

AMERICAN MUSEUM NOVITATES

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CITY OF NEW YORK APRIL 5, 1951 NUMBER 1503

SYRPHID FLIES RELATED TO *VOLUCELLA* *SCUTELLATA* MACQUART

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These large flies occur in the Neotropical region, and many are found at high altitudes in the Andean region from Colombia to Argentina. Some time ago Dr. C. H. Curran sent me numerous specimens, several of which were determined as new, and asked me if I would revise this difficult group. What started out to be eight or nine species has been enlarged to more than 20, and there are possibly several more described by other writers that I am unable at present to include.

In addition to the specimens lent by the American Museum, many have been sent to me for study by Dr. M. Aczel of the Universidad Nacional de Tucuman, Argentina. Dr. Dietrich of Cornell kindly lent the type of *abrupta* and other specimens. Thanks are also due to Professor Herrera of Santiago, Chile; to Dr. Messias Carrera, São Paulo, Brazil; to Dr. F. M. Hull, University of Mississippi; to Dr. W. W. Wirth, United States National Museum; and to Dr. J. N. Knull, Ohio State University, for the loan of specimens for study.

THE *SCUTELLATA* GROUP

Large species generally more than 10 mm. long; face always yellow; scutellum with strong tuberculate spines, prescutellars usually present; marginal cell always closed, often widened at the apex, especially in those with conspicuous wing maculations and seldom widened in immaculate species; second sternite strongly convex, especially anteriorly, and usually with a short

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digitate process on the anterior margin, sometimes very short but usually easily seen; first sternite rather membranous which permits a curving downward of the abdomen and in so doing the digitate process on the second sternite fits into the groove between the hind coxae. All species of this group have a vittate appearance to the mesonotum which is due mainly to shorter white or yellow hairs mixed in with longer black or pale pile; these hairs are in longitudinal bands, one narrow median one and two broader ones, one on each side, which are usually expanded on the anterior margin and which fade out posteriorly; this vittate appearance is best seen from a posterior view. This characterization is not repeated in the following descriptions.

The majority of the species are somewhat uniform in color; rather dark, usually shining black or dark red, but some are paler along the sides of the mesonotum and at the basal corners of the abdominal tergites.

The best characters for species separation appear to be color of the short setae on the facial tubercle, color of the cheeks, color of the pile of the front, shape of the third segment of the antennae, the length and number of rays on the arista, presence or absence of prescutellars, size and number of scutellar spines, pile of the scutellum, and the pile of the sternites.

The vittate appearance of the thorax is not a group characteristic since it occurs in other species of *Volucella*. The digitate process, or at least the strong convexity of the second sternite, is more of a group characteristic as I have found it in only a few other species. However, it has not been mentioned in descriptions, and, while I find it mainly on the specimens that I believe belong here, it might occur elsewhere.

Nearly all of the older descriptions have been consulted but they are of very little value. Yet I believe a number of older species names that have been considered synonyms are good species, and wherever possible these older names have been used. There remain a number that are impossible to use, and they probably will never be resurrected.

The genitalia of this group offer very good characters for species separation. The males of all species available have been studied, and a number of illustrations made to show their differences. The general shape of the styli, the arrangement and presence or absence of setae on the styli, the shape of the

sickle-shaped superior lobe, and the shape of the cerci are the characters showing the most variations. All drawings were made with the aid of the camera lucida and like structures are drawn to the same scale.

In Curran's 1939 key (Amer. Mus. Novitates, no. 1027) this group goes to several couplets, such as 49, 69, 72, and 150.

Types of the new species are in the American Museum of Natural History except where otherwise indicated.

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***Volucella scutellata* Macquart**

Figures 18, 21, 36, 47

Volucella scutellata MACQUART, 1842, Diptères exotiques, vol. 2, p. 25.

Temnocera andicola BIGOT, 1844, Ann. Soc. Ent. France, ser. 2, vol. 3, p. 548.

Volucella scutellata ARRIBALZAGA, 1892, An. Soc. Cient. Argentina, vol. 34, p. 189.

Volucella scutellata SHANNON AND AUBERTIN, 1933, Diptera of Patagonia and south Chile, pt. 6, fasc. 3, p. 169.

A large, shining blue-black species, legs mostly black, scutellum with eight to 10 setigerous spines. Length, 16 to 17 mm.

MALE: Face and front yellow, with black pile; front on the sides with white pubescence; cheeks black, with black pile in front, yellow behind; mouth edge narrowly black; vertical triangle yellow, the ocellar area brown, with black pile, a few long yellow hairs behind; occiput gray pollinose, with very short black cilia above, longer and paler pile below; ocular pile yellowish to light brown. Antennae dark brown to reddish brown, arisal hairs twice as long above as below, third segment about two and one-quarter times longer than broad, the basal third a little broader than apical third, a small round sensory pit on the inner surface.

Thorax shining blue-black, the pile black, on the mesonotum shorter white kinky pile which is arranged in four vittate rows and can be seen best with the naked eye from a posterior view; pleural pile also mixed black and white; a pair of slender, elongate prescutellars sometimes present; scutellum dark translucent, the pile mostly black, with some white hairs intermixed, the rim with three or four pairs of stout, black tubercle spines. There are usually five or six stout spines on each notopleuron and several above the wing base and on the posterior calli.

Legs black, with black pile; wings hyaline, clouded on the cross veins and at the fork of the second and third veins, stigma black; squamae and plumule dark brown, halteres yellow, the stalks slender.

Abdomen shining blue-black, the basal corners dark red, pile black, with fine white pile on first tergite and basal corners of the second.

FEMALE: Very similar, the front bisulcate, somewhat translucent yellow below, brighter non-translucent yellow around the ocelli, the pile all black, lightly white pubescent on the sides of the front, third segment of antennae with a small round sensory pit on the inner surface.

This species has been recorded generally from southern South America (Chile, Argentina, Uruguay, and Brazil), but it is possible that the identifications do not always agree. Shannon and Aubertin questioned the older records, but their identification definitely does not agree with the present. My understanding of the species is taken from the specimens sent me by

the American Museum and Dr. F. M. Hull, many of them labeled *scutellata* by other workers.

Shannon and Aubertin state that "The original description of *V. scutellata*, Macquart is very inadequate . . . , but by a general consensus of opinion the name is now applied to a species with the characters noted above (scutellum reddish, with six widely-spaced stiff spines, each on a tubercle; four or five additional short stiff spines just in front of scutellum. Sides of dorsum of thorax reddish; face, antennae and pubescence of eyes orange)." This short characterization could apply to several of the species described here.

I believe Arribalzaga identified the species as understood here and also believe that this is *scutellata* as it is now generally accepted. Macquart mentions only three pairs of scutellar spines, but this undoubtedly varies, since sometimes there are four on one side and three on the other. The number will vary from six to even 10. The prescutellars are usually absent or represented by a pair of very weak ones.

Specimens before me are all from Chile except one male and two females from Matucana, Peru, January 7, 1944. There are 10 males and 11 females from Chile, almost all unlabeled as to exact locality but apparently from Santiago and Valparaiso, also three females from Arica, Putre, 3650 meters, February 24, 1948.

***Volucella vulta*, new species**

Figures 17, 22, 39, 53

Very similar in many respects (size, general appearance, etc.) to *scutellata* but differs mainly in the white pile on the venter of the abdomen, reddish antennae, and limited black setae on the face. Length, 14 to 16 mm.

MALE: Face and front yellow, cheeks black, oral opening narrowly brown; pile of front black, of face yellow, with black setae on upper slope of tubercle and black hairs along facial slits; pile of cheeks yellow, a few black hairs in front; ocellar pile black. Antennae small, reddish yellow, the third segment only a little narrowed on the apical half, a tiny sensory pit on the inner surface; arista black, rays 18 to 20; pile of eyes abundant and dilutely yellowish.

Thorax shining black, paler along sides and usually an in-

dication of a prescutellar yellowish spot; bristles along the sides prominent, three on the humeri, five or six above the wings, and usually three or more on the calli; one pair of prescutellars which are not strong; scutellars are black and usually three, sometimes four, pair; scutellum is translucent yellow, with black pile and some whitish hairs on the borders, the black apical pile a little longer than the spines; pleural pile mostly yellow, with black pile intermixed.

Legs dark red to black, the tibiae somewhat paler, pile all black. Wings hyaline, a black stigmal spot, the anterior cross vein and the third vein basal to the cross vein clouded, in general similar to those of *scutellata*; marginal cell non-bulbous. Squamae and plumule brown to blackish, halteres yellow.

Abdomen shining black to dark red, the sides of the second and part of the third tergite often reddish, pile all black above, except for the usual white patch at the basal corners of the second tergite; all white on the sternites.

FEMALE: Similar in every respect, the front shining yellow, with black pile.

TYPES: Holotype, male, Cafayete, Salta, Argentina, February 12, 1948 (Willink-Monras), in the Universidad Nacional de Tucuman, Argentina; allotype, female, Rearte, Tucuman, Argentina, May 3, 1946 (Bellonio). Paratypes, three males, El Morenillo, Rosario de la Frontera, Salta, March, 1936; male, San Pedro de Colalao, Tucuman, February 10, 1934; male, Siambon, Tucuman, Argentina, December, 1945; two males, Siambon, Tucuman, Argentina, September 21, 1945 (Willink); male, Las Lechuzas, Tucuman, Argentina, May 3, 1946 (Bellonio).

A female from Matucana, Peru, May 26, 1920 (Cornell collection), is not entirely typical; the pile of the venter is black, the tubercle appears slightly less produced, and the scutellar spines are somewhat stronger.

Volucella recta? (Van der Wulp)

Figures 1, 49

Temnocera recta VAN DER WULP, 1882, Tijdschr. v. Ent., vol. 25, p. 125.

Temnocera recta ARRIBALZAGA, 1892, An. Soc. Cient. Argentina, vol. 34, p. 189.

Relatively small (12 mm.), face, cheeks, and front yellow,

slightly brownish on the cheeks; pile on the face black, yellow on the lower slopes towards the tubercle, on the cheeks mainly black, frontal triangle yellow, with black pile; face short, with well-rounded tubercle. Antennae yellowish, small, the third segment narrowed on the apical half; arista yellow, with about 15 rays above and an equal number below. Eyes golden yellow pilose.

Thorax black, the sides of the mesonotum broadly yellow and with a yellow quadrate spot in front of the scutellum; pile on the mesonotum of the usual black and yellow mixture and not strongly vittate; on the pleura mostly black, all black on the sternum. Scutellum yellow, somewhat translucent, with black pile and a fringe of short golden hairs on the fore margin; two pairs of black prescutellars and two pairs of black setigerous spines on the rim of the scutellum, sometimes a smaller third pair. Spines along the sides of the mesonotum few and weak. Legs yellowish red, the tibiae somewhat paler, the pile mainly black. Wings hyaline, with yellow veins, the stigma black; marginal cell closed and bulbous. Squamae brown, with darker fringe, halteres and plumule yellow.

Abdomen reddish yellow in strong light, much darker to the naked eye, the pile all black above and below.

The collection from Argentina includes three males, which I believe represent this species, and one specimen has been so determined by Lindner. The three males come from Villa Nougues, January, 1929; Tafi Viejo, Tucuman, October 10, 1926; and El Morenillo, Salta, March, 1936.

I reproduce below a translation of Van der Wulp's description which was kindly made for me by P. H. van Doesburg of Baarn, Holland. There are some discrepancies from the description above. I am also unable to understand why *recta* has been made a synonym of *frauenfeldi* by Shannon and Aubertin (1933), since *frauenfeldi* has a conspicuous wing spot, at least that is my understanding of the species. Van der Wulp's statement of the "not hunched face" would imply no tubercle, and the present species has a very decided tubercle. For this reason I question my determination.

"As a rule smaller than *T. spinigera* and moreover different from it by the immaculate wings, the not projecting frons and the upright (perpendicular), not hunched face.

"Head waxen (as yellow as wax), face with inconspicuous

yellowish pile; the dense hairs of eyes yellowish-gray, in male longer, also longer than in *spinigera* male. Antennae rubiginous, shorter than half the length of the face; the third joint pinched in the middle [this would imply something like *fulvicornis*—Fluke], darkened at the apex; arista black-brown, the feathering [piles of the arista—V.D.] at the apex longer than at the basis. Thorax and abdomen shining black with metallic reflections; scutellum pellucid brownish-yellow; likewise colored laterally on the thorax of the female; hairs on thorax and scutellum dark-brown (male) or more brown-yellow (female); abdomen finely punctate with extremely short blackish hairs. Legs black, wings hyaline, entirely without markings, with exception of a little black-brown spot at the end of the auxiliary vein; veins yellow-brown, discal cross vein darker; the costal cell of female yellowish.

"One couple from Argentina. Male, female 9–11 mm."

Van der Wulp's figure is not before me.

***Volucella ventana*, new species**

Figures 4, 23, 37, 50

A medium-sized species with golden yellow pile over the facial tubercle, cheeks yellow. Length, 12 mm.

MALE: Head yellow, pile all golden yellow except for black hairs on the front, ocellar triangle, along the sides of the face next to the slits, and a very few weak black hairs in front of cheeks and sometimes four or five on the upper slope of the tubercle, but usually these are absent, a few golden hairs just above the antennae. Antennae yellowish, the third segment small and slightly narrowed on the apical half, the arista black, about 20 rays above, and an equal number, but shorter, below. Eyes yellowish pilose.

Thorax shining black, somewhat paler along the sides, the pile dominantly yellowish, the bristles along the sides weak and fewer than usual; pleural pile mostly yellowish and kinky, more blackish towards the venter. Scutellum translucent yellow, discal pile black, rim pile yellow mixed with black and longer than the three pairs of weak setigerous spines; there is an indication of a shallow depression; no prescutellars.

Legs shining black, with black pile. Wings hyaline, the stigma dark brown, anterior cross vein bordered with brown,

marginal cell not bulbous; squamae and plumule brown, halteres yellow.

Abdomen shining black, with the usual reddish side spots on the second tergite, pile black; venter shining black, with black pile, on two specimens a few golden hairs intermixed.

FEMALE: Very similar, the front shining yellow, yellow pilose on the lower third to half, black pilose above.

TYPES: Holotype, male, Cerro de la Ventana, Tornquist, Buenos Aires, Argentina, February 8, 1947 (Rossi), in the Universidad Nacional de Tucuman, Argentina; allotype, female, same data as holotype; paratypes, four males and one female, same data as holotype.

This species is related to *scutellata* but is much smaller, the pile over the tubercle is nearly all yellow, and the wing is nearly all hyaline.

***Volucella willinki*, new species**

Figures 2, 24, 54

Relatively small, frontal triangle small, slopes of the face yellow pilose, one pair of prescutellars, three or four pairs of scutellars. Length, 11.5 to 13 mm.

MALE: Face and front yellow, cheeks slightly reddish yellow; frontal pile black; facial pile black on and just above the tubercle and next to the facial slits, otherwise yellow; cheeks sparsely black pilose in front, heavier pale pilose behind; ocellar triangle reddish, with black pile. Antennae reddish, third segment narrowed on apical third but the lower side straight, concave only on the upper side; arisal rays black, with about 20 above and an equal number and shorter ones below.

Thorax shining black, the sides of the mesonotum and the scutellum reddish yellow, the pile mixed pale and black in the usual vittate pattern on the mesonotum, mostly black on the pleura; an inconspicuous, yellow, translucent spot in front of the scutellum. Pile of the scutellum black, the apical hairs slightly longer than the small setigerous spines, the apical rim with shorter whitish hairs, the prescutellars weak, usually only two, but sometimes a third bristle is present. Five or six bristles on the calli, five above the wing base, and three on the humeri.

Legs dark red to black, the tibiae somewhat paler, the pile

all black. Wings hyaline, the stigma black and the anterior cross vein bordered with brown. Squamae and plumule yellow to brown, halteres yellow.

Abdomen black to the naked eye but somewhat reddish to yellowish on the sides of the second tergite, with a narrow, black, median vitta; venter shining black; pile black above but nearly all white on the sternites.

FEMALE: Very similar, the front shining yellow, with rather abundant black pile, the usual sensory pit on the third segment of the antennae quite prominent.

TYPES: Holotype, male, Siambon, Tucuman, Argentina, September 21, 1945 (Willink), in the Universidad Nacional de Tucuman, Argentina; allotype, female, Cordoba, Argentina, May 23, 1948 (Lopez); paratypes, all Argentina, three males, same data as holotype; three males and one female, La Rioja, 1928; two males, El Morenillo, Salta, March, 1936; two males, El Molle, Amaicha del Valle, 2900 meters, November, 1932; one male and three females, Tucuman; male, without data; female, Aconquija, Tucuman, November 17, 1946 (Goldbach); female, Cordoba, January 23, 1948 (Lopez); female, Fda. Carapunco, Tucuman, 2500 meters, November, 1932; female, Cerro de la Ventana, Tornquist, Buenos Aires, February 8, 1947 (Rossi); female, Valle Vieja, Catamarca, January 2, 1947 (Morales); female, Tafi del Valle, Tucuman, December 6-12, 1947 (Goldbach); two reared females, Tucuman, the larvae taken on *Gymnocalycium* sp., December, 1931, and May 26, 1933.

A few of these specimens had been labeled *scutellata*, and this species is undoubtedly closely related to *scutellata*, but it is much smaller, the facial pile is mostly pale, the cheeks are reddish yellow, the sternites are white pilose, and the genitalia are markedly different.

This species and *diversa* are very similar and easily confused. The differences are noted under *diversa*.

***Volucella diversa*, new species**

Figures 3, 25, 38, 52

Entirely like *willinki* except the front in both sexes is wider and more inflated; the third segment of the antennae concave above and below; the pile of the fourth tergite usually entirely

yellow, with a few black hairs intermixed, average size larger. Length, 14 mm.

The description of *willinki* will serve for this species, differing only in the characters noted above. The front of both sexes across the base of the antennae is 2.5 mm.; on *willinki* the male front is 1.75 mm. and the female front scarcely 2 mm. The epistoma is also slightly longer.

TYPES: Holotype, male, Isla Choele, Choel, Rio Negro, Argentina, November 21-24, 1946 (Willink), in the Universidad Nacional de Tucuman, Argentina; allotype, female, same data; paratypes, male, Rio Colorado, Rio Negro, Argentina, February 15-20, 1946 (Hayward-Willink); male, Rearte, Tucuman, Argentina, May 3, 1946 (Bellonio); male, Santiago del Estero, Argentina, October, 1946 (Briones); male, La Rioja, 1928; female, same data as holotype; two females, Santa Maria, Catamarca, November 27, 1944 (Hayward).

The yellow pile on the fourth tergite is quite characteristic on all specimens except the paratype female on which the black pile dominates. The tip of the third segment of the antennae is slightly darkened, a little more so than in *willinki*.

***Volucella currani*, new species**

Figures 5, 26, 48

Recognized principally by the long scutellar spines and yellow cheeks. Length, 15 to 16 mm.

FEMALE: Front, face, and cheeks yellow; pile on the front black, on the face black over the tubercle and along the sides but yellow on the lower slopes, on the cheeks black in front, yellow behind; yellow pubescent beneath the antennae and lightly on the lower slopes of the face; facial strips yellow pilose; ocellar triangle black pilose. Antennae yellowish red, the third segment broad basally and narrowed above on the apical half, a deep sensory pit on the inner side near the base and lower margin, rays black and about 25 above. Eyes heavily yellow pilose.

Thorax shining, the mesonotum black, broadly luteous along the sides and on a large quadrangular spot in front of the scutellum; the pile abundant, the short vittate pile golden, the longer hairs black, black stout bristles along the sides, three on the humeri, three or four above the wing base, and three on the

calli; pleura reddish above, blacker below, the pile yellow and black mixed, with about three strong black bristles on the mesopleura; scutellum rusty red, slightly concave before the apex, the pile black, with yellow hairs around the border, the apical hairs much shorter than the four pairs of long, black, setigerous spines, sometimes a smaller fifth pair present; four or five prescutellars.

Legs reddish, basal two-thirds of the femora almost black, the pile all black. Wings hyaline, the stigmal spot black and the cross veins very narrowly clouded, marginal cell very little widened at the apex; plumule golden; squamae brown, the fringe dark brown; halteres yellowish white, the stalks darker.

Abdomen shining dark red to black, darker on the apical segments and somewhat mottled on the sternites; pile of the tergites black, yellow on the first segment and the basal corners of the second; on the sternites the pile is mostly yellow on the second and third, with a few black hairs intermixed, all black on the fourth and fifth; on the paratype the sternal pile is largely black, the yellow hairs confined to the basal corners.

MALE: Very similar; there is a dash of golden pile on the front just above each antenna; the abdomen is more reddish and the pile similar to that of the paratype female.

TYPES: Holotype, female, Cuenca, Azuay, Ecuador, 2650 meters, July, 1947 (Z. Muller); allotype, male, Banos, Ecuador, February, 1939 (F. M. Brown); paratype, female, Cuicocha, Imbabura, Ecuador, 3300 meters, May 27-31, 1939 (F. M. Brown).

***Volucella aurea*, new species**

Figures 6, 27

Recognized principally by the golden yellow pile on the face and mesonotum; scutellum with four pairs of long setigerous spines; abdominal pile all black above and below. Length, about 15 mm.

FEMALE: Head entirely golden yellow, the pile all golden except for a few black hairs intermixed on the front, for black hairs on the front half of the cheeks, and for the black pile on the ocellar triangle; antennae reddish yellow, the third segment tapering on the apical third or more, a long deep sensory pit on the inner side; arista black, with long, black rays, about 15 above.

Thorax shining black; the mesonotum yellowish along the sides and with a spot in front of the scutellum; the pile golden, the black hairs longer and intermixed, strong black spines along the sides; pleura black, the mesopleura more yellowish, pile mainly black, with soft yellowish pile intermixed; two pairs of strong prescutellars and four pairs of long, black scutellars, a smaller fifth pair on the sides; pile on the scutellum is black but the entire border with golden pile, the apical pile much shorter than the spines. The scutellum is strongly flattened, with a shallow depression; it is rusty red in color.

Legs shining black, the four front tibiae somewhat yellowish red in color, the pile all black; wings hyaline, stigma black, the anterior cross vein and fork of the second and third veins brownish infuscated; marginal cell slightly widened at the apex; squamae dark brown, the fringe black, halteres white.

Abdominal tergites dark red to black, the pile black; sternites shining black, the pile all black.

TYPE: Holotype, female, Zipacoa, Lund, Colombia, 2900 meters, August 1, 1948 (L. Richter).

This species is quite similar to *currani*, but the face is more extended, is broader, and the pile is all golden.

***Volucella ecuadorea*, new species**

Figures 7, 28, 51

Metallic, scutellum with four pairs of very long spines, two pairs of prescutellars; face covered with gray pubescence. Length, 14 to 16 mm.

MALE: Face, front, and vertex reddish yellow and gray pubescent, all pile black, yellow only posteriorly on the cheeks; face well rounded, produced downward only slightly; occiput very thin above, pile short and pale, cheeks reddish and shining. Antennae dark reddish, the third segment concave on its dorsal edge, an elongate shallow pit on the inner surface; arista black, with about 15 to 18 rays above. Upper facets of the eyes considerably enlarged, pile of eyes yellowish.

Thorax shining; mesonotum almost blackish, with a dark reddish rectangle in front of the scutellum and the sides paler, the pile black, with shorter white pile in the usual vittate rows; three black spines on the notopleura, two or three above the wing base, and three or four on the postalar callosities. Pleura

shining brownish to black, the pile brown, with several long black bristles on the mesopleura; sternal pile black. Scutellum large, the fore margin convex, with a median anterior hump, slightly concave to the apical margin which is beset with four pairs of setigerous spines; two pairs of prescutellars; the entire fore margin of the scutellum with short brown pile which can be seen in certain lights with the naked eye, rest of the pile short, depressed, black, longer and erect on the sides and posteriorly, especially in the middle.

Legs yellowish red, the bases of the four front femora about one-third and the hind pair one-half black; pile inconspicuous, mostly black, under sides of the front and hind metatarsi with conspicuous yellow pile and a specially large tuft on the hind metatarsus.

Wings hyaline, the stigma black, stigmal cell brown; squamae and fringe black, plumule brown, halteres brown, with yellow knob, marginal cell non-bulbous.

Abdomen shining, with a wine to purplish cast, the pile black, short, stubby, and spine-like, with longer, more slender hairs mixed in on the fourth tergite and all slender and long on the sternites; the usual yellow patch on the basal corners of the second tergite and the second sternite, pile of cerci yellow. Genitalia quite distinct, the superior lobes with a large extension below the terminal hook.

FEMALE: Front dark red, the vertex across the ocelli bright red, the pile all black; side depressions prominent and heavily pollinose, the anterior two-thirds dark brown and the posterior third light brown; antennal pit more prominent; mesonotal vittae conspicuous.

TYPES: Holotype, male, and allotype, female, Cuenca, Azuay, Ecuador, 2650 meters, July, 1947 (Z. Muller); paratypes, male, and two females, same data; two males and two females, same data, October 20, 1946; male, Cuenca, Azuay, Ecuador, February 25, 1939 (F. M. Brown); male, Banos, Ecuador, January, 1939 (F. M. Brown); female, Cuicocha, Imbabura, Ecuador, 3300 meters, May 27-31, 1939 (F. M. Brown).

This species is readily told by the dull face, heavily coated with gray to yellowish pubescence. The color of the abdomen varies considerably from rather light red to metallic blue, many with purplish reflections.

***Volucella escomeli* Curran**

Figures 15, 29, 40, 55

Volucella escomeli CURRAN, 1929, Ann. Ent. Soc. Amer., vol. 22, p. 489.

Easily recognized in this group by the elongate snout, pale-colored abdomen, and long slender spines on the scutellum. It was originally described from Peru, and there are three paratypes before me.

ADDITIONAL RECORDS: Two females, Arequipa, Peru, April 10, 1938 (C. Nicholson); two pairs, Arica, Poroma, Mini-Nini, and Tarapaca-Miñita, Chile.

***Volucella hambletoni*, new species**

Figures 16, 41, 57

A large species, with yellow cheeks, two or three pairs of prescutellars and four or five pairs of strong scutellars, reddish to yellow tergites and yellowish sternites. Length, 15 mm.

MALE: Face, cheeks, and frontal triangle yellow, white pubescent on the front and under the antennae in the concavity; pile of front black, of face whitish, with black setae over the tubercle and a few black hairs down the sides next to the eye slits; pile of cheeks white except for a very few black hairs in front; ocellar triangle reddish, with black pile; ocular pile almost whitish. Antennae small, reddish, third segment slightly narrowed just beyond the middle, a small, slightly elongate pit on the inner surface.

Thorax shining, the mesonotum black, with the sides and a large rectangle in front of the scutellum translucent yellowish, the pile black, with the vittate hairs white and prominent anteriorly, the sides with strong black bristles, three on the humeri, five or six above the wings and about six or seven on the calli; pleura yellow, pile yellow and white mixed, strong black bristles on the upper half of the mesopleura; sternum shining black, the pile black; scutellum translucent yellow, two or three pairs of rather strong prescutellars (two on the type) and four or five pairs of strong setigerous scutellars, the pile on the disc black, the entire border with white pile; a slight depression across the disc.

Legs yellowish, the coxae, trochanters, and the apical three segments of the tarsi darkened, pile black; wings immaculate,

the stigma black; squamae brown, plumule light brown, halteres yellow. Marginal cell closed but not bulbous.

Abdomen well inflated, the tergites reddish yellow, the apical two segments darker, with an indication of a slender, median, dark line, pile of the tergites black, white on the first and side patches of white on the second; sternites yellow, the fourth reddish, pile all yellow; pile on the genitalia black.

FEMALE: Not represented.

TYPES: Holotype, male, Canete, Peru, October 24, 1942 (E. J. Hambleton); paratypes, male, same place, September 6, 1942; male, same place, September 10, 1942.

I take considerable pleasure in naming this striking species after E. J. Hambleton, who has sent me many Syrphidae from Brazil and Peru.

***Volucella cockerelli* Curran**

Figures 46, 60

Volucella cockerelli CURRAN, 1925, Bull. Brooklyn Ent. Soc., vol. 22, p. 85.

This large and handsome species was described from Peru. It is readily recognized by the large, "boot-shaped," third antennal segment on the male and the eight to 10 pairs of spines on the scutellum.

Pile on the facial tubercle coarse, black; on the cheeks white; cheeks black behind; two or three pairs of prescutellars; dominant pile of the thorax crinkly and white; wings with an irregular brown spot behind the stigma; abdomen rusty reddish, the ventral pile mostly white. Length, 17 to 18 mm. Male genitalia very distinctive, with a window spot at the apex of the tenth tergite.

The female is very similar to the male, differing only in the antennae; the third segment is considerably smaller and less "boot-shaped." Pile of the front black.

Specimens before me are the type and allotype, female (by present designation), Tingo, Peru, August 22 (Cockerell); metatypes, two males and two females, Canete, Peru, August 16 to December 4, 1942 (E. J. Hambleton), and one male, Mini-Nini, February 14, 1940.

***Volucella spinigera* Wiedemann**

Figures 11, 20, 31, 42, 58

Volucella spinigera WIEDEMANN, 1830, Aussereuropäische zweiflügelige Insekten, vol. 2, p. 197.

Temnocera fulvicornis BIGOT, 1883, Ann. Soc. Ent. France, ser. 6, vol. 3, p. 547.

Temnocera spinigera ARRIBALZAGA, 1892, An. Soc. Cient. Argentina, vol. 34, p. 188.

Volucella spinigera SHANNON AND AUBERTIN, 1933, Diptera of Patagonia and south Chile, pt. 6, fasc. 3, p. 170.

Wings with a dark spot in the middle on the anterior margin and with a small connected spot at the apex of the second basal cell; third segment of the antennae deeply excavated above, aristal rays rather short and less than 15. Length, 12 to 13 mm.

MALE: Face yellow, shining, the pile short, yellow, with stubby black hairs on the tubercle above and mainly black along the facial slits; the tubercle weak, the apex of the face deep and somewhat pointed; cheeks mostly dark, shining, and black pilose; mouth edge narrowly black, bordered by brown; front yellow, with black pile; ocellar triangle darkened with black pile; occiput gray pollinose, the upper pile short but black, becoming longer and yellowish below. Antennae yellow, the third segment considerably broader at the base than at the apex, a rather deep excavation on the fore margin; arista yellow, rays short above and shorter below, usually no more than 12 or 13 above. Eyes with short yellowish white pile.

Thorax shining black, with a dark red cast to the scutellum, a small area in front of the scutellum, and along the sides of the mesonotum; pile of the mesonotum rather short and black, with the usual vittae of pale pile which is white; pile of the pleura black, on the scutellum black; spines on the rim of the scutellum short, little longer than the pile, usually three or four pairs; the prescutellars usually absent but sometimes a weak pair present. Spines present on the notopleura, above the wing and on the callus, usually about three in each place; no spines on the pleura.

Legs entirely dark red to black, the pile all black. Wings hyaline, with a rather large spot in the stigmal area and a small one at the apex of the second basal cell which is connected to the other spot. Squamae dark brown to black, halteres white. Marginal cell closed, very little widened.

Abdomen dark red to black, the pile practically all black.

FEMALE: Very similar, the third antennal segment twice as wide at the base as at the apex, inside surface with a round, deep pit; front shining yellow, with black pile; a pair of pre-scutellars usually evident.

Twelve males and 14 females before me, all from Argentina: Cordoba; Clorinda, Formosa; Colonia, Benitez, Chaco; Cadillal, Tucuman; Salta; Santa Fe, Buenos Aires; El Clavillo, Tucuman; and one female from Uruguay.

Several specimens have the pupa cases attached, labeled "Caciaciae, larva on *Gymnocalcium* sp."

***Volucella frauenfeldi* (Schiner)**

Figure 32

Temnocera frauenfeldi SCHINER, 1868, Reise der...Fregatte Novara... 1857-59, Diptera, p. 358.

Volucella frauenfeldi SHANNON AND AUBERTIN, 1933, Diptera of Patagonia and south Chile, pt. 6, fasc. 3, p. 169.

Wing spot similar to that in *spinigera*, cheeks brownish black, pile on the abdominal sternites white. Length, 14 to 16 mm.

MALE: Face and front yellow, with black pile, a few whitish hairs on the lower slopes of the face, pollinosity is faint and found only below the antennae and along the orbits; cheeks and lower edge of mouth reddish brown to black, with silvery pile; occiput gray pollinose, with white pile, a few short black cilia above; ocellar triangle yellowish red, with black pile. Antennae reddish, the third segment very little excavated above; rays of the arista black, about 20 above, shorter below; in certain lights the bases of the rays yellow; ocular pile white.

Thorax shining blackish, yellowish translucent along the sides of the mesonotum and in front of the scutellum, the latter also translucent, the pile largely whitish, the usual black pile on the mesonotum and mostly black on the disc of the scutellum, the pile becomes mostly black on the sternum; long, slender, black bristles on the upper mesopleura, along the sides of the mesonotum, and there is one pair of weak prescutellars; three or four (usually four) pairs of black scutellars which are shorter than surrounding pile.

Legs shining black, the tibiae, especially basally, reddish, the pile black. Wings hyaline, with a prominent black spot in

the stigmal area and which is connected to the black at the apex of the second basal cell; marginal cell closed, petiolate but not enlarged. Squamae dark brown to black, halteres yellow.

Abdomen shining black, the second tergite reddish on the sides, not apparent to the naked eye; the dorsal pile black, ventral pile white.

FEMALE: Very similar; front yellow, with pile all black.

It has been reported from Chile and Argentina; specimens before me are from Argentina: three males and four females, Uspallata, Mendoza, January 14, 1947 (Willink); male, Mendoza; male, Tucuman; female, El Molle, Amaicha del Valle, 2900 meters, November, 1932; female, Potrerillos, Mendoza, January 21, 1947 (Hayward-Willink). There are also two females in the Cornell collection from Mendoza, Argentina, which are undoubtedly the same.

This species is related to *spinigera* Wiedemann, differs in the more pronounced facial tubercle, straighter third segment of the antennae, fewer rays on the arista, and white pile on the sternites. The genitalia indicate the close relationship.

I believe this is the species Shannon and Aubertin had before them, since they compared it to *spinigera* Wiedemann and noted that the wing spot is less intense than on *spinigera*. It is also a little larger.

***Volucella spinithorax* (Arribalzaga)**

Figures 33, 59

Temnocera spinithorax F. Lynch ARRIBALZAGA, 1892, An. Soc. Cient. Argentina, vol. 34, p. 190.

A shiny black species, pile of face yellow, two pairs of strong scutellar spines and three pairs of prescutellars, wings with black spot. Length, 15 to 16 mm.

MALE: Face and front shining yellow, with practically no pollen-like pubescence, the pile all yellow, with just a black hair showing occasionally on the front; vertical triangle yellowish red, the pile black; cheeks yellow in front, black narrowly behind, the pile mostly black. The facial tubercle prominent, and there is a small bulla on each side as in *obesa* but not so prominent. Occiput thin, black pollinose, the pile short and generally pale. Antennae yellow, the third segment a little con-

cave on the apical third above, the arista with 12 to 18 rays above and 12 or 15 somewhat shorter ones below, pile on the second segment black. Eyes heavily golden pilose.

Thorax shining black, with a dark red cast to the sides of the mesonotum, the pleura, and the scutellum, and faintly so on the mesonotum in front of the scutellum; pile black, with the usual yellowish brown, shorter hairs on the anterior half of the mesonotum arranged as vittae; yellowish hairs more numerous around the humeri, and there is a narrow fringe on the anterior edge of the scutellum; disc of the scutellum black pilose; four or five black bristles on the notopleura, a row of seven or eight above the wing, five or six on the callus, and several usually on the mesopleura and pteropleura. Scutellar margin with two pairs of stout setigerous spines, and there are three pairs of stout prescutellars.

Legs dark reddish black, the pile all black or dark brown. Wings hyaline, with a definite, almost square, black spot in the middle of the anterior margin. Marginal cell closed, petiolate, and bulbous. Squamae and plumule black, the halteres whitish yellow.

Abdomen shining black, under certain lights a dark reddish cast; pile all black, short and somewhat depressed; some shorter and some longer erect pile mixed on the fourth tergite.

FEMALE: Front shining yellow, somewhat duller across the ocelli; the pile yellow, black across the ocelli and for a short distance down the sides next to the eyes, mesonotal and pleural color often more reddish, especially on the mesopleura.

Originally described from Argentina. Specimens before me are: three males and five females, Nova Teutonia, Brazil, February to May, 1938 and 1939 (Fritz Plaumann); two females, São Paulo, Brazil, October, 1934; female, Caviuna, Parana, Brazil, October, 1946 (Maller); female, Sapucay, Paraguay, December 12, 1902, female, São Paulo, September, 1948 (Carrera); male, São Paulo, Rio Parana, June, 1941; female, Curityba, Parana, November, 1938.

Shannon and Aubertin listed *spinithorax* as a possible synonym of *scutellata*, but their identification of the latter does not agree with the present. It appears that they did not have *scutellata* before them, or they would not have considered these two as the same.

This species should be quite readily recognized by the wing maculation and reddish pile on the face.

In the specimens from Nova Teutonia there are two females of smaller size, 12 to 13 mm., and on which the frontal pile is all black; otherwise they are indistinguishable from typical *spinithorax*. For this variety I propose the name *nova*.

TYPES: Holotype, female, Nova Teutonia, Brazil, April 4, 1939 (Fritz Plaumann); paratype, female, same place.

***Volucella abrupta* (Curran)**

Figures 10, 19, 34, 44

Phalacromyia abrupta CURRAN, 1925, Ann. Mag. Nat. Hist., ser. 9, vol. 16, p. 251.

Volucella spinigera CURRAN, 1926, Ann. Ent. Soc. America, vol. 19, p. 59.

Volucella abrupta CURRAN, 1939, Amer. Museum Novitates, no. 1027, p. 2.

Abdomen and legs wine to dark red colored, stubby pile on the facial tubercle black, pile on anterior sternites pale yellow. Length, about 15 mm.

FEMALE: Head shining yellow, the occiput covered with white pollen; pile on the ocellar triangle black, on the front black and yellow mixed, on the facial tubercle black (stubby), on the slopes of the face yellow, on the cheeks black in front and yellow behind; on the sides of the face above a flat-like area with a small bulla on the sides, a few black hairs down the sides next to the slits, most of the weak pile on the strips black; antennae orange colored, the third segment considerably narrowed on the apical half, an elongate sensory pit on the inner side, arista black, with about 15 to 18 rays above.

Thorax shining; the mesonotum black, sides broadly and a large spot in front of the scutellum luteous, the pile mostly golden and the vittate appearance due mainly to heavier vittae of golden pile, black hairs are fewer than usual and only slightly longer than the yellow ones, black bristles numerous along the sides, and there are two pairs of stout short prescutellars; pleura yellowish, becoming black on the sternal areas, pile yellowish and black mixed, with a couple of bristles on the upper part of the mesopleura. Scutellum yellow, with yellow pile and some black hairs intermixed which on the apex are sometimes almost as long as the black setigerous spines.

Legs yellowish, with a slight reddish cast, the pile reddish to black. Wings with a quadrate brown spot on the anterior margin, darker along the veins, squamae brown, with light brown fringe, halteres yellow, with white knobs.

Abdomen shining wine red, the pile on the tergites all black except the first tergite and the usual yellow patch on the basal corners of the second tergite; venter pile yellow on the first three sternites and on the middle in front of the fourth, rest of pile black.

Described from the type and a female, Bahia, Brazil, "16-6-15" (P. G. Russell).

***Volucella villarica*, new species**

Figures 12, 62

Abdomen shining dark red to black, scutellum yellow with yellow pile and two pairs of stout setigerous spines, front black and yellow pilose. Length, 14 mm.

FEMALE: Face, front, cheeks, and antennae shining yellow, lightly pollinose beneath antennae; pile on the facial tubercle yellow, on sides next to eye strips black, on cheeks black in front and yellow behind, on front and ocellar region black, with yellow hairs intermixed; third segment of antenna concave on upper margin widest just apical from arista, without any sensory pit on the inside, arista yellow, with about 25 black rays above and slightly shorter ones below; eyes thickly golden short pilose.

Mesonotum shining black, broadly yellow on the sides and on a rectangular spot in front of the scutellum; the pile mostly yellowish, with a pair of narrow, black, pilose stripes; humeri partly black pilose; black spines on the humeri, above the wing and on the callus, usually two to four in each place. Pleura shining brownish black, with black pile, the upper half of the mesopleura yellow, with yellow pile. Scutellum yellow, with yellow pile and two pairs of short, stout, setigerous spines, the middle pair the stoutest, often a third pair on the sides, somewhat weaker; scutellar disc somewhat concave. Three pairs of short, stout, black prescutellars.

Legs uniformly dark red, similar to the abdomen, the pile black; front tarsi somewhat enlarged. Wings hyaline, with large, almost rectangular black stigmal spot, base yellow; squamae yellow, halteres with white head. Marginal cell closed and bulbous.

Abdomen with uniform dark reddish color that appears almost black, with dark purple reflections, to the naked eye,

slightly dullish; venter same color, but highly polished; pile of the abdomen all black except for a few pale hairs on the first tergite and basal corners of the second; pile on fourth tergite erect and of two lengths, short and somewhat appressed on the other tergites; on the venter long and erect.

MALE: Similar, the front well rounded and the pile is mostly golden with black hairs intermixed, the ocellar pile also yellow and black mixed, becoming all golden behind.

TYPES: Holotype, female, Villarica, Paraguay, May, 1938 (F. Schade); allotype, male, same place, January, 1937; paratypes, female, same data as allotype; two females, Piedra, Brazil, April (Williston collection); female, São Paulo, Brazil; female, São Paulo, S. Roque, May, 1945 (F. Lane) in collection of Messias Carrera.

The two females from Piedra were determined by Williston as *spinigera*? Wiedemann. The absence of the sensory pit on the inside of the third segment of the antennae of the female and the yellow hairs over the tubercle of both sexes will help to distinguish this species from *abrupta*, to which it is closely allied.

***Volucella bulbosa*, new species**

Figures 13, 35, 45, 63

A large species, shining black, with a dark red cast to the abdomen and scutellum; rays of the arista stout, 10 or 12 above, very short ones below; front inflated; scutellum with three or four pairs of setigerous spines. Length, 15 to 16 mm.

MALE: Face and front reddish yellow, with black pile and well coated with white pubescence; lower mouth edge shining black, cheeks shining reddish, with black pile, a few white hairs intermixed; ocellar triangle reddish, with black pile; front greatly swollen, very lightly whitish pollinose; occiput thin, pile mostly black, especially below. Antennae reddish, the third segment gradually tapering, with the apex slightly enlarged and darkened; arista black, with about 10 to 14 rays above and twice as many below but very short; eyes with abundant, long, golden pile.

Thorax shining blackish, the pile rather long and black, the usual white hairs in vittate arrangement inconspicuous; inconspicuous prescutellars sometimes present; scutellum translucent reddish, with long, erect, black pile, and six scutellars

(seven on one specimen) about the same length as the apical pile.

Legs black to dark reddish, the apical half of the femora and the basal half of the tibiae yellowish red, the pile black, brownish under the front and hind tibiae and tarsi. Wings hyaline, the stigmal cell dilutely yellowish, stigma black; plumule and squamae black; halteres black, with yellow knobs. Marginal cell elongate petiolate, not at all bulbous.

Abdomen with a shining, dark red cast, the pile all black, yellow on the cerci. Second sternite very convex but lacks the finger-like process on the anterior margin.

FEMALE: Very similar, the abdomen somewhat more reddish. Front reddish, lower half swollen, whitish pubescent and long black pilose; sides of the face also lightly whitish pubescent; a pair of black prescutellar bristles; scutellum of the allotype female with seven setigerous spines.

TYPES: Holotype, male, Minza Chica, V. Tungurahua, Ecuador, 3750 meters, April 2-14, 1939 (F. M. Brown); allotype female, same data; paratypes, five males, same data; male, El Molle, Amaicha del Valle, Tucuman, Argentina; female, Cerro de la Mina, Tucuman, Argentina, 3000 meters, May, 1933.

This species belongs to that group with an inflated front, rays of the arista much longer on the upper side, and without a digitate process on the second sternite. It is related to *bradleyi* Curran.

***Volucella parina*, new species**

Figures 14, 61

A large, shiny species, the scutellum and abdomen dark red; front of male greatly inflated; arista with 10 to 12 long rays above and about twice as many very short rays below; scutellum with four pairs of setigerous spines and one pair of prescutellars; closely related to *bulbosa*. Length, 17 mm.

MALE: Face, front, and vertical triangle reddish yellow, with a light coating of pale pubescence, more shining on the tubercle; the pile all black, heavy on the greatly swollen front; cheeks posteriorly and the mouth edge shining black; pile of the cheeks white and black mixed; facial tubercle low, inconspicuous; occiput very thin and the pile short and pale; eyes with a large oval area above with enlarged facets, the pile golden

and very thick but thinner along the occiput. Antennae blackish, the basal segments reddish, third segment narrowed on the apical third; arista black, with 10 to 12 long rays above but with very short rays below.

Thorax shining black, the pile black, with the usual shorter, white, kinky pile intermixed; notopleura with one or two black bristles, also two or three weak ones above the wing base; pleural pile mixed with long black and white hairs; scutellum dark shining red, with black pile, short and whitish on the fore margin, the apical margin with four pairs of black setigerous spines; a noticeable pair of black prescutellars.

Legs dark reddish to black; the basal half of the femora, all the tarsi and coxae black; pile all black. Wings hyaline, dilutely yellowish at the base, the stigmal cell brown entire length, stigma black. Squamae brown to black, the fringe long and black; plumule brown; halteres black, with yellow knob. Marginal cell closed, not at all bulbous.

Abdomen shining dark reddish, the pile black; venter shining black, with black pile; some whitish hairs near the base. Anterior median margin of the second sternite without the finger-like protuberance.

Types: Holotype, male, Arica, Parinacota, Chile, 4500 meters, March 7, 1948, in the University of Chile, Santiago; allotype, female, same place, February 23, 1948; paratype male, same place, February 27, 1948.

The more elongate face separates this species from *bradleyi* and *bulbosa*; otherwise they are very similar.

***Volucella bradleyi* Curran**

Volucella bradleyi CURRAN, 1925, Ann. Mag. Nat. Hist., ser. 9, vol. 16, p. 348.

Front of both sexes inflated, that of the male greatly swollen; pile of front and face black; face and front pale pubescent; cheeks yellow; third segment of the antennae reddish, with darker tips, the rays about 14 above and long, much shorter below but longer than in *bulbosa*. Pile of the thorax dominantly pale and kinky, a pair of black prescutellars and four pairs of scutellars, pile on the sides of the scutellum pale; tibiae and apical two-thirds of the femora yellowish. Wings hyaline, stigmal cell yellow, stigma black, marginal cell narrow

at apex, closed. Abdomen with reddish cast, pile of the dorsum black, of the venter yellow basally, black on the apical half.

Twenty-four specimens before me from Peru (Yura and Arequipa) and northern Chile (Arica), including a pair of paratypes.

An easily recognized species in the group, with a greatly inflated front. It is paler than either *parina* or *bulbosa*.

Volucella aricia Curran

Volucella aricia CURRAN, 1930, Amer. Mus. Novitates, no. 413, p. 22.

This species belongs to the group with inflated front, but I am unable to place it among those before me, and I have been unable to locate the type female. It apparently was deposited in the American Museum, but no trace of it has been found.

Curran's description leaves me in doubt as to which species is described here. It apparently will trace to *tumicephala* Hull, and it is possible that the two are the same. It was taken in Mendoza, Argentina.

Volucella tumicephala Hull

Volucella tumicephala HULL, 1943, Ann. Mag. Nat. Hist., ser. 11, vol. 10, p. 35.

This species belongs to the group with bulbous front and is probably closely related to *bradleyi* Curran or *aricia* Curran. The pile of the face on *tumicephala* is chiefly pale, and is all black on *bradleyi*; apparently Hull's species is devoid of short pubescence which is present on *parina*, *bulbosa*, and *bradleyi*. Arista rays about 20; *parina* has no more than 10 or 12 above and only short ones below.

Hull compares his species with *boliviana* Hine, a species that is known only in the female which has a very wide front, somewhat inflated, but the scutellar spines are weak and not setigerous.

Known only from the type male from Peru.

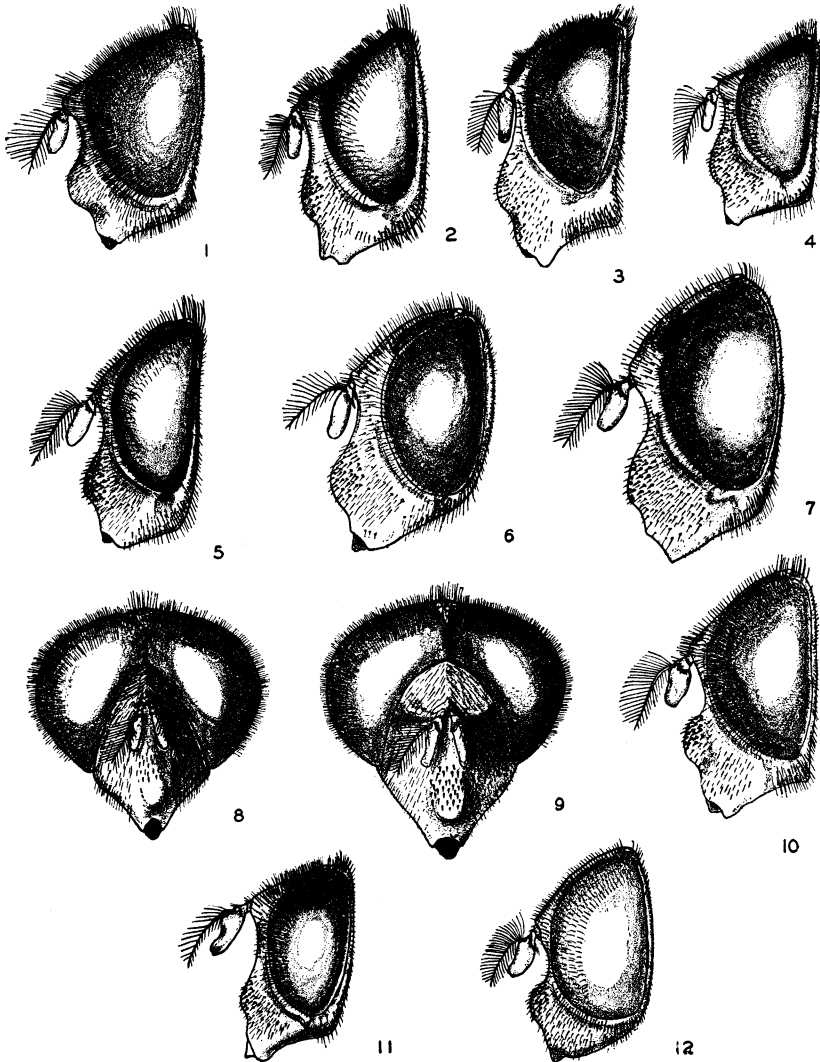
Volucella splendens Hull

Volucella splendens HULL, 1949, Psyche, vol. 56, p. 26.

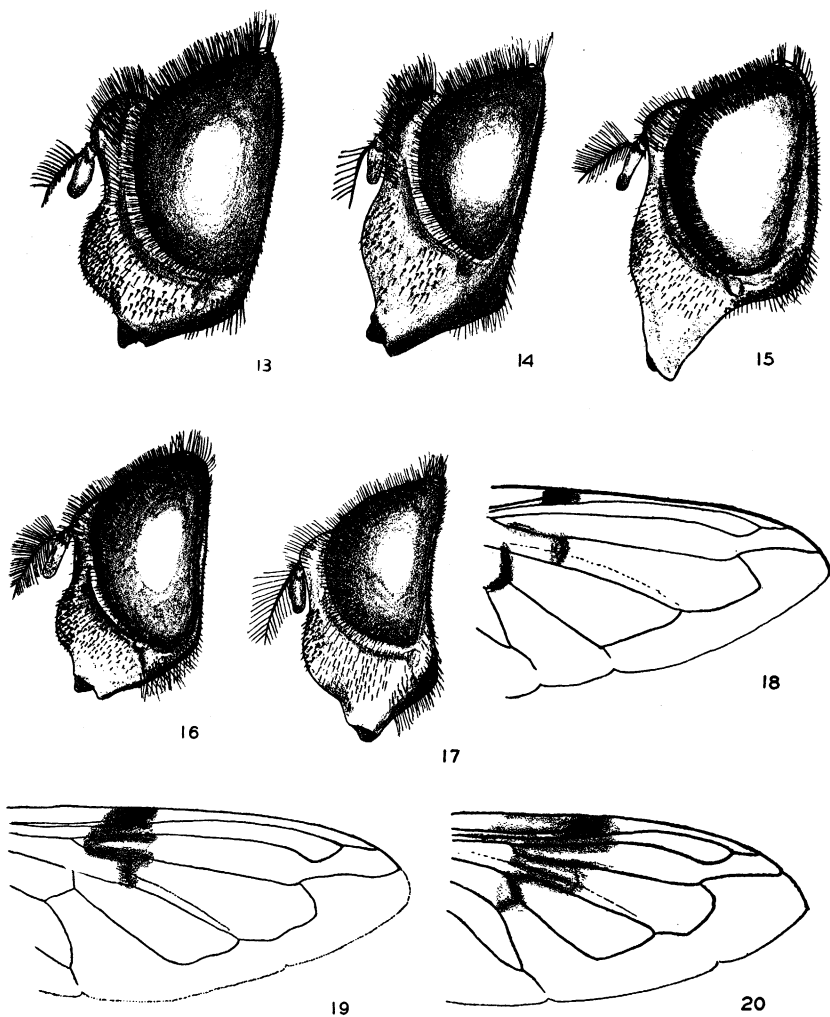
Hull described this species from Nova Teutonia, Brazil. The description indicates that it might belong to the *scutellata*

group, but it lacks the digitate process on the second sternite, although this segment is considerably convex, and the spines on the scutellum are not on tubercles such as are found on *scutellata* and related forms. It indicates that the *scutellata* group is not an easily segregated one and perhaps not entirely a natural one.

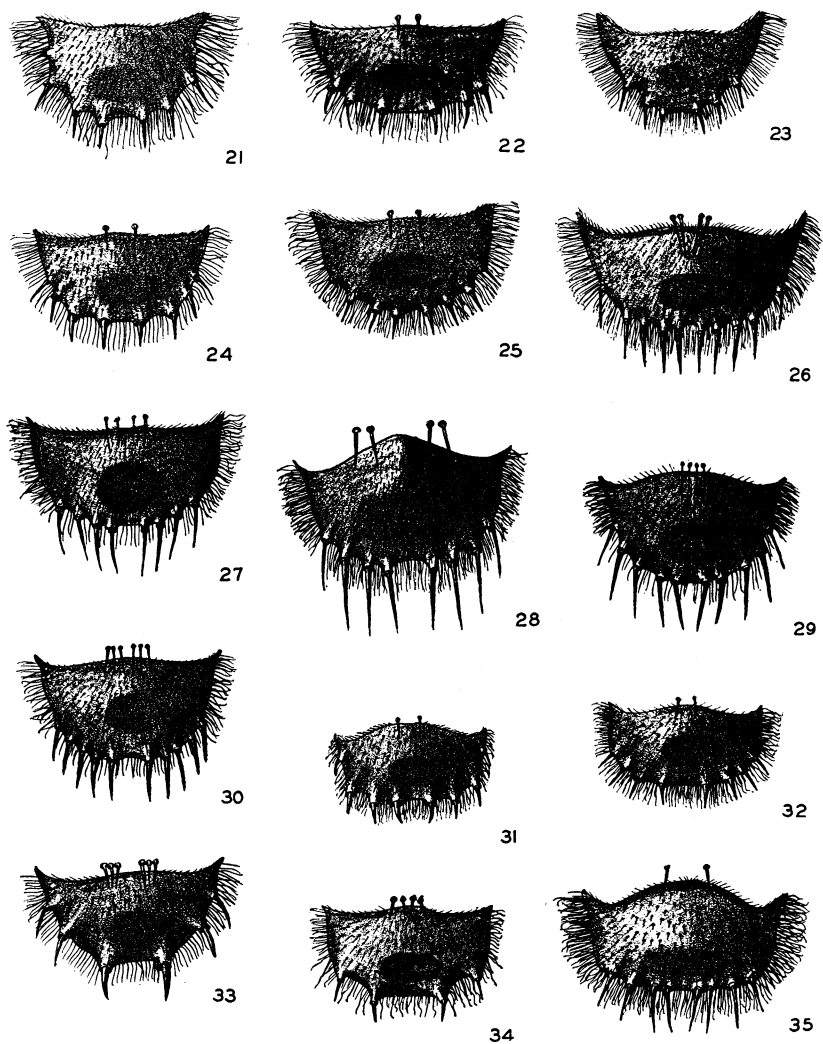
Volucella splendens can be recognized by a remarkable elongate flattened area on each side of the face similar to that in *meretricias* Williston.



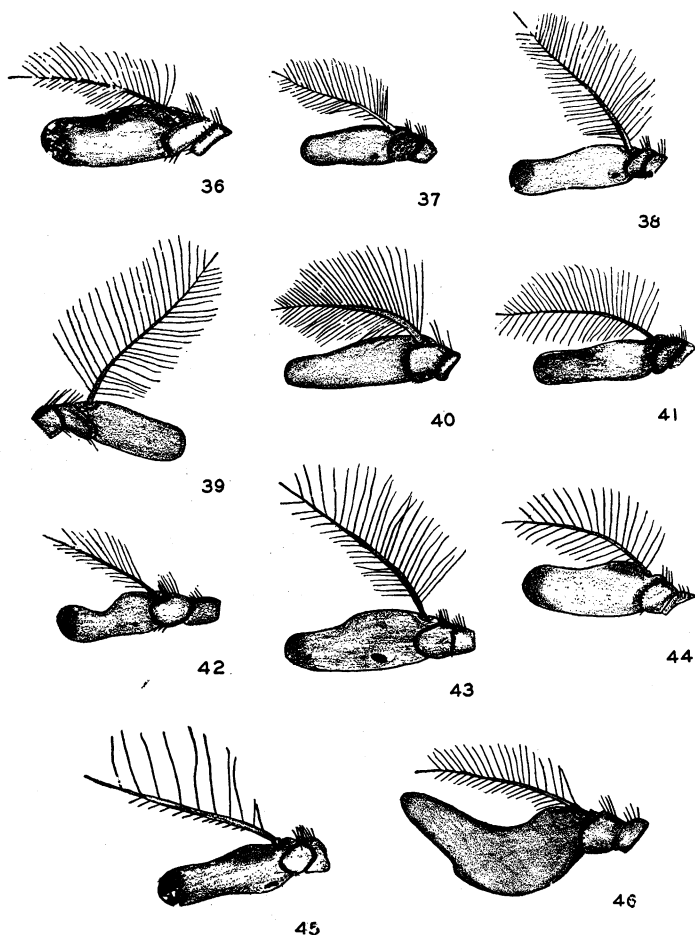
FIGS. 1-12. Heads of *Volucella* species. 1. *recta* (Van der Wulp). 2. *willinki*, new species. 3. *diversa*, new species. 4. *ventana*, new species. 5. *currani*, new species. 6. *aurea*, new species. 7. *ecuadorena*, new species. 8. *willinki*, new species. 9. *diversa*, new species. 10. *abrupta* Curran. 11. *spinigera* Wiedemann. 12. *villarica*, new species.



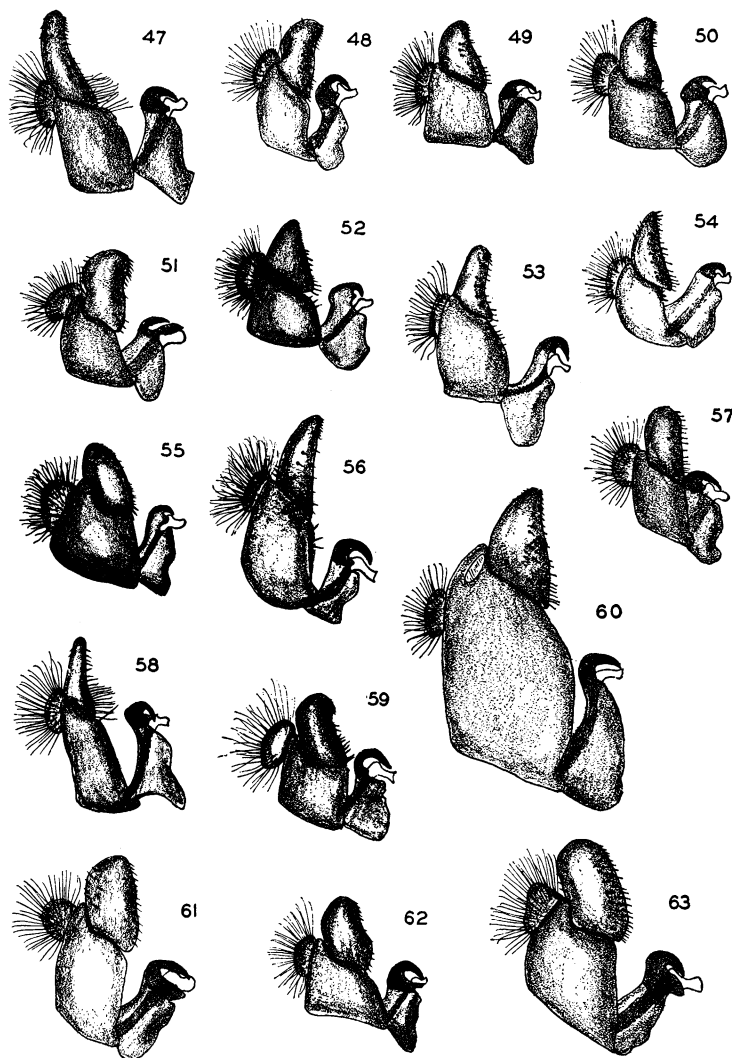
FIGS. 13-20. Heads and wings of *Volucella* species. 13 *bulbosa*, new species. 14. *parina*, new species. 15. *escomeli* Curran. 16. *hambletoni*, new species. 17. *vulta*, new species. 18. *scutellata* Macquart. 19. *abrupta* Curran. 20. *spinigera* Wiedemann.



FIGS. 21-35. Scutella of *Volucella* species. 21. *scutellata* Macquart. 22. *vulta*, new species. 23. *ventana*, new species. 24. *willinki*, new species. 25. *diversa*, new species. 26. *currani*, new species. 27. *aurea*, new species. 28. *ecuadorena*, new species. 29. *escomeli* Curran. 30. *hambletoni*, new species. 31. *spinigera* Wiedemann. 32. *frauenfeldi* (Schiner). 33. *spinithorax* Arribaza. 34. *abrupta* Curran. 35. *bulbosa*, new species.



FIGS. 36-46. Antennae of *Volucella* species. 36. *scutellata* Macquart. 37. *ventana*, new species. 38. *diversa*, new species. 39. *vulta*, new species. 40. *escomeli* Curran. 41. *hambletoni*, new species. 42. *spinigera* Wiedemann. 43. *currani*, new species. 44. *abrupta* Curran. 45. *bulbosa*, new species. 46. *cockerelli* Curran.



FIGS. 47-63. Male genitalia of *Volucella* species. 47. *scutellata* Macquart. 48. *currani*, new species. 49. *recta* (Van der Wulp). 50. *ventana*, new species. 51. *ecuadorena*, new species. 52. *diversa*, new species. 53. *vulta*, new species. 54. *willinki*, new species. 55. *escomeli* Curran. 56. *frauenfeldi* (Schiner). 57. *hambletoni*, new species. 58. *spinigera* Wiedemann. 59. *spinithorax* Arribalzaga. 60. *cockerelli* Curran. 61. *parina*, new species. 62. *villarica*, new species. 63. *bulbosa*, new species.

