KEY TO THE GENERA OF PSAPHIDINI, WITH DESCRIPTIONS OF A NEW GENUS AND SPECIES FROM WESTERN NORTH AMERICA (NOCTUIDAE : CUCULLINAE)

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In analyzing the tribe Psaphidini, the present authors consider the following genera as components: *Psaphida* Walker; *Pseudocopivaleria* Buckett & Bauer, new genus; *Eutolype* Grote; *Copipanolis* Grote; *Copivaleria* Grote; *Brachionycha* Hübner. The tribe is defined by Forbes (1954) and appears to be an unnatural, nonhomogenous grouping when *Feralia* Grote is included. The characters given the greatest consideration herein for tribal distinction are: possession of a corona in the male genitalia; strong foretibial spine, or claw, sometimes attended by a chitinous plate; numerous spines arising from the vesical sac. We exclude *Feralia* from the tribe Psaphidini because members of this genus lack a corona in the male genitalia, the uncus possesses a large double ventral process, and the tibial claw is absent. Even though the general habitus of *Brachionycha* seems atypical for the tribe, it corresponds morphologically, and is therefore included.

While the authors were preparing the description of *anaverta* Buckett and Bauer, new species, it became apparent that this species and *sonoma* McDunnough did not correspond generically with the type species of *Psaphida*. The two western species more closely correspond to *Copivaleria*, but differ by lacking the clasper in the male genitalia, as well as other characteristics to be found in the generic key to the Psaphidini.

Some of the genera within the tribe (e.g. *Copivaleria* Grote, and *Pseudocopivaleria* Buckett & Bauer, new genus) appear to be quite closely related, and perhaps when more species are discovered within these genera, convergence, rather than divergence, will prove to be the pattern. At such time only, will separate generic status be positively established. At present, due to the general habitus of the moths within the tribe, as well as their morphology, it seems best to retain the genera as they are treated by Forbes (1954) and to propose an additional new genus for the two western species, *sonoma* and *anaverta*.

KEY TO THE GENERA OF THE TRIBE PSAPHIDINI

1 Primaries with little pattern, drab, light grey to dark grey; uncus spatulate; female with weakly sclerotized ductus bursae ..... *Eutolype* Grote.
Primaries with some pattern, if drab, then not grey; uncus may be thickened, but not spatulate 2

2 Tan to reddish brown or fawn; vesica with one large spine, as well as many smaller ones, the sac somewhat thickened ..... *Copipanolis* Grote.
Not of fawn coloration; if vesica possesses a large spine, then sac greatly expanded 3
3 Abdomen with dorsal tufts on segments III and IV; vesical sac only slightly expanded, no conspicuously enlarged spine 4
Abdomen lacking dorsal tufts on segments III and IV; vesical sac greatly expanded, possessing one large spine (as well as many smaller ones) 5
4 Reniform spot of forewing large, whitish; clasper very large, nearly one millimeter long; uncus lanceolate; aedeagus with a heavily sclerotized annulus at apical portion; ductus bursae heavily sclerotized ..... *Copivaleria* Grote.
Reniform not as above; clasper lacking; ampulae well developed; uncus tip abruptly pointed, not lanceolate; aedeagus lacking annulus; ductus bursae weakly sclerotized ..... *Pseudocopivaleria* Buckett & Bauer, new genus.
5 Uncus thickened; ampulae lacking; greatest expanse of forewing over 20 mm; large, prominent discal lunule of hindwing; ductus bursae heavily sclerotized ..... *Brachionycha* Hübner.
Uncus not noticeably thickened; ampulae prominent; greatest expanse of forewing less than 20 mm; discal lunule, when present, weak; ductus bursae weakly sclerotized; bursa copulatrix possessing a signum ..... *Psaphida* Walker.

Pseudocopivaleria Buckett and Bauer, new genus

Primaries dark grey with darker markings; secondaries white with dark exterior border in males, to solid fuscous in females.

Antennae of male pectinate for greater portion of flagellum, pectinations ciliate, apical few segments moniliform, ciliate; of female, scaled basal portion, ciliate to tip. Head and palpi densely pubescent. Eyes weakly lashed. Proboscis weakly developed. Thorax densely clothed in flattened hairs dorsally; anterior and posterior divided crests present, weak or strong; ventral surface densely pubescent. Foretibiae armed with a heavy terminal claw, no chitinous plate present. Wing shape as in Figs. 1, 2, 3, and 4. Abdomen with dorsal tufts on third and fourth segments; clothed both dorsally and ventrally with thick pubescence. Genitalia of male lacking clasper; aedeagus lacking annulus terminally; ampulae well developed; uncus abruptly pointed; of female, ductus bursae weakly sclerotized.

TYPE SPECIES: *Psaphida sonoma* McDunnough, 1941.

Pseudocopivaleria is most closely related to *Copivaleria* but can be readily distinguished from it by various genital features; in the male by lack of the clasper, whereas *Copivaleria* has a very prominent clasper; absence of apical sclerotized annulus of aedeagus: and abruptly terminated uncus. In the female, the lack of the heavily sclerotized ductus bursae will, in itself, serve to distinguish *Pseudocopivaleria* from *Copivaleria.*

This new genus is exclusively of western distribution, at present being known only from California and Oregon.

Apparently, thus far there has been nothing presented dealing with the immature stages of the species of *Pseudocopivaleria*; however, through personal correspondence with Mr. A. Noel McFarland, a foodplant of *anaverta* Buckett and Bauer, new species, has been reported, canyon oak (*Quercus chrysolepis* Liebmann). Nothing is yet known

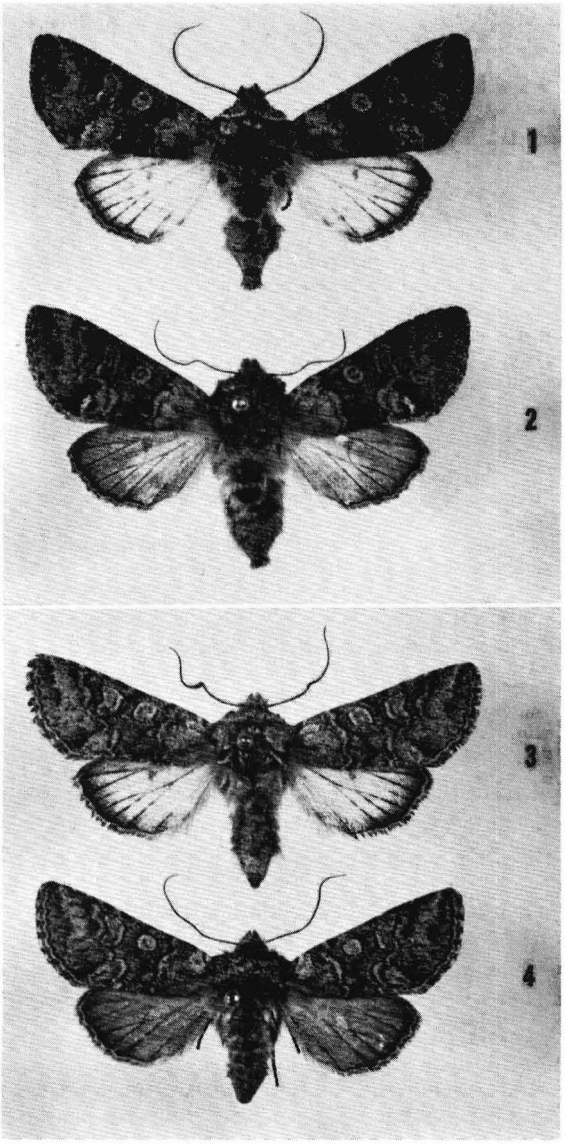

Fig. 1. *Pseudocopivaleria sonoma* (McDunnough), male. Cobb Mt., Lake Co., California, 19 February 1955 (W. R. Bauer & J. S. Buckett). Fig. 2. *P. sonoma*, female. Anderson Springs, Lake Co., Calif., 15 March 1960 (W. R. B. & J. S. B.). Fig. 3 *Pseudocopivaleria anaverta* Buckett and Bauer, holotype male. 2½ miles SSW Valyermo, Los Angeles Co., Calif., 14 April 1964 (Noel McFarland). Fig. 4. *P. anaverta*, allotype female. Locality and collector same as Holotype, 12 April 1964.

concerning the immature stages of *sonoma*, but it is probably an oak feeder also, judging by its close relationship to *anaverta*, both morphologically and ecologically.

Members of this genus inhabit the upper sonoran and transition life zones (after Merriam), and are collected in the spring months.

KEY TO THE SPECIES OF PSEUDOCOPIVALERIA

I External morphology

Primaries dark, contrastingly marked; subterminal line at tornus vertical and broad; terminal line composed of black crescents between veins; secondaries narrowly shaded with fuscous, as in (Figs. 1, 2); antennal pectinations short; hair pencil and pocket at base of abdomen ..... *sonoma* (McDunnough).

Primaries not as dark, lacking contrasting areas; subterminal line at tornus narrow, diagonal; terminal line continuous, not broken; secondaries broadly shaded with fuscous (Figs. 3, 4); lacking hair pencil and pocket at base of abdomen ..... *anaverta* Buckett and Bauer, new species.

II Male genitalia

Ampulae close to base of valva, long and finger-like; uncus blunt; aedeagus as in Fig. 9 ..... *sonoma*

Ampulae farther from base, short and triangular; uncus blunt, but more pointed than preceding; aedeagus as in Fig. 10 ..... *anaverta*

III Female genitalia

Bursa copulatrix large, median constriction minimal, therefore bursa appears to be broad (Fig. 6) ..... *sonoma*

Bursa copulatrix smaller than in preceding, median constriction great, therefore bursa appears to be figure 8 shaped (Fig. 5) ..... *anaverta*

McDunnough's description of *sonoma* is very good, and needs little amending, therefore the following description deals mainly with the pertinent points plus supplementary information. At the time of the original description of *sonoma*, the female was unknown.

Pseudocopivaleria sonoma (McDunnough)

Psaphida sonoma McDunnough, 1941, Canad. Ent., 73: 67–68.

Male: Head clothed in smokey pubescence with admixture of lighter and darker scaling; antennae pectinate. Thorax with collar porrect, dark, terminally white; tegulae clothed in smokey, white and black spatulate hairs; disc contiguous with tegulae; anterior and posterior divided tufts strong, of black and white spatulate hairs; primaries dorsally with basal half line black; transverse anterior space black, irrorated with white costally, portion of wing toward inner margin with chestnut colored scaling; transverse anterior line geminate, scalloped, black, filled with grey; median space darker than either transverse anterior or subterminal spaces; orbicular

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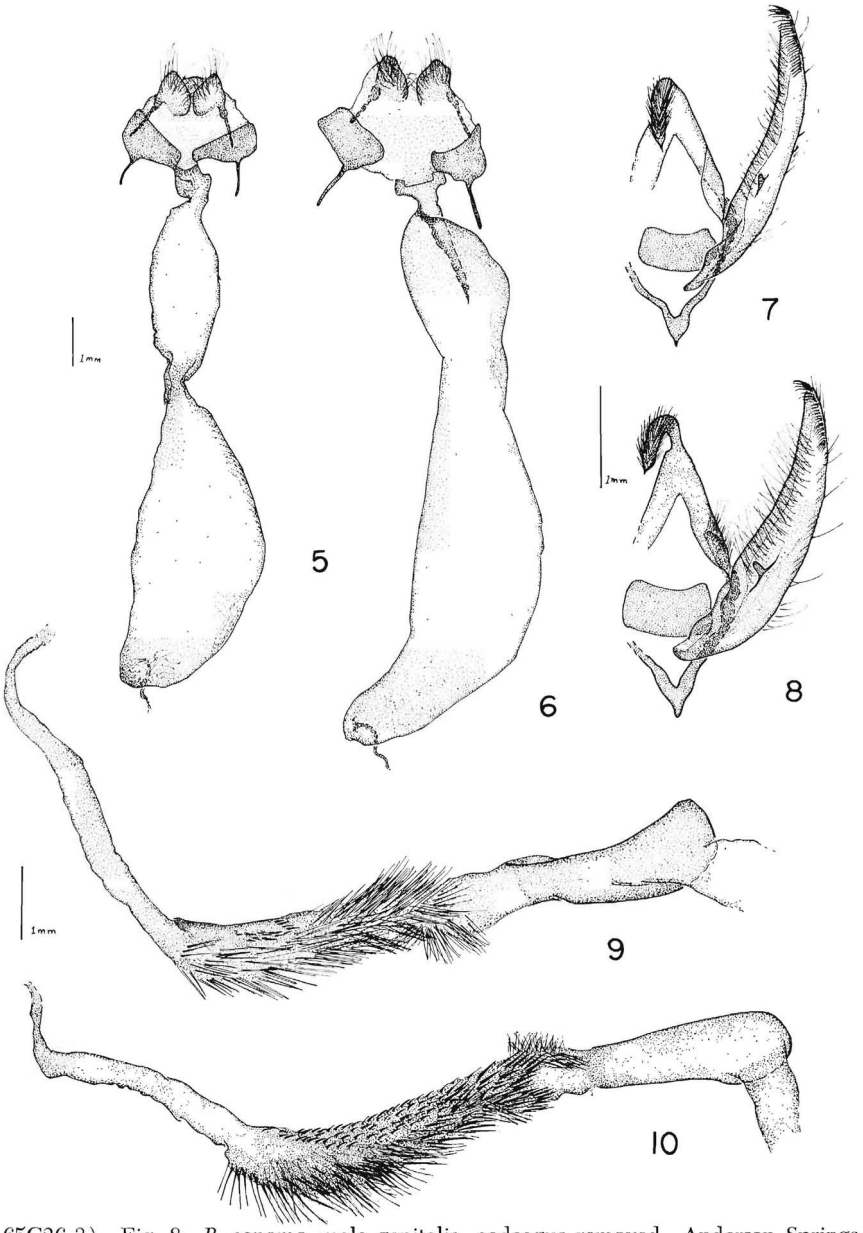
Fig. 5. *P. anaverta*, paratype, female genitalia. Data same as Fig. 3 (Bauer & Buckett slide No. 65C26-4). 1 mm measurement to left of figure applicable to Figs. 5 and 6. Fig. 6. *P. sonoma*, female genitalia. Cobb Mt., Lake Co., Calif., 18 March 1955 (W. R. B. & J. S. B.), (B.–B. slide No. 65C26-2). Fig. 7. *P. anaverta*, paratype, male genitalia, aedeagus removed. Data same as Fig. 3 (B.–B. slide No.



65C26-3). Fig. 8. *P. sonoma*, male genitalia, aedeagus removed. Anderson Springs, Lake Co., Calif., 8 March 1959 (W. R. B. & J. S. B.), (B.–B. slide No. 65C26-1). 1 mm measurement to left of figure applicable to Figs. 7 and 8. Fig. 9. *P. sonoma*, aedeagus. Data same as Fig. 8. 1 mm measurement to left of figure applicable to Figs. 9 and 10. Fig. 10. *P. anaverta*, paratype, aedeagus. Data same as Fig. 7.

round, black outlined, centrally paler; reniform pale but darker than orbicular; claviform weak; transverse posterior line colored as transverse anterior line; subterminal area greyish; tornal area with broad streak of creamy white scales (Fig. 1); subterminal line weakly defined; terminal area greyish; terminal line represented by a series of black triangles between veins; ventral surface dark, subterminal line represented by black dash on costa; secondaries dorsally white with thin exterior border of smokey scales; discal lunule faint; veins outlined with smokey; ventral surface similar to dorsal surface; venter of thorax deeply clothed in grey; legs clothed in grey, tarsi black and white banded; foretibiae with prominent anteroterminal spine, or claw. Abdomen smokey with prominent dorsal tufts on third and fourth segments; hair pencil and accompanying pocket present on sternum I; hair pencil composed of clavate sensory hairs which are reticulate for apical one-half (easily discernible under 430×); spiracles with inner lining possessing a row of single, double, or triple pectinate sensillae. Genitalia as in Figs. 8, 9.

Greatest expanse of forewing 16 mm to 18 mm for 29 specimens examined.

Female: Darker than male; antennae ciliate, setose; secondaries dorsally smokey, veins outlined in black, discal lunule faint; ventral surface as in dorsal surface, except discal lunule more prominent; remainder as in male. Genitalia as in Fig. 6.

Greatest expanse of forewing 16 mm to 18 mm for 15 specimens examined.

SPECIMENS EXAMINED. All California unless otherwise stated. Paratype #5184, The Geysers, Sonoma County, 1 ♂, 19 March 1939 (W. R. Bauer); Paratype #5184, Mount St. Helena, Sonoma Co., 1 ♂, 7 March 1940 (W. R. B.); Anderson Springs, Lake Co., 1 ♂, 21 March 1949 (W. R. B.), 2 ♂, 11 March 1955 (W. R. B. & J. S. Buckett), 3 ♂, 3 ♀, 30 March 1956 (W. R. B. & J. S. B.), 1 ♀, 21 February 1958 (W. R. B. & J. S. B.), 4 ♂, 7, 8 March 1959 (W. R. B. & J. S. B.); Cobb Mountain, Lake Co., 8 ♂, 11 March 1955 (W. R. B. & J. S. B.), 2 ♂, 3 ♀, 18 March 1955, 1 ♂, 28 February 1959, 2 ♀, 7 March 1959; Laytonville, Mendocino Co., 2 ♀, 8 May 1949 (R. Sternitsky); 1 mi. N. Elephant Butte, Plumas Co., 1 ♀, 5 April 1960 (W. R. B. & J. S. B.); Placerville, El Dorado Co., 1 ♂, 15 March 1964, 1 ♀, 22 April 1964; Twain Harte, Tuolumne Co., 1 ♂, 29 March 1960 (M. R. Lundgren); Anza, Riverside Co., 2 ♂, 17 April 1965 (R. H. Leuschner); Burney Mountain, Shasta Co., 1 ♀, 25 March 1947; Grants Pass, Josephine Co., Oregon, 2 ♂, 1 ♀, 5 June 1964 (K. Goeden).

P. sonoma can readily be distinguished from *anaverta* as in above diagnosis, by genitalia in both sexes; the possession of a hair pencil and accompanying pocket on abdominal sternum I; the creamy white broad dash in tornus region (Figs. 1, 2). *P. sonoma* is more northern in distribution (see map, Fig. 11) than is *anaverta*.

Pseudocopivaleria anaverta Buckett and Bauer, new species

Holotype male: Head with palpal scaling mixed fuscous and white; frons scaling centrally white with mixed white and fuscous scales around outer edge; vertex scaling mixed white and fuscous, largely fuscous; antennae pectinate. Thorax with collar smokey, possessing two dark, narrow, transverse bands, apically white; thoracic vestiture largely smokey with scales white-tipped; anterior and posterior dorsal tufts prominent; primaries silvery grey, not strongly contrasted; basal area grey, overlain with whitish scales; basal line represented on costa by black dash; basal streak faintly indicated; inner margin from base of wing to transverse anterior area clothed in pale brown scales; transverse anterior line geminate, gradually outwardly oblique, outcurved between veins, inner line faint, centrally filled with whitish scales, outer line black; median area slightly darker than remainder of wing; orbicular nearly round, moderate in size, pale, centrally grey, outlined in black; reniform pale, moderately constricted, centrally filled with grey, outlined in black; claviform small,

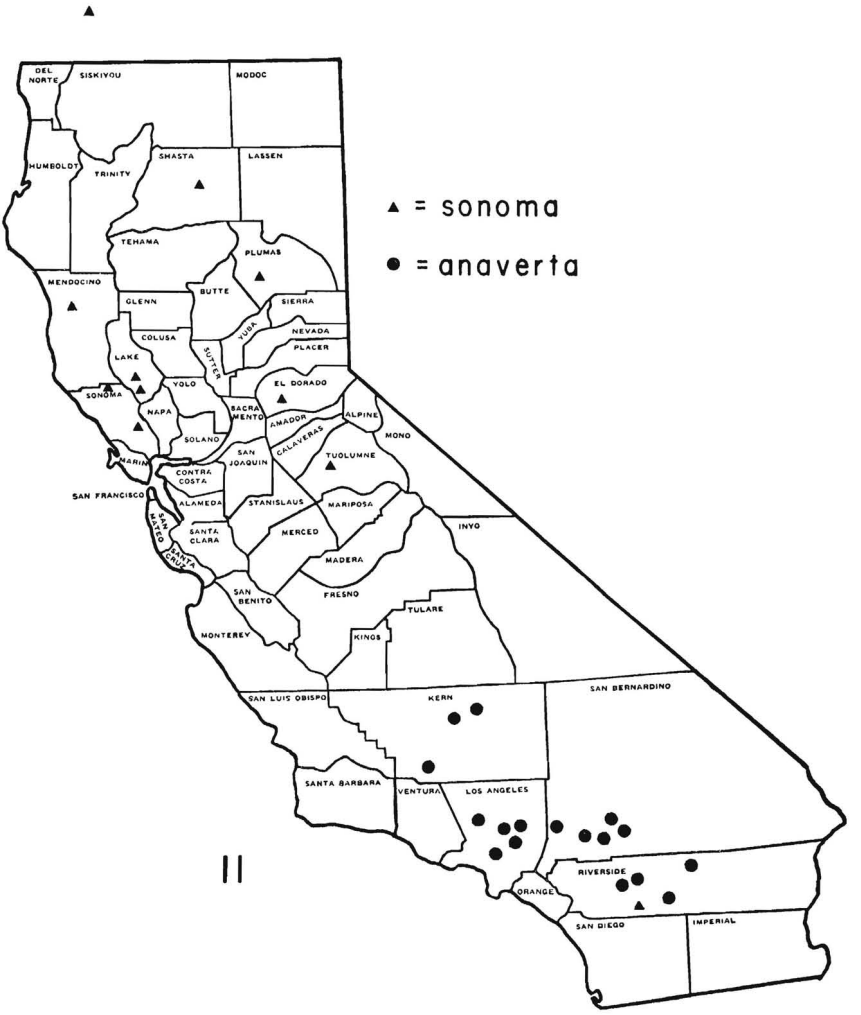


Fig. 11. Distribution of the members of *Pseudocopivaleria.* The triangle to the north of the northern California border represents Grants Pass, Josephine County, Oregon.

pale, outlined in black; transverse posterior line faintly geminate, inner line black, outer line faint, included area pale, irregularly bent closely around reniform, converging with base, thence with a small inward scallop incurved below reniform, followed by a larger scallop inwardly, terminating with a very small scallop to inner margin; subterminal area grey, strongly overlain with white scales, veins somewhat outlined in black; subterminal line irregular, strongest from apex to middle of wing; upper half of terminal area darker grey than subterminal area; tornal area with a black elongate triangle basally from terminal line, projecting inwardly; terminal line continuous, represented by lunules between veins; fringes basally pale, medially

fuscous, terminally checkered; ventral surface mostly deep smokey, basal area pale brown; costal area paler; transverse posterior line represented by dark dash on costa; fringes with dark dots opposite innerspace between veins; secondaries basally white, broadly shaded with fuscous on costa and on outer edge; veins outwardly shaded with fuscous; discal dot faint; postmedial line hardly discernible; terminal area dark; fringes pale, darker shading following; ventral surface whitish, paler than on dorsal surface, with smokey shading costally and along outer margin; discal dot stronger than on dorsal surface; postmedial line represented by dark spots on costa and on inner margin; fringes pale, darker area following; foretibiae possessing strong red-brown terminal claw; each tarsal segment with a white annulus distally; abdomen smokey grey with strong dorsal tufts on segments III and IV. Genitalia as in Figs. 7, 10.

Greatest expanse of forewing 16 mm.

Female: As in male except antennae dentate, and secondaries entirely smokey (see Fig. 4). Genitalia as in Fig. 5.

Greatest expanse of forewing 16 mm.

Holotype male, and allotype, female: California, Los Angeles County, Ranch—2½ mi. SSW of Valyermo (4,800′), 14 April and 12 April 1964, at black light (Noel McFarland). Paratypes: same locality as Holotype, 2 ♂, 20 March 1965 (C. Henne); Singing Springs, San Gabriel Mts., Los Angeles Co., elev. 3,200′, 1 ♂, 1 ♀, 12 April 1948 (C. Henne); 1 ♂, 13 May 1948; 2 ♂, 3 ♀, 28 March 1950 (F. P. Sala); Chilao Flats, Los Angeles Co., elev. 6,000′, 2 ♂, 26 April 1958 (R. H. Leuschner); 4 ♂, 2 ♀, 28 April 1958; Eagle Rock, Los Angeles Co., 1 ♂, 15 April 1950 (F. P. Sala); Buckhorn Flat, San Gabriel Mts., Los Angeles County, elev. 6,400′, 1 ♀, 1 June 1963 (R. H. L.); 1 ♂, 9 May 1959 (C. H.); Hidden Valley, Joshua Tree Natl. Monument, Riverside Co., 1 ♀, 22 March 1948 (C. I. Smith); Idyllwild, Riverside Co., 1 ♂, 1 ♀, 13 April 1960 (J. R. Helfer); Pinyon Flats, San Jacinto Mts., Riverside Co., 1 ♂, 5 March 1960 (R. H. L.); 1 ♀, elev. 4,000′, 2 April 1961 (C. H.); Pinyon Crest, Riverside County, elev. 4,000′, 5 ♂, 6 March 1965 (R. H. L.); 1 ♂, 2 ♀, 21 March 1965; 2 mi. below Greenhorn, Kern Co., elev. 5,000′, 2 ♂, 9 April 1960 (R. H. L.); Mount Pinos, Los Padres Natl. Forest, Kern County, elev. 6,700′, 1 ♀, 10 May 1961 (C. H.); Wrightwood, San Bernardino Co., 4 ♂, 30 April 1964 (C. Hill); 1 ♀, 19 April 1957; 3 ♂, 2 ♀, 12–14 April 1964; Crestline, near Lake Arrowhead, San Bernardino Co., elev. 4,600′, 2 ♂, 1 ♀, 24 April 1965 (R. H. L.); Rimforest, near Lake Arrowhead, San Bernardino Co., elev. 5,600′, 1 ♂, 23 April 1965 (R. H. L.); Barton Flats, San Bernardino Mts., San Bernardino Co., elev. 6,700′, 2 ♂, 1 ♀, 29 April 1959 (C. H.); Cedar Pines Park, San Bernardino Mts., San Bernardino Co., elev. 5,200′, 1 ♀, 3 April 1961 (C. H.).

Holotype male deposited in the United States National Museum, allotype female deposited in the collection of the authors. Paratypes deposited in the following institutions: Bauer-Buckett Collection, Davis; California Academy of Sciences, San Francisco; California State Department of Agriculture, Sacramento; John G. Franclemont Collection, Cornell University, Ithaca, New York; C. Henne Collection, Pearblossom, California; R. Leuschner Collection, Gardena, California; Los Angeles County Museum, Los Angeles; University of California, Davis.

P. anaverta can be readily distinguished from *sonoma* by the less contrasting primaries, lack of hair pencil and accompanying pocket on abdominal sternum I, and other characteristics already mentioned; in general, *anaverta* has a more southerly distribution also (see map, Fig. 11).

We wish to extend our appreciation to those individuals who made available their material for this work. The genitalic illustrations were done by the first author.

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NEW HELIOTHID MOTH FROM THE SOUTHWESTERN UNITED STATES (NOCTUIDAE)

ROWLAND R. MCELVARE
Southern Pines, N. C.

The genus *Grotella* is identified with the southwestern United States, with some records ranging into Colorado. Although adults of a number of species are regularly collected in spring or fall in association with composite flowers in semi-arid areas, the early stages are apparently unknown. Adequate records of time and place of adult flight are available, and some species are common locally. A study of larval forms should not be difficult for lepidopterists in the area and might resolve the problem whether or not the genus properly belongs in the Heliothiinae to which it is currently attributed.

In the Chihuahuan desert in 1948, the Vauries turned up a new *Grotella* (*vauriae* McE.) in the Big Bend National Park, Texas, near Hot Springs on the Mexican border. Mexican lepidopterists' interests seem primarily tropical and American visits to northern Mexico have been sporadic. With roads now more available, this area might well prove a rewarding source of new material.

The following species is described from the same part of Texas and adjacent regions in New Mexico and Mexico.

Grotella blanchardi McElvare, new species

Palpi short, porrect, white with dark scaling on terminal segment. Head, thorax, and abdomen, white. Frons with typical *Grotella* hollowed-out process, having corneous walls with a truncate central process, itself slightly hollowed out.