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BEES OF THE GENUS *PERDITA* SMITH IN THE AMERICAN MUSEUM OF NATURAL HISTORY (HYMENOPTERA)

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The genus *Perdita* Smith is one of the most characteristic genera of North American bees and is peculiar to the North American continent. Its center of distribution is the arid regions of the Southwestern States and Northern Mexico, but it has a representative on the Atlantic Coast as far north as New Brunswick and as far south as Guatemala. On the Pacific Coast the genus is well represented in Lower California and spreads northward as far as Victoria, British Columbia.

The following records of species in The American Museum of Natural History are new and will add considerably to the known range of many of the species. Three of the species are here described as new, and three others are new species which are being published elsewhere. I have arranged the species in groups designated by the earliest described component species.

Perdita georgica Timberlake

2 ♀, De Funiak Springs, Florida, October 17 and 19, 1914 (F. E. Watson and A. J. Mutchler).

The description of this species will appear elsewhere, and the above specimens will be recorded in it as paratypes. This species belongs to the *ignota* group.

Perdita callicerata Cockerell

3 ♀, 5 ♂, Coyote Mts., Arizona, at an altitude of about 3500 feet, August 4 to 7, 1916 (Frank E. Lutz); 1 ♀, north side of Kits Peak, Baboquivari Mts., Pima County, Arizona, at an altitude of about 3600 feet, August 7 to 9, 1916 (Frank E. Lutz).

Callicerata is a member of the *ignota* group. The specimens collected in the Coyote Mts. were taken on *Baileya multiradiata*.

¹Citrus Experiment Station, Riverside, California.

***Perdita albovittata* Cockerell**

1 ♀, Black Dike Prospect, Sierritas, Arizona, July 26 to 29, 1916 (Frank E. Lutz).

This species seems in every way characteristic of the *ignota* group, except that the maxillary palpi are 5-jointed. It is the type of the subgenus *Pentaperdita* Cockerell and Porter.

***Perdita albipennis* Cresson**

1 ♀, 3 ♂, La Junta, Colorado, at an altitude of 4100 feet, August 12, 1920 (Dr. and Mrs. Frank E. Lutz); 1 ♀, Denver, Colorado, September 5, 1920 (L. O. Jackson); 1 ♂, Brownsville region, Texas, January 2-13, 1928 (F. H. Benjamin).

The Brownsville specimen agrees with the var. *helianthi* Cockerell in the color of the antennæ, but the abdomen is entirely dark. *P. albipennis* is the type of the subgenus *Cockerellia* Ashmead, which is very closely allied to the *ignota* group both in somatic and in genitalic characters.

***Perdita lacteipennis* Swenk and Cockerell**

1 ♀, La Junta, Colorado, at an altitude of 4100 feet, August 12, 1920 (Frank E. Lutz).

***Perdita bequaerti* Viereck**

1 ♀, Mobile, Alabama (T. S. Van Aller); 6 ♀, 2 ♂, South McAlester, Indian Territory (now Oklahoma), June 11 (Wickham).

This species, like the preceding, belongs to the *albipennis* group. I have seen specimens of *P. bequaerti* also from Knoxville, Tennessee (G. G. Ainslie) and Bryson City, North Carolina (Crawford). The Oklahoma specimens evidently form a part of a series, from which the type of *P. wickhami* Cockerell was selected and submitted to Dr. Cockerell for determination. These specimens might possibly be regarded as a western race, with slightly smaller face marks than in typical *bequaerti*, but there is no question that *wickhami* and *bequaerti* are conspecific.

***Perdita octomaculata* (Say)**

1 ♂, Mosholu, New York, August 30, 1919 (Frank E. Watson); 5 ♀, Keene Valley, Essex County, New York, August 7 to 16, 1917 (H. Notman); 7 ♀, 4 ♂, Lake George, New York, August 22, 1894 and August 3, 1903 (Zabriskie); 1 ♀, 1 ♂, Franconia, New Hampshire

(Mrs. Slosson); 1 ♂, Putnam, Connecticut, August 5, 1919, on *Solidago* (A. Barrett Klots); and 1 ♀, Florence, South Carolina, October 12, 1916 (A. H. Sturtevant).

P. octomaculata is typical of a rather large group of species, restricted mainly to the region east of the Rocky Mountains.

***Perdita consobrina*, new species**

1 ♀ (holotype), Sumter, South Carolina, October 13, 1916 (A. H. Sturtevant).

The female runs to *P. affinis* Cresson, var. (couplet 80) in Cockerell's table (Proc. Acad. Nat. Sci., Philadelphia, 1896) but, as the supraclypeal mark is in the form of two small spots and perhaps sometimes absent in a series, it might also run to typical *affinis* in couplet 62. It differs from *affinis* in having the head longer than wide, the facial quadrangle narrower, the clypeus much more projecting in front of ocular line, the mesonotum as dull as the frons, the pale markings bright yellow instead of yellowish white, etc. It is a member of the *octomaculata* group and differs from *P. octomaculata* (Say) in its smaller size, narrower head, duller and hairy mesonotum, the marks on abdomen much larger and not so widely separated, etc. From *P. jonesi* Cockerell it differs in having the stigma pallid centrally, the tegulae hyaline instead of light reddish brown, the abdominal marks much larger (larger than in *octomaculata* instead of smaller), the lateral face marks larger and not pointed above, etc.

FEMALE.—General form ordinary. Head a little longer than wide, the facial quadrangle very distinctly longer than wide. Cheeks ordinary. Eyes considerably more than twice as long as wide, the inner orbits slightly and broadly emarginate opposite the middle of frons. Clypeus rather prominent and strongly projecting in front of ocular line; disk convex, somewhat broader than long and broadly truncate above between dog-ear plates; lateral extensions of clypeus strongly reflexed, extending obliquely backward from sides of labrum toward base of mandibles, rather wide at inner ends and not at all visible in frontal view of head. Dog-ear plates very large and pointed below. Lateral plates of face strongly widened at lower ends and each at a point opposite middle of dog-ear plates, covering about one-fifth the total width of face. Prominence between antennae high and tectiform, the carina of the ridge extending on to frons and continued above as a smooth fine line to anterior ocellus. Mandibles curved, rather slender, acute at apex and reaching to far margin of labrum. Antennae ordinary, the joints of flagellum about as long as thick. Abdomen oval, about twice as long as wide, convex above, the pygidium broad at base and narrow and obtuse at apex. Membrane of wings densely covered all over with fine short setae; stigma narrowly lanceolate, somewhat shorter than first submarginal cell, and emitting the radius slightly beyond the middle; marginal cell as long as stigma obliquely truncate at apex, and with the substigmatal and poststigmatal parts about equal; second submarginal cell narrowed about two-thirds to the marginal cell;

third discoidal cell distinct, the recurrent veins interstitial with the intercubiti. Claws missing in type, but probably with a fine subapical inner tooth as in other species of the *octomaculata* group.

Frons, vertex, mesonotum and metanotum dull and granular tessellate, and having the numerous setiferous punctures extremely fine and indistinct. Dog-ear plates and lateral plates, except below, sculptured much like the frons, but lower end of lateral plates, supraclypeal area, and clypeus polished, or with a fine indistinct tessellation only on the more dorsal parts, the clypeus also having sparse shallow punctures. Cheeks strongly tessellate, somewhat shining, without a smooth strip next to eyes and with numerous fine rather indistinct punctures. Propodeum, pleura, and sternum distinctly tessellate and rather more shining than cheeks, the posterior face of propodeum smoother and strongly shiny, the mesopleura punctured like the cheeks. Pubescence of head and thorax beneath whitish and tinted with ochreous above, the hairs briefly plumose and appearing rather coarse; on cheeks, pleura, and apex of abdomen rather long and moderately dense; rather dense but short and erect on mesonotum; longer on frons, especially around bases of antennæ, and on the vertex posteriorly, but short on middle of frons. Face below antennæ almost nude. Scopa of hind tibiæ rather thin and long, the hairs on the anterior side of tibiæ strongly curved and simple.

Head and thorax very dark green, the propodeum and pleura very slightly bluish green. Mandibles except reddish apices, labrum, clypeus, lateral face marks, and two small supraclypeal spots bright yellow. Remainder of supraclypeal plate piceous, but dog-ear plates dark green. Disk of clypeus with two piceous vittæ, convergent and pointed above, somewhat thickened and bifid below, where they end slightly below the middle of disk. Anterior margin of disk of clypeus, very narrowly, and a transverse band at base of labrum, extending on to inner margin of lateral extensions of clypeus, brown. Lateral face marks much higher than broad, broad below and with the inner corners rounded next to clypeus, narrowing about one-half just above level of top of clypeus and extending with the same width to frontal foveæ, where they are obliquely truncate and reach half-way from orbital margin to antennal sockets. Cheeks entirely dark. Small spot on posterior corners of pronotum and the tubercles yellow. Abdomen piceous above and below, with a slight greenish luster on the first tergite, the pygidium reddish. Tergites 1-5 each with a yellow band, reaching to lateral margins except on 5, and more or less distinctly interrupted medially. Band on tergite 1 subapical, narrow, straight, narrowly interrupted medially, and abruptly and quadrately enlarged at lateral margins. Band on 2 in form of two widely separated triangular spots, one at each basal corner, pointed within on basal margin, reaching along lateral margins to the apical depression, extending broadly on to the reflexed part of the tergite and enclosing the black lateral foveal line. Band on 3 much less broadly interrupted medially than on 2 but much more than on 1, oblique at sides where it extends on to the reflexed part of tergite and tapering medially to rather sharp points on basal margin. Band on 4 similar to that on 3, but reaching only to lateral margins, nearly uniform in width, linearly interrupted at middle, arcuate and about one-fourth as wide as length of segment. Band on 5 very similar to that on 4, except that it is rather less arcuate and does not quite reach to lateral margins. Maxillæ piceous, the labium brown. Antennæ piceous, the scape rather broadly yellow beneath, the flagellum narrowly dull yellow beneath. Legs piceous, all the knees, front tibiæ broadly on anterior side and middle tibiæ narrowly in front, yellow;

front tarsi yellowish anteriorly but otherwise brown. Tegulae hyaline with a yellow spot at base, but appearing almost entirely yellowish because of the underlying yellow wing bases. Wings hyaline, slightly tinted with fuscous, but appearing rather whitish at certain angles; veins and margins of stigma brown, the stigma with a distinct central pallid streak.

Length about 5.5 mm.

***Perdita gerardiæ* Crawford**

2 ♀, 3 ♂, Gainesville, Florida, September 26 to October 2, 1914 (A. J. Mutchler and F. E. Watson).

P. gerardiæ belongs to the *octomaculata* group. At the time of writing, *gerardiæ* is still a manuscript species, which I have identified through specimens contributed by Mr. Crawford.

***Perdita affinis* Cresson**

2 ♀, 3 ♂, Jim Creek, near Boulder, Colorado, altitude about 7000 feet, August 3, 1922 (Frank E. Lutz).

P. affinis seems to be rather variable, and these specimens belong to the large variety. *Affinis* is also a member of the *octomaculata* group. One of the females was collected on *Grindelia*.

***Perdita wheeleri*, new species**

1 ♂ (holotype) collected in May, 1905, in Indian Gardens in the Grand Cañon, Arizona (W. M. Wheeler).

It is a pleasure to name this very interesting and distinct species for its discoverer, Dr. William Morton Wheeler.

The male runs to *P. nitidella* Cockerell (couplet 71) in Cockerell's table, but it is not at all closely allied and is also distinct from other species falling at the same place (*P. wilmattæ*, *tropicalis*, *mentzeliarum* and *mentzeliarum* var. *lauta*, all of Cockerell). In some respects, especially in the color of abdomen, it resembles *P. tropicalis* Cockerell, but the abdomen is much shorter and broader, with the dark bands much paler, and the claws are much different. The peculiar face marks will also separate *wheeleri* from any of the above species. In structural characters, including genitalia, *wheeleri* belongs to the group of *P. mentzelia* (other verified members of the group are *P. mentzeliarum* Cockerell and *P. wootonæ* Cockerell), but differs greatly from the other species in color and markings. Like other members of the group, doubtlessly *wheeleri* will be found to vary greatly in size of the head and in the presence or absence of the genal tubercles, and it would not be surprising to learn that it visits *Mentzelia* like the other members of the group.

MALE.—Form rather robust. Head moderately enlarged, quadrate, much broader than thorax but only slightly wider than long, and distinctly wider below than above. Temples and cheeks very broad, the latter simple and well rounded next to occipital cavity. Eyes slightly more than twice as wide as long, the inner orbits very slightly and broadly emarginate above and a little divergent below. Mandibles long, slender, tapering, very acute and simple at apex, and reaching much beyond far margin of labrum. Clypeus broad, low and rather strongly depressed; the disk nearly twice as broad as high, the sides nearly straight and oblique, and the base moderately broadly subtruncate; lateral extensions rather shorter than width of disk, moderately wide at inner ends, not very strongly narrowed toward base of mandibles and inflexed on the anterior margin so that about one-half of their surface is visible in frontal view of head. Dog-ear plates not quite twice as high as wide and pointed below. Lateral plates of face only slightly widened below and each covering a little less than one-third the total width of face. Prominence between antennæ broad, low, tectiform, and rather carinate below. Frons with an impressed median line broadening toward anterior ocellus and not quite reaching below to the prominence. Posterior corners of pronotum well rounded and prominent, the disk slightly concave between them. Propleura deeply and broadly sulcate with the bottom of the sulcation rounded. Abdomen very broadly ovate, considerably less than twice as long as wide, convex and with the apex strongly recurved; apical tergite large, broad across the base and tapering to the rather narrow obtuse apex. Membrane of wings with very minute subobsolete setæ; stigma large but of ordinary width, as long as first submarginal cell and emitting the radius somewhat beyond the middle; marginal cell somewhat shorter than stigma, with the apical truncation a little oblique and appendiculate, and with the substigmal part about one-fourth longer than the poststigmal part; second submarginal cell narrowed nearly one-half above; first recurrent vein received by the first submarginal cell close to apex and the second recurrent received by the second submarginal a short distance before the apex; subdiscoidal and second recurrent veins obsolete. Claws large, abruptly bent at middle, deeply cleft and with the inner tooth a little shorter than the outer tooth.

Vertex dull, strongly tessellate and almost granular medially; frons rather shining but distinctly and finely tessellate; face below antennæ still more shining and delicately tessellate, with the tessellation more distinct on lateral plates; cheeks about as distinctly tessellate as frons. Face, sides of frons and of vertex, and the cheeks rather indistinctly and very sparsely punctured, with the punctures very fine except on the face. Middle of frons with much more distinct and closer but well separated punctures. Thorax shining, uniformly, finely, and rather delicately tessellate, the mesonotum and pleura with very fine and sparse punctures. Abdomen shining and with the usual microscopic sculpture. Pubescence remarkable for its sparsity, the entire body being practically nude, although there are a few moderately long whitish hairs on the occipital rim above. The usual hair on cheeks, pleura, and sides of propodeum is extremely sparse, fine, and short. Legs, especially middle and hind tibiae and tarsi, moderately hairy.

Head and thorax very dark green with a weak brassy luster, but the disk of mesoscutum, the scutellum, and metanotum almost black. Mandibles at base, anterior half of clypeus, and very large lateral face marks deep yellow or almost orange. Mandibles reddish at middle and rather dark red at apex. Labrum shining brown. Upper half of clypeus, dog-ear plates, and supraclypeal area piceous. Lateral

face marks covering remainder of face below antennæ, quadrate, slightly broader below, and squarely and broadly truncate at level of lower margin of antennal sockets. Cheeks with a small brownish yellow nubilous spot anteriorly but dark next to the orbits. Thorax entirely dark. Legs piceous, the front knees very narrowly, front tibiæ except behind, front tarsi beneath except on apical joint, middle knees beneath and middle tibiæ beneath, yellow; tarsi otherwise brown. Abdomen yellow but first tergite entirely and broad apical margin of tergites 2-7 brown, the dark color becoming paler and fainter on successive segments toward apex; on tergites 2 and 3 the yellow and brown bands are rather distinct and about equally wide, the yellow not quite reaching to the lateral margins, especially on 2; on the following segments the two colors shade into each other gradually. Venter entirely slightly brownish dull yellow. Labio-maxillary structure brown. Antennæ rather dark brown above, the scape narrowly and the flagellum broadly dull yellow beneath. Tegulæ glassy hyaline and testaceous at base. Wings clear hyaline, the veins rather pale brown with subcosta and margins of stigma darker, the stigma otherwise whitish.

Length about 4.0 mm.

***Perdita maura* Cockerell**

1 ♀, 3 ♂, White Rocks, near Boulder, Colorado, at an altitude of about 5500 feet, June 30, 1922 (Frank E. Lutz).

Maura seems to be an isolated species, related in a general way to the *octomaculata* and *mentzelæ* groups. It is the type of the subgenus *Zaperdita* Robertson. All of the specimens were collected on *Physalis*.

***Perdita obscurata* Cresson**

1 ♀, Kushla, Alabama (A. H. Sturtevant).

Obscurata belongs to a small group of species characterized especially by the usual presence of a small intercalated submarginal cell. The group is apparently confined to the Atlantic Seaboard States and includes *P. novæ-angliæ* Viereck, *P. bradleyi* Viereck, and *P. floridensis*, new species. *P. novæ-angliæ* Viereck is the type of the subgenus *Alloperdita* Viereck.

***Perdita novæ-angliæ* Viereck**

1 ♂, Lakehurst, New Jersey, June 9 (Harry B. Weiss).

***Perdita floridensis*, new species**

2 ♀, 2 ♂ (holotype ♂, allotype and paratypes), Clearwater, Florida, May 1, 1908 (E. P. Van Duzee).

The female runs exactly to *P. obscurata* Cresson (couplet 62) in Cockerell's table (1896), and differs from that species in having the head distinctly longer than wide (wider than long in *obscurata*), the hind tibiæ dark, and the abdomen with a straight, narrow yellow band at base of

tergites 2-5, narrowly interrupted or notched medially. In *obscurata* the abdominal bands are broadly interrupted medially and absent on 5.

The male runs to the male of *P. tarda* Cockerell (couplet 86) and differs therefrom in having the head a little longer than wide, the supra-clypeal mark transverse, not or hardly reaching above middle of dog-ear marks, the wings clear, with pale veins and with an intercalated submarginal cell, the abdominal marks yellow instead of white and confined to tergites 2 and 3, etc. It differs from the male of *obscurata* in not having the face entirely yellow beneath antennæ.

MALE.—Form rather elongate and slender. Head small, narrower than thorax, thin fronto-occipitally, somewhat longer than wide, gently rounded at sides and subtransverse above. Cheeks narrow and simple. Eyes large, about two and one-half times longer than wide, with the inner orbits arcuate, a little divergent below the middle, and very broadly and slightly emarginate above. Mandibles moderately stout, acute at apex, with a small inner tooth, curved, and reaching somewhat beyond far margin of labrum. Clypeus convex, somewhat prominent and rather strongly projecting in front of ocular line; disk a little broader than high and squarely truncate above between dog-ear plates; lateral extensions not very long, broad at inner ends and broadly reflexed on anterior margin, so that only a small part is visible in frontal view of head. Dog-ear plates elongate oval, somewhat pointed below and about twice as high as wide. Lateral plates of face somewhat widened at lower end and each covering at level of middle of dog-ear plates about one-fourth the total width of face. Antennæ long, joints of flagellum distinctly longer than wide but the scape hardly more than twice as long as wide. Prominence between antennæ rather high, subtectiform and declivous above middle of antennal sockets, and abruptly terminated at dorsal level of the sockets. Frons depressed, without a median impressed or smooth line but with a broad very shallow median depression most noticeable above and marked above on each side by a slight rounded prominence just below the anterior ocellus. Abdomen elongate oval, considerably more than twice as long as wide, gently convex above, and with the apex moderately reflexed toward venter. Seventh tergite broad at base, tapering to the rather narrow rounded apex and depressed on disk. Membrane of wings with very fine, not dense, and subobsolete setæ; stigma rather large and moderately broad, about as long as first submarginal cell and emitting radius slightly beyond the middle; marginal cell rather broad, as long as stigma, somewhat obliquely truncate and appendiculate at apex, and with the substigmatal and poststigmatal parts about equal; normal second submarginal cell narrowed about one-half above, but having the first intercubitus split below to include a small triangular intercalary cell¹; first recurrent vein interstitial or nearly so with outer branch of first intercubitus; subdiscoidal and second recurrent veins obsolete, the latter interstitial with second intercubitus. Claws rather large, abruptly bent at middle, not very deeply cleft at apex, and with the inner tooth stout and distinctly shorter than the outer tooth.

¹I believe with Robertson that the first intercubitus of *Perdita*, and of other Panurgidæ with two submarginal cells, is of dual origin, and that the condition in *Alloperdita* is a reversion to a remote ancestral condition. It is hardly possible to suppose that the intercalary cell has been persistent throughout the ancestry of *Alloperdita* on account of the close affinity of the group to other species of *Perdita*.

Frons and vertex finely but rather distinctly tessellate and moderately dull, the frons with rather sparse and very fine punctures. Face below antennæ polished and impunctate. Cheeks shining, finely tessellate except in a smooth strip along posterior orbits, the fine punctures numerous but well separated. Mesonotum polished and shining, but showing a fine delicate tessellation around margins of scutum and on scutellum, and with numerous, well separated, very fine punctures. Metanotum dull and very finely and densely tessellate. Propodeum and pleura tessellate and shining much like the frons, the pleura with numerous very fine punctures. Abdomen shining and with a delicate microscopic tessellation. Pubescence fine, moderately long and whitish, rather thinner than usual on cheeks, occiput, and pleura, thin and moderately short on frons, and moderately thin and long, but uniformly distributed, on mesonotum.

Head and thorax dark greenish blue. Mandibles except reddish tips, labrum, clypeus except usual pair of dots, and lateral, supraclypeal, and dog-ear marks rather bright yellow. Lateral face marks broad below, but tapering above to a narrow obtuse point at level of antennal sockets. Supraclypeal mark transverse and narrow, the greater part of the supraclypeal plate being dark. Dog-ear marks large and oval but margined nearly or quite all around with black, the acute lower point of the plates, especially, being dark. Cheeks entirely dark. Small cuneiform marks on posterior margin of pronotum and sometimes small spot at apex of tubercles yellow. Legs brownish piceous, the front and middle knees, front tibiæ except a brown streak behind, middle tibiæ in front, and all the tarsi yellow; the middle tibiæ otherwise brown. Abdomen brownish piceous above and beneath, with the last tergite yellowish brown, and tergites 2 and 3 each with a narrow basal yellow band, rather broadly interrupted in middle and as broadly separated from lateral margins. Labio-maxillary structure brown. Scape yellow, with a brownish piceous spot above at apex; flagellum dull brownish piceous above and dull brownish yellow beneath. Tegulæ nearly clear hyaline with a yellow spot at base. Wings rather distinctly milky hyaline, the stigma whitish, the veins mostly colorless, but subcosta and margins of stigma moderately dark brown.

Length about 6.0 mm.

FEMALE.—Similar to the male. Head distinctly longer than wide, very thin fronto-occipitally, slightly rounded on the sides, and nearly transverse above. Cheeks and temples narrow. Eyes about thrice as long as wide, the inner orbits parallel and nearly straight except at upper ends, where they slightly converge for a short distance. Mandibles very similar to those of male but somewhat stouter. Clypeus convex, projecting strongly in front of ocular line, but not especially prominent; disk distinctly wider than long and rather well rounded above; lateral extensions not visible in frontal view of head, very wide at inner ends and rapidly tapering toward base of mandibles. Dog-ear plates very large. Lateral plates of face a little widened below and opposite middle of dog-ear plates, each covering somewhat less than one-fourth the total width of face. Prominence between antennæ moderately high and tectiform above, the ridge reaching for a short distance on the frons. Frons not quite so much depressed as in the male and with a median, fine, impressed line extending from anterior ocellus to the prominence. Abdomen oval, rather more than twice as long as wide, the pygidium rather acutely angled at apex. Wings as in the male, except that the intercalary submarginal cell is larger, but reaching only about half-way to marginal cell, and the third discoidal cell is complete. Claws with a small inner tooth a little beyond the middle, and with the outer tooth strongly curved inward.

Frons and vertex finely tessellate and rather strongly shining, the frons with numerous, but well separated, very fine punctures. Face below antennæ polished and very sparsely and indistinctly punctured. Cheeks indistinctly tessellate and shining, and with numerous but very fine punctures. Mesonotum shining, polished on disk, finely tessellate around the margins and on anterior part of scutum, and with numerous but well separated, very fine punctures, which become sparse on posterior part of disk of scutum. Prothorax, propodeum, and pleura finely tessellate and shining, the pleura with numerous fine punctures. Abdomen with the usual microscopic lineolation. Pubescence very much as in the male, the scopa of the hind tibiæ rather short and of ordinary density.

Head and thorax very dark green, the propodeum slightly bluish green. Base of mandibles, marks on clypeus, and lateral face marks lemon-yellow. Mandibles otherwise rather pale ferruginous or reddish. Labrum dark brown, clypeus piceous, with a slender median vitta, fine marginal line at summit of disk, and sometimes a rather large spot on each side of disk anteriorly, yellow; the median pale vitta and dorsal transverse line uniting to form a T or anchor-shaped mark. Lateral face marks in form of a vertical rather narrow triangle, more than twice as high as wide at base, and with the acute to rather blunt apex ending at level of lower margin of antennal sockets. Remainder of face above clypeus dark green. Posterior corners of pronotum each with a large cuneiform mark, sometimes nearly meeting medially, and anterior border of pronotum yellow, but tubercles entirely dark or showing only a trace of yellow at apex. Abdomen piceous above and beneath, the pygidium ferruginous brown. Tergites 2 to 5 each with a narrow even basal yellow band, narrowly interrupted in middle, reaching to lateral foveæ on 2 and not quite to lateral margins on other segments, the band on 5 very narrow and concealed when segment is retracted. Labio-maxillary structure brown, the glossa paler brown. Antennæ piceous, the flagellum uniformly dark, the scape yellow except above on distal half. Legs piceous, the front tibiæ anteriorly and all the tarsi yellow (in one specimen on left side only the middle and hind basitarsal joints are piceous). Tegulæ hyaline, with a yellow spot at base. Wings milky hyaline, the subcosta brown, the stigma yellowish with deeper yellow margins, the remainder of venation very pale.

Length about 6.5 mm.

***Perdita excisa* Timberlake**

1 ♀, Dulzura, San Diego County, California, 2800 feet altitude (W. S. Wright). This species will be described in my report on the California species of *Perdita*. It belongs to the group of *P. interrupta* Cresson.

***Perdita zebrata* Cresson**

1 ♂, 3 ♀, New Mexico (no other data); 1 ♂, Pueblo, Colorado, altitude 4700 feet, August 9, 1920 (Frank E. Lutz); 1 ♂, La Junta, Colorado, altitude 4100 feet, August 12, 1920 (Frank E. Lutz); and 1 ♀, Canfield, Colorado, August 15, 1922 (Frank E. Lutz). *Zebrata* forms the type of a large group of southwestern species, which almost always have the abdomen yellow with four or five dark bands. This group is the subgenus *Neoperdita* Ashmead.

In the American Museum there is also another species of the *zebrata* group, represented by a single rather poor specimen, labelled New Mexico, without other data. Both Dr. Cockerell and myself consider this an undescribed species, similar in many respects to *P. stottleri* Cockerell, but much smaller. On account of the poor material and incomplete data it does not seem advisable to describe it at this time.

***Perdita dasyliirii* Cockerell**

19 ♀, 1 ♂, Sabino Basin, Santa Catalina Mts., Arizona, at an altitude of about 3800 feet, July 8 to 20, 1916 (Frank E. Lutz and J. A. G. Rehn).

All of the specimens were taken on *Agave palmeri*.

The female from this locality was described by Dr. Cockerell as *P. nolinæ*, but the association of the females with a typical male of *dasyliirii*, collected at the same time, establishes the synonymy without doubt, a fact which I had suspected before examining the above material, on account of the close similarity to *P. rhois* Cockerell in both sexes. The synonymy, however, is complicated by the fact that *P. dasyliirii* was originally described from the supposed female and male, so that it is necessary to restrict the name to the supposed female which was actually a male and exclude the second male as belonging to another as yet apparently unnamed species.

P. dasyliirii belongs to the *rhois* group, apparently restricted to the southwestern states and Lower California, and characterized by the large very broad stigma and the well-marked antigeny of the sexes.

***Perdita larreae* Cockerell**

1 ♀, Santa Cruz village, Cobabi Mts., Arizona, August 10 to 12, 1916, at about 3100 feet elevation (Frank E. Lutz and J. A. G. Rehn). The bee was "swept from greasewood (*Covillea tridentata*)."

At first I considered the above specimen to be an undescribed species but later concluded that it is the previously unknown female of *P. larreae*. If this is actually the case, it seems equally certain that *P. larrearum* Cockerell is the female of *P. marcialis* Cockerell. The whole matter, however, is perplexing and needs clarification by careful field observations or by much more abundant material than has been as yet assembled.

The female runs in Cockerell's table (1896) to couplet 3, where it agrees with *P. marcialis* Cockerell except in sexual characters and in having the thorax brownish or ferruginous yellow. It differs from *P. larrearum* Cockerell by having the head, thorax, and abdomen brownish

or ferruginous yellow, with a transverse blackish band on vertex and a broad transverse dark green band on mesosternum, the mesonotum nearly nude, etc. The yellow parts of the *P. larreæ*, male, and of *P. marcialis*, are deep orange-yellow and quite different from the more or less ferruginous or brownish pale parts of *P. larrearum* or *P. larreæ*, female, but I believe this difference is only sexual. *P. larreæ* is the type of the subgenus *Perditella* Cockerell. The group is apparently restricted to the Southwest and is characterized by the very peculiar venation, marked antigeny of the sexes, and by the peculiarly half milky and half clear hyaline wings of the female, etc.

FEMALE.—General form small and ordinary. Head a little longer than wide and rather well rounded on sides and above. Cheeks rather narrow. Inner orbits of eyes nearly straight and parallel. Mandibles rather slender for a female *Perditia*, rather acute and simple at apex, and reaching nearly to far margin of labrum. Clypeus convex but not prominent and extending a short distance in front of ocular line; disk somewhat broader than high, the sides straight and extending obliquely nearly to inner side of base of mandibles, and the summit not very broadly truncate between dog-ear plates; lateral extensions feebly differentiated, being extremely broad and continuous with disk on inner side, rather strongly reflexed along anterior margin and visible in large part in frontal view of head. Dog-ear plates distinctly more than twice as high as wide, strongly oblique and diverging below, and very acute at lower end. Lateral plates of face a third narrower below than at level of antennæ and at level of summit of clypeus each covering about one-fourth the total width of face. Prominence between antennæ low but distinctly tectiform and carinate medially above the level of middle antennal sockets, the carina extending nearly to middle of frons and replaced above the middle of frons by a fine impressed median line, which reaches to anterior ocellus. Abdomen very broadly oval, hardly more than one-half longer than wide, depressed above, the pygidium rather narrow and broadly rounded at apex. Membrane of wings with rather sparse obsolescent setæ in apical field; stigma very large and broad, being fully as wide and almost as long as first submarginal cell, and emitting radius near the middle. Marginal cell extremely oblique to costal margin, squarely truncate and appendiculate at apex, and with the substigmal part about one-half as wide and more than twice as long as poststigmal part; first and second abscissæ of radius bent almost at right angles with each other, the metacarpus a little shorter than the apical truncation of cell. Second submarginal cell triangular, moderately bulging on outer side, and with the intercubiti meeting above on radius where the latter is bent. Third discoidal cell complete. First recurrent vein, first intercubitus, and second abscissa of radius forming an almost straight line; second recurrent vein exactly interstitial with the second intercubitus. Claws rather small and simple.

Head and thorax moderately shining, and finely, rather delicately but distinctly tessellate. Cheeks rather more delicately tessellate than other parts. Clypeus smooth except at summit. Prothorax strongly shining, smooth above and very delicately tessellate on the pleura. Sides of face, middle of frons, cheeks, mesoscutum, and mesopleura with very fine, sparse, obscure punctures. Abdomen shining and with an indistinct microscopic lineolation. Pubescence white and very sparse, longest and

thickest on legs and at apex of abdomen, sparse and rather short on cheeks, pleura, and mesosternum. Frons with a few very short appressed hairs on each side of middle below and the foveæ filled with fine short appressed white hair. Scopa very sparse, with the hairs on outer side of tibiæ short, those on inner side two or three times longer.

Head, thorax, and legs ferruginous yellow, the clypeus and abdomen a little paler or testaceous yellow. Frons with a nubilous piceous spot on each side extending obliquely from foveæ (and enclosing foveæ) toward antennal sockets. Vertex of head with a broad transverse black band, shining with a slightly metallic greenish luster, and squarely and broadly emarginate medially behind ocelli. Anterior end of meso-scutum with a greenish luster. Posterior part of mesosternum with a broad, very dark green, transverse band, reaching slightly on to the pleuron on each side. Legs concolorous with body, but hind tibiæ and base of hind tarsi above, fuscous. First two tergites, except black lateral foveæ of 2, sides of tergite 3, base of tergites 3-5, and pygidium clearer yellow than rest of abdomen. Venter dark brown or fuscous on last four segments and at middle of first two, but the reflexed sides of the tergites pale. Labio-maxillary structure ferruginous brown. Mandibles almost concolorous with face, with the apices a little reddish. Antennæ nearly concolorous with face, except that the flagellum is broadly dark brown or fuscous above. Tegulæ almost clear hyaline, but concolorous at base with thorax. Wings hyaline, clear in apical field, but milky to end of venation, the hind pair entirely milky; veins and stigma very pale yellow, with margins of stigma a little deeper yellow.

Length about 3.5 mm.

