E. GORTON LINSL

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VOLUME 1, NO. 4

THE CALIFORNIA VELVET ANTS OF THE GENUS DASYMUTILLA ASHMEAD

(Hymenoptera: Mutillidae)

BY
PAUL D. HURD, JR.
(Division of Entomology and Parasitology, University of California, Berkeley)

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THE CALIFORNIA VELVET ANTS OF THE GENUS DASYMUTILLA ASHMEAD

(Hymenoptera: Mutillidae)

The velvet ants of the genus *Dasymutilla*, perhaps because of their conspicuous and contrasting colors, have attracted much interest from the naturalist and the laity alike. Even so, most of our species are poorly or inadequately known. It is, therefore, one of the primary objectives of this paper to emphasize certain of the deficiencies in our knowledge of the California species of this genus.

Radoszkowski (1861) described the first California species now included in the genus and between 1865 and 1915 additional species were described by Cresson (1865, 1875), Blake (1879, 1886), Fox (1899), and Cockerell (1894, 1900, 1915). Mickel (1928) in his very excellent monograph of the genus placed some of these previously described species in synonymy, described new species which had been overlooked or confused with existing species, and noted the plasticity of several species. Mickel (1936 a, b) added two new California species and listed new distributional records. Barr and Hurd (1947) described another California species, associated the sexes of one species, and listed new distributional records for nine species.

Biological studies by Bohart and MacSwain (1939) and Linsley and MacSwain (1942) provided certain information on the host relationships of two of our well-known California species, *sackenii* and *aureola*.

Host records for two additional species, *foxi* and *fulvohirta* are listed by Mickel (1928:11). In so far as is known, the genus *Dasymutilla* is parasitic solely upon aculeate Hymenoptera.

It is rather surprising that an area as large and climatically diversified as California should contain such a relatively small number of species as is known now. At the present writing there are but twenty-seven species and three "varieties" known to occur within the state. Of these twenty-seven species only eleven are known from both sexes In an accompanying table (Table 1) these species have been summarized and the probable sex associations of those species which are known from but one sex have been indicated.

Most of the species (19) known to occur in California are found in the desert or more arid regions of the state. These species are: *arenivaga* and its variety *unicolor, atricauda, dammersi, eminentia, errabunda, foxi, fulvohirta, gloriosa, heliophila, magna, magnifica, megalophthalma, nocturna, paenulata, paranocturna, phaon* and its variety *fimbrialis, satanas, scitula,* and *subhyalina.* Of these, three species (*magnifica; phaon,* var. *fimbrialis;* and *scitula*) have also been collected on the Pacific slope of California. Eight species (*abdita, aureola* and its variety *pacifica, californica* and its variety *clio, clytemnestra, coccineohirta, flammifera, sackenii,* and *testaceiventris*) are apparently restricted in their distribution to the Pacific slope, that area of California which lies to the west of the main cordilleran axis.

Since many of the species are known to be quite variable, especially in size and coloration of the vestiture, it is quite difficult and uncertain to correlate the sexes of any given species in the absence of supportive field evidence. As has been indicated previously, only eleven of our California species are known from both sexes; and since the association or the discovery of the opposite sexes of the remaining species is to be desired, the following remarks are offered in the hope that they may prove of some assistance toward that end.

Distributional data, when subjected to analysis, often suggest possibilities of associating the sexes; also, similarities in distributional patterns, population densities, and seasonal activity periods, although not always reliable guides, provide indications of how to proceed with field research. Supportive field evidence may be of three kinds: 1) securing a copulating pair under natural conditions, 2) host relationships, or 3) attracting males to individually caged females and observing the mating process.

Since it is quite uncommon to encounter a copulating pair in the field, or to obtain definitive information from host relationships, or to derive direct evidence from an analysis of distributional knowledge, the writer has found that the attraction of males to individually caged females and observation of the ensuing mating offers a more conclusive form of supportive evidence on which to associate the sexes, especially if the results so obtained are considered in light of the other findings. In the fall of 1947 a number of small screen cages were set up in an area inhabited by several species of *Dasymutilla*. Females of *californica, coccineohirta,* and *sackenii* were collected between 1 and 3 p.m. and introduced individually into the cages which were grouped together in an open area. About 3:15 p.m. the first males were observed in the general area, but in no instance did they fly near the cages. At 3:30 p.m. what appeared to be a freshly emerged female *coccineohirta* was collected

and placed in a cage in the same situation as occupied by the other cages. At 3:35 p.m. several males were noted about twenty-five feet away. At 3:40 p.m. a male flew in a large circle over the cages and landed beside the cage containing the freshly emerged *coccineohirta* female. The male attempted to enter the cage from all exposed sides, and, after being permitted a few minutes of investigation, a try was made to capture him for introduction. The male, however, escaped and flew off, circling the area only to return to the same cage. The capture was then effected and he was introduced into the cage. After moving restlessly about for some moments, copulation of the pair took place, lasting only a few seconds. The group of cages was allowed to remain in the same area for another hour, during which time no additional males were observed to come near the cages. Upon return to the laboratory, the identification of the species which had undergone induced mating was verified as *coccineohirta*. Whether or not there are certain requisites necessary for the attraction of the males cannot be stated at this time. Undoubtedly cages can be perfected which will allow the male free access to enter and still not allow the introduced female to escape. In view of this success and that listed by Mickel (1938) with *Pseudomethoca praeclara*, and the partial success recorded by Fattig (1943), it would seem that such a means of experimentation would yield valuable information as to the sexes of species which are unknown or described as separate species.

Commander C. M. Dammers, of Riverside, California, has demonstrated to the writer a rather ingenious method he has utilized with success in attracting the males. A number of small wire screen soap dispensers, such as those used by the housewife in her kitchen sink, are fastened about the waist of the collector, and, as the female mutillids are collected, they are introduced singly into the separate containers. Thus the ordinary routine of general collecting is not greatly hampered; and, still more important, since the females are transported by the collector, a greater opportunity for the attraction of males is offered as the collector visits various habitats. The ad-

Table 1. Summary of the California species of the genus *Dasymutilla* Ashmead

Species Known from Both Sexes	Probable Sex Associations of the Species Known from But One Sex	
	♂♂ only	♀♀ only
aureola	*abdita*	*californica*
aureola, var. *pacifica*		*californica*, var. *clio*
coccineohirta	?	*clytemnestra*[1]
eminentia	*errabunda*	*heliophila*
foxi	?	*paenulata*
fulvohirta	*phaon*	?
gloriosa	*phaon*, var. *fimbrialis* .	
magna	*testaceiventris*.	*flammifera* (in part)
magnifica	?	*atricauda*
sackenii	?	*dammersi*
satanas	*megalophthalma*	*arenivaga*
scitula	*subhyalina*	*arenivaga*, var. *unicolor*
		nocturna
		paranocturna

[1]Probably a subspecies of *coccineohirta*.

vantage of continuous observation of the attracted male is immediately apparent, particularly if more than one species of female is represented in the caged material.

The distributional records of the present paper have been obtained principally from material contained in the following collections: the California Insect Survey, University of California, Berkeley (C.I.S.); California Academy of Sciences, San Francisco (C.A.S.); and the University of California, College of Agriculture, Davis (U.C.D.). No attempt has been made, other than the citation of the type locality, to include the published distributional records of the species concerned, since this information has been adequately summarized by Mickel (1928, 1936a) and for certain of our desert species by Barr and Hurd (1947). New state records have been indicated by an asterisk immediately preceding the state in question.

The writer wished to express his sincere appreciation to the authorities in charge of the above-named institutions for the privilege of examining the material upon which this report is based. To Professor C. E. Mickel, of the University of Minnesota, the writer is indebted for the assistance and many helpful suggestions he has made available over the past several years.

The genus *Dasymutilla* as defined by Mickel (1928:44) may be recognized by the following characteristics: eyes round, prominent, almost hemispherical in shape, polished, the facets usually very indistinct but not necessarily so; first abdominal segment either distinctly petiolate, subpetiolate, or subsessile, but never completely sessile with the second, a distinct constriction present at the junction of these two segments; anterior wings of the male with cells 1st $R_1 + R_1$ and R_5 present, cell R_4 either indistinct or completely absent; females with a distinct pygidial area; body either clothed with long, dense pubescence, sparsely pubescent or almost bare; pubescence of body composed entirely of simple hairs; plumose hairs never present.

The vestiture of all but four of our California species (*dammersi, errabunda, heliopnila,* and *paenulata*) is dense and generally quite long. The abdominal tergites are always immaculate, except in the above-named species. The females of twelve of our California species have been photographically reproduced in an accompanying plate.

Key to California Velvet Ants of the Genus *Dasymutilla*

1. Males (winged; abdomen composed of seven visible segments; antennae 13-segmented) 2
   Females (wingless; abdomen composed of six visible segments; antennae 12-segmented) 20

2(1). Second abdominal sternite with a median pit densely filled with hairs . . 3
   Second abdominal sternite without any clearly defined median pit filled with hairs 10

3(2). Head and thorax black pubescent . . 4
   Head and thorax above red, yellow, or white pubescent 5

4(3). Abdominal sternites apically red pubescent; ultimate abdominal tergite (= pygidium) without any apical fringe of erect hairs . . . *magnifica* (p. 104)
   Abdominal sternites apically black pubescent; ultimate abdominal tergite with an apical fringe of erect hairs . . . . . *satanas* (p. 107)

5(3). Apical margins of abdominal sternites for the most part black pubescent 6
   Apical margins of abdominal sternites entirely pale pubescent. 8

6(5). Abdominal tergites 4–5 white or yellowish pubescent 7
   Abdominal tergites 4–5 black pubescent . . . . . *scitula* (p. 107)

7(6). Apical half of tergite 2 yellow pubescent; ultimate abdominal tergite not medio-longitudinally elevated into a ridge. . . . . *gloriosa* (p. 104)
   Second abdominal tergite black pubescent; ultimate abdominal tergite medio-longitudinally elevated into a ridge. . . . . *sackenii* (p. 104)

8(5). Dorsal vestiture of head, thorax, and abdominal tergites 3–6 concolorous; ultimate abdominal tergite without a fringe of erect hairs 9
   Dorsal vestiture of head and thorax white, of tergites 3–6 yellow; ultimate abdominal tergite with a fringe of erect hairs . . . . . *magna* (p. 104)

9(8). Dorsal vestiture of head, thorax and abdominal tergites 3–6 yellow . . . . . *aureola* (p. 99)
   Dorsal vestiture of head, thorax and abdominal tergites 3–6 scarlet . . . . . *aureola*, var. *pacifica* (p. 101)

10(2). Posterior tibia cylindrical, ventral surface not flattened 11
Posterior tibia not cylindrical, ventral surface markedly flattened . . . . . *joxi* (p. 94)

11(10). Ultimate abdominal tergite (= pygidium) with an apical fringe of erect hairs (sometimes incomplete medially) . . 12
Ultimate abdominal tergite without an apical fringe of hairs. 13

12(11). Dorsum of head and thorax black pubescent . . . . . *phaon* (p. 111)
Dorsum of head and thorax red pubescent . . *phaon*, var. *fimbrialis* (p. 111)

13(11). Ultimate abdominal sternite (= subgenital plate) with postero-lateral margins dentate 14
Ultimate abdominal sternite with postero-lateral margins rounded, not dentate. 15

14(13). Posterior trochanters produced at apex into a distinct tooth; second abdominal sternite concave . . . . . *eminentia* (p. 94)
Posterior trochanters not modified as above; second abdominal sternite convex . . . . . *fulvohirta* (p. 94)

15(13). Eyes and ocelli greatly enlarged, the eyes removed from posterior margin of head by less than one-third their greatest diameter . . 16
Eyes and ocelli normal, the eyes removed from posterior margin of head by considerably more than one-third their greatest diameter 17

16(15). Wings fuliginous; pubescence of abdominal tergites 3–6 yellowish . . . . . *megalophthalma* (p. 111)
Wings subhyaline; pubescence of abdominal tergites 3–6 whitish . . . . . *subhyalina* (p. 112)

17(15). Apices of middle and hind femora rounded; vestiture of head, thorax, and abdomen dense; calcaria black 18
Apices of middle and hind femora truncate, the outer lobe sulcate on its posterior surface; vestiture of head, thorax, and abdomen sparse; calcaria white . . . *errabunda* (p. 108)

18(17). Ultimate abdominal sternite not truncate at apex, impunctate on apical third 19
Ultimate abdominal sternite truncate at apex, entire surface punctate . . . . . *testaceiventris* (p. 112)

19(18). Second abdominal sternite broadly depressed medially forming a distinctly shiny surface which is sculptured with small setigerous punctures in contrast to the larger and coarser punctures which surround the concavity . . . . . *coccineohirta* (p. 95)
Second abdominal sternite not at all depressed medially, uniformly punctate throughout . . . . *abidta* (p. 110)

20(1). Scutellar scale evident. 21
Scutellar scale entirely absent . . 35

21(20). Pubescence of abdominal tergites 2–5 (except anterior margin of second) unicolorous 22
Pubescence of abdominal tergites 2–5 bicolorous 30

22(21). Antennal scrobes not carinate above 23
Antennal scrobes distinctly carinate above, the carina extending from antennal base nearly to inner eye margin 25

23(22). Postero-lateral angles of head rounded, not at all tuberculate 24
Postero-lateral angles of head conspicuously tuberculate, the tubercles glabrous . . *californica* (p. 97)

24(23). Dorsal vestiture of head, thorax, and abdomen red or yellow . . . . . *coccineohirta* (p. 95)
Dorsal vestiture of head, thorax, and abdomen white . . . *clytemnestra* (p. 95)

25(22). Pubescence of abdominal tergites 2–5 concolorous with that on dorsum of thorax 26
Pubescence of abdominal tergites 2–5 not concolorous with that on dorsum of thorax 29

26(25). Abdominal sternites entirely pale pubescent 27
Abdominal sternites for the most part black pubescent 28

27(26). Dorsal vestiture of head, thorax, abdomen ivory white; legs white pubescent . . . . . *gloriosa* (p. 104)
Dorsal vestiture of head, thorax, and abdomen yellow to pale reddish; legs black pubescent . . . *satanas* (p. 107)

28(26). Dorsal vestiture of head, thorax, and abdomen white to yellow; integument of pronotum almost entirely black; tubercle on antero-lateral margin of pronotum prominent, dentate . . . . . *sackenii* (p. 104)

Dorsal vestiture of head, thorax, and abdomen brown ocher to scarlet; integument of pronotum largely ferruginous, especially on lateral sides; tubercle on antero-lateral margin of pronotum evident, but not greatly elevated and dentate . . . . . *flammifera* (p. 102)

29(25). Dorsum of thorax black pubescent . . . . . *magnifica* (p. 104)

Dorsum of thorax white pubescent . . . . . *magna* (p. 104)

30(21). Second abdominal tergite not maculated 31

Second abdominal tergite maculated with a pair of round coalescent pale yellow spots . *puenulata* (p. 99)

31(30). Dorsal vestiture of head, thorax, and abdominal tergite 2 white 32

Dorsal vestiture of head, thorax, and abdominal tergite 2 (sometimes 3 and 4 also) yellow, orange, or reddish 33

32(31). Abdominal tergites 3–5 black pubescent . . . . . *nocturna* (p. 109)

Abdominal tergites 3–5 burnt umber pubescent . . . . *paranocturna* (p. 109)

33(31). Postero-lateral angles of head not tuberculate, rounded; abdominal tergites 3–5 (sometimes only 4–5, or just 5) black pubescent 34

Postero-lateral angles of head conspicuously tuberculate, the tubercles glabrous; apical margin of tergite 2 medially and entire median surface of tergite 3 black pubescent, remainder of dorsal vestiture yellow or orange . . . . . *californica*, var. *clio* (p. 98)

34(33). Pygidium longitudinally rugose; genal punctures not confluent separated from each other by nearly their diameter . . . . . *arenivaga* (p. 108)

Pygidium irregularly rugose; genal punctures confluent . *scitula* (p. 107)

35(20). Apices of middle and hind femora truncate, the outer lobe sulcate on its posterior surface; vestiture of head, thorax, and abdomen sparse; integument of tergite 2 maculated. . 36

Apices of middle and hind femora rounded, not modified as above; vestiture of head, thorax, and abdomen dense; integument of tergite 2 not maculated 37

36(35). Vertex of head with a conspicuous tuft of silvery pubescence . . . . . *dammersi* (p. 108)

Vertex of head with sparse appressed scarlet pubescence . *heliophila* (p. 108)

37(35). Legs pale pubescent 38

Legs black pubescent 39

38(37). Second abdominal sternite convex, not scabrous at sides and apex *joxi* (p. 94)

Second abdominal sternite concave, scabrous at sides and apex . . . . . *eminentia* (p. 94)

39(37). Pubescence of abdominal tergites 2–5 (except anterior margin of tergite 2) unicolorous 40

Pubescence of abdominal tergites 2–5 bicolorous, that of tergites 2–3 orange or yellow, that of tergites 4–5 black . . . . *atricauda* (p. 95)

40(39). Frontal area of head entirely pale (golden, yellow, red, or scarlet) pubescent; mandibles edentate; head usually much broader than thorax . . 41

Frontal area of head with a distinct transverse band of black pubescence immediately above and including the antennal scrobes, remainder of frontal area pale pubescent; mandibles clearly unidentate near apex; head characteristically narrower than thorax . . . . . *fulvonirta* (p. 94)

41(40). Dorsal vestiture of head, thorax, and abdomen golden, yellow, or white; black pubescence of anterior margin of second abdominal tergite projected posteriorly into the paler pubescence to form a median emargination; carina of first abdominal sternite produced anteriorly into a distinct blunt tooth. *aureola* (p. 99)

Dorsal vestiture of head, thorax, and abdomen orange, red, or scarlet; no median emargination of black pubescence on anterior margin of second abdominal tergite; carina of first abdominal sternite not forming anteriorly a blunt tooth . . . . . *aureola*, var. *pacifica* (p. 101)

Discussion of Species

Mickel (1928) has redefined and proposed a number of new species groups for the members of this genus. These categories are based primarily upon the morphological similarities possessed by the species included in each of them. In spite of the admitted unnaturalness of many of the groups, their usefulness as a further aid in the identification of the species warrants their inclusion in the present paper. Therefore, the following species are arranged alphabetically under each of the eleven species groups represented in our California *Dasymutilla* fauna. The species groups are presented in the same sequence as given by Mickel (*loc. cit.*), and are accompanied in each instance by the definition provided by that writer.

Group Fulvohirta

The females have the mandibles bidentate; antennal scrobes carinate above; thorax short, subhexagonal, and without a scutellar scale, pygidium rugose. The males have the first abdominal segment subsessile and the postero-lateral angles of the last sternite angulate or dentate.

Dasymutilla fulvohirta (Cresson)[2]

Mutilla fulvohirta Cresson, 1865, Proc. Ent. Soc. Phila., *4*:433. Type ♂, Colorado Territory (American Entomological Society of Philadelphia).

Recorded host:

Anthophora occidentalis Cresson (Mickel, 1928:11).

Geographic range:

Tex., N. Mex., Ariz., Lower Calif., Calif., Nev., Colo., Kans., Neb., S. D., N. D., Mont., Wyo., Ida., Oreg., Utah, and Wash.

California records:

MODOC CO.: Lake City, 3 ♂, VII-27-22 (C. L. Fox, C.I.S.).

Group Scabra

Females with antennal scrobes strongly carinate above, thorax broader than long, scutellar scale absent, first abdominal segment subsessile, pygidium longitudinally rugose, second abdominal sternite strongly scabrose at the sides and subapically. Males with the second abdominal sternite decidedly concave medially, slightly scabrous at the sides and subapically, and trochanters produced at the apex into a prominent tooth.

Dasymutilla eminentia Mickel

Dasymutilla eminentia Mickel, 1928, Bull. U. S. Nat. Mus. No., *143*:45, 51, 79-82, 84, 276, plate 1, figure 3. Type ♂, Tucson, Arizona (University of Kansas).

Geographic range:

*Lower Calif., Calif., Ariz.

California records:

RIVERSIDE CO.: Blythe, ♀, IV-28-39 (R. E. Beer); ♀, V-17-47 (E. G. Linsley, C.I.S.); ♀, V-21-47 (E. G. Linsley, C.I.S.).

Group Foxi

The females of this group have the thorax broader than long, antennal scrobes carinate above, scutellar scale absent, and pygidium longitudinally rugose. The males have the ventral surface of the posterior tibiae greatly flattened, and the posterior tibiae arcuate.

Dasymutilla foxi (Cockerell)[3]

Sphaerophthalma foxi Cockerell, 1894, Ent. News, *5*:199. Type ♂, Juarez, Mexico (American Entomological Society, Philadelphia).

Recorded host:

Diadasia sp. (Mickel, 1928:11, 85).

Geographic range:

*Calif., Ariz., N. Mex.

California records:

*IMPERIAL CO.: Westmorland, ♀, IV-28-32 (C.I.S.).

Group Sparsa

Females with the thorax pyriform, longer than broad, scutellar scale absent, head as broad as the thorax, pygidium longitudinally striate. Males with the cephalic margin of the pronotum not emarginate,

[2] *Sphaerophthalma townsendi* Cockerell and *Ephuta californica*, var. *euchroa* Cockerell are synonyms of *fulvohirta* (Cresson). *Mutilla californica*, Cresson (1865), Blake (1871), Fox (1899), Melander (1903), and *Sphaerophthalma californica*, Blake (1886), and *Ephuta californica*, Cockerell (1898) are misidentifications of *fulvohirta* (Cresson) *cf.* Mickel, 1928:66.

[3] *Sphaerophthalma heterochroa* Cockerell and Casad is a synonym of *foxi* (Cockerell).

the dorsum and cephalic face of pronotum evenly rounded into one another; posterior third of mesonotum not extended laterally each side into a broad, distinct lobe; second abdominal sternite simple, without a median pit filled with hairs, or a median, longitudinal row of hairs simulating a carina; last abdominal tergite with an apical fringe of erect black hairs.

Dasymutilla atricauda Mickel

Dasymutilla atricauda Mickel, 1936, Pan-Pac. Ent., *12*:92-94. Type ♀, Blythe, California (University of Minnesota).

Geographic range:

*Ariz., Calif.

California records:

IMPERIAL CO.: Westmorland, ♀, V-15-33 (C.I.S.). San Felipe Creek, ♀, VI-17-40 (R. G. Dahl, C.I.S.); ♀, VI-17-40 (W. F. Barr, C.I.S.).

INYO CO.: Olancha, 3 mi. S., 3 ♀, VIII-6-48 P. D. Hurd & J. W. MacSwain, C.I.S.).

RIVERSIDE CO.: Blythe, ♀, V-13-47 (E. G. Linsley, C.I.S.); ♀, VI-23-47 (W. F. Barr, C.I.S.).

SAN BERNARDINO CO.: Yermo, ♀, IV-28-49 (E. G. Linsley, J. W. MacSwain, & R. F. Smith, C.I.S.).

SAN DIEGO CO.: Borego, ♀, IV-24-49 (J. E. Gillaspy, C.I.S.).

Group Zelaya

Females with the mandibles bidentate; thorax subhexagonal, either as broad as long or slightly longer than broad; scutellar scale either present or absent; pygidial area irregularly rugose. Males with the cephalic margin of the pronotum emarginate medially, second sternite without a median pit filled with hairs or a row of hairs simulating a carina; last abdominal tergite without an apical fringe of hairs.

Dasymutilla clytemnestra (Fox)

Mutilla clytemnestra Fox, 1899, Trans. Amer. Ent. Soc., 25:233, 246. Type ♀, Poway, California (American Entomological Society of Philadelphia).

Geographic range:

Calif., Oreg., (see discussion below).

California records:

LOS ANGELES CO.: Van Nuys, ♀, VII-1944 (W. F. Barr, C.I.S.). Clear Creek, Angeles National Forest, ♀, VI-29-46 (C. A. Hanson, C.I.S.).

ORANGE CO.: Newport Bay, 2 ♀, V-17-40 (P. D. Hurd, Jr. C.I.S.); ♀, V-23-40 (P.D. Hurd, Jr., C.I.S.).

RIVERSIDE CO.: Hemet, ♀, VIII-2-46; 2 ♀, VIII-7-46; ♀, VIII-28-46 (all collected by J. W. MacSwain, C.I.S.).

SAN BERNARDINO CO.: Cucamonga Canyon, ♀, VII-16-25 (T. Craig, C.A.S.). Rialto, ♀, IX-20-38 (P. D. Hurd, Jr., C.I.S.).

SAN DIEGO CO.: San Diego, ♀, VI-6-14 (E. P. Van Duzee, C.A.S.). Descanso, ♀, VIII-14-14 (W. S. Wright, C.A.S.). San Felipe Valley, ♀, VI-6-40 (H. T. Reynolds, C.I.S.).

VENTURA CO.: Saticoy, ♀, VIII-7-27 (T. Craig, C.A.S.). Santa Paula, ♀, VI-9-26 (U.C.D.).

Discussion:

Mickel (1928:126) has suggested that this species probably represents a variety of *coccineohirta*. However, distributional evidence would seem to indicate a subspecific status for this species. Morphologically no appreciable differences appear to exist between *clytemnestra* and the females of *coccineohirta*. An indication of the relationship between the aforementioned species has been revealed by a male specimen of *coccineohirta*. This specimen, which was collected at Kernville, Kern County, California, has the dorsal vestiture white (slightly tinged with yellowish) instead of the usual red or yellow color. Until more conclusive evidence is forthcoming, the relegation of *clytemnestra* to a subspecific status seems at this time unwise.

The occurrence of *clytemnestra* in Oregon was reported by Mickel (1936:45) on the basis of a female specimen labelled from Ashland, March, 1916 without an indication of the collector. It appears to the present writer that this record may rest upon a mislabelled specimen since all of the known records of its distribution are from southern California and intensive collecting in the northern areas of California have failed to reveal its presence.

Dasymutilla coccineohirta (Blake)[4]

Mutilla (Sphaeropthathalma [sic!]) *coccineohirta* Blake, 1871, Trans. Amer. Ent. Soc., *3*:220, 223, 235-236. Type ♂, California (American Entomological Society of Philadelphia).

Geographic range:

Calif. (including Santa Catalina Is.), Nev., Oreg., Wash., Ida.

California records:

ALAMEDA CO.: Tesla, Corral Hollow, 2 ♂, IX-3-46 (P. D. Hurd, Jr., C.I.S.); 2 ♂, 14 ♀, X-10-46 (W. E. Ferguson, C.I.S.); ♂, IX-19-50 (F. Morishita, C.I.S.); 2 ♀, IX-25-48 (P. D. Hurd, Jr., C.I.S.); ♂, 2 ♀, X-15-48 (J. W. MacSwain, C.I.S.); 2 ♂, ♀, same data (P. D. Hurd, Jr., C.I.S.). Altamont, 2 ♀, VII-1937 (E. S. Ross, C.A.S.). Hills back of Oakland, ♀, VI-4-10 (E. C. Van Dyke, C.A.S.). Bay Farm Island, ♀, VIII-16-39 (R. G. Dahl, C.I.S.).

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[4] *Mutilla ochracea* Blake, *Sphaerophthalma venifica* Blake, *Mutilla progne* Fox, and *Dasymutilla aletina* Cockerell are synonyms of *coccineohirta* (Blake).

ALPINE CO.: Woodfords, 3 mi. NE, ♂, ♀, VIII-21-49 (C. D. MacNeill).

CALAVERAS CO.: Mokelumne Hill, ♀, VIII-17-17 (F. E. Blaisdell, C.A.S.).

CONTRA COSTA CO.: Mt. Diablo, ♀, IV-8-34 (U.C.D.); ♀, V-16-40 (C.I.S.). Oakley, ♀, X-13-35 (E. C. Van Dyke); ♀, X-5-38 (E. C. Van Dyke, C.A.S.). Antioch, ♂, VIII-30-30 (E. C. Van Dyke, C.A.S.); ♀, VII-4-32 (C.A.S.); ♂, 3 ♀, IX-26-32 (C.I.S.); ♂, X-1-32 (E. O. Essig, C.I.S.); ♀, VIII-4-33 (C.I.S.); ♀, VIII-15-33 (C.I.S.); ♂, ♀, IX-10-33 (G. E. & R. M. Bohart, U.C.D.); ♂, IX-9-35 (C.I.S.); ♂, 67 ♀, IX-29-35 (E. C. Van Dyke); 2 ♀, IX-9-35 (U.C.D.); ♀, X-6-35 (U.C.D.); ♂, VIII-29-36 (M. Cazier, C.A.S.); 3 ♂, 2 ♀, IX-10-36 (G. E. & R. M. Bohart, C.A.S., C.I.S., U.C.D.); ♀, IV-10-36 (M. Cazier, C.A.S.); 2 ♀, IX-13-36 (E. C. Van Dyke, C.A.S.); ♂, V-1938 (R. M. Bohart, U.C.D.); ♀, VII-29-38 (E. C. Van Dyke, C.A.S.); 2 ♀, VIII-21-38 (E. C. Van Dyke, C.A.S.); ♀, IX-2-38 (T. H. G. Aitken, C.A.S.); ♂, ♀, IX-4-38 (J. W. MacSwain, C.I.S.); 2 ♀, IX-4-38 (E. C. Van Dyke, C.A.S.); ♂, 3 ♀, IX-9-38 (E. C. Van Dyke, C.A.S.); 5 ♂, 12 ♀, IX-18-38 (E. C. Van Dyke, C.A.S.); ♀, IX-17-39 (G. F. Smith, C.I.S.); ♂, ♀, VIII-10-41 (E. C. Van Dyke, C.A.S.); 2 ♂, ♀, IX-13-41 (J. R. Fisher, C.I.S.); ♀, VIII-16-42 (E. C. Van Dyke, C.A.S.); ♀, XI-3-46 (R. E. Beer); 3 ♀, VIII-9-47 (P. D. Hurd, Jr., C.I.S.); 2 ♀, VIII-9-47 (U. N. Lanham, C.I.S.); 2 ♂, IX-10-47 (P. D. Hurd, Jr., C.I.S.); ♀, X-12-47 (U. N. Lanham, C.I.S.); 2 ♂, IX-8-48 (P. D. Hurd, Jr., C.I.S.); 2 ♂, 2 ♀, IX-25-48 (P. D. Hurd, Jr., C.I.S.); 2 ♂, X-24-48 (P. D. Hurd, C.I.S.); ♂, ♀, X-3-49 (P. D. Hurd, Jr., C.I.S.); 3 ♂, ♀, VIII-11-50 (P. D. Hurd, Jr., C.I.S.).

ELDORADO CO.: Camino, 3 mi. S., ♀, VI-26-48 (R. C. Bynum, C.I.S.). Pollock Pines ♀, VII-14-48 (J. W. MacSwain, C.I.S.). Camp Snowline, ♀, VI-21-48 (J. W. MacSwain, C.I.S.).

FRESNO CO.: Coalinga, 3 ♂, VII-18-46 (P. D. Hurd, Jr., C.I.S.). Mercy Hot Springs, ♂, 3 ♀ (P. Crane, C.I.S.); Firebaugh, ♀, VI-26-49 (A. D. Telford, C.I.S.).

KERN CO.: Kern Park, 2 ♀, VII-8-46 (F. A. Ehrenford, C.I.S.). Kernville, ♂, VI-7-40 (R. G. Dahl, C.I.S.). Kern River at mouth of Kern Canyon, 2 ♂, VII-30-39 (C.A.S.). Shafter, ♀, IX-25-35 (C.I.S.); ♀, X-29-35 (G. L. Smith, C.I.S.). McKittrick, 9 ♀, X-12-35 (G. L. Smith, C.I.S.). Famosa, 20 mi. N., ♂, VII-18-41 (D. J. Raski, C.I.S.). Lost Hills, ♂, VIII-1923 (G. Heid, C.A.S.). Milham City, ♀, IV-23-49 (E. G. Linsley, C.I.S.).

LOS ANGELES CO.: Long Beach, ♀, IX-1932 (E. E. Seibert, C.I.S.). Westwood Hills, ♀, IV-29-40 (H. Records, C.I.S.). Santa Monica, ♀(F. C. Clark, C.A.S.). Tanbark Flat, San Dimas Experimental Forest, ♀, VI-20-50 (J. W. MacSwain, C.I.S.); ♀, VII-3-50 (P. D. Hurd, Jr., C.I.S.).

MADERA CO.: Bass Lake, ♀, VII-14-35 (F. E. Blaisdell, C.A.S.). Madera, ♀, VII-7-50 (H. F. Madsen, C.I.S.).

MARIPOSA CO.: Mariposa, ♀, V-25-40 (W. F. Barr, C.I.S.).

MENDOCINO CO.: Ryan Creek, ♂, ♀, VII-15-49 (R. Craig, C.I.S.).

MERCED CO.: Dos Palos, ♂, ♀, VIII-12-47; 3 ♂, 3 ♀, VIII-15-47; 2 ♂, 2 ♀, VIII-20-47 (all collected by V. M. Stern, C.I.S.). ♂, IX-4-50 (C. D. MacNeill); ♂, VI-21-50 (C. D. MacNeill); 2 ♀, VII-8-49 (A. D. Telford, C.I.S.); ♀, VII-13-49 (A. D. Telford, C.I.S.). Dos Palos, 4 mi. SW, ♀, VII-27-50 (C. D. MacNeill). Dos Palos, 10 mi. SW, ♀, VI-21-50 (C. D. MacNeill). Turner Island, near Dos Palos, ♀, IX-5-50 (C. D. MacNeill); 2 ♂, 3 ♀, IX-6-50 (C. D. MacNeill); 2 ♂, 2 ♀, VII-19-50 (C. D. MacNeill); ♀, VIII-9-50 (C. D. MacNeill); 2 ♂, VII-24-50 (C. D. MacNeill); ♀, VII-24-50 (C. D. MacNeill). Los Banos, ♀, VII-7-40 (U.C.D.).

MODOC CO.: Davis Creek, ♂, VII-16-22 (C. L. Fox, C.A.S.). Buck Creek, ♀, VII-21-24 (C. L. Fox, C.A.S.). Hackamore, ♀, VII-4-34 (E. C. Van Dyke, C.A.S.). Horsecamp, 6 mi. NE of Perez, ♀, VII-1-34 (J. T. Howell, C.A.S.). Lake City, ♂, VII-27-22 (C. L. Fox, C.A.S.); 2 ♂, ♀, VII-28-22 (C. L. Fox, C.A.S.).

MONO CO.: Coleville, ♀, VII-20-39 (E. A. Drews, C.A.S.).

MONTEREY CO.: Paraiso Springs, ♀, V-6-28; ♀, V-25-24; ♀, V-27-24; 2 ♀, V-30-24; ♀, VIII-26-24; ♀, VI-8-32 (all collected by L. S. Slevin, C.A.S.). Carmel, ♀, V-21-11 (E. C. Van Dyke, C.A.S.). Monterey, ♀, V-29-35 (L. S. Slevin, C.A.S.).

ORANGE CO.: Newport Bay, 2 ♀, V-1941 (F. F. Mock, C.I.S.); ♀, VI-25-41 (P. D. Hurd, Jr., C.I.S.); 3 ♂, VII-17-41 (P. D. Hurd, Jr., C.I.S.). Costa Mesa, ♀, V-10-40 (P. D. Hurd, Jr., C.I.S.).

PLUMAS CO.: Meadow Valley, ♂, VII-1-24 (U.C.D.). Meadow Valley, 3500–4000 ft., ♂, VI-4-24; 6 ♂, VI-30-24; 3 ♂, ♀, VII-1-24; ♀, VII-2-24 (all collected by E. C. Van Dyke, C.A.S.). Quincy, 4 mi. W., ♀, VI-30-49 (J. W. MacSwain, C.I.S.); ♀, VII-3-49 (J. E. Gillaspy, C.I.S.).

RIVERSIDE CO.: Corona, ♀, VI-1908 (C.I.S.); ♀, IV-1910 (C.A.S.); ♂, ♀, IX-1911 (C.A.S.); ♂, VIII-1-16 (C.A.S.); ♂, IX-1920 (C.A.S.).

SACRAMENTO CO.: Sacramento, ♀, VII-11-22 (C. E. Van Geldern, C.A.S.). Folsom, 2 ♀, VII-4-39; ♀, VII-16-39; ♀, IX-26-38 (all collected by P. Q. Tomich, C.I.S.).

SAN BENITO CO.: Panoche, ♀, V-15-30 (E. C. Van Dyke, C.A.S.).

SAN DIEGO CO.: San Diego, ♀, VI-6-14 (E. P. Van Duzee, C.A.S.); ♂, VI-3-37 (C.A.S.). Descanso, ♂, VIII-14-14 (W. G. Wright, C.A.S.). San Felipe Valley, 2 ♂, VIII-1925 (E. Hulbert, C.A.S.); ♀, VI-6-40 (A. Perry, C.I.S.). Mt. Laguna, ♂, VII-9-50 (D. Cox, C.I.S.).

SAN JOAQUIN CO.: Lodi, ♀, IV-25-31 (F. E. Blaisdell, C.A.S.). San Joaquin, ♀, IX-12-47 (K. S. Hagen, C.I.S.). Tracy, 2 ♀, VI-1939 (A. S. Kapp, C.A.S.); ♀, V-31-49 (J. W. MacSwain, C.I.S.); ♀, VI-13-49 (J. W. MacSwain, C.I.S.); ♀, IX-31-49 (J. W. MacSwain, C.I.S.);

♀, VIII-1-49 (J. W. MacSwain, C.I.S.); ♀, VI-7-49 (J. W. MacSwain, C.I.S.).

SANTA BARBARA CO.: Santa Ynez Valley, ♀, VII-1915 (H. C. Muzzall, C.A.S.). Cuyama Valley, ♂, 2 ♀, VI-1940 (W. E. Cawelti, C.I.S.).

SANTA CLARA CO.: San Antonio Valley, ♀, VIII-18-49 (J. E. Gillaspy, C.I.S.).

SANTA CRUZ CO.: Ben Lomond, ♀, V-2-31 (G. Heid, C.A.S.); 6 ♀, V-21-31 (G. Heid, C.A.S.). Mt. Hermon, 2 ♂, 2 ♀, VII-7 to 30-22 (F. E. Blaisdell, C.A.S.).

SHASTA CO.: Shingletown, ♀, V-24-41 (P. D. Hurd, Jr., C.I.S.). Hat Creek, ♀, VI-1-41 (C. D. Michener, C.I.S.). Hat Creek Ranger Station, ♀, VI-30-47 (C. A. Hanson, C.I.S.); 3 ♀, VII-1-47 (D. W. Adams, C.I.S.). Cassel, 5 mi. N., 2 ♂, ♀, VII-15-47 (C. A. Hanson, C.I.S.).

SISKIYOU CO.: Shasta Springs, ♀, VI-22-20 (C. L. Fox, C.A.S.).

STANISLAUS CO.: Claus, ♀, VII-19-50 (C.I.S.). Westley, ♂, X-16-50 (J. W. MacSwain, C.I.S.).

SUTTER CO.: Nicolaus, ♀, VI-22-44 (A. T. McClay, U.C.D.); ♂, ♀, VI-25-44 (A. T. McClay, U.C.D.).

TRINITY CO.: Carrville, ♀, VI-26-31 (E. C. Van Dyke, C.A.S.); ♀, V-25-34 (R. M. & G. E. Bohart, U.C.D.); ♀, VI-3-34 (E. C. Van Dyke, C.A.S.). Coffee Creek P. O., ♀, VIII-28-42 (W. E. Ferguson, C.I.S.).

TULARE CO.: Tulare, 5 mi. S., ♀, IX-20-43 (W. F. Barr, C.I.S.).

TUOLUMNE CO.: Pinecrest, 2 ♂, ♀, VII-18-42 (R. E. Beer).

VENTURA CO.: Santa Paula, ♀, VI-6-26 (C.A.S.). ♀, VI-9-26 (U.C.D.); ♂, ♀, VI-12-26 (C.A.S.). Wheeler Springs, ♀, VI-20-26 (U.C.D.). Saticoy, 2 ♂, VIII-7-27 (T. Craig, C.A.S.). Frazier Park, ♀, V-18-40 (R. M. Bohart, U.C.D.).

YOLO CO.: Davis, ♀, VII-1925 (U.C.D.); ♀, VII-1-26 (F. H. Wymore, U.C.D.); ♀, X-1931 (U.C.D.); ♂, VII-11-36 (R. M. Bohart, U.C.D.).

Group Quadriguttata

Females with the head narrower than the thorax; antennal scrobes not carinate above in our species; the postero-lateral angles of head prominent, in ours tuberculate; thorax long, subhexagonal, scutellar scale present; pygidium longitudinally striate.

Dasymutilla californica (Radoszkowski)

Mutilla californica Radoszkowski, 1861, Horae Soc. Ent. Ross., *1*:86, plate 2, figure 7. Type ♀, California (St. Petersburg Academy of Science).

Geographic range:
Calif. and Utah

California records:

ALAMEDA CO.: Livermore, ♀, VIII-1904 (F. X. Williams, C.A.S.). Alameda, ♀, VIII-24-30 (U.C.D.). Murrieta Caves, ♀, IX-2-41 (W. L. Swisher, C.I.S.). Tesla, Corral Hollow, ♀, IX-3-46 (P. D. Hurd, Jr., C.I.S.); ♀, X-10-46 (W. E. Ferguson, C.I.S.); 3 ♀, X-15-48 (P. D. Hurd, Jr., C.I.S.). Sunol, 2 ♀, V-26-40 (C.A.S.).

CONTRA COSTA CO.: Richmond, ♀, VI-1937 (C.A.S.). Mt. Diablo, ♀, VI-1940 (C.I.S.); ♀ VII-10-47 (P. D. Hurd, Jr., C.I.S.). Antioch, ♀, IV-10-32 (F. E. Blaisdell, C.A.S.); 2 ♀, VIII-15-33 (C.I.S.); ♀, IX-29-35 (E. C. Van Dyke, C.A.S.); ♀, X-6-35 (U.C.D.); 2 ♀, IX-10-36 (G. E. & R. M. Bohart, U.C.D.); ♀, X-4-36 (E. C. Van Dyke, C.A.S.); ♀, VII-15-37 (E. C. Van Dyke, C.A.S.); ♀, IX-26-37 (G. E. & R. M. Bohart, U.C.D.); 3 ♀, IX-4-38 (J. W. MacSwain, C.I.S., E. S. Ross, C.A.S., E. C. Van Dyke, C.A.S.); 3 ♀, IX-18-38 (E. C. Van Dyke, C.A.S.); ♀, X-20-40 (E. C. Van Dyke, C.A.S.); ♀, IX-13-41 (J. R. Fisher, C.I.S.); ♀, VIII-9-47 (P. D. Hurd, Jr., C.I.S.); 2 ♀, X-13-47 (P. D. Hurd, Jr., C.I.S.).

FRESNO CO.: Firebaugh, 2 ♀, IX-23-41 (R. E. Beer, C.I.S.). Huron, ♀, VI-23-39 (A. T. McClay, U.C.D.).

KERN CO.: Wheeler Ridge, ♀, VI-10-47 (R. F. Smith, C.I.S.). Shafter, ♀, IX-14-35 (G. L. Smith, C.I.S.). McKittrick, 3 ♀, X-12-35 (G. L. Smith, C.I.S.).

LASSEN CO.: Summit Camp, ♀, VI-28-49 (P. D. Hurd, Jr., C.I.S.).

LOS ANGELES CO.: Santa Monica, 2 ♀ (F. C. Clark, C.A.S.). Barley Flats, 5300 ft., Angeles National Forest, ♀, VI-24-18 (V. Duran, C.A.S.).

MARIPOSA CO.: Mariposa, ♀, VI-3-40 (K. S. Hagen, C.I.S.).

MERCED CO.: Dos Palos, ♀, VIII-12-47; 5 ♀, VIII-15-47; 2 ♀, VIII-20-47 (all collected by V. M. Stern, C.I.S.). Merced, ♀, IV-1942 (W. F. Barr, C.I.S.).

MODOC CO.: Lake City, ♀, VII-27-22 (C. L. Fox, C.A.S.).

MONO CO.: Hot Creek, ♀, VIII-1-36 (R. M. Bohart, U.C.D.); 5 ♀, VIII-2-36 (G. E. & R. M. Bohart, U.C.D.). Grant Lake, ♀, VIII-5-48 (P. D. Hurd, Jr., & J. W. MacSwain, C.I.S.). Owens Valley, ♀, VIII-3-36 (G. E. & R. M. Bohart, U.C.D.).

MONTEREY CO.: Pacific Grove, 3 ♀, IX-4 to 16-20 (F. E. Blaisdell, C.A.S.). Monterey, ♀, VI-26-20 (F. E. Blaisdell, C.A.S.); 2 ♀, VII-5-33 (L. S. Slevin, C.A.S.). Carmel, ♀, IX-5-12 (L. S. Slevin, C.A.S.); ♀, VIII-17-16

(E. C. Van Dyke, C.A.S.); ♀, IX-3-16 (E. C. Van Dyke, C.A.S.); ♀, IX-22-16 (L. S. Slevin, C.A.S.); ♀, VIII-18-18 (L. S. Slevin, C.A.S.); ♀, IX-15-18 (L. S. Slevin, C.A.S.); 2 ♀, VIII-18-24 (L. S. Slevin, C.A.S.). Paraiso Springs, ♀, IX-19-33 (L. S. Slevin, C.A.S.); ♀, IX-27-34 (L. S. Slevin, C.A.S.).

ORANGE CO.: Laguna Beach, 2 ♀, VII-20-26 (T. Craig, C.A.S.). Newport Bay, ♀, V-17-40; ♀, VI-25-41; ♀, VI-26-41; 3 ♀, VII-17-41 (all collected by P. D. Hurd, Jr., C.I.S.). Santa Ana, 7 ♀, VII-17-42 (P. D. Hurd, Jr., C.I.S.). Brea, ♀, V-23-27 (J. Stives, C.A.S.).

PLACER CO.: Tahoe, 2 ♀, VII-1925 (F. X. Williams, C.A.S.).

RIVERSIDE CO.: Hemet Reservoir, ♀, VI-13-39 (E. S. Ross). Corona, 2 ♀, IX-1920 (C.I.S.).

SAN BERNARDINO CO.: Rialto, ♀, VII-15-38 (P. D. Hurd, Jr., C.I.S.). Upland, ♀(T. Craig, C.A.S.).

SAN DIEGO CO.: San Diego, ♀, X-22-39 (F. E. Blaisdell, C.A.S.). San Felipe Valley, 3 ♀, VI-6-40 (H. T. Reynolds, C.I.S.); ♀, VI-6-40 (A. Perry, C.I.S.).

SAN FRANCISCO CO.: 3 ♀, IX-11-21 (C. L. Fox, C.A.S.); ♀, IX-30-21 (C. L. Fox, C.A.S.). San Francisco University, 2 ♀, VIII-13-22 (C. L. Fox, C.A.S.). Lone Mountain, ♀, VII-4-20 (F. X. Williams, C.A.S.).

SAN JOAQUIN CO.: Tracy, 2 ♀, VII-16-38 (M. Cazier, C.A.S.); 4 ♀, V-31-49 (J. W. MacSwain, C.I.S.); 2 ♀, VI-13-49 (J. W. MacSwain, C.I.S.); 2 ♀, IX-21-49 (J. W. MacSwain, C.I.S.).

SAN MATEO CO.: Millbrae, ♀, VII-21-12 (E. C. Van Dyke, C.A.S.); ♀, IX-1-12 (F. E. Blaisdell, C.A.S.); ♀, IX-9-14 (C. L. Fox, C.A.S.). Burlingame, ♀, VII-10-09 (J. A. Kusche, C.A.S.); ♀, VII-29-09 (J. A. Kusche, C.A.S.).

SANTA CLARA CO.: San Antonio Valley, ♀, VIII-17-49 (J. E. Gillaspy, C.I.S.); 2 ♀, IX-14-48 (R. V. D. Bosch, C.I.S.).

SANTA CRUZ CO.: Mt. Hermon, ♀, VII-7 to 30-22 (F. E. Blaisdell, C.A.S.). Bear Valley, Santa Cruz Mountains, ♀, VII-1913 (F. C. Clark, C.A.S.).

SHASTA CO.: Hat Creek Ranger Station, ♀, VII-1-47 (C. A. Hanson, C.I.S.).

VENTURA CO.: Santa Paula, ♀,VI-6-26 (C.I.S.); ♀, VI-11-26 (U.C.D.). Saticoy, ♀, V-19-26 (U.C.D.). Wheeler Springs, ♀, VI-20-26 (U.C.D.).

YOLO CO.: Davis, ♀, VIII-26-39 (G. E. Bohart, U.C.D.); ♀, X-1942 (U.C.D.).

Discussion:

There remains but little doubt that *californica* represents the female of *abdita*. The distributional patterns of the sexes [♂, *abdita* Mickel, 1928; ♀, *californica* (Radoszkowski, 1861)] when superimposed strongly favor this contention.

A survey of the material collected over the years at Antioch, Contra Costa County, California [an area where two other species – *testaceiventris* (♂ only) and *flammifera* (♀ only) – of similar geographical distribution are apparently quite uncommon] and a diligent search during the past years has revealed the following species of *Dasymutilla* to be present in some abundance: *coccineohirta, sackenii, abdita,* and *californica*. Since both *coccineohirta* and *sackenii* are already known from both sexes, they may be disregarded for purposes of this discussion. The evidence suggests, then, that *abdita* and *californica* are the sexes of one species. Both *abdita* and *californica* present a much more uniform type of distributional pattern when taken together than does either *testaceiventris* or *flammifera*. If one could assume that population samplings as represented in the accumulated data were reliable, then the sexes could be correlated in light of the distributional evidence.

The color of the vestiture of *californica*, excepting the "variety" *clio*, seems to be fairly constant throughout the known geographical range, although there is, perhaps, a tendency for the southern specimens to be slightly darker. The biology of the species remains unknown.

Dasymutilla californica, var. *clio* (Blake)

Mutilla clio Blake, 1879, Trans. Amer. Ent. Soc., 7:251. Type ♀, Vancouver Island (American Entomological Society of Philadelphia).

Geographic range:

*Calif., *Nev., Oreg., Ida., and British Columbia.

California records:

ALPINE CO.: Hope Valley, ♀, VII-18-48 (R. C. Bynum, C.I.S.).

NEVADA CO.: Hobart Mills, ♀, VIII-26-48 (M. A. Cazier, C.I.S.).

PLUMAS CO.: Meadow Valley, ♀, VI-27-24 (U.C.D.); 5 ♀, VI-21-24 (E. C. Van Dyke, C.A.S., C.I.S.); ♀, VI-22-24 (E. C. Van Dyke, C.A.S.); ♀, VI-27-24 (E. C. Van Dyke, C.A.S.); 2 ♀, VII-1-24 (E. C. Van Dyke, C.A.S., C.I.S.).

SAN FRANCISCO CO.: San Francisco, ♀, IX-1941 (R. M. Bohart, C.I.S.).

Discussion:

Distributionally *clio* appears to represent a northern subspecies of *californica*, rather than a variety. While the evidence to substantiate such a view is largely incomplete, the distributional records certainly seem to indi-

cate that *clio* occupies the northern portion of the distributional range.

Specimens from British Columbia before the writer are much smaller in size than those from California or Nevada and possess whitish colored eyes – a condition which has been noted only in two other species of the genus. The specimen from San Francisco is morphologically referable to *clio;* however, it is much smaller in size and with the dorsal vestiture of the head, thorax, and second abdominal tergite pale citrine yellow, tergites 1, and 3-6 are wholly black pubescent.

Group Caneo

Females small, varying in length from 4.5 to 10 mm., head as wide as thorax; posterolateral angles very weakly, obscurely tuberculate (the tubercle is limited to the occipital margin, is much reduced and indistinct); head and thorax more or less clothed with silvery pubescence; sometimes thickly so; thorax long, subrectangular; scutellar scale present; pygidium longitudinally striate. Males unknown.

Dasymutilla paenulata Mickel

Dasymutilla paenulata Mickel, 1928, Bull. U. S. Nat. Mus. No. *143*:50, 206-208. Type ♀, Phoenix, Arizona (Cornell University).

Geographic range:

Ariz., *Calif.

California records:

*IMPERIAL CO.: Westmorland, ♀, VII-20-33 (H. S. Gentry, C.I.S.).

Group Occidentalis

Females with the head narrower than the thorax except in *aureola* and *aureola,* var. *pacifica;* antennal scrobes carinate above; thorax distinctly longer than broad subrectangular, except in aforementioned species where as broad as long, scutellar scale well-developed (absent in *aureola*), usually with a sinuate, discontinuous carina immediately anterior; pygidium either longitudinally striate or rugose; bodies coarsely sculptured and clothed with dense, erect pubescence. Large, 10-25 mm.

Males black, the abdomen above clothed with dense, erect, white, yellow, or red pubescence; head narrower than the thorax (except in *aureola* and its variety *pacifica*); second abdominal sternite with a pit densely filled with hairs; apical margin of last tergite with or without a fringe of short, erect hairs.

Dasymutilla aureola (Cresson)[5]

Mutilla aureola Cresson, 1865, Proc. Ent. Soc. Phila., 4:386. Type ♀, California (American Entomological Society of Philadelphia).

Recorded host:

Antnophora stanfordiana Cockerell (Linsley and MacSwain, 1942:195).

Geographic range:

Calif., Nev., Colo. (type of *mollissima*), Oreg.

California records:

ALAMEDA CO.: Berkeley, ♀, V-27-15 (M. C. Van Duzee, C.A.S.); ♀, VIII-26-16 (E. C. Van Dyke, C.A.S.); ♂, ♀, IX-23-17 (E. P. Van Duzee, C.A.S.); ♀, IV-22-19 (E. C. Van Dyke, C.A.S.); ♀, IV-18-20 (E. C. Van Dyke, C.A.S.); ♀, III-24-25 (F. C. Hadden, U.C.D.); ♀, XI-1925 (U.C.D.); ♀, 1936 (E. S. Ross, C.A.S.); ♀, V-7-39 (K. D. Snyder, C.I.S.); ♀, I-29-46 (J. W. MacSwain, C.I.S.); ♀, IV-22-46 (J. W. MacSwain, C.I.S.); ♀, XII-7-46 (N. H. Parley, U.C.D.); 4 ♀, IV-17-47 (J. W. MacSwain, C.I.S.); 2 ♀, VI-25-47 (C. A. Hanson, C.I.S.); ♂, IX-30-49 (J. W. MacSwain, C.I.S.). Redwood Park, 4 ♀, I-22-39 (E. C. Van Dyke, C.A.S.); ♀, V-12-49 (C. D. MacNeill); 2 ♀, VI-19-49 (C. D. MacNeill). Niles Canyon, ♀, IV-15-22 (E. C. Van Dyke, C.A.S.). Newark, 6 ♀, XI-6-38 (E. P. Van Duzee, C.A.S.). Hills back of Oakland, ♀, XII-18-10 (E. C. Van Dyke, C.A.S.). Hayward, ♀, X-1937 (E. S. Ross, C.A.S.). Oakland, ♀, II-1937 (E. S. Ross, C.A.S.). Livermore, 2 ♂, 3 ♀, VIII-1904 (F. X. Williams, C.A.S.). Castro Valley, ♀, III-10-39 (C.A.S.).

BUTTE CO.: Camp Gridley, ♀, IV-24-09 (E. C. Van Dyke, C.A.S.).

CALAVERAS CO.: Mokelumne Hill, ♀, VII-28-21 (F. E. Blaisdell, C.A.S.).

CONTRA COSTA CO.: Avon, ♀, VII-1925 (U.C.D.). Moraga, ♀, X-1915 (U.C.D.). Lafayette, IV-18-37 (E. C. Van Dyke, C.A.S.). Rock City, Mt. Diablo, ♀, V-24-40 (E. G. Linsley, C.I.S.). Mt. Diablo, ♀, II-10-35 (E. C. Van Dyke, C.A.S.). Marsh Creek Canyon, 4 ♀, IX-10-47 (P. D. Hurd, Jr., U. N. Lanham, & J. W. MacSwain, C.I.S.). Clayton, ♀, IV-7-39 (E. S. Ross, C.A.S.). Martinez, 2 ♀, VI-1910 (J. G. Grundel, C.A.S.).

ELDORADO CO.: Camp Snowline, ♀, VI-19-48 (P. D. Hurd, Jr., C.I.S.); 3 ♀, VI-20-48 (P. D. Hurd, Jr., C.I.S.); ♀, VI-24-48 (D. Carter, C.I.S.). Camino, 3 mi. S., ♀, VII-3-48 (P. D. Hurd, Jr., C.I.S.).

[5] *Sphaerophthalma parmosa* Blake and *Sphaerophthalma mollissima* Blake are synonyms of *aureola* (Cresson).

HUMBOLDT CO.: Fort Seward, ♀, V-26-35 (E. O. Essig, C.I.S.).

INYO CO.: Olancha, ♀, VI-4-17 (C. L. Fox, C.A.S.).

KERN CO.: Kernville, ♀, IV-24-49 (E. G. Linsley, C.I.S.).

LOS ANGELES CO.: Torrance, ♀, VII-1-34 (A. T. McClay, U.C.D.); ♀, VI-20-36 (A. T. McClay, U.C.D.).

MADERA CO.: Bass Lake, ♀, VII-17-34 (F. E. Blaisdell, C.A.S.).

MARIN CO.: Mill Valley, ♀, VI-11-22 (C. L. Fox, C.A.S.); ♀, III-18-23 (E. P. Van Duzee, C.A.S.); ♀, IV-21-24 (E. P. Van Duzee, C.A.S.); ♀, VIII-11-25 (F. X. Williams, C.A.S.); ♀, III-24-29 (M. C. Van Duzee, C.A.S.); ♀, III-2-30 (G. Heid, C.A.S.). Woodacre, ♀, IV-10-30 (U.C.D.). Fairfax, 2 ♀, IV-20-18 (C. L. Fox, C.A.S.); ♀, IV-13-19 (E. P. Van Duzee, C.A.S.); 4 ♀, V-25-19 (E. P. Van Duzee, C.A.S.); 3 ♀, V-9-20 (E. P. Van Duzee, C.A.S.); ♀, V-2-21 (E. C. Van Dyke, C.A.S.); ♀, V-23-21 (C. L. Fox, C.A.S.); 2 ♀, III-27-32 (C.A.S.). Cypress Ridge, 2 ♀, IV-22-19 (C. L. Fox, C.A.S.); 2 ♀, IV-27-20 (E. C. Van Dyke, C.A.S.); ♀, IV-20-22 (E. P. Van Duzee, C.A.S.). Lagunitas, ♀, IV-28-40 (E. S. Ross, C.A.S.). Bootjack Camp, Mt. Tamalpais, ♀, IV-20-46 (H. Weston, C.I.S.).

MENDOCINO CO.: Hopland, ♀, V-9-23 (M. C. Van Duzee, C.A.S.). Ryan Creek, ♀, IV-9-39 (N. F. Hardman, C.I.S.).

MODOC CO.: Hackamore, ♀, IV-15-34 (C.A.S.). Lake City, ♀, VII-28-22 (C. L. Fox, C.A.S.). Horse Camp, 6 mi. E., Perez, 3 ♀, VII-1-34 (J. T. Howell, C.A.S.). Davis Creek, Warner Mountains, 5600 ft., ♀, VI-16-22 (C. L. Fox, C.A.S.); ♀, VII-7-22 (A. W. Lindsay, C.A.S.); 2 ♀, VII-8-22 (A. W. Lindsay, C.A.S.); ♀, VII-12-22 (C. L. Fox, C.A.S.); 2 ♀, VII-16-22 (C. L. Fox, C.A.S.); ♀, VII-23-22 (C. L. Fox, C.A.S.); ♀, VII-27-22 (C. L. Fox, C.A.S.).

MONTEREY CO.: Carmel, ♀, VIII-22-16 (E. C. Van Dyke, C.A.S.).

NAPA CO.: Napa, ♀, VII-25-34 (W. E. Ferguson, C.I.S.); 2 ♀, VII-26-34 (W. E. Ferguson, C.I.S.); ♀, VI-6-36 (W. E. Ferguson, C.I.S.). Mt. St. Helena, 2 ♀, VI-9-18 (E. P. Van Duzee, C.A.S.). Pope Valley, ♀, IV-20-30 (U.C.D.).

SAN BERNARDINO CO.: ♀, V-1939 (D. L. Dow, U.C.D.).

SAN FRANCISCO CO.: San Francisco, 4 ♀, IX-20-08 (F. E. Blaisdell, C.A.S.); ♀, VI-17-11 (J. A. Kusche, C.A.S.).

SAN JOAQUIN CO.: Tracy, ♀, III-30-49 (J. W. MacSwain, C.I.S.); ♀, V-26-49 (J. W. MacSwain, C.I.S.); ♀, VI-7-49 (J. W. MacSwain, C.I.S.).

SAN MATEO CO.: San Mateo, 3 ♀, II-1920. (J. A. Kusche, C.A.S.); ♀, V-29-28 (G. Heid, C.A.S.). Burlingame, ♀, VII-9-09 (J. A. Kusche, C.A.S.). Crystal Lakes, 2 ♀, V-14-16 (F. E. Blaisdell, C.A.S.).

SANTA CLARA CO.: Palo Alto, ♀, IX-4-21 (E. P. Van Duzee, C.A.S.). Los Gatos, ♀, VII-27-33 (J. A. Kusche, C.A.S.). Alum Rock Park, ♀, V-25-50 (J. W. MacSwain, C.I.S.).

SANTA CRUZ CO.: Santa Cruz, 2 ♀, V-14-26 (U.C.D.); ♀, II-23-29 (E. P. Van Duzee, C.A.S.). Glenwood, ♀, VI-15-18 (L. S. Slevin, C.A.S.). Mt. Hermon, 2 ♀, VII-7 to 30-20 (F. E. Blaisdell, C.A.S.). Bear Valley, Santa Cruz Mts., ♀, VII-1913 (F. C. Clark, C.A.S.). Aptos, ♀, VII-6-49 (H. Wasburn, C.I.S.).

SHASTA CO.: Hat Creek, ♀, VI-2-41 (J. R. Fisher, C.I.S.); ♀, VI-1-41 (T. C. Russell, C.I.S.); ♀, V-2-47 (A. T. McClay, U.C.D.); ♀, VII-3-47 (W. D. Dyer, C.I.S.). Hat Creek, 4 mi. S., ♀, VI-1-41 (C. D. Michener, C.I.S.). Hat Creek Ranger Station, ♀, VI-23-47 (C. A. Hanson, C.I.S.); ♀, VI-30-47 (C. A. Hanson, C.I.S.); ♀, VII-1-47 (D. W. Adams, C.I.S.). Hat Lake, ♀, VII-1948 (A. S. Perry, C.I.S.). Big Springs, ♀, V-25-41 (P. D. Hurd, Jr., C.I.S.). Old Station, ♀, V-29-41 (C. D. Michener, C.I.S.); ♀, VI-14-41 (J. R. Fisher, C.I.S.); ♀, VI-16-41 (T. C. Russell, C.I.S.). Shingletown, ♀, VI-2-41 (C. D. Michener, C.I.S.). Burney, 5 mi. E., ♀, VI-9-41 (P. D. Hurd, Jr., C.I.S.). Cassel, ♀, VIII-25-40 (T. H. G. Aitken, C.A.S.). Cassel, 5 mi. N., ♀, VII-15-47 (C. A. Hanson, C.I.S.). Cayton, ♀, VII-19-13 (E. P. Van Duzee, C.A.S.).

SISKIYOU CO.: Yreka, ♀, V-28-30 (C. L. Fox, C.A.S.). Sisson, ♀, VII-25-18 (E. P. Van Duzee, C.A.S.). Elk Creek, 2 ♂, IX-8-41 (E. C. Van Dyke, C.A.S.).

SOLANO CO.: Green Valley Park, ♀, IV-27-41 (B. Brookman, C.I.S.).

SONOMA CO.: Sobre Vista, 5 ♀, VI-9-90 (J. A. Kusche, C.A.S.). Cazadero, ♀, IX-3-18 (E. P. Van Duzee, C.A.S.). South Sonoma County, ♀, VI-26-10 (J. A. Kusche, C.A.S.); 2 ♀, VI-17-11 (J. A. Kusche, C.A.S.); ♀, III-19-11 (J. A. Kusche, C.A.S.).

TEHAMA CO.: Red Bluff, 18 mi. E., VIII-29-48 (C.I.S.).

TRINITY CO.: Carrville, 2400-2500 ft., 2 ♀, V-23-34 (U.C.D.); ♀, VI-1-34 (E. C. Van Dyke, C.A.S.). Coffee Creek, near Carrville, ♀, VIII-1-31 (R. L. Usinger, C.I.S.).

TULARE CO.: Potwisha, Sequoia National Park, 2000-5000 ft., ♀, V-18-29 (E. C. Van Dyke, C.A.S.); ♀, V-20-29 (E. C. Van Dyke, C.A.S.); 2 ♀, V-25-29 (E. C. Van Dyke, C.A.S.); 9 ♀, V-28-29 (E. C. Van Dyke, C.A.S.); 2 ♀, V-29-29 (E. C. Van Dyke, C.A.S.); 18 ♀, VI-2-29 (E. C.

Van Dyke, C.A.S.); 3 ♀, VI-13-29 (E. C. Van Dyke, C.A.S.); ♀, VI-13-29 (A. T. McClay, C.A.S.); ♀, VI-20-29 (E. C. Van Dyke, C.A.S.); ♀, VI-29-29 (A. T. McClay, C.A.S.); 4 ♀, V-18-30 (E. C. Van Dyke, C.A.S.); 2 ♀, V-19-30 (G. Heid, C.A.S.); ♀, V-8-31 (E. C. Van Dyke, C.A.S.); 3 ♀, VII-16-31 (E. C. Van Dyke, C.A.S.); 2 ♀, VII-1-41 (E. C. Van Dyke, C.A.S.). Sequoia National Park, 2000-3000 ft., ♀, V-18-20 (U.C.D.); 2 ♀, V-1929 (U.C.D.); ♀, V-13-29 (U.C.D.); 2 ♀, V-24-29 (A. T. McClay, U.C.D.); 2 ♀, V-29-29 (A. T. McClay, U.C.D.); ♀, VI-2-29 (A. T. McClay, U.C.D.); ♀, VI-13-29 (A. T. McClay, U.C.D.); ♀, V-19-30 (E. G. Linsley, U.C.D.); 2 ♀, V-12-37 (A. T. McClay, U.C.D.). Ash Mt., ♀, IV-27-50 (A. G. George, C.I.S.). Porterville, ♀, VI-1-35 (U.C.D.).

VENTURA CO.: Wheeler Springs, ♂, VI-20-26 (U.C.D.).

YOLO CO.: Davis, ♀, VI-13-14 (G. E. Eckert, U.C.D.); ♀, VII-1925 (U.C.D.); ♀, X-1926 (U.C.D.); ♀, V-22-36 (U.C.D.); ♀, X-1942 (U.C.D.).

Discussion:

The females of *aureola* are subject to considerable variation in the color of the dorsal vestiture. Specimens from the southeastern portions of the known range (Inyo and Tulare Counties) are almost white, and in this regard bear a striking resemblance to *clytemnestra*. Specimens taken along coastal California as far north as the San Francisco Bay Region, in general, tend toward orange to almost scarlet coloration and in certain interior coastal localities some difficulty has been encountered in separating *pacifica* from *aureola (s. str.)*. The black anterior median emargination of pubescence on the second abdominal tergite is all but obliterated, thereby imparting a cordate pattern to the dorsal abdominal vestiture. Even the carina on the first abdominal sternite has been found to be variable, which makes the proper allocation still more difficult. In some instances individuals from the San Francisco Bay Region, particularly those taken in the fall of the year from under rocks, have the usual concolorous pubescent pattern interrupted on the abdominal tergites with a continuation of the black pubescence from the anterior median emargination. North of the bay region both coastally and interiorly the color of the vestiture becomes paler, approaching almost a light yellow or golden color.

Under the present concept of this "species-variety," the males of *aureola (s. str.)* possess a rather uniform yellowish coloration of the dorsal vestiture in contrast to the red or scarlet coloration exhibited by *pacifica*. Structurally the males of *aureola* and *pacifica* appear to be identical.

J. W. MacSwain has recently found a nesting site of *Melissodes* sp. at Marsh Creek, Contra Costa County, California, from which specimens of *aureola* have been collected as they emerged from the nesting burrows. The mutillid may therefore be parasitic upon this Anthophorid bee or hyperparasitic upon one of the parasitic genera of bees inhabiting the nesting site. As already listed above, *aureola* has been recorded from another Anthophorid, *Anthophora stanfordiana*, and it appears likely that this new record will be substantiated.

Dasymutilla aureola, var. *pacifica* (Cresson)

Mutilla pacifica Cresson, 1875, Trans. Amer. Ent. Soc., 5:120. Type ♀, California (American Entomological Society of Philadelphia).

Geographic range:

Lower Calif., Calif., Colo. (Fox, 1899), *Oreg., and British Columbia.

California records:

ALAMEDA CO.: Berkeley, ♀, III-23-40 (D. J. Raski, C.I.S.). Newark, ♀, XI-6-38 (E. P. Van Duzee, C.A.S.). Tesla, Corral Hollow, ♀, II-21-46 (J. W. MacSwain, C.I.S.). Murrieta Caves, ♀, VII-1938 (T. H. G. Aitken, C.I.S.).

CONTRA COSTA CO.: Mt. Diablo, ♀, V-18-36 (E. S. Ross, C.A.S.); ♀, V-9-39 (U.C.D.).

FRESNO CO.: 2 ♀ (E. C. Van Dyke, C.A.S.).

LOS ANGELES CO.: Claremont, 2 ♀, V-24-96 (C.A.S.); ♂, ♀ (C. H. Muzzall, C.A.S.); ♀, VIII-4-86 (C.A.S.). Los Angeles, ♀, VIII-3-38 (D. L. Dow, U.C.D.). Torrance, ♀, VI-20-36 (A. T. McClay, U.C.D.). San Dimas, ♂, X-15-38 (K. Frick, C.I.S.); ♀, V-3-39 (K. Frick, C.I.S.). Tanbark Flat, San Dimas Experimental Forest, 2 ♀, VI-20-50 (J. W. MacSwain, C.I.S.); 2 ♀, VII-3-50 (P. D. Hurd, Jr., C.I.S.); ♀, VII-3-50 (J. D. Paschke, C.I.S.). Sierra Madre Mts., ♀ (V. G. Duran, C.A.S.). Pasadena, ♀ (M. C. Van Duzee, C.A.S.). Westwood, ♀, IV-29-40 (H. E. Records, C.I.S.); ♀, VI-3-42 (R. E. Beer). Westwood Hills, ♀, VII-4-30 (I. Wilson, U.C.D.). Santa Monica, ♂ (F. C. Clark). Mt. Verdugo, ♀, V-28-38 (C. A. Fleschner, C.I.S.). Glendale, ♂, ♀, V-14-38 (C. A. Fleschner, C.I.S.). Clear Creek, Angeles National Forest, 3 ♀, VI-29-46 (C. A. Hanson, C.I.S.).

KERN CO.: Tejon Canyon, ♀, V-12-37 (E. C. Van Dyke, C.A.S.).

MADERA CO.: Bass Lake, ♀, VI-6-38 (N. F. Hardman, C.I.S.); ♀, VI-7-38 (K. D. Snyder, C.I.S.). North Fork, 2 ♀, V-10-39 (J. R. Helfer, C.I.S.); ♀, V-11-39 (J. R. Helfer, C.I.S.). Oakhurst, ♀, V-19-42 (W. E. Ferguson, C.I.S.); ♀, VI-1-42 (W. E. Ferguson, C.I.S.).

MARIPOSA CO.: El Portal, ♀, V-23-38 (R. M. Bohart, U.C.D.).

MODOC CO.: Lake City, ♀, VII-27-22 (C. L. Fox, C.A.S.).

MONTEREY CO.: Paraiso Hot Springs, ♀, V-17-24; ♀, VI-26-26; ♀, V-6-28; ♀, VI-10-32; ♀, VI-10-39 (all collected by L. S. Slevin, C.A.S.). Tassajaro Hot Springs, ♀, V-27-20 (L. S. Slevin, C.A.S.); ♀, V-29-20 (L. S. Slevin, C.A.S.). Jamesburg, ♀, IV-29-18 (L. S. Slevin, C.A.S.); ♀, V-28-19 (L. S. Slevin, C.A.S.). Carmel, 5 mi. S., ♀, IX-16-19 (L. S. Slevin, C.A.S.).

ORANGE CO.: Newport Beach, ♀, IX-16-32 (A. T. McClay, U.C.D.). Newport Bay, 2 ♀, V-14-40; ♂, VIII-6-40; ♀, VI-25-41; ♂, VIII-1-41; 2 ♂, VIII-6-41; ♀, VIII-17-41 (all collected by P. D. Hurd, Jr., C.I.S.). Costa Mesa, ♀, V-7-40, ♀, V-9-40; 2 ♀, V-19-40; 3 ♀, VI-11-40 (all collected by P. D. Hurd, Jr., C.I.S.). Laguna Beach, ♀, IV-25-31 (H. Little, C.A.S.). Huntington Beach, 4 ♂, 3 ♀, X-10-36 (R. E. Beer). Santa Ana, ♀, VII-15-42 (P. D. Hurd, Jr., C.I.S.). Brea, VIII-31-23 (A. J. Basinger, C.A.S.); ♀, III-6-27 (Hitchcock, C.A.S.); ♀, III-21-27 (Hitchcock, C.A.S.). Horse Thief Canyon, ♀ (W. C. Reeves, C.I.S.).

RIVERSIDE CO.: Palm Springs, ♀, III-27-16 (C. L. Fox, C.A.S.); ♀, IV-12-39 (E. C. Van Dyke, C.A.S.). Soboba Springs, 2 ♀, VI-5-17 (E. P. Van Duzee, C.A.S.). Pinon Flat, San Jacinto Mts., ♀, V-17-39 (E. S. Ross, C.A.S.); ♀, IV-18-41 (E. C. Van Dyke, C.A.S.). Herkey Creek, ♀, VI-4-40 (H. Records, C.I.S.). Keen Camp, ♀, VI-5-39 (E. S. Ross, C.A.S.). Keen Camp, 8 mi. SW., ♀, V-17-39 (E. G. Linsley, C.I.S.). Beaumont, ♀, IX-16-89 (W. S. Wright, C.A.S.). Riverside, 2 ♀, VI-10-28 (E. C. Van Dyke, C.A.S.). Corona, ♂, IX-1920 (C.I.S.).

SAN BENITO CO.: Hollister, ♀, IV-19-30 (A. T. McClay, U.C.D.). Pinnacles National Monument, ♀, V-25-41 (C.I.S.).

SAN BERNARDINO CO.: Morongo Valley, ♀, V-23-41 (E. C. Van Dyke, C.A.S.); ♀, V-25-41 (E. C. Van Dyke, C.A.S.). Mojave Desert, ♀, IV-1935 (I. McCracken, C.A.S.). Yermo, ♀, V-3-39 (J. R. Helfer, C.I.S.). Stoddard Springs, 3 ♀, VII-16-25 (T. Craig, C.A.S.). Little Bear, ♀, VII-1942 (C.A.S.). San Bernardino, 10 mi. W., ♀, X-26-36 (E. G. Linsley, C.I.S.). Cucamonga, ♀, VII-16-25 (T. Craig, C.A.S.). Cucamonga Valley, ♀, VII-18-23 (T. Craig, C.A.S.). Big Bear, San Bernardino Mts., ♀, IX-4-30 (I. Wilson, U.C.D.). Lake Arrowhead, ♀, VI-20-35 (A. R. Mead, U.C.D.).

SAN DIEGO CO.: San Diego, 3 ♂, 3 ♀, II-8-13 (E. P. Van Duzee, C.A.S.); ♀, IV-22-13 (E. P. Van Duzee, C.A.S.); ♀, IV-15-85 (F. E. Blaisdell, C.A.S.); ♀, IV-25-20 (E. P. Van Duzee, C.A.S.). Descanso, ♀, VIII-14-14 (W. S. Wright, C.A.S.). Point Loma, ♂, VIII-17-26 (C.A.S.); ♀, VIII-18-26 (C.A.S.); ♀, VIII-21-26 (C.A.S.). Oceanside, 2 ♀, VII-25-34 (C.A.S.). El Monte Park, ♀, III-21-46 (E. C. Clark, C.I.S.). Cuyamaca Park, ♀, V-20-43 (E. C. Clark, C.I.S.). Mission Valley, ♀ (E. C. Clark, C.I.S.).

SAN JOAQUIN CO.: Hospital Canyon, ♀, IV-18-48 (V. M. Stern, C.I.S.).

SAN LUIS OBISPO CO.: San Luis Obispo, ♀, IV-24-18 (E. P. Van Duzee, C.A.S.); ♀, IV-26-19 (E. P. Van Duzee, C.A.S.). San Luis Obispo, 5 mi. E., ♀, IV-25-19 (L. S. Slevin, C.A.S.).

SAN MATEO CO.: Halfmoon Bay, ♀, V-31-50 (W. W. Middlekauff, C.I.S.).

SANTA BARBARA CO.: Santa Barbara, ♀, I-30-30 (F. E. Blaisdell, C.A.S.); 2 ♀, V-17-31 (F. E. Blaisdell, C.A.S.); ♀, IV-28-33 (J. Boyd, C.A.S.); ♀, V-7-36 (I. McCracken, C.A.S.); ♀, VII-7-49 (K. Tucker, C.I.S.); ♀, IX-6-48 (K. W. Tucker, C.I.S.). Los Olivos, ♀, III-6-94 (W. S. Wright, C.A.S.).

SANTA CLARA CO.: Santa Clara, ♀, X-1932 (A. R. Mead, U.C.D.). Palo Alto, ♀, V-29-28 (G. Heid, C.A.S.); ♀, V-24-46 (E. S. Ross, C.A.S.). San Antonio Valley, ♀, VIII-18-49 (J. E. Gillaspy, C.I.S.).

SANTA CRUZ CO.: Santa Cruz, 5 ♀, VII-7 to 30-22 (F. E. Blaisdell, C.A.S.); ♀, VI-1-36 (U.C.D.). Felton Station, ♀, IX-1937 (I. McCracken, C.A.S.).

SHASTA CO.: Hat Creek Ranger Station, ♀, VII-1-47 (W. D. Dyer, C.I.S.).

SONOMA CO.: Sobre Vista, ♀, V-8-16 (J. A. Kusche, C.A.S.).

TULARE CO.: Camp Wishon, ♀, VI-6-38 (E. A. Erickson, C.A.S.).

TUOLUMNE CO.: ♀, VI-12-? (J. G. Grundel, C.A.S.).

VENTURA CO.: Santa Paula, ♀, VI-12-26 (C.I.S.). Saticoy, ♀, VI-24-? (U.C.D.); ♀, VII-23-? (U.C.D.); ♀, VIII-10-35 (U.C.D.).

Discussion:

Potts and Smith (1944:60) have reported collecting *pacifica* females in January hibernating under a rock. They were found in association with a broken nest of *Sceliphron servillei (=caementarium)* which may have served as the host.

Dasymutilla flammifera Mickel

Dasymutilla flammifera Mickel, 1928, Bull. U.S. Nat. Mus. No. *143*:48, 240-242. Type ♀, Mountains near Claremont, California (Cornell University).

Geographic range:
Ariz., Calif., Oreg., Ida.
California records:
ALAMEDA CO.: Tesla, Corral Hollow, 2 ♀, IX-3-46 (P. D. Hurd, Jr., C.I.S.).
CONTRA COSTA CO.: Antioch, ♀, IX-9-35 (U.C.D.); ♀, IX-26-37 (G. E. & R. M. Bohart, U.C.D.).
KERN CO.: Bakersfield, ♀, IX-10-39 (J. R. Fisher, C.I.S.). Famosa, ♀, VII-19-41 (D. J. Raski, C.I.S.). Frazier Mountain Park, ♀, VII-17-46 (F. A. Ehrenford, C.I.S.).
LOS ANGELES CO.: Glendale, ♀, V-1939 (C. A. Fleschner, C.I.S.). Glendora, ♀, IX-1933 (E. E. Seibert, C.I.S.).
MADERA CO.: Bass Lake, 4 mi. NW., ♀, VII-1-46 (T. O. Thatcher, C.I.S.).
MONTEREY CO.: Paraiso Springs, ♀, VIII-24-24; 3 ♀, VIII-26-24; ♀, VIII-31-24; ♀, IX-10-33; ♀, IX-1-40 (all collected by L. S. Slevin, C.A.S.).
SAN BERNARDINO CO.: Stockton Flats, 5 ♀, VIII-2-35 (R. E. Beer).
SAN DIEGO CO.: Point Loma, ♀, VIII-2-26 (C.A.S.).
SANTA CRUZ CO.: Mt. Hermon, 5 ♀, VII-7 to 30-24 (F. E. Blaisdell, C.A.S.). Santa Cruz, 2 ♀, VII-1904 (F. X. Williams, C.A.S.).
STANISLAUS CO.: Modesto, 5 mi. NE., ♀, VI-19-47 (H. T. Reynolds, C.I.S.).
TUOLUMNE CO.: near Lake Eleanor, ♀, VII-29-30 (E. C. Zimmerman, C.A.S.).
VENTURA CO.: near Pine Mountain, 2 ♀, VIII-13-41 (J. E. Hare, C.I.S.).

Discussion:

The color of the dorsal vestiture of this species varies from bright scarlet to nearly ocher with the former color predominating in the specimens used for this study. As Mickel (1928:241) has already noted, the brown ocher specimens of *flammifera* are nearly the same in appearance as the yellow females of *sackenii*. In studying the gradational color forms of both *flammifera* and *sackenii* the writer experienced some difficulty in allocating certain individuals. Mickel (1928:48 and 1936:32) has utilized in his keys the relative development of the carinae above the antennal scrobes as the main character for separating *flammifera* and *sackenii*. In the original description of *flammifera* (Mickel, 1928:240) the antennal scrobes are stated to be "distinctly carinate above" which stands in contrast to the "feebly carinate" condition described in both keys (1928, 1936). Working with metatypical material, which possessed the scarlet pubescence, as a criterion for the species, an attempt by the writer was made to find additional specific characters that might be of value for separating similarly colored specimens of the aforementioned species. In most of the specimens studied of *flammifera* the antennal scrobes do not possess the well-developed carinae present in *sackenii*. In some the carina, though not as markedly elevated as in characteristic specimens of *sackenii*, extends nearly to the inner eye margin. In others the carina extends only a little more than half the distance between the antennal tubercles and the inner eye margins. *Sackenii*, which normally exhibits the well-developed carinae above the antennal scrobes, especially with respect to height, does, in some specimens of the "white" form, possess the weakly elevated type of carinae. Additional specific characters useful in distinguishing *flammifera* from *sackenii* as listed by Mickel (1928:241) are differences in sculpture of the genae and the character of the pubescence on the ventral surfaces of the femora. However, the writer has found these characters only of secondary importance and not translatable into words. These differences are useful, nevertheless, as refinements which are acquired by familiarity with the species.

A careful examination of all the available specimens of both species reveals that there is an apparent lack of any consistently reliable character for separating specimens which exhibit similar color of the pubescence. In general, *sackenii* has the antero-lateral tubercles of the pronotum quite well-developed and in most instances distinctly dentate or acuminate at the apex, while in *flammifera* the tubercles tend toward reduction of size which results in the loss of the dentate appearance. Moreover, the integument of *flammifera*, particularly on the lateral portions of the pronotum, including the tubercles, is much lighter in color than that found in *sackenii*. The cephalic carina of the propleura is generally quite distinct in *flammifera*.

If, as has been pointed out in the discussion of *testaceiventris*, distributional similarities of *flammifera* and *testaceiventris* are significant, then there remains but little doubt that these are sexes of one and the same species. However, the writer believes that *flammifera* as now understood may well include three rather closely related species since *testaceiventris* is not known to occur in Arizona or Idaho and also since *flammifera* now includes several morphologically variable forms. Possibly the *flammifera* specimens from Arizona and Idaho may be females of a species now known only from the male sex.

Dasymutilla gloriosa (Saussure)[6]

Mutilla gloriosa Saussure, 1867, Ann. Soc. Ent. France, ser. 4, 7:359, plate 8, figures 9, 9a. Type ♀, California inferior ... in Promontorio Sancti-Lucae ... (Museum d'Histoire Naturelle, Geneva, Switzerland).

Geographic range:
Mex., Tex., N. Mex., Ariz., Lower Calif., Calif., Nev., and Utah.

California records:
IMPERIAL CO.: Westmorland, ♀, VII-20-33 (H. S. Gentry, U.C.D.).
INYO CO.: Olancha, ♂, VIII-6-48 (P. D. Hurd, Jr., and J. W. MacSwain, C.I.S.).
RIVERSIDE CO.: Blythe, ♀, V-8-47 (E. G. Linsley, C.I.S.); ♀, VI-22-47 (W. F. Barr, C.I.S.). Coachella, ♀, VII-15-27 (F. H. Wymore, C.A.S.); ♂, VII-15-27 (U.C.D.). Palm Springs, ♀, V-19-17 (E. P. Van Duzee, C.A.S.); ♀, IX-15-30 (E. C. Van Dyke, C.A.S.); 2 ♀, VIII-28-34 (C. M. Dammers, C.A.S.). Palms to Pines Highway, 1000 ft., ♂, VI-12-40 (C. D. Michener, C.I.S.). Banning, ♀, IX-1859 (W. G. Wright, C.A.S.). Whitewater, ♂, ♀, VII-9-50 (E. G. Linsley, C.I.S.); ♂, same data (J. D. Paschke, C.I.S.); ♂, same data (P. D. Hurd, Jr., C.I.S.). Indio, ♂, V-6-47 (J. W. MacSwain, C.I.S.).
SAN BERNARDINO CO.: Needles, ♀, XII-5-21 (J. A. Kusche, C.A.S.). Yermo, ♀, VI-16-39 (W. M. Pearce, C.I.S.).
SAN DIEGO CO.: ♀, VII-29-13 (E. P. Van Duzee, C.A.S.). Borego Valley, ♀, VI-6-40 (A. Perry, C.I.S.). Borego, 2 ♀, VI-2-46 (J. R. Fisher, C.I.S.). Borego State Park, 2 ♂, IV-25-50 (C. D. MacNeill); 4 ♂, IV-26-50 (C. D. MacNeill).

Dasymutilla magna (Cresson)

Mutilla magna Cresson, 1865, Proc. Ent. Soc. Phila., 4:385-386. Type ♀, Cape St. Lucas, Lower California (American Entomological Society of Philadelphia).

Geographic range:
Mex., Lower Calif., Calif., Ariz., and Colo.

California records:
IMPERIAL CO.: Fort Yuma, 2 ♀, VII-1929 (C.A.S.). El Centro, ♀, X-5-25 (J. D. Gunder, C.A.S.); ♀, IX-2-48 (C.I.S.). Brawley, 2 ♀, X-22-48 (C.I.S.).
RIVERSIDE CO.: Blythe, ♀, VI-15-47 (R. F. Smith, C.I.S.). North of Salton Sea, ♀, VI-22-40 (W. F. Barr, C.I.S.).

Discussion:
Cresson (1865:385) stated that this species occurred from California eastward to Texas and Kansas, but there are no subsequent records of the species occurring east of Colorado (Blake, 1871:235).

Dasymutilla magnifica Mickel

Dasymutilla magnifica Mickel, 1928, Bull. U.S. Nat. Mus., No. 143:50, 54, 153, 234-237, 240, 259, plate 3, figure 24. Type ♀, Pima County, Arizona (University of Minnesota).

Geographic range:
Mex., *Lower Calif., Calif., Nev., Ariz., and N. Mex.

California records:
IMPERIAL CO.: San Felipe Valley, ♀, VII-19-31 (F. B. Sumner, C.A.S.).
LOS ANGELES CO.: Claremont, ♀, V-25-98 (C.A.S.).
RIVERSIDE CO.: Coxcomb Mountains, Joshua Tree National Monument, ♀, X-12-47 (L. M. Smith, C.I.S.). Palm Springs, ♀, III-22-16 (C. L. Fox, C.A.S.); ♀, III-25-16 (C. L. Fox, C.A.S.); ♀, V-19-17 (E. P. Van Duzee, C.A.S.); ♀, IV-18-22 (C. A. Hill, C.A.S.). Soboba Springs, ♀, V-31-17 (E. P. Van Duzee, C.A.S.). Beaumont, ♂, IX-16-89 (W. S. Wright, C.A.S.). Hemet, 10 mi. SW, 3 ♂, VII-19-46 (P. D. Hurd, Jr. and R. F. Smith, C.I.S.). Riverside, ♀, VII-8-36 (C.I.S.).

Discussion:
Magnifica seems to be subject to little variation in color of the vestiture, particularly that on the adbominal tergites. In some individuals the pubescence may show considerable wear with an accompanying fading of the red to orange.

Dasymutilla sackenii (Cresson)[7]

Mutilla sackenii Cresson, 1865, Proc. Ent. Soc. Phila., 4:385. Type ♀, California (American Entomological Society of Philadelphia).

Recorded host: *Bembix occidentalis beutenmuelleri* Fox (Bohart and MacSwain, 1939:89-90).

Geographic range:
Lower Calif., Calif., Ariz., Nev., and Oreg.

California records:
ALAMEDA CO.: Tesla, Corral Hollow, ♀, (W. E.

[6] *Mutilla tecta* Cresson and *Dasymutilla reperticia* Mickel are synonyms of *gloriosa* (Saussure).

[7] *Sphaerophthalma eurdita* (Cresson) is a synonym of *sackenii* (Cresson).

Ferguson, C.I.S.); ♂, X-15-48 (P. D. Hurd, Jr., C.I.S.); ♂, same data (J. W. MacSwain, C.I.S.). Altamont, 5 ♂, VII-1937 (E. S. Ross, C.A.S.).

ALPINE CO.: Woodfords, 3 mi. NE., ♀, VIII-21-49 (C. D. MacNeill).

CONTRA COSTA CO.: Oakley, 2 ♂, IX-5-37 (E. C. Van Dyke, C.A.S.). Antioch, 2 ♀, V-8-32 (C.I.S.); 8 ♂, 9 ♀, VIII-15-32 (C.A.S.); ♀, VIII-17-32 (C.A.S.). ♂, VI-8-33 (U.C.D.); ♀, VII-4-33 (C.A.S.); ♀, VII-26-33 (U.C.D.); 8 ♂, VII-26-33 (C.A.S.); ♀, IV-21-34 (U.C.D.); 2 ♂, 2 ♀, IX-9-35 (U.C.D.); ♂, ♀, IX-9-35 (G. E. & R. M. Bohart, U.C.D.); ♀, IX-4-36 (E. C. Van Dyke, C.A.S.); 4 ♂, 8 ♀, IX-10-36 (G. E. & R. M. Bohart, C.A.S., C.I.S., U.C.D.); ♀, IX-13-36 (E. C. Van Dyke, C.A.S.); ♀, VIII-1937 (E. S. Ross, C.A.S.); ♀, IX-17-37 (E. C. Van Dyke, C.A.S.); 2 ♂, IX-26-37 (K. D. Snyder, C.I.S.); ♂, ♀, VII-31-38 (E. P. Van Duzee, C.A.S.); ♂, 2 ♀, VIII-7-38 (J. W. MacSwain, C.I.S.); 6 ♂, VIII-21-38 (E. C. Van Dyke, C.A.S.); ♀, VIII-25-38 (E. C. Van Dyke, C.A.S.); ♂, VIII-27-38 (E. C. Van Dyke, C.A.S.); ♀, VIII-27-38 (K. D. Snyder, C.I.S.); ♂, 2 ♀, IX-2-38 (T. H. G. Aitken, C.A.S.); ♂, 3 ♀, IX-4-38 (E. C. Van Dyke, C.A.S.); 3 ♂, 3 ♀, IX-9-38 (E. C. Van Dyke, C.A.S.); 11 ♂, 21 ♀, IX-18-38 (E. C. Van Dyke, C.A.S.); ♂, VIII-17-39 (G. F. Smith, C.I.S.); ♀, VIII-27-39 (C.A.S.); ♂, 2 ♀, VI-30-40 (E. C. Van Dyke, C.A.S.); ♂, IX-2-40 (E. C. Van Dyke, C.A.S.); ♂, ♀, X-20-40 (E. C. Van Dyke, C.A.S.); 2 ♂, 2 ♀, VII-27-41 (E. C. Van Dyke, C.A.S.); ♀, VIII-19-41 (E. C. Van Dyke, C.A.S.); 2 ♂, IX-13-41 (J. R. Fisher, C.I.S.); ♀, IX-26-41 (C.I.S.); ♀, VII-19-42 (W. E. Ferguson, C.I.S.); ♂, VIII-23-42 (E. C. Van Dyke, C.A.S.); ♀, VIII-9-47 (P. D. Hurd, Jr., C.I.S.); 3 ♀, VIII-9-47 (U. N Lanham, C.I.S.); ♀, X-12-47 (C. C. Lanham, C.I.S.); ♀, X-13-47 (P. D. Hurd, Jr., C.I.S.); ♀, X-19-47 (C. A. Hanson, C.I.S.); 2 ♂, IX-8-48 (P. D. Hurd, Jr., C.I.S.); ♂, ♀, X-24-48 (P. D. Hurd, Jr., C.I.S.); ♀, V-20-49 (C. D. MacNeill); ♀, V-21-49 (P. D. Hurd, Jr., C.I.S.); ♂, VIII-12-49 (J. W. MacSwain, C.I.S.); ♂, X-1-49 (C. D. MacNeill); ♂, X-3-49 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-11-50 (P. D. Hurd, Jr., C.I.S.).

ELDORADO CO.: Chile Bar, 2 ♀, VII-5-48 (P. D. Hurd, Jr., C.I.S.); ♀, same data (J. W. MacSwain, C.I.S.).

FRESNO CO.: ♂ (E. C. Van Dyke, C.A.S.). Coalinga, 4 ♂, VII-18-46 (P. D. Hurd, Jr., C.I.S.). Mercy Hot Springs, ♀, VI-1941 (P. Crane, C.I.S.). Firebaugh, ♀, VI-13-49 (A. D. Telford, C.I.S.).

IMPERIAL CO.: El Centro, ♀, X-5-23 (J. D. Gunder, C.A.S.).

INYO CO.: Independence, ♂, VI-17-37 (C.I.S.). Lone Pine, 2 ♂, VI-6-37 (N. W. Frazier, C.I.S.); ♀, VI-17-37 (E. C. Van Dyke, C.A.S.); ♂, same data (C.I.S.); ♂, VI-20-37 (C.I.S.); ♀, VI-21-37 (E. C. Van Dyke, C.I.S.).

KERN CO.: Shafter, ♀, VI-1-40 (C. G. Lewis, C.I.S.). Taft, ♀, IX-30-49 (C.I.S.). Bakersfield, 10 mi. N., ♀, VII-3-46 (F. A. Ehrenford, C.I.S.). Kern River at mouth of Kern Canyon, ♀, VII-30-39 (C.I.S.). Kern Park, 3 ♂, ♀, VII-18-46 (F. A. Ehrenford, C.I.S.); ♂, VII-28-46 (F. A. Ehrenford, C.I.S.). McKittrick, ♀, X-12-35 (G. L. Lewis, C.I.S.).

LAKE CO.: Pillsbury Lake, ♀, IX-25-33 (U.C.D.). Clear Lake, ♀, VII-28-34 (E. C. Van Dyke, C.A.S.).

LASSEN CO.: Hallelujah Jct., ♀, VIII-9-49 (J. W. MacSwain, C.I.S.).

LOS ANGELES CO.: Los Angeles, ♀, IX-25-32 (A. T. McClay, U.C.D.); ♀, VIII-10-38 (C.A.S.). Claremont, ♀ (L. H. Muzzall, C.A.S.). San Antonio Canyon, San Gabriel Mts., ♀, VII-6-25 (T. Craig, C.A.S.). San Dimas, ♀, X-20-38 (K. Frick, C.I.S.). Santa Anita Canyon, Sierra Madre Mts., ♀, VII-27-11 (J. I. Carlson, C.A.S.). Barley Flats, Angeles National Forest, 5,500 ft., ♀, VI-24-18 (V. Duran, C.A.S.). Pacoima, ♂, ♀, IX-27-36 (R. E. Beer). Eagle Rock, ♀, X-18-36 (J. R. Fisher, C.I.S.). Mt. San Antonio, ♂, VIII-5-48 (W. E. Kelson, C.I.S.). Tanbark Flat, San Dimas Experimental Forest, ♂, ♀, VI-19-50 (J. W. MacSwain, C.I.S.); ♂, same data (P. D. Hurd, Jr., C.I.S.); 5 ♂, ♀, VI-20-50 (J. W. MacSwain, C.I.S.); 3 ♂, ♀, same data (O. D. Hurd, Jr., C.I.S.); 2 ♂; VI-25-50 (P. D. Hurd, Jr., C.I.S.); ♂, same data (J. W. MacSwain, C.I.S.); ♂, VII-4-50 (P. D. Hurd, Jr., C.I.S.); ♂, VII-7-50 (J. W. MacSwain, C.I.S.); 2 ♂, VII-12-50 (P. D. Hurd, Jr., C.I.S.); ♂, VII-13-50 (P. D. Hurd, Jr., C.I.S.).

MARIN CO.: Stinson Beach, ♀, IX-24-? (U.C.D.).

MADERA CO.: Bass Lake, ♀, VII-10-34 (F. E. Blaisdell, C.A.S.), ♀, VI-7-40 (E. C. Van Dyke, C.A.S.). Madera, ♀, VII-17-50 (H. F. Madsen, C.I.S.).

MERCED CO.: Dos Palos, 2 ♂, VIII-15-47 (V. M. Stern, C.I.S.). Dos Palos, 6 mi. SW., ♂, ♀, VIII-22-50 (C. D. MacNeill). Turner Island, near Dos Palos, ♂, VII-9-50; ♀, VII-18-50; 14 ♀, VII-24-50; ♂, ♀, VIII-22-50; ♂, VIII-23-50; 5 ♂, ♀, VIII-29-50; ♂, 2 ♀, IX-5-50 ♀, IX-6-50 (all collected by C. D. MacNeill).

MONO CO.: Benton, ♀, IV-25-42 (W. M. Pearce, C.I.S.).

MONTEREY CO.: Paraiso, ♀, VII-26-24; ♀, VII-31-24; ♀, VI-18-30; ♀, VIII-27-33 (all collected by L. S. Slevin, C.A.S.). Big Sur River ♀, VII-1-17 (P. G. Fair, C.A.S.). Big Sur, ♀, VII-1934; ♀, VII-1935 (L. S. Slevin, C.A.S.). Monterey, ♀, V-27-39 (G. Heid, C.A.S.). Monterey, 3 mi. NE., ♀, VII-28-20 (L. S. Slevin, C.A.S.).

ORANGE CO.: Newport Beach, ♀, VIII-20-30 (U.C.D.). Newport Bay, ♀, V-17-40; ♀, VII-9-40; ♀, VII-21-40; 2 ♂, ♀, VIII-1-41; 3 ♀, VIII-6-41 (all collected by P. D. Hurd, Jr.. C.I.S.). Brea, 2 ♀, V-28-27 (J. Stives, C.A.S.). Olive, ♀, VII-10-40 (M. M. Barnes, C.I.S.). Santa Ana, ♀, IX-1933 (E. E. Seibert, C.I.S.).

RIVERSIDE CO.: Riverside, ♀, VII-1917; ♂, VIII-26-34 (C. M. Dammers, C.I.S.); ♀, VIII-24-35 (C. M. Dammers, C.A.S.); ♀, VIII-27-34 (C. M. Dammers, C.A.S.). Corona, ♂, ♀, VI-1911 (C.A.S.). Elsinore, ♀, V-1932 (E. E. Seibert, C.I.S.). San Jacinto Mts., ♂, V-30-40 (C. D. Michener, C.I.S.). Ribbonwood, San Jacinto Mts., ♀, V-21-40 (H. T. Reynolds, C.I.S.). Idyllwild, ♀, VI-21-39 (J. H. Dorman, C.I.S.).

SAN BERNARDINO CO.: Stoddard Springs, ♂, VII-16-25 (T. Craig, C.A.S.). Oak Glenn Lodge, 5000 ft., ♀ (F. S. Daggett). Chino ♀, VII-9-32 (C.A.S.).

SAN DIEGO CO.: ♂, VIII-23-91 (F. E. Blaisdell, C.A.S.); 2 ♀, IX-4-13 (E. P. Van Duzee, C.A.S.); ♀, VI-6-14 (E. P. Van Duzee, C.A.S.). San Diego 2 ♀, VIII-1918 (C.A.S.). Poway, ♀, V-24-85 (F. E. Blaisdell, C.A.S.). Point Loma, ♀, VII-4-26 (C.A.S.). Monte Robles, ♀, VII-22-28 (C. C. Searl, C.A.S.).

SAN JOAQUIN CO.: Stockton, ♀, VIII-20-19 (E. P. Van Duzee, C.A.S.). Tracy, 7 ♂, ♀, IX-3-46 (P. D. Hurd, Jr., C.I.S.); ♀, IX-3-48 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-16-49 (J. W. MacSwain, C.I.S.). Manteca, ♀, X-12-38 (K. S. Hagen, C.I.S.).

SAN LUIS OBISPO CO.: Morro, ♀, IV-30-17 (L. S. Slevin, C.A.S.).

SAN MATEO CO.: Burlingame, ♀, VII-17-09 (J. A. Kusche, C.A.S.); 3 ♀, VII-20-09 (J. A. Kusche, C.A.S.). San Mateo, ♀, IX-9-13 (C.A.S).

SANTA BARBARA CO.: Santa Barbara, 3 ♀, IX-6-48 (K. W. Tucker, C.I.S.). Cuyama Valley, 2 ♀, VI-1940 (C.I.S.); ♂, 4 ♀ (W. E. Cawelti, C.I.S.). Santa Ynez Valley, ♀, VII-1915 (C. H. Muzzall, C.A.S.).

SANTA CLARA CO.: Los Altos, ♀, VIII-20-39 (K. Frick, C.I.S.).

SANTA CRUZ CO.: Santa Cruz, ♀, VI-1-36 (C.A.S.); ♂, ♀, same data (U.C.D.). Ben Lomond, 2 ♀, V-2-31 (G. Heid, C.A.S.). Mt. Hermon, ♂, ♀, VII-7 to 30-22 (F. E. Blaisdell).

STANISLAUS CO.: Oakdale, ♀, VII-3-48 (F. B. Davis, C.I.S.). Patterson, ♀, VII-23-49 (T. F. Leigh, C.I.S.). Westley, ♂, VII-3-49; 2 ♀, VII-18-49; ♀, VII-21-49; ♀, VII-23-49 (all collected by T. F. Leigh, C.I.S.).

SUTTER CO.: Nicolaus, 2 ♀, VI-22-44 (A. T. McClay, U.C.D.).

TULARE CO.: Camp Wishon, 3 ♀, VII-4-39 (E. C. Van Dyke, C.A.S.); ♀, VI-21-37 (E. C. Van Dyke, C.A.S.). Lindsay, ♀, VII-31-09 (C.A.S.). Potwisha, Sequoia National Park, 2000-3000 ft., ♀, V-28-29 (E. C. Van Dyke, C.A.S.).

TUOLUMNE CO.: Lake Eleanor, ♂, VII-29-30 (E. C. Zimmerman). Yosemite, 3880-4000 ft., ♀, V-12-28 (E. O. Essig, C.I.S.).

VENTURA CO.: Santa Paula, ♀, VI-6-26 (C.A.S.); ♀, VI-13-26 (U.C.D.). Ventura, ♂, VII-20-26 (U.C.D.). Sespe Canyon, ♂, VI-9-26 (U.C.D.).

YOLO CO.: Davis, ♀, VII-1-26 (F. H. Wymore, U.C.D.); ♀, IX-1935 (U.C.D.); ♀, IX-12-37 (U.C.D.); ♀, VIII-26-39 (G. E. Bohart, U.C.D.); ♀, X-5-39 (U.C.D.).

Discussion:

The dorsal vestiture of this species, particularly in the females, exhibits a remarkable

Figure 1. Male (above) and female (below) of *Dasymutilla sackenii* (Cresson).

north-south geographical color variation. Two rather well-defined differentiation units—one northern and one southern—are visible when specimens are plotted. Essentially, physical isolation is lacking. The southern unit is well marked, being characterized by the uniform white colored dorsal vestiture. Geographically this form occurs on the Pacific slope of southwestern California with a northeastern extension of its range along the eastern flanks of the Sierra Nevada Mountains into Inyo County and northward, and a northwestern extension through the Tehachapi mountains into the southern portion of the San Joaquin Valley. Coastally the unit terminates in the Santa Barbara-San Luis Obispo district.

The northern differentiation unit lacks the homogeneity of color expression found in the southern counterpart, except perhaps in the males. Such a condition is understandable in view of the more diversified environmental influences—particularly with respect to temperature and humidity. This unit, which appears to reach maximum expression of color variation in the humid coastal section of Monterey and Santa Cruz Counties, is characterized, in general, by the yellow color of the dorsal vestiture. Geographically the unit occupies the humid coastal areas of Monterey, Santa Cruz, San Mateo, San Francisco, Marin, and Mendocino Counties eastward through the northern portion of the San Joaquin and Sacramento Valleys to the west and east central flanks of the Sierra Nevada Mountains.

Cresson (1875:120) recognized the northern unit and regarded it as a distinct species, *erudita*, as did Blake (1886:186, 217); however, Mickel (1928:238) has regarded *erudita* as a synonym of *sackenii* owing to the apparent lack of constancy in the degree of color variation.

Intergradation with the southern unit has been observable only in the San Joaquin Valley and because of this our knowledge of the inter-racial relationships is incomplete; however, since the variation is geographical, it appears that *erudita* may ultimately be regarded as a subspecies of *sackenii*.

Additional specimens of *sackenii* have not been recorded or seen from Arizona and Lower California and the original citations may rest upon misidentified material.

Dasymutilla satanas Mickel[8]

Dasymutilla satanas Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*:50, 239-240. Type ♂, Bill Williams Fork, Arizona (University of Kansas).

Geographic range:

*Lower Calif., Calif., Ariz., and Nev.

California records:

IMPERIAL CO.: Fort Yuma, 2 ♀, VII-1929 (C.A.S.); 4 ♂, VI-28-36 (G. E. & R. M. Bohart, U.C.D.). Westmorland, ♀, VII-20-24 (U.C.D.); 2 ♀, VII-20-33 (U.C.D.). Holtville, ♂, VI-28-36 (M. A. Cazier, C.I.S.); ♂, VI-1936 (E. S. Ross, C.A.S.); ♂, ♀, VI-23-40 (K. S. Hagen, C.I.S.).

INYO CO.: Argus Mountains, ♂, VI-4-39 (R. M. Bohart, C.A.S.). Olancha, 3 mi. S., ♂, ♀, VIII-6-48 (P. D. Hurd, Jr., and J. W. MacSwain, C.I.S.).

KERN CO.: Lost Hills, ♀, VIII-1923 (G. Heid, C.A.S.). Dove Springs, 3 ♀, VIII-12-37 (R. E. Beer). Arvin, ♀, VII-22-46 (F. A. Ehrenford, C.I.S.).

RIVERSIDE CO.: Coachella, ♀, VI-11-27 (U.C.D.). Indio, 2 ♀, VII-10-26 (C.A.S.); ♂, VI-27-36 (M. A. Cazier, C.I.S.); ♀, same data (U.C.D.); ♀, VI-21-36 (M. A. Cazier, C.A.S.). Blythe, ♀, VII-4-47 (W. F. Barr, C.I.S.); ♂, VII-23-47 (W. F. Barr, C.I.S.); 4 ♂, 3 ♀, VIII-6-47 (T. W. Fisher, C.I.S.).

SAN BERNARDINO CO.: Mojave Desert, ♀, 1937 (C.A.S.). Vidal, ♀, VIII-29-47 (J. W. MacSwain, C.I.S.).

Discussion:

A female specimen which is unquestionably referable to this species and which possesses the characteristic ochraceous vestiture is labelled Petaluma, Sonoma County, California, July 20, 1935 (E. C. Johnston, C.A.S.). If this is a valid record the range of the species is greatly extended in a northerly direction and represents an occurrence in a habitat wholly different from that now known for *satanas*. One male from Holtville, Riverside County, California has the pit on the second abdominal sternite reduced to a shallow excavation (similar to that found in *fulvohirta*) upon which the closely compacted hairs are borne.

Dasymutilla scitula Mickel

Dasymutilla scitula Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*:51, 56, 244-246, 279, plate 3, figure 25. Type ♂, Trout Creek, Juab County, Utah (University of Minnesota).

Geographic range:

Utah, *Nevada, *Calif.

California records:

MARIPOSA CO.: Yosemite Valley, ♀, VII-25-28 (F. H. Wymore, C.I.S.). North Fork, ♀, V-10-37 (J. R. Helfer).

MONO CO.: Owens Valley, ♂, VIII-3-30 (C.I.S.). Hot Creek, ♀, VIII-2-36 (U.C.D.).

[8] *Dasymutilla simula* Mickel is a synonym of *satanas* Mickel.

Group Obscura

Females with the head as wide or wider than the thorax; thorax pyriform; scutellar scale absent; pygidium granular; femora of middle and hind legs squarely truncate at apex, the faces of the truncation sulcate. Males with the clypeus very prominently bidentate medially; second sternite without a median pit densely filled with hairs; middle and hind femora modified at the apex like those of the females.

Dasymutilla dammersi Mickel

Dasymutilla dammersi Mickel, 1936, Pan-Pac. Ent., *12*:94-96. Type ♀, Palm Springs, California (University of Minnesota).

Geographic range:
Calif.

California records:
Known only from the type specimens.

Dasymutilla errabunda Mickel

Dasymutilla errabunda Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*:56, 269-271, 274, Type ♂, Tucson, Arizona (University of Kansas).

Geographic range:
Ariz., and *Calif.

California records:
*RIVERSIDE CO.: Indio, ♂, V-7-33 (E. P. Van Duzee, C.A.S.). Blythe, ♂, VIII-14-46 (P. D. Hurd, Jr., C.I.S.).

Discussion:
The above new records place this species for the first time on our California faunal list and strengthen the Mickel contention (1928:271) that this species may possibly be the male of *heliophila*. Both *errabunda* and *heliophila* possess in common a number of structural similarities, particularly the peculiar modification of the middle and hind femoral apices. Future collecting in the above-named states together with field experimentation should prove of value in associating the sexes of this species.

Dasymutilla heliophila (Cockerell)[9]

Sphaerophthalma heliophila Cockerell, 1900, The Entomologist, *33*:65. Type ♀, Glendale, Arizona (U.S. National Museum).

Geographic range:
Arizona and Calif.

California records:
RIVERSIDE CO.: Blythe ♀, VIII-28-46 (P. D. Hurd, Jr., C.I.S.); ♀, VI-25-47 (J. W. MacSwain, C.I.S.).

Discussion:
An indication of the host relationships of *heliophila* was obtained by J. W. MacSwain of the University of California during the summer of 1947 when he observed a member of this species "searching" in a nesting site of *Nomia nevadensis* Cresson at Blythe, Riverside County, California.

Group Arenivaga

Females with the head narrower than the thorax; eyes unusually large, the distance between the eye margins and the postero-lateral angles of the head not equal to one-third the greatest diameter of the eyes; thorax longer than broad (or as broad as long), subhexagonal, scutellar scale prominent; pygidium longitudinally rugose. Males unknown, may be represented by the following group—SUBHYALINA.

Dasymutilla arenivaga Mickel

Dasymutilla arenivaga Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*:51, 278-279, 281. Type ♀, Coyote Wells, Colorado Desert, California (Cornell University).

Geographic range:
Ariz., and Calif.

California records:
IMPERIAL CO.: Westmorland, VII-20-23 (C.I.S.); 2 ♀, VII-20-33 (H. S. Gentry, U.C.D.); ♀, VII-20-24 (U.C.D.). Palo Verde, 7 ♀, IV-8-49 (P. D. Hurd, Jr., C.I.S.).
INYO CO.: Death Valley, 2 ♀, V-19-28 (E. C. Van Dyke, C.I.S.). Ballarat, ♀, V-24-31 (J. R. Slevin, C.A.S.).
MONO CO.: Little Walker Lakes, ♀, VII-7-46 (N. Frazier, C.I.S.).
RIVERSIDE CO.: Blythe, 3 ♀, V-7-47 (E. G. Linsley, C.I.S.); ♀, VII-12-47 (W. F. Barr, C.I.S.); 2 ♀, VII-23-47 (W. F. Barr, C.I.S.). Coachella, ♀, V-19-25 (E. C. Van Dyke, C.I.S.). Devils Canyon, Coachella Valley ♀, V-7-32 (C.I.S.).
SAN BERNARDINO CO.: Yermo, ♀, V-10-39 (J. R. Helfer, C.I.S.); ♀, IV-27-49 (R. F. Smith, C.I.S.).
SAN DIEGO CO.: Borego, ♀, IV-24-49 (J. E. Gillaspy, C.I.S.).

[9] *Dasymutilla welltonensis* Bradley and Bequaert is a synonym of *heliophila* (Cockerell).

Dasymutilla nocturna Mickel

Dasymutilla nocturna Mickel, 1928, Bull. U.S. Nat. Mus., No. 143:45, 279-281, 282. Type ♀, Andrade, Colorado Sand Desert, California (University of Minnesota).

Geographic range:
Calif., and *Nev.

California records:
IMPERIAL CO.: Holtville, ♀, X-22-36 (A. T. McClay, C.I.S.). Westmorland, ♀, VII-2-38 (C.I.S.).

Dasymutilla paranocturna Barr and Hurd

Dasymutilla paranocturna Barr & Hurd, 1947, Pan-Pac. Ent., 23:88-90. Type ♀, (California Academy of Sciences).

Geographic range:
Calif.

California records:
SAN BERNARDINO CO.: Yermo, 5 mi. NE., ♀, VI-26-39 (W. M. Pearce, C.I.S.).

Megalophthalma complex

The MEGALOPHTHALMA complex, as herein defined, includes the species *megalophthalma* and *subhyalina* which are known only from the male sex and *arenivaga* (also its variety *unicolor*), *nocturna*, and *paranocturna* which are known only from the female sex. These five species possess in common one salient character—enlarged eyes—which readily distinguishes them from all other known "female species" of the genus *Dasymutilla*. Mickel (1928:277-278, 281) utilized this character along with other characters to define the two species groups—SUBHYALINA for the species *subhyalina* and *megalophthalma* (and others), and ARENIVAGA for the species *arenivaga* and *nocturna*—and stated that the males (SUBHYALINA) were probably those of the females (ARENIVAGA). On the basis of the material used in this study and a previous one (Barr and Hurd, 1947) it now appears that these *species* may represent variants of one and the same species.

The principal differences which have been used to recognize the species of the MEGALOPHTHALMA complex have been color, the nature and extent of the color pattern, and the intensity of color. A study of the males assignable to the complex and which have been collected in Arizona, California, and Nevada reveals that no appreciable structural differences appear to exist. Color of the dorsal vestiture in these specimens varies from orange to very pale yellow. The degree to which the wings are infuscated seems to be directly related to the intensity of color as exhibited by the dorsal vestiture. The variation is apparently independent of geographical distribution since the series of specimens from Blythe, Riverside County, California, display all degrees of coloration with respect to the dorsal vestiture.

The females of the MEGALOPHTHALMA complex are quite variable in both size and coloration-al characteristics. Even within any given *species* a considerable degree of apparently non-segregable geographic color variation is present. In the *arenivaga* pattern, for example, the black colored pubescence may be replaced on the third, fourth, and fifth tergites with orange colored pubescence which results in the *arenivaga*, var. *unicolor* pattern, or it may be replaced only on the third and fourth tergites, and so on. Intensity of color also is variable and imparts an apparent specific difference between any two specimens. In a gradational series of female specimens the writer has been able to align the described species in a linear sequence with a reddish pubescent *arenivaga* at one extreme and with the pale colored *nocturna* at the other. A morphological study of the females reveals that apparently no one character may be utilized consistently. The comparative dorsal measurements of the thorax have been used to separate *arenivaga* from *nocturna* and *paranocturna*, but an examination of a large series of *arenivaga* specimens shows that this character is untenable since these measurements are subject to considerable individual variation.

Since the sexes of the MEGALOPHTHALMA complex possess in common the peculiar modification of the eyes, similar distributional affinities, and related color pattern variation, the writer is of the opinion that when sufficient material becomes available, the complex may be resolved into a single polytypic species.

Group Subhyalina

Males with the eyes and ocelli unusually large; anterior margin of pronotum emarginate medially; first segment of the abdomen nodose; second abdominal sternite without a median pit densely filled with hairs; wings light fuliginous to subhyaline. Possibly the males of the species of the preceding group—ARENIVAGA.

Dasymutilla abdita Mickel[10]

Dasymutilla abdita Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*: 53, 293-296, 303, plate 5, figure 38. Type ♂, Los Angeles, California (U.S. National Museum).

Geographic range:
Calif., *Nev., Oreg., Wash., and British Columbia.

California records:

ALAMEDA CO.: Tesla, Corral Hollow, ♂, X-10-46 (W. E. Ferguson, C.I.S.); ♂, IX-25-48 (P. D. Hurd, Jr., C.I.S.). Livermore, 2 ♂, VIII-1904 (C.A.S.).

ALPINE CO.: Hope Valley, 2 ♂, VII-18-48 (R. C. Bynum, C.I.S.); ♂, same data (P. D. Hurd, Jr., C.I.S.); ♂, same data (K. W. Tucker, C.I.S.).

CALAVERAS CO.: Calaveras Lake, ♂, VII-1-20 (G. Heid, C.A.S.).

CONTRA COSTA CO.: Mt. Diablo, ♂, V-23-40 (C.I.S.); ♂, V-31-40 (C.I.S.); ♂, VI-1940 (C.I.S.). Antioch, ♂, IX-6-30 (G. E. Bohart, U.C.D.); 2 ♂, VI-8-33 (C.I.S., U.C.D.); ♂, VII-3-33 (C.I.S.); 4 ♂, IX-10-33 (C.I.S., U.C.D.); ♂, IX-9-35 (U.C.D.); ♂, IX-20-36 (E. C. Van Dyke, C.A.S.); ♂, IX-4-38 (E. C. Van Dyke, C.A.S.); 2 ♂, VIII-10-41 (E. C. Van Dyke, C.A.S.); ♂, VIII-9-47 (U. N. Lanham, C.I.S.); ♂, same data (P. D. Hurd, Jr., C.I.S.); ♂, V-24-49 (E. G. Linsley, C.I.S.); ♂, VIII-11-50 (P. D. Hurd, Jr., C.I.S.); ♂, X-1-49 (C. D. MacNeill); ♂, X-3-49 (P. D. Hurd, Jr., C.I.S.).

ELDORADO CO.: Quincy, 4 mi. W., ♂, VII-3-49 (P. D. Hurd, Jr., C.I.S.).

FRESNO CO.: Coalinga, 10 ♂, VII-18-46 (P. D. Hurd, Jr., C.I.S.). Fresno, ♂, VI-21-49 (C.I.S.).

HUMBOLDT CO.: Honeydew, ♂, VI-20-50 (J. N. Simons, C.I.S.).

KERN CO.: Poso Creek, ♂, VI-5-29 (R. L. Usinger, C.I.S.). Shafter, ♂, IX-14-35 (G. L. Smith, C.I.S.); ♂, VIII-10-40 (C. G. Lewis, C.I.S.). Famosa, 20 mi. N., ♂, VII-18-41 (D. J. Raski, C.I.S.).

LASSEN CO.: Hallelujah Jct., 2 ♂, VII-4-49 (P. D. Hurd, Jr., C.I.S.); 15 ♂, same data (J. W. MacSwain, C.I.S.); 3 ♂, same data (F. Morishita, C.I.S.); ♂, same data (J. N. Simons, C.I.S.); ♂, same data (R. L. Sisson, C.I.S.).

LOS ANGELES CO.: Griffith Park, Los Angeles, ♂, XI-10-35 (R. E. Beer). Big Dalton Dam, ♂, VI-25-50 (J. W. MacSwain, C.I.S.). Tanbark Flat, San Dimas Experimental Forest, ♂, VI-25-50 (P. D. Hurd, Jr., C.I.S.); ♂, VII-4-50 (J. W. MacSwain, C.I.S.); ♂, VII-7-50 (J. W. MacSwain, C.I.S.).

MERCED CO.: Dos Palos, ♂, VIII-12-47 (V. M. Stern, C.I.S.); 2 ♂, VIII-15-47 (V. M. Stern, C.I.S.); 2 ♂, VIII-20-47 (V. M. Stern, C.I.S.); 2 ♂, VIII-13-48 (D. W. Adams, C.I.S.); 2 ♂, VII-7-49 (A. D. Telford, C.I.S.); ♂, VIII-17-49 (A. D. Telford, C.I.S.); 5 ♂, VIII-18-49 (A. D. Telford, C.I.S.). Dos Palos, 6 mi. SW., ♂, VIII-22-50 (C. D. MacNeill). Turner Island, near Dos Palos, ♂, VII-19-50; ♂, VII-24-50; ♂, VIII-9-50; 2 ♂, VIII-29-50; 3 ♂, IX-5-50 (all collected by C. D. MacNeill, C.I.S.).

MODOC CO.: near Canby, ♂, VIII-1-38 (E. C. Van Dyke, C.A.S.). Lake City, ♂, VII-27-22 (C. L. Fox, C.A.S.).

MONTEREY CO.: Paraiso Springs, ♂, V-27-24 (L. S. Slevin, C.A.S.); ♂, IX-4-24 (L. S. Slevin, C.A.S.). Hastings Reservation, Jamesburg Route, 2 ♂, VI-28-40 (G. F. Smith, C.I.S.). Carmel, ♂, VI-10-17 (E. C. Van Dyke, C.A.S.). Pacific Grove, ♂, IX-11 to 16-20 (F. E. Blaisdell, C.A.S.).

ORANGE CO.: Newport Bay, ♂, VIII-1-40; 3 ♂, VIII-6-40; 10 ♂, VII-17-41 (all collected by P. D. Hurd, Jr., C.I.S.).

PLACER CO.: Tahoe, 5 ♂, VII-1925 (F. X. Williams, C.A.S.).

PLUMAS CO.: Meadow Valley, 4000-5000 ft., ♂, VI-1-24; ♂, VI-2-24; 9 ♂, VI-21-24; ♂, VI-27-24 (all collected by E. C. Van Dyke, C.A.S.); ♂, VI-28-24 (U.C.D.). Quincy, 4 mi. W., ♂, VII-3-49 (P. D. Hurd, Jr., C.I.S.).

RIVERSIDE CO.: Banning, ♂, VI-5-39 (D. J. Raski, C.I.S.). Hemet Reservoir, 2 ♂, VI-13-39 (E. S. Ross, C.A.S.). Corona, ♂, V-14-14 (C.I.S.).

SAN BENITO CO.: Panoche, 2 ♂, V-15-30 (E. C. Van Dyke, C.A.S.).

SAN BERNARDINO CO.: Big Bear Lake, ♂, VII-7-34 (I. McCracken, C.A.S.). Lake Arrowhead, ♂, VII-8-37 (J. R. Fisher, C.I.S.). Rialto, ♂, VIII-14-38 (P. D. Hurd, Jr., C.I.S.).

SAN DIEGO CO.: San Diego, ♂, VI-6-14 (E. P. Van Duzee, C.A.S.). Borego Valley, ♂, VI-6-40 (D. J. Raski, C.I.S.). San Felipe Valley, ♂, VI-7-40 (C. D. Michener, C.I.S.).

SAN FRANCISCO CO.: San Francisco, 3 ♂, IX-11-21 (C. L. Fox, C.A.S.); ♂, VIII-13-22 (C. L. Fox, C.A.S.). Lone Mountain, ♂, VI-1920 (F. X. Williams, C.A.S.); ♂, VII-3-22 (F. X. Williams, C.A.S.).

SAN JOAQUIN CO.: Stockton, ♂, VIII-20-19 (E. P. Van Duzee, C.A.S.). Hospital Canyon, ♂, VIII-26-48 (R. F. Smith, C.I.S.). Tracy, ♂, IX-3-46 (P. D. Hurd, Jr., C.I.S.); ♂, VIII-13-48 (D. W. Adams, C.I.S.); 2 ♂, VI-7-49 (J. W. MacSwain, C.I.S.); ♂, same data (R. F. Smith, C.I.S.); 2 ♂, V-31-49 (J. W. MacSwain, C.I.S.); ♂, VIII-1-49 (P. D. Hurd, Jr.,

[10] *Mutilla testaceiventris* Fox, in part, was confused by that author with *abdita*, *cf.* Mickel, 1928:293, 296.

C.I.S.); ♂, IX-21-49 (J. W. MacSwain, C.I.S.).

SAN MATEO CO.: Redwood City, ♂, VII-24-22 (F. X. Williams, C.A.S.).

SANTA BARBARA CO.: Sunset Valley, ♂, VII-14-38 (M. A. Cazier, C.A.S.).

SANTA CLARA CO.: Mt. Hamilton, ♂, V-25-50 (E. G. Linsley, C.I.S.).

SANTA CRUZ CO.: Mt. Hermon, ♂, VII-7 to 30-22 (F. E. Blaisdell, C.A.S.). Bear Valley, Santa Cruz Mts., ♂, VII-1913 (F. C. Clark, C.A.S.). Santa Cruz, ♂, VI-1-36 (U.C.D.).

SHASTA CO.: Hat Creek Ranger Station, 2 ♂, VI-30-47 (C. A. Hanson, C.I.S.).

SIERRA CO.: Calpine, ♂, VIII-27-48 (J. W. MacSwain, C.I.S.).

TULARE CO.: Springville, ♂, VI-1-40 (C. G. Lewis, C.I.S.).

TUOLUMNE CO.: Tioga Pass, 2 ♂, VII-3-33 (C.I.S., U.C.D.). Sonora, ♂, V-6-38 (C. D. MacNeill).

VENTURA CO.: Santa Paula, ♂, VI-13-26 (U.C.D.); ♂, VI-3-27 (C.I.S.); ♂, VII-11-27 (C.I.S.); ♂, VII-13-31 (C.I.S.). Saticoy, ♂, VI-24-? (U.C.D.); ♂, VII-27-? (U.C.D.); ♂, V-30-26 (U.C.D.).

Discussion:

That *abdita* and *californica* represent one species now seems certain. In the discussion of *californica* the reasons for considering such to be the case have been enumerated. However, in the absence of conclusive evidence the writer has refrained from effecting the synonymy as indicated.

Abdita is frequently confused with the male of *coccineonirta*. The external morphological characters of these species are at best only fully appreciated by familiarity. Mickel (1928:53, 295) has utilized the relative lengths of the first flagellar segment in comparison with the second flagellar segment, presence or absence of an emargination on the cephalic margin of the pronotum, and the punctuation of the apical margin of the clypeus as external characters by which *abdita* and *coccineohirta* may be separated. Nevertheless, there are individuals which seem intermediate in these respects, making it essential to remove and study the genitalia. During the course of this study, the author discovered an additional external character which seems to be more useful in distinguishing the males of these species. In *coccineohirta* the second abdominal sternite is broadly depressed medially and sculptured with rather small, almost setigerous, punctures which stand in contrast to the larger and coarser surrounding punctures. The depressed surface is quite shiny, especially when viewed from the side in bright light, probably owing to the reduction in size of the punctures on its surface. *Abdita* possesses no such modification. The sculpturing is almost uniform and there is no depressed shiny area medially.

Specimens from the northern portions of the range, which are most probably the males of *clio*, have the yellowish pubescence on the second abdominal tergite restricted to the apical margin of that segment.

Dasymutilla megalophthalma Mickel

Dasymutilla megalophthalma Mickel, 1928, Bull. U.S.-Nat. Mus., No. *143*:52, 282-284. Type ♂, Yuma County, Arizona (American Museum of Natural History).

Geographic range:

Ariz., Calif., and *Nev.

California records:

RIVERSIDE CO.: Palm Springs, 2 ♂, V-23-17 (E. P. Van Duzee, C.A.S.). Thermal, ♂, VI-17-40 (K. S. Hagen, C.I.S.). Blythe, ♂, VII-23-47 (W. F. Barr, C.I.S.).

Dasymutilla phaon (Fox)[11]

Mutilla phaon Fox, 1899, Trans. Amer. Ent. Soc., 25:235, 243. Type ♂, Arizona (American Entomological Society of Philadelphia).

Geographic range:

Ariz., *Calif., N. Mex., Tex., and Utah.

California records:

*INYO CO.: Lone Pine, ♂, VI-14-37 (E. C. Van Dyke, C.I.S.); ♂, VI-18-37 (C.I.S.).

Dasymutilla phaon, var. *fimbrialis* Mickel

Dasymutilla phaon, var. *fimbrialis* Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*:53, 302. Type ♂, Utah (U.S. National Museum).

Geographic range:

Ariz., Calif., *Nev., and Utah.

California records:

ELDORADO CO.: Camp Snowline, ♂, VII-20-48 (S. A. Sher, C.I.S.).

INYO CO.: Lone Pine, ♂, VI-14-37 (E. C. Van Dyke, C.A.S.).

RIVERSIDE CO.: ♂, IV-1917 (E. R. Leach, C.I.S.). Blythe, 8 ♂, IV-28-39 (R. E. Beer). Coachella, ♂, V-6-29 (G. Heid, C.I.S.).

SAN BERNARDINO CO.: Yermo, ♂, VI-16-39 (W. M. Pearce, C.I.S.).

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[11] *Mutilla gorgon* Blake is a synonym of *phaon* (Fox).

SAN DIEGO CO.: Borego State Park, ♂, IV-26-50 (C. D. MacNeill, C.I.S.).
VENTURA CO.: Sespe Canyon ♂, VI-9-26 (U.C.D.).

Discussion:

Although available material is inadequate for positive conclusions, it appears that *fimbrialis* is a northwestern race of *phaon*. One specimen before the writer has the reddish pubescence of the thorax reduced to a tuft of but four hairs, while the other material used in this study is as characterized by Mickel (1928:302).

Dasymutilla subhyalina Mickel

Dasymutilla subhyalina Mickel, 1928, Bull. U.S. Nat. Mus., No. *143*:52, 281-282, 284, 297, plate 4, figure 31. Type ♂, Andrade, California, Colorado Sand Desert (University of Minnesota).

Geographic range:

Calif.

California records:

Known only from the type specimens.

Dasymutilla testaceiventris (Fox)

Mutilla testaceiventris Fox, 1899, Trans. Amer. Ent. Soc., 25:235, 242. Type ♂, Poway, California (Entomological Society of Philadelphia).

Geographic range:

Calif. and Oreg.

California records:

ORANGE CO.: Newport Bay, 2 ♂, VIII-6-41 (P. D. Hurd, Jr., C.I.S.).
RIVERSIDE CO.: Hemet, ♂, IX-2-46 (J. W. MacSwain, C.I.S.).
SAN DIEGO CO.: Descanso, ♂, VIII-14-14 (W. S. Wright, C.I.S.).
SAN JOAQUIN CO.: Stockton, ♂, VIII-20-19 (E. P. Van Duzee, C.I.S.).
SANTA CRUZ CO.: Mt. Hermon, ♂, VII-7 to 30-32 (F. E. Blaisdell, C.A.S.).
VENTURA CO.: Saticoy, ♂, VI-24-? (U.C.D.).

Discussion:

The relative abundance and general distributional patterns of *flammifera* (in part) and *testaceiventris* would seem to indicate that these species are the sexes of one and the same species. Even so, there still remains a considerable average size difference between the males (*testaceiventris*) and the females (*flammifera*).

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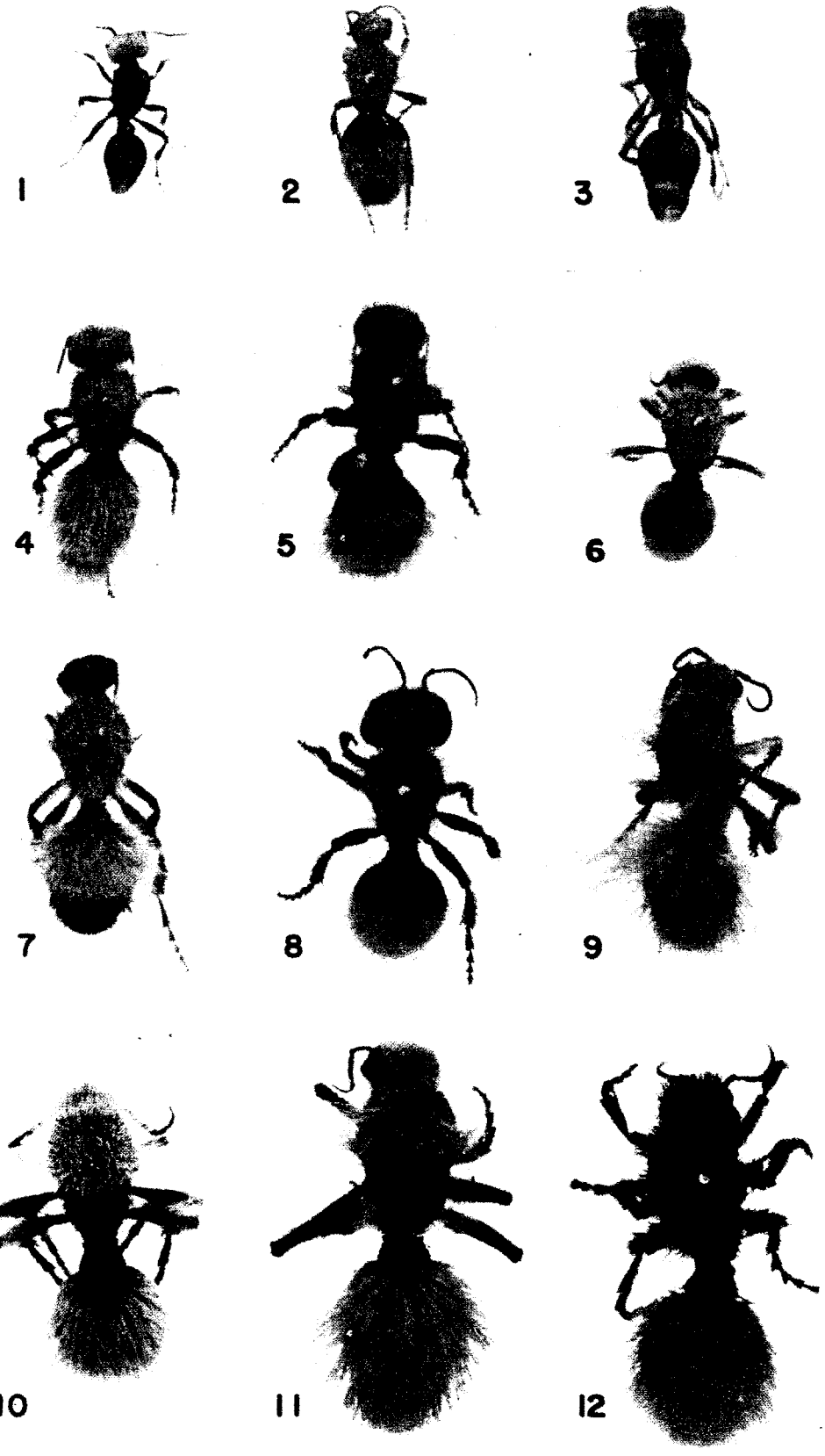
PLATE

Plate 10

Fig. 1. *Dasymutilla dammersi* Mickel
Fig. 2. *Dasymutilla californica*, var. *clio* (Blake)
Fig. 3. *Dasymutilla heliophila* (Cockerell)
Fig. 4. *Dasymutilla clytemnestra* (Fox)
Fig. 5. *Dasymutilla flammifera* Mickel
Fig. 6. *Dasymutilla eminentia* Mickel
Fig. 7. *Dasymutilla arenivaga* Mickel
Fig. 8. *Dasymutilla aureola* (Cresson)
Fig. 9. *Dasymutilla gloriosa* (Saussure)
Fig. 10. *Dasymutilla magna* (Cresson)
Fig. 11. *Dasymutilla satanas* Mickel
Fig. 12. *Dasymutilla magnifica* Mickel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