

J. Bolling Sullivan III. Santa Ana National Wildlife Refuge, Hidalgo Co., 24 June (sight record), 25 June (2 ♀), leg J. R. Heitzman.

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MORE NEW MOTHS FROM TEXAS (NOCTUIDAE)

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This is a follow-up of the Blanchard 1966, 1968 and 1970 papers.

***Oncocnemis cottami*, A. Blanchard, new species.**

Head: Black; scales on upper half of front, vertex, and base of antennae long, raised and whitish tipped; antennae simple; palpi rough scaled, whitish basally, blackish distally; second segment longest, not quite reaching middle of front; third segment very short, porrect.

Collar: Black basally, dark gray on top; the white band in between is itself divided in two by a thin black line.

Thorax: Disc and patagiae brownish gray; sordid white below; foretibia short, armed with a strong claw; each segment of foretarsus contrastingly dark basally, whitish distally; middle and hind tibiae loosely clothed with brown and whitish scales and long hairs.

Abdomen: Brownish gray on top, lighter beneath. The male has a pair of hair pencils in two grooves, one on each side at base of abdomen.

Pattern of maculation: Background of forewing a mixture of white and brown scales appearing as a powdery, light brownish gray; lighter basally near costa; darker basally between Cu and inner margin; transverse lines obsolete; a fusiform, slightly diffuse, black fascia runs along Cu from base to middle of wing; a thicker, fusiform, black fascia runs in the cell and beyond, almost from base to outer margin between M2 and M3; the space between these two fasciae is so dark as to give the appearance of only one big fascia, very thin at its ends, but covering about a fourth of the width of the wing in its middle; vein ends slightly darkened; darker, longer, intervenular dashes; a thin, black subcontinuous terminal line; fringe yellowish at extreme base, checkered distally, dark brown between vein ends; some specimens show the black outline of the claviform, immediately under the black fascia; orbicular and reniform obsolete. Hindwing of male iridescent white, blackish at vein ends and along a thin terminal line; fringe basally yellowish, white distally, with a thin brownish dividing line. Hindwing of female similar except for soiled veins and presence of a diffuse soiled band along outer margin. Undersurface of forewing white, brownish along costa, near apex, and along Cu; fringe as above. Undersurface of hindwing white, slightly soiled along costa; fringe white.

Length of forewing: 13 to 14 millimeters.

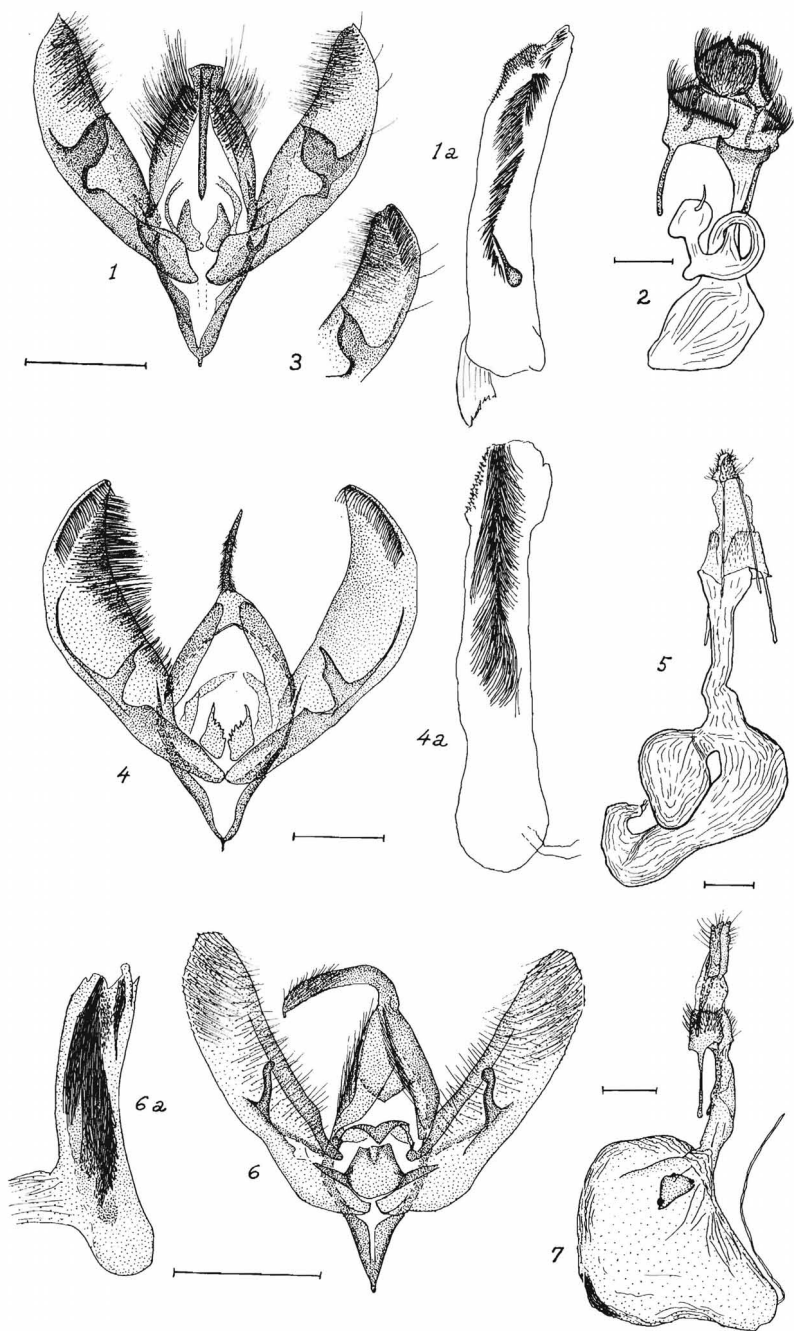
Male genitalia: As in Fig. 1 and 1a.

Female genitalia: As in Fig. 2.

Holotype: Male, Texas, Big Bend National Park, Basin, altitude 5500 feet, 10 May 1966, genitalia on slide A.B. 1050, deposited in the National Museum of Natural History, (No. 68147).

Paratypes: All taken in or around the Chisos Mountains of Big Bend National Park: Basin, 7 July 1964, 1 ♂; 10 July 1964, 1 ♂; 4 Aug. 1964, 1 ♂; 29 Aug. 1965, 1 ♂; 29 June 1965, 1 ♂, 1 ♀. Oak Spring, 9 July 1964, 3 ♂ ♂, 2 ♀ ♀; 5 Aug. 1964, 1 ♀; 31 Aug. 1964, 1 ♂. Green Gulch, 27 June 1965, 1 ♂; 25 Mar. 1971, 1 ♂; 28 Mar. 1971, 2 ♀ ♀. Government Spring, 27 Mar. 1971, 1 ♂. Paratypes will be deposited in the National Museum of Natural History, in the American Museum of Natural History, in the British Museum (Natural History) and in Dr. J. G. Frandemont's collection.

Oncocnemis cottami is very close to *O. atricollaris* Harvey. The transverse lines of *atricollaris* are generally well marked, sometime only partly traceable, rarely completely obsolete; the part of the reniform which falls below the upper black fascia generally shows as a pure white small pupil; the white median band of the collar appears narrower because its top half is much soiled with brown scales. If all three of these characters appear doubtful, one has to rely on the genitalia to remove all doubt. The valves of the male genitalia of *atricollaris* are broader, rounder, and present a well developed corona (Fig. 3); those of *cottami* have no trace of a corona. The female genitalia are also different, the ductus bursae of *atricollaris* goes directly into the bursa copulatrix, whereas it is much contorted in *cottami*. Distribution: *O. cottami* is known only from the Chisos Mountains of Texas. *O. atricollaris*, which is known from a large territory including parts of Colorado and Arizona and most of Texas, is either absent or quite rare in the Chisos Mts. *O. nigrocaput* Smith, another species of the same group, described from Colorado, also extends to Texas.



it must also be quite rare as we have only two males, both taken 27 March 1971 at Government Spring in Big Bend National Park.

I take great pleasure in dedicating this new species to Dr. Clarence Cottam, Director of the Rob and Bessie Welder Wildlife Foundation. This is a privately endowed, non-profit organization, supporting educational and research activities, situated near Sinton in the San Patricio County of Texas. Dr. Cottam always made us feel welcome there.

***Oncocnemis heterogena*, A. Blanchard, new species.**

Head: Front covered with short, raised, black, white tipped scales; vertex with rough squamation of longer, black, ochreous tipped scales; tongue strong; palpi ascending, exceeding front by half eye diameter, first and second segments clad with rough scales, mixed on underside with much longer hairlike scales; first segment ochreous below, blackish laterally; second segment with more black than ochreous scales; third segment, the shortest, blackish. Antennae simple, dark reddish brown.

Collar: Wide, smooth, pinkish ochreous, more or less darkened by blackish scales.

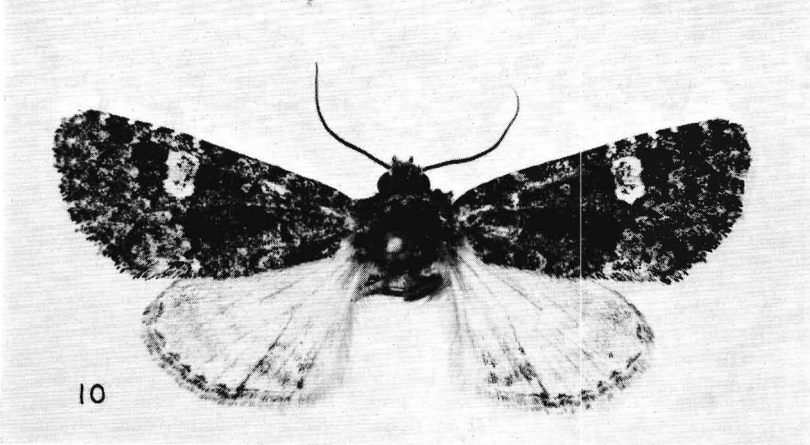
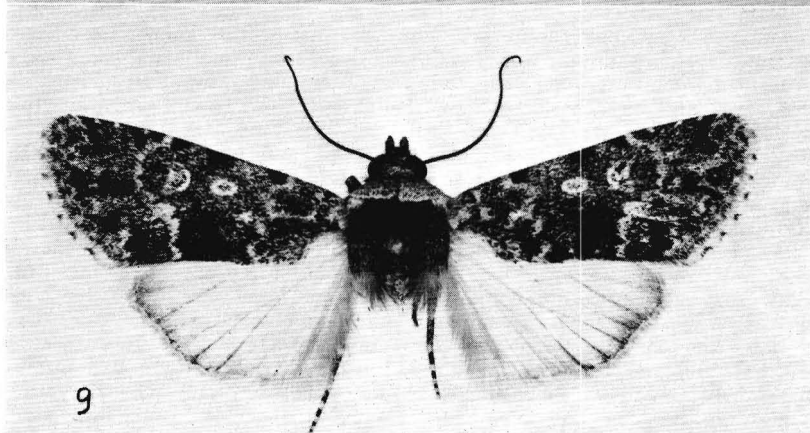
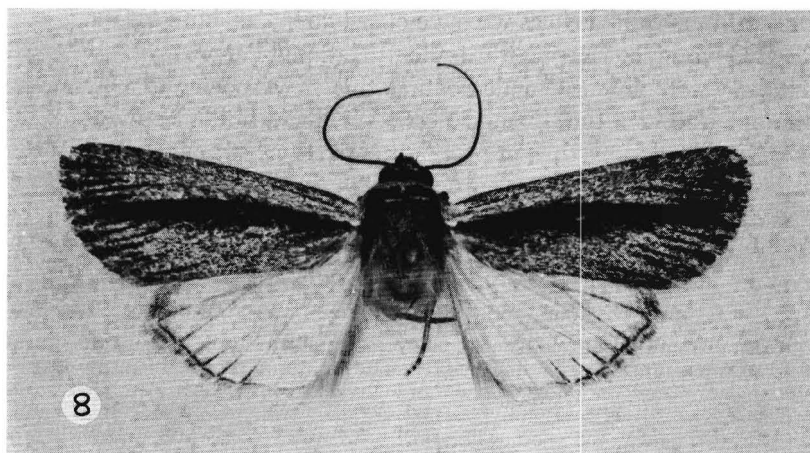
Thorax: Disc and patagia smooth, brownish black; whitish below. Legs blackish; segments of metatarsi distally ringed with pinkish ochreous; foretibia armed with claw.

Abdomen: Ochreous above, whitish below. The male has a pair of hair pencils in two grooves, one on each side at base of abdomen. The female presents a tuft of very dark reddish brown scales, below, at the tip of the abdomen.

Pattern of maculation: Maculation of forewing on upperside produced by mixture in variable proportions of scales of essentially two colors only: black and same pinkish ochreous as collar; these two colors about evenly mixed in background; three deep-black spots on costa: one adnate to and distad of t.a. line, one adnate to and basad of t.p. line, and one marking anterior origin of rather indistinct median shade; basal line pinkish ochreous, internally bordered by fine black line, extending from costa to cubital vein; t.a. line pinkish ochreous, outcurved between veins, generally slanted a little outwardly, with faint, discontinuous indication of black borders more definite near inner margin; t.p. line pinkish ochreous, narrow, outwardly convex and well beyond reniform between costa and M3, broader, lighter in color and outwardly concave between M3 and inner margin; s.t. line pinkish ochreous, very irregular and discontinuous; terminal line thin, black, varying from almost continuous to nearly obsolete; fringe grayish ochreous, checkered with darker gray between vein ends on better marked specimens; orbicular elongated, with dark center, outlined in pinkish ochreous; reniform with dark center, inwardly bordered with pinkish ochreous; these discal spots quite variable in intensity and sometimes obsolete; on some specimens the light color of the broader posterior part of the t.p. line extends into the subterminal space, contrasting with the always darker posterior part of the wing between transverse

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Figs. 1-7. Male and female genitalia. Scales shown equal 1 mm. Figs 1-2. *Oncocnemis cottami*: 1 and 1a, ♂ type, Big Bend National Park, Basin, slide A.B. 1050; 1, aedeagus omitted, 1a, aedeagus. 2, ♀, Big Bend National Park, Oak Spring, slide A.B. 2384. Fig. 3. *Oncocnemis atricollaris* Harvey, Lake Brownwood State Park, part of right valve, slide A.B. 1055. Figs. 4-5. *Oncocnemis heterogena*: 4 and 4a, ♂ type, Big Bend National Park, Green Gulch, slide A.B. 1059; 4, aedeagus omitted, 4a, aedeagus. 5, ♀, Big Bend National Park, Basin, slide A.B. 1354. Figs. 6-7. *Paramiana callaisata*: 6 and 6a, ♂ type, Guadalupe Mountains National Park, Pine Spring Canyon, slide A.B. 1138; 6, aedeagus omitted, 6a, aedeagus. Fig. 7, ♀, Guadalupe Mountains, Pine Spring Canyon, slide 1377.



lines. Hindwing white, darkened on veins and along diffuse narrow marginal band, somewhat wider and darker in the female than in the male; fringe yellowish basally, white distally, with narrow brownish median line. Undersurface of forewing smoky, darker along costa, varying to sordid white along inner margin; fringe varying from smoky to whitish and checkered. Undersurface of hindwing white, darker on veins, near apex and along narrow terminal line; fringe white.

Length of forewing: Male 15 to 16 millimeters; female 15 to 17 millimeters.

Male genitalia: As in Fig. 4 and 4a.

Female genitalia: As in Fig. 5.

Holotype: Male, Big Bend National Park, Green Gulch, 27 August 1965; genitalia on slide A.B. 1059, deposited in the National Museum of Natural History (No. 68148).

Paratypes: Big Bend National Park, Basin, 4 August 1964, 1 ♀; 4 Sept. 1964, 1 ♀; 29 Mar. 1965, 1 ♀; 25 Aug. 1965, 5 ♂♂, 2 ♀♀; 28 Aug. 1965, 1 ♂; 14 May 1966, 1 ♂; 7 April 1967, 1 ♂, 1 ♀. Big Bend National Park, Pine Canyon, 1 April 1965, 1 ♂; 8 April 1967, 1 ♂. Big Bend National Park, Green Gulch, 3 April 1965, 1 ♂, 3 ♀♀; 27 Aug. 1965, 1 ♂; 5 April 1967, 1 ♀; 25 Mar. 1971, 1 ♀. Sierra Diablo Wildlife Management Area, 22 & 23 June 1965, 3 ♂♂, 1 ♀; 20 May 1968, 11 ♂♂, 8 ♀♀; 5 to 7 June 1969, 6 ♂♂, 2 ♀♀; 14 & 15 July 1969, 7 ♂♂, 5 ♀♀; 1 Sept. 1969, 2 ♀♀; 31 Mar. 1970, 2 ♂♂, 1 ♀; 31 Aug. and 1 Sept. 1970, 4 ♂♂, 1 ♀.

It is remarkable, but probably not meaningful, that although the Davis Mountains lie between the Chisos Mountains of the Big Bend and the Sierra Diablo, this list does not include a single specimen from the Davis Mountains. It may more likely mean that our collecting spots, limited as they are to the few locations accessible by car, where our traps appear reasonably safe during the night, do not satisfactorily represent the Davis Mountains.

Paratypes will be deposited in the National Museum of Natural History, in the American Museum of Natural History, in the British Museum (Natural History) and in Dr. J. G. Franclemont's collection.

This species is quite variable, the transverse lines vary from well defined and contrasty, as they are in the holotype, to fuzzy and nearly obsolete; *Oncocnemis heterogena* appears to resemble *O. homogena* Grote most closely in the pattern of maculation and size, but it may be easily separated because the basal part of the forewing is not noticeably paler than the median area, and the t.a. line is differently colored than in *homogena*. In the latter species the t.a. line is uniformly dark brown and black, strongly contrasting with the remainder of the wing. In *heterogena* the t.a. line is composed of a thinner, less intensely colored line of brown scales bordered basally by a line as wide or wider of ochreous scales.

***Paramiana callaisata*, A. Blanchard, new species.**

Head: Retracted; front bulging, dusky, smoothly scaled; vertex roughly clad with white tipped, black scales; eyes large, slightly elliptical; palpi short, concolorous with front, ascending, barely exceeding front; first and second segments rough scaled, third segment smooth, shorter than second; antennae finely, shortly pubescent in male, simple in female.

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Figs. 8–10. Male holotypes: 8, *Oncocnemis cottami*; 9, *Oncocnemis heterogena*; 10, *Paramiana callaisata*.

Collar: Disc of thorax and patagia covered with raised, white tipped, black scales, forming a high tuft on metathorax. Legs dusky, with loose, long hairs.

Abdomen: Fuscous above and below, with weak tuft on first segment.

Pattern of maculation: Maculation of forewing consisting mostly of hard-to-trace, transverse bands and fuzzy patches of black and green; basal band, when not completely obsolete, reduced to its inner black line, reaching from costa to anal vein; t.a. band substantially reduced to its fine, black, discontinuous outer border, starting on costa about one fourth distance from base to apex, slightly bulging between veins from costa to anal vein, squarely outcurved on anal vein and reaching inner margin almost at its middle; t.p. band poorly defined, median line paler than background, inner black line consisting of intervenular, finely confluent, black spots, outer line almost obsolete, in course arising on costa above reniform, outwardly bent just below costa to well beyond reniform, then parallel to outer margin, except for broad, shallow concavity in fold; s.t. line consisting of a succession of elongated, intervenular, black spots sprinkled in their center with green scales; terminal line reduced to intervenular, small, triangular, black spots; a white spot at vein ends; fringe concolorous with background, checkered, with a darker median line; orbicular small, green, outlined in black; reniform large, squarish, mottled yellowish green and black, broadly changing to bluish white at outer corners and along lower side; a black spot along inner margin midway between base and a.m. band; rest of area between basal and a.m. band well sprinkled with green scales; a.m. outer and p.m. inner lines enlarged in fold, forming there two black patches more or less connected by darker background; a large black patch basad of reniform; a green patch distad of p.m. band in fold; four to five white dots on costa, about equally spaced in its outer half. Hindwing of male light brassy ochreous, heavily sprinkled with brown scales forming two extramedial bands; terminal line brown, accented between veins; fringe concolorous with background, with medial brown dividing line. Hindwing of female more heavily sprinkled with brown scales. Undersurface of forewing dusky; with darker p.m. line; a terminal brown line; fringe concolorous, checkered. Undersurface of hindwing dusky, darker along costa, an extramedial line in continuation of that of the forewing.

Length of forewing: 18 to 19 millimeters.

Male genitalia: As in Figs. 6 and 6a.

Female genitalia: As in Fig. 7.

Holotype: Male, Guadalupe Mountains, Pine Spring Canyon, altitude 5700 feet, 28 August 1967; genitalia on slide A.B. 1138, deposited in the National Museum of Natural History (No. 68149).

Paratypes: Guadalupe Mts., Pine Spring Canyon, 28 Aug. 1967, 1 ♂, 6 ♀ ♀. Davis Mountains, Mt. Locke (McDonald Observatory), altitude 6000 feet, 25 Aug. 1967, 3 ♂ ♂; 30 Aug. 1969, 1 ♂; 6 Sept. 1969, 10 ♂ ♂, 12 ♀ ♀; 27 Aug. 1970, 2 ♂ ♂, 3 ♀ ♀; 29 Aug. 1970, 3 ♂ ♂, 2 ♀ ♀. Paratypes will be deposited in the National Museum of Natural History, in the American Museum of Natural History, in the British Museum (Natural History) and in Dr. J. C. Franclemont's collection.

The forty four specimens before me show very little variation. Separating *Paramiana callaisata* from other species in the same genus is a very simple matter since its maculation resembles that of no other previously described species that I have been able to compare it with in the National Museum. The distinctive whitish contrasting reniform spot separates it from all the other species of the genus. *Paramiana laetabilis* Smith also has a contrasting, large reniform spot, but it is blue in fresh unfaded specimens. The broad blue subterminal band of *laetabilis* is absent in the new species.

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A POSSIBLE CASE OF MIMICRY BETWEEN LYCAENID
BUTTERFLIES (LYCAENIDAE)

Mimicry is a relatively common phenomenon among lepidopteran insects. Familiar North American examples have been studied extensively (e. g. Brower 1958, *Evolution* 12: 32-47, 123-136, 273-285). Recently, Downey (1965, *J. Lepid. Soc.* 19: 165-170) suggested a mimicry complex with several blues (Plebejinae, especially *Plebejus icarioides* Boisduval) serving as models for the noctuid moth *Caenurgina caerulea* Grote. Another possible case of mimicry with blues as models involves the male Blue Copper (*Lycaena heteronea* Boisduval). The striking superficial resemblance of the dorsal wing surface of the latter and blues has been noted often (Ehrlich and Ehrlich 1961, *How to Know the Butterflies*; Comstock 1927, *Butterflies of California*; Brown et al. 1957, *Colorado Butterflies*). The difference in coloration of the male *L. heteronea* from that of other coppers immediately suggests mimicry.

I suggest that the male of *L. heteronea* is a mimic of *Glaucopsyche lygdamus* Doubleday and possibly other sympatric blues. The dorsal coloration of *L. heteronea* is nearly identical to that of *G. lygdamus*. The geographical range and flight period of the copper appear to be entirely within those of the blue.

Furthermore, Batesian mimicry is indicated by at least three sets of data. The dorsal resemblance is nearly perfect. Batesian mimics tend to be more perfect than Müllerian (Ford 1964, *Ecological Genetics*). The food plant of the copper is *Eriogonum*; those of *G. lygdamus* include *Lupinus* and *Astragalus* among other legumes (Ehrlich and Ehrlich, op. cit.). *Lupinus* contains alkaloids (Robinson 1968, *The Biochemistry of Alkaloids*) and many *Astragalus* contain selenium; both are known to be poisonous to vertebrates (Kingsbury 1964, *Poisonous Plants of the United States and Canada*). If these compounds are incorporated into insect tissues, such insects may be poisonous or unpalatable to their predators. The mimic appears to be less common than its model (Comstock, op. cit.; Brown et al., op. cit.). In June and July, 1963, in Garfield County, Colorado (Coffee Pot Springs, White River Plateau, 10,000 feet), I found *G. lygdamus* to be about ten times as common as *L. heteronea*; the latter was ecologically sympatric with the former and could not be distinguished in the field.