

# AMERICAN MUSEUM NOVITATES

Published by  
Number 1243 THE AMERICAN MUSEUM OF NATURAL HISTORY  
New York City

August 20, 1943

## NEW *TRIGONA* BEES FROM PERU

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The new forms herein described are all represented in Peru, and with one exception their known range is confined to Peru. I am indebted to Cornell University for some of the specimens of *Trigona heideri* variety *pereneae* collected by its expedition of 1920, and to Dr. F. X. Williams for specimens of *Trigona opaca* variety *pacifica* from Ecuador. Especially, however, am I indebted to Dr. W. Weyrauch not only for the number and interest of the specimens he submitted but also for his observations, which constitute a noteworthy addition to our knowledge of the habits of stingless bees. The photographs he has kindly supplied are a welcome contribution to this paper. The excellent portraits that Mrs. Philip Risser has prepared should make the identification of the bees included in this paper an easy one.

### *Trigona* (Tetragona) *buchwaldi* variety *weyrauchi*, new variety

WORKER.—*Head* with the facial quadrangle moderately wide. The distance between the compound eyes at the level just below the anterior ocellus about as  $5\frac{1}{2}$  is to 6 when compared with the distance between the anterior ocellus and the apex of the clypeus. The compound eyes rather convergent below, the distance separating them at their level of closest approximation (below) being about as  $4\frac{1}{2}$  is to  $5\frac{1}{2}$  when compared to their divergence at the level just below the anterior ocellus. The clypeus and small supraclypeus raised only slightly above the level of the sides of the face. The clypeus about one-half as long as wide, its diverging sides feebly emarginate over their lower half, its apex truncate virtually from end to end, its apicolateral extremities acute. The labrum simple. The mandibles overlapping, widest at the apex and the base, with a "waist" toward the middle due to the strong emargination of their inner contour, their apex edentate over its outer two-thirds but with two minute denticles on the inner one-third. The malar space rather well defined; measured from the

lower extremity of the eye to the base of the mandible at the middle it is somewhat less than the width of the scape. The distance between the lateral ocelli nearly twice that which separates each lateral ocellus from the nearest compound eye. The vertex slightly raised behind the ocelli, with the lateral ocelli tilted each toward the nearest compound eye. The chitin smooth, moderately shiny and black with the following yellow maculations: a stripe along the inner side of each of the lateral borders of the clypeus, wide below, narrowed upward, and ending at the base of the clypeus in an in-pointing projection that is directed toward but does not quite succeed in joining the terminus of the corresponding stripe; a faint narrow and inconspicuous stripe usually traceable along the apical edge of the clypeus, confluent or almost confluent with the expanded lower part of the lateral stripes; a small spot sometimes islanded in the large black area enclosed by these bounding stripes; a stunted stripe, wider below than above, extending along the inner orbit of the eye from the lower extremity of the eye to about the upper level of the clypeus, being well separated from the lateral stripes of the clypeus by an intervening area of black; a small solid supraclypeal maculation that is much wider than high and has upward-converging sides; often the labrum (in other instances cloudy); the mandibles except for the black basal prominences and a roseate suffusion toward the apex; the antennal sockets; the scape except for black toward the apex posteriorly; the under side of the flagellum (here the yellow is sometimes adulterated with rose color). The front and sides of face covered rather densely with almost scale-like to woolly short plumose appressed gray hairs; the clypeus densely covered with short appressed as well as erect silvery gray simple hairs that are much less conspicuous than the scale-like to woolly hairs upward of the clypeus. The scape, particularly on its inner side, with abundant silvery gray erect hairs, some of which have a length that is almost comparable to the width of the scape. There are longer silvery gray hairs fringing the mandibles below, toward the lower extremity of the genae, on the labrum, and particularly on the front and vertex. The genae are for the most part silvery gray pruinose. The flagellum is barely wider than the scape and about twice as long.

*Thorax* with the mesonotum, measured along its base, a little wider than long, about as 6 is to

5, but the combined length of the mesonotum and scutellum a little greater than the width of the mesonotum at the base. The scutellum short, not half so long as wide, broadly rounded posteriorly, not emarginate, not tending to over-roof the propodeum. Smooth, semi-shiny and black, with the following yellow maculations: a transverse stripe across the pronotum posteriorly; the tubercles; a very narrow stripe along the sides of the mesonotum from near the base to, or virtually to the axillae; the stripe broadened over the axillae and continued thence in corresponding or sometimes even greater thickness around the posterior margin of the scutellum; a transverse stripe of yellow immediately below and posterior to the stripe along the posterior margin of the scutellum; and a cuneiform maculation (down-pointing) below the point of emergence of each of the hind wings. The

rior rim that is increasingly wide from base to apex and at its widest is of about the maximum width of the elevated area. The hind metatarsus wide, at its widest two-thirds as wide as the hind tibia at its widest, but very sharply narrowed toward the base and with a strong angle posteriorly at the apex. The fore legs fulvous. The middle legs mainly fulvous but with cloudiness often on the posterior face of the femora and the apex of the tibiae, while the metatarsi are wholly black and all the small joints except the apical small joint tend to be dusky. The hind legs usually wholly black except for the fulvous coxae and trochanters, the extreme base of the femora and of the tibiae and the apical tarsal joint. The hairs for the most part silvery gray, this being the case not only over the areas that are fulvous but being true also of the short branched hairs along the posterior contour of

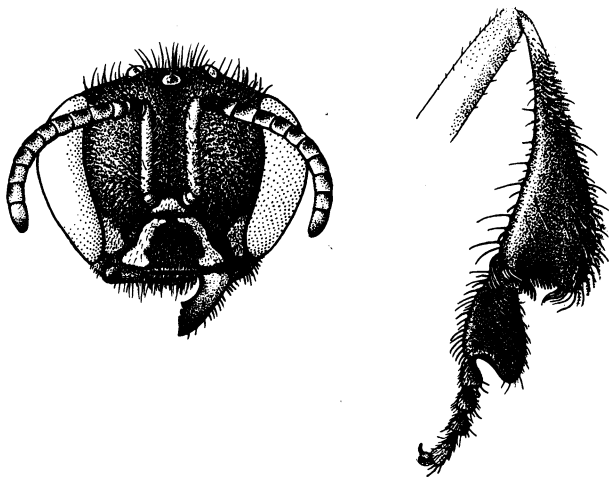


Fig. 1. *Trigona (Tetragona) buchwaldi* var. *weyrauchi*, new variety. Head and left hind leg of worker. Drawing by Shirley H. Risser.

mesonotum, mesopleura and sides of the propodeum rather densely covered with scale-like to woolly gray hairs and, in addition, with silvery gray, longer, simple hairs that occur in greater length on the under side also of the thorax and on the scutellum.

*Legs* with the hind tibia somewhat longer than the combined length of the hind femur and trochanter, about as 9 is to 8. The hind tibia clavate in outline: its anterior lateral contour concave; its posterior lateral contour strongly convex over the lower half (but not battle-dore-like); the anterior half of the apex of rounded contour, the posterior half emarginate; the outer face of the joint for the most part very gently arched, briefly depressed at the apex; the inner face with a plateau-like elevated area covered densely with exceedingly short silvery gray bristles, this elevated area followed by a poste-

the black hind tibiae. The much longer simple hairs of the anterior fringe of the hind tibiae are, however, black, and approximating black are also the bristles on the inner face of the middle and of the hind metatarsi. A character—rare among New World *Tetragona*—is the presence of a differentiated smooth sericeous oval area at the base of the inner face of the hind metatarsi, which is white. Short, silvery gray, compound hairs occur abundantly over the outer face of the middle tibiae and on the outer face of the associated metatarsi.

*Wings* unstained throughout, windowglass-like except for slight milkiness. The venation and stigma ferruginous. No, or virtually no vestige of transverse cubital veins. The first discoidal cell about three-fourths as long as the marginal, which is slightly open toward its apical extremity. The tegulae fulvous, with usually a

small brownish pupil. Hamuli in the 28 lower wings examined, uniformly 5.

*Abdomen* narrower than the thorax and in most specimens tending to be elongate rather than compact, with much of the segments exposed. Viewed from above, light reddish brown except for the darkened and therefore contrasted apical rims of tergites 1-5; the apex of tergite 6 pale yellow. Tergites 1-4 glabrous and shiny; tergite 5 and more especially tergite 6 with short, inconspicuous, silvery gray hairs. The under side of the abdomen yellowish, sometimes clouded here and there, but the sternites, unlike the tergites, lacking a zebra-like band on their apical rims. The apical half of each of the sternites with erect silvery gray to whitish hairs that grade into sericeous patches to each side.

Length, 3.5 to 4.75 mm.; width of thorax, about 1.5 mm.; length of forewing about 4.75 mm.

QUEEN.—Unknown.

MALE.—Unknown.

*TYPE MATERIAL*.—The holotype and paratypes are in the American Museum.

*DISCUSSION*.—This interesting bee is a close relative of *jaty* Smith, *jaty* variety *fiebrigi* Schwarz, *pfeifferi* Friese and *buchwaldi* Friese. The workers of all of these forms—alone among the New World representatives of the subgenus *Tetragona*—have a smooth oval patch of sericeous hairs at the base of the inner face of the hind metatarsi, a character more commonly associated in the New World with members of the subgenus *Trigona*, all of the workers of which, as well as the males, carry this earmark. Of the forms mentioned, *weyrauchi* is closest to *buchwaldi*. Indeed, I am inclined to regard it as a variety of *buchwaldi*, with which it is structurally in substantial agreement, although its superficial appearance gives the impression at first glance that it is of independent status. Its maculated head and thorax, its fulvous fore and mainly fulvous middle legs give it a very different appearance not only from *buchwaldi* but also from the smaller but also very closely related *pfeifferi*, both *buchwaldi* and *pfeifferi* being of generally dark appearance. The presence of erect hairs on the scape differentiate *weyrauchi* not only from *buchwaldi* and *pfeifferi* but also from *jaty* and from *jaty* variety *fiebrigi*.

From the two varieties of *jaty* the form *weyrauchi* is separable at once by its larger size, the distinctive pattern on its clypeus

(the clypeus is largely or wholly yellow in *jaty*), the more extensively darkened hind legs, the distinctively banded abdomen and other characters.

*DISTRIBUTION*.—Holotype and paratypes from Valle Chanchamayo, Peru, at 800 meters, 1939, No. 173 (W. Weyrauch).

### *Trigona* (*Tetragona*) *heideri* variety *pereneae*, new variety

? *Melipona heideri* DUCKE, 1916, Com. de Linhas Teleg. Estrat. de Matto Grosso ao Amazonas, Publicação 35, Anexo 5, Hist. Nat., Zoologia, pp. 69-70. (Forms with dark legs from upper Amazonia and southeastern Colombia.)

? *Melipona heideri* DUCKE, 1925, Zool. Jahrb. Syst. Geogr. u. Biol., XLIX, p. 383. (Forms with dark legs from upper Amazonia and southeastern Colombia.)

*WORKER*.—Like the typical variety but much more strongly melanistic.

*Head*.—The two longitudinal stripes on the clypeus, subobsolescent in typical *heideri*, usually more strongly developed in *pereneae*.

*Thorax*.—Prevalingly black or blackish, including the sides, with only the following parts yellow: pronotum, tubercles, lines along lateral borders of mesonotum, axillae and sometimes a stripe immediately below the scutellum. The scutellum usually black, but sometimes reddish (probably indicative of a callow condition) although even in such cases darker than the axillae. The propodeum like the pleura black, or at least dark reddish.

*Legs*.—All of the legs at least partly black, the front legs less emphatically darkened than the middle and hind legs, with the front tibiae and front basitarsi sometimes largely or wholly yellow and the front femora sometimes merely clouded; in other cases the front femora are quite dark, with usually a contrasting yellow stripe on their upper surface. Such a yellow stripe usually traverses longitudinally the dark middle femora along their upper surface; in practically all specimens the middle coxae and trochanters are largely or wholly dark. The middle tibiae usually more or less invaded with yellowish, with a bleached yellowish area especially at the base; the middle tibiae sometimes yellowish with merely a blackish stripe. The middle basitarsi black. The hind legs very largely black, with the apex of the femora briefly and with approximately the basal half of the tibiae pale yellow. Hind tarsal joints except for the black hind metatarsus dark reddish as are the corresponding joints of the other legs.

*Wings*.—Barely darker than in typical *heideri* but a little longer. Number of hamuli in each hind wing, 6-8.

*Abdomen*.—Variable from castaneous to fuscous, and even the castaneous specimens usually more or less streaked with black; in contrast to

variety *occidentalis*, tergite 1 is only rarely lighter than the subsequent tergites, and the yellow apical bandings of the tergites are absent or quenched.

Average a little larger than that of specimens of the typical variety that have come to my attention, comparable to variety *occidentalis*. Length, 7.5–10 mm.; width of thorax, 2.5 mm.; length of forewing, including tegula, 9.5–10 mm.

QUEEN.—Unknown.

MALE.—Unknown.

TYPE MATERIAL.—Holotype (from El Campamiento, Colony of the Perene, Peru) and several paratypes at Cornell University; other paratypes in The American Museum of Natural History.

DISCUSSION.—The variety *pereneae* differs from *heideri* variety *occidentalis* especially in the coloration of the thorax, which is almost wholly blackish in the former, light reddish in the latter. From typical *heideri* and *heideri* variety *mocsáryi* it differs not only in having the darker coloration of the thorax but also in the much greater prevalence of black on the legs.

DISTRIBUTION.—Very possibly the specimens with dark legs that Ducke reported (1916, pp. 69–70; 1925, p. 383) from localities in Amazonia close to the Peruvian border and from southeastern Colombia are so closely allied to the present variety that they may be included in its range. It is possible also that this race extends into Bolivia. There are before me three specimens from Bolivia, unfortunately all callows and, therefore, with the black markings very imperfectly indicated or absent. One of them, however—a specimen collected by W. M. Mann in November at Rurrenabaque, Río Beni, Bolivia—gives indication of affiliation with *pereneae*. The specimens on which *pereneae* is based are mainly from the Colony of the Perene in Peru. The localities represented, all in Peru, are:

El Campamiento, Colony of the Perene, June 19–21, 1920; Hda. San Juan, Colony of the Perene, June 23, 1920, also one specimen collected June 16, 1920; lower Río Pachitea, July 22, 1920; Oriente, Río Igara Parana, August 16, 1920. (All of the specimens were collected by the Cornell University Expedition.)

San Ramon, Valle de Chanchamayo, 800 meters, February 1, 1939, on flowers of coffee, and September 20, 1939, sucking perspiration (W. Weyrauch); Oxapanpa, 1600 meters, 1940 (W. Weyrauch).

### *Trigona* (*Paratrigona*) *lineata* variety *nuda*, new variety

WORKER.—Head structurally like typical *lineata*, black with the following yellow maculations: a stripe from base to apex on the scape in front; a stripe (considerably wider below than above) extending along the entire inner orbit of the eye almost to the level of the anterior ocellus; a small trapezium-shaped maculation in the supraclypeal area; a tridentate figure occupying the lower one-half of the clypeus, the median element of the trident for the most part slender, up-pointing, shaped somewhat like a fool's cap, its extremity separated by an area of black from the supraclypeal maculation, the lateral elements of the trident wider, rather angular, their up-pointing extremity usually



Fig. 2. *Trigona* (*Paratrigona*) *lineata* variety *nuda*, new variety. Head of worker. Drawing by Shirley H. Risser.

approximating the rectangular; the labrum; the mandibles except for the dark basal prominence and the rosette to darkened apical extremity. The head almost completely devoid of erect hairs, which are confined to the lower one-third of the genae, the inferior margin of the mandibles and the labrum, no or only a negligible number of stunted hairs on the vertex. In addition to these few erect hairs there is a sericeous sheen due to the presence over most of the head of dense appressed very microscopic silvery gray hairlets. The upper two-thirds of the cheeks silvery gray pruinose.

Thorax structurally like typical *lineata*, but devoid of erect hairs on the mesonotum, scutellum and mesopleura, having only appressed sericeous silvery gray hairs in these areas. The chitin black, with the following cream-colored to yellowish maculations (corresponding with those of the typical variety): a transverse stripe (usually interrupted medially) along the posterior margin of the pronotum supplemented usually by a much narrower transverse band along the anterior margin; the tubercles; a narrow stripe rimming continuously the sides of the

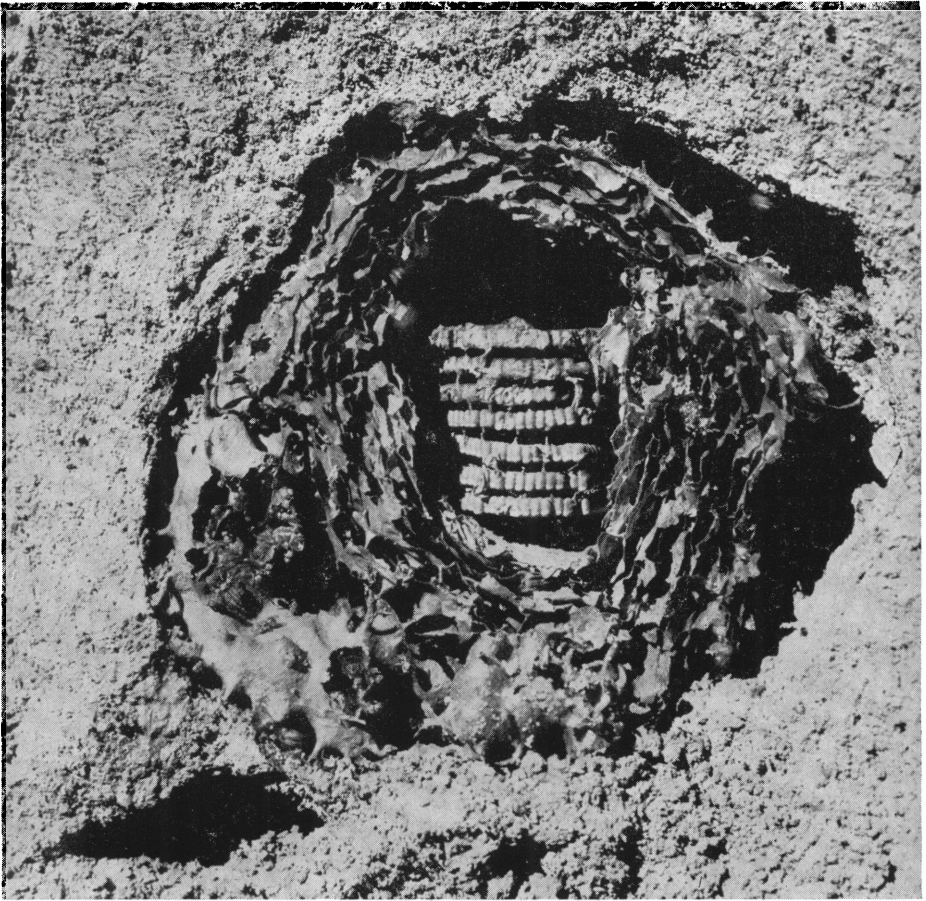


Fig. 3. Nest of *Trigona* (*Paratrigona*) *lineata* variety *nuda*, new variety, erected in a deserted fungus chamber of the fungus-raising ant *Atta sexdens*. There are seven brood-combs, with a width of 5 cm. According to Dr. W. Weyrauch the three top combs contained only nutriment and eggs; the four lower combs had pupae. The nest was from 11 cm. to 14 cm. in diameter. The involucreum consisted of numerous layers. The length of the cells was 4.5 mm., their width 2.45 mm. In the lower part of the nest were honey-pots, and the dark space immediately below the nest at the left is a more or less destroyed connecting passageway of the ants.

Photograph by Dr. W. Weyrauch.

mesonotum, the axillae and the posterior edge of the scutellum, being of virtually uniform width except for a slight dilation on the axillae.

*Legs* with a maculation at the base of the outer face of all the tibiae, as in typical *lineata*. The hairs few, silvery gray and distributed as in the typical variety.

*Wings* uniformly clear and transparent, iridescent. The venation and stigma fuscous to black, with the transverse cubital veins fairly well demarked. The tegulae ferruginous with a cream-colored maculation anteriorly. The number of hamuli per lower wing usually 5, rarely 6, very exceptionally 7. Out of 142 wings ex-

amined, 131 had 5 hamuli, 10 had 6 hamuli, and 1 had 7 hamuli, an average of 5.08.

*Abdomen* black, structurally and in the absence of erect hairs on the tergites like typical *lineata*.

Length, 3.5 to 4.5 mm.; width of thorax, about 1.5 mm.; length of forewing, including tegula, about 4.5 mm.

QUEEN.—Unknown.

MALE.—Unknown.

TYPE MATERIAL.—The entire type material of the variety *nuda* was collected by Dr. W. Weyrauch in the Chanchamayo

Valley of Peru. The specimens were obtained, however, from four different nests. The holotype and numerous paratypes are in The American Museum of Natural History.

DISCUSSION.—The following key will aid in separating the workers of *lineata* and *opaca*, which have sometimes been confused in the past:

The antennae moderately long: the scape when in vertical position extending somewhat more than one-half the way to the anterior ocellus; the intermediate joints of the flagellum as long as or a little longer than they are wide. The scutellum relatively short, about twice as wide as it is long, not strongly over-roofing the propodeum. The tubercles deflected somewhat from the horizontal to the vertical. . . . . *lineata*.

The antennae distinctly short: the scape when in vertical position extending about half way to the anterior ocellus<sup>1</sup>; the intermediate joints of the flagellum wider than long. The scutellum about three-fifths as long as it is wide, of considerable backward extension, so that, when viewed from above, it conceals much of the propodeum. The tubercles vertical or almost vertical. . . . . *opaca* and varieties.

The present variety, structurally an affiliate of *lineata*, is characterized by the paucity of hairs, a distinction ordinarily more exclusively associated with *opaca* and varieties of *opaca* than it is with *lineata*. From typical *lineata* the form *nuda* can readily be separated by the absence of erect hairs on the scutellum and the mesopleura, typical *lineata* being more or less hairy in both these areas. The clypeal maculation, too, is different, the median stripe on the clypeus being not rather uniformly wide and shaft-like as in typical *lineata* but running to a sharp point above.

Nests of *nuda* were found in colonies of the leaf-cutting ant *Atta sexdens*. The

bees utilized a deserted fungus chamber of the ant for the establishment of their nest.

DISTRIBUTION.—Known from Valle Chanchamayo, 800 meters, Peru, where four lots of specimens (Nos. 150, 154, 161, 176) were collected by Dr. W. Weyrauch in 1939.

### *Trigona* (*Paratrigona*) *opaca* variety *pacifica*, new variety

WORKER.—Head structurally like that of typical *opaca* but differs in its maculations. The clypeus with a rather anchor-like, pale yellow maculation: the vertical shaft of the anchor rather wide, usually entire but in some specimens (especially those from Mariposa, Peru) occasionally fragmentary; the lateral extremities of the irregular transverse bar of the "anchor" very angular and much expanded. The supraclypeal maculation barely trapezium-shaped, almost a solid triangle of pale yellow

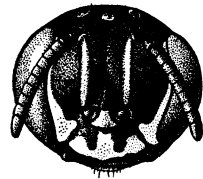


Fig. 4. *Trigona* (*Paratrigona*) *opaca* variety *pacifica*, new variety. Head of worker. Drawing by Shirley H. Risser.

with only a very slight truncation at the top, not (as in typical *opaca*) an up-pointing, arrow-shaped maculation; instead the maculation more nearly resembles the supraclypeal maculation of *lineata*. No yellow stripe extending from the anterior ocellus downward as in *opaca* variety *lineatifrons*<sup>2</sup> and *opaca* variety *ornaticeps*,<sup>3</sup> and even in some specimens that I have classed with typical *opaca*,<sup>4</sup> the front being immaculate. A pale yellow stripe, as in typical *opaca*, extending from approximately the level of the anterior ocellus downward along the inner orbit of the eye for the full extent of that inner orbit; at its lower extremity it makes a sharp angular bend inward and diagonally upward to extend part way along the outer boundary of the side of the clypeus, suggesting in its configuration a short-handled cane. The scape with a yellow stripe in front.

Thorax like that of typical *opaca* with the maculations duplicating those of typical *opaca*, except that the stripe that rims the sides of the

<sup>1</sup> In Figs. 2 and 4 the scape appears relatively longer, due to the position from which the head was drawn, than is the case when the insect is viewed from the side. To appreciate fully the relative brevity of the scape of *opaca* variety *pacifica* as compared with *lineata* variety *nuda* the bees should be so viewed.

<sup>2</sup> Schwarz, 1938, Bull. Amer. Mus. Nat. Hist., LXXIV, pp. 497-498, Pl. LIX, E, E'.

<sup>3</sup> Idem, pp. 495-496, Pl. LIX, D, D'.

<sup>4</sup> Idem, pp. 489-494, Pl. LIX, C, C'.

mesonotum from end to end and continues thence over the axillae and unbrokenly around the posterior margin of the scutellum is not any wider apically on the axillae than it is along the lateral border of the mesonotum. The tubercles and posterior half of pronotum maculated as in typical *opaca*.

*Legs* like those of typical *opaca*, with the cream-colored to pale yellowish stripes on the outer face of the fore and middle tibiae running from the base nearly to the apex of the joint and that on the hind tibiae along the posterior margin of the joint also from the base nearly to the apex.

*Wings* like those of typical *opaca*, with a pale yellow maculation anteriorly on the tegulae and another at the root of the wing. Number of hamuli per lower wing usually 5, more rarely 6. Out of 124 wings examined, 113 had 5 hamuli and 11 had 6 hamuli, an average of 5.09.

*Abdomen* like that of typical *opaca*.

Length, 3.5 to 4.5 mm.; width of thorax, 1.25 to about 1.5 mm.; length of forewing, including tegula, about 4 mm.

**QUEEN (PHYSOGASTRIC).—Head** relatively smaller than that of the worker, about as wide as the mesonotum but not so wide as the distance between the outer rim of one of the tegulae and the outer rim of the other tegula. The face narrow, the distance between the compound eyes at a level just below the middle ocellus being only about two-thirds that of the distance from the anterior ocellus to the apex of the clypeus. The compound eyes almost parallel-sided, the distance separating them at their level of closest approximation about as 5.5 is to 6 when compared to their divergence at the level just below the anterior ocellus. The clypeus about one-half as long as it is wide, gently arched, a little more elevated than the sides of the face, six-sided, the apex rather widely truncate along the middle and rather strongly receding to each side of the apical middle, the apicolateral extremities slightly subrectangular and separated from the nearest compound eye by somewhat more than the width of the flagellum. The supraclypeus about as prominent as the clypeus. The labrum simple, rather slightly and evenly thickened. The mandibles overlapping each other, wider at their base and at their apex than they are at their middle, their apex as clearly quadridentate as is the apex of the mandible in the worker. The malar space longer than in the worker, at its shortest (toward the inner angle of the base of the mandible) about one-fourth longer than the flagellum is wide. The eyes not measurably smaller than those of the worker—a condition unusual in the Meliponidae. The distance between the lateral ocelli scarcely, if any, greater than that which separates a lateral ocellus from the nearest compound eye. The vertex somewhat thickened and raised behind the ocelli. The top of the supraclypeus and the anterior ocellus connected by a deep sulcus. The sculpturing of the head, like that of the thorax, dense and very fine, the

entire surface being rather dull and approximately opaque due to a microscopic granulation which is a little finer on the genae than on the face. The scape somewhat more robust than in the worker, at least equal to the flagellum in width and about half as long. The head black but with pale yellow maculations that are even more extensive than those of the covarietal worker. Thus the entire clypeus is rust-colored to yellowish, the rust-colored areas occupying most of the clypeus except the apicolateral extremities and the apical margin, which are pale yellow. There is a solid triangle of pale yellow on the supraclypeus. The stripe along the inner orbit of the eyes is expanded below (in the area between the clypeus and the eye) having an in-pointing extremity; the stripe tapers upward, ending slightly below the level of the anterior ocellus. There is a stripe (as in the worker) anteriorly from base to apex on the scape, but (unlike the worker) the flagellum is bright ferruginous beneath. Unlike the condition, too, in the covarietal worker, the mandible of the queen is yellowish to roseate throughout except for the dark apical prominence and the blackish teeth. The labrum also is reddish, and the lower extremity of the genae as well as the malar space is pale or largely so. The head devoid of erect hairs except on the labrum and along the lower margin of the mandible, the hairs in these areas being silvery gray to ferruginous and long, those near the base of the mandible as long, if not longer, than the mandible is wide. A sericeous sheen, more particularly over the upper half of the head, due to the presence of very microscopic silvery gray hairlets.

*Thorax* sculptured much like the head, very densely and finely granular; the granulation on the propodeum a shade coarser and a trifle less crowded than that of the mesonotum. The thorax considerably wider than that of the worker. The width of the mesonotum at its maximum near the basal margin about equal to the combined length of the mesonotum and scutellum. The scutellum about three-fifths as long as its greatest width, but, unlike the condition in the worker, the robust propodeum is largely visible when the insect is viewed from above, being very inadequately covered by the scutellum. The tubercles vertical or almost vertical in position, shaped somewhat like a mussel-shell, with the upper extremity somewhat carinate. The thorax devoid of erect hairs except for rather long ferruginous hairs fringing the scutellum posteriorly and rather long silvery gray hairs on the under side of the thorax. A sericeous sheen over the mesonotum, mesopleura and scutellum due to the presence of very microscopic silvery gray hairlets. The silvery gray tomentum on the sides of the propodeum very short and inconspicuous, with a sericeous sheen. The mesonotum and scutellum black, the mesopleura and the pronotum anteriorly brownish black to brownish. The propodeum rust-colored. There are the following cream-colored to yellowish maculations: a transverse stripe

over the posterior half of the pronotum; the tubercles; a narrow band that rims continuously the sides of the mesonotum, the axillae and the posterior margin of the scutellum, being of rather uniform width throughout, the part of the band on the axillae no wider than that part of the band along the sides of the mesonotum.

*Legs* more robust than those of the worker but of very limited and feeble sculpturing, which is traceable in the form of an exceedingly fine tessellation more especially on the outer face of the fore and middle tibiae and the anterior face of the hind femora, the general condition, even in these areas, approximating the smooth. The middle legs intermediate in length between the short fore legs and the long hind legs. The fore tibiae and the middle tibiae notably shorter than their femora, reversing the condition of the hind pair of legs in which the tibiae are distinctly longer than the femora, although not so long as the femora and trochanters combined. The hind tibiae subtriangular in outline, widest at apex, a little wider and longer by a third than are the hind tibiae of the worker; their anterior lateral contour almost straight to very feebly convex; their posterior lateral contour without convexity except at the extreme base, being otherwise straight throughout and ending in a posterior apical angle; the apical contour rounded on the anterior two-thirds but emarginate on the posterior one-third; the outer face gently arched except near the apex, where it is briefly depressed; the inner face more strongly arched than the outer face and without a posterior rim. The hind metatarsi at their widest (near the base) a little more than half the width of the hind tibiae at their widest, tapering slightly toward the apex; the length of the hind metatarsus about that of the combined small joints of the tarsus. The outer face of the fore and middle tibiae, the anterior face of the hind femora and the outer face of the metatarsi with a feeble sericeous sheen due to the presence of very microscopic silvery gray hairlets. The erect hairs few, short and inconspicuous so that the general effect is one of nudity. There are a few silvery gray hairs on the coxae, trochanters beneath, fringing the under side of the middle femora, lower half of anterior margin of middle tibiae and especially the lower half of the anterior margin of the hind tibiae. The inner face of the hind tibiae densely covered from base to apex with very microscopic silvery gray hairlets. The metatarsal brushes light golden. In contrast to the black legs of the worker those of the queen are mainly fulvous, with black stripes, however, on the under side of the femora and cloudiness here and there also in other areas.

*Wings* in present specimen very much worn, their apical half missing, the surviving basal part clear and transparent. The venation more or less fuscous; the first and second transverse cubital veins entire and rather strongly demarked. The tegulae brownish with a large cream-colored spot anteriorly and a small spot inwardly and posteriorly; a large cream-colored

maculation at the root of the wing. Hamuli destroyed in present specimen.

*Abdomen* very greatly distended and shapeless, much longer than the combined length of the head and thorax and also wider and thicker than either the thorax or the head. Its color, except for cloudiness on the basal tergite, fulvous throughout, contrasting with the black abdomen of the worker. The first tergite devoid of hairs and the second tergite nearly so except for the sides and narrowly and sparsely along the apex. The subsequent tergites with short pale dense hairs that are very slightly longer from tergite to tergite and on tergites 5 and 6, at least, have an almost velvety surface. Along with these hairs of uniform level are a few hairs of longer growth, especially on the apical half of tergite 5 and on tergite 6. A few short, erect, silvery gray hairs on the apex of the several sternites, those of sternite 1 being the longest. Sternite 6 almost entire, only feebly nicked at the middle of its apical contour.

Length, 8 mm. (of which the abdomen alone accounts for about 5 mm.); width of thorax, about 2.25 mm.; length of forewing, judging from the basal part surviving, actually somewhat longer than that of the worker but, in relation to the much greater body size of the queen, proportionately smaller than the wing of the worker.

MALE.—Unknown.

TYPE MATERIAL.—The holotype from Valle de Chanchamayo, Peru, and paratypes from the same locality, from Mariposa, Peru, and from Tena, Ecuador, are in the American Museum.

DISCUSSION.—Very close to the typical form, from which it differs mainly in the fuller maculation of the clypeus and the supraclypeus and in the relative narrowness of the stripe on the axillae.

In some of the specimens from Mariposa, Peru, the clypeal maculation, especially the central shaft of the "anchor," tends to be blurred, broken or even sometimes absent. Such specimens also sometimes have the supraclypeal maculation slightly emarginate with black below. In all these respects they resemble to some degree typical *opaca*, although usually they bear the earmarks of variety *pacifica* in having the stripe over the axillae unexpanded and no wider than the stripe on mesonotum.

Note the short joints of the antennae in the worker of *pacifica* by which this bee is readily separated from that caste of *lineata* variety *nuda* of very similar facial maculation.



Dr. W. Weyrauch, to whom I am indebted for the specimens from Peru, made note in his accompanying field observations that the specimens from Mariposa in that country were obtained from a nest built in an entanglement of roots of orchids on a tree trunk. But interesting as this nest site is, it yields in significance to the other reported cases—all from San Ramon in the Chanchamayo Valley of Peru—where this observer came upon at

nest (No. 149) was attached to the dead limb of a tree at the time that the photograph reproduced herewith was taken. Weyrauch's field note, however, indicates that this bee colony was originally started in a bird's nest but that the material constituting the bird's nest was carried off progressively as the wax structure of the bees tended to expand. The bees' nest, measured externally, was 14 cm. wide and 14 cm. long. Within there were ten

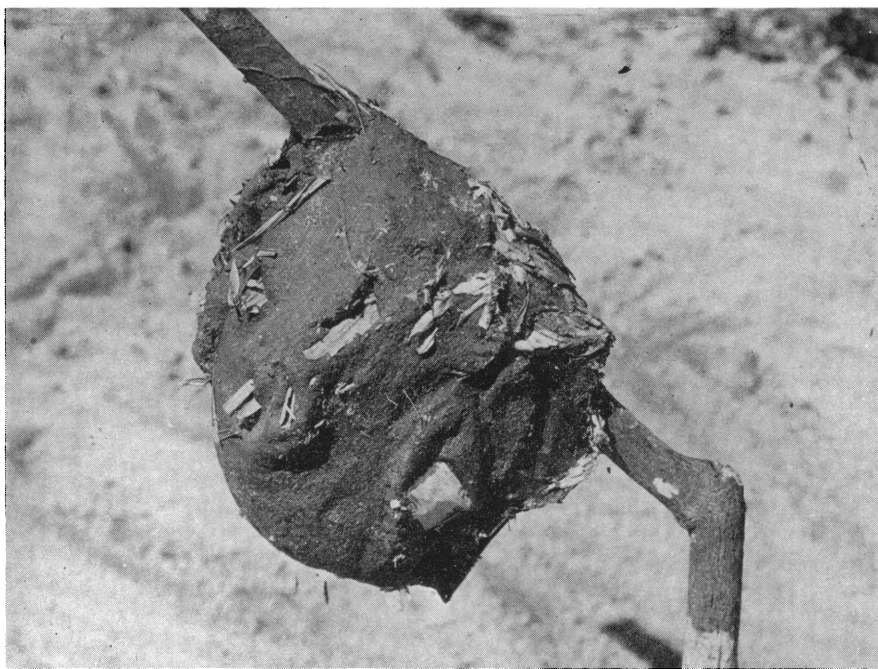


Fig. 5. Nest of *Trigona* (*Paratrigona*) *opaca* variety *pacifica*, new variety, on the dead limb of a tree. Dr. Weyrauch, in an accompanying field note, stated that the colony was originally started in a bird's nest but that the material constituting the bird's nest was carried off progressively as the wax structure of the bees tended to expand.

Photograph by Dr. W. Weyrauch.

least three nests<sup>1</sup> of *pacifica* that had been established in the nests of birds. One of these *pacifica* nests (No. 157) was in a bird's nest made of straw. The second *pacifica* nest (No. 171) was in a bird's nest located on the limb of a tree. The third

brood-combs which in descending order had, according to the calculations of Dr. Weyrauch, respectively the following diameters, all measured in centimeters: 3.5; 3.5; 5; 4.5; 5.5; 6; 7; 7.5; 6; 3. The cells containing the pupae of workers were 5 mm. long; the royal cells, 12 mm. long.

The use of birds' nests—occasionally at least—has been noted in the case of certain bumblebees of the Old World as well

<sup>1</sup> A fourth nest, No. 159, is likewise noted by Weyrauch as having been constructed in the nest of a bird on the limb of a tree. Unfortunately specimens from this nest did not reach me, but the probability is that they were *opaca* variety *pacifica*.

as of the New, including our own *Bombus vagans*. Salt (1929, Trans. Ent. Soc. London, LXXVII, p. 437) has even recorded the establishment of a colony of the stingless bee *Melipona favosa* var. *favosa* Fabricius in the mud nest of an oven-bird of the family Furnariidae. The fact that all three of the observed nests of *pacifica* in a given area were established in the nests of birds points strongly to a predilection, at least locally, for this type of nest site on the part of *pacifica*.

DISTRIBUTION.—The variety *pacifica* is known as yet only from certain South American countries bordering the Pacific as follows:

Ecuador.—Tena, March 24, 1923 (F. X. Williams).

Peru.—San Ramon, Valle de Chanchamayo, 800 meters, April 1, 1939, No. 149, No. 157, No. 171 (W. Weyrauch); Mariposa, near Huancayo, at 1200 meters, No. 135 (W. Weyrauch).



