, mesoscutum, and scutellum, immaculate. (Utah and California) *brachyurum*.
- 15.—Maculations at base and apex of front and middle tibiae. The mesoscutum immaculate. (9–10 mm.) (Utah and probably California) . . . *utahense*.
- These tibiae with continuous bands. A maculation sometimes above the tegulae on the mesoscutum and usually a broadly interrupted band on the scutellum. Pygidium sometimes reddish-brown. 8–9 mm. (California) . . *fontis*.
- 16.—The pygidium with yellow or pale maculations 17.
- The pygidium black 23.
- 17.—The spines on the hind tibiae black and opaque. The scape with a distinct stripe. The mesoscutum black. The medianly interrupted or subinterrupted bands on abdominal segments 2–5 deeply and squarely emarginate above on each half. The pile on the under side of the abdomen usually black, as already indicated under 9, but now and then silvery. The maculations

- cream-colored to light yellow. (California, Oregon, Wyoming) . . . *atriventre*.
 The tibial spines light yellow to faint reddish, transparent. 18.
- 18.—The maculations very pale yellow. A stripe above the tegulæ but not on the anterior margin of the mesoscutum. The femora without a stripe beneath. The lateral lobes of the pygidium rounded rather than angulate. (Utah).
niveumtarsum, new species.
- The maculations lemon-yellow or orange. Frequently L-shaped marks, complete or interrupted, on the mesoscutum. Stripes on the under side of the femora. 19.
- 19.—The maculations lemon-yellow. The lateral lobes of the pygidium usually inclined to be angulate, in some cases very strongly so. Relatively small to medium-sized bees, not exceeding 12 mm. in size. 20.
- The maculations orange-colored. The scape often maculated. The lateral lobes of the pygidium broadly and rather evenly rounded. Large bees, 13 to 15 mm. 22.
- 20.—The scape maculated. The scutellum maculated but not the axillæ. The lateral processes of the pygidium distinctly pointed, the emargination on the inner side resulting in a contour that extends, without a bend, from the base of the middle tooth virtually to the apical extremity of the outer margin. (California) *aridum*.
- The scape immaculate. The axillæ as well as the scutellum as a rule maculated. The lateral processes of the pygidium much broader at the apex, the inner contour from the base of the middle tooth to the apex of the lateral processes following a subrectangular bend, not virtually a straight line. 21.
- 21.—The inner maculations on segment 1 of the abdomen usually speck-like. Relatively small; about 10 mm. (Western) *mormonum* (*blanditum*).
- The inner maculations on segment 1 usually more developed. Relatively large; in the specimens at hand 12 mm. (Colorado, New Mexico, Arizona, California) *mormonum pecosense*.
- 22.—The venter ferruginous. The curvature of the lateral lobes of the pygidium relatively elevated. L-shaped maculations, sometimes discontinuous, on the thorax. Length 13 mm. (California) *bernardinum*.
- The venter black except for the first sternite. The curvature of the lateral lobes at the apex relatively low. A maculation above the tegulæ but not on the anterior margin of the mesoscutum. [The restricted maculation of the only male specimen of this putative variety of *bernardinum* is not shared by the females, and may be exceptional rather than characteristic.] Conspicuously large and robust, 15 mm. (Colorado).
bernardinum mesaverdense, new variety.
- 23.—The apices of the tibiæ with large triangular areas or stripes, rather dwarfing the maculations at the base. Segment 1 of the abdomen usually with a maculation at each lateral extremity and a broad separating area of black between, but sometimes with two tiny inner maculations in addition. (Nebraska, Wyoming, California) *nebrascense*.
- The apices of the tibiæ without or with much reduced maculations, though occasionally stripe-like on front tibiæ. Segment 1 of the abdomen four-spotted. 24.

- 24.—Tubercles and scutellum immaculate. (South Dakota, Nebraska, Colorado, Idaho, Wyoming, California, Oregon, Washington, Montana, Alberta, Saskatchewan)..... *tenuifloræ*.
 Tubercles and scutellum maculated..... 25.
 25.—The anterior margin of the mesoscutum without maculations. The hind tibiæ with a basal spot. (Kansas, Nebraska, Missouri, Colorado, New Mexico, California)..... *emarginatum*.
 The anterior margin of the mesoscutum with a linear maculation on each side. The hind tibiæ without a basal but with an apical spot. (Colorado).
emarginatum bilineatum, new variety.

Key to Females

- 1.—The region below the ocelli with sparse, irregularly grouped, clear punctures on a minutely tessellated ground. Sides of face immaculate but clypeus with two large lateral spots. Segments 1–5 of the abdomen each with four maculations of triangular or subtriangular shape. Segment 6 immaculate, with strongly developed lateral teeth; the contour beyond the teeth sinuate and reflexed; a sub-pitlike depression near the apex on each side of the median longitudinal carina. (Oregon, California, Utah, Arizona, New Mexico, Colorado, South Dakota)..... *maculosum*.
 The region between the ocelli and the antennæ with dense, often rather granular, punctuation. Segments 3–5 only in rare instances four-spotted, and then with linear rather than triangular inner maculations..... 2.
 2.—The mandibles almost entirely yellow, two large spots on the clypeus, and a small spot above each eye; but *no trace, or at most a specklike trace, of lateral face marks*. The coxæ, trochanters, and femora (basally) black to reddish brown; the tibiæ both within and outwardly, and the femora within and outwardly toward the apex, light reddish brown, as are the tegulæ; the tibiæ have in addition usually a yellow stripe or basal marks externally. Small bees, about 8 to 9 mm. in length. (California)..... *palmarum*.
 The sides of the face maculated when the clypeus is maculated, and sometimes maculated even when the clypeus is not, but more often black when the clypeus is black..... 3.
 3.—The bands on segments 1 and 2, and sometimes those beyond, broken up into four spots. The mandibles, sides of face, and clypeus with maculations. The legs immaculate except for stripes of rather variable length on the outer side of the tibiæ. Rather large bees, 10 to 12 mm..... 4.
 Segment 1 sometimes four-spotted or with merely two widely separated spots, one at each lateral extremity of the tergite, but more usually with a medianly interrupted band, the two halves being emarginate either above or below, or, in rare instances, not emarginate at all. The bands beyond segment 1 not divided into four spots..... 6.
 4.—Abbreviated maculations above the tegulæ. The tubercles sometimes wholly black, though usually with a faint touch of yellow. The abdominal segments with deep, wide, and rectangular emarginations on each lateral half above, those on segments 3 and 4 sometimes so deep as to break up the abdominal bands into four spots like those on segments 1 and 2. The lines

- connecting the inner with the outer maculations, when present, long and thin, not mere narrow links between the two. Segment 6 frequently wholly black. (Virginia, Georgia, North Carolina, Florida, Texas, Mississippi, Illinois, New Mexico)..... *cognatum*.
- A stripe not merely above the tegulae but also on the anterior margin of the mesoscutum. The tubercles distinctly maculated. The abdominal bands on segments 3-5 medianly interrupted and with abrupt, deep but narrow, subtriangular emarginations on each lateral half above. Segment 6 with two disc-like maculations..... 5.
- 5.—Ground color of abdomen above black. (Nebraska, Kansas, Texas, Utah, Colorado, New Mexico, and Calgary, Canada)..... *porteræ*.
Ground color of abdomen above reddish. (Nebraska, Kansas, Colorado, and Wyoming)..... *porteræ amabile*.
- 6.—The clypeus, sides of face, and mesoscutum black..... 7.
At least some of these parts maculated..... 11.
- 7.—The tubercles and scutellum wholly black..... 8.
The tubercles and scutellum maculated..... 9.
- 8.—The legs wholly black. (California, Utah (?))..... *palliventre*.
The tibiae with pale spots at the base. (South Dakota, Nebraska, Colorado, Wyoming, Idaho, California, Oregon, Washington, Montana, Alberta, Saskatchewan)..... *tenuifloræ*.
- 9.—The legs immaculate. Segment 6 with two unusually well-developed sharp teeth that are nearly twice as long as their width at the base. (California).
longispinum, new species.
The tibiae with maculations. Segment 6 with rather blunt, tooth-like projections interrupting the contour on each side..... 10.
- 10.—The ventral scopa golden brown to black. Usually black hairs also on the lower half of the face and on the legs, particularly on the basal joint of the tarsi. (California, Washington, Colorado, and Wyoming)..... *atriventre*.
The ventral scopa yellowish-white. The pubescence on the face light as is that on the legs; the pubescence on the basitarsi within rufofuscous. (Western).
emarginatum.
- 11.—The clypeus wholly black. Small maculations on the sides of the face. Tibiae with a stripe externally; that on the fore and middle tibiae is interrupted basally and does not quite attain the apex. Legs otherwise immaculate. Tegulae, tubercles, and scutellum (but not axillae) with maculations, that on scutellum widely interrupted posteriorly. Segment 1 with yellow maculations at each lateral extremity and two microscopic dots discally. The bands on segments 2 and 3 squarely but narrowly emarginate above, those on segments 4 and 5 sinuate above, on each half. The bands yellow and all medianly interrupted. Segment 6 two-spotted; its lateral teeth rather strongly developed; its apex truncate. Size $7\frac{3}{4}$ mm. (Wyoming).
wyomingense, new species.
- The clypeus maculated..... 12.
- 12.—The bands on segments 4 and 5 with rather abrupt, deep but narrow, subtriangular emarginations. Exceptional specimens of *porteræ*, having the lateral halves of the band on segment 2 merely emarginate, not completely subdivided. For a fuller description the reader is referred back to . 4 and 5.

The bands on segments 4 and 5 merely sinuous above, broadly and curvilinearly, not deeply, incised. 13.

- 13.—Segment 6 very slightly angulate but presenting an unbroken contour. The clypeus yellow except for a parallel-sided ribbon of black traversing the middle longitudinally. The femora beneath, the outer tibiæ, and outer basitarsi, yellow. The maculation on the mesoscutum variable: bisymmetrical L-shaped bands with their shorter arm part way along the anterior margin and their longer arm flanking the sides of the mesoscutum sometimes replace the more normal maculation extending merely along the sides. The tegulæ front and back, the tubercles, and the axillæ and scutellum (confluently) maculated. The band on segment 1 sometimes divided into four spots but often merely medially interrupted with slight posterior emarginations. The yellow of segment 6 bisected by a narrow longitudinal line of black, resulting in two clearly separated maculations. (California).

hesperium.

The lateral angles of segment 6 thrown into prominence by a more or less sharp bend in the contour, with resulting tooth-like projections 14.

- 14.—The tibiæ black, striped with yellow on the outside. 15.

The tibiæ, externally at least, completely maculated to the exclusion of black except for now and then a reddish-black spot near the apex. L-shaped marks often present on the thorax. 17.

- 15.—Maculations yellow. Clypeus very largely yellow; the only black portion, in addition to the apical margin, being usually a W-shaped figure at the base. 16.

Maculations cream-colored to light yellow. The clypeus with lateral maculations confined to the apical half, and sometimes between them and more or less on a level with their upper edge a third, much smaller maculation. (Utah and California.) *brachyurum*(?).

- 16.—The lateral face marks narrow, placed slantingly along the sides of the clypeus and ending about at its base; not in contact with the inner margin of the eye except at their lower end. (California) *fontis*(?).

The lateral face marks occupying the full space between the clypeus and the inner margin of the eye, obliquely truncated, their uppermost point on the inner margin of the eye on a level slightly above that of the base of the antennæ. A maculation on each side of the anterior margin of the mesoscutum that usually extends, L-shaped fashion or brokenly, part way along the sides of the mesoscutum. (California) *angelarum*.

- 17.—The posterior face of the thorax with two yellow maculations. The legs very strongly maculated; in addition to the tibiæ above, the yellow areas include the coxæ (largely), the trochanters (largely), practically the entire under side of all of the femora, and to some extent the upper side, especially on the middle and hind pairs of legs, and the hind basitarsi, the basitarsi of the front and middle legs being concealed beneath a heavy thatch of basally snowy and apically golden-brown hair. The otherwise yellow clypeus traversed medianly by a parallel-sided longitudinal band of black. The scape usually maculated. (Nevada and California) *placitum*.

The thoracic truncation unadorned with maculations. The maculations on the under side of the femora, if present, not so extensive, merely stripe-like; the third pair of coxæ often maculated, but the front and usually the middle pair of coxæ, and the trochanters black. 18.

- 18.—The maculations rich orange. The otherwise maculated clypeus traversed medianly by a parallel-sided longitudinal black band. Two large maculations on segment 6 narrowly separated from each other by a narrow line of black; the contour of this segment black, including the lateral teeth. Rather large, robust bees about 13 mm. in length. (Colorado).

bernardinum mesaverdense, new variety.

The maculations lemon-yellow or of lighter hue. Smaller bees, rarely exceeding 10 mm., and often less, in length. 19.

- 19.—Maculations light yellow. Lateral spots on clypeus extending about half-way from the apex to the base. No stripes, or only barely traceable, much abbreviated vestiges of stripes, on femora beneath. No L-shaped maculations on thorax; instead, a band on each side above the tegulæ that is about coextensive with them. (Wyoming, Utah, Idaho).

niveumtarsum, new species.

Maculations lemon-yellow. The femora of the front and middle legs and usually also the hind femora with strong, well-developed stripes beneath. 20.

- 20.—The clypeus with large lateral spots. The thorax with a stripe on each side above the tegulæ. The maculation on segment 6 medianly bisected by a narrow line of black. 10 mm. in length and rather robust. (Wyoming and Colorado) *dentipygum*.

The clypeus wholly or largely yellow. L-shaped stripes on the thorax. Segment 6 almost wholly yellow, narrowly black at the base and at the middle of the extreme apex and with two hair-fine inward- and downward-pointing lines of black projected into the yellow from symmetrically spaced points along the base. More slender. 21.

- 21.—The clypeus wholly yellow except for the narrow black apical rim and sometimes two black spots at the base. (Western) *mormonum (blanditum)*.

The clypeus with a down-pointing triangle of black (Colorado).

mormonum trianguliferum.

ADDITIONAL COMMENTS ON ANTHIDIINÆ BEES

Paranthidium lepidum (Cresson)

A female of this species, recently acquired in the collection of Mrs. A. T. Slosson, is from L. Toxaway, North Carolina, and therefore still farther extends the known range. In the possession of two subparallel, posteriorly diverging, thin stripes on the disk of the thorax, the specimen resembles the male type rather more closely than does the previously designated allotype, which wholly lacks these stripes. There is much more black, and a consequently greater restriction of red, on the legs of the North Carolina specimen than is the case in the allotype from Tennessee.

Callanthidium formosum (Cresson)

A specimen, unfortunately without designation of locality, taken by Eugene L. Keen, Sept. 6, 1883, has well-developed apical stripes on the under side of all the femora, differing in this respect from the type and from a specimen taken at Starkville, Colo., by Dr. F. E. Lutz, June 13, 1919.

Hypanthidium panamense Cockerell

Two specimens from Barro Colorado, Panama Canal Zone, collected by Dr. F. E. Lutz, Nov. 13, 1923, are, I think, undoubtedly the male of this species, which was described on the basis of the female in 1913. In almost all respects the description given by Cockerell fits also the opposite sex. In one of the two specimens the "spot at each lower corner of the supraclypeal area" is lacking; in both specimens there is a yellow band on the second segment, not merely "a yellow patch on each side," and the ferruginous mark on each side of the sixth segment is lacking, that segment being broadly yellow, with merely a reddish hyaline rim. This rim is in the male rather abruptly produced toward the middle, the extension occupying in width a little more than a third of the tergite and terminating at each of its lateral extremities in a rather flat but well-defined tooth. The seventh segment is bilobed, each of the lobes being subequal to the emargination between. The specimen that shares with the type the "spot at each lower corner of the supraclypeal area" has been designated the allotype.

Hypanthidium mexicanum taboganum (Cockerell)

A male specimen, collected by Mr. T. Hallinan at Corozal, Panama Canal Zone, February 23, 1914, checks up in all particulars with Cockerell's description of *taboganum*. Prior to reading this description I had compared the specimen with the type of *mexicanum* and had found their agreement in structure so close that I concluded the specimen from Corozal was only a variety of Cresson's species. Particularly to be noted is the fact that in both the seventh segment is broadly rounded and of uninterrupted contour, and has a large pit-like depression near its apical middle and a less conspicuous, glistening subtuberculate swelling at its base. It may be mentioned, by way of supplementing Cresson's description of *mexicanum* and thus bringing out more sharply the differences between this species and its variety, that the male of *mexicanum* has on the first abdominal segment a wide band of yellow, medianly interrupted, while in *taboganum* this segment is immaculate. The second segment is immaculate in *mexicanum*, laterally marked in *taboganum*. The seventh segment is in *mexicanum* black except for the testaceous apical border; in *taboganum* this black is replaced by yellow.

