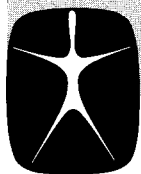


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STUDIES ON CALIFORNIA ANTS. 7.  
THE GENUS *STENAMMA*  
(HYMENOPTERA: FORMICIDAE)

*By* ROY R. SNELLING

CONTRIBUTIONS IN SCIENCE



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2721

# STUDIES ON CALIFORNIA ANTS. 7. THE GENUS *STENAMMA* (HYMENOPTERA: FORMICIDAE)<sup>1</sup>

by ROY R. SNELLING<sup>2</sup>

**ABSTRACT:** This paper reviews the *Stenamma* of the Western United States with emphasis on those of California. Twelve western species are recognized and separated by a key for the worker caste. Habitus figures for worker and female of all species are given. The following species are described as new: *californicum* (California), *chiricahua* (Arizona), *dyscheres* (California), *exasperatum* (California), *punctatovenstre* (California) and *wheelerorum* (Nevada). One new synonymy is proposed: *knowltoni* Gregg = *smithi* Cole.

## INTRODUCTION

The *Stenamma* of America north of Mexico were revised by M. R. Smith (1957) and the systematics of our species greatly improved. Because their small size and unobtrusive habits require special collecting techniques, these ants are seldom taken by the casual collector; Smith had available to him far fewer western samples than eastern and it is evident that his work was incomplete as far as the western fauna is concerned.

Smith recognized eleven species in the United States and Canada. Of these, five were known to occur from the Rocky Mountains westward. A sixth western species was added by Cole (1966) and a seventh by Gregg (1972). The considerable amount of western material now at hand, mostly from California, reveals the existence of several additional species and requires that the previously described species undergo some reexamination and recharacterization. The present study increases the number of western species to twelve, a total of eighteen in America north of Mexico. I have not listed full bibliographies for previously described species. For these, refer to Smith (1957).

## METHODS AND TERMINOLOGY

All specimens were studied with an American Optical stereoscopic microscope with 15x ocular and 3x objective lenses. Some details were studied under 8x objective. Measurements were made by means of a reticule within the microscope, calibrated against a stage micrometer for conversion to millimeters. In the descriptions all measurements are in millimeters, the appropriate figure of the holotype and allotype indicated in parenthesis.

The following abbreviations are used:

CI. Cephalic index. HW X 100/HL.

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EL. Eye length. Maximum length of the compound eye as viewed from side.

HL. Head length. Maximum length of head, in full face view, from anterior margin of median lobe to posterior margin of occiput.

HW. Head Width. Maximum width of head, in full face view, excluding compound eyes.

OI. Ocular index.  $EL \times 100 / HL$ .

OMD. Oculo-mandibular distance. Shortest distance between lower eye margin and mandibular insertion.

PW. Pronotal width. Maximum width of pronotum, as measured from above.

SI. Scape index.  $SL \times 100 / HW$ .

SL. Scape length. Length of scape, excluding basal condyle.

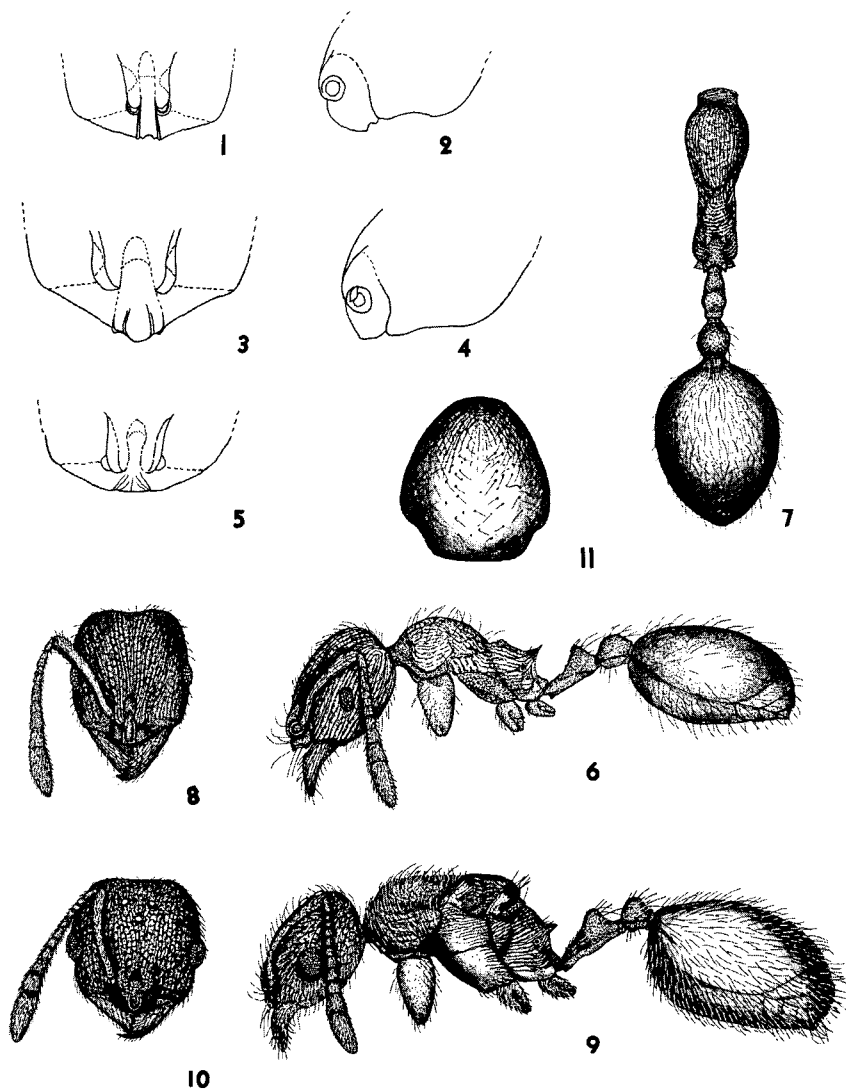
WL. Weber's length. Length of thorax, in profile, from anterior margin of pronotal declivity to apex of metasternal lobe.

Two morphological characters which seem very useful in species recognition are used here for the first time in *Stenamma*. The first of these involves the median lobe of the clypeus. The clypeus of *S. diecki* Emery is typical of most western species. In this species the median lobe in frontal view has a shallow, longitudinal depression extending from the base to the apical portion of the lobe. On either side of the longitudinal depression is a fine carinula extending from between the antennal insertions to the apex of the median lobe; these carinulae are parallel, or nearly so, basally but become divergent in the apical third, curve over the apical portion of the median lobe and extend to the clypeal margin. Below the apical curvature of the median lobe these are usually joined by a transverse carinula. Because this transverse carinula is below the curvature of the median lobe, the median lobe, in frontal view, appears to be notched (Fig. 1).

A very different clypeal structure is exemplified by *S. smithi* Cole. The median depression is shallow and adjacent carinulae are present, much as in *S. diecki*. The median lobe, however, is more strongly projecting and in frontal view extends beyond the apical clypeal margin. In addition, the transverse carinula is more dorsal, so that in frontal view, the lower margin of the median lobe is entire, either transverse or slightly convex (Fig. 3). In profile, the apical portion of the median lobe of *S. smithi* is angular, its portion below the transverse carinula somewhat concave (Fig. 4). By contrast, the profile of the median lobe of *S. diecki* is distinctly convex (Fig. 2).

A modification of the *S. diecki* type is seen in *S. huachucanum* M. Smith, in which the median lobe is shortened and flattened, the longitudinal depression virtually absent, the strongly divergent lateral carinulae very faint (Fig. 5). The transverse carinula is absent. In profile, the median lobe, is short, low and evenly convex from base to apex, sometimes weakly angulate in the middle.

The first sternite of the gaster has not previously been utilized to discriminate between species although details of sculpturation are excellent for this purpose. In most species of North American *Stenamma* the segment is smooth



FIGURES 1, 2: *S. diecki*, worker, lower part of face in frontal and profile views. Figures 3, 4: *S. smithi*, worker, lower part of face in frontal and profile views. Figure 5: *S. huachuacanum*, worker, lower part of face in frontal view. Figures 6-11: *S. chiricahua*. 6, worker, lateral view; 7, worker, thorax and abdomen, dorsal view; 8, worker, head frontal view; 9, female, lateral view; 10, female, head frontal view; 11, female, mesocutum, dorsal view. Figures by Ruth Ann DeNicola.

and polished. In a few western species this is not true. The peculiarly sculptured first gastric tergite of *S. heathi* Wheeler is well enough known, but that the first sternite is similarly sculptured appears to have escaped notice. The sculpture of the sternite is basically of two types. It may consist of fine, dense punctulation, extending over the basal one-third or more of the segment as in *S. heathi* and *S. californicum*, n. sp. Fine striations may also be present. Or, it may consist solely of a series of long fine striations, presently known to occur only in *S. dyscheres*, n. sp. Those species which possess sculptured first sternites also possess similar sculpturing on the corresponding tergite, as in *S. heathi*, *S. californicum*, *S. punctatovenstre* and *S. dyscheres*. The converse, however, is not always true: *S. sequoiarum* Wheeler has long striae on the tergite, but the sternite is smooth and polished.

Although our knowledge of the western *Stenamma* is still fragmentary, it is possible to segregate the twelve species here recognized into five species groups. No attempt has been made, when evaluating these groups, to accommodate the Eastern species into any of these groups, except group I, the *brevicorne* group. Groups III, IV and V are doubtless wholly Western. At least some of the Eastern species belong to group II while others possibly will form additional groups.

Group I (*brevicorne* group). Eyes large, EL 1.0—1.8 x OMD; scape basically cylindrical; thoracic sculpturation consisting of rugulae and punctulae; median lobe of clypeus extended beyond clypeal margin and appearing truncate in frontal view; tergite I smooth and shiny, except striae may be present on basal one-third or less; sternite I polished or sculptured; pilosity erect on head and thorax.

*S. chiricahua*, n. sp. Arizona.

*S. punctatovenstre*, n. sp. California.

*S. smithi* Cole. Nevada, Utah, Idaho.

Group II (*diecki* group). Eyes small, EL half or less OMD; scape basically cylindrical; thoracic sculpture consisting of rugulae and punctulae; median lobe of clypeus not extended beyond clypeal margin, appearing notched in frontal view; tergite I usually smooth and shiny, but may be weakly punctulate on basal third; sternite I usually smooth, but may be striate or punctulate; pilosity erect on head and thorax.

*S. californicum*, n. sp. Calif.

*S. diecki* Emery. All western States except Arizona.

*S. dyscheres*, n. sp. Calif.

*S. occidentale* M. Smith. Most western States.

*S. sequoiarum* Wheeler. Calif.

Group III (*heathi* group). Eyes small, EL less than half OMD; scape basically cylindrical; thoracic sculpturation consisting of fine punctulae and reticulate pattern of rugulae; median lobe of clypeus not exceeding clypeal margin, appearing notched in frontal view; half or more of first tergite and sternite closely punctulate, with scattered coarse punctures and fine striae which form reticulae toward base; pilosity erect on head and thorax.

*S. exasperatum*, n. sp. Calif.

*S. heathi* Wheeler. Calif., Nev., Baja Calif.

Group IV (*huachucanum* group). Eyes small, EL less than half OMD; thoracic sculpturation consisting of fine, dense punctures, rugulae effaced; median lobe of clypeus obliquely flattened, not apparent in frontal view; first tergite and sternite polished; pilosity erect on head and thorax.

*S. huachucanum* M. Smith. Arizona.

Group V (*wheelerorum* group). Eyes small, EL less than half OMD; scape strongly flattened at base; thoracic sculpture of dense punctulae effacing weak, irregularly reticulate rugulae; median lobe of clypeus not exceeding clypeal margin, appearing notched in frontal view; first tergite and sternite smooth and shiny; pilosity largely appressed on head and thorax.

*S. wheelerorum*, n. sp. Nevada.

Although this paper is nominally concerned with the California species I am including for convenience, data on species from other western states as well. The key given below is for the species occurring from the Rocky Mountains to the Pacific Coast. The key is restricted to the workers, as the sexual castes are yet too poorly known to include them feasibly. Data on these castes are given, where known, in the discussion of each species.

#### Key to *Stenamma* of Western United States, Based on Workers

1. Median lobe of clypeus prolonged beyond clypeal margin, in frontal view apex truncate; eyes relatively large, OMD 1.0—1.8 x EL ..... 2  
 Median lobe of clypeus short, not exceeding clypeal margin, in frontal view apex appearing notched; eyes relatively small, OMD 2—3 x EL ..... 4
2. First sternite wholly smooth and polished; first tergite without conspicuous basal striae; eye diameter variable ..... 3  
 First sternite conspicuously striate, often coarsely so, and often finely and closely punctulate, especially at sides; first tergite with conspicuous short, fine basal striae; eyes with 4-6 facets in greatest diameter, OMD 1.3-1.8 x EL, usually about 1.5 ..... *punctatoventre*, n. sp.
3. Eyes large, with 8-12 facets in greatest diameter; pronotal declivity usually without more than a single transverse rugule, this at summit; basal face of propodeum punctate, without irregular transverse rugulae ..... *smithi* Cole  
 Eyes small, with 6-7 facets in greatest diameter; pronotal declivity usually with several distinct transverse rugulae; basal face of propodeum punctate and with several fine transverse rugulae ..... *chiricahua*, n. sp.
4. First tergite half or more densely and closely punctulate, with scattered coarse piligerous punctures and with fine striae over basal half, forming reticulae anteriorly; head and thorax evenly rugoso-reticulate (Group IV) ..... 5  
 First tergite usually smooth and shiny; if sculptured, sculpture limited to

- basal third or less, consisting of fine punctulae and/or fine divergent basal striae; head and thorax usually not regularly rugoso-reticulate ..... 6
5. Sculpturation of first tergite limited to basal half; scapes and tibiae with abundant fully erect white hairs; erect hairs on front of head very even in length ..... *exasperatum*, n. sp.  
Sculpturation of first tergite extending over most of segment, with only a very narrow apical band devoid of punctulation; scapes and tibiae with hairs mostly reclinate; erect hairs on front of head very uneven in length, longest at least twice the length of shortest ..... *heathi* Wheeler
6. Cephalic and thoracic dorsa with conspicuous long erect hairs; scape cylindrical, notably broader at apex than elsewhere; head and thorax often with shiny areas of little or no punctation ..... 7  
Cephalic and thoracic dorsa with hairs reclinate, short; scape conspicuously flattened toward base, as broad immediately distad of bend as at apex; head and thorax densely punctate, virtually matt (Group V) ..... *wheelerorum*, n. sp.
7. First sternite conspicuously sculptured, at least at sides, usually much of segment densely punctulate or basal third with conspicuous striae, either coarse or fine; first tergite usually conspicuously sculptured ..... 8  
First sternite wholly smooth and shiny, without punctulation or striae; first tergite largely smooth and shiny, but with usual short, separated divergent striae at base ..... 9
8. Mesopleura usually without conspicuous longitudinal rugulae; upper half of propodeal sides densely punctulate, without evident rugulae; basal one-fourth to one-third of first tergite closely punctulate; first sternite with fine, dense punctulae on basal one-third or more .....  
..... *californicum*, n. sp.  
Mesopleura with conspicuous longitudinal or oblique rugulae; upper half of propodeal sides with longitudinal rugulae; first tergite usually with conspicuous very fine dense striae on basal third, lightly, if at all, punctulate; first sternite striate on basal one third, sometimes with punctulae at sides ..... *dyscheres*, n. sp.
9. Carinae of median lobe of clypeus subparallel or slightly divergent apically, area between carinae concave, so apex appears notched in frontal view; mesopleura punctate or rugulose; pronotal sides either conspicuously punctate or rugulose or both; first tergite conspicuously striate at base or not (Group II) ..... 10  
Carinae of median lobe of clypeus strongly divergent from base, area between flattened, lobe not notched in frontal view; mesopleura densely punctate and sides of pronotum smooth and without sculpture on lower half at least; first tergite without basal striae (Group III) .....  
..... *huachucanum* M. Smith
10. Basal striae of first tergite, if evident, very short, seldom exceeding 0.05 mm when present; postpetiole smooth and shiny above and on sides occasionally with a few short, inconspicuous rugulae; mesopleura punctate or rugulose or both ..... 11

- Basal striae of first tergite conspicuous, 0.12-0.20 mm long; postpetiole shiny, with conspicuous longitudinal rugulae; mesopleura rugulose, interspaces punctulate ..... *sequoiarum* Wheeler
11. Mesopleura closely punctate, rugulae absent or largely effaced; pronotal sides with conspicuous coarse punctures between rugulae, latter often effaced; basal striae of first tergite inconspicuous, usually less than 0.04 mm long ..... *occidentale* M. Smith
- Mesopleura with several coarse rugulae, interspaces lightly and sparsely punctate to impunctate; pronotal sides impunctate between rugulae, rarely a scattering of fine punctures below; basal striae of first tergite usually distinct, usually about 0.05 mm long ..... *diecki* Emery

## GROUP I

***Stenamma chiricahua***, new species

Figures 6-11

**DIAGNOSIS.** Worker hardly distinguishable from that of *S. smithi* but smaller, scape with decumbent hairs, propodeum above metapleural gland with distinct longitudinal rugulae and metanotal depression narrow, V-shaped. Female similar to that of *S. smithi* but disc of mesoscutum smooth, with scattered coarse piligerous punctures, striae or rugulae absent.

**WORKER. Measurements.** HL 0.76-0.86; HW 0.65-0.73; SL 0.53-0.60; WL 0.90-1.03; PW 0.43-0.50.

**Head.** A little longer than broad, CI 80-87, longer than scape, sides almost parallel, nearly as broad above as below. Eyes of moderate size, with five to seven facets in greatest diameter, OMD 1.2-1.6 x EL; OI 13-17. Scape stout, a little shorter than HW, SI 80-85, cylindrical at bend, thickened near apex. Mandible with six or seven teeth, three apical teeth largest, median and second basal teeth reduced; shiny, longitudinally rugulose, breaking up into elongate punctures on blade. Median lobe of clypeus slightly produced beyond clypeal margin, longitudinally depressed and laterally carinate, with transverse carinula at summit of declivity, thus appearing truncate in frontal view. Depressed frontal area and clypeus shiny; remainder of head slightly shiny, lightly punctulate between reticulate pattern of fine rugulae.

**Thorax.** Pronotal neck closely punctulate and slightly shiny; sides shinier, lightly punctulate between fine, irregular longitudinal rugulae; summit of declivity usually with several irregular transverse rugulae, sometimes only one; promesonotal dorsum moderately shiny, finely and sparsely punctulate between fine, longitudinal rugulae, punctulation coarser and closer on posterior third. Mesopleura densely punctate, usually with a few irregular longitudinal rugulae, slightly shiny. Metanotal depression, in profile, usually shallow, V-shaped. Propodeal sides shiny, finely punctulate, with several distinct longitudinal rugulae above opening of metapleural gland; basal face conspicuously longer than posterior face, with transverse welt anteriorly, surface moderately



shiny and finely punctulate, often with a few fine transverse rugulae; spines sharp, short, separated by about twice their length; posterior face shiny, impunctate.

*Petiole.* Shape as in *S. smithi* (Cole, 1966), nodes usually closely punctate and with a few rugulae, but may be largely impunctate and with rugulae obscure or absent.

*Gaster.* As in *S. smithi* but with longer striae (up to 0.13 mm) at base of first tergite.

*Pilosity.* Similar to *S. smithi*, but hairs of scape fully decumbent; erect cephalic hairs a little more numerous.

*Color.* Brownish ferruginous, legs yellowish, antennae more reddish.

**FEMALE. Measurements.** HL 0.77-0.88 (0.87); HW 0.65-0.77 (0.75); SL 0.57-0.63 (0.60); WL 1.07-1.27 (1.27); PW 0.60-0.70 (0.70).

*Head.* A little longer than broad, CI 85-89 (87), in frontal view sides slightly convergent above, occiput flat or slightly concave. Eyes large, OMD 0.54-0.64 (0.57) x EL; OI 25-28. Mandibles, clypeus and scape as described for worker. Sculpture as described for worker but rugulae coarser and reticulate pattern better defined.

*Thorax.* Declivitous face of pronotum shiny, sparsely punctulate and with several distinct transverse rugulae; sides shiny, sparsely punctulate and with distinct, through irregular, longitudinal rugulae. Mesoscutum indistinctly transversely striatopunctate along anterior margin, disc smooth and shiny, without longitudinal rugulae or striae between parapsides, with scattered coarse piligerous punctures. Upper mesopleural plate with fine longitudinal striae, the lower plate largely smooth and shiny, except a few fine striae and punctures along posterior margin. Metapleura and sides of propodeum shiny, sparsely punctate and with strong longitudinal rugae. Scutellum coarsely rugulose at sides, more finely and sparsely rugulose in middle. Base of propodeum transversely rugulose and moderately shiny; declivity smooth, impunctate, shiny; basal and declivitous faces about equally long; spines moderately long, only a little shorter than distance between them.

*Petiole.* As described for worker.

*Gaster.* As described for worker.

*Pilosity.* As described for worker.

*Color.* As described for worker.

*Wings.* Forewing about 4.5 mm long, whitish, with pale brownish veins, venation of the *brevicorne* type, i.e., r-m absent, Mf3 present; first abscissa of Rs+M very short, about one-fourth as long as second abscissa.

**MALE. Measurements.** HL 0.57-0.62 (0.62); HW 0.50-0.53 (0.52); SL 0.25-0.27 (0.27); WL 1.17-1.33 (1.33); PW 0.63-0.73 (0.63).

*Head.* A little longer than broad, CI 83-89 (84). Scape short, straight, much shorter than HW, SI 47-53 (52). Eyes large and strongly convex, facets coarse, OI 43-45 (43), OMD reduced to a narrow transverse strip. Mandibles shiny, with three to five teeth. Median lobe of clypeus strongly convex, apically with a shallow longitudinal depression; apical margin slightly sinuate in middle.

Ocelli small, hardly raised above surface, distance between posterior ocelli slightly greater than distance between either and anterior ocellus, the latter distance about 1.5 x diameter of anterior ocellus (about 0.07 mm). Mandibles, clypeus and frontal depression shiny, with a few fine, scattered punctures; remainder of front of head a little less shiny, superficially finely and closely punctulate, area between eyes and clypeus with a few fine, obscure rugulae; occipital area shiny, with a few fine scattered punctures; side of head moderately shiny, finely and closely punctulate.

*Thorax.* Shape very similar to that of *S. brevicorne* Mayr as figured by Creighton (1950), but mesonotum not as strongly depressed behind. Base of propodeum strongly sloping, flat or gently convex, about twice as long as posterior face; juncture of anterior and posterior faces angulate, neither spinose nor tuberculate. Mesonotum smooth and shiny, with a few fine piligerous punctures. Metanotum moderately shiny, finely and closely longitudinally striate, with fine punctulae between striae. Mesepisternum moderately shiny, finely longitudinally striate and weakly punctulate; or, striate and punctulate along margins only. Mesosternum mostly smooth and shiny, weakly punctulate. Metepisternum slightly shiny, densely punctulate. Propodeum densely punctulate and slightly shiny laterally, anterior and posterior faces mostly smooth and shiny.

*Petiole.* Dorsal face of anterior peduncle longer than anterior face of node, node low and rounded in profile. Node of postpetiole low in profile, apparently a little more convex than in *S. brevicorne*. Nodes smooth and shiny, remainder moderately shiny and closely punctulate.

*Gaster.* As described for *S. brevicorne* (Smith, 1957).

*Pilosity.* As described for *S. brevicorne* (Smith, 1957).

*Color.* Brownish ferruginous, antennae and legs yellowish to yellowish brown. Wings whitish, with yellowish veins and stigma.

*Wings.* Length 3.7-3.9 mm, otherwise as described for female.

**TYPE MATERIAL.** Holotype alate female, allotype male; 8 alate females, 10 males and 36 workers, paratypes: Upper Cave Creek, 6000-7500', Chiricahua Mts., Cochise Co., Ariz., 15 August 1970 (V. Roth), in shaded creek bed. Additional paratypes: dealate female, 11 males, 36 workers: Ramsey Canyon, Huachuca Mts., Cochise Co., Ariz., 25 August 1932 (W. S. Creighton: WSC). Holotype, allotype, 4 male, 15 worker paratypes in LACM; two female, 10 male, 29 worker paratypes in WSC; one female, two male, three worker paratypes in AMNH; three paratypes (one each caste) in ACC, GCW, MCZ and USNM.

**ADDITIONAL MATERIAL.** 12 workers, Santa Catalina Mts., Pima Co., Ariz., 26 July 1947 (L. F. Byers; 626, No. 7800; USNM).

**ETYMOLOGY.** Chiricahua, Apache Indian tribe historically resident in southeastern Arizona.

**DISCUSSION.** I have departed from normal procedure by selecting a female as a holotype. Justification for so doing lies in the more obviously distinct nature of this caste, for the workers are not reliably separable from

small individuals of *S. smithi*. The difficulties of separation are discussed under *S. smithi* and need not be repeated here. The female of *S. chiricahua* appears readily separable from *S. smithi* and known females of other North American species by the smooth and shiny mesonotum, which wholly lacks longitudinal rugulae in the area between the parapsides, and the nonsculptured first sternite. The nonstriate mesoscutum is shared with the female of *S. punctatoventre*, from which it differs most obviously by the smooth, shiny first sternite. The shiny mesonotum, long basal propodeal face and lack of propodeal spines are characteristic of the male.

***Stenamma punctatoventre*, new species**

Figures 12, 13, 20, 21, 55

**DIAGNOSIS.** Eyes of worker with 4-6 facets in greatest diameter and separated from mandibular insertions by 1.3-1.8 x EL; first gastric sternite and tergite both closely punctulate in part; cephalic rugulae fine, largely effaced by dense punctulation; mesopleura densely and coarsely punctate, rugulae obscure when present.

**WORKER. Measurements.** HL 0.70-0.83 (0.75); HW 0.56-0.67 (0.60); SL 0.46-0.55 (0.50); WL 0.80-0.94 (0.86); PW 0.36-0.46 (0.43).

**Head.** Head a little longer than broad, CI 77-87 (80), longer than scape, slightly narrowed toward occiput. Eyes of moderate size, with 4-6 facets in greatest diameter, OMD 1.3-1.8 (1.50) x EL; OI 12-15 (13). Scape stout, a little shorter than HW, SI 76-86 (83), cylindrical, distinctly thickened near apex. Mandible with six or seven teeth, three apical teeth largest, second basal tooth reduced; mandibles shiny, striate basally, striatopunctate apically. Median lobe of clypeus slightly produced, exceeding clypeal margin; longitudinally depressed and laterally carinulate, with transverse carinula anteriorly, so it appears truncate in frontal view. Depressed frontal area shiny; frontal lobes densely punctulate and dull; remainder of head slightly shiny, densely punctulate and with fine longitudinal rugulae, forming fine reticulae above and on sides; rugulae mostly obscured by punctulation.

**Thorax.** Pronotal neck moderately shiny, lightly punctulate; with transverse carinula at summit of slope; dorsally with fine longitudinal rugulae which extend onto mesonotum; interspaces moderately shiny and lightly punctulate; laterally with a few obscure, widely spaced rugulae, interspaces shiny, lightly and sparsely punctulate. Mesopleura slightly shiny, densely and coarsely punctate, a few obscure longitudinal rugulae present. Sides of propodeum densely and coarsely punctate, with more distinct longitudinal rugulae; dorsum densely punctulate and slightly shiny; spines short, sharp, separated by about twice their length.

**Petiole.** Dorsal face of anterior peduncle about as long as anterior face of node, node cuneate in profile; peduncle below with short blunt tooth anteriorly. Postpetiole, from above, slightly broader than long, sides nearly straight; in profile, anterior face nearly vertical; without anterior projection ventrally.

Sides and venter of petiole and post-petiole dull, densely punctulate; nodes a little shinier, a little more lightly punctulate, without evident rugulae.

*Gaster.* First tergite slightly shiny and densely punctulate basally, punctulae becoming finer and sparser to about middle of segment, apical half shiny, but not polished. First sternite densely punctulate on basal half or more.

*Pilosity.* With numerous scattered erect hairs, longest on clypeus and promesonotum; those of frons mostly short, but a scattering of conspicuously longer hairs.

*Color.* Medium ferruginous, but variable, usually with cephalic dorsum conspicuously darker; apex of gastric segments yellowish.

**FEMALE. Measurements.** HL 0.80; HW 0.66-0.70; SL 0.53-0.57; WL 1.10-1.13; PW 0.60-0.62; wing length 4.0-4.3.

Very similar to female of *S. chiricahua*. Head shape similar, CI 83-88; SI 78-83. Eyes proportionately a little smaller, OMD 0.66-0.75 x EL; OI 25. Clypeal structure as in worker. Cephalic sculpture as described for worker. Pronotum more finely rugulose than in *S. chiricahua*, interspaces much wider. Area between mesoscutal parapsides polished, without longitudinal striae, with sparse fine piligerous punctures separated by two or more times a puncture diameter. Mesopleura less coarsely striate in upper half. Basal area of propodeum smooth, without transverse rugulae. First sternite with fine striations, at least at sides. Wing venation as in *S. chiricahua*.

**MALE. Measurements.** HL 0.55-0.57 (0.55); HW 0.47-0.48 (0.48); SL 0.23; WL 1.13-1.20 (1.13); PW 0.63; wing length 3.4.

Very similar to male of *S. chiricahua* but eyes smaller, OI 41-42 (42); CI 83-88 (88); SI 48-50 (48). Scutellum finely lineo-punctulate. Wings similar to those of *S. chiricahua*.

**TYPE MATERIAL.** Holotype and 15 paratype workers: Todd's Creek, about 5 mi W. Foresthill, Placer Co., CALIF., elev. ca. 1900', 24 June 1962 (R. R. Snelling), under decayed limb in litter. Allotype male and one male, four female, nine worker paratypes: Dodge Ridge, 6000', Tuolumne Co., CALIF., 6 Sept. 1967 (G. C. and J. N. Wheeler, #182). Holotype, allotype, two female and 14 worker paratypes in LACM; one male, one female, three worker paratypes in GCW; one female, three worker paratypes in MCZ; one paratype each in AMNH, USNM, ACC, WSC.

**ADDITIONAL RECORDS** (all CALIF.). Silverthorne Lake, Shasta Co., June 1971 (T. R. Haig & R. F. Wilkey; LACM); Ione Cemetery, Amador Co., 21 Mar. 1959 (L. M. Smith; UCD); Lucerne, Lake Co., 17 May 1961 (R. O. Schuster; UCD); Guerneville, Sonoma Co., 30 May 1960 (C. Judson; UCD); Glen Ellen, Sonoma Co., 15 April 1960 (L. M. Smith; UCD); Napa Valley Ranch, Napa Co., 12 April 1958 (L. M. Smith; UCD); Casey Flat, Yolo Co., 9 June 1960 (W. W. Wiard; UCD); vic. Poopout Hill, 7000', San Bernardino Co., 8 July 1972 (R. J. Hampton; LACM).

**ETYMOLOGY.** Combining form of *punctum* (dot or point) plus *venter* (belly), in allusion to the punctate first sternite.

**DISCUSSION.** The structure of the median lobe of the clypeus and the

relatively large eyes are possibly indicative of an affinity with *S. smithi*. That species lacks the punctulate areas of the first tergite and sternite. The superficially similar *S. californicum* has much smaller eyes and the median lobe of the clypeus is of the *diecki* type.

The specimens examined are quite uniform in most samples. Notably exceptional are three series: the Dodge Ridge paratype workers, the workers from Silverthorne Lake and those from Poopout Hill. These have the promesonotum quite shiny, especially along the midline and on the pronotal sides; the promesonotal rugulae are discernably present only along the sides. The nodes of both the petiole and postpetiole are free of sculpturation and are shiny. Although the base and sides of the first sternite are conspicuously punctulate, the disc is largely smooth and shiny in some specimens. In others, the smooth shiny area is limited to a broad longitudinal area along the midline. In nearly all specimens the first tergite is almost entirely without basal punctulation.

The Glen Ellen record is based on a single specimen which, although largely as described for this species, has unusually small eyes. There are five facets along the greatest diameter of the eye, which is removed from the mandibular insertions by 2.1 x its greatest length. The pronotal sides are distinctly shiny and sparsely punctulate.

The specimens from Poopout Hill, San Bernardino Mts., have the eyes unusually small, the OMD 1.8-1.9 x EL and the first sternite without striae, mostly polished, but lightly punctulate at the sides and apically. These closely resemble *S. californicum*, but the clypeal structure places them with *S. punctatovenstre*.

The female of this species is very similar to that of *S. chiricahua* and shares with it the smooth, shiny mesoscutum which is without longitudinal striae or rugulae. Differences are noted under the description of the *S. punctatovenstre* female given above. The males are so similar that they are, at this point, essentially inseparable.

*Stenamma smithi* Cole  
Figures 14, 15, 22, 23, 56

*Stenamma smithi* Cole, 1966. Brigham Young Univ. Sci. Bull. 7: 7-8. ♀ .

*Stenamma knowltoni* Gregg, 1972. Great Basin Nat. 32: 35-39. ♀ ♀ NEW SYNONYMY.

This species was described by Cole (1966) from a dozen specimens taken from can traps at the AEC Nevada Test Site near Mercury, Nevada. Gregg (1972) described *S. knowltoni* from 19 workers and one dealate female from Box Elder Co., UTAH, and seven workers, one female (not paratypes) from Oneida and Elmore Cos., IDAHO. Dr. Gregg donated a paratype worker to the LACM. The description, figure, discussion and paratype clearly indicate that *S. knowltoni* = *S. smithi*. Numerous additional specimens have been sent by Dr. Knowlton from various localities in Cache and Box Elder Cos., UTAH, and Oneida Co., IDAHO. One additional worker has been seen from NEVADA:

Lemmon Valley, T.21N, R.19E, sec. 33, 4900', Washoe Co., 25 Oct. 1967 (G. C. & J. Wheeler; GCW).

These specimens have been compared with two paratypes of *smithi* sent by Dr. Cole and are, in my opinion, conspecific even though they are somewhat at variance with the original description. The workers vary greatly in size. The smallest (HL 0.73, HW 0.61, SL 0.51, PW 0.40, WL 0.86) is much smaller than any of the paratypes, but numerous other specimens completely close this gap; none seen are as large as the holotype. The types of *S. knowltoni* fall within the limits of *S. smithi* as here interpreted. Apparently the description of *S. smithi* was overlooked by Gregg (1972), for in his paper he remarked (p. 37) that no new species had been described subsequent to Smith's revision.

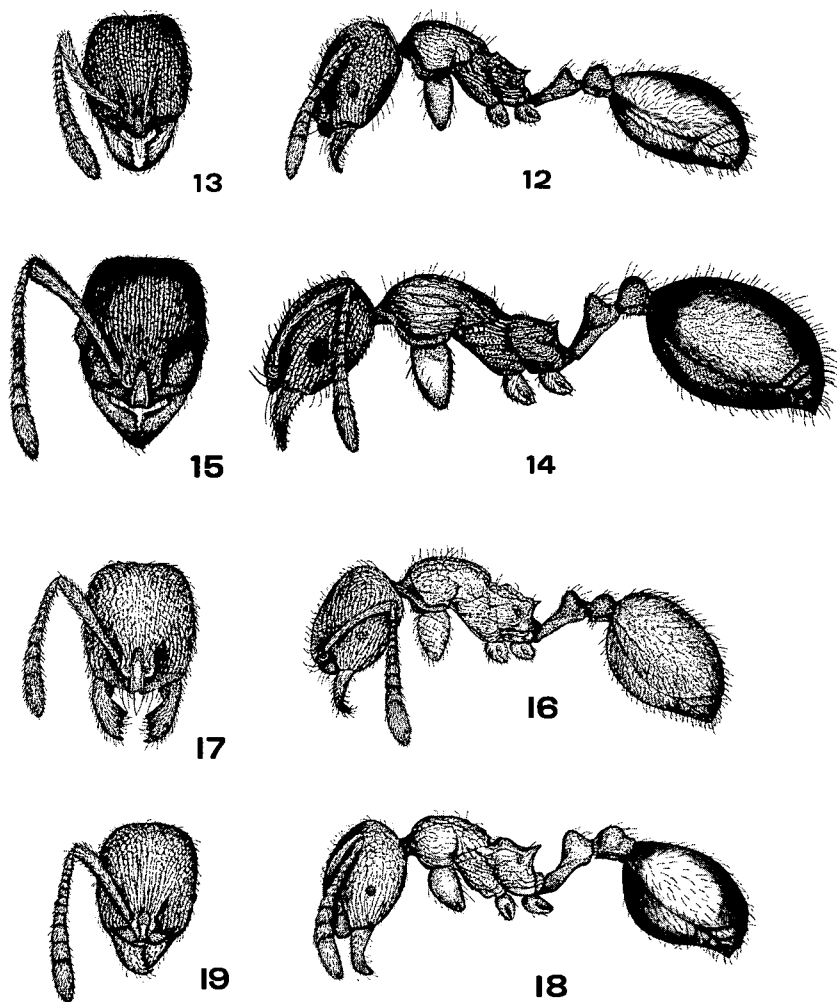
All these specimens have the same clypeal structure. The median lobe projects beyond the apical margin of the clypeus, and there is a distinct transverse carinula at the summit of the declivity so that in frontal view the median lobe appears to be truncate. In profile the declivitous face of the median lobe is concave.

Eye size is variable and appears to be correlated with overall size. The number of ommatidia in the greatest diameter of the eye varies from 8-12 and the distance from the lower eye margin to the mandibular insertion is from 1.3-1.5 times the eye length. This distance is proportionately greater in small specimens.

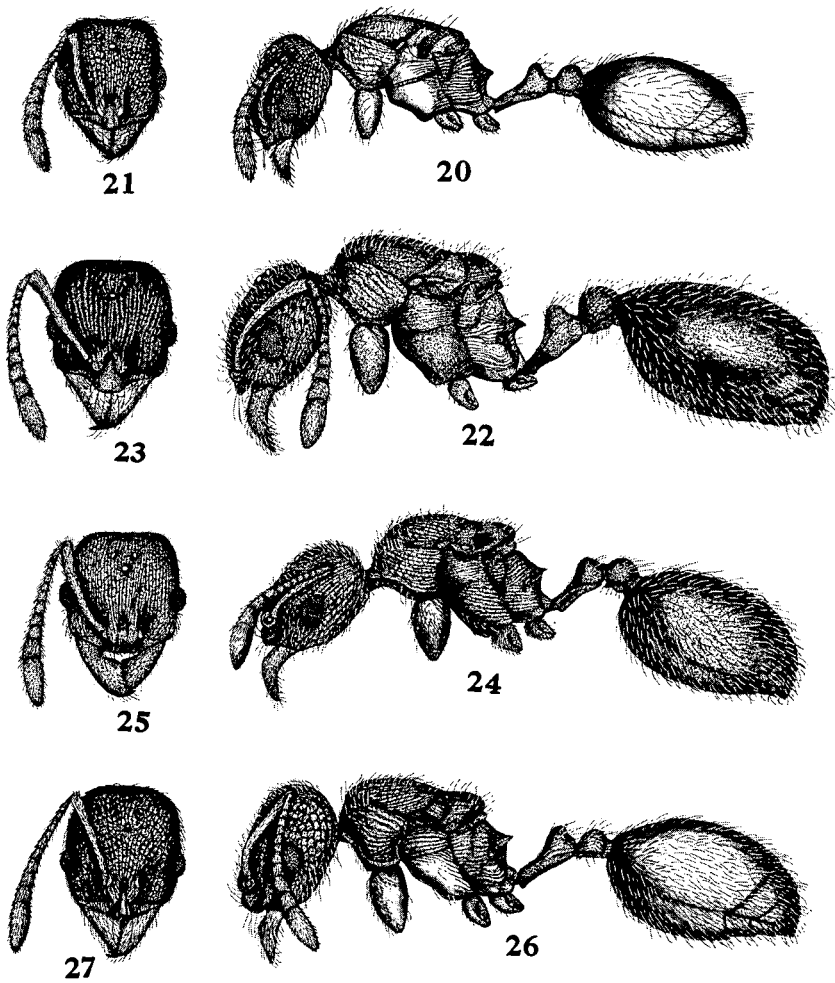
The metanotal impression seems always to be long, as noted by Cole, shallowest in small specimens, most pronounced in the largest. The transverse median welt within the impression, noted and figured by Cole, seems to be of rare occurrence. It is absent from many specimens (including the two paratypes studied) and barely discernible in most. Seldom is it distinct and I doubt that it can be of any importance as a diagnostic character.

Among the western species of *Stenamma*, the workers of *S. smithi* may be separated from most by the combination of large eyes, short oculo-mandibular distance, form of the median clypeal lobe, long basal face of the propodeum and polished first tergite and sternite. The relatively large eyes and structure of the median clypeal lobe and of the propodeum are shared with two other species: *S. punctatovenstre* and *S. chiricahua*. The first of these, however, possesses distinctly sculptured first tergite and first sternite. Separation from *S. chiricahua* is not such a simple matter and I have thus far not been successful in working out a reliable method.

As a rule, the eyes of *S. smithi* are larger, with from 8-12 facets in greatest diameter and the oculo-mandibular distance is from 0.8-1.1 times the eye length. There are, however, some unusually small specimens with five or six facets in the greatest eye diameter and the oculo mandibular distance is from 1.2-1.5 times the eye length. Of 40 specimens examined at random, 30% fall into this range, and thus lap into the range given for *S. chiricahua*. These small specimens, while very similar to *S. chiricahua*, usually lack definite longitudinal rugulae on the upper half of the side of the propodeum. In *S. smithi* this area is more often moderately shiny and closely, finely punctulate.



FIGURES 12, 13: *S. punctatoventre*, worker, lateral view and frontal view of head; Figures 14, 15: *S. smithi*, worker, same; Figures 16, 17: *S. californicum*, worker, same; Figures 18, 19: *S. diecki*, worker, same (from cotype). Figures by Ruth Ann DeNicola.



FIGURES 20, 21: *S. punctatoventre*, female, lateral view and frontal view of head; Figures 22, 23: *S. smithi*, female, same; Figures 24, 25: *S. californicum*, same; Figures 26, 27: *S. diecki*, female, same. Figures by Ruth Ann DeNicola.



The transverse metanotal groove of *S. smithi* is most often deeply impressed, the sides straight; the groove, in profile view, is longer than deep, the bottom flat. In *S. chiricahua* the groove is much narrower, notch-like in profile with oblique sides.

Included in the samples studied are four females associated with workers. Since all are dealate they may be nest queens; wing venation is of the *brevicorne* type of Smith (1957) according to Gregg (1972) who studied an alate female. The characters of the median clypeal lobe and first tergite and sternite are as in the workers; these should be sufficient to separate the females of *S. smithi* from most other western *Stenamma*. From *S. chiricahua*, the only western species with which *S. smithi* shares the clypeal and gastric characteristics, *S. smithi* may be separated by larger size, relatively smaller eyes and the distinctly sculptured mesonotal disc. Dimensions for the four females studied are: HL 0.96-1.00; HW 0.83-0.86; SL 0.73; EL 0.23-0.25; OMD 0.16; WL 1.36-1.43; PW 0.66-0.70; CI 86-89; SI 84-88; OI 0.24-0.25; OMD 0.66-0.71 x EL.

#### GROUP II

##### ***Stenamma californicum***, new species

Figures 16, 17, 24, 25, 57

**DIAGNOSIS.** Eyes with 3-5 facets in greatest diameter; thoracic rugulae coarse, close, interspaces moderately to strongly shiny; postpetiole shiny between rugulae; first tergite lightly punctulate on basal third or less; first sternite punctulate and finely striolate, at least at sides.

**WORKER. Measurements.** HL 0.63-0.83 (0.76); HW 0.53-0.70 (0.63); SL 0.53-0.60 (0.60); WL 0.76-1.00 (0.93); PW 0.36-0.46 (0.43).

**Head.** A little longer than broad, CI 77-85 (82), longer than scape; slightly narrowed toward occiput. Eyes small, with 3-5 facets in greatest diameter, OMD 2.9-3.6 (3.0) x EL; OI 7.7-9.5 (8.7). Scape rather stout, shorter than to equal to HW, SI 85-100 (98), ending below level of occipital margin, cylindrical at base, distinctly thicker apically than near base. Mandible with five large, equally spaced teeth, one or two minute denticles sometimes present. Mandible shiny, striate on basal half, coarsely and closely punctate apically. Clypeus shiny; median lobe longitudinally depressed, laterally carinulate, appearing notched in frontal view; in profile, median lobe short, oblique, extending below antennal socket by about maximum eye length. Depressed frontal area shiny; frontal lobes shiny; remainder of head densely punctulate and dull or slightly shiny, irregularly finely rugulose, forming reticulae on sides and occiput.

**Thorax.** Pronotal neck dull, densely punctulate, with one or two fine transverse rugulae on vertical surface; sides moderately shiny, lightly punctulate, with a few widely spaced, irregular longitudinal rugulae; dorsum slightly shiny, densely punctulate, with distinct median longitudinal rugulae and short irregular rugulae laterad. Mesonotum dull, densely punctulate, reticulo-rugose. Mesopleura densely punctate and dull, with a few short, irregular longitudinal rugulae. Metanotal depression broad, shallow, poorly defined. Propodeal base

slightly shiny, densely punctulate, with a pair of rugulae extending from middle of base to bases of spines, otherwise without prominent rugulae; sides with prominent longitudinal rugulae, interspaces slightly shiny and densely punctulate; spines variable, from corners largely angulate to having short, distinct spines, distance between spines at least twice length of spines; declivitous face distinctly shiny, lightly punctulate.

*Petiole.* Anterior peduncle thick in profile, dorsal face slightly shorter than anterior face of node; node broadly triangular in profile, summit narrowly rounded; triangular ventral projection present, or not, anteriorly. Postpetiole, from above with sides slightly convex, about as broad as long; ventrally with distinct anterior projection. Sides of petiole and postpetiole dull, densely punctulate, nodes slightly to moderately shiny, without prominent rugulae.

*Gaster.* First tergite lightly punctulate over basal half or less and moderately shiny, apical half more lightly punctulate to nearly smooth, shinier than basal half but not polished. First sternite variable but always densely punctulate over basal half or more of sides, often most of disc densely punctulate and slightly shiny.

*Pilosity.* As usual in the genus, with numerous fully erect hairs on most body surfaces, clypeal and frontal hairs longest, those of frons short, uniform in length, rather sparse.

*Color.* Uniformly light ferruginous, sutures and margins a little darker.

FEMALE (deälate). *Measurements.* HL 0.83; HW 0.75; SL 0.61; WL 1.23; PW 0.63.

Similar to worker except for usual sexual modifications. Head a little broader, CI 90; eyes about 0.23 mm long, OMD 0.71 x EL; OI 28; distance between posterior ocelli about equal to distance between anterior ocellus and posterior ocelli, the latter about 3 times diameter of anterior ocellus. Scape a little short of occipital margin; SI 82. Head more coarsely and distinctly reticulate. Metapleura mostly smooth and shiny, with a few fine longitudinal rugulae above and posteriorly with a few coarser short rugulae, the interspaces densely punctulate. Gaster much as in worker.

MALE. Unknown.

TYPE MATERIAL. Holotype and 14 paratype workers: Snow Creek Canyon, San Jacinto Mts., Riverside Co., CALIF., 20 March 1954 (J. N. Belkin, et al.) in fern humus. Holotype and 8 paratypes in LACM; one paratype each in AMNH, MCZ, USNM, ACC, GCW and WSC.

ADDITIONAL RECORDS (all Calif.). Type locality, 13 April 1955 (J. N. Belkin, et al.; LACM); Hell Hole Cyn., Borrego Spr., San Diego Co., 25 Mar. 1959 (L. M. Smith & A. A. Grigarick; UCD); Los Angeles State College Campus, Los Angeles Co., 24 Jan. 1966 (C. Goodpasture; LACM), ex leaf litter; nr. Strawberry, El Dorado Co., 17 Apr. 1961 (R. O. Schuster; UCD); 4 mi and 5 mi W. Newcastle, Placer Co., 12 Mar. 1958 and 15 Apr. 1958 (L. M. Smith & R. O. Schuster; UCD); 2.6 mi E Nimbus, Sacramento Co., 18 Mar. 1959 (F. C. Raney; UCD); Folsom Lake State Park, Sacramento Co., 15 Apr. 1958 (L. M. Smith & R. O. Schuster; UCD); 5.4 mi W Winters, Yolo Co., 17 Jan.

1960 (L. M. Smith & R. O. Schuster; UCD); Davis, Yolo Co., 28 Mar. 1952 (J. K. Hester; UCD); Berkeley Hills, Alameda Co., 10 May 1953 (T. C. Lawrence; USNM) (♀ & ♂♂ "flying and mating after sunset"); Santa Paula Cr., Stickle Park, Ventura Co., 10 Jan. 1972 (P. M. Jump; LACM), ex oak leaf litter; Upper Trabuco Publ. Camp, Orange Co., Calif., 22 Febr. 1960 (E. L. Sleeper; RJH), ex oak litter.

ETYMOLOGY. Named for the State of California.

DISCUSSION. This is a rather variable, small member of the *diecki* group, but evidently not closely related to any other species. The sculptured first sternite, within this group, is shared with *S. dyscheres*, but that species is usually larger, has distinct, rather coarse rugulae on the sides of the thorax, usually has distinct longitudinal striae on the first sternite and the first tergite is not distinctly punctulate.

Two specimens in the LACM are doubtfully referred to this species: a worker, 5 mi, N. Descanso, 3000', San Diego Co., 18 Febr. 1972 (J. H. Hunt, # 532), from leaf litter in an oak grove; a dealate female, same site and collector, 12 June 1972 (# 869), from a can trap. Both closely approximate the characteristics of *californicum*, except in clypeal structure; the median lobe is slightly prolonged and in frontal view ends on the same level as the clypeal apex. Because a distinct transverse carinula is present, the median lobe appears truncate and these specimens thus resemble members of the *brevicorne* group.

The series from Stickle Park vary toward a similar condition, but the apex of the median lobe does not extend to the level of the clypeal margin. A trace of the transverse carinula is present in some specimens, fairly strong in others. But, even when well developed it is depressed in the middle so that, in frontal view, the apex of the median lobe is slightly concave.

The sample from the Berkeley Hills consists of three females and ten males captured during a mating flight.

#### *Stenamma diecki* Emery

Figures 18, 19, 26, 27, 58

*Stenamma (Stenamma) westwoodi diecki* Emery, 1895. Zool. Jahrb. Abt. f. Syst. 8:300.♀♀.

*Stenamma (Stenamma) westwoodi diecki* var. *impressum* Emery, 1895. *Op. cit.*, 301.♀.

*Stenamma (Stenamma) brevicorne diecki*, Forel, 1901. Ann. Soc. Ent. Belg. 45:347. ♀♀.

*Stenamma (Stenamma) breviorne diecki* var. *impressum*, Forel, 1901. *Op. cit.*, 347.

*Stenamma brevicorne impressum*, Buren, 1944. Iowa State Coll. Jour. Sci. 18:284. ♀.

*Stenamma diecki*, Creighton, 1950. Bull. Mus. Comp. Zool. 104:136. ♀ M. Smith, 1957. Amer. Midl. Nat. 57:142, 158-163.♀♀♂.

*Stenamma impressum*, Creighton, 1950. *Op. cit.*, 136, 137-138. ♀.

*Stenammina diecki* is the most widely distributed North American species, recorded by Smith (1957) from about half the United States and southern Canada. In the area from the Rocky Mountains westward it is now known to occur in all States except Arizona. This species tolerates a wide variety of habitats and is extremely variable. Over much of the western range it is sympatric with the equally tolerant and variable *S. occidentale*.

The original description was brief and not very informative. Smith (1957) recharacterized *S. diecki*, after having studied several cotypes and included the species in his key. Unfortunately, separation of *S. diecki* from *S. occidentale* is usually not possible by means of this key. Important differences are lost through vague expression and are not emphasized in the discussions under these species. Further, the existence of several previously unrecognized species, which could be run to one or the other of these two names, served only to complicate an already muddled situation.

I have studied numerous samples of *Stenammina* from the western United States, including cotypes of *S. diecki* and paratypes of *S. occidentale*. Once those samples obviously representing other species were removed it was possible to resolve the remaining material into two discrete assemblages. The first of these approximates the characteristics of the cotypes of *S. diecki*: the median lobe of the clypeus possesses a fine transverse carinula below the summit of the declivity between the two lateral carinulae; the median lobe, in profile has definite dorsal and anterior surfaces, the latter clearly "undercut" below; the sides of the pronotum are sharply longitudinally rugulose, with distinctly shiny interspaces; the mesopleura, although with numerous fine punctulae, is moderately shiny and with several distinct oblique rugulae; the upper half of the side of the propodeum bears several longitudinal rugulae; and the anterior face of the metanotal groove, in profile, is vertical or nearly so, the groove flat along the length.

The second group of specimens possess characteristics which ally them with the *S. occidentale* types: the median clypeal lobe lacks a clearly defined transverse carinula and in profile the lobe is evenly, strongly convex, without defined dorsal and anterior surfaces, the latter not sharply "undercut"; the sides of the pronotum are densely punctate, longitudinal rugulae largely effaced; the mesopleura barely shiny, densely punctate and without evident rugulae; the upper half of the propodeal sides closely punctate, dull and without defined longitudinal rugulae; the metanotal groove, in profile, either broadly V-shaped, or if long, the anterior slope oblique rather than vertical.

These differences between the two types, while perfectly obvious in many specimens, are subject to much variation and many specimens are thus difficult to correctly place. The variation of greatest significance is perhaps that of thoracic punctuation. It is on this single character, unfortunately, that separation of these two species is dependent in Smith's key. The lugs of the couplet are not sufficiently exclusive to permit more than a third of the western material to be confidently assigned one way or the other.

After studying nearly a thousand specimens from several hundred

samples I can now comprehend Smith's intention, I think. The sides of the pronotum are longitudinally rugulose in both species, the rugulae very fine and irregular in *S. occidentale*, coarse and sharp and widely spaced in *S. diecki*. The interspaces are, in *S. diecki*, usually concave, smooth, shiny and without evident punctulae. Specimens do show up, however, which do have punctulae in these interspaces; the punctulae are fine, often visible only in oblique lighting, and most often separated by more than a puncture diameter. Those specimens which do have punctulate propleurae have the punctulae confined to the lower half or less and the punctulae do not obscure the decidedly shiny overall aspect of the segment. In those insects which I interpret to be *S. occidentale* the entire propleura is closely punctulate and the punctures evenly distributed and the overall appearance is of a dull, or barely shiny, segment.

The mesopleura of *S. diecki* is variable, but is usually more or less closely punctulate, varying from moderately to strongly shiny, dependent upon the density and depth of the punctulae. Although occasionally reduced or absent, rugulae are usually present and distinct. These rugulae may be strictly longitudinal or may extend obliquely from the upper anterior angle toward the lower posterior corner. In *S. occidentale* the mesopleura is barely shiny, closely and deeply punctulate. Usually absent, occasionally one or two fine, indefinite longitudinal rugulae may be present.

The propodeal sides of *S. diecki* always bear coarse longitudinal rugulae over the entire surface; these are sometimes reduced over the posterior portion of the upper half. The interspaces are punctulate, the punctulae most often fine and sparse, the surface moderately shiny. In this species, too, the basal face of the propodeum is definitely shiny, with fine, obscure, sparse punctulae. Sometimes fine transverse rugulae may be present and in a few specimens the basal face is reticulate-rugulose. Dense punctation on both lateral and basal faces is characteristic of *S. occidentale*, the lateral face rarely with a few fine, obscure longitudinal rugulae on the sides at or below the level of the spiracular opening.

The profile of the metanotal groove is variable in both species, but in *S. diecki* it is usually long. The posterior slope of the mesonotum, which sets off the groove anteriorly is usually vertical, or nearly so, as is the anterior slope of the basal face of the propodeum. In this species, the "floor" of the metanotal groove is, in profile as long as the groove is deep or longer. In *S. occidentale* the groove is most commonly broadly V-shaped in profile, without a definite "floor." Some specimens have been seen in which this is not true; in these, however, the posterior slope of the mesonotum is strongly oblique, rather than vertical, and the anterior slope of the basal face of the propodeum is similarly inclined. In a few specimens the basal face of the propodeum almost entirely lacks the anterior slope and the mesonotal groove is thus very poorly delimited and is quite shallow.

Other differences exist between the workers of these species, but are too variable to be used reliably. Eyes tend to be larger in *S. diecki*, the OMD correspondingly less; cephalic rugulae are usually coarser in *S. diecki*; the pronotal humeri are usually more pronounced in *S. diecki* and in this species the nodes

of the petiole and postpetiole are usually shiny and occasionally lightly rugulose. These conditions are usually contrasted in *S. occidentale* which is also, on the average, a smaller species.

Of the cotypes of *S. diecki* I have studied two from the collections of the Museum of Comparative Zoology. The first of these bears the following labels: *Stenamma*/Westwoodi/Diecki Em/Brit. Columbia/ /Cotypes/from/C. Emery/ /M.C.Z./Cotype/20594. Selected here as Lectotype, this specimen has the following measurements: HL 0.80; HW 0.65; SL 0.58; PW 0.43; WL 0.90; TL 3.20; CI 81; SI 90; OI 12; OMD 1.83 x EL. The second specimen has been designated a lectoparatype and both have been returned to the MCZ. Both are in accord with the basic description of the worker caste as given by M. R. Smith (1957).

The above lengthy discussion has redefined the characters of *S. occidentale* and of western populations of *S. diecki*. The interpretation of *S. occidentale*, in particular, differs from that originally given by Smith (1957). Although I have not studied all the material seen by Smith, I am aware that some which he had determined as *S. occidentale* are now, by my definition, to be assigned to *S. diecki*. Until all this material is restudied I cannot predict how this will affect the distribution of *S. occidentale* as given by Smith. Of *S. diecki* in the West, I have seen specimens from British Columbia, Washington, Oregon, California, Idaho, Nevada, Montana, Utah and from the State of Baja California, Mexico. Smith (1957) has recorded *S. diecki* from Wyoming and New Mexico in addition to most of the above States and Gregg (1963) has recorded it from Colorado.

This is the most common *Stenamma* in California and is found from low elevations in coastal and northern areas to moderate elevations in the Sierra Nevada and southern California. Specimens have been examined from the following Counties: Amador, Del Norte, El Dorado, Humbolt, Kern, Lake, Los Angeles, Marin, Mendocino, Mono, Monterey, Napa, Orange, Placer, Riverside, Sacramento, San Benito, San Diego, San Luis Obispo, San Mateo, Siskiyou, Solano, Sonoma, Stanislaus, and Yolo.

### ***Stenamma dyscheres*, new species**

Figures 28, 29, 34, 35

**DIAGNOSIS.** Worker with 2-4 facets in EL, OMD 2.0-4.0 x EL; median lobe of clypeus notched in frontal view; first tergite largely polished, basal one-fourth or less with fine longitudinal striae; first sternite with sparse longitudinal striae which are coarse and conspicuous, or with numerous very fine striations, interspaces usually smooth and shiny, but fine punctulae may be present, particularly on sides (see DISCUSSION).

**WORKER. Measurements.** HL 0.68-0.90 (0.90); HW 0.52-0.75 (0.73); SL 0.47-0.63 (0.61); WL 0.77-1.03 (1.03); PW 0.37-0.50 (0.48).

**Head.** Distinctly longer than broad, CI 70-86 (81), sides nearly straight in frontal view, weakly to distinctly narrowed above. Eyes small, with 2-4 facets in EL, OMD 2.0-4.0 (2.6) x EL; OI 7-13 (9). Scape stout, shorter than HW, cylin-

drical at bend, distinctly thickened near apex, SI 78-97 (84). Mandibles moderately shiny, coarsely striate over entire length, more finely so in small specimens; cutting margin with six or seven teeth, apical and preapical teeth large, sub-basal teeth often reduced, basal tooth distinct, triangular. Clypeus shiny, median lobe longitudinally depressed and laterally carinulate, weakly to strongly notched in frontal view, with or without transverse carinula below summit of declivity; in profile, lobe not exceeding clypeal margin, declivity straight to distinctly concave in lower half or less. Frontal lobe barely shiny, with one or two longitudinal rugulae; front and sides of head with fine, widely spaced longitudinal rugulae, weaker and forming reticulae above, especially at sides, interspaces slightly shiny, finely punctulate and with scattered coarse, piligerous punctures.

*Thorax.* Pronotal neck closely punctulate and slightly shiny, declivity shiny, with one to four fine irregular transverse rugulae, interspaces lightly punctulate; sides with widely spaced longitudinal rugae, interspaces smooth, shiny, with a few fine punctulae; *or* interspaces slightly shiny and densely punctulate. Promesonotum with irregular longitudinal rugae for most of length (a few transverse rugulae anteriorly), interspaces smooth, shiny, with scattered fine punctulae; *or* closely and finely longitudinally rugulose, interspaces slightly shiny, closely and finely punctulate. Mesopleura coarsely rugulose or reticulate, moderately shiny, interspaces lightly and sparsely punctulate; *or* dull, densely punctulate and rugulose; *or* densely punctulate and without rugulae. Sides of pronotum with coarse longitudinal rugulae, slightly to moderately shiny, interspaces lightly, but usually closely, punctulate; *or* rugulae largely obsolescent, surface barely shiny, sharply and closely punctulate; basal area moderately shiny, finely and sparsely punctulate, with a few obscure transverse rugulae; *or* slightly shiny, densely and finely punctulate, with few or no transverse rugulae; spines acute, about as long as distance between them; *or* short, triangular and separated by about twice their length. Metanotal groove shallow, usually broad in profile.

*Petiole.* Dorsal face of anterior peduncle about as long as front of node; node, in profile, broadly cuneate with rounded crest; ventrally with or without anterior tooth or projection. Postpetiole evenly convex in profile; from above, slightly wider than long, distinctly broader caudad; nodes with distinct to obscure longitudinal rugulae, surface shiny and sparsely punctulate to slightly shiny and densely punctulate; remainder closely punctulate.

*Gaster.* First tergite with conspicuous fine striae on basal one-fourth or less, striae sometimes reduced to extreme basal one-sixth, but then exceptionally fine and dense; segment otherwise smooth and shiny, with scattered fine piligerous punctures. First sternite with a variable number of sharply defined, widely spaced striae on basal one-third or more, interspaces smooth and shiny; *or* basal one-third or more with numerous fine striae, interspaces sometimes weakly punctulate, especially laterad; rarely, striae are restricted to basal one-fifth and along extreme sides, most of segment smooth and shiny.

*Pilosity.* Front of head with intermixed sparse long and short hairs; thoracic

dorsum with scattered long, erect hairs of variable length; remainder of body with sparse suberect hairs.

*Color.* Medium ferruginous, legs and antennae yellowish, to brownish ferruginous with mandibles, lower third of head and appendages paler.

*FEMALE. Measurements.* HL 0.83-0.93; HW 0.70-0.78; SL 0.60-0.66; WL 1.20-1.30; PW 0.60-0.66.

*Head.* Longer than broad, CI 81-85, sides mostly parallel, but slightly convergent above in frontal view. Eyes convex, of moderate size, OMD 0.77-0.92 x EL; OI 21-24. Scape stout, cylindrical at base and somewhat thickened toward apex, SI 81-87. Mandibles moderately shiny, rugose over entire length, with 6 or 7 teeth on cutting margin, apical and two preapical teeth large, sub-basal teeth much reduced, basal tooth usually distinct. Clypeus as described for worker. Sculpture as described for worker but rugulae a little coarser and reticulae more numerous.

*Thorax.* Pronotal neck slightly shiny, densely and finely punctulate; declivity moderately shiny, with irregular fine transverse rugulae, interspaces lightly punctulate; sides with several coarse, widely spaced rugae, interspaces shiny, lightly to moderately shiny. Pleurae moderately to strongly shiny, with coarse longitudinal rugae above, but mostly smooth, interrugal spaces shiny, sometimes with light punctulation. Mesocutum and scutellum longitudinally coarsely rugulose, interspaces moderately shiny and lightly to moderately punctulate. Propodeal sides longitudinally rugose, interspaces narrow, lightly to moderately shiny; basal area slightly shiny, closely punctulate; declivitous area smooth and shiny; spines as described for worker.

*Petiole.* As described for worker.

*Gaster.* As described for worker.

*Pilosity.* About as in worker, but longer and a little more abundant.

*Color.* As described for worker.

*MALE. Measurements.* HL 0.57-0.65 (0.60); HW 0.48-0.55 (0.50); SL 0.20-0.27 (0.25); WL 1.06-1.23 (1.10); PW 0.60-0.70 (0.62); wing length 3.2-3.7 (3.3).

*Head.* Longer than broad, CI 82-89(83), margins slightly convergent below in frontal view, occiput broadly rounded. Eyes large, EL about 3 x OMD; OI 32-37 (36). Mandible smooth and shiny, with 3-5 teeth. Median lobe of clypeus abruptly declivitous in profile and with weak transverse carinula at summit of declivity. Head mostly closely punctulate and slightly shiny, with sparse fine striae, especially above at sides; occiput shiny, with a few fine punctures and rugulae.

*Thorax.* Pronotal neck slightly shiny and finely punctulate; short declivity overhung by front of mesonotum; sides moderately shiny, with a few scattered punctures. Middle lobe of scutum shiny, very lightly shagreened, with a few fine striations near Mayrian furrows, and with scattered piligerous punctures; lateral lobes similar, but usually with fine close striae on posterior half or less. Scutellum moderately shiny, with conspicuous coarse longitudinal rugulae, interspaces lightly punctulate. Pleurae mostly smooth and shiny, but with variable areas of fine striae and/or punctures above and along posterior margin.



Propodeum, in profile, with long, sloping basal face and much shorter vertical posterior face, juncture slightly angulate to very weakly tuberculate; basal face with fine longitudinal striae in middle, a few weak rugulae at sides; declivitous face smooth and shiny; sides with a few longitudinal rugulae below which, along distal portion, curve up to meet those from sides of basal face.

*Petiole.* Nodes smooth and shiny, without rugulae or striae; rest of petiole and postpetiole closely punctulate.

*Gaster.* Extreme base of first tergite with numerous short, fine striae, segment otherwise polished; first sternite with sparse, obscure basal striae, usually more evident at sides.

*Wings.* Venation of the *brevicorne* type; first abscissa of Rs+M from one-third to one-half as long as second abscissa. Whitish, veins and stigma pale yellowish; fringe hairs of posterior margin of hind wing about 0.13 mm long.

*Pilosity.* With scattered erect to suberect hairs of varying length over most of the body; short and suberect on scape.

*Color.* Light brownish ferruginous, variably darker on head and thoracic dorsum; mandibles, antennae and legs yellowish.

**TYPE MATERIAL.** Holotype worker, allotype male and 9 workers, 21 male paratypes: Bull Flat, 3600', T5N, R.18E, Tuolumne Co., CALIF., 6 Sept. 1967 (G. C. and J. N. Wheeler; #187, CALIF). Holotype, allotype and 2 workers, 7 male paratypes in LACM; 2 workers, 4 male paratypes in GCW; 1 worker, 2 male paratypes in each: AMNH, MCZ, USNM, ACC, WSC.

**ETYMOLOGY.** *Dyscheres*, Gr., vexatious or difficult; in allusion to the extreme variability of this species and the difficulty in characterizing it.

**DISTRIBUTION:** Low to moderate elevations in the Sierra Nevada foothills south to Tejon Pass area of the Tehachapi Mountains; in the north, westward into the upper Sacramento Valley.

**ADDITIONAL RECORDS.** Strawberry, El Dorado Co., 17 Apr. 1961 (R. O. Schuster, #61, 69; UCD); 2 mi W Riverton, El Dorado Co., 18 May 1961 (R. O. Schuster, #96; UCD); 2 mi N Riverton, El Dorado Co., 12 Dec. 1970 (F. G. Andrews; LACM), Berlese ex pine duff; 1.6 mi W Quintette, El Dorado Co., 4 Apr. 1971 (F. G. Andrews; LACM); 5.6 mi SE Dorrington, Calaveras Co., 16 June 1959 (L. M. Smith & R. O. Schuster, #142; UCD); Foresthill, Placer Co., 6 June 1959 (F. C. Raney, #139; UCD); Tahoe City, Placer Co., 3 July 1961 (H. L. McKenzie, #112; UCD); Michigan Bluff, 3500', Placer Co., 24 June and 5 Nov. 1962 (R. R. Snelling; LACM); Bieber, Lassen Co., 17 Apr. 1958 (R. W. Gerhardt, #101; UCD); Post Pile Camp, 5800', Tehama Co., 30 Aug. 1960 (R. O. Schuster & A. A. Grigarick; UCD); Chico, Butte Co., 4 Sept. 1958 (L. M. Smith & R. O. Schuster, #192; UCD); 2 mi W Springville, Tulare Co., 13 May 1959 (L. M. Smith #86; UCD); 5 mi S Gorman, Los Angeles Co., 25 Mar. 1959 (H. L. McKenzie, #34; UCD).

**DISCUSSION.** When adequate samples, including entire nest populations, become available it may prove that what is here treated as a single, highly variable species is actually two species. The type series consists of a uniformly similar assemblage in which the integument is moderately to strongly shiny on

the thorax and petiolar nodes. The thoracic rugulae are coarse and well defined. The first gastric sternite has a number of widely spaced, rather coarse longitudinal striae and the corresponding tergite has numerous coarse striae basally, these about 0.2 mm long. The nodes of the petiole and postpetiole are conspicuously longitudinally rugulose. In addition to the types, specimens from Michigan Bluff (24 June 1962), Strawberry and Post Pile Camp fall into this type of sculpturation.

Most of the remaining specimens are, on the average, smaller, with thoracic rugulae quite fine and the interspaces closely punctulate, hence only slightly shiny. The first gastric sternite is very finely and closely longitudinally striate with a few punctulae between striae, especially toward the sides. The base of the first tergite is closely and finely striate, the striae 0.13 mm long, or less. These closely punctulate specimens also usually have short, triangular propodeal spines, but the series from the Tehachapi Mountains has the spines about as long as in the types.

A few specimens (Quintette, Foresthill) appear to be intermediate. The Quintette series have short propodeal spines, the interrugular spaces are moderately shiny and the first sternite, while mostly finely striate, has a few coarse striae. The Foresthill specimens are as shiny and coarsely rugulose as the types, the propodeal spines are long, but the sternal striae are fine and punctulate between striae at the sides.

Among the species with sculptured gastric segments *S. dyscheres* most closely resembles *S. punctatoventre* and *S. californicum*; *S. punctatoventre* may be immediately separated by the shape of the median clypeal lobe, which is produced and appears truncate in frontal view. In *S. californicum* the rugulae on the sides of the thorax are much reduced and very obscure because of the fine, dense punctulation; this is especially evident on the mesopleura which usually is without rugulae and on the propodeal sides which may have a few rugulae below the spiracle but none above it. In this species, too, the basal one-fourth or more of the first tergite is finely punctulate and without evident striations except the usual ones at the basal articulation. Finally, the sculpture of the first sternite consists of fine, dense punctulation. Those specimens of *S. dyscheres* which possess dense punctulae on the sides of the thorax retain the coarse, conspicuous rugulae on the mesopleura and propodeal sides and the base of the first tergite is conspicuously striate, the articular striae interspersed with longer, finer supplementary striae. The sternite is striate, the striae coarse or fine and punctulae may be present laterally between striae.

*Stenamma occidentale* M. Smith

Figures 30, 31, 36, 37, 60

*Stenamma neoarcticum* Mayr, 1886. Zool.-Bot. Gesell. Wien. 36:454. ♀ ♂ (not ♀).

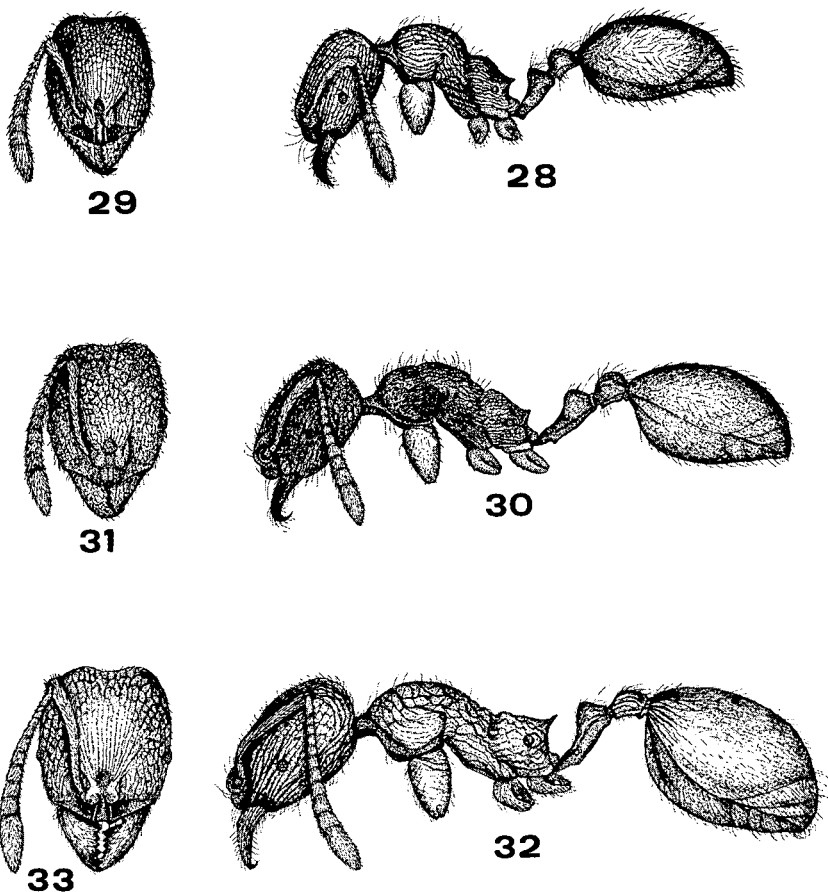
? *Stenamma (Stenamma) westwoodi neoarcticum*, Emery, 1895. Zool. Jahrb. Abt. f. Syst. 8:299-300. ♀ ♀ .

*Stenamma (Stenamma) neoarcticum*, Forel, 1901. Soc. Ent. Belg. Ann. 45:347. ♀ ♂ .

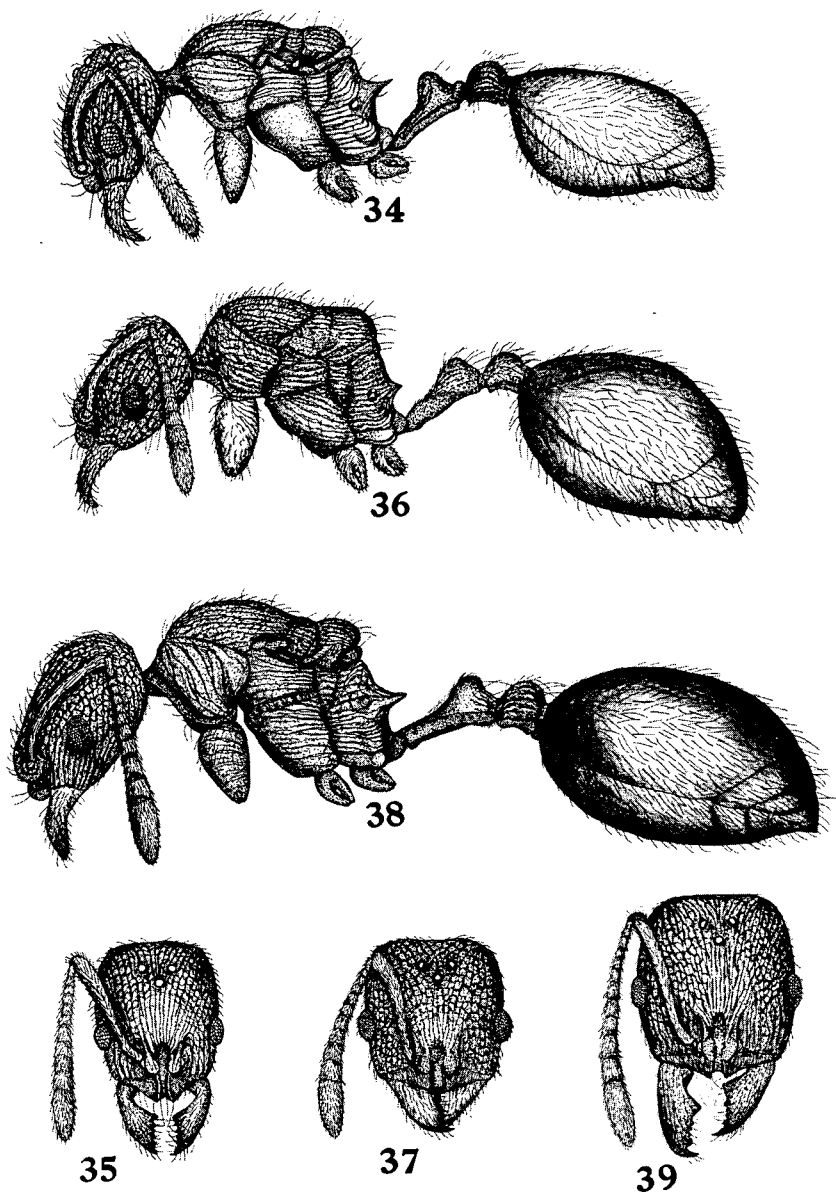
*Stenamma neoarcticum*, Wheeler, 1903. Psyche 10:165-166. ♀ . Creighton, 1950. Bull. Mus. Comp. Zool. 104:, 135, 138. ♀ ♀ ♂ .

*Stenamma occidentale* M. R. Smith, 1957. Amer. Midl. Nat. 57:142, 146-150. ♀ ♀ ♂ .

Most of the confusion between this species and *S. diecki* has been discussed under that species and need not be repeated. Material which, in my opinion, belongs to *S. occidentale* has been examined from the following States: Arizona, New Mexico, Colorado, Utah, Idaho, California, South Dakota, Oregon and



FIGURES 28, 29: *S. dyscheres*, worker, lateral view and frontal view of head; Figures 30, 31: *S. occidentale*, worker, same; Figures 32, 33: *S. sequoiarum*, worker, same. Figures by Ruth Ann DeNicola.



FIGURES 34, 35: *S. dyscheres*, female, lateral view and frontal view of head; Figures 36, 37: *S. occidentale*, female, same (cotype of *S. neoarcticum* Mayr); Figures 38, 39: *S. sequoiarum*, female, same. Figures by Ruth Ann DeNicola.

Washington. Although there are no records from Nevada, the ant is likely to be found there.

The following California specimens have been examined: 1♀, 1♂, "Calif. Oct. 31.85" (Cotypes of *S. neoarcticum* Mayr; USNM); Auburn, Placer Co., 12 Mar. 1958 (L. M. Smith & R. O. Schuster; UCD); Davis, Yolo Co., 2 May 1932 (T. W. Cook; LACM) (Note: These are the specimens from Davis recorded by Cook (1953) as *S. brevicorne heathi*).

*Stenamma sequoiarum* Wheeler

Figures 32, 33, 38, 39, 59

*Stenamma brevicorne sequoiarum* Wheeler, 1917. Proc. Amer. Acad. Arts. Sci. 52:520. ♀♀.

*Stenamma diecki sequoiarum*, Creighton, 1950. Bull. Mus. Comp. Zool. 104: 136, 137. ♀.

*Stenamma sequoiarum*, M. Smith, 1957. Amer. Midl. Nat. 57: 142, 156-158. ♀♀.

The most important characteristics are adequately covered in the above key and in the redescription of Smith (1957), who studied the types from Mt. Tamalpias and specimens from Sam P. Taylor State Park, both in Marin County, California. I have seen specimens from the following additional California localities: Steven's Creek, Santa Clara Co.; 28 and 31 m W of Paso Robles, San Luis Obispo Co.; Pine Cyn., Monterey Co.; Donomore Meadow, 5600', Siskiyou Co. The Davis, Yolo Co., record cited by Cook (1953) cannot be verified as there are no such specimens under this name in his collection.

GROUP III

*Stenamma exasperatum*, new species

Figures 40, 41, 46, 47, 63

**DIAGNOSIS.** Eyes of worker with three facets in greatest diameter; first tergite densely and finely punctulate, with basal longitudinal striae and scattered coarse piligerous punctures; first sternite densely, finely punctulate; scapes and tibiae with abundant fully erect hairs.

**WORKER. Measurements.** HL 0.87-0.93 (0.93); HW 0.70-0.77 (0.77); SL 0.60-0.66 (0.66); WL 1.00-1.13 (1.13); PW 0.47-0.53 (0.53).

**Head.** A little longer than broad, CI 81-83 (82), longer than scape, a little narrowed toward occiput. Eyes small, with three facets in greatest diameter, OMD 2.16-2.33 (2.33) x EL; OI 10-11 (10). Scape stout, a little shorter than HW, SI 86-89 (87), distinctly thickened near apex. Mandible with longitudinal rugulae over most of length, shiny and sparsely punctate, cutting margin with six or seven teeth. Median lobe of clypeus not exceeding clypeal margin, longitudinally depressed and laterally carinulate, without transverse carinula. Clypeus and depressed frontal area shiny; frontal lobes roughened, slightly shiny;

remainder of cephalic dorsum slightly shiny, finely punctulate, evenly and coarsely reticulo-rugose, with numerous coarse piligerous punctures.

*Thorax.* Pronotal neck slightly shiny, densely punctulate and with a few coarse punctures; laterally reticulo-rugose, interspaces punctate and slightly shiny; promesonotum regularly reticulo-rugose, interspaces shiny, with scattered obscure punctures. Mesopleura and sides of propodeum coarsely longitudinally rugose, interspaces closely punctate and slightly shiny. Metanotal depression broad and deep. Propodeum basally with a poorly defined transverse welt; basal face closely punctulate and with irregular rugulae tending to form reticulae; spines short, sharp, about two-thirds as long as distance between them; declivity closely punctulate and slightly shiny on upper half, lower half shiny and impunctate.

*Petiole.* Dorsal face of anterior peduncle about as long as anterior face of node; summit of node narrowly rounded, anterior and posterior faces about equal; peduncle without ventral tooth anteriorly. Postpetiole, from above, about as broad as long, sides slightly convex. Sides and venter of petiole and postpetiole dull, densely punctulate; nodes sharply reticulo-rugose and dull, with closely punctulate interspaces.

*Gaster.* First tergite densely punctulate and dull on basal half, or more; entire segment with numerous coarse, piligerous punctures; punctulate area with numerous fine longitudinal rugulae, forming reticulae toward base. First sternite similar, but striatopunctulate on basal half, rugulae less conspicuous. Remainder of gaster as usual in genus.

*Pilosity.* Scapes, femora and tibiae with abundant fully erect whitish hairs of even length; cephalic and thoracic dorsa with numerous evenly spaced fully erect hairs of uniform length. Gastric hairs a little denser than in *S. heathi*.

*Color.* Yellowish ferruginous, median flagellar segments a little darker; mandibular margins darker; antennal club and tibiae yellowish.

FEMALE. See Discussion below.

MALE. Unknown.

TYPE MATERIAL. Holotype and three paratype workers: Calaveras Big Trees, Calaveras Co., CALIF., June 1952 (R. R. Snelling), under stone in Sequoia grove, all specimens in LACM.

ETYMOLOGY. *Exasperatum*, L., so named to express my feeling upon discovering that these specimens, thought to be *S. heathi*, represent still another species.

ADDITIONAL MATERIAL. Three workers, Mariposa Camp, 5600', Yosemite National Park, 3 August 1952 (E. O. Wilson; USNM) "under rock, pine forest".

DISCUSSION. This species is most closely related to *S. heathi* with which it shares details of clypeal structure and gastric sculpture. The sculpturation of the head and thorax are similar but in *S. exasperatum* both are more clearly reticulate. The reticulae become less defined on the sides of the head and thorax of *S. heathi*, usually replaced by a series of irregular longitudinal rugulae.

Although the hairs of the scapes and tibiae are fully erect in *S. exasper-*

*atum* studied, there may be some variation not now evident. In *S. heathi* these appendages usually have the hairs strongly decumbent, but in some specimens the hairs may be subdecumbent and with a few which are suberect. The hairs of the hind tibiae apparently are consistently decumbent in *S. heathi*, fully erect in *S. exasperatum*.

The erect hairs on the front of the head are conspicuously more abundant in *S. exasperatum* and are more uniform in length. Some of the hairs on the front of the head of *S. heathi* are three to four times the length of the shortest hairs and hairs of all lengths are sparser than in *S. exasperatum*.

A single female, taken at the same time and place as the types, but from under a different stone, may belong to this species. It is very similar to that of *S. heathi* and lacks the distinctive pilosity features of *S. exasperatum*. While the female of *S. heathi* has the entire first tergite closely punctulate, this presumed *S. exasperatum* female has the first tergite conspicuously longitudinally striate on the basal fifth, the remainder, smooth, shiny and with scattered fine piligerous punctures. Coarse piligerous punctures are found only on the basal one-fifth of the segment. The first sternite is conspicuously striate for most of its length, with punctulate interspaces, and scattered coarse piligerous punctures. The apical one-fifth of the segment is smooth and shiny. The mesopleura is largely smooth and shiny, rather than longitudinally striate as in *S. heathi*; the pronotal sides are longitudinally rugose rather than reticulate; the basal face of the propodeum is punctulate rather than transversely striate or striato-punctulate; the erect hairs on the cephalic dorsum are denser and more uniform in length. Measurements for this female are as follows: HL 0.93; HW 0.73; SL 0.66; EL 0.20; OMD 0.20; WL 1.28; PW 0.63; CI 78; SI 91.

*Stenamma heathi* Wheeler

Figures 42, 43, 48, 49, 62

*Stenamma brevicorne heathi* Wheeler, 1915. Bull. Amer. Mus. Nat. Hist. 34:410. ♀ .

*Stenamma heathi*, Creighton, 1950. Bull. Mus. Comp. Zool. 104:136, 137. Smith, 1957. Amer. Midl. Nat. 57:141. 154-156. ♀ .

This is one of the more distinctive western *Stenamma*, most readily recognized by the peculiar sculpturation of the first tergite. Very nearly the entire segment is shagreened and finely, densely punctulate. Over the basal third of the segment extend a variable number of fine longitudinal rugulae which tend to form a reticulate pattern in some specimens. Finally, scattered over the entire segment are numerous coarse punctures, from each of which arises a long, coarse hair. The overall effect is very peculiar and is shared, in North American species, only with *S. exasperatum*. Other western species, such as *S. californicum*, *S. dyscheres* and *S. punctatovenire* have sculptured first tergites, but in these species the sculpturation consists of fine, dense punctulation and

is restricted to the basal third, or less; fine longitudinal basal striae may be present or not. These species wholly lack the conspicuous coarse, piligerous punctures.

Two workers specimens are atypical in the sculpturation of the first tergite. Both are from Meling's Ranch, 1800', Sierra San Pedro Martir, Baja Calif., Mex., 24 May 1952 (W. S. Creighton; WSC). In these the surface is closely reticulate on the basal one-third and with the usual coarse, piligerous punctures. On the remainder of the segment the piligerous punctures are shallower and the surface is very lightly shagreened, this more pronounced adjacent to the punctures. In other respects these specimens seem typical of *S. heathi*.

As indicated above, the sculptured first sternite has been overlooked by previous workers. In *S. heathi* and *S. exasperatum* the sculpturation of the first sternite is of the same character as that of the corresponding tergite as described above. In the other species this is usually true, though the sculpturation of the sternite may be more pronounced.

The female of *S. heathi* was unknown to Smith when he revised the genus; several are available and the salient characters of this caste follow. The male remains unknown.

**FEMALE. Measurements.** HL 0.93-0.97; HW 0.79-0.83; SL 0.66-0.73; WL 1.33-1.40; PW 0.66-0.73.

**Head.** Longer than broad, CI 85-86, sides nearly parallel below, somewhat convergent toward occiput, CI 85-86. Eyes convex, of moderate size, OMD 0.83-1.00 X EL; OI 21-22. Scape stout, cylindrical at base, thickened toward apex, SI 83-89. Mandible finely rugose over entire length, cutting margin with six or seven teeth. Median lobe of clypeus of the *diecki* type, i.e., with longitudinal depression, laterally carinulate, appearing apically notched in frontal view. Mandibles, clypeus and frontal depression shiny; frons with divergent longitudinal rugulae to level of anterior ocellus, interspaces slightly shiny, roughened and lightly punctulate; occiput reticulate-rugulose, interspaces shiny, remainder of head reticulate-rugulose, slightly shiny and punctulate.

**Thorax.** Pronotal neck densely and coarsely punctulate, declivity and sides moderately shiny, lightly punctulate and reticulate-rugulose. Mesonotum longitudinally rugulose over entire length, a few reticulae toward sides and front, interspaces closely punctulate. Scutellum longitudinally rugulose, interspaces closely punctulate except in middle where punctulae are sparse and surface shiny. Pleurae moderately shiny, longitudinally rugose, interspaces punctulate, less densely so below. Sides of propodeum moderately shiny, rugose, interspaces lightly punctulate; basal face, in profile, about as long as posterior face, moderately shiny, transversely rugulose, interspaces closely punctulate; posterior face smooth and shiny; spines short, acute, about half as long as distance between them.

**Petiole.** As described for worker (M. R. Smith, 1967).

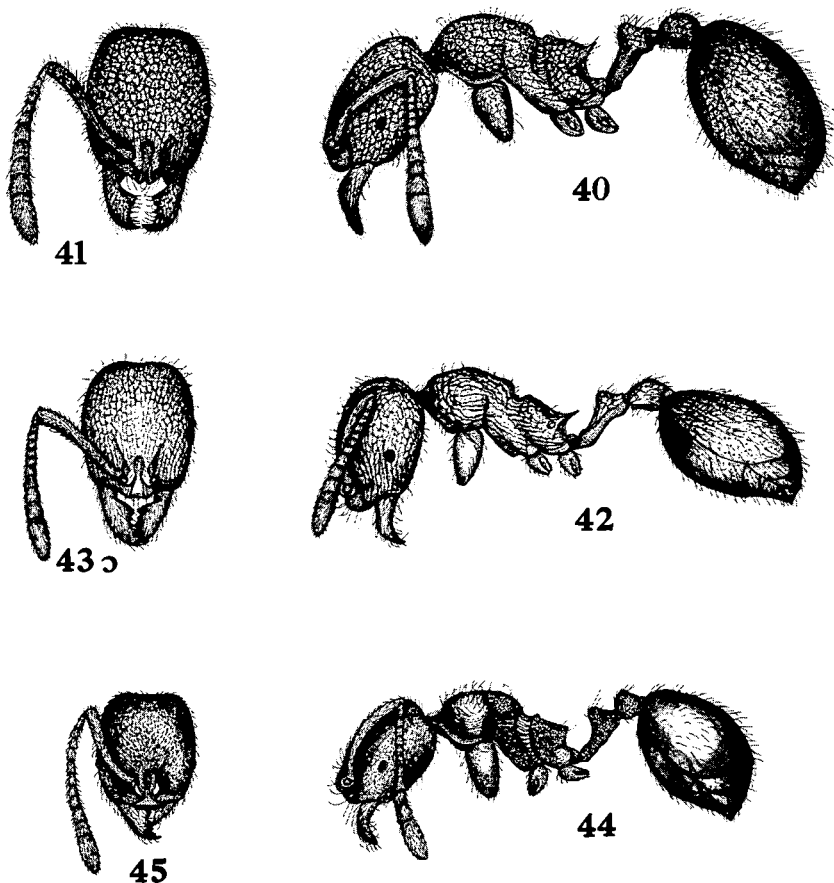
**Gaster.** As described for worker (M. R. Smith, 1967).

**Pilosity.** As described for worker, with usual sexual differences.

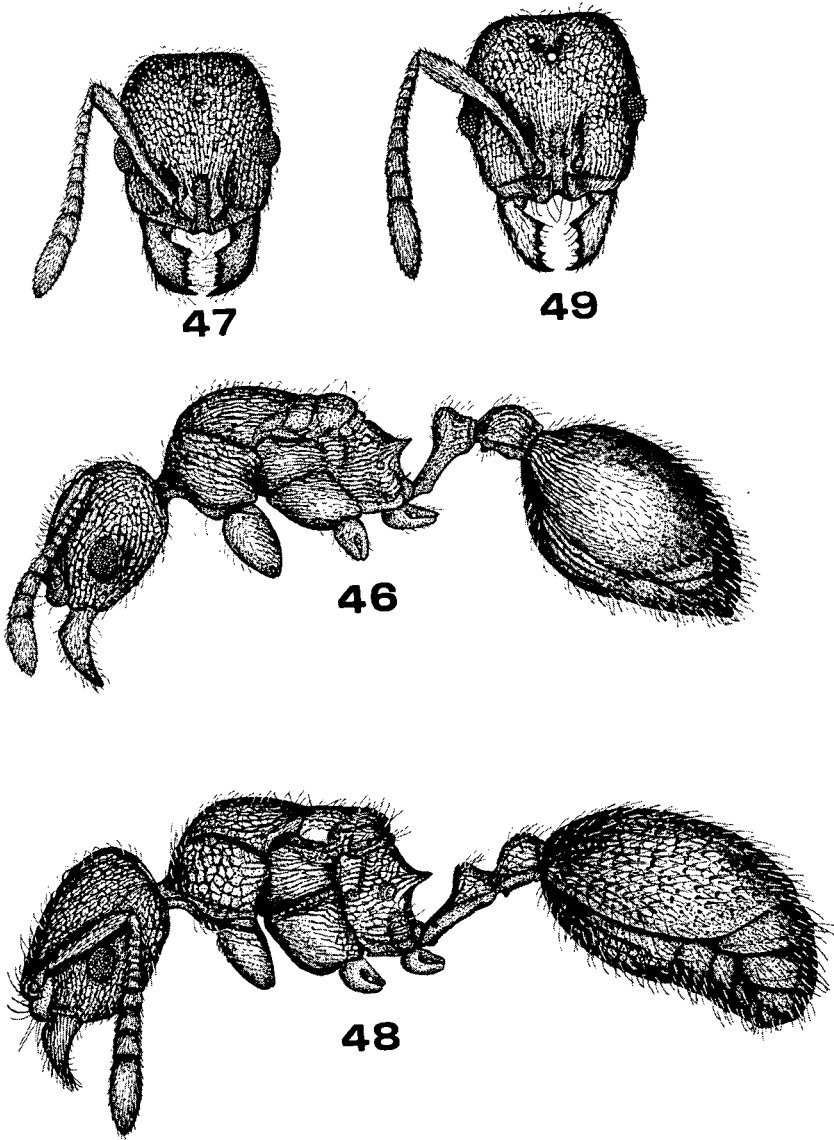


*Color.* Light to medium ferruginous, mandibular margins and sutures darker; legs and apical flagellar segments lighter.

The above description is based on four dealate females: 1, Michigan Bluff, 3500', Placer Co., CALIF., 5 Nov. 1962 (R. R. Snelling; LACM); 1, nr. Strawberry, El Dorado Co., CALIF., 17 Apr. 1961 (R. O. Schuster; UCD); 2, 10 mi SE Uncle Tom's Cabin, El Dorado Co., CALIF., 1 July 1961 (D. A. Eliason; UCD). In addition to the above localities, I have seen two workers collected 11 mi S. Bridgeport, Mono Co., CALIF., 11 May 1959 (L. M. Smith; UCD). M. R. Smith (1967) recorded this species from Washoe Co., NEV. and from Yosemite Natl. Park, Sequoia Natl. Park and the type locality, Kings River



FIGURES 40, 41: *S. exasperatum*, worker, lateral view and frontal view of head; Figures 42, 43: *S. heathi*, worker, same; Figures 44, 45: *S. huachuacanum*, worker, same. Figures by Ruth Ann DeNicola.



FIGURES 46, 47: *S. exasperatum*, female, lateral view and frontal view of head; Figures 48, 49: *S. heathi*, female, same. Figures by Ruth Ann DeNicola.

Canyon, all in CALIF. The range of this species is extended into Baja California, MEXICO: two workers, Meling's Ranch, 1800', Sierra San Pedro Martir, 24 May 1952 (W. S. Creighton; WSC).

GROUP IV

*Stenamma huachucanum* m. Smith

Figures 44, 45, 61

*Stenamma huachucanum* M. Smith, 1957. Amer. Midl. Nat. 57:141, 153-154. ♀ .

This species, described from the mountains of southern Arizona has been recorded from Colorado by Gregg (1963). The sexual castes remain unknown. It should be pointed out that in Smith's (1957) paper, fig. 8 shows the eye much too large, the EL and OMD equal in length. In all specimens which I have seen, including paratypes, the OMD is at least 1.5 x EL, sometimes as much as 1.8 x EL. The inaccuracy of several figures in Smith's paper has been noted by Gregg (1972).

GROUP V

*Stenamma wheelerorum*, new species

Figures 50-54

**DIAGNOSIS.** Eyes of worker with 4-6 facets in greatest diameter; antennal scapes flattened and broadened below, as broad at bend as at apex; head and promesonotum with few or no erect hairs; the coarse, bristle-like hairs curved closely appressed to surface; head and thorax closely rugulose, interspaces tessellate and dull, pronotal rugulae transverse.

**WORKER. Measurements.** HL 0.72-0.80 (0.77); HW 0.60-0.67 (0.65); SL 0.57-0.65 (0.62); WL 0.85-1.00 (0.95); PW 0.37-0.47 (0.45).

**Head.** Head a little longer than broad, CI 80-89 (83), usually a little longer than scape; distinctly narrowed toward occiput. Eyes small, with 4-6 facets in greatest diameter, OMD 2.5-3.3 x EL; OI 9-11 (10). Scape rather stout, usually shorter than HW, SI 92-100 (96), ending at level of occipital margin, base strongly flattened and broadened, maximum width at bend hardly less than that at apex. Mandibular margin with 6 or 7 teeth. Mandibles shiny, coarsely and closely punctate. Clypeus shiny; median lobe of clypeus short, longitudinally depressed and laterally carinulate, appearing notched in frontal view, the notch also involving clypeal border as well as lobe; in profile, lobe short, obliquely flattened to gently convex. Depressed frontal area shiny; frontal lobes densely punctulate and dull; remainder of head densely punctulate and dull and closely reticulo-rugose.

**Thorax.** Pronotum dorsally transversely rugulose, interspaces dull and densely punctulate, neck finely transversely striate and dull; sides dull, densely rugosopunctate. Mesonotum dull, finely punctulate, reticulorugulose, pleurae

more coarsely so; abruptly descending behind to metanotal groove. Propodeum densely punctulate and dull, dorsum with a few irregular rugulae, sides longitudinally rugulose below; juncture of dorsal and posterior faces with short denticle on each side, a thin rugule extending from each denticle, one anteriorly along dorsal face and another ventrad to posterior lamella; posterior face shiny, very lightly punctulate.

*Petiole.* Anterior peduncle of petiole thick in profile; node, in profile, narrowly rounded at summit; postpetiole, from above, with sides strongly convex, as broad as long. Sides of petiole and postpetiole densely punctulate and dull, dorsally with a few fine longitudinal rugulae, nodular summits somewhat shiny.

*Gaster.* First tergite without, or with extremely short, basal striae; first sternite without basal or lateral striae. Surface of segments shiny, without evidently punctulation or papillae.

*Pilosity.* Mandibles, clypeus and ventral cephalic surface with fully erect yellow hairs; nodes of petiole and postpetiole and gastric segments with sparse long suberect yellowish hairs; scapes, front and top of head and entire thorax with numerous short hairs which may be appressed or bent parallel to body surface.

*Color.* Dull yellowish ferruginous, mandibles, antennae, legs and gaster more yellowish. Often with variable brownish infuscation on head, thorax and petiole.

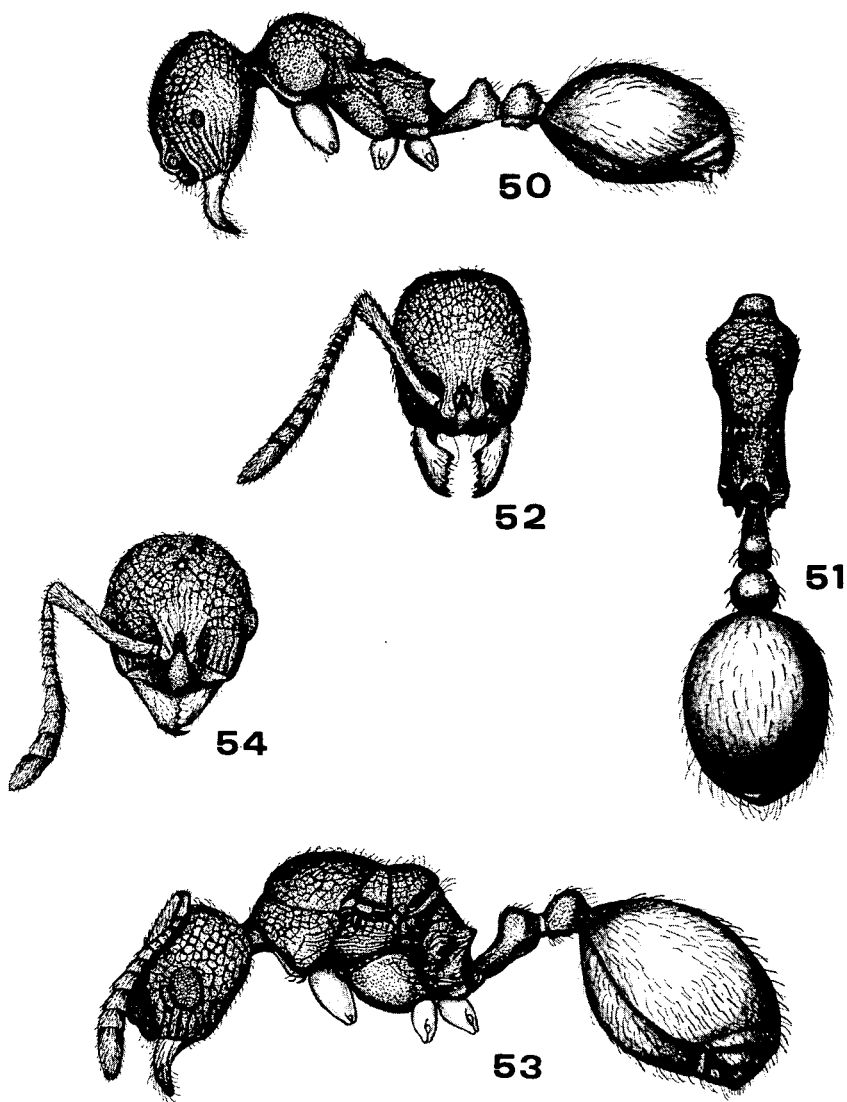
**FEMALE (deālate).** *Measurements.* HL 0.72-0.75; HW 0.65; SL 0.60; WL 1.15; PW 0.55.

Very similar to worker except for usual sexual modifications. Head a little broader, CI 86-89; eyes about 0.20 mm long, OMD 0.75 x EL; OI 27-28. Distance between posterior ocelli about 1.3 x distance between anterior ocellus and posterior ocelli, the latter about 2 times diameter of anterior ocellus; scapes slightly surpassing level of occipital margin, SI 92. Dorsal thoracic surfaces with scattered erect hairs.

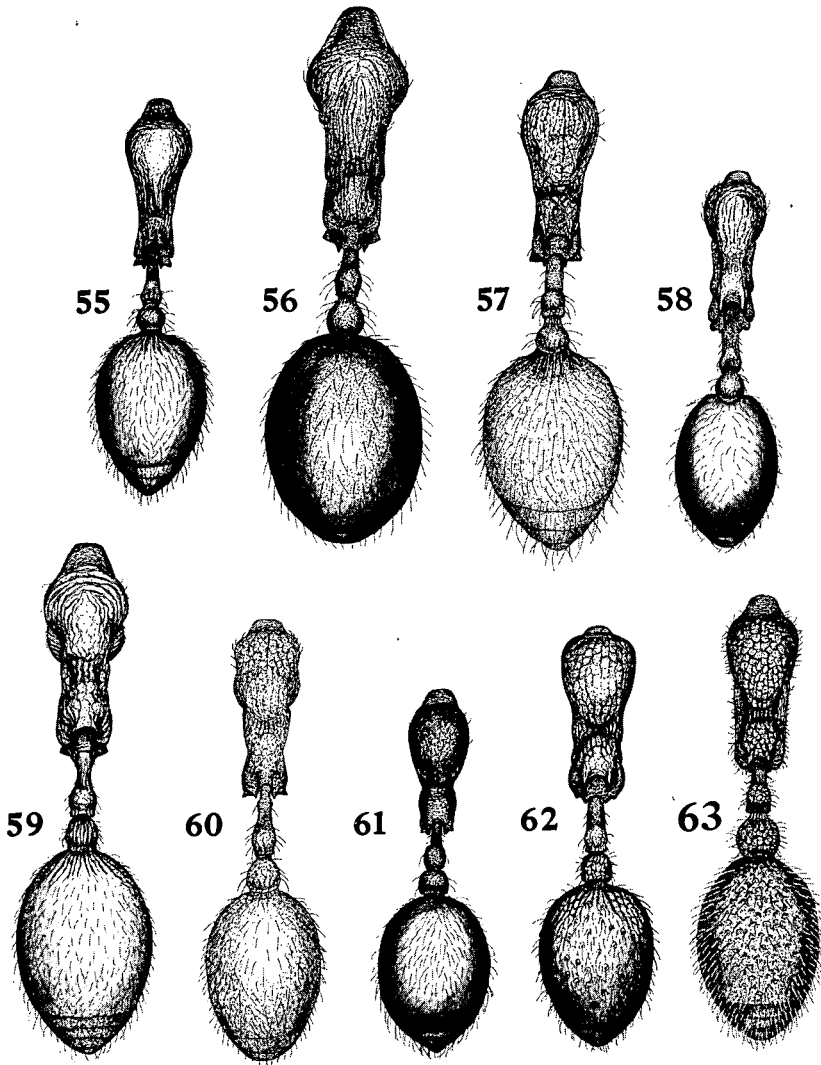
**TYPE MATERIAL.** Holotype worker, two deālate female and 55 worker paratypes: T.17N, R.19E, Sec. 19, 8800', nr. Mt. Rose, Washoe Co., NEVADA, 8 August 1967 (G. C. and J. N. Wheeler, #Nev. 161). Holotype, one female and 20 worker paratypes in LACM; one female and 20 worker paratypes in GCW. Three worker paratypes in each of the following: AMNH, MCZ, USNM, ACC, and WSC.

**ETYMOLOGY.** I am pleased to dedicate this species to my colleagues, George C. and Jeanette N. Wheeler, who have graciously placed at my disposal so much interesting material from their collections.

**DISCUSSION.** This is certainly one of the most distinctive North American *Stenamma*. The flattened scape and appressed body hairs are diagnostic. Unusual, also is the differentiated rugulation of the thorax, transverse on the dorsum of the pronotum, longitudinal elsewhere. In other North American species the thoracic rugulae are longitudinal and pass without interruption from the pronotum onto the mesonotum.



FIGURES 50-54: *S. wheelerorum*. 50, worker, lateral view; 51, worker, dorsal view of thorax and abdomen; 52, worker, head frontal view; 53, female, lateral view; 54, female, head frontal view. Figures by Ruth Ann DeNicola.



FIGURES 55-63: workers, dorsal view of thorax and abdomen of: 55, *S. punctatovenstre*; 56, *S. smithi*; 57, *S. californicum*; 58, *S. diecki*; 59, *S. sequoiarum*; 60, *S. occidentale*; 61, *S. huachuacanum*; 62, *S. heathi*; 63, *S. exasperatum*. Figures by Ruth Ann DeNicola.

## ACKNOWLEDGMENTS

Specimens utilized in this study are only partly from the collections of the Natural History Museum of Los Angeles County (LACM). Very important material was made available by the following individuals: A. C. Cole, Jr., private collection (ACC); W. S. Creighton, private collection (WSC); H. E. Evans, Museum of Comparative Zoology (MCZ); R. E. Gregg, University of Colorado; G. F. Knowlton, Utah State University (USU); R. O. Schuster, University of California at Davis (UCD); D. R. Smith, U. S. National Museum (USNM); G. C. Wheeler, private collection (GCW). The figures are the work of Ruth Ann DeNicola. I extend my thanks to all who have participated in making possible this paper.

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