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Descriptions of and Notes on North American Geometridae (Lepidoptera)

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While working over the collection of North American Geometridae in the American Museum of Natural History, I found it necessary to do some rearranging in order that a more natural system of classification would result. In addition, some of the specimens submitted for identification by Charles P. Kimball proved to be a problem that necessitated type comparisons at the British Museum (Natural History). Further difficulties arose on material sent in by Carl W. Kirkwood and Lloyd M. Martin. The present paper is the result, and it makes several changes in the synonymy and includes the description of two new species.

The author acknowledges with thanks the photographic work done by Mr. Rudolph Schrammel of the Department of Insects and Spiders.

GENUS *EUPITHECIA* CURTIS

Eupithecia slossonata McDunnough

Figure 5

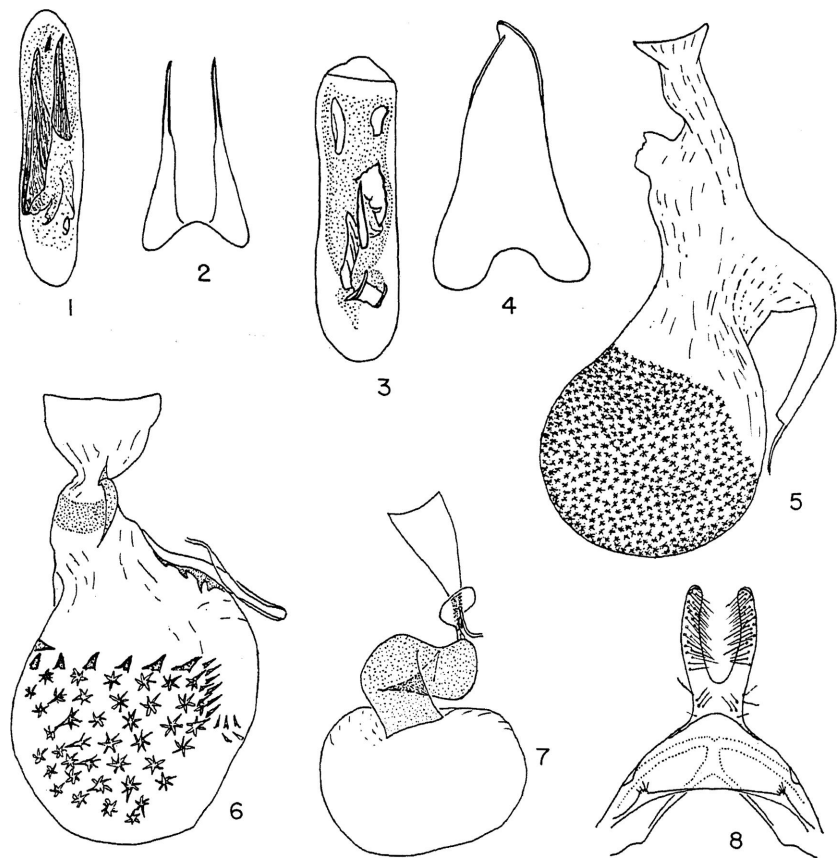
Eupithecia slossonata McDUNNOUGH, 1949, Bull. Amer. Mus. Nat. Hist., vol. 93, p. 547.

Among some material submitted by C. P. Kimball for identification was a single female belonging to the *palpata* group, taken at Weeki Wachee Springs, Hernando County, Florida, February 22, 1955 (J. F. May); this is referable to *slossonata*. As the species was described from

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the male only, the following descriptive notes are given to supplement the original description.

FEMALE: Palpi very long, blade-like, brownish black, with apex narrowly white. Upper surface of wings deep smoky brown, with scattered



FIGS. 1-6. Genitalia of *Eupithecia*. 1. *E. jejuna* McDunnough, aedeagus. 2. Same, ventral plate. 3. *E. uinta*, new species, aedeagus of holotype. 4. Same, ventral plate of paratype. 5. *E. slossonata* McDunnough, bursa copulatrix. 6. *E. uinta*, new species, bursa copulatrix of paratype.

FIGS. 7, 8. Genitalia of *Hydriomena peratica*, new species. 7. Female genitalia of allotype. 8. Uncus and adjacent parts of holotype.

black scales; forewings with t. p. line the most prominent part of the maculation, followed by wider geminate band of ground color; secondaries with prominent postmedian band running straight across wing from vein

Rs to inner margin; s. t. line white, extending all the way across wing. Under surface with prominent discal spots and postmedian lines on all wings.

FEMALE GENITALIA: Dorsal plate of segment VIII lightly sclerotized, almost square, with strongly reënforced cephalic margin; ventral plate membranous, feebly spiculate. Ostium short, moderately broad, membranous; ductus bursae membranous, as wide as ostium, entering the much broader bursa neck on right side, a little below the apex of the blind, sac-like, caudal end; ductus seminalis arising from central portion of membranous bursa neck, on right side and slightly dorsad, with very wide base, tapering in width, then turning anteriorly, and abruptly narrowing to a fine, thread-like tube cephalad of spined area of bursa; bursa copulatrix small, globular, entirely covered with moderately large spines.

This species can be distinguished from *palpata* by the darker color of the front, palpi, and wings, and by the more prominent postmedian lines above and below on the wings. The female genitalia are closely similar, but in *slossonata* the ductus seminalis arises from a more broadly triangular base, then tapers and turns sharply anteriorly.

Eupithecia jejunata McDunnough

Figures 1, 2

Eupithecia jejunata McDUNNOUGH, 1949, Bull. Amer. Mus. Nat. Hist., vol. 93, p. 574.

Another series of *Eupithecia* submitted by C. P. Kimball from Siesta Key, Sarasota County, Florida, February and March (Kimball), included both sexes of *jejunata*. This species was described from two females, the type female being from Texas and the paratype female from Georgia. As stated in the original description, this is a small, insignificant species. The male antennae are finely and evenly ciliate.

MALE GENITALIA: Strong hair pencils on segment IX. Uncus well sclerotized, narrow, rather long, with bifid apex; valves broad at base, somewhat pointed apically; aedeagus rather narrow and moderately long; vesica armed with several elongate, roughly sclerotized pieces, the ventral one arising from a twisted end piece, the area surrounding these sclerotized pieces minutely striated, and with a minute apical piece. Ventral plate of segment VIII with broad base and a strong anterior excavation; this base gives rise to two thin, sharply pointed, parallel, sclerotized rods.

Eupithecia uinta, new species

Figures 3, 4, 6

MALE: Head, antennae finely ciliate; front covered with grayish white and dark brown scales, the latter concentrated on lower part of front; palpi extending well beyond front, covered with light gray and brown scales. Thorax and abdomen appearing light gray or grayish brown, with a mixture of grayish white and dark brown scales, the latter concentrated on second abdominal segment dorsally.

UPPER SURFACE OF FOREWINGS: Ground color a pale grayish brown, with indistinct maculation except for the prominent, elongate, black, discal dash; costal margin with alternating spots of dark brown and ground color; t. a. and median lines obsolescent; t. p. line indistinctly indicated, geminate, light gray, most prominent on costa; s. t. line weakly indicated by light gray scales, most distinct above tornus; marginal line dark, strongest between veins; fringe darkened opposite veins. Hind wings concolorous with forewings, with slightly less brown scaling; discal dot present; postdiscal line vaguely indicated; terminal line and fringes as on primaries.

UNDER SURFACE OF WINGS: All wings light gray, lightly dusted with dark brown scales; discal dots present on all wings; postmedian and subterminal lines incompletely indicated.

Expanse: 19 to 22 mm.; holotype, 20 mm.

FEMALE: Similar to male.

Expanse: 18 to 21 mm.; allotype, 18 mm.

MALE GENITALIA: Hair pencils present on segment IX. Uncus well sclerotized, simple, with rather short terminal point; valves moderately broad at base, roughly triangular in outline, tapering to apex; aedeagus moderately broad; vesica armed with a twisted end piece to which a moderately long, semicylindrical piece is partly attached, two median sclerotized pieces, one being elongate and narrow, the other subtriangular, and with two smaller, apical, sclerotized pieces. Ventral plate tapering from wide base with strong anterior excavation; posterior portion with lateral margins more heavily sclerotized than central area, asymmetrical, terminating in a small protuberance that projects to the left side.

FEMALE GENITALIA: Dorsal plate of segment VIII with small indentation on posterior margin, with small, adjacent, oval, membranous area, from which a number of small oblique striae extend; ventrally with subtriangular spiculate area near ostium. Ostium membranous, funnel-shaped, tapering rather sharply to form very short ductus bursae, the latter terminating in a well-sclerotized half collar projecting somewhat

to the left; ductus seminalis arising on right side of dorsal surface below collar, extending as a moderate-sized tube along the bursa to its median area, then recurving ventrally and narrowing to a fine, thread-like tube; bursa copulatrix well rounded, the right side strongly bulging, with a few spines dorsally below collar, several more around ventro-anterior margins of mouth of ductus seminalis, anterior portion of bursa covered with moderately spaced, large spines extending farther up left side than right, the latter being largely membranous.

Types: Holotype, male, and allotype, female, Uinta Mountains, Uinta County, Utah, June 10, 1955 (C. W. Kirkwood); paratypes, six males and four females, same data. Holotype and allotype in the collection of the American Museum of Natural History; paratypes in the collection of that Museum and in the collection of C. W. Kirkwood.

This rather obscurely marked species belongs in the *satyrata* group, and is most closely related to *gibsonata* Taylor and *arceuthata* Freyer. One of the most important differences between these two species is the food plant, but, as this is unknown for the present species, a definite relationship cannot be stated at the present time. *Uinta* is grayer than either of these two species, the maculation is less definite, and it is slightly larger. The genitalia also show a very close relationship, but differences are present in the shape of the ventral plate of the male and in the armature of the vesica; in the female, the bursa appears to be less heavily spined, and the spines are smaller in size.

GENUS *HYDRIOMENA* HÜBNER

Hydriomena HÜBNER, 1825, Verzeichniss bekannter Schmettlinge, p. 322. McDUNNOUGH, 1954, Bull. Amer. Mus. Nat. Hist., vol. 104, pp. 237-358.

A series of rather obscurely marked gray specimens from southern Arizona apparently are referable to this genus. However, they are rather different in both the facies and genitalia of both sexes from the other known North American species. In general appearance, they are reminiscent of *Hymenodria mediodentata* Barnes and McDunnough, *Ersephila indistincta* Hulst, or even *Hydriomena manzanita* Taylor.

Hydriomena peratica, new species

Figures 7, 8

MALE: Head, vertex and front with light gray and dark brown scales; palpi very long, third joint elongate, gray-brown or brown-black. Thorax light gray, with scattered brown and dark brown scales, especially at

wing bases and on metathoracic tuft; legs light gray, with some brown scaling. Abdomen light gray, with a few scattered brown scales.

UPPER SURFACE OF WINGS: Forewings, ground color light gray, more or less heavily overlain with black and brown scales, the general coloration appearing dark gray; line I black, arising at right angle to costa, angled on vein Cu, then outwardly oblique from anal vein to margin; band II poorly defined, followed on distal side by a band of ground color with some reddish brown scaling; line III rather weak, black when present, slightly sinuous; postmedian area pale; line IV black, with slight incurve in cell, and with a more prominent one in cell Cu_2 , rarely with a black bar connecting lines III and IV; band V black-brown, distally concave near costa, subparalleling outer margin below vein R_5 ; apex with black-brown transverse dash, followed by a black dash in cell R_5 and a smaller one in cell M_1 ; terminal line black-brown; fringe gray, darkened distally. Hind wings light gray, slightly darkened with gray-brown scales distally, and with trace of postmedial line; terminal line gray-brown; fringe light gray.

UNDER SURFACE OF WINGS: Ground color of forewings and hind wings light gray; forewings with scattered gray-brown scales, especially along costa and near apex, and with an incomplete postmedial line; secondaries immaculate.

Expanse: 29 to 32 mm.; holotype, 29 mm.

FEMALE: Similar to male; palpi slightly longer.

Expanse: 30 to 35 mm.; allotype, 31 mm.

MALE GENITALIA: Uncus neck short, broad; forks fairly broad, very long, their apices slightly converging and rounded, with numerous setae on ventral surface of terminal portion, incision very deep, U-shaped; valves broad, constricted medially; costa sclerotized, extending as pointed projection near apex of valve; costobasal tubercle I and II fused, with a pair of thin, elongate, sickle-shaped ribbons, and with a strong tuft of knobbed setae; finger-like processes from transtilla small and weakly represented; juxta elongate, broadest near apex, with lateral projections poorly defined, lateral edges slightly concave, narrowed towards base, the latter with an inverted, V-shaped, membranous area, marginal band rather broad, lightly sclerotized, continuous; anellus large, thickly beset with very many short spines; aedeagus elongate, rather slender; vesica unarmed.

FEMALE GENITALIA: Ostium membranous, elongate, tapering to narrow, sclerotized half collar, ductus bursae heavily sclerotized, broad, situated transversely at junction with ostial passage, curving ventrally from left side back to median plane; ductus seminalis arising from middle

of anterior margin of a fair-sized membranous sac just above junction with sclerotized ductus bursae; bursa copulatrix membranous, large, rounded.

Types: Holotype, male, and allotype, female, Pine Crest, Mt. Graham, Pinaleno Mountains, Graham County, Arizona, elevation 7300 feet, June 28, 1955 (Lloyd M. Martin). Paratypes, 10 males and six females: same data as types, June 28, 29, 1955 (Lloyd M. Martin and William A. Rees), three males and three females; Madera Canyon, Santa Rita Mountains, Santa Cruz County, Arizona, elevation 5800 feet, June 22, 23, 1955 (Lloyd M. Martin and William A. Rees), six males and three females; upper camp, Pinery Canyon, Chiricahua Mountains, Cochise County, Arizona, June 27, 1955 (Lloyd M. Martin), one male. Holotype and allotype in the collection of the Los Angeles County Museum; four males and two female paratypes each in the Los Angeles County Museum and the American Museum of Natural History collections, and one pair each in the collections of William A. Rees and James H. McDunnough.

A very distinct species, easily separated by genitalia from any species in the United States. It keys out to McDunnough's Group VII on the basis of the male genitalia, but it does not seem to be very closely related to either *regulata* Pearsall or *furculoides* Barnes and McDunnough. In some respects it is reminiscent of *manzanita* Taylor, but the genitalia preclude this relationship.

GENUS *GLENA* HULST

Glena cribrataria (Guenée)

Tephrosia cribrataria GUENÉE, 1857, Histoire naturelle des insectes, vol. 9, p. 260, pl. 3, fig. 9.

Boarmia fuliginaria HULST, 1888, Ent. Amer., vol. 3, p. 215. RINDGE, 1955, Bull. Amer. Mus. Nat. Hist., vol. 106, p. 143. (New synonymy.)

Selidosema fuliginarium, DYAR, "1902" [1903], Bull. U. S. Natl. Mus., no. 52, p. 324.

Cleora fuliginaria, BARNES AND MCDUNNOUGH, 1916, Contributions to the natural history of the Lepidoptera of North America, vol. 3, p. 184.

Cleora indicataria ab. *fuliginaria*, BARNES AND MCDUNNOUGH, 1917, Check list of the Lepidoptera of Boreal America, p. 117.

Glena fuliginaria, MCDUNNOUGH, 1938, Check list, p. 164. FORBES, 1948, Cornell Univ. Agric. Exper. Sta. Mem. 274, p. 54.

Hulst described this moth from a single male specimen. The locality given in the original description is Illinois, but the type specimen is labeled "N. Ill." Hulst realized that his specimen was probably not a normal one, as he stated that "this may possibly be a case of melanism,

but if so I am unable to tell to which one of our common species this referred peculiar form should be." A glance at the bibliography for this name will show that it has been a source of confusion for everyone, although Forbes was apparently the first to suggest that it was most likely an aberration of *cribrataria*. A slide of the genitalia of the type specimen in the American Museum of Natural History has been made, and it shows without doubt that this moth is the same species as *cribrataria*.

Glena cognataria (Hübner)

Anagoga cognataria HÜBNER, "1825" [1827-1831], *Zuträge zur Sammlung exotischer Schmettlinge*, vol. 3, p. 34, figs. 549, 550.

Diastictis crassata HULST, 1896, *Trans. Amer. Ent. Soc.*, vol. 23, p. 333. RINDGE, 1955, *Bull. Amer. Mus. Nat. Hist.*, vol. 106, p. 140. (New synonymy.)

Cymatophora crassata, DYAR, "1902" [1903], *Bull. U. S. Natl. Mus.*, no. 52, p. 314.

Itame crassata, BARNES AND McDUNNOUGH, 1917, *Check list of the Lepidoptera of Boreal America*, p. 114. McDunnough, 1938, *Check list*, p. 161.

A dissection has been made of the genitalia of the unique female type, which is in the collection of the American Museum of Natural History. A study of this preparation, and of the specimen itself, shows that *crassata* is conspecific with *cognataria* Hübner.

In the original description Hulst gave the type locality as Colorado, but the type is labeled Hastings, Florida. Unfortunately this kind of error has happened on more than one occasion with Hulst's types; in this case it is highly probable that the label, rather than the original description, gives the true locality. If a southern subspecies is to be recognized, the name *crassata* is available, as it may be the oldest name. There is the possibility that *infixaria* Walker (1862, *List of the specimens of lepidopterous insects in the collection of the British Museum*, pt. 26, p. 1685) will take priority. No type locality was given for this name, as it was described from a male from Milne's collection. Georgia is the only locality given for the Milne specimens of the North American geometrids described by Walker; the majority of these moths were without locality data, according to Walker's descriptions. If the type of *infixaria* was from Georgia, it may be the same as the Florida population, so this name would have to be used instead of *crassata* Hulst.

GENUS *PSEUDOBOARMIA* McDUNNOUGH

Pseudoboarmia McDUNNOUGH, 1920, *Canadian Dept. Agric., Tech. Bull.*, no. 18, p. 21, pl. 3, fig. 3 (male genitalia), pl. 9, fig. 7 (antenna), pl. 10, fig. 3 (venation). FORBES, 1948, *Cornell Univ. Agric. Exper. Sta. Mem.* 274, p. 53, figs. 75, 76 (male genitalia).

Two species, *umbrosaria* Hübner and *buchholzaria* Lemmer, have been placed in this genus. Forbes covers them in his memoir, giving descriptions of the genus and both species, as well as a key to the latter. A third species must now be added to the genus.

KEY TO ADULTS

1. Upper surface of wings dark, with distinct cross lines and discal spots . . . 2
 Upper surface of wings light violet-gray, with obsolete maculation . . . *luridula*
2. Male with hair pencil on hind tibia; upper surface of wings gray-brown, without violaceous tinge *umbrosaria*
 Male without tibial hair pencil; upper surface of wings gray-black, with violaceous tinge *buchholzaria*

KEY TO ADULTS BY MALE GENITALIA

1. Processes at distal end of tegumen that bear very long, hair-like scales one-fifth of the length of the uncus *luridula*
 Tegumen processes at least two-fifths or one-half of the length of the uncus . . . 2
2. Tegumen processes two-fifths to two-thirds of the length of the uncus
 *buchholzaria*
 Tegumen processes three-fourths to five-sixths of the length of the uncus . . .
 *umbrosaria*

KEY TO ADULTS BY FEMALE GENITALIA

1. Length of bursa copulatrix about 2.5 times longer than apophyses of segment VIII; sclerotized ostial plate wider than long *luridula*
 Length of bursa copulatrix not more than twice the length of the apophyses of segment VIII; sclerotized ostial plate as wide as long
 *buchholzaria, umbrosaria*

Pseudoboarmia luridula (Hulst), new combination

Figure 9

Alcis luridula HULST, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 346. DYAR, "1902" [1903], Bull. U. S. Natl. Mus., no. 52, p. 321. GROSSBECK, 1917, Bull. Amer. Mus. Nat. Hist., vol. 37, p. 96. RINDGE, 1955, Bull. Amer. Mus. Nat. Hist., vol. 106, p. 147.

Cleora luridula, BARNES AND McDUNNOUGH, 1916, Contributions to the natural history of the Lepidoptera of North America, vol. 3, p. 185 (synonym of *cognataria* Hübner).

Glena luridula, BARNES AND McDUNNOUGH, 1917, Check list of the Lepidoptera of Boreal America, p. 118. McDUNNOUGH, 1920, Canadian Dept. Agric., Tech. Bull., no. 18, p. 23; 1938, Check list, p. 163.

Sexes alike in color and maculation. Head, front black-brown, with vertex white; palpi with mixed gray and brown scales. Thorax and abdomen light violet-gray, the latter with scattered brown scales; legs light gray, with scattered brown scales. Upper surface of both wings

light violet-gray, with a few scattered brown scales; almost without maculation, occasionally with very faint trace of discal spots and extra discal line, and with dark, intravenular terminal line also partially indicated. Under surface of wings light gray, with slight violet tinge; without maculation except for discal spots on all wings. Length of forewing: male, 15 to 17 mm.; female, 17 to 18 mm.

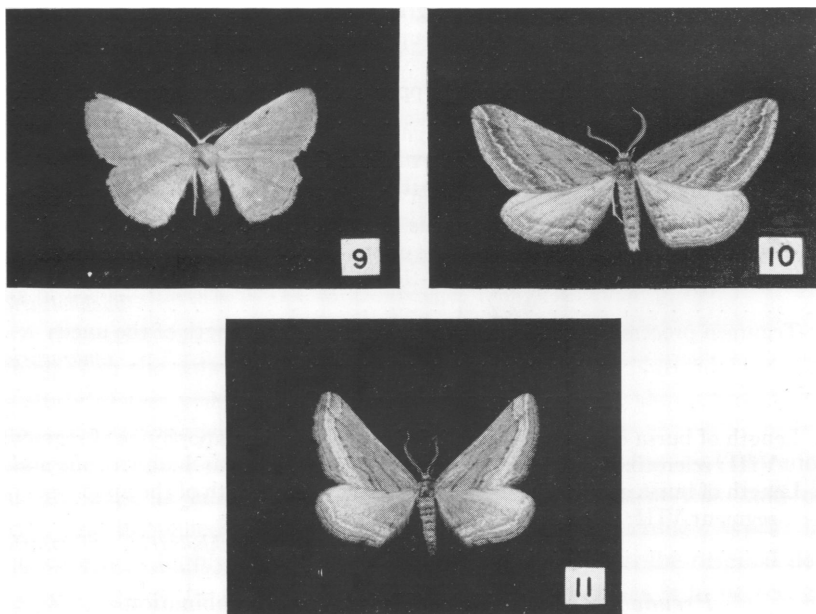


FIG. 9. *Pseudoboarmia luridula* (Hulst), male, Port Sewall, Martin County, Florida, January 23–27, 1949 (L. J. Sanford).

FIG. 10. *Chesiadodes morosata* Hulst, male, Mint Canyon, Los Angeles County, California, March 2, 1946.

FIG. 11. *Chesiadodes simularia* (Barnes and McDunnough), male, Inyo Mountains, Inyo County, California, May 11, 1936, elevation 9000 feet (R. H. Andrews and L. M. Martin).

MALE GENITALIA: Processes at distal end of tegumen bearing very long, hair-like scales are very short, not exceeding one-fifth of the length of the uncus; valves narrow, with spine patch of valvula short, in length not exceeding twice the length of longest spines, sclerotized ridge of sacculus terminating at or before basal margin of spine patch, widened distally and bearing several spines; aedeagus slender, weakly spined.

FEMALE GENITALIA: Apophyses of ovipositor lobes extremely long, being about four times as long as dorsum of segment VIII; ostial plate

sclerotized, wider than long, elliptical in outline; bursa copulatrix membranous, very long and slender, about 2.5 times longer than apophyses of segment VIII.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPE: In the American Museum of Natural History.

TYPE LOCALITY: Florida (Mrs. Slosson).

RANGE: Florida. This species was reported from Georgia by both Dyar and Grossbeck. On the wing in January, February, March, August, and September.

REMARKS: Eleven specimens, including the type, are before the author; four genitalic preparations have also been studied. The adults are easily distinguished from the other members of the genus by their pale coloration and obsolete maculation. The genitalia are quite similar to those of the other two species, but are differentiated in the above key.

GENUS *CHESIADODES* HULST

Chesiadodes HULST, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 354.

Jenana CLARKE, 1939, Proc. Ent. Soc. Washington, vol. 41, p. 73. (New synonymy.)

Head, front projecting beyond eyes, truncate apically, with longitudinal ridge extending from between antennal bases to top of projecting front, and with narrow, horizontal ridge below front; eyes large, wider than front; antennae of male bipectinate, with apex simple, the pectinations arising in middle of segments, of female shortly bipectinate; tongue present; labial palpi small, not exceeding front. Thorax without tufts; fore tibia with processes almost one-half of the length of the tibia and with single terminal spine; hind tibia not dilated, without hair pencil, with two pairs of spines. Abdomen without crests; terminal segment without plate. Forewings broadly triangular, 11 veins, with or without a single areole, R_{1+2} from top of cell, with or without anastomosis to R_{3+5} , which arises from top of cell, R_5 from stalk before R_3 ; M_1 from upper angle, M_2 from upper portion of dc, M_3 and Cu_1 approximate at lower angle of cell; Cu_2 from well before outer angle; fovea absent. Hind wings broad, elongate, outer margin slightly excavated between A and Cu_1 , frenulum strong in both sexes; Sc approximate to R near base for less than one-half of length of cell; R and M_1 from just before upper angle; M_3 from angle; Cu_2 from well before outer angle, with Cu_1 arising nearer M_3 than Cu_2 . Forewings and hind wings not concolorous; forewings dark gray or gray-brown, with t. a. line weakly represented,

t. p. and s. t. lines more prominent; secondaries light gray, discal dot present or absent, s. t. line usually present, other lines obsolescent. Beneath light gray, with only traces of maculation.

MALE GENITALIA: Uncus simple, broadly triangular, with sides slightly concave, the apex with a single curved point; socius not differentiated; gnathos strongly developed, heavily sclerotized, produced medioventrally into a prominent, rounded enlargement; valves large, symmetrical, costal region sclerotized, extending as far as apex of uncus, with numerous slender spines apically, valvula membranous, or with sclerotized strip going transversely to median area of sacculus, the latter broadly sclerotized, widened apically where a heavily sclerotized, spinose, apical process is located on lower surface in a pocket of valvula; transtilla absent; cristae present; juxta elongate, sclerotized, narrowed medially; furca absent; tegumen short and broad; saccus projecting short distance beyond base of valves, broadly rounded apically, longer than length of uncus; aedeagus elongate, slightly shorter than combined length of uncus, tegumen, and saccus, swollen basally, narrowed medially, with right side sclerotized from beyond middle in form of long narrow arm, distally with small spine; vesica unarmed.

FEMALE GENITALIA: Ostium with sclerotized lateral ridges; operculum absent; ductus bursae short, sclerotized, collar-like; ductus seminalis arising ventrally below ductus bursae; bursa copulatrix membranous, elongate, with a narrow, transverse signum.

EARLY STAGES: Unknown.

TYPE SPECIES: *Chesiadodes morosata* Hulst; *Glaucina simularia* Barnes and McDunnough, the type of *Jenana* Clarke; both by original designation.

DISTRIBUTION: Known only from California and Utah (Clarke).

An examination of the type of *morosata* Hulst shows a close relationship to examples of *simularia* Barnes and McDunnough. As they are congeneric, it becomes necessary to place *Jenana* in the synonymy.

KEY TO ADULTS

- Forewings above dark gray; space between t. p. and s. t. lines of ground color, becoming darker next to s. t. line *morosata*
 Forewings above gray-brown; space between t. p. and s. t. lines broadly marked with white below median veins *simularia*

KEY TO SPECIES BY MALE GENITALIA

- Spinose apical process of sacculus with four or five spines, arising from edge of process *morosata*
 Spinose apical process of sacculus with seven or eight spines, arising from outer surface of process *simularia*

Chesiadodes morosata Hulst

Figure 10

Chesiadodes morosata HULST, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 354.
RINDGE, 1955, Bull. Amer. Mus. Nat. Hist., vol. 106, p. 148.

Head with front truncate, dorsal edge rounded, central area gently rounded; male antennae with longest pectinations over three times as long as antennal segments. Spine on fore tibia three-fourths of the length of the tibial process.

A large, dark gray species with generally obscure maculation; vein R_{1+2} usually not anastomosing with R_{3+5} , so without areole; t. a. line black, running parallel with costal margin from inner margin, fading out in cell; a faint, diffuse, dark median shade line; t. p. line black, with narrow shade line of white on outer side, arising on costa four-fifths of distance from base, represented by dots on veins R_4 and R_5 , then becoming a solid line, being emphasized on veins by dots, slightly concave between veins R_5 and M_1 , then subparalleling outer margin to vein Cu_1 , curving basad and being concave in cell Cu_2 , meeting inner margin one-half of distance from base; s. t. line white, the most prominent part of the maculation, subparalleling outer margin but tending to be convex between veins, and shaded basally by gray-black and black scales; terminal line black, narrow, followed by narrow white line; fringe dark gray, with median and outer portions whitish gray. Secondaries light gray, with inner margin darker; discal dot usually prominent; intradiscal and extradiscal lines represented on inner margin, the latter extending part way across wing; s. t. line white, extending from vein R_s to inner margin, paralleling outer margin; terminal line and fringe as on primaries. Under surface light gray, sprinkled with dark scales; maculation absent except for indication of t. p. line near costa on primaries, this being followed by a patch of black-brown scales opposite cell, and for discal dot on secondaries. Length of forewing: 17 to 20 mm.

The female, as well as the early stages, is unknown.

MALE GENITALIA: Gnathos with enlarged median portion slightly narrower than base of uncus; valves with prominent costal region extending as far as apex of uncus, terminal portion with numerous slender spines; spinose apical process of sacculus with four to six strong, curved spines arising from edge only; juxta elongate, constricted medially; aedeagus with right side sclerotized from beyond middle, in form of long, narrow arm.

TYPE: In the American Museum of Natural History.

TYPE LOCALITY: Sierra Nevada, California.

RANGE: In addition to the type specimen, this species is known to the author only from Glendale, Mint Canyon, and Palmdale, all in Los Angeles County, California. All these latter specimens were captured in February.

REMARKS: Five specimens, and the genitalia of two of these, including the type, were studied.

Chesiadodes simularia (Barnes and McDunnough),
new combination

Figure 11

Glaucina simularia BARNES AND MCDUNNOUGH, 1918, Contributions to the natural history of the Lepidoptera of North America, vol. 4, p. 152, pl. 21, fig. 14 (type female).

Jenana simularia, CLARKE, 1939, Proc. Ent. Soc. Washington, vol. 41, p. 73, pl. 11, figs. 1-5 (venation, head, antennae, and male and female genitalia).

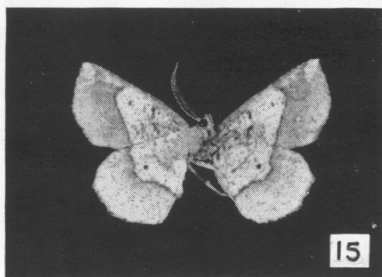
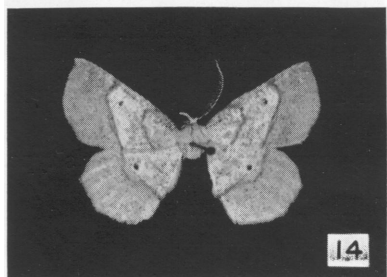
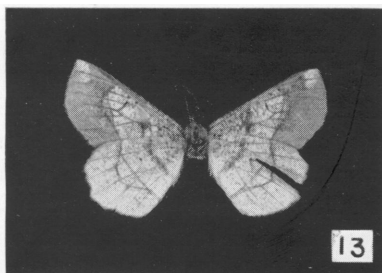
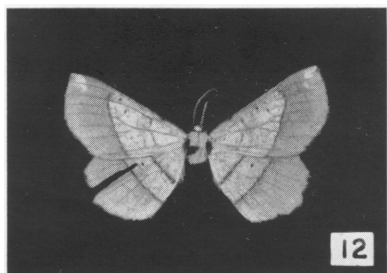
Head with front sharply truncate, dorsolateral margins raised, and with narrow vertical ridge medially; male antennae with longest pectinations over two times as long as antennal segments. Spine on fore tibia one-fourth of the length of the tibial process.

A smaller, gray-brown species, with the cross lines usually distinct; vein R_{1+2} usually anastomosing with R_{3+5} , and hence areole present; t. a. line dull black, running parallel with costal margin from inner margin, fading out in cell, sometimes indicated again on costa by a dark spot one-third of distance from base; a diffuse, dark, median, shade line; t. p. line dull black, with narrow shade line of white and brown on outer side, complete, tending to be thickened on veins, arising on costa about seven-eighths of distance from base, concave to vein R_5 , then subparalleling outer margin to middle of cell Cu_2 , curving basad to meet inner margin one-half of distance from base; s. t. line white, prominent, subparalleling outer margin; the area between the t. p. and s. t. lines broadly shaded with white below cell; terminal line rather wide, interrupted by veins, followed by narrow, light, shade line; fringe dark gray, with median and outer portions narrowly whitish gray. Secondaries light gray, overlain with darker scales; discal dot weakly represented; intradiscal and extradiscal lines represented on inner margin, the latter extending part way across wing; s. t. line white, complete, with basal and outer darker margins; terminal line and fringe as on primaries. Under surface light gray, more or less heavily sprinkled with dark gray and brown scales; t. p. and s. t. lines present on primaries in costal half of wing, fading out posteriorly; discal dot sometimes weakly indicated on both wings; extra-

discal line on secondaries indicated by dark, elongate spots on veins, followed by more or less complete s. t. line. Length of forewing: 16 to 18 mm.

The single female is similar to the males in color and pattern, although the primaries appear to be more suffused with dark scales and, as a result, the pattern is not so clearly defined. Length of forewing: 16 mm.

MALE GENITALIA: Gnathos with enlarged median portion as wide as base of uncus; valves with prominent costal region extending slightly beyond apex of uncus, terminal portion with very many slender spines; spinose apical process of sacculus with seven or eight strong, curved spines arising from outer surface; juxta elongate, constricted medially to form a narrow ridge; aedeagus with right side sclerotized from beyond middle, in form of long, narrow arm that widens posteriorly.



FIGS. 12, 13. *Euchlaena madusaria* (Walker), male, St. Petersburg, Florida, March 20, 1914. 12. Upper side. 13. Under side.

FIGS. 14, 15. *Euchlaena deplanaria* (Walker) (?), male, Port Sewall, Florida, February 1-5, 1949 (L. J. Sanford). 14. Upper side. 15. Under side.

TYPE: In the United States National Museum.

TYPE LOCALITY: Monachee Meadows, Tulare County, California.

RANGE: Inyo, Mono, and Tulare counties of California; a single male

from Verdugo, Los Angeles County, California; Eureka and Ridgefield, Utah (Clarke). On the wing from May to July.

REMARKS: Twenty-one specimens and four genitalic preparations were examined. The male and female genitalia have been described and illustrated by Clarke (1939, Proc. Ent. Soc. Washington, vol. 41, pl. 11, figs. 4, 5). The adults can be separated from *morosata* by the shorter antennal pectinations, the shorter spine on the fore tibia, smaller size, lighter gray-brown coloration with clearer maculation, and by the prominent white area between the t. p. and s. t. lines. The male genitalia are rather similar, but those of this species can be recognized by the greater number of spines on the apical process of the sacculus.

GENUS *EUCHLAENA* HÜBNER

A number of specimens from the southeastern portion of this country have been studied, and it has become obvious that the current listing of the species left considerable difficulties as to the proper application of the names. Mr. C. P. Kimball has been largely responsible for this material from Florida; additional specimens have come from the Sperry collection, and through the collecting of L. J. Sanford. As Walker described a number of species from Florida, it became necessary to send examples to the British Museum (Natural History), where Mr. D. S. Fletcher was kind enough to compare them with Walker's types. The resulting changes came as a result of his comparisons.

It should be noted that two of the species concerned (*madusaria* Walker and *deplanaria* Walker) are distinguished by the fact that the males have non-swollen hind tibiae and no tibial hair pencil. This distinguishes them from all the other known North American species except *irraria* Barnes and McDunnough, which is not known to occur in the southeastern states.

The specimens that are illustrated were compared with Walker's type.

Euchlaena madusaria (Walker), new status

Figures 12, 13

Endropia madusaria WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 20, p. 153.

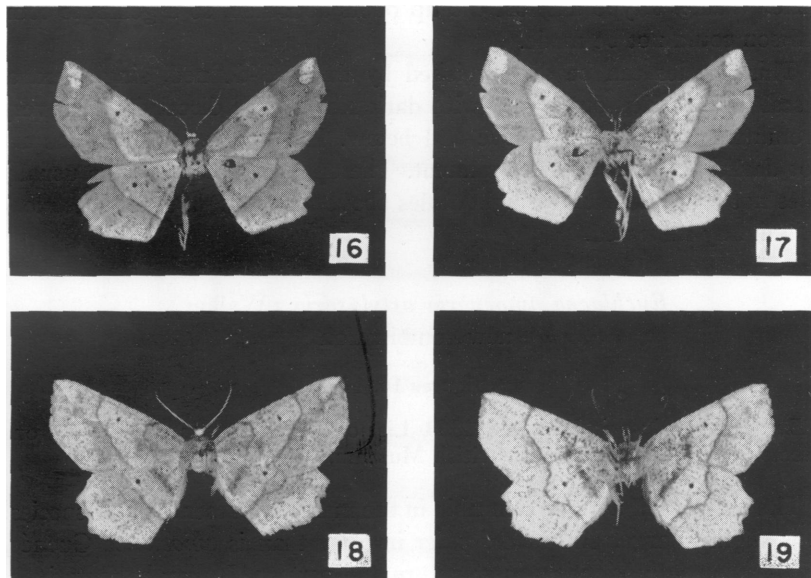
Endropia oponearia WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 20, p. 153.

Endropia tiviararia WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 20, p. 250.

Endropia vinulentaria GROTE AND ROBINSON, 1867, Ann. Lyc. Nat. Hist. New York, vol. 8, p. 446, pl. 15A, fig. 5. (New synonymy.)

Endropia vinosaria GROTE AND ROBINSON, 1867, Ann. Lyc. Nat. Hist. New York, vol. 8, p. 448, pl. 15A, fig. 4.

This species has been known by the name *vinulentaria* (Grote and Robinson), but it appears that Walker's name applies to the same species. It can be recognized by the geminate nature of the extradiscal line on all wings, in addition to the non-swollen hind tibia of the male. The geminate extradiscal line is most noticeable on the secondaries, especially on the under surface, where the area distad of this line is concolorous with the remainder of the wing. Discal dots are present on all wings, above and



FIGS. 16, 17. *Euchlaena amoenaria astylusaria* (Walker), male, Punta Gorda, Florida, January 21, 1941 (Wyatt). 16. Upper side. 17. Under side.

FIGS. 18, 19. *Euchlaena pectinaria* (Schiffermüller and Denis) (*E. deductaria* Walker), male, Arkansas (collection Chas. Palm). 18. Upper side. 19. Under side.

below, but they are usually not very prominent. The veins tend to be darker than the ground color of the wings and hence appear rather prominently on both surfaces. This species also tends to have a well-defined patch of ground color at the apex of the primaries above and below.

Euchlaena deplanaria (Walker), new status

Figures 14, 15

Ellopiia deplanaria WALKER, 1862, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 26, p. 1510.

The second species with the non-swollen hind tibia was referred here, although with some reservations. The type has the proximal and distal areas of the wings concolorous, while in a series of 26 males and nine females from Florida before the author, these two areas are usually contrastingly colored. In a few examples, the outer area of the upper surface of the secondaries is largely concolorous, but this is not usually the case. In general appearance, the type of this species is very close to *pectinaria* (Schiffermüller and Denis), but differs in the hind tibia of the male. Walker's type has lost the tip of its abdomen, so a genitalic comparison could not be made.

This species can be distinguished by the well-defined, single, extradiscal line, shaded outwardly with dark scales. The discal dots are very prominent on all wings above and below. In this species the veins are not darkened, so are not prominent. The apex of the primaries usually does not have the patch of light scales above, although in some specimens it is lightly indicated.

Euchlaena amoenaria astylusaria (Walker),
new combination

Figures 16, 17

Endropia astylusaria WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 20, p. 152.

The hair pencil and swollen tibia in the male are present in this species. It is slightly larger and rather paler in color than is *amoenaria* Guenée, but is apparently identical in structure and pattern. It may be tentatively placed as the southern subspecies pending the capture of additional specimens. The specimen illustrated is an excellent match for Walker's type, according to Fletcher.

Euchlaena pectinaria (Schiffermüller and Denis)

Figures 18, 19

Geometra pectinaria SCHIFFERMÜLLER AND DENIS, 1775, Systematisches Verzeichniss der Schmetterlinge der Wienergegend, p. 103.

Endropia deductaria WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 20, p. 151.

The accepted synonymy is correct in this case. There seems to be some seasonal dimorphism in this species, as a specimen caught in May in Atlanta, Georgia, and a second male from Arkansas (without date)

match Walker's type very well. Additional specimens from Florida, captured in February and March, are also referable here, but differ in being slightly larger, in having less yellowish in the ground color, in being more heavily dusted with dark scaling above, and in having the area beyond the t. p. line more broadly suffused with brownish scales.