

Figs. 143–147. *Copestylum* spp., heads, male, lateral. 143, *C. infractum*. 144, *C. hispaniola*. 145, *C. vacuum*. 146, *C. rectifacies*. 147, *C. abdominale*.

been described (39 Nearctic, 318 Neotropical). Some 17 species, representing 7 species groups, are known from the West Indies: *abdominale* Wiedemann group (4 species, Bahamas, Cuba, Jamaica, Hispaniola); *chalybescens* Wiedemann group (1 species, Cuba, Jamaica, Puerto Rico, Lesser Antilles);

brunneum Thunberg group (1 species, Puerto Rico); *pubescens* Loew group (3 species, Cuba, Hispaniola, Jamaica); *lugens* Wiedemann group (1 species, Lesser Antilles); *sexmaculatum* Palisot de Beauvois group (3 species, all islands); *persimile* Williston group (2 species, Cuba, Lesser Antilles); and *vacuum* Fabricius group (2 species, all islands). Most of these groups contain additional species which are found in both the Nearctic and Neotropical regions. The *abdominale* group is apparently now restricted to the West Indies, and the *lugens* and *persimile* groups have no Nearctic representatives.

Key to West Indian Species of *Copestylum* Macquart

1. Scutellum with a preapical depression 2
 - Scutellum without a preapical depression 6
2. Bristles yellow; squama completely yellow 3
 - Bristles black; squama usually brownish, always with brown fringe 4
3. Wing bare except for partially microtrichose alula (all islands?) *sexmaculatum* (Palisot de Beauvois)
 - Wing extensively microtrichose on apical $\frac{1}{2}$ (Jamaica) *pseudopallens*, new species
4. Scutellum with basolateral flattened rugose areas (*chalybescens* group) (all islands?) *apicale* (Loew)
 - Scutellum without such areas 5
5. Scutellum all iridescent purple, yellow pilose on disc; hypopleuron brown; mesonotum with disc mainly yellow pilose; abdomen beyond middle of 2nd tergum shiny purplish black (not Antillean) *neotropicum* Thompson
 - Scutellum orange, with a large round black spot covering apical $\frac{2}{3}$ or less, all black pilose; pleuron all yellowish orange; mesonotum with disc all black pilose; abdomen with yellow fascia on 3rd and 4th terga (Lesser Antilles) *discale* (Curran)
6. With prescutellar bristles 7
 - Without prescutellar bristles 9
7. Face strongly produced forward, scarcely produced downward, acutely conical (Fig. 144) (*pubescens* group) 16
 - Face produced downward (Fig. 146) (*persimile* group) 8
8. Face and cheek entirely black; 3rd and 4th abdominal terga with basolateral yellowish spots; 2nd tergum with basal $\frac{1}{2}$ yellow pilose; thoracic pleuron yellow pilose except for a few black hairs on upper edge of pteropleuron *rectifacies*, new species
 - Face and cheek black but separated by a broad yellow vitta; 3rd and 4th terga all shiny black; 2nd tergum all black pilose; thoracic pleuron black pilose on sternopleuron, pteropleuron and posterior portion of mesopleuron (Cuba) *bruneri* (Curran)

9. Marginal cell closed and bulbous; wing patterned with brown bands on apical $\frac{1}{3}$ (Fig. 166); with yellow prescutellar spots; small flies, under 10 mm; abdomen with yellow markings (*vacuum* group) 10
- Marginal cell open or closed, never bulbous; wing hyaline on apical $\frac{1}{3}$; mesonotum usually without distinct yellow prescutellar spots; if marginal cell closed, then larger flies (14–20 mm) with abdomen unicolorous 11
10. Femora and basal $\frac{3}{4}$ of tibiae reddish orange (all islands except Cuba and Bahamas) *vacuum* (Fabricius)
- Femora and tibiae dark brown to black (Cuba) *pusillum* (Macquart)
11. Abdomen unicolorous, dark metallic brownish to violet purple; face greatly produced downward, forming an acute cone with small tubercle and shallow concavity under antennae (Fig. 147); large flies, 14–20 mm 12
- Abdomen with base yellow and with yellow bands on apical segments; face produced slightly forward, with a large tubercle and deep concavity under antennae (Fig. 143); smaller flies, 8 mm or less *infractum*, new species
12. Face bright yellow; wing yellowish to hyaline on basal $\frac{1}{3}$ or more, completely bare except microtrichose alula (*abdominale* group) . . . 13
- Face brown to black; wing brownish to black on basal $\frac{1}{3}$ or more, partially microtrichose on basal $\frac{1}{2}$ or more (Puerto Rico) *brunneum* (Thunberg)
13. Scutellum light yellow, wholly yellow pilose; alula microtrichose (Cuba) *abdominale* (Wiedemann)
- Scutellum darker, at most brownish yellow or dull red and at least partially black pilose; alula bare 14
14. Thoracic pleura wholly black pilose 15
- Mesopleuron with yellow pile on anterior and dorsal portions (Hispaniola) *purpurascens* (Loew)
15. Scutellum concolorous with mesonotum; wing with only isolated brown spots (Bahamas) *eugenia* (Williston)
- Scutellum much yellower than mesonotum; wing with medial spots connected, forming an indistinct brown quadrate spot (Jamaica) *exeugenia* (Curran)
16. Second and 3rd sterna rusty red; 1st 3 sterna yellow pilose; 3rd tergum yellow pilose on basal $\frac{1}{2}$ and all rusty red (Jamaica) *intona* (Curran)
- All sterna dark brownish black, yellow pilose on 1st and narrowly on base of 2nd; 3rd tergum black, all black pilose 17
17. Mesopleuron and pteropleuron yellow pilose, rarely with a few black hairs. Male genitalia: Surstyle angulate in dorsal view, with blunt apex; postanal process small, with only 1 ventral tooth (Fig. 161a, c) (Cuba) *pubescens* (Loew)

- Mesopleuron and pteropleuron extensively black pilose, with yellow hairs intermixed. Male genitalia: Surstyle evenly curved in dorsal view, with pointed apex; postanal process large, with 2 ventral teeth (Figs. 163a, c) (*Hispaniola*) *hispaniolae*, new species

MODIFICATION TO CURRAN'S (1939a: 1-7) KEY TO NEW WORLD
SPECIES OF *COPESTYLUM* MACQUART (= *VOLUCELLA*, AUCTORES)

- 1-42. No change.
- 43. Abdomen with entirely black apical fasciae and median vitta *claripenne* (Curran)
- Abdomen without entirely black fasciae 43a
- 43a. Wing bare except for microtrichose alula 43b
- Wing extensively microtrichose on apical ½
..... *pseudopallens*, new species
- 43b. Tarsi with basal 2 tarsomeres yellow to orange, apical 3 tarsomeres dark; male frontal triangle small (Fig. 149)
..... *sexmaculatum* (Palisot de Beauvois)
- Tarsi with only basitarsis yellow, apical 4 tarsomeres dark; male frontal triangle large (Fig. 148) *pallens* (Wiedemann)
- 44-47. No change.
- 48. With prescutellar row of bristles or at least a short spinous pair 49
- Without clearly differentiated pair of prescutellar bristles .. 106
- 49-54. No change.
- 54. Second and 3rd sterna yellow or rusty red; 1st 3 sterna yellow pilose; 3rd tergum yellow pilose on basal ½, all yellow or rusty red 55a
- All sterna dark brownish black, yellow pilose only on 1st and base of 2nd sterna; 3rd tergum black, all black pilose 55
- 55. Mesopleuron and pteropleuron yellow pilose, rarely with a few black hairs. Male genitalia: Surstyle angulate in dorsal view, with blunt apex; postanal process small, with only 1 ventral tooth (Figs. 161a, c) *pubescens* (Loew)
- Mesopleuron and pteropleuron yellow and black pilose. Male genitalia: Surstyle evenly curved in dorsal view, with pointed apex; postanal process large, with 2 ventral teeth (Figs. 163a, c) *hispaniolae*, new species
- 55a. Abdomen mainly rusty red; front of female narrow, less than 3× as wide as ocellar triangle; ocellar triangle slightly longer than wide *intona* (Curran)
- Abdomen mainly yellow; front of female broad, at least 4× as wide as ocellar triangle; ocellar triangle slightly wider than long *haagii* (Jaenicke)

- 56-61. No change.
61. Thoracic pleura almost all pale pilose 61a
 - Thoracic pleura at most pale pilose only in front 63
61. Face all black; 3rd and 4th terga all black pilose
 *rectifacies*, new species
 - Face yellow with black medial vitta; 3rd and 4th terga with
 basal band of yellow pile *macquarti* (Curran)
- 62-104. No change.
105. Delete.
- 106-119. No change.
120. Mesopleuron with a whitish-yellow spot 121
 - Mesopleuron wholly black 128
- 121-122. No change.
123. Legs reddish, tarsi paler basally 129
 - Legs black, basal 2 tarsal segments yellow 124
124. No change.
125. Scutellum with apical ½ all black pilose 125a
 - Scutellum with apex pale pilose except above 126
- 125a. Squama dirty brown to black; mesonotum above wing black,
 black pilose; postalar callus black pilose; male frontal triangle
 with black medial vitta *pusillum* (Macquart)
 - Squama bright yellow; mesonotum above wing yellow, yellow
 pilose; postalar callus yellow pilose; male frontal triangle
 wholly yellow *florida* (Hull)
- 126-156. No change.
157. Cheek dark, black or brown, on posterior ½ or more 163
 - Cheek light colored, either reddish, greenish or yellowish .. 158
158. Scutellum with apical marginal groove 159
 - Scutellum without such a groove 160
159. Hindfemur all black pilose; femora black; front of female
 black *gertschi* (Curran)
 - Hindfemur with basal ½ or more yellow pilose; femora red-
 dish yellow; front of female reddish yellow or greenish
 *vagoidea* (Curran)
160. Face with distinct black medial and lateral vittae 161
 - Face usually without vittae, never with lateral vittae between
 face and cheek, rarely with a very diffuse dark brownish iri-
 descent medial vitta *correctum* (Curran)
161. Scutellum with disc iridescent bluish black 162
 - Scutellum with disc greenish or yellowish, with a slightly
 brownish cast apically, all black pilose *selectum* (Curran)
162. Metasternum yellow pilose 162a
 - Metasternum with some lateral black bristlelike hairs
 *albifrons* (Curran)

- 162a. Apical sterna black pilose; frontal triangle black in middle
 *infractum*, new species
 - Sterna all pale pilose; frontal triangle all yellow
 *latevittatum* (Curran)
 163. No change.
 164-165. Delete, these couplets refer to the forms of *Volucella bom-*
bylans, the only New World species of *Volucella*.

Copestylum abdominale (Wiedemann)

Fig. 147

Volucella abdominalis Wiedemann, 1830: 196. Type-loc.: Cuba. Syntypes
 ♂ ZMB and VMNH. Subsequent references: Macquart, 1842: 85 (Cuba,
 descript. notes on ♀); Bigot, 1857: 336 (Cuba, descript.); Hine, 1914: 338
 (Cuba); Curran, 1926a: 64 (redescript.).

Temnocera abdominalis: Ragues, 1908: 312 (Cuba).

Copestylum abdominale: Thompson et al., 1976: 70.

Distribution.—Bahamas (Rum Cay*), Cuba*, Grand Cayman*.

Copestylum apicale (Loew)

Volucella apicalis Loew, 1866a: 151. Type-loc.: Cuba. Type ♂ MCZ (lost).

Subsequent reference: Williston, 1887: 149 (translation of orig. descript.).

Copestylum apicale: Thompson et al., 1976: 71.

Volucella tricincta of Wolcott, 1936: 351, 1941: 115, 1948: 487 (Puerto Rico);
 Telford, 1973: 238 (Puerto Rico).

Distribution.—USA (Maryland); Cuba*, Puerto Rico*, Lesser Antilles
 (Dominica*).

Copestylum apicale belongs to a complex of four or more closely related
 species. This complex is characterized by the presence of a preapical scu-
 tellar depression and basolateral depressed and rugose areas on the scutel-
 lum. Some of the available names for the species of this complex are: *chal-*
ybescens Wiedemann, 1830; *fuscipenne* Macquart, 1842; *apicale* Loew,
 1866, *tricinctum*, *purpuriferum*, and *varians* Bigot, 1875, *nigrifrons* Hine,
 1914; *incommoda* Knab, 1916; *deceptor* Curran, 1925; *salti* Curran, 1930;
zephyra Curran, 1939; *virtuosa* Hull, 1942; *sepia* Hull, 1943; and *draceana*
 and *hoya* Curran, 1947. All the West Indian material I have examined ap-
 pears to belong to one species, which is closely related to *chalybescens*
 Wiedemann. Of the names available for species of this complex, *apicale*
 (Loew) is the third oldest one and would take precedence if one considers
 the West Indian populations to be distinct from those of Brazil (i.e. *chal-*
ybescens and *fuscipenne*), as I do. The use of the name *tricinctum* Bigot for
 the West Indian form (Wolcott, 1936, 1941, 1948; Telford, 1973) does not
 make any sense because it would be in such a case the junior synonym of

apicale Loew. Also since *tricinctum* Bigot is a primary homonym, the name cannot be used for any species.

Copestylum bruneri (Curran)

Volucella bruneri Curran, 1939b: 6, Type-loc.: Cuba, Sierra del Cobre, Loma del Gato. Holotype ♂ AMNH*.

Copestylum bruneri: Thompson et al., 1976: 72.

Distribution.—Cuba*.

Copestylum brunneum (Thunberg)

Syrphus inanis Fabricius, 1775: 763, Type-loc.: "Americae Insulis" (Fabricius, 1794: 281). Lectotype ? MC, see Appendix B. [Secondary homonym when placed with *Musca inanis* Linnaeus in *Musca* (by Thunberg, 1789 and Gmelin, 1790); in *Volucella* (by Latreille, 1804, and all subsequent authors until the present); or when *inanis* Linnaeus was placed in *Syrphus* (by Fabricius, 1794, 1805)]. Subsequent reference: Zimsen, 1964: 477 (type).

Musca brunnea Thunberg, 1789: 89 (new name for *Syrphus inanis* Fabricius).

Musca exinanita Gmelin, 1790: 2876 (new name for *Syrphus inanis* Fabricius).

Syrphus esuriens Fabricius, 1794: 281 (new name for *Syrphus inanis* Fabricius).

Volucella esuriens: Wiedemann, 1830: 197 (redescript.); Roeder, 1885: 341 (Puerto Rico); Gundlach, 1887: 184 (Puerto Rico); Wolcott, 1923: 219, 1936: 350, 1948: 467 (Puerto Rico); Curran, 1953: 8 (Puerto Rico, descript. ♀, synonymy, suggests orig. type-loc. as St. Thomas); Telford, 1973: 237 (status of sp. in Puerto Rico); Thompson, 1974: 5 (synonymy). NEW SYNONYMY.

Copestylum esuriens: Thompson et al., 1976: 75.

Volucella adjuncta Walker, 1849: 636. Type-loc.: [*patria ignota*]. Syntypes ♂ ♀ BM(NH). NEW SYNONYMY.

Volucella rica Curran, 1939a: 6. Type-loc.: Puerto Rico, Ensenada (restricted by Thompson, 1974: 5). Lectotype ♀ AMNH (by Thompson, 1974: 5). Synonymy by Curran, 1953: 8.

Volucella sp. nov. of Wolcott, 1936: 351.

Distribution.—Puerto Rico*, Virgin Islands*.

Although Fabricius did not indicate that he was renaming a species when he introduced *esuriens*, it is obvious that that is what he did. In 1794 when Fabricius transferred *inanis* Linnaeus from *Musca* to *Syrphus*, he apparently changed his *inanis* to *esuriens*. The original descriptions of both *inanis* and *esuriens* are identical, except that in 1794 Fabricius gives a more re-

stricted type-locality, i.e. "Americae Insulis Dom. v. Rohr" instead of "Americae v. Rohr." This was not unusual since Fabricius also restricted the type-localities of a number of other species described in 1775 (see introduction).

The correct name for this species is *brunneum* Thunberg. The problem of the Gmelin names was discussed in the introduction. The present case is similar to the basic one discussed there, except *brunneum*, *exinanita*, and *esuriens* are all replacement names. Although *esuriens* has had a history of frequent and continuous usage, the name has been confused taxonomically. It has been applied to various members of a complex of closely related species. For this reason, I consider it best to use Thunberg's name and to suppress *esuriens* Fabricius.

Copestylum discale (Curran)

Figs. 152, 154, 155, 159

Volucella discalis Curran, 1926a: 57. Type-loc.: Grenada. Holotype ♂ USNM. Subsequent reference: Doesburg, 1970: 99 (synonymy).

Copestylum discale: Thompson et al., 1976: 75.

Volucella sp. n. of Williston, 1896: 347 (St. Vincent).

Distribution.—Lesser Antilles (Dominica*, St. Vincent*, Grenada*).

Copestylum eugenia (Williston)

Volucella eugenia Williston, 1887: 139, pl. 6, fig. 10 (head). Type-loc.: Bahamas, Florida. Lectotype ♀ USNM*, see Appendix B. Subsequent references: Johnson, 1908: 74 (Bahamas); Curran, 1953: 5 (distr. notes, suggests that Williston's Florida syntype was mislabeled, synonymizes *ingenia* Curran); Telford, 1973: 237 (questions status of sp. in Puerto Rico).

Copestylum eugenia: Thompson, 1972: 109.

Volucella ingenia Curran, 1930e: 4. Type-loc.: Bahamas, Andros Is., Mangrove Cay, Gibson Cay. Holotype ♀ AMNH. Synonymy by Curran, 1953: 5.

Distribution.—USA (Florida, now extinct or mislabeled?); Bahamas*.

Copestylum exeugenia (Curran)

Volucella exeugenia Curran, 1953: 4. Type-loc.: Jamaica, St. Andrew, Constant Spring. Holotype ♂ AMNH.

Copestylum exeugenia: Thompson et al., 1976: 75.

Volucella purpurascens of Johnson, 1894: 276 (Jamaica); Gowdey, 1926: 80 (Jamaica).

Volucella abdominalis of Townsend, 1895: 39 (Jamaica, descript. notes, synonymy); Johnson, 1919: 434 (Jamaica, quotes Townsend); Gowdey, 1926: 80 (Jamaica).

Volucella eugenia of Johnson, 1919: 435 (Jamaica, gives *purpurascens* of Johnson, 1894 as synonym); Gowdey, 1926: 80 (Jamaica).

Volucella spiniger of Cockerell, 1893: 259 (Jamaica).

Distribution.—Jamaica*.

Copestylum hispaniolae Thompson, NEW SPECIES

Figs. 144, 163

Male.—*Head*: Face, cheek and frontal triangle brownish black, completely gray pollinose, black pilose; frontal lunule brown medially, yellow laterally; vertical triangle as long as wide, yellow except black ocellar triangle, black pilose; occiput black, light gray pollinose, white pilose with few black hairs near vertex. Eye white pilose. *Antenna*: 1st 2 segments brownish orange, black pilose; 3rd segment brownish black; arista black, with black rays.

Thorax: Mainly black, yellow and black pilose; humerus, notopleuron, postalar callus, very narrowly along sides of mesonotum and quadrate spot in front of scutellum yellow; scutellum translucent yellow, mainly black pilose, with yellow hairs along base and apical margin; squama, plumula and halter orange; bristles, all strong except for weaker outer most prescutellars, black, 1+1 mesopleural, 5+5 notopleural, 3+3 supraalars, 5+6 postalars, 3+3 prescutellars, and 3+3 scutellars. *Legs*: mainly dark brownish black, black pilose, with femoral-tibial joint yellowish, with front and middle tibiae yellowish on basal $\frac{1}{3}$, with basal 3 tarsomeres of front and middle legs brownish yellow, with hindtarsus reddish. *Wings*: epaulet and base of costa black pilose; hyaline except brownish basal crossvein and furcations, stigma and tip of marginal cell; microtrichia as figured.

Abdomen: Mainly shiny black and black pilose, with sides of 1st tergum and basolateral corners of 2nd tergum yellow, with yellow pile on 1st segment and basal $\frac{1}{2}$ of 2nd tergum and narrowly along basal margin of 2nd sternum.

Holotype.—♂, DOMINICAN REPUBLIC, San Cristobal, Marcano F., deposited in USNM. Paratype ♂, HAITI, Kenskoff (near Port-au-Prince), 4–5000 ft., 5 August 1934, M. Bates (MCZ).

Discussion.—*Copestylum hispaniolae* belongs to the *pubescens* super-species, a complex of four vicariant species: *haagii* (Jaenicke) (southwestern USA and Mexico); *pubescens* (Loew) (Cuba); *intona* (Curran) (Jamaica); and *hispaniolae* (Hispaniola). This superspecies is characterized as follows: 1) Face produced forward into an acute cone; 2) 3rd antennal segment kidney-shaped; 3) chaetotaxy of 1+1 mesopleurals, 3+3 supraalars, 4+4 prescutellars, 4–6+4–6 notopleurals, postalars, and scutellars; 4) scutellum without a preapical depression; 5) barrette pilose; 5) wing with marginal cell closed and petiolate, but not bulbous apically; 6) male hindtrochanter with a small spinose tubercle; 7) 1st sternum with a basomedial projection; and

8) male genitalia of unique structure, with an enlarged postanal process and a very complex surstylar apodeme. The differences between the species of the *pubescens* superspecies are given in the modification of Curran's key (v. couplets 54–55a).

Copestylum infractum Thompson, NEW SPECIES

Figs. 143, 160

Male, female.—*Head*: Face deeply concave under antennae, straight above epistoma, with very high but small tubercle, yellow except for black medial vitta, yellow pilose except black pilose on tubercle, shiny except sparsely white pollinose under antennae; cheek yellow except for black anterior vitta on border with face; frontal lunule brown; frontal triangle yellow and yellow pilose laterally, black and black pilose medially; vertical triangle dull black, black pilose; occiput yellow on lower $\frac{1}{3}$, black on upper $\frac{2}{3}$, yellow pilose on lower $\frac{1}{2}$, black pilose on upper $\frac{1}{2}$; front black, black pilose. Antenna light brownish orange, black pilose; 3rd segment $1\frac{1}{2}\times$ as long as broad, broad, blunt apically; arista orange on basal $\frac{2}{3}$, black on apical $\frac{1}{3}$, with black rays. Eye yellow pilose.

Thorax: Prothorax yellow, yellow pilose; mesonotum bluish black on disc, with green opalescence and violaceous reflection, with side broadly yellow except light brownish on lateral edge of notopleuron, yellow pilose with some black pile intermixed, black pilose on postalar callus and in front of scutellum; pleuron brownish black ventrally, yellow on posterior mesopleuron, pteropleuron, barrette and metapleuron, all yellow pilose; scutellum bluish black with greenish opalescence and purplish reflections except yellow base and edges, black pilose; bristles as follows, 1 on mesopleuron, 2 on notopleuron, 2 above wing, 2 on postalar callus, 5 to 6 on scutellar margin, no prescutellar present; barrette bare; metasternum yellow, yellow pilose; halter yellow; plumula pale yellowish white; squama dirty white with margin and fringe brownish black. *Legs*: front and middle coxae brownish black, black pilose, sparsely gray pollinose; front and middle trochanters brownish black, hindcoxa and trochanter yellow and yellow pilose except for few black apical hairs; all femora brownish black except for yellow subapical bands, black pilose; front and middle tibiae yellow on basal $\frac{1}{3}$, black on apical $\frac{2}{3}$, black pilose; hindtibia yellow on basal $\frac{1}{4}$, black on apical $\frac{3}{4}$, black pilose; all tarsi black, black pilose. *Wing*: light brownish in color, mainly microtrichose except bare as follows, 1st costal cell, basal $\frac{1}{8}$ of 2nd costal cell, basal $\frac{2}{3}$ of 1st basal cell except very sparsely microtrichose behind spurious vein, 2nd basal cell except microtrichose narrowly at apex and along posterior margin on apical $\frac{1}{2}$, anal cell except narrowly along posterior margin on apical $\frac{1}{2}$, and behind anal cell except microtrichose on posterior margin of wing and two narrow triangular areas projecting in from wing margin; marginal cell open; alula microtrichose.

Abdomen: First segment yellow, yellow pilose; 2nd tergum yellow on basal $\frac{2}{3}$, black on apical $\frac{1}{3}$ and with 2 sublateral black vitta extending to basal $\frac{1}{3}$, yellow pilose on yellow areas, black on black areas; 3rd and 4th terga black except for yellow semicircular band, with this band extending from basolateral corners across middle of segment, with band on 4th tergum narrowly interrupted medially, black pilose; 2nd sternum yellow, yellow pilose; 3rd sternum, yellow in male, black in female, black pilose; 4th sternum black, black pilose.

Holotype.—♂, DOMINICA, Freshwater Lake, 2500 ft., 6 March 1965, (H. E. Evans). Paratype ♀, DOMINICA, Pont Cassé, 27–30 November 1964 (P. J. Spangler). Both deposited in USNM.

Discussion.—*Copestylum infractum* belongs to the *lugens* Wiedemann group and will trace, with some difficulty, to *gertschi* Curran to Curran's key (1939a). For this reason I have rewritten couplets 157–162 to include *lugens* as well as to improve the placement of some of the other species of the *lugens* group.

Copestylum intona (Curran)

Volucella intona Curran, 1928a: 37. Type-loc.: Jamaica, Gordon Town.

Holotype ♀, BM(NH). Subsequent reference: Gowdey, 1928: 9 (Jamaica).

Copestylum intona: Thompson et al., 1976: 77.

Volucella haagii of Townsend, 1895: 43 (Jamaica, descript. notes); Johnson, 1919: 435 (Jamaica); Gowdey, 1926: 80 (Jamaica).

Distribution.—Jamaica.

Apparently this species is known only from the holotype.

Copestylum pseudopallens Thompson, NEW SPECIES
Figs. 153, 156

Male.—*Head:* Face, cheek and frontal triangle yellowish orange, yellow pilose except for few black hairs on frontal triangle, narrowly white pollinose under antennae, elsewhere shiny; frontal lunule yellowish orange; vertical triangle more brownish orange, black pilose; occiput black except yellow on lower $\frac{1}{5}$, light gray pollinose, yellow pilose below becoming white on upper $\frac{2}{3}$ and with few black hairs near vertex. Eye yellow pilose. Antenna orange, orange pilose; arista orange with rays more brownish, ventral rays about as long as dorsal ones.

Thorax: Mostly orange, yellowish-orange pilose; mesonotum with medial $\frac{2}{3}$ more reddish brown except for broad yellow band in front of scutellum, with broad black submedial vittae behind transverse suture, with a medial and pair of submedial brown spots on anterior margin, with scattered black hairs intermixed with yellow ones; postalar callus all black pilose; sternopleuron black on lower $\frac{3}{4}$; hypopleuron obliquely black above hindcoxa;

barrette bare; halter and plumula yellow; squama yellow with golden margin and fringe; scutellum translucent orange, black pilose except for few yellow basolateral hairs, with preapical depression. Bristles orange, 1+1 mesopleural, 3+3 notopleurals, 2+2 supraalars, 3+3 postalars, 4+4 scutellars, no prescutellars. *Legs*: Orange except black apical $\frac{1}{4}$ of front and hindtibiae and brownish apical 4 tarsomeres, mainly yellow pilose, with scattered black hairs on coxae, femora and tibiae; black hairs on posterior surface of femora and dorsoapically on tibiae, more numerous in holotype than paratype, almost whole hindtibia black pilose in holotype. *Wing*: Hyaline, bare basally and microtrichose apically; bare on basal $\frac{3}{4}$ of 2nd costal, all of basal and anal cells, basal $\frac{3}{4}$ of discal cell, basoposterior $\frac{1}{3}$ of apical cell, all cubital cell, almost all of anal lobe except narrowly along posterior margin and basal $\frac{1}{2}$ of alula; microtrichose elsewhere; epaulets and swollen base of costa yellow and black pilose; base of costa with yellow bristles, rest of costa with black hairs.

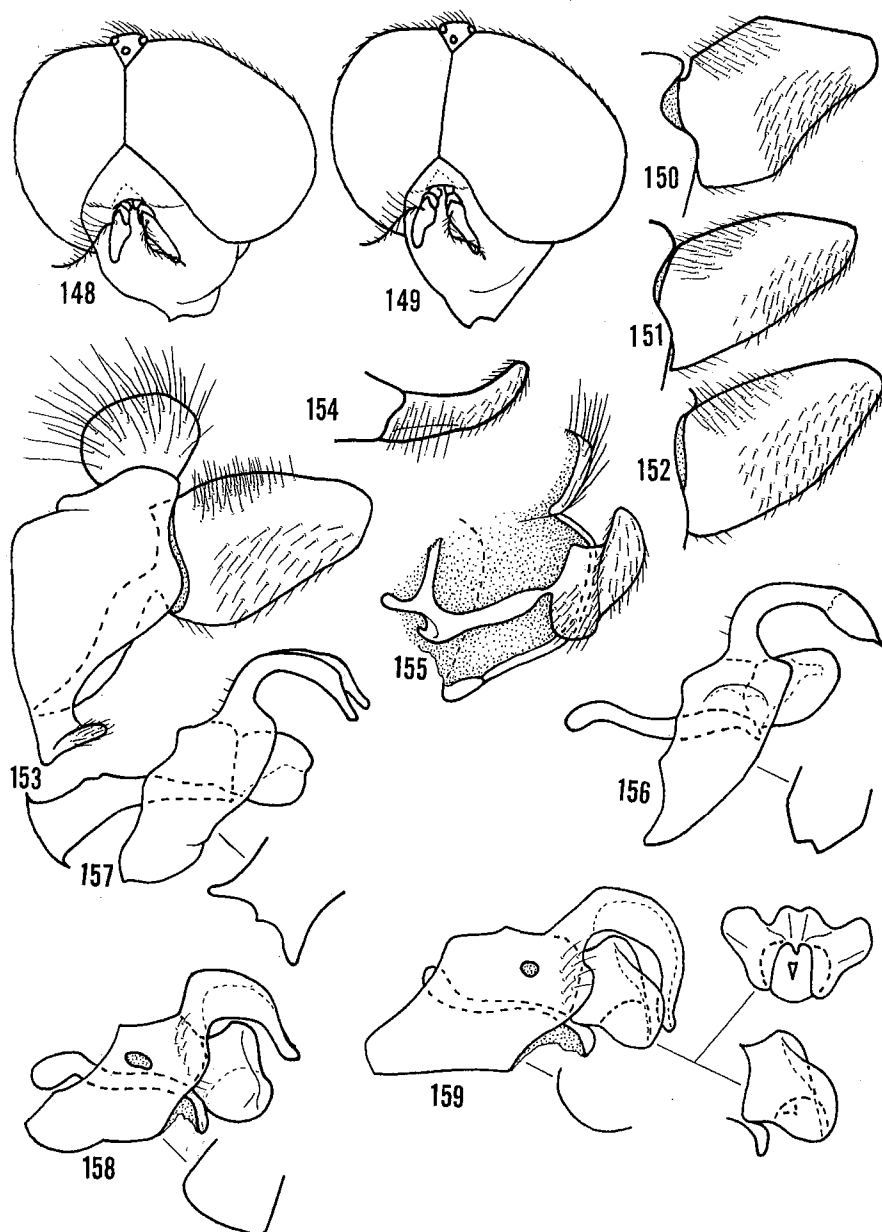
Abdomen: Mostly orange and orange pilose, black pilose on apical $\frac{1}{2}$ of 2nd and 3rd terga and intermixed on apex of 4th sternum; black spots as follows, a round basomedial one and 2 apical sublateral transverse ones on 2nd tergum, 2 transverse lateral ones on apical margin of 3rd tergum, 2 apical triangular ones on 4th tergum; 4th sternum black. Male genitalia: Cercus simple, ovoid; 9th tergum with small basolateral projection, otherwise simple; postanal processes absent; surstyle elongate ovoid, broader and more blunt apically than in other species of *pallens* complex; 9th sternum with apicolateral ridge; ligula very small, triangular; superior lobes parallel, not divergent apically, swollen apically and with narrow acute point; aedeagus with lateral lobes parallel, not divergent; aedeagal apodeme narrow, rodlike, not flared nor enlarged anteriorly.

Holotype.—♂, JAMAICA, Perkins; deposited in Carnegie Museum, Pittsburg. Paratype ♂ with same data as for type, in USNM.

Discussion.—*Copestylum pseudopallens* belongs to a complex of five or more closely related species. The complex is characterized by: 1) Presence of a preapical scutellar depression; 2) similar facial shape and male genitalia; and 3) similar overall pale yellow to orange coloration with black markings. The species of this complex are contrasted in the following key.

KEY TO SPECIES OF *COPESTYLUM SEXMACULATUM* COMPLEX

1. Face yellow; thoracic bristles yellow to orange; scutellum yellow; squama yellow to golden 2
- Face yellow with medial black vitta; thoracic bristles black; scutellum yellow with a large apical black spot; squama dark brownish black; frontal triangle small; mesonotum yellow to orange; pectus yellow to orange; wing microtrichose on apical $\frac{1}{2}$, immaculate (Lesser Antilles) *discale* (Curran)
2. Wing immaculate; pectus brownish black to black 3



Figs. 148-149. *Copestylum* spp., head, male, frontal oblique. 148, *C. pallens*. 149, *C. sexmaculatum*. Figs. 150-152. *Copestylum* spp., male surstyles, lateral. 150, *C. pallens*. 151, *C. tympanitis*. 152, *C. discale*. Fig. 153. *C. pseudopallens*, male 9th tergum and associated structures, lateral. Fig. 154. *C. discale*, surstyle, dorsal. Fig. 155. *C. discale*, 9th tergum and associated structures, ventral oblique. Figs. 156-159. *Copestylum* spp., male 9th sternum and aedeagi, lateral, with outlines of ligula. 156, *C. pseudopallens*. 157, *C. pallens*. 158, *C. tympanitis*. 159, *C. discale* (with posterior and lateral views of aedeagus).

- Wing with apical brown spot; pectus yellow to orange; mesonotum yellow to orange; frontal triangle small; wing microtrichose on apical ½ (Mesoamerica) *tympanitis* (Fabricius) (1805: 226)
- 3. Wing bare; mesonotum black medially in mature male 4
- Wing microtrichose on apical ½; mesonotum mainly yellow to orange medially with only 1 pair of dark supraalar vittae; frontal triangle small (Jamaica) *pseudopallens*, new species
- 4. Frontal triangle small (Fig. 149) (West Indies, Nearctic)
. *sexmaculatum* (Palisot de Beauvois)
- Frontal triangle inflated, large (Fig. 148) (South America)
. *pallens* (Wiedemann) (1830: 204)

Copestylum pubescens (Loew)

Fig. 161

Temnocera pubescens Loew, 1861: 38. Type-loc.: Cuba. Type ♀ ZMB? (not in MCZ). Subsequent reference: Ragues, 1908: 312 (Cuba).

Volucella pubescens: Williston, 1887: 148 (translation of orig. descript.).

Copestylum pubescens: Thompson et al., 1976: 82.

Volucella eugenia of Hine, 1914: 338 (Cuba, descript. notes).

Distribution.—Cuba*.

Copestylum purpurascens (Loew)

Temnocera purpurascens Loew, 1869: 31. Type-loc.: Hayti, Iérémie (restricted here by lectotype designation). Lectotype ♂ MCZ*.

Volucella purpurascens: Williston, 1887: 148 (translation of orig. descript.).

Copestylum purpurascens: Thompson et al., 1976: 82.

Volucella watsoni Curran, 1930e: 3. Type-loc.: Haiti, Port-au-Prince. Holotype ♂ AMNH. Synonymy by Thompson et al., 1976: 82.

Distribution.—Hispaniola*.

Williston gave a description of the female of this species, and he stated that it was a "Translation from the original, compared with the two type specimens . . ." Loew's description was based on a male. Among the *purpurascens* material collected by Uhler from Haiti and now at the MCZ there is only one specimen, a male, with a Loew collection label. This specimen has been assumed to be the holotype of the species, but in light of Williston's statement I hereby designate it the LECTOTYPE of *purpurascens* Loew and have so labeled it.

Copestylum pusillum (Macquart)

Volucella pusilla Macquart, 1842: 81, pl. 5, fig. 1 (habitus), 1a (head). Type-loc.: Cuba. Type ♀ Macquart Coll., Lille (?lost). Subsequent references:

Bigot, 1857: 336 (Cuba; descript., diff. *vacua* and *picta*); Ragues, 1908: 312 (Cuba).

Copestylum pusilla: Thompson, 1972: 109.

Graptomyza Horvathi Szilady, 1926: 610, fig. 18 (habitus). Type-loc.: Cuba.

Holotype ♀ DEI. NEW SYNONYMY.

Volucella pictoides Hull, 1941b: 280. Type-loc.: Cuba, Havana. Holotype ♀ CNC. NEW SYNONYMY.

?*Volucella picta* of Bigot, 1857: 336 (Cuba: descript.).

Distribution.—Cuba*.

Copestylum pusillum Macquart is very closely related to *vacuum* (Fabricius) and *florida* (Hull), and these species are considered to form a single superspecies: *Copestylum florida* is found in the southeastern United States, *pusillum* is restricted to Cuba, and *vacuum* is absent from Cuba but is found throughout the rest of the Antilles. The principal differences between these species are outlined the following key. The name *pusillum* (Macquart) was previously used to include *florida* (Hull), but I now consider the Cuban and mainland populations to be distinct species. Among the Cuban material I have examined are two distinct color morphs which may represent two different species. As I have seen less than a dozen specimens from Cuba I have arbitrarily considered these morphs to represent a single species. Should they represent two species the names *pusillum* (Macquart) and *horvathi* (Szilady) would apply to them.

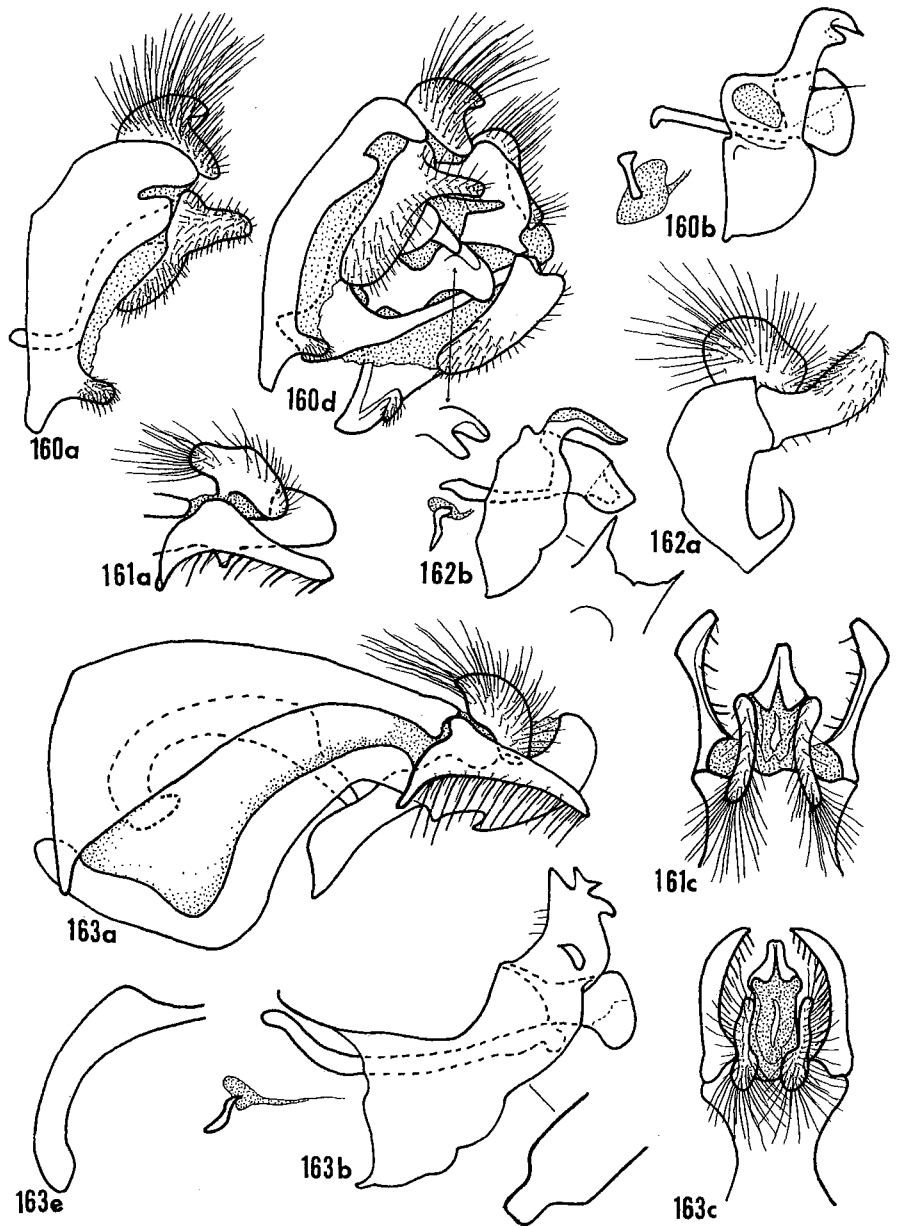
KEY TO SPECIES OF THE *COPESTYLUM VACUUM* (FABRICIUS) SUPERSPECIES

1. Femora and basal $\frac{3}{4}$ of tibiae reddish orange *vacuum* (Fabricius)
- Femora and tibiae dark brown to black 2
2. Squama dirty brown to black; mesonotum above wing black, black pilose; pteropleuron black pilose; postalar callus black pilose; male frontal triangle with black medial vitta 3
- Squama bright yellow; mesonotum above wing yellow, yellow pilose; pteropleuron yellow pilose; postalar callus yellow pilose; male frontal triangle wholly yellow *florida* (Hull)
3. Scutellum with apex black; mesonotum with a single yellow spot in front of scutellum *pusillum*, form *horvathi* (Szilady)
- Scutellum wholly yellow; mesonotum with a pair of prescutellar yellow spots *pusillum* (Macquart), typical form

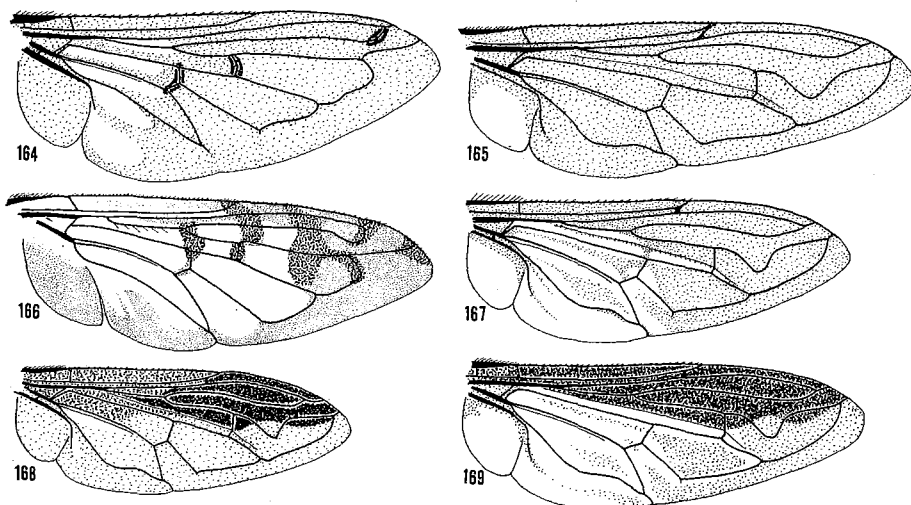
Copestylum rectifacies Thompson, NEW SPECIES

Figs. 146, 162

Male, female.—*Head*: Black; face straight, with low tubercle, shiny medially except under antennae, yellowish-white pollinose laterally and under antennae, yellow pilose with a few black hairs intermixed, black pilose on



Figs. 160-163. *Copestylum* spp., male genitalia. 160, *C. infractum*. 161, *C. pubescens*. 162, *C. rectifacies*. 163, *C. hispaniolae*. a, 9th tergum and associated structures, lateral. b, 9th sternum, aedeagus and ejaculatory apodeme, lateral view, with outline of ligula. c, Apex of 9th tergum and associated structures, dorsal. d, Same as a, ventral oblique. e, Internal arms of surstyler apodeme, lateral.



Figs. 164–169. Wings. 164, *Copestylum haagii*. 165, *Meromacrus pinguis*. 166, *Copestylum vacuum*. 167, *Meromacrus farri*. 168, *M. decorus*. 169, *M. ruficrus*.

tubercle; cheek sparsely yellowish-white pollinose, bare; frontal lunule black; frontal triangle about $\frac{3}{4}$ as long as eye contiguity, shiny except narrowly and sparsely pollinose on sides, black pilose; vertical triangle dull, black, black pilose; front shiny, black pilose, with lateral impressed grooves demarking a narrow triangular area on upper $\frac{2}{3}$, about $\frac{2}{3}$ as long as face, about $\frac{2}{3}$ as long as broad at level of antennae, about $\frac{3}{5}$ as broad at level of antennae as at ocellar triangle; occiput silvery-white pollinose, white pilose except for some black cilia on upper $\frac{1}{5}$. Antenna black, black pilose; 3rd segment elongate, slightly concave on both dorsal and ventral margins, twice as long as broad; arista black, with about 15–18 upper rays and 12–16 lower rays; eye light brown pilose.

Thorax: Mainly brownish black; humerus pale brown dull pollinose, yellow pilose; mesonotum greenish opalescent with strong violaceous reflections, except brownish-orange postalar callus, brassy-yellow pilose with some black hairs intermixed; pleuron sparsely yellowish-gray pollinose, yellow pilose except for few black hairs on upper pteropleuron; barrette bare; bristles as follows, 1 pair on mesopleuron, 3 pairs on notopleuron, 3 pairs above wing, 3 pairs on postalar callus, 1 pair in front of scutellum, 4 pairs on margin of scutellum [paratype female with 5 pairs]; scutellum orange, with weak violaceous reflections from disc, black pilose, without preapical depression, with subscutellar fringe short and black; plumula light orange; squama light orange with brownish fringe; halter pale yellow. *Legs*: brownish black, except lighter yellowish femoral-tibial joints, coxae sparsely grayish pollinose and partially yellow pilose, rest of legs black pilose. *Wing*:

Brownish; marginal cell narrowly open; spurious vein present; microtrichose except bare as follows: 1st costal cell, between Rs and spurious vein, anterior $\frac{1}{2}$ of 2nd basal cell on basal $\frac{4}{5}$, most of anal cell except apicoposterior apex, and most of auxiliary lobe behind anal cell except trichose along wing margin and in form of a medially extending triangular area; alula microtrichose.

Abdomen: 1st tergum light brownish yellow, yellow pilose; 2nd tergum light brownish yellow except black apical $\frac{1}{3}$ and medial vitta on apical $\frac{1}{2}$, black pilose on black areas and yellow on yellow areas; 3rd and 4th terga shiny black except for large yellow basolateral spots on basal $\frac{1}{2}$ or less, all black pilose; 5th tergum all shiny bluish black, black pilose; 1st sternum brownish yellow, sparsely pollinose, yellow pilose; 2nd sternum yellow and yellow pilose except brownish black and black pilose apicolateral corners; 3rd sternum black and yellow, with yellow in form of large triangle, base of which extends along basal margin of sternum and apex reaches apical margin medially; black pilose on black areas, yellow pilose on yellow areas; 4th sternum yellow and yellow pilose on basal $\frac{1}{2}$, black and black pilose on apical $\frac{1}{2}$.

Holotype.—♂, DOMINICA, Clarke Hall, 11–20 February 1965 (W. W. Wirth), Malaise trap. Paratype ♀, DOMINICA, Layou Valley, 23–25 July 1963 (O. S. Flint, Jr.). Both deposited in USNM.

Discussion.—*Copestylum rectifacies* traces to *macquarti* Curran in the last comprehensive key to the New World *Copestylum* species (as *Volucella*; Curran, 1939a). *Copestylum rectifacies* can be contrasted with *macquarti* as follows: 1) Face black, not yellow with black medial vitta; 2) 3rd antennal segment broader, about twice as long as broad, not narrow, $3\times$ as long as broad; 3) front of female all black pilose, not white pilose laterally; 4) squama of female partially brown, not all white; 5) scutellum all black pilose, not with a basal band of yellow pile; 6) legs all black pilose, not partially white pilose on femora; 7) only 1 pair of prescutellar bristles present, not 2 or 3 pairs; and 8) 3rd and 4th terga all black pilose, not with basal bands of yellow pile.

Copestylum sexmaculatum (Palisot de Beauvois)

Fig. 149

Syrphus sexmaculatus Palisot de Beauvois, 1819: 2, pl. 3, fig. 8 (habitus).

Type-loc.: Saint-Dominique [here restricted (*v.i.*)]. Type(s) ?. Subsequent reference: Osten Sacken, 1878: 124 (note on generic placement, probably *Volucella*).

Volucella pallens of Johnson, 1894: 276 (Jamaica), 1919: 435 (Jamaica); Townsend, 1895: 45 (Jamaica, descript. notes); Wolcott, 1923: 219, 1936: 340, 1948: 467 (Puerto Rico, descript. and biol. notes); Curran, 1926a: 56 (Jamaica, descript. notes), 1928b: 42 (Puerto Rico); Gowdey, 1926: 80

(Jamaica); Miskimen and Bond, 1970: 66 (St. Croix); Telford, 1973: 237 (Puerto Rico).

Volucella sexpunctata Loew, 1861: 38. Type-loc.: Cuba. Syntypes 2 ♀ MCZ (lost). Subsequent references: Stahl, 1883: 206 (Puerto Rico); Roeder, 1885: 341 (Puerto Rico); Gundlach, 1887: 185 (Puerto Rico); Williston, 1887: 141, pl. 6, fig. 2 (wing) (descript.).

Volucella sixpuntata of Ragues, 1908: 312 (Cuba; misspelling).

Distribution.—USA; Cuba*, Jamaica*, Hispaniola*, Puerto Rico*.

Palisot de Beauvois clearly indicated that he was using *Syrphus* in the sense of Fabricius (1794, 1805; =*Volucella* Geoffroy), and his description can only apply to the species now known as *pallens* of authors. *Copestylum pallens* was described from Brazil, and Williston (1891: 53) first applied this name to the northern populations (southern Nearctic, Mesoamerican, and Antillean), which previously had been called *sexpunctatum* (Loew). If we accept all these populations as one species, the name for it should be *sexmaculatum* (Palisot de Beauvois). I have compared material from Brazil with material from the West Indies and have found them very similar. Significant differences are the head shape and tarsal coloration. The West Indian population differs as follows: 1) Facial tubercle smaller and not as broad, especially in male; 2) basal 2 tarsomeres yellow to orange, not brownish black; and 3) male frontal triangle small, not inflated, and with a prominent lunule (cf. Figs. 148–149). Whether these character states will be found to be constant or to vary geographically along a north-south cline, I do not know. The important point is that the West Indian population must now be called *sexmaculatum* (Palisot de Beauvois). To assure this, I restrict the type-locality of *sexmaculatum* Palisot de Beauvois to Hispaniola (=Saint-Dominque).

Copestylum vacuum (Fabricius)

Figs. 145, 166

Syrphus vacuus Fabricius, 1775: 763. Type-loc.: "Americae Insulis" (restricted by Fabricius, 1794: 281). Lectotype ♂ KIEL now in MC, see Appendix B. Subsequent reference: Zimsen, 1964: 477 (type, no information).

Volucella vacua: Wiedemann, 1830: 202 (redescript.); Townsend, 1895: 46 (Jamaica, redescript.); Johnson, 1919: 435 (Jamaica); Gowdey, 1926: 80 (Jamaica).

Copestylum vacuum: Thompson et al., 1976: 86.

Volucella unipunctata Curran, 1926a: 63. Type-loc.: Desecheot Island, West Indies. Holotype ♂ AMNH. Subsequent references: Curran, 1928b: 42 (Puerto Rico, Virgin Is.); Wolcott, 1936: 351, 1948: 467 (Puerto Rico); Beatty, 1944: 149 (St. Croix); Miskimen and Bond, 1970: 66 (St. Croix);

Doesburg, 1970: 99 (Lesser Antilles); Telford, 1973: 238 (Puerto Rico, synonymy).

Copestylum unipunctatum: Thompson, 1972: 110.

Volucella horvathi of Wolcott, 1941: 115, 1948: 467 (Puerto Rico, descript. notes); Ramos, 1946: 57 (Mona Is.); Telford, 1973: 238 (synonymy).

Volucella pulchrapuella Hull, 1943e: 33. Type-loc.: Jamaica, Kingston. Holotype ♀ BM(NH). NEW SYNONYMY.

Volucella picta of Johnson, 1919: 435 (Jamaica).

Volucella pusilla of Roeder, 1885: 341 (Puerto Rico); Wolcott, 1923: 220, 1936: 351, 1948: 467 (Puerto Rico); Telford, 1973: 238 (reviews status of Puerto Rican records).

Volucella fasciata of Miskimen and Bond, 1970: 66 (St. Croix).

Distribution.—Jamaica*, Puerto Rico*, Virgin Is.*, Lesser Antilles (Nevis*, Antigua*, Montserrat*, Dominica*).

When Fabricius first described *vacuum*, he gave the habitat as "America. v. Rohr.", but later he restricted the type-locality to the West Indies (1794: 281). From what is known about von Rohr, it is possible to restrict the type-locality even further to the island of St. Croix (v. introduction). This species was redescribed by Wiedemann and Townsend, but these redescriptions were apparently overlooked by modern authors. Both Curran and Hull described the species as new, Hull from the same material on which Townsend based his redescription of *vacuum* Fabricius. I have studied material from Jamaica, Puerto Rico, and the Lesser Antilles and can find no significant differences among any of these island populations. I consider there to be one species involved and that the senior name for it is *vacuum* Fabricius. *Copestylum vacuum* Fabricius can be separated from the other West Indian species of the *pictum* species group by its extensively reddish orange legs.

Telford (1973: 238) gave *horvathi* Szilady as a synonym of *unipunctatum* Curran (= *vacuum*) based on his study of the type of *horvathi*. I doubt this synonymy because *horvathi* was described as having mainly black legs and thus would appear to be a synonym of *pusillum* Macquart (q.v.). Telford's statements about specimens being conspecific must be taken lightly as he has frequently overlooked obvious characters (v. *Toxomerus luna* Hull and *Palpada pusilla* Macquart). I agree with Telford (1973) in that the Puerto Rican records of *horvathi* do refer to *vacuum* (as *unipunctata* Curran in Telford).

The species is variable within and among the various island populations. The typical Lesser Antillean form has yellow and/or black thoracic bristles, and the wing microtrichia are distributed as figured. The Puerto Rican form has black bristles and tends to have a more trichose wing, in that there are scattered hairs along the whole length of the second costal cell. The Jamaican form has yellow and/or black bristles and more extensively bare wings, in that the second costal and cubital cell anal lobe are almost com-