

A REVISION OF THE MOTH GENUS
SOMATOLOPHIA (LEPIDOPTERA,
GEOMETRIDAE)

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CONTENTS

Abstract	295
Introduction	295
Acknowledgments	299
Genus <i>Somatolophia</i> Hulst	299
Group I	304
Group II	326
List of Species	331
Literature Cited	331

ABSTRACT

The genus *Somatolophia* is revised for the first time. It is redescribed and divided into two groups, defined on the basis of male and female genitalia. Relationships within the genus are discussed, and a cladogram is presented; *simplicia* and *cuyama* form an apomorphic group and are sister species to all the others in the genus. A key is given for the species, based on male genitalia. All species are described, and both the adults and their genitalia are illustrated; distributional data are given for all species.

The following species are described as new: *desolata* (California), *montana* (California), *sinaloa* (Sinaloa), *incana* (Nevada), *vatia* (Arizona), and *petila* (Texas); aberration "obliterata" Warren is placed as a synonym of *pallescens* McDunnough.

The members of this genus occur in the western United States and Mexico, from southern Idaho to the states of Puebla and México.

INTRODUCTION

The genus *Somatolophia* has never been revised. Several years ago, when I made a preliminary survey of the species placed in that genus, I became aware of the difficulty in applying specific names with any certainty. This problem led to the present revisionary study, in which all known species and their genitalia are described and illustrated.

Somatolophia is placed in the Cingiliini by Ferguson (in press). Forbes (1948) stated that this very distinct tribe of the Ennominae is limited to the New World, and is richly developed in South America. Various antennal, venational, genitalic, and pupal characters were used in defining the Cingiliini (Forbes, 1948, pp. 23, 100). Some of the tropical American genera show much greater variation of these structures than do the North American taxa, and there may be intergradation with the closely related Ourapterygini. The latter tribe is also essentially tropical American in distribution; as with the Cingiliini, these southern forms badly need study. Until such revisionary work is done, it is going to be almost impossible to have a meaningful tribal classification in this section of the Ennominae.

The northern species that have been placed in the Cingiliini are homogeneous; the genera have been subdivided on appearance and minute points of the genitalia, but no real solution can be reached without a study of the more southerly types (Forbes, *op. cit.*). I agree with his statement on the genera; this

was verified by my revision of *Sabulodes* (Rindge, 1978). For almost 80 years *Phengommataea* and *Sabulodes* were listed as distinct genera occurring in North America, but my study of the Middle and South American species showed *Phengommataea* to be a synonym of *Sabulodes*. The latter genus is placed in the Ourapterygini.

The degree of morphological differences in such adult characters as the antennae, palpi, legs, venation, and genitalia that are used to differentiate the northern Cingiliini at the present time is not usually comparable to the variation in the same characters that are used to define genera in some other tribes of the New World Ennominae, such as, for example, the Boarmiini, Bistonini, and Nacophorini. The members of these three tribes are considered more plesiomorphic than the Cingiliini. (For revisionary studies of the Boarmiini, see Rindge, 1952, 1954, 1959, 1964a, 1964b, 1964c, 1965, 1966, 1967, 1968, 1970, 1971b, 1972, 1973a, 1973b, 1974c; of the Bistonini, Rindge, 1975b; of the Nacophorini, Rindge, 1961, 1971a, 1974a, 1974b, 1975a.) I do not necessarily mean to infer that the same amount or degree of variation in characters mentioned should necessarily apply to all groups. I do believe that good morphological characters of the adults and the early stages, when the latter become known, should be present so that meaningful genera can be defined.

Seven species and one aberration have

been named and placed in what is now *Somatolophia*. The genus itself was named by Hulst in 1896. The earliest species was described in *Gnophos* (1876); other genera that have been used are *Catascia* (for the aberration in 1904), *Gonodontis* (1908, 1918), and *Selidosema* (1920). The remaining three taxa were described in *Somatolophia* (1896, and two in 1940). Of those not described in the present genus, two were placed therein in 1917, one in 1938, another in 1940, and the remaining one is transferred in the present paper.

This confusion regarding the correct generic placement represents, probably more than anything else, an almost complete lack of study of the moths. Most of the included species are similar to one another in color, maculation, and size. This, on one hand, makes it surprising that it took so long to make the proper generic placement; on the other, it has led to confusion regarding the correct specific determinations. The genitalic structures have never been dissected much less studied and described for all the included species; for many, an examination of the male structures is necessary to make correct identifications.

One of the long-standing controversies in *Somatolophia* is whether or not the males have a hair pencil on the hind tibia. Hulst (1896, p. 350) did not mention this character when he proposed the generic name. Grossbeck (1907, p. 148) was the first to call attention to the presence of this structure, but neither Dyar (1907, p. 205) nor McDunnough (1940, p. 97) found it. It is not surprising that the hair pencil has been overlooked, even though it is present in all species of *Somatolophia*. I strongly suspect that it is deciduous; in some species (such as *petila*) it appears that only a relatively few males have the hair pencil, as it is extremely difficult to find. In some specimens it is thick and very obvious, extending most of the length of the tibia, at least as far as or beyond the upper pair of spurs. Most males are not like this, but have a number of relatively long (up to 0.5 mm. in length) flattened scales near the basal end of the tibia on the inner surface, where the hair pencil originated; these con-

trast with the much shorter scaling that covers the tibia. In worn examples these elongate flattened scales may become rubbed off, leaving a long narrow "scar" denuded of all scales, and up to 0.5 mm. in length. Many males have a shallow depression or flattened surface on the inner side of the tibia, which serves as another indication of the presence of the hair pencil.

I have divided *Somatolophia* into two groups, based on the characters of both the male and female genitalia. The differences utilized here appear to be greater and more basic than those utilized to separate some of the current North American genera of the Cingiliini. I keep these two groups as subdivisions of *Somatolophia* instead of splitting them off as separate genera because when all the adult characters studied are analyzed, a homogenous, presumably monophyletic, group is represented.

The male genitalia have a number of good specific characters. The single most valuable structure is the furca, as it varies in size, shape, and the number and positioning of the spines. Some value may be found in the position of the furca, whether it is located medially or to one side or the other; it is usually on the right in *Somatolophia*. However, the position has to be considered carefully, as this can vary with the amount of flattening if the genitalia are mounted on a slide, or even when the valves are being spread. Varying degrees of flattening will also tend to tilt the furca so that it becomes difficult to get a full ventral view of the structure. When this happens, one gets a different perspective of the shape of the furca and of the spinose column on the dorsal surface; this column and its spines are of specific value.

The shape of the gnathos is basically the same in all species. Those of Group II have a swollen transverse median process; the latter is absent in Group I. The median area of the gnathos in both groups has a variable number of spines, with the numbers of Group II tending to be more numerous and of a more equal length than those in Group I. The spines of the latter group are variable in length, number, and position; this is usually an individual character, as can be seen

TABLE 1
Plesiomorphic and Apomorphic Character States used in Figure 1

Character	Plesiomorphic State	Apomorphic State
1. Size of furca	Elongate	Very small
2. Papillae anales	Membranous, without dorsal ridge	Sclerotized, with dorsal keel-like ridge
3. Apophyses	Slender, short	Thick, elongate
4. Anteromedian portion of gnathos	Bulbous, with large number of short spines	Not enlarged, with fewer spines of varying length
5. Extent of spining of furca	Full length	Two-thirds or less
6. Ratio of length of apophyses posteriores to apophyses anteriores	Five times or less	Seven times or more
7. Location of spining of furca	On left side	In middle
8. Length of longest pectinations of male antenna	Short, 1.4 to 1.5 mm.	Long, 1.7 to 2.0 mm.
9. Armament of vesica	Band of slender straight spines	Row of thick curved spines
10. Ostium bursae	Heavily sclerotized	Membranous
11. Length of forewing	Short, 15–18 mm.	Long, 20–24 mm.
12. Apex of male antenna	12 simple segments	21 simple segments
13. Spining of furca	Present	Absent
14. Armament of vesica	Band of many slender spines	Two to four elongate spines
15. Length of uncus	Long, 0.8 to 1.4 mm.	Short, 0.6 to 0.7 mm. (secondary reduction)
16. Shape of furca	Straight	Curved
17. Distal spining of furca	Terminal two-thirds, medially	Terminal one-third to one-fourth, on left side
18. Length of furca	Short, 0.7 to 0.9 mm.	Long, 1.1 to 1.4 mm.
19. Apex of male antenna	9 simple segments	12 to 14 simple segments
20. Females	Fully winged	Brachypterous

when studying a number of specimens of the same species from a single locality.

The uncus is relatively uniform within the genus. Specific differences are usually represented by variations in length. As this structure is curved, care must be taken with measurements, which will depend on the degree of flattening on the slide.

The aedeagus of each species is similar from one species to the next, although specific differences do occur in length and width. The armament of the vesica is usually a band of many slender spines; in some species these may be deciduous, leaving only the small base or losing even that. The exceptions to this band of slender spines is that in one species there is a row of shorter, thick, curved spines and, in a second species, two to four very long slender spines.

The female genitalia are less useful on the specific level for making determinations, although there are excellent characters for recognizing the two species-groups; these are the two types of papillae anales and of both sets of apophyses. There is a progressive reduction in the length of the apophyses; measurements of these structures can be utilized to recognize a few of the species.

As indicated above, we know practically nothing about the Neotropical genera of the Cingiliini, and revisionary studies of the North American fauna are practically nonexistent. In the light of present knowledge, it is impossible to know the sister group of *Somatolophia*; it could quite possibly be found in tropical America, as none of the North American genera appear to be very closely related. Under these circumstances,

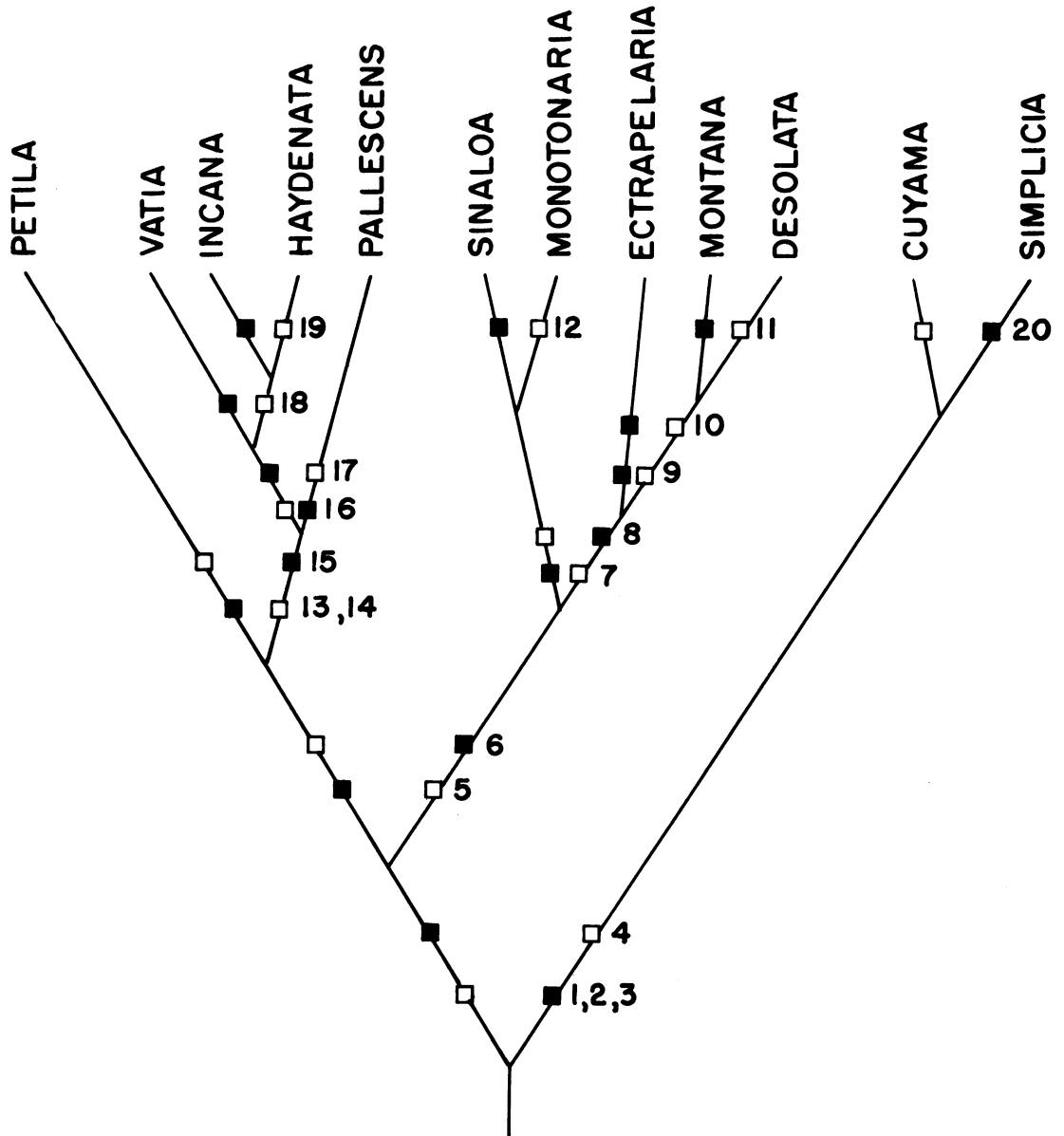


FIG. 1. Hypothetic phylogeny of *Somatolophia*. Open squares represent the plesiomorphic character state; solid squares represent the apomorphic character state. See table 1 for characters used.

when analyzing the characters of the present genus, it becomes necessary to compare them with those of the other North American Cingiliini. By so doing, it is realized that some of the conclusions that are reached

may turn out to be erroneous when the tribe as a whole is analyzed; however, there is no viable alternative.

Practically all the described North American species now placed in the Cingiliini have

recently been dissected by me; the result is that both the male and female genitalia and the male and female antennae and legs are available for study. Using this material and the adults as the outgroups, I have compared and analyzed the structures found in *Somatolophia*. The results are summarized in table 1 and figure 1. The genus is divided into two groups, with *simplicia* and *cuyama* being the sister species for all the others in the genus. In the light of the very limited knowledge of North American Cingiliini and the almost complete ignorance of the characters of the Neotropical members of the tribe, I purposely have not given any apomorphic characters for the genus itself. It should be noted that no apomorphic characters have been noted to separate *desolata-montana-ectrapelaria* and *haydenata-incana*.

During the course of this study, more than 1200 specimens have been examined; the males outnumbered the females by slightly more than two to one. I have examined all the primary types of valid names and studied their genitalia. One name was published as an aberration, and it is in the collection of the British Museum (Natural History); it was dissected and a sketch of the pertinent parts were sent to me, which enabled me to identify it. Whenever possible, the holotypes or lectotypes are illustrated in this paper. All specimens studied by me have had either identification or type labels placed on their pins. Two-thirds of the specimens studied, nearly three-fourths of the genitalic slides, and practically all the slides of antennae and legs are in the collection of the American Museum of Natural History.

The following abbreviations have been used:

AMNH, American Museum of Natural History
CNC, Canadian National Collection
LAM, Los Angeles County Museum of Natural History
MCZ, Museum of Comparative Zoology, Harvard University
RL, Ronald H. Leuschner
UC, University of California, Berkeley
USNM, National Museum of Natural History, Smithsonian Institution

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I also thank Mr. Iggi Fajardo for making the drawings and for preparing the maps.

GENUS *SOMATOLOPHIA* HULST

Somatolophia Hulst, 1896, p. 350. Dyar, "1902" [1903], p. 322. Barnes and McDunnough, 1917, p. 118. McDunnough, 1938, p. 171; 1940, p. 96.

DIAGNOSIS: *Somatolophia* can be separated from the other genera of Cingiliini occurring in North America north of Mexico by the following combination of characters: male antennae with terminal pectinations, longest pectinations 1.4 to 2.0 mm.; female antennae simple or with terminal pair of very short lobes; gnathos rounded medially; and male hind tibia with hair pencil. The upper surface of all wings is beige, brown, or gray, evenly covered with variable number of blackish scales, and with cross lines varying from obsolescent to clearly represented; the females are similar to the males, although one species is apparently brachypterous. The length of the forewings varies from 14 to 25 mm.; the brachypterous wings are 6.5 to 9.0 mm. long.

ADULT: Head with eyes of both sexes large, round, wider than front, those of females slightly smaller than those of males; front slightly convex; palpi moderate, ex-

tending slightly beyond front, not rising to middle of eyes, those of females slightly longer than those of males; antennae with from about 44 to 65 segments, bipectinate in male, simple or with terminal pair of very short lobes in female; males with pectinations arising at distal ends of segments, with terminal four to 21 simple, pectinations 1.4 to 2.0 mm. in length, six to eight times as long as basal segments, each pectination with double row of slender setae below and with single seta at apex. Thorax slender, without tufts; fore tibia without terminal spine, with process of male arising approximately one-third distance from base and extending slightly beyond apex, of female shorter, arising three-fifths to two-thirds distance from base of segment; hind tibia with two pairs of spurs in both sexes, males with or without shallow groove and with deciduous hair pencil. Abdomen elongate, slender, without dorsal tufts; males without row of setae on ventral surface of third segment and last segment without modifications.

Forewings broad, apex angulate, outer margin rounded; 12 veins present; with one accessory cell; R uniting with Sc; R_{1+2} stalked, R_4 going to costa just before apex; mdc shorter than ldc; Cu_1 from shortly before lower angle; fovea absent. Hind wings broad, outer margin rounded, weakly concave between veins; frenulum strong in both sexes; Sc paralleling R for one-quarter to one-third length of cell; R and M_1 separating before upper angle of cell; m and ldc angled; M_3 from before lower angle; cell one-half to two-thirds length of wing; Cu_1 arising nearer angle than to Cu_2 .

Upper surface of all wings beige, brown, or gray, sparsely and evenly covered with variable number of black scales, producing a finely mottled appearance; forewings with t. a., t. p., and s. t. lines varying from obsolescent to clearly represented, and with small discal spot present; hind wings with median and s. t. lines obsolescent to clearly represented, discal spot reduced or absent. Under surface pale brown or pale gray, with maculation reduced or absent. Females similar to males; one species may be brachypterous. Length of forewings from 14 to 25

mm., with brachypterous wings being 6.5 to 9.0 mm. in length.

MALE GENITALIA: Uncus elongate, 0.6 to 1.4 mm. long, base small, slender, slightly tapering into long tubular shaft, apex tapering to point or short transverse ridge; socius elongate, membranous, sparsely setose; gnathos elongate, rounded anteriorly, median portion either swollen or not, with variable number of setae; valves elongate, broad, simple, with slender, sclerotized costa; transtilla broad; anellus lightly sclerotized, broad, flat; cristae absent; furca present, varying from very small to elongate, 0.05 to 1.4 mm. long, situated medially or on right side, variable in shape and ornamentation; tegumen broad, with length equal to width; saccus tapering, longer than wide; aedeagus slender, in length either equal to or slightly longer than, combined length of tegumen and saccus, ventral surface posteriorly with elongate, slender process; vesica with row of permanent or deciduous spines, when exerted in form of simple tube either extending posteriorly, dorsally or ventrally, in length slightly shorter than or equal to length of aedeagus, and with row of spines.

FEMALE GENITALIA. Papillae anales either elongate, lightly sclerotized, and with narrow sclerotized posterodorsal ridge, or short and membranous, without ridge; sterigma with lamella postvaginalis with anterolateral areas either lightly sclerotized or membranous, lamella antevaginalis membranous, with or without variable number of small transverse ridges; ductus bursae sclerotized, longer than wide, either short, 0.3 to 0.4 mm. long, with parallel sides, or longer, 0.6 to 0.7 mm. long, more heavily sclerotized and tapering anteriorly; ductus seminalis arising ventrally from posterior end of corpus bursae near ductus bursae; corpus bursae either entirely membranous, symmetrical, and slightly swollen anteriorly, or more or less asymmetrical, posterior portion lightly sclerotized, slender, with longitudinal striations, and with swollen membranous anterior portion; signum present, round. Apophyses posteriores either thick and elongate, 3.2 to 4.0 mm. long, or short and slender, 0.7 to 2.4 mm. long; apophyses anteriores either

thick and long, 1.5 to 2.1 mm. long, or shorter and slender, varying from 0.05 to 1.30 mm. long.

EARLY STAGES: Very poorly known. Comstock ("1939" [1940]) described the mature larva and pupa of *cuyama*, and illustrated the latter. Dyar (1903b) published on the egg and five larval instars of *haydenata*; however, due to the confusion regarding the identification of this species the descriptions need verifying. One other species (*ectrapelaria*) has been reared but no descriptions were published.

FOOD PLANTS: *Chrysothamnus* and *Hymenoclea* (Compositae), for *ectrapelaria* and *cuyama*, respectively. Dyar found that the caterpillars of *haydenata* would eat *Prunus* (Rosaceae) and *Polygonum* (Polygonaceae); these are not necessarily the natural food plants.

TYPE SPECIES: *Somatolophia umbripennis* Hulst, 1896, by original designation and monotypy. The taxon represented by the nominal species *S. umbripennis* is currently treated subjectively on taxonomic grounds as the same as that represented by the older established nominal species *Gnophos haydenata* Packard, 1876.

DISTRIBUTION: Western United States and Mexico. The species are found from southern Idaho and eastern Oregon to California and western Texas, in northern Baja California and south to the highlands of central Mexico (the Distrito Federal, México, and Puebla).

REMARKS: Twelve hundred seventeen specimens (817 males, 400 females), 249 genitalic dissections (165 males, 84 females), and 50 slide mounts of antennae and legs (32 males, 18 females) have been studied.

As indicated above, most of the species are very similar to one another in color, pattern, and size. In addition, a number of females have genitalia that are very much alike, so much so, in fact, that they are difficult to recognize with certainty on the specific level. Consequently, it has not been possible for me to make a usable key based on either the adults or female genitalia.

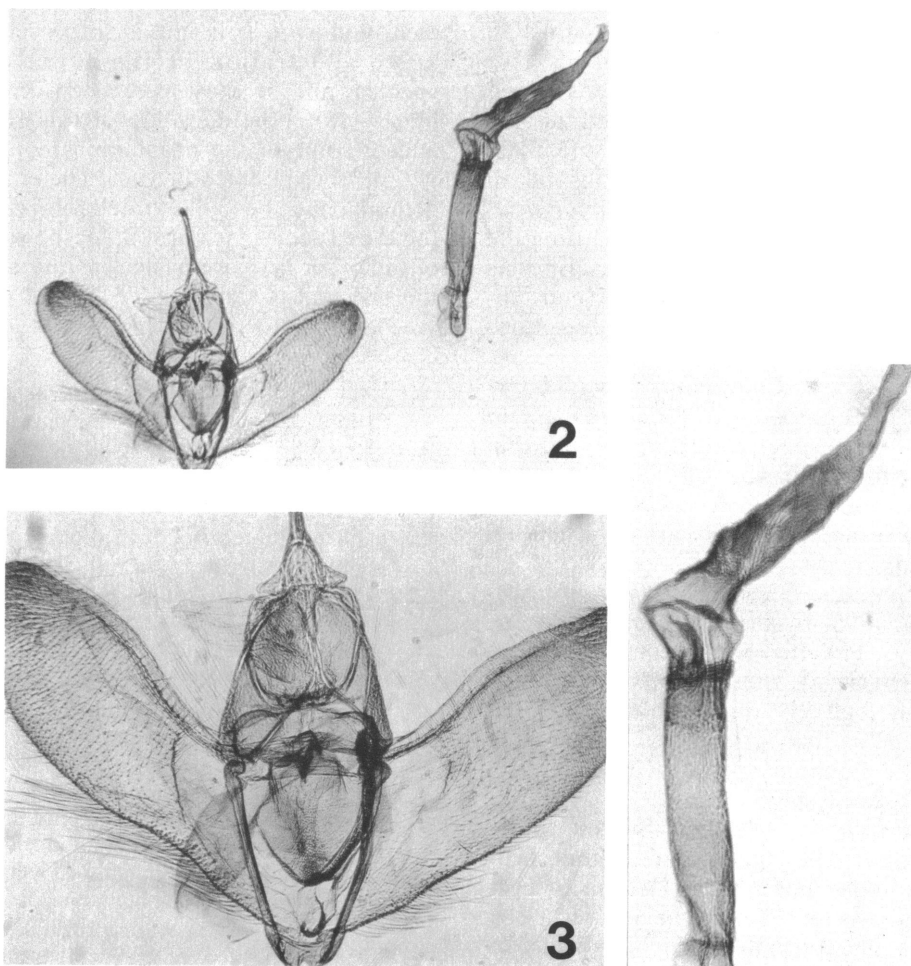
The use of photographs for illustrating the male genitalia did not prove satisfactory for

this revision, as the finer details were not clearly shown. It is important to have a detailed illustration of the furca of each species, and so they have been drawn (see figs. 4–15). For the value of this structure, and of some of the problems when working with it, see the Introduction. The entire male genitalia have been illustrated for *haydenata*, the type species (see figs. 2, 3); the structures of the other taxa are basically very similar to the one that is shown.

KEY TO SPECIES

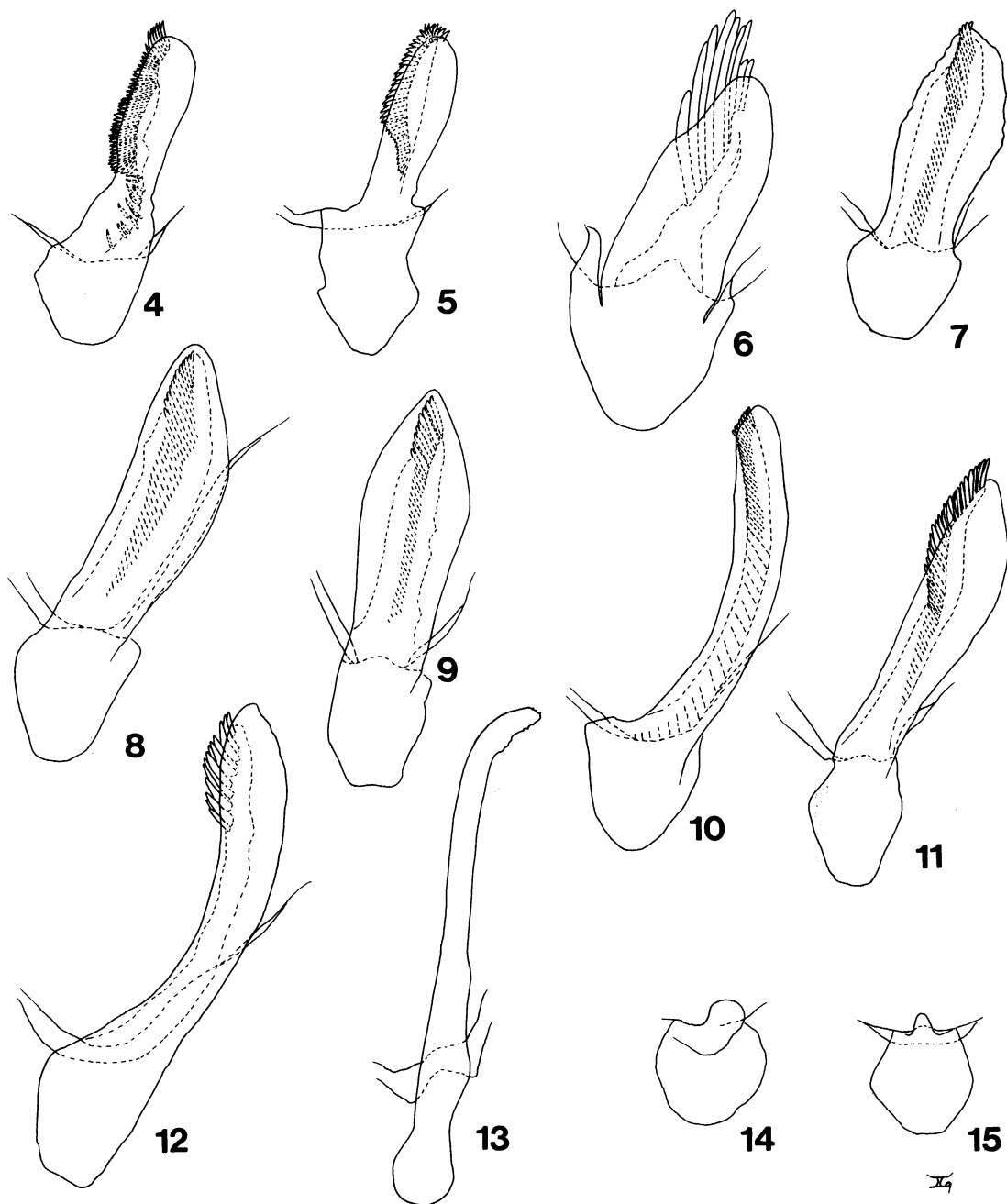
Based on Male Genitalia

1. Furca very small, 0.1 mm. or less in length (Group II) 2
- Furca large, 0.4 to 1.4 mm. in length (Group I) 3
- 2(1). Uncus 1.1 to 1.2 mm. in length *simplicia*
- Uncus 1.0 mm. in length *cuyama*
- 3(1). Furca 0.4 to 1.0 mm. in length 4
- Furca 1.2 to 1.4 mm. in length 11
- 4(3). Furca with setae extending 0.2 mm. beyond posterior end of furca; vesica with row of thick spines *ectrapelaria*
- Furca with setae not extending beyond posterior end of furca by more than 0.05 mm.; vesica with band of very slender spines 5
- 5(4). Furca long, slender, and curved, averaging 6.5 times longer than wide (range: 5.0 to 8.0 times), being 0.7 to 0.9 mm. long (measured from anterior margin of anellus) and 0.10 to 0.15 mm. wide (at middle) 6
- Furca wider and straighter, averaging 3.3 times longer than wide (range: 2.1 to 4.8 times), being 0.5 to 1.0 mm. in length and 0.15 to 0.30 mm. wide 7
- 6(5). Smaller, with uncus 0.8 to 0.9 mm. in length, furca 0.70 to 0.85 mm. long (measured from anterior margin of anellus), and aedeagus 2.2 to 2.6 mm. in length *haydenata*
- Larger, with uncus 0.95 mm. in length, furca 0.9 mm. long, and aedeagus 2.6 to 2.7 mm. in length *incana*
- 7(5). Furca with band of spines on left side .. 8
- Furca with band of spines in middle ... 9
- 8(7). Gnathos with median area having six to 15



FIGS. 2, 3. Male genitalia of *Somatolophia haydenata* (Packard), Tolland, Colorado, July 15-16, 1927 (AMNH). Figure 3 is 2× figure 2.

- | | |
|--|--------------------|
| spinelike processes on anterior margin;
uncus 0.7 to 0.8 mm. in length | |
| | <i>desolata</i> |
| Gnathos with median area having 12 to 15
spinelike processes from anteroventral
surface; uncus 0.8 to 0.9 mm. in length
..... | <i>montana</i> |
| 9(7). Uncus 0.7 to 0.9 mm. in length; aedeagus
2.1 to 2.4 mm. long | <i>monotonaria</i> |
| Uncus 0.9 to 1.4 mm. in length; aedeagus
2.2 to 3.0 mm. long | 10 |
| 10(9). Furca with dense band of posteriorly di-
rected spining extending length of struc-
ture, spines not extending beyond apex | |
| of furca, with band centered in broad
median column; gnathos with four or five
spines medially | <i>sinaloa</i> |
| Furca with slender band of posteriorly di-
rected spining on posterior three-fourths
to one-half length of structure, spines
extending short distance beyond apex of
furca, with this band centered in narrow-
er median column; gnathos with from
three to 38 spines medially | <i>pallescens</i> |
| 11(3). Furca with longitudinal band of spines ... | <i>vatia</i> |
| | <i>petila</i> |
| Furca without spines | |



FIGS. 4–15. Furcae of *Somatolophia*. 4. *S. desolata*, new species, holotype. 5. *S. montana*, new species, holotype. 6. *S. ectrapelaria* (Grossbeck). 7. *S. monotonia* (Dyar), holotype. 8. *S. sinaloa*, new species, holotype. 9. *S. pallescens* McDunnough. 10. *S. haydenata* (Packard). 11. *S. incana*, new species, holotype. 12. *S. vatia*, new species, holotype. 13. *S. petila*, new species, paratype. 14. *S. simplicia* (Barnes and McDunnough). 15. *S. cuyama* Comstock, holotype. All drawn to the same scale.

GROUP I

The male genitalia can be recognized by the furca being from 0.4 to 1.4 mm. long, and by the gnathos lacking a swollen median process but having from 1 to 32 short to moderately long spines medially. The female genitalia have short, simple, membranous papillae anales, and short slender apophyses; the posterior apophyses range in length from 0.7 to 2.5 mm., and the anterior ones from 0.05 to 1.30 mm.; the signum has an enlarged right margin with a raised dentate lip.

Nearly all the females examined have the papillae anales withdrawn into the end of the abdomen, so it is usually impossible to examine the ovipositor lobes for the presence or absence of the sclerotized dorsal keel-like strip; the latter is always absent in this group.

***Somatolophia desolata*, new species**

Figures 4, 16, 17, 32

DIAGNOSIS: This species is very similar in color and maculation to *simplicia* (Barnes and McDunnough), a member of Group II; see the diagnoses of the two groups for their respective characters. The present species can be separated from the other members of Group I by its small size, by the male genitalia having a straight, broad furca extending to the right and having its band of spines on the left side, and by having only six to 15 spines arising from the anterior margin of the gnathos; in the female genitalia, by the elongate apophyses posteriores (2.2 mm. in average length) and apophyses anteriores (1.2 mm. in average length).

MALE: Head with vertex grayish white; front concolorous with or slightly darker than vertex; palpi grayish white to pale gray, tending to become slightly darker distally; antennae with from 45 to 50 segments, terminal seven simple, longest pectinations 1.8 mm. long. Thorax above unicolorous pale grayish brown, with patagia slightly grayer in some specimens; below grayish white; legs pale grayish brown, some specimens with indefinite brownish scaling. Abdomen above unicolorous pale grayish brown, below slightly paler.

Upper Surface of Wings: Forewings grayish white, with variable amounts of brown and gray scaling, and with scattered brownish black scales; maculation weakly represented or obsolescent, with cross lines, when present, dark gray; t. a. line arising on costa one-third distance from base, curved or angled outward into cell to vein Cu, then turning posteriorly and fading out; discal spot black, small; t. p. line represented as costal spot three-fourths distance from base; subterminal area grayer than basal portion of wing, with irregular outer edge; s. t. line absent; terminal area concolorous with basal portion of wing; fringe concolorous with wing. Hind wings concolorous with forewings, becoming darker distally; without cross lines; discal spot absent or very weakly indicated; subterminal area darkened as on forewings, with paler terminal area; fringe concolorous with wing.

Under Surface of Wings: All wings pale grayish white, heavily and variably covered with dark gray scaling; without cross lines except for dark costal spot representing t. p. line; discal spots grayish black, small, present on all wings; subterminal area broadly dark gray; terminal area and fringe as on upper surface.

Length of Forewing: 15 to 18 mm.; holotype, 17 mm.

FEMALE: Similar to male but with both upper and lower surfaces of wings tending to be slightly grayer.

Length of Forewing: 15 to 18 mm.; allotype, 16 mm.

MALE GENITALIA: Uncus 0.7 to 0.8 mm. in length, slender apex laterally compressed, tapering to small spinelike point; gnathos with median portion having from six to 15 short to moderately long spines arising from anterior margin; anellus with rounded anterior margin; manica minutely rugose anteromedially, remainder smooth; furca with anterior portion longer than wide, medially produced into point or slender ridge dorsally; posterior portion of furca extending to right side, straight, 0.4 to 0.6 mm. long from anterior margin of anellus, 0.15 mm. wide medially, with dense transverse spining on left side in broad band extending length of furca,

spines in central section about equal in length to width of unspined portion; aedeagus 2.2 to 2.4 mm. in length, 0.25 to 0.30 mm. in maximum width; vesica, when exerted, extending posteriorly and slightly to right, with swelling on left side at end of aedeagus, with row of eight to 12 slender spines.

FEMALE GENITALIA: Sterigma with lamella postvaginalis having anterolateral areas lightly sclerotized and weakly rugose, lamella antevaginalis membranous, without transverse ridges; ostium bursae membranous, approximately twice length of ductus bursae; ductus bursae sclerotized, 0.3 mm. in length, with parallel sides; corpus bursae with narrow posterior portion, partially and weakly sclerotized, with a few widely spaced longitudinal striations on dorsal surface, anterior portion swollen, with weakly sclerotized diagonal strip dorsally at enlargement; signum variable, slightly to strongly asymmetrical, right margin stellate, median area smooth to minutely denticulate. Apophyses posteriores 1.8 to 2.4 mm. in length, with average length 2.2 mm.; apophyses anteriores 1.2 to 1.3 mm. long, with average length 1.23 mm.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPES: Holotype, male, Palm Springs, Riverside County, California, April 27, 1957 (A. H. Rindge); allotype, female, same data but May 13, 1954; both specimens from the author's collection. The holotype has its genitalia mounted on slide FHR 18691A, with the right antenna and left legs on slide 18691B; the allotype has its genitalia mounted on slide FHR 18728A, with the left antenna and right legs on slide 18728B. Paratypes, all from California: *Riverside County*: same data and collector as the holotype, May 20, 1950, April 14, 1953, April 29, 1960, May 1, 6, 7, 1960, five males, three females (AMNH); Palm Springs, April 20, 1939 (J. C. von Bloeker), one male (LAM); Palm Desert, elevation 1000 ft., May 27, 1973 (R. H. Leuschner), four males, one female (RL); Split Rock Tank, Mojave Desert, May 31, 1938 (G. H. and J. L. Sperry), one female (AMNH); Pinyon Crest, elevation 4200 ft.,

4400 ft., May 31, 1970, May 27, 1972, May 26, 1973 (R. H. Leuschner), three males, one female (RL). *San Diego County*: Borrego, May 1946, July 1946 (N. Crickmer), four males, one female (AMNH); Borrego, May 15, 1948 (G. H. and J. L. Sperry), one male (AMNH); Tub Canyon, Borrego, July 1948 (N. Crickmer), one male, one female (AMNH); Mason Valley, May 20, 1939 (L. M. Martin), two males, four females (LAM, RL).

The holotype and allotype (figs. 16, 17) are in the collection of the American Museum of Natural History; paratypes are in the collections of that institution, of the Natural History Museum of Los Angeles County, and of R. H. Leuschner.

DISTRIBUTION: The western edge of the Lower Colorado Valley section of the Sonoran Desert in southern California where it meets the mountain ranges at its western edge. One specimen is known from Santa Tomas, Baja California; it is excluded from the type series. (See map 2.)

FLIGHT PERIOD: April, May, and July.

REMARKS: Thirty-four specimens (21 males, 13 females) and seven genitalic dissections (five males, two females) have been studied.

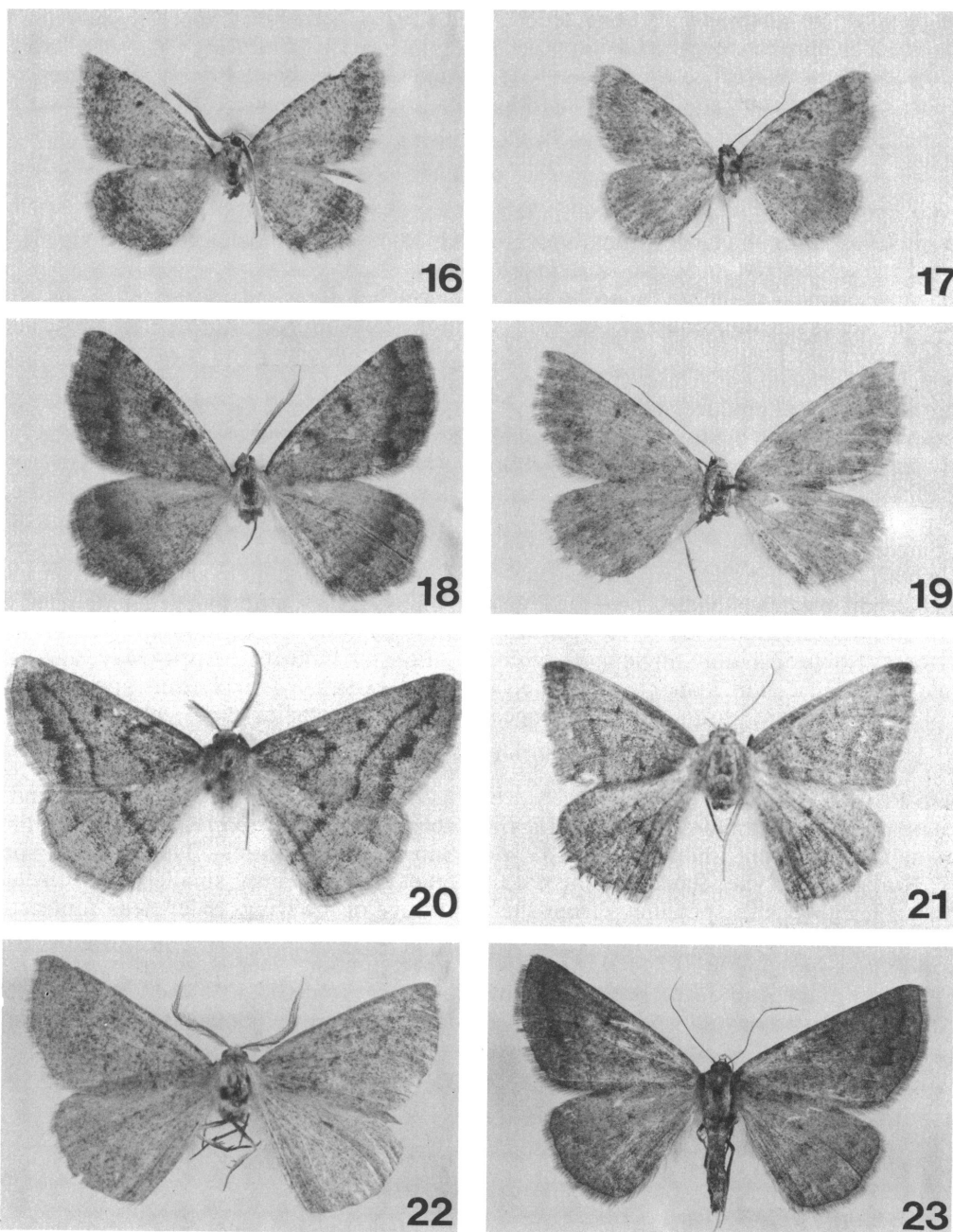
This species occurs sympatrically and synchronically with *simplicia* in Riverside and San Diego counties. The present species tends to be slightly smaller, with the upper surface of the wings paler, less contrastingly colored, and with weaker maculation than corresponding specimens of *simplicia*. The best way to distinguish the two species is by means of the genitalia, as the furca and papillae anales can be used to place the specimens into the correct groups and species.

ETYMOLOGY: The specific name is from the Latin *desolatus*, forsaken or desolate, in reference to the arid habitat of this species.

***Somatolophia montana*, new species**

Figures 5, 18, 19, 33

DIAGNOSIS: This species is very similar to *desolata*; it may be distinguished from the latter by its larger size, by the male genitalia having from 12 to 15 spinelike processes on



FIGS. 16-23. Adults of *Somatolophia*. 16, 17. *S. desolata*, new species. 16. Holotype, male, Palm Springs, California, April 27, 1957 (A. H. Rindge; AMNH). 17. Allotype, female, Palm Springs, California, May 13, 1954 (A. H. Rindge; AMNH). 18, 19. *S. montana*, new species. 18. Holotype, male, Upper Santa Ana River, California, August 18, 1946 (G. H. and J. L. Sperry; AMNH). 19. Allotype, female, Upper Santa Ana River, California, September 15, 1948 (G. H. and J. L. Sperry; AMNH). 20-

the anteroventral surface of the median area of the gnathos, and by the uncus being 0.8 to 0.9 mm. long, and, in the female genitalia, by the signum having a weakly dentate raised rim all around the structure.

MALE: Head with vertex pale gray; front slightly darker than vertex; palpi grayish white, becoming slightly darker distally; antennae with from 46 to 48 segments, terminal 10 or 11 simple, longest pectinations 1.7 mm. in length. Thorax above unicolorous grayish brown, with patagia gray; below grayish white; legs pale grayish brown, tending to be gray on outer surfaces. Abdomen above pale grayish white, with the posterior ends of segments narrowly paler; below slightly paler than above.

Upper Surface of Wings: Forewings grayish white, heavily scaled with brown and gray, and with scattered brownish black scales; maculation weakly represented or obsolescent, similar to that of *desolata* but tending to be slightly more strongly represented; t. a. line tending to reach inner margin one-third distance from base; median shade line represented by diffuse spot on costa near discal spot; t. p. line angled outward from costa, extending halfway to outer margin, then sharply angled posteriorly, tending to be obsolescent in middle of wing, meeting inner margin two-thirds distance from base; subterminal and terminal areas, and fringe, similar to those of *desolata*. Hind wings concolorous with forewings, similar to those of *desolata*.

Under Surface of Wings: Similar to those of *desolata* but grayer.

Length of Forewing: 20 to 22 mm.; holotype, 21 mm.

FEMALE: Similar to male.

Length of Forewing: 20 mm. (allotype and paratype).

MALE GENITALIA: Similar to those of *desolata*, differing mainly as follows: uncus

longer, 0.8 to 0.9 mm. in length, posteroventral surface flatter; gnathos with more spines from wider area, having from 12 to 15 spine-like processes from anteroventral surface, more variable in length, from very short to moderately long; furca with posterior portion tending to be slightly wider, spines slightly longer, with anterior and median ones tending to be pointed to left, posterior ones curving distally; aedeagus 2.1 to 2.3 mm. in length; vesica, when exerted, extending directly posteriorly, with row of 11 to 18 slender spines.

FEMALE GENITALIA: Similar to those of *desolata*, differing mainly as follows: ductus bursae with slightly broader sclerotized diagonal strip dorsally between anterior and posterior portion, ventral surface with rugose posterolateral lobe on right side and smooth anterolateral lobe on left side; signum encircled by raised, weakly stellate rim. Apophyses posteriores 2.0 to 2.4 mm. in length, with average length 2.2 mm.; apophyses anteriores 1.1 to 1.2 mm. in length, with average length 1.15 mm.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPES: Holotype, male, Upper Santa Ana River, San Bernardino County, California, August 18, 1946 (G. H. and J. L. Sperry); allotype, female, same data but September 15, 1948; both specimens are from the Sperry collection. The holotype has its genitalia mounted on slide FHR 18483A, with the left antenna and left legs on slide 18483B; the allotype has its genitalia mounted on slide FHR 18586A, with the right antenna and right legs on slide 18586B. Paratypes: same data and collectors as the holotype, July 21, 22, 23, 1946, August 19, 22, 1946, September 5, 10, 11, 1946, July 18, 20, 1947, August 17, 1947, September 12, 15, 1948, 17 males, one female.

The holotype and allotype (figs. 18, 19) are

←

23. *S. ectrapalaria* (Grossbeck). 20. Lectotype, male, Stockton, Utah, August 18, 1907 (T. Spalding; AMNH). 21. "Female type," Stockton, Utah, August 26, 1902 (T. Spalding; AMNH). 22. Male, Glenwood Springs, Colorado, July 24–30 (AMNH). 23. Female, 7 miles E Jacob Lake, Arizona, July 23, 1965 (F., P., and M. Rindge; AMNH). All $\times 1.37$.

in the collection of the American Museum of Natural History; paratypes are in the collections of that institution and of the Natural History Museum of Los Angeles County.

DISTRIBUTION: This species is known only from the type locality in the San Bernardino Mountains of southern California (see map 2).

FLIGHT PERIOD: July, August, and September.

REMARKS: Twenty specimens (18 males, two females) and five genitalic dissections (three males, two females) have been studied.

Some variation is present in the coloring and amount of maculation on the upper surface of the wings. This may be due, in part at least, to the age of the individual specimen, as freshly emerged ones presumably would tend to be darker and more contrastingly marked, with older moths tending to become faded.

ETYMOLOGY: The specific name is from the Latin *montanus*, belonging to or dwelling on mountains, in reference to the habitat of this species.

Somatolophia ectrapelaria (Grossbeck)

Figures 6, 20–23, 34

Gonodontis ectrapelaria Grossbeck, 1908, p. 31.
Barnes and McDunnough, 1912, p. 35, pl. 16, fig. 4 (cotype female); 1917, p. 121. Rindge, 1955, p. 141.

Somatolophia ectrapelaria: McDunnough, 1938, p. 171.

DIAGNOSIS: This large brown species has on the upper surface of the forewings a broadly incurved t. a. line and a more or less straight t. p. line. It is easily recognized by the genitalia: in the male by the row of seven to 15 thick spines in the vesica, with the latter extending ventrally when exerted; in the female by the large, convoluted, heavily sclerotized lip of the ostium bursae.

MALE: Head with vertex covered with a mixture of broad, narrow, and threadlike scales, pale gray, grayish brown or dark gray, with scales tending to be paler apically; front unicolorous grayish brown to dark gray; palpi concolorous with or slightly paler

than front; antennae with from 51 to 56 segments, terminal six simple, longest pectinations 2.0 mm. in length. Thorax above pale gray to grayish brown, scales of collar and patagia mostly long and very slender; below grayish white or pale gray; legs grayish white, with variable amount of grayish brown scaling. Abdomen above with mixture of pale gray, dark gray, and grayish brown scales, below slightly more unicolorous and faintly darker.

Upper Surface of Wings: Forewings grayish white, with variable amount of gray, grayish brown, and brownish black scaling distributed evenly over wing, producing wings ranging from pale brown to grayish black; maculation varying from prominent to weakly represented or obsolescent, with cross lines, when present, dark gray or brownish black; t. a. line obsolescent on costa, crossing cell parallel with inner margin, angled or sharply curved on vein Cu, extending more or less straight to meet inner margin one-third distance from base; discal spot small, black; median cross line absent; t. p. line arising on costa about 5 mm. from apex, faint, curved outward, then angled inwardly, slightly concave crossing wing, meeting inner margin two-thirds distance from base; subterminal area darkened distally, with irregular margin; terminal area paler than basal portion of wing; fringe concolorous with terminal area. Hind wings slightly paler than forewings; median line present, straight, incorporating small dark discal spot; subterminal area tending to be narrowly darkened, and with terminal area and fringe similar to those of forewings.

Under Surface of Wings: All wings pale grayish brown, with variable and even amount of gray or grayish brown scaling; maculation absent except for small discal dots and darkened subterminal band on all wings.

Length of Forewing: 20 to 24 mm.

FEMALE: Similar to male; some specimens tending to have slightly more dark scaling above and below, with maculation reduced.

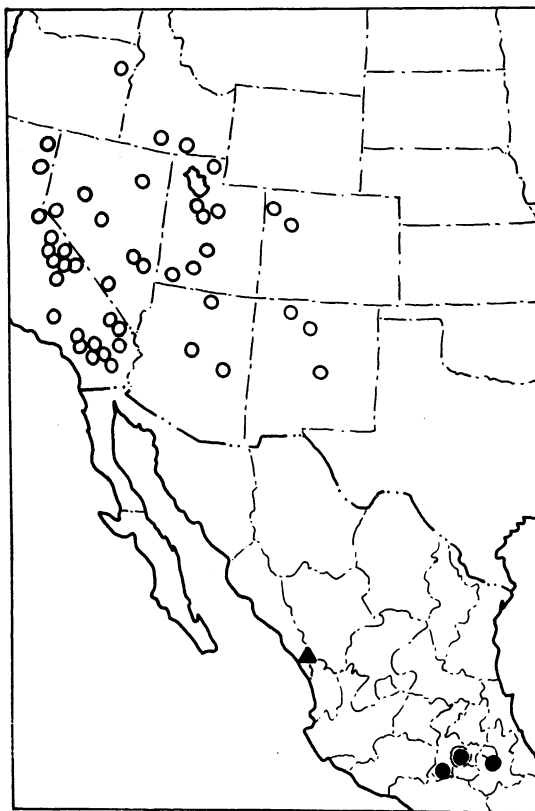
Length of Forewing: 20 to 24 mm.

MALE GENITALIA: Uncus 1.1 to 1.3 mm.

long, apical portion either equal in width to shaft or slightly wider, apex flattened ventrally and with very short, slender, transverse sclerotized ridge; gnathos with median portion having from five to 12 short to moderately long spines arising from anterior margin; anellus with bilobed anterior margin, asymmetrical, left side larger than right; manica with wide area minutely spinose or rugose anteriorly, tapering posteriorly; furca with broad anterior portion, medially produced into slender longitudinal ridge dorsally; posterior portion of furca extending to right side, straight, 0.45 to 0.60 mm. in length from anterior margin of anellus, 0.20 to 0.25 mm. in width medially, with dense posteriorly directed spining in broad band on mediodorsal surface, extending from base to 0.15 to 0.20 mm. beyond end of furca, apical spines subequal in length to width of furca; aedeagus 2.5 to 3.0 mm. in length, 0.3 to 0.4 mm. in maximum width; vesica, when exerted, extending ventrally, with row of from seven to 20 thick spines, with longest being slightly shorter than or equal to, width of aedeagus.

FEMALE GENITALIA: Sterigma with lamella postvaginalis having anterolateral areas lightly sclerotized and weakly rugose, lamella antevaginalis membranous, varying from smooth to having variable number of low transverse ridges; ostium bursae with ventral lip heavily sclerotized, variably convoluted, 0.6 to 0.9 mm. in width, and with very short membranous connection to ductus bursae; ductus bursae 0.4 to 0.7 mm. in length, sclerotized, slightly tapered anteriorly, tending to have median point posteroventrally; corpus bursae elongate, posterior portion slightly narrowed, weakly sclerotized and with longitudinal striations, anterior portion with bluntly pointed end; signum asymmetrical, with right margin variably dentate, median area minutely to moderately denticulate. Apophyses posteriores 1.1 to 1.5 mm. in length, with average length 1.3 mm.; apophyses anteriores with anterior projecting portion 0.2 to 0.4 mm. long, with average length 0.3 mm.

EARLY STAGES: Undescribed; C. Henne reared this species from eggs of a female tak-



MAP. 1. Distribution of *Somatolophia ectrapelaria* (Grossbeck; open circles), *S. monotonaria* (Dyar; solid circles), and *S. sinaloa*, new species (triangle).

en in the Granite Mountains, central San Bernardino Co., California (in LAM).

FOOD PLANT: *Chrysothamnus teretifolius* (Durand and Hilgard; Compositae).

TYPES: Grossbeck described *ectrapelaria* from a male type, a female type, and an unspecified number of cotypes. The first two specimens and four male cotypes are in the American Museum of Natural History; one male and one female cotypes are in the National Museum of Natural History. I hereby select Grossbeck's "♂ Type" as the lectotype, and have so labeled it; its genitalia are mounted on slide FHR 18509. The genitalia of Grossbeck's "♀ Type" are on slide FHR 18592. The lectotype (see fig. 20) is in excel-

lent condition, with part of the left antenna missing; this specimen is contrastingly marked with prominent maculation.

TYPE LOCALITY: Stockton, Tooele County, Utah.

DISTRIBUTION: The Great Basin of the western United States (see map 1). The species occurs from southern Idaho south to central Arizona and New Mexico, and from northwestern Colorado to eastern Oregon and California. In the last state it is found on the Mojave Desert and in the adjacent mountains to the west. Most specimens (as far as can be told from their locality labels) have been taken in various mountain ranges or higher hills in the Great Basin, at elevations ranging from 4000 to 8200 ft.

TIME OF FLIGHT: May through October, with one March record. The majority of specimens have been captured in June and July.

REMARKS: Two hundred twenty-one specimens (116 males, 105 females) and 40 genitalic dissections (24 males, 16 females) have been studied.

The upper surface of the wings is variable in color and in the degree of maculation. The former is due in part to age, as old specimens tend to become brownish; freshly caught moths are blacker. Specimens from arid areas tend to have pale wings with obsolescent maculation; extreme examples are found mainly in northwestern Colorado, parts of Utah, Arizona, Nevada, and eastern California. Moths from moister areas have darker wings and prominent maculation; specimens of this type are from parts of Utah (including the lectotype), New Mexico, and the mountains of California. Good series of specimens are before me from the higher elevations of Tulare and San Bernardino counties, California; considered by themselves, they form an easily recognizable population, as they are large, dark, and usually have relatively distinct maculation. When compared with specimens from elsewhere in the range of *ectrapelaria*, they can easily be matched; the lectotype of this species agrees very well with some specimens from the California mountains. It is not practical to apply sub-specific names to this species, as the various

distinctive populations can all be connected by intergrades.

Somatolophia monotonaria (Dyar),
new combination
Figures 7, 24-26

Selidosena monotonaria Dyar, 1920, p. 33.

DIAGNOSIS: This Mexican species can be recognized by the crenulate t. p. and extra-discal lines of the upper surface of the wings, and by the longer furca (0.60 to 0.65 mm.) with median spining; see Key for additional characters.

MALE: Head with vertex pale grayish brown, with scales tending to be pale gray distally; front pale grayish brown to brown; palpi slightly darker than front; antennae with 55 segments, terminal 12 simple, longest pectinations 1.5 mm. in length. Thorax above pale grayish brown to grayish brown, scales of patagia mostly long and very slender; below grayish white to grayish brown; legs grayish white, tending to be brown on outer surfaces. (Abdomens removed for dissection.)

Upper Surface of Wings: Forewings pale gray, evenly and thickly covered with dark gray and brown scales, producing wings ranging in color from grayish brown to dark brown; maculation weakly represented or obsolescent, with cross lines, when present, dark brown; t. a. line arising on costa about one-fourth distance from base, swinging outwardly into cell, turning posteriorly, going to inner margin with irregular, wavy course; discal spot small, black; faint indication of median line as dark spot in some specimens; t. p. line arising on costa two-thirds distance from base, broadly convex between veins, more or less paralleling outer margin, meeting inner margin two-thirds distance from base; subterminal area varying from unmarked to faintly darkened, having irregular outer margin; terminal area and fringe concolorous with wing. Hind wings concolorous with forewings; discal spot black, small; median line absent; extra discal line similar to t. p. line; outer portion of wing similar to that of forewing.

Under Surface of Wings: All wings pale grayish white, with variable and even amount of gray or grayish brown scaling; discal spots black, present on all wings; maculation absent or with t. p. and extra discal lines represented; subterminal area very slightly darkened.

Length of Forewing: 18 to 20 mm.

FEMALE: Unknown.

MALE GENITALIA: Uncus 0.7 to 0.9 mm. in length, shaft and apical portion of equal width, apex bluntly pointed; gnathos with from 10 to 18 short to moderately long spines arising from width of median portion; anellus with bilobed anterior margin, asymmetrical, left side larger than right; manica sparsely and minutely spinose anteromedially, becoming weakly rugose medially; furca with anterior portion longer than wide, medially produced into wedge-shaped evagination dorsally, extruding anterolaterally to posteromedially; posterior portion of furca extending slightly to either side of center, straight, 0.60 to 0.65 mm. in length from anterior margin of anellus, 0.2 to 0.3 mm. in width medially, with dense band of posteriorly directed spining medially on dorsal surface, narrow anteriorly, becoming wider posteriorly but being narrower than furca; longest spines shorter than width of furca; aedeagus 2.1 to 2.4 mm. in length, 0.25 mm. in width; vesica, when exerted, extending posterodorsally, with narrow band of slender spines, approximately 12 to 18 in number, with longest spines about half width of aedeagus.

FEMALE GENITALIA: Unknown.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPE: Dyar described *monotonaria* from a single male specimen; it is USNM 22758. Its genitalia are mounted on slide HWC 416. The upper surface of the wings is somewhat rubbed, but otherwise the type is in good condition (see fig. 24).

TYPE LOCALITY: Mexico City, Mexico.

DISTRIBUTION: The highlands of central Mexico, having been taken in the Distrito Federal and the states of México and Puebla, at elevations of from about 7000 to 8000 feet (see map 1).

FLIGHT PERIOD: April, June, and October.

REMARKS: Three specimens (all males) and three genitalic dissections have been studied.

The color and maculation of the three specimens would seem to indicate that *monotonaria* is a variable species. The holotype (April 1919; in USNM) has a uniformly dark brown upper surface of the wings, and the maculation is obsolescent. The specimen from Puebla, Puebla, October 1920 (in AMNH) is much paler, unicolorous, and has a trace of the cross lines. The moth from Zacualpan, México, June 1913 (in USNM) is dark, with distinct maculation, and with a faintly contrasting median area. All were caught within a few years of one another, so it is assumed that any color change (fading) due to their age is about equal for all specimens. This degree of variation is present within some of the other species in the genus, such as *ectrapelaria* and *pallescens*. Similarly, the degree of variation within the male genitalia falls well within what is found in other species.

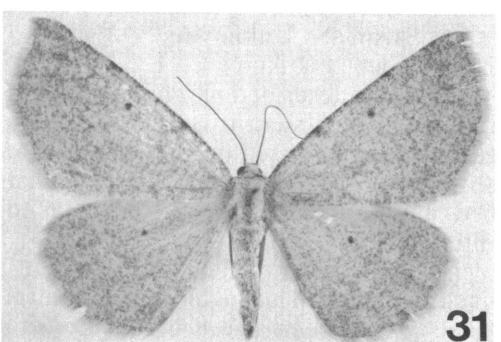
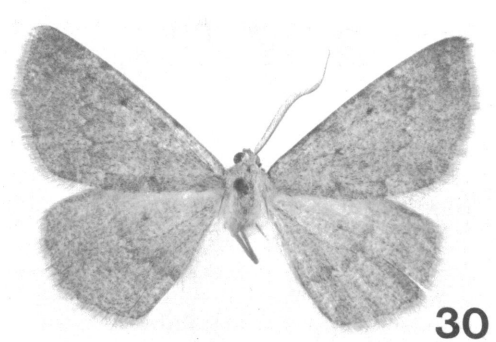
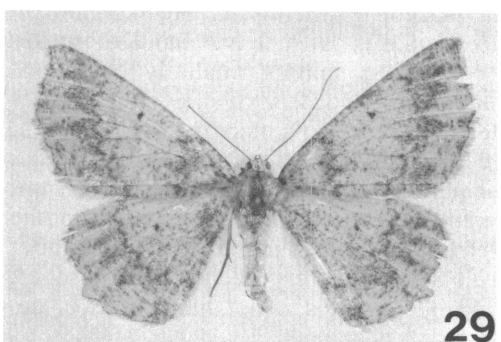
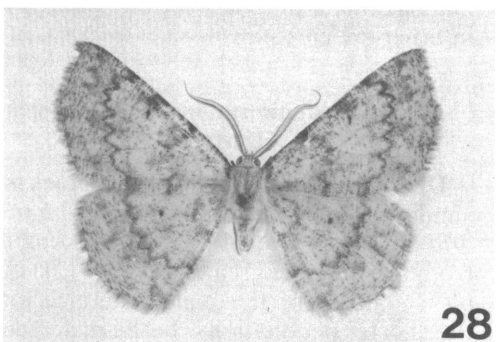
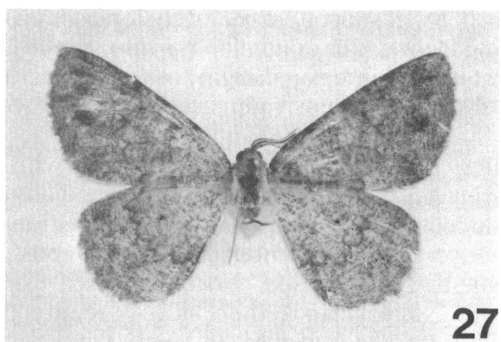
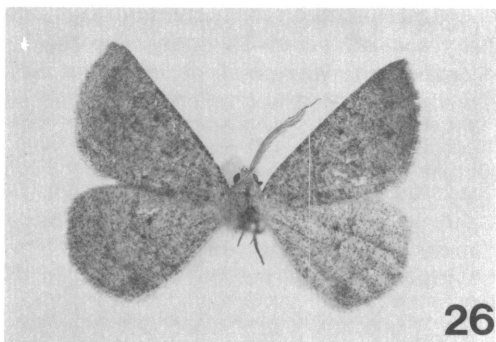
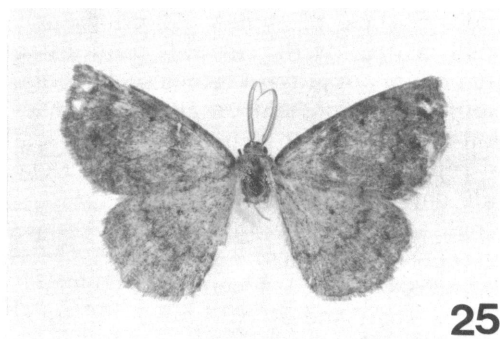
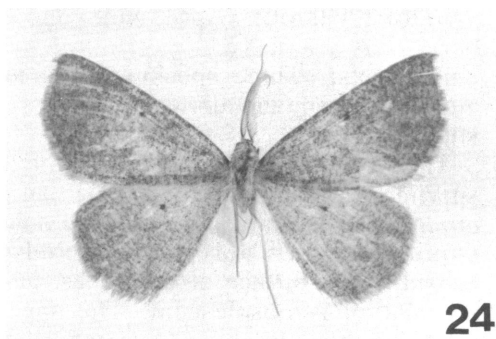
Somatolophia sinaloa, new species

Figures 8, 27

DIAGNOSIS: This Mexican species is very similar in color and maculation to *monotonaria* and *pallescens*, but can be distinguished from them by the greater number (21) of simple segments of the male antennae and by the shorter pectinations. In the male genitalia the present species can be separated from those of *monotonaria* and *pallescens* by the longer uncus, fewer spinelike processes on the median area of the gnathos, by the longer furca, and by the larger aedeagus; see Key for details.

MALE: Head and thorax similar to those of *monotonaria* but slightly grayer; antennae with 55 segments, terminal 21 simple, longest pectinations 1.4 mm. in length; patagia with fewer long and very slender scales. (Abdomen removed for dissection.)

Upper Surface of Wings: Forewings similar to those of *monotonaria*, differing mainly as follows: basal and distal areas more gray-



ish, median area reddish brown; median area narrower; t. p. line arising just distad of middle of costa, crenulate, basal indentations tending to be filled with white scales, meeting inner margin nearer middle of wing; broader subterminal area with dark blotches in upper part of wing midway between t. p. line and outer margin. Hind wings similar to forewings, with reddish brown median area; maculation similar to that of *monotonaria*.

Under Surface of Wings: All wings pale grayish white, with variable amount of dark gray scaling, being more concentrated on forewings than on hind wings; without maculation except for small discal spots, black on forewings, dark gray and rather poorly defined on hind wings.

Length of Forewing: 20 mm. (holotype).

FEMALE: Unknown.

MALE GENITALIA: Uncus 1.1 mm. in length, shaft and apical portion of equal width, apex flattened ventrally and with narrow, transverse, sclerotized ridge; gnathos with four or five short to moderately long spines arising from width of median portion; anellus with weakly bilobed anterior margin, left side slightly larger than right; manica shortly spinose anteromedially, spines becoming shorter and more widely spaced laterally and posteriorly; furca with anterior portion asymmetrical, right side slightly longer than left, medially produced into slender longitudinal ridge dorsally; posterior portion of furca extending on right side, weakly curved, median margin almost straight, distal margin convex, 0.85 mm. in length from anterior margin of anellus, 0.25 mm. in width medially, with slender, dense band of pos-

teriorly directed spining medially on dorsal surface, narrow anteriorly, becoming wider posteriorly but tapering apically, individual spines short and not extending beyond apex of furca, this band centered in broader median column with shortly spiculate ventral surface; aedeagus 3.0 mm. in length, 0.45 mm. in width; vesica, when exerted, extending dorsally, with narrow band of slender spines, approximately 24 in number, in length less than half width of aedeagus (most spines have been broken off and hence not available for measurement).

FEMALE GENITALIA: Unknown.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPE: Holotype, male, 2 miles west of El Palmito, elevation 6000 ft., Sinaloa, Mexico, October 12, 1975 (J. Powell, J. Chemsak, T. Eichlin, T. Friedlander). The genitalia of the holotype are mounted on slide FHR 18555A, with the left antenna and right legs on slide 18555B.

The holotype (see fig. 27) is in the collection of the University of California, Berkeley, and will be deposited on indefinite loan at the California Academy of Sciences.

DISTRIBUTION: This species is known only from the type locality on the western slopes of the Sierra Madre Occidental (see map 1).

FLIGHT PERIOD: October.

REMARKS: One specimen and one genitalic dissection have been studied.

In color and maculation, *sinaloa* is basically similar to both *monotonaria* and *pallescens*. Some specimens of *pallescens*, most commonly found in Santa Cruz Coun-

←

FIGS. 24–31. Adults of *Somatolophia*. 24–26. *S. monotonia* (Dyar). 24. Holotype, male, Mexico City, Distrito Federal, April 1919 (R. Muller; USNM). 25. Male, Zacualpan, México, June 1913 (R. Muller; USNM). 26. Male, Puebla, Puebla, October 7, 1920 (C. C. Hoffmann; AMNH). 27. *S. sinaloa*, new species, holotype, male, 8 miles W El Palmito, Sinaloa, October 12, 1975 (Powell et al.; UC). 28–31. *S. pallescens* McDunnough. 28. Holotype, male, Greer Road, Arizona, June 27, 1935 (J. A. Comstock; CNC). 29. Allotype, female, Oracle, Arizona, June 5, 1935 (G. H. and J. L. Sperry; CNC). 30. Beaver, Utah, July 14, 1938 (G. H. and J. L. Sperry; AMNH). 31. Red Canyon, Utah, August 1, 1965 (F., P., and M. Rindge; AMNH). All $\times 1.37$.

ty, Arizona, approach the color and maculation of *sinaloa*; the separation of these is discussed under Remarks for *pallescens*.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

Somatolophia pallescens McDunnough
Figures 9, 28–31, 35

Catascia haydenata ab. *obliterata* Warren, 1904, p. 115. NEW SYNONYMY.

Somatolophia obliterata: Barnes and McDunnough, 1917, p. 118. McDunnough, 1938, p. 171.

Alcis haydenata (misidentification): Dyar, 1903a, p. 226. Wright, 1920, p. 489.

Somatolophia pallescens McDunnough, 1940, p. 97.

DIAGNOSIS: The maculation of this species is similar to that of *monotonaria* but is usually more clearly defined. The present species, occurring in the southwestern United States, is very variable in the color and degree of maculation on the upper surface of the wings; the genitalia should be used to make determinations. For the male structures, see the Key; for the female genitalia, it is impossible at this time to differentiate them from the two preceding Mexican species, as the females of both are unknown. From *ectrapelaria*, the female structures of *pallescens* lack the sclerotized rim of the ostium bursae, the apophyses posteriores average 1.0 mm. in length (1.3 mm. in *ectrapelaria*), and the apophyses anteriores average slightly less than 0.1 mm. in length (0.3 mm. in *ectrapelaria*).

MALE: Head with vertex pale gray to dark grayish brown, with scales tending to be paler distally; front concolorous with or slightly darker than vertex; palpi more or less concolorous with front; antennae with from 48 to 67 segments, terminal eight to 18 simple, longest pectinations 1.4 to 1.8 mm. in length. Thorax above pale gray to grayish brown, many scales of patagia long and very slender; below pale grayish white to gray; legs grayish white, tending to be gray or brown on outer surfaces. Abdomen above and below pale grayish white to grayish brown.

Upper Surface of Wings: Variable in color, ranging from unicolorous grayish white to grayish brown and dark brown, from evenly colored to mottled, from having median area not differentiated to contrastingly paler; pattern similar to that of *monotonaria*, varying from obsolescent to prominent; discal dots black, small, present on all wings in most specimens.

Under Surface of Wings: Unicolorous pale gray to pale grayish brown; maculation absent or obsolescent in most specimens, some with more or less prominent cross lines on forewings, and with nebulous, partially darkened subterminal area; discal dots black, small, present on most specimens.

Length of Forewing: 17 to 25 mm.

FEMALE: Similar to male.

Length of Forewing: 15 to 25 mm.

MALE GENITALIA: Uncus 0.9 to 1.4 mm. in length (average, 1.13 mm.), shaft and apical portion of equal width, latter varying from being convex to shallowly V-shaped ventrally, apex with narrow, sclerotized, rounded or V-shaped ridge; gnathos variable, with from three to 38 very short to moderately long spines arising from width of median portion; anellus with weakly bilobed anterior margin, lobes either of equal size or right one slightly larger; manica minutely spinose anteromedially, becoming smooth or very weakly rugose posteriorly; furca with anterior portion variable in length and outline, medially produced into a slender longitudinal ridge dorsally; posterior portion of furca extending medially or to right side, symmetrical or with distal margin more or less convex, 0.5 to 1.0 mm. in length (average, 0.74 mm.) from anterior margin of anellus, 0.15 to 0.30 mm. in width medially, with dorsal surface V-shaped, having slender, dense band of posteriorly directed spining on posterior three-fourths of surface, narrow anteriorly, becoming wider posteriorly, tapering apically, individual spines short and apical ones often extending short distance beyond apex of furca, this band centered in broader median area with shortly spiculate surface; aedeagus 2.2 to 2.9 mm. in length (average, 2.6 mm.), 0.30 to 0.45 mm. in width; vesica, when exerted, extending pos-

teriorly on right side, with short band of slender spines, variable in number and length, tending to break off and leave only bases, longest spines about three-fourths width of aedeagus.

FEMALE GENITALIA: Sterigma with lamella postvaginalis having anterolateral areas weakly sclerotized and with variable number of transverse ridges, lamella antevaginalis membranous, 0.4 to 0.5 mm. wide, with numerous, complete, lightly sclerotized transverse ridges; ostium bursae membranous, slightly shorter than ductus bursae; ductus bursae 0.3 mm. in length, sclerotized, with sides parallel; corpus bursae with posterior portion thick, lightly sclerotized and with numerous striations, tending to curve dorsally and to left before joining swollen, membranous anterior portion, with swelling tending to extend slightly posteriad on right side of striate area; signum asymmetrical, with right margin variably dentate, median area moderately denticulate. Apophyses posteriores 0.7 to 1.2 mm. in length, with average length 1.0 mm.; apophyses anteriores with anterior projecting portion 0.05 to 0.15 mm. long, with average length 0.10 mm.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPES: The holotype, male, of "obliterata" is in the collection of the British Museum (Natural History); its genitalia are mounted on slide Geometridae 10316. D. S. Fletcher kindly sent me a drawing of the furca, which has enabled me to identify this taxon.

Of *pallescents*, the holotype, male, is CNC 4975; the allotype is in the same collection. The genitalia of the holotype are on McDunnough's slide So3. The holotype (see fig. 28) is in excellent condition; the allotype (see fig. 29) appears to be a bit faded but otherwise is in fine shape.

TYPE LOCALITIES: Of "obliterata," Glenwood Springs, Garfield County, Colorado. Of *pallescents*, Greer Road, White Mountains, Apache County, Arizona.

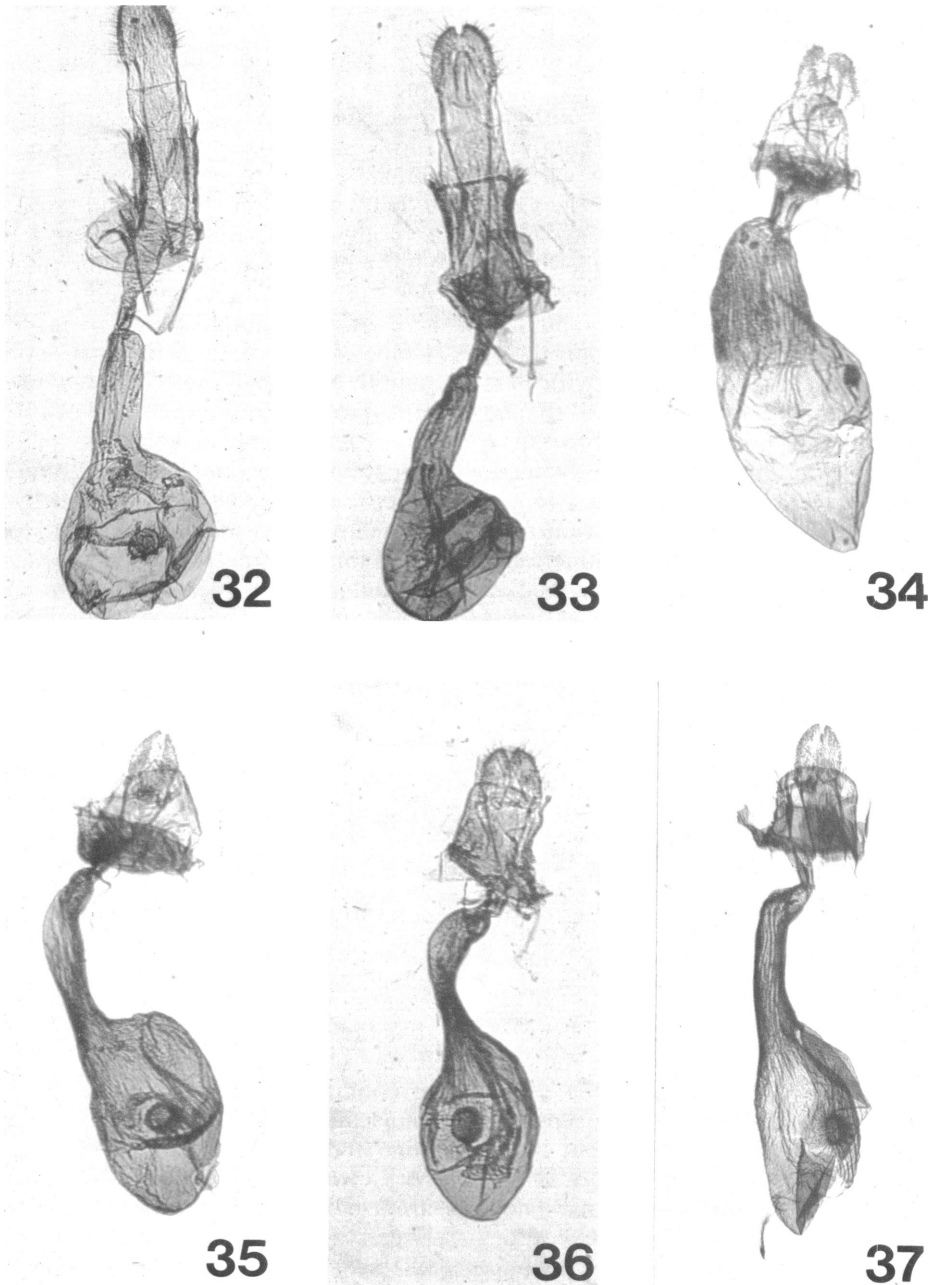
DISTRIBUTION: Western Colorado, Utah, New Mexico, and Arizona (see map 2). All the localities are west of the continental divide except for those in San Miguel and Socorro counties, New Mexico.

FLIGHT PERIOD: From April into October in Arizona; July into October in Colorado, Utah, and New Mexico.

REMARKS: Four hundred thirty-one specimens (283 males, 148 females), 83 genitalic dissections (55 males, 28 females), and 22 slides of antennae and legs (14 males, eight females) have been examined.

Difficulties may be encountered in properly identifying this species due to the variability in the color and maculation of the upper surface of the wings, and in the range of size of the adults. Moths from Colorado, Utah, and northern Arizona (Coconino Co.) tend to be large (length of forewing, 22 to 24 mm.), to have rather pale and evenly colored wings with weak maculation, and are, presumably, univoltine. There is some variation in color from different localities; moths flying in more arid situations tend to be paler than those from moister localities. These specimens have been taken from about 7000 to 8500 feet in elevation. Adults from central and southern Arizona and New Mexico tend to be smaller (length of forewing, 16 to 22 mm.), to have darker and more speckled wings, and are, at least in part, multivoltine. Some of the moths that fly late in the year and in the spring months tend to be paler and to have the median area of both the forewings and hindwings a contrasting pale or medium buff; the type of *pallescents* has this coloration. Specimens taken in the middle of the year seldom have this paler coloration; the median areas are concolorous with the basal and distal areas. It might be possible that these two color forms are the result of temperature acting upon the pupa, with cooler conditions producing paler moths. Specimens taken in the White Mountains of Arizona and in northwestern and northern New Mexico (McKinley and San Miguel counties) are usually intermediate in size and color between the northern and southern populations of the species. To summarize, there is more variability within *pallescents* than there is between most of the different species of *Somatolopia*.

A study of 83 genitalic dissections did not produce any characters that I could consider as being specific in nature, either in shape or



FIGS. 32-37. Female genitalia of *Somatolophia*. 32. *S. desolata*, new species, allotype, Palm Springs, California, May 13, 1954 (A. H. Rindge; AMNH). 33. *S. montana*, new species, allotype, Upper Santa Ana River, California, September 15, 1948 (G. H. and J. L. Sperry; AMNH). 34. *S. ectrapelaria* (Grossbeck), Death Valley National Monument, California, July 26, 1975 (R. M. Brown; AMNH). 35. *S. pallescens* McDunnough, Todd's Lodge, Arizona, September 15, 1941 (G. H. and J.

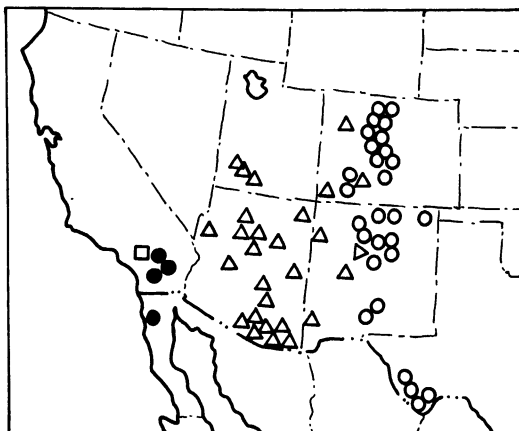
size. The large northern males (14 specimens) had an average uncus length of 1.15 mm., an average furca length of 0.78 mm., and an average aedeagus length of 2.71 mm.; the smaller Arizona and New Mexico specimens (25 specimens) had corresponding average values of 1.16 mm., 0.72 mm., and 2.45 mm., respectively.

With regard to the number of antennal segments, the larger northern specimens (14) averaged, in the male, a total of 60, with the terminal 14 being simple; the corresponding females (seven specimens) had 62 segments. The smaller southern specimens (25) averaged, in the male, 54 and 12, respectively, with 55 segments in the females (nine specimens). The average length of the longest pectinations in the male antennae of both populations was 1.6 mm. There seems to be a direct correlation between the size of the adults and the number of antennal segments in both sexes, with larger specimens having more segments.

A few specimens of *pallascens* from southern Arizona (Santa Cruz County) have maculation and color that are quite similar to those found in *sinaloa*. The latter is as large as the largest Arizona moths in wing length; it has a significantly greater number of simple segments (21) in the male antennae, shorter antennal pectinations (1.4 mm.), a longer furca (0.85 mm.) and a longer aedeagus (3.0 mm.) than are to be found in *pallascens*.

The reference by Dyar (1903a, p. 226) for *haydenata* concerning specimen(s) caught at Williams, Coconino County, Arizona, probably belongs here; one specimen (in LAM), caught in 1931 at that locality, has been studied. Wright (1920, p. 489) used the same specific name for specimens from Pima County, Arizona; these moths (in AMNH) definitely are *pallascens*.

For a discussion of the hair pencil on the hind tibia of the male, see the Introduction. McDunnough (1940, p. 97) did not find any



MAP 2. Distribution of *Somatolophia desolata*, new species (solid circles), *S. montana*, new species (square), *S. pallascens* McDunnough (triangles), and *S. haydenata* (Packard; open circles).

hair pencils when he described this species, although these structures are present.

The oldest name for this species is "obliterata" Warren; as it was named as an aberration it is not available under Article 45(c) of the Code.

Somatolophia haydenata (Packard)

Figures 10, 36, 38–41

Gnophos haydenata Packard, 1876, p. 445, pl. 5, fig. 5 (venation), pl. 11, fig. 27 (female). Anon., 1882, p. 24.

Gnophus [sic] *haydenata*: Gumppeburg, 1893, p. 423.

Gnophos haydenatum [sic]: Smith, 1891, p. 72.

Alcis haydenata: Hulst, 1896, p. 345. Dyar, "1902" [1903], p. 321. Smith, 1903, p. 76.

Somatolophia haydenata: Barnes and McDunnough, 1917, p. 118. McDunnough, 1938, p. 171; 1940, p. 97.

Somatolophia umbripennis Hulst, 1896, p. 350. Dyar, "1902" [1903], p. 322; 1904, p. 225 (placed as synonym of *haydenata*); 1907, p. 205. Grossbeck, 1907, p. 147. Barnes and McDunnough, 1917, p. 118 (as synonym of *hay-*

←
L. Sperry; AMNH). 36. *S. haydenata* (Packard), Basin, Big Bend National Park, Texas, August 25, 1965 (A. and M. E. Blanchard; AMNH). 37. *S. incana*, new species, allotype, Lee Canyon, Nevada, July 27, 1966 (F., P., and M. Rindge; AMNH).

denata). McDunnough, 1938, p. 171; 1940, p. 97. Rindge, 1955, p. 155.

DIAGNOSIS: In color and pattern, this species is extremely similar to *pallescens*. The present species has about 49 to 51 segments in the antennae, and the longest pectinations in the male are from 1.5 to 1.6 mm. in length; the corresponding figures for *pallescens* are 48 to 67 segments, with the pectination length being 1.4 to 1.8 mm. The best way to separate the two species is by using the male genitalia; the furca of *haydenata* is narrow, curved, and has the heaviest spining on the left side of the terminal third, whereas the furca of *pallescens* is broad, straight, and has the spining in the center for two-thirds its length. In the female genitalia, the ductus bursae is narrower in *haydenata* than in *pallescens*, and the present species has fewer transverse ridges across the ventral surface of the ostium bursae than in the latter.

MALE: Head, thorax, and abdomen similar to those of *pallescens*; antennae with from 49 to 51 segments, terminal 12 to 14 simple, longest pectinations 1.5 to 1.6 mm. in length.

Upper Surface of Wings: Variable in color and maculation, similar to *pallescens* but with few pale grayish specimens and with less variability in color than in that species.

Under Surface of Wings: Similar to that of *pallescens*.

Length of Forewing: 16 to 22 mm.

FEMALE: Similar to male, with some specimens slightly paler.

Length of Forewing: 16 to 22 mm.

MALE GENITALIA: Uncus 0.8 to 0.9 mm. in length, shaft and apical portion of equal width, very slender, 0.05 mm. wide, apical part rounded ventrally, apex with narrow, sclerotized, rounded ridge; gnathos with from one to 18 very short to moderately long spines arising from width of median portion; anellus with rounded or bluntly pointed anterior margin; manica minutely spinose anteromedially, becoming smooth posteriorly, lateral portions weakly rugose or smooth; furca with anterior portion asymmetrical, left margin going to anterior point of anellus,

right margin forming base of posterior portion of furca, anterior portion deeply excavated medially, terminating dorsally in slender longitudinal or slightly diagonal ridge; posterior portion of furca curving to right side, 0.70 to 0.85 mm. in length from anterior margin of anellus, 0.10 to 0.15 mm. in width medially, with rounded dorsal surface, having slender, transversely spinose, longitudinal band, spines short and slender but becoming longer, thicker, and posteriorly directed on apical third of furca on left side, spines attaining or slightly extending beyond apex of furca; aedeagus 2.2 to 2.6 mm. in length, 0.3 to 0.4 mm. in width; vesica, when exerted, extending dorsolaterally to right side, most specimens with short band of slender spines, variable in number and length, tending to break off and leave only bases, longest spines about half width of aedeagus.

FEMALE GENITALIA: Sterigma with lamella postvaginalis having anterolateral areas weakly sclerotized and with variable number of sharply raised transverse ridges, lamella antevaginalis membranous, 0.3 to 0.4 mm. wide, with numerous, minute transverse ridges; ostium bursae slightly shorter than ductus bursae, with ventral lip either membranous or weakly sclerotized; ductus bursae 0.25 to 0.30 mm. in length, sclerotized, with lateral margins slightly tapering anteriorly; corpus bursae with posterior portion moderately wide, elongate, lightly sclerotized and with numerous striations, anterior portion membranous, more or less evenly increasing in width, globose; signum asymmetrical, with right margin variably dentate, median area variably denticulate. Apophyses posteriores 0.7 to 1.2 mm. in length, with average length 0.9 mm.; apophyses anteriores with anterior projecting portion 0.05 to 0.15 mm. long, with average length 0.10 mm.

EARLY STAGES: Dyar (1903b, p. 390) described the egg and five larval instars; no adults emerged, nor was the parent female preserved. Due to the confusion of applying specific names (see below, under Remarks) the descriptions and food plants need to be verified.

FOOD PLANT: *Prunus* (Rosaceae), *Polygonum* (Polygonaceae; Dyar, 1903b, p. 392). These may not be the food plants in nature; see preceding paragraph.

TYPES: Packard described *haydenata* from two females from "Colorado Territory, August 3 (Mead); Clear Creek Cañon, Colo., August (Uhler, Hayden's Survey)." A search of the collection of the Museum of Comparative Zoology produced only one of these specimens, namely the former (A. F. Newton, Jr., in letter); it is without locality data except for "8-3," and it bears Packard's holographic type label. This specimen is hereby designated, and has been labeled, as the lectotype; it is MCZ 14601. The genitalia are mounted on slide FHR 18712. The specimen is in fairly good condition, although somewhat rubbed; both antennae are missing (see fig. 39).

Hulst presumably described *umbripennis* from a single specimen, although neither this nor its sex was mentioned in the original description. The holotype, male, is in the collection of the American Museum of Natural History (Rindge, 1955, p. 155). Hulst, in his original description said "tuft on first segment of abdomen black"; this abdomen (or one similar to it) is still on the specimen, although it has been glued on (poorly), and is female (see Grossbeck, 1907, p. 148). McDunnough (1940, p. 97) was incorrect in stating that the type lacked its abdomen. The type is in good condition except for a tear in the left forewing, and for the loss of both antennae (see fig. 38).

TYPE LOCALITIES: For *haydenata*, fortunately we can be more accurate than Colorado Territory. Brown has been able to trace the route traveled by Theodore L. Mead, who accompanied the Denver party of the Wheeler Survey of 1871, as a collector. On August 3, Mead collected in Apex Gulch south of the present mining town of Apex. This locality is in Gilpin County, and is at an altitude of 9200 to 9900 ft. (Brown, 1934, p. 157); this should be accepted as the type locality.

For *umbripennis*, "Colorado."

DISTRIBUTION: Colorado, New Mexico,

and western Texas (see map 2). All the localities are either east of the continental divide or just west of it (Durango and San Miguel counties, Colorado).

FLIGHT PERIOD: From March into October. Specimens have been collected in western Texas from March into May, and again in September and October. In New Mexico and Colorado, most moths were taken from late June into August.

REMARKS: Two hundred thirty-eight specimens (164 males, 74 females) and 61 genitalic dissections (38 males, 23 females) have been studied.

The moths from Colorado and New Mexico, which are presumably univoltine, are larger than the multivoltine ones from Texas; this parallels the north-south situation in *pallenscens*. Unlike the latter species, *haydenata* is relatively uniform in color and maculation. These two species are very similar to each other, and a study of the genitalia is strongly recommended for specific identification; the male structures are much easier to recognize than those of the females.

A number of years ago there was quite a discussion in the literature as to the identities of *haydenata* and *umbripennis*, and whether or not they had a hair pencil on the hind tibia. Dyar (1904, p. 225) was the first to place *umbripennis* as a synonym of Packard's species. Grossbeck (1907, pp. 147-148) challenged that action, and called attention (for the first time) to the presence of the hair pencil on the hind tibia of the male. Dyar (1907, p. 205) then agreed that two species were involved; he did not find any tibial hair pencils. Barnes and McDunnough (1917, p. 118) returned *umbripennis* to the synonymy. McDunnough (1940, p. 97) followed this, and did not find any males with hair pencils. For a discussion of the male hair pencils, see Introduction.

Somatolophia incana, new species

Figures 11, 37, 42, 43

DIAGNOSIS: This species from Nevada can be recognized by the upper surface of the wings being pale gray and having obsolescent maculation. In the male genitalia, the

furca is longer (0.9 mm.) than in either *palescens* or *haydenata*, and in the female structures the posterior portion of the corpus bursae is curved ventrally anterior of the ductus bursae.

MALE: Head with vertex pale grayish brown, with scales tending to be paler distally; front slightly darker than vertex; palpi more or less concolorous with front; antennae with from 50 to 52 segments, terminal nine simple, longest pectinations 1.6 mm. in length. Thorax above pale grayish brown, many scales of patagia long and very slender; below pale grayish white; legs pale grayish brown, tending to be darker on outer surfaces. Abdomen above pale gray, with gray and grayish brown scales, becoming grayer distally; below pale gray.

Upper Surface of Wings: Unicolorous pale grayish white, evenly covered with gray and pale grayish brown scales; maculation obsolescent, grayish brown when present, similar to that of *haydenata* but only weakly crenulate; subterminal area undifferentiated or slightly darkened.

Under Surface of Wings: Slightly paler than upper surface, unicolorous; without maculation or with faint traces of t. p. and extradiscal lines and subterminal area; discal dots either small or absent.

Length of Forewing: 19 to 21 mm.; holotype, 21 mm.

FEMALE: Similar to male, with upper surface of wings tending to be slightly paler.

Length of Forewing: 21 mm. (allotype).

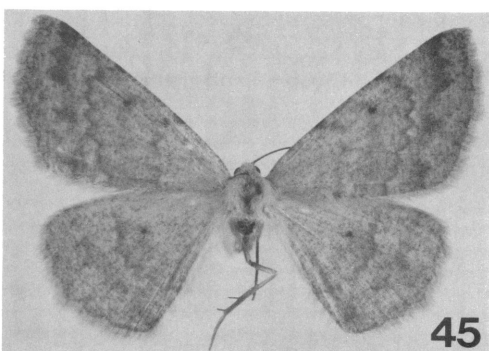
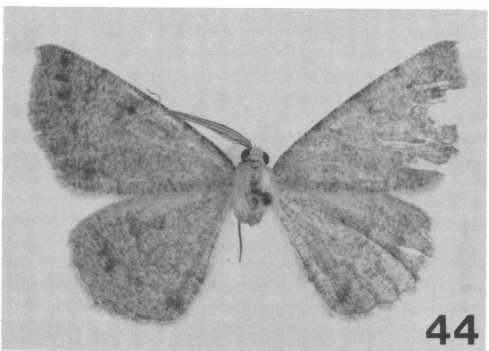
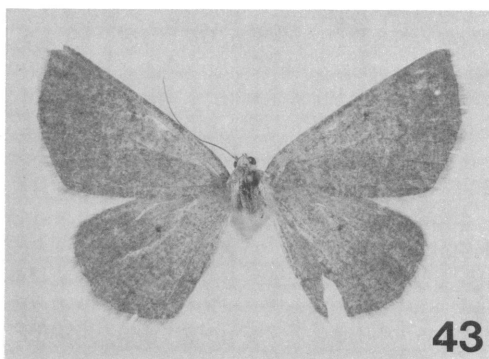
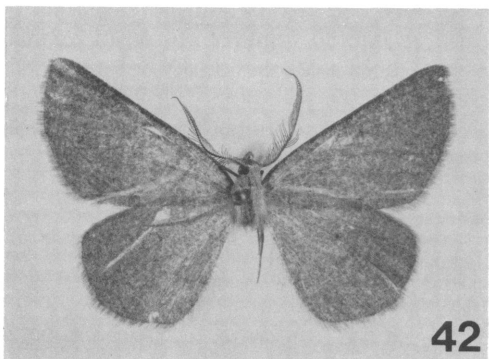
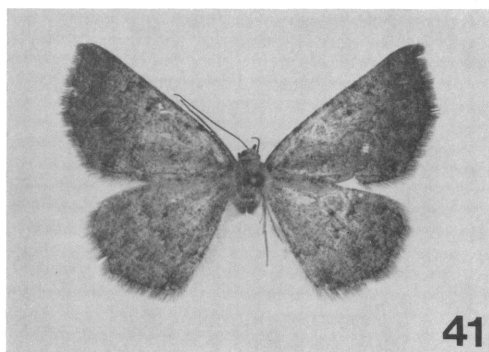
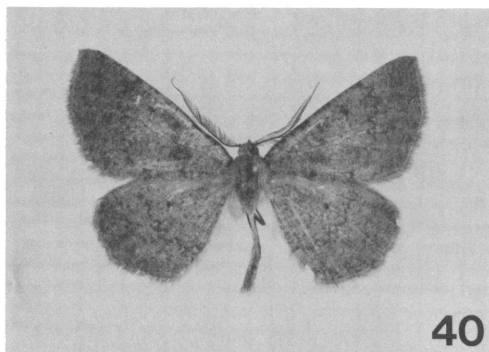
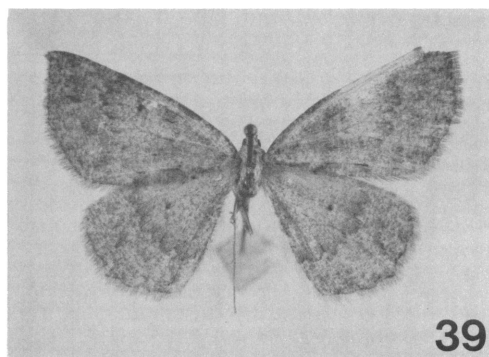
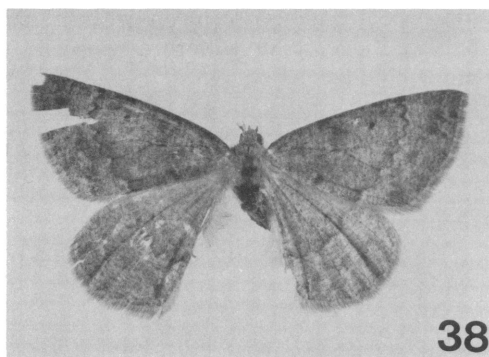
MALE GENITALIA: Uncus 0.95 mm. in length, median portion of shaft and apical portion of equal width, latter tending to be somewhat laterally compressed, ventrally varying from rounded to V-shaped depend-

ing on amount of lateral flattening, apex with narrow sclerotized point; gnathos variable, with from 11 to 25 very short to moderately long spines arising from width of median portion; anellus with bilobed anterior margin, left side larger than right; manica minutely spinose anteromedially, becoming smooth posteriorly, lateral portions weakly rugose or smooth; furca with anterior portion oval or slightly narrowed anteriorly, deeply excavated medially, terminating dorsally in slender ridge; posterior portion of furca on right side, very slightly curved, right margin convex, 0.9 mm. in length from anterior margin of anellus, 0.15 mm. in width medially, with rounded dorsal surface, having broad, transversely spined, longitudinal band narrowing posteriorly, becoming spinose on left side on apical third of furca, these spines longer, thicker, and directed posteriomedially and posteriorly at apex of furca, spines nearly attaining or slightly extending beyond apex of furca; aedeagus 2.6 to 2.7 mm. in length, 0.4 mm. in width; vesica, when exerted, extending dorsolaterally to right side, with short band of slender spines, approximately 24 in number, longest spines about two-thirds width of aedeagus.

FEMALE GENITALIA: Sterigma with lamella postvaginalis having anterolateral areas weakly sclerotized and with several, widely separated transverse ridges, lamella postvaginalis with many, closely spaced, minute transverse ridges; ostium bursae membranous, about equal in length to length of ductus bursae; ductus bursae 0.3 mm. in length, with lateral margins slightly tapering; corpus bursae with posterior portion moderately wide, elongate, curved ventrally near ductus bursae, lightly sclerotized and with

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FIGS. 38–45. Adults of *Somatolophia*. 38–41. *S. haydenata* (Packard). 38. Holotype, male, of *S. umbripennis* Hulst, Colorado (AMNH). 39. Lectotype, female, Apex Gulch, Colorado, August 8, 1871 (T. Mead; MCZ). 40. Male, Green Gulch, Big Bend National Park, Texas, May 3, 1972 (A. and M. E. Blanchard; AMNH). 41. Basin, Big Bend National Park, Texas, October 6, 1967 (A. and M. E. Blanchard; AMNH). 42, 43. *S. incana*, new species. 42. Holotype, male, Lee Canyon, Nevada, July 24, 1966 (F., P., and M. Rindge; AMNH). 43. Allotype, female, Lee Canyon, Nevada, July 27, 1966 (F., P., and M. Rindge; AMNH). 44, 45. *S. vatia*, new species. 44. Holotype, male, North Kaibab, Arizona, June 29, 1974 (R. Wielgus; AMNH). 45. Allotype, female, North Kaibab, Arizona, June 30, 1974 (R. Wielgus; AMNH). All $\times 1.37$.



numerous striations, anterior portion membranous, more or less evenly increasing in width, globose; signum asymmetrical, with right margin variably dentate, median area weakly denticulate. Apophyses posteriores 1.1 mm. in length; apophyses anteriores with anterior projecting portion 0.15 mm. long.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPES: Holotype, male, Lee Canyon, elevation 7400 ft., 39 miles northwest of Las Vegas, Clark County, Nevada, July 24, 1966 (F., P., and M. Rindge); allotype, female, Lee Canyon, elevation 7500 ft., 40 miles northwest of Las Vegas, Clark County, Nevada, July 27, 1966 (F., P., and M. Rindge). The genitalia of the holotype are mounted on slide FHR 16167; the genitalia of the allotype are on slide FHR 18600A, with the right antenna and two legs (both hind legs are missing from the specimen) on slide 18600B. Paratypes: same data as holotype but July 28, 1966, two males; same data as allotype, July 23, 27, 1966, two males.

The holotype, allotype (see figs. 42, 43), and four paratypes are in the collection of the American Museum of Natural History.

DISTRIBUTION: This species is known only from the type locality in the Spring Mountains of southern Nevada (see map 3).

FLIGHT PERIOD: Late July.

REMARKS: Six specimens (five males, one female) and three genitalic dissections (two males, one female) have been studied.

The six specimens are quite uniform in color, but there is some variation in the strength of the maculation. The holotype, allotype, and two paratypes have at most but faint traces of the cross lines; the remaining two paratypes have the outer cross line on the forewings and hind wings more or less clearly defined.

ETYMOLOGY: The specific name is from the Latin *incanus*, quite gray, in reference to the color of the upper surface of the wings.

***Somatolophia vatia*, new species**

Figures 12, 44, 45, 54

DIAGNOSIS: This species, from northern Arizona, can be recognized by the long (2

mm.) pectinations in the male antennae, by its large size (length of forewings, 22 to 24 mm.), and by the pale unicolorous upper surface of the wings. In the male genitalia the furca is longer (1.0 to 1.4 mm.) than in any of the previous species; it differs from the following species by having this structure relatively broad and spinose.

MALE: Head with vertex pale brownish white, with scales tending to be paler distally; front either concolorous with or slightly darker than vertex; palpi more or less concolorous with front; antennae with from 55 to 63 segments, terminal 14 simple, longest pectinations 2.0 mm. in length. Thorax above pale brownish white, many scales of patagia long and very slender; below whitish; legs pale brownish white, tending to be darker on outer surface. Abdomen above pale gray with pale brown scaling; below pale gray.

Upper Surface of Wings: Unicolorous pale grayish white, evenly covered with pale brown and grayish brown scales; maculation with t. a., t. p. and extradiscal lines usually represented, last two more prominent than first, in course similar to those of *pallescens*; discal dots present, dark; subterminal area with variable number of grayish brown cellular maculae, stronger on forewings than on hind wings.

Under Surface of Wings: Slightly paler than upper surface, unicolorous; without maculation or with faint traces of t. p. and extradiscal lines and subterminal area; discal dots either small or absent.

Length of Forewing: 22 to 24 mm.; holotype, 23 mm.

FEMALE: Similar to male.

Length of Forewing: 22 to 24 mm.; allotype, 24 mm.

MALE GENITALIA: Uncus 1.2 to 1.3 mm. in length, median portion of shaft and apical portion of even width, apex with transverse ridge; gnathos with from 11 to 16 very short to moderately long spines arising from width of median portion; anellus with rounded anterior margin; manica finely spinose anteromedially, becoming smooth posteriorly, lateral portions weakly rugose; furca with anterior portion oval, slightly narrowed an-

teriorly, deeply excavated medially, terminating dorsally in keel-like projection; posterior portion of furca on right side evenly curved, 1.1 to 1.4 mm. in length from anterior margin of anellus, 0.10 to 0.15 mm. in width medially, with angulate dorsal surface, having slender (less than half width of furca), transversely spined, longitudinal band extending to left side on apical one-fourth of furca, becoming spinose, these spines longer, thicker, and directed posteromedially, attaining or extending beyond left margin and apex of furca; aedeagus 2.7 to 3.2 mm. in length, 0.4 to 0.5 mm. in width; vesica, when exerted, extending posterolaterally to right side, with short band of slender spines, varying from approximately 12 to 50 in number, longest spines about two-thirds width of aedeagus.

FEMALE GENITALIA: Sterigma with lamella postvaginalis with anterolateral areas lightly to moderately sclerotized and with variable number of transverse ridges, lamella antevaginalis with variable number of transverse ridges; ostium bursae membranous, about equal in length to length of ductus bursae; ductus bursae 0.4 mm. in length, with lateral margins slightly tapering; corpus bursae with posterior portion moderately wide, curved ventrally near ductus bursae, lightly sclerotized and with numerous striations, anterior portion membranous, globose, right side posteriorly swollen and having finely striate surface; signum asymmetrical, with right margin variably dentate, median area thickly denticulate. Apophyses posteriores 0.8 to 1.0 mm. in length; apophyses anteriores with projecting portion 0.05 mm. long.

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPES: Holotype, male, North Kaibab, elevation 8153 ft., North Rim, Grand Canyon National Park, Arizona, June 29, 1974 (R. Wielgus); allotype, female, same data, June 30, 1974. The genitalia of the holotype are mounted on slide FHR 18761A with the right antenna and right legs on slide 18761B; the genitalia of the allotype are on slide FHR 18762A, with the left antenna and left legs on slide 18762B. Paratypes, all from Arizona: same data as allotype, one male (LAM), one

female (AMNH); North Rim, [Grand Canyon National Park], August 1949 (Crickmer), one male (AMNH); North Rim, Grand Canyon [National Park], July 10, 1953 [J. H. Baker], one male, one female (USNM); 7 miles east of Jacob Lake, elevation 6800 ft., Coconino County, July 23, 1965 (F., P., and M. Rindge), one female (AMNH).

The holotype and allotype (see figs. 44, 45) are in the collection of the American Museum of Natural History; paratypes are in the collections of that institution, of the National Museum of Natural History, and of the Natural History Museum of Los Angeles County.

DISTRIBUTION: Northern Arizona, being only known from the North Rim of the Grand Canyon and adjacent Coconino County, at elevations of from about 6800 to 8150 ft. (see map 3).

FLIGHT PERIOD: Late June, July, and August.

REMARKS: Eight specimens (four males, four females) and five genitalic dissections (three males, two females) have been studied.

The species can easily be confused with the large, pale northern form of *pallesens*. Both occur in Coconino County, Arizona; present records indicate that *vatia* is found only to the north of the Grand Canyon, and *pallesens* to the south of the national park. An examination of the male antenna or furca will distinguish the two species (see Diagnosis).

ETYMOLOGY: The specific name is from the Latin *vatius*, bent outward, in regard to the shape of the furca.

***Somatolophia petila*, new species**

Figures 13, 46, 47, 55

DIAGNOSIS: This species from west Texas is smaller and tends to be slightly grayer in color than does *haydenata*. The best way to identify the present species is by the male genitalia, which have a very long (1.2 to 1.4 mm.) and slender furca (0.05 mm. wide), and is without any spines, unlike any other known species.

MALE: Head with vertex pale gray; front

grayish brown; palpi more or less concolorous with front; antennae with about 48 segments, terminal nine simple, longest pectinations 1.8 mm. in length. Thorax above grayish white, many scales of patagia long and very slender; below white; legs pale grayish white, tending to be gray on outer surface. Abdomen above and below pale grayish white.

Upper Surface of Wings: Unicolorous pale gray, heavily and evenly covered with darker gray and grayish brown scales; maculation weakly represented or obsolescent, with t. a. line tending to have right angle bend in cell, discal dot with a few pale scales medially, t. p. line weakly crenulate, tending to be darkened on veins, and slightly darkened. Hind wings with discal dot minute or absent; extra discal line tending to be concave opposite discal dot and near anal margin.

Under Surface of Wings: Slightly paler than upper surface, hind wings paler than forewings; without maculation or with faint traces of discal spot, t. p. line, and partially darkened subterminal area on forewings of some specimens; hind wings without maculation.

Length of Forewing: 16 to 21 mm.; holotype, 18 mm.

FEMALE: Similar to male.

Length of Forewing: 17 mm. (allotype).

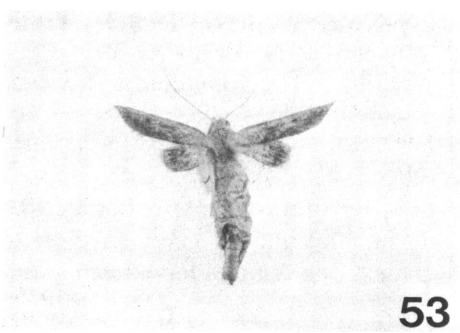
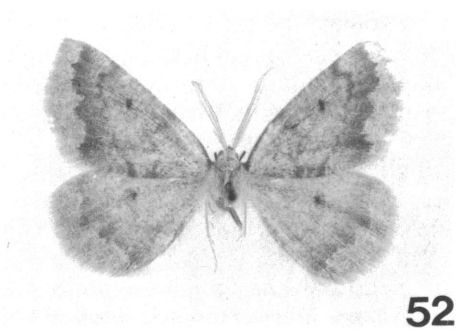
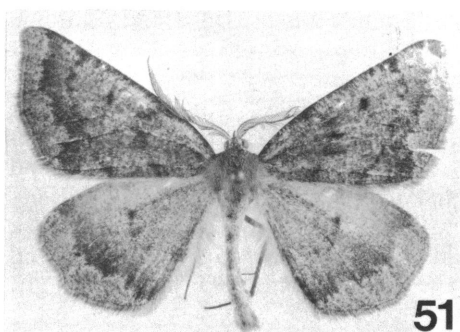
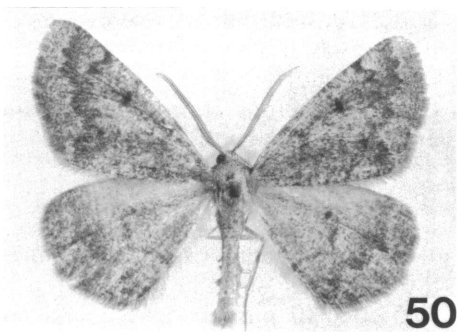
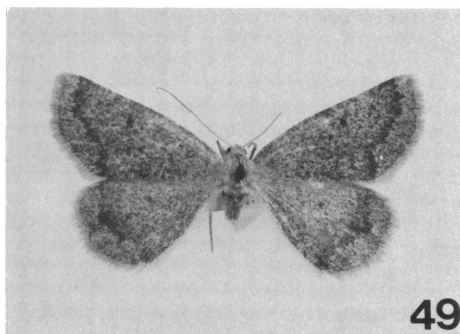
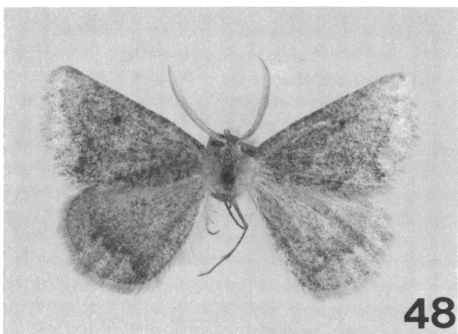
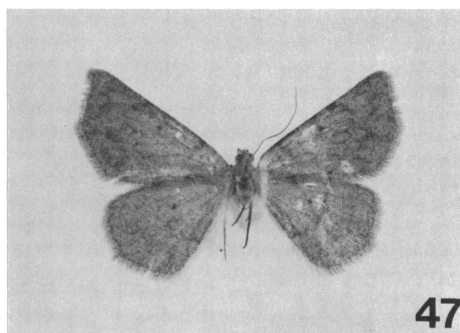
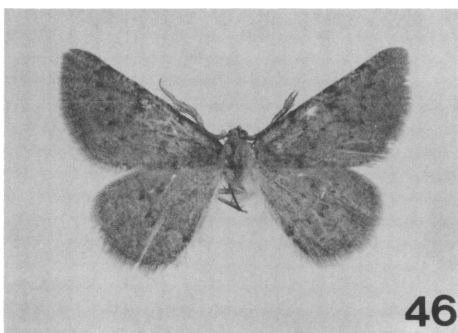
MALE GENITALIA: Uncus 0.6 to 0.7 mm. in length, median portion of shaft and apical portion of equal width, latter varying from being flat to shallowly V-shaped ventrally, apex with narrow, sclerotized point; gnathos variable, with from 10 to 24 very short to moderately long spines arising from width of median portion; anellus membranous, with

weakly bilobed anterior margin, lobe on left side tending to be slightly larger than one on right side; manica membranous, without spines; furca with anterior portion not differentiated from posterior part, widened at junction with saccus, and medially produced dorsally into very slender longitudinal ridge; posterior portion of furca more or less median in position, extending straight almost to gnathos, then with apical portion curved dorsally or to right side, 1.2 to 1.4 mm. in length from anterior margin of anellus, 0.05 mm. in width medially, entire structure without spines; aedeagus 1.9 to 2.1 mm. in length, 0.20 to 0.25 mm. in width; vesica with from one to four elongate slender spines, longest ones about three times longer than width of aedeagus.

FEMALE GENITALIA: Sterigma with lamella postvaginalis having anterolateral areas weakly sclerotized and with one larger and one or more smaller raised transverse ridges, lamella antevaginalis membranous, with numerous, minute transverse ridges; ostium bursae membranous, about equal in length to length of ductus bursae; ductus bursae 0.3 mm. in length, sclerotized, with lateral margins slightly tapering anteriorly; corpus bursae with posterior portion lightly sclerotized and with numerous striations, weakly curved ventrally near ductus bursae, then becoming enlarged, membranous, anterior portion globose, with membranous area posteriorly on right side rugose; signum asymmetrical, with right margin variably dentate, median area denticulate. Apophyses posteriores 0.9 mm. in length; apophyses anteriores 0.05 mm. long.

EARLY STAGES: Unknown.

FIGS. 46–53. Adults of *Somatolophia*. 46, 47. *S. petila*, new species. 46. Holotype, male, Sierra Diablo Wildlife Management Area, Texas, August 30, 1970 (A. and M. E. Blanchard; AMNH). 47. Allotype, female, Sierra Diablo Wildlife Management Area, Texas, September 1, 1970 (A. and M. E. Blanchard; AMNH). 48–51. *S. simplicia* (Barnes and McDunnough). 48. Lectotype, male, Olancho, California, June 8–15 (USNM). 49. "Type ♀," Olancho, California, June 8–15 (USNM). 50. Male, Borrego, California, May 1, 1941 (G. H. and J. L. Sperry; AMNH). 51. Male, Arroyo Catarina, Baja California, April 2, 1976 (Doyen, Rude; UC). 52, 53. *S. cuyama* Comstock. 52. Holotype, male, Cuyama Valley, California, June 3, 1937 (D. Tiemann; LAM). 53. Female, Cuyama Valley, California, June 10, 1937 (D. Tiemann; LAM). All $\times 1.37$.



FOOD PLANT: Unknown.

TYPES: Holotype, male, Sierra Diablo Wildlife Management Area, elevation 6000 ft., 20 miles north of Van Horn, Culberson County, Texas, August 30, 1970 (A. and M. E. Blanchard); allotype, female, same data but September 1, 1970. The genitalia of the holotype are mounted on slide FHR 16169, and of the allotype on slide FHR 16186. Paratypes, all from western Texas: same data as holotype, May 20, 1968, June 7, 1969, August 30, 1970, September 1, 1970, July 14, 1971, 34 males; Mt. Locke, elevation 6700 ft., Davis Mountains, Jeff Davis County, March 21, 1971, April 3, 1970 (A. and M. E. Blanchard), three males; Fort Davis, Jeff Davis County, June 11, 1969, September 23, 1965, October 5, 1969 (A. and M. E. Blanchard), four males; Big Bend National Park, March 29, 1965 (A. Blanchard), three males; Green Gulch, Big Bend National Park, March 25, 28, 1971, May 3, 6, 1972, May 14, 1966, September 14, 1971, September 27, 1965, October 2, 9, 1967 (A. and M. E. Blanchard), 27 males; Basin, Big Bend National Park, April 9, 1967, May 12, 14, 1966, August 25, 1965, September 27, 1965, October 3, 1965, October 2, 4, 1967 (A. and M. E. Blanchard), September 17, 1958 (R. R. McElvare), 15 males; Oak Spring, Big Bend National Park, May 8, 1972, May 11, 1966, October 4, 1965 (A. and M. E. Blanchard), six males; Government Spring, Big Bend National Park, May 12, 1966 (A. and M. E. Blanchard), one male.

The holotype, allotype, (see figs. 46, 47), and paratypes are in the collection of the American Museum of Natural History.

DISTRIBUTION: The mountains of western Texas (see map 3).

FLIGHT PERIOD: From late March into early October.

REMARKS: Ninety-five specimens (94 males, one female) and 14 genitalic dissections (13 males, one female) have been studied.

The series of specimens from the Sierra Diablo Wildlife Management Area is slightly grayer and the moths tend to have less clearly defined maculation than do the adults from

Jeff Davis County and Big Bend National Park.

There does not appear to be much seasonal variation within this species. Specimens caught in the spring months may be slightly larger (about 1 mm. in length of forewing) and a hint paler than those caught late in the year. This is difficult to judge because of the individual variation that occurs, which is more noticeable than the seasonal one. Individual specimens from a given locality and caught within any given month will vary in the color of the upper surface of the wings, the amount of dark scaling, and the strength of the maculation.

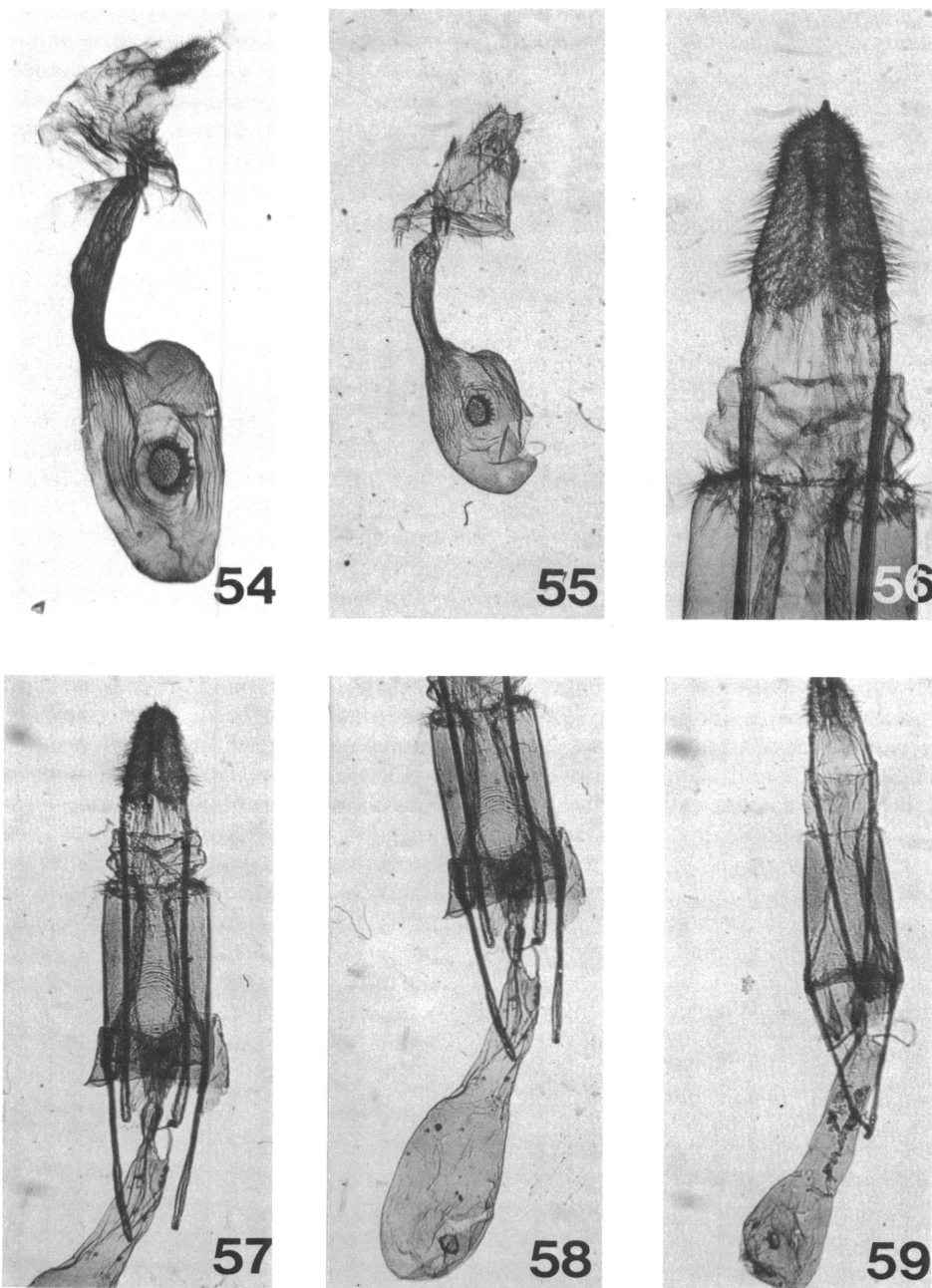
The hair pencil on the hind tibia of the male is very difficult to find in this species. In only a few of the 94 males that were studied was this structure obvious; in some it appeared that the long hairlike scales may lie under the normal scaling of the tibia. The "scar" that is usually present in other species is also difficult to locate. It is possible that many specimens never had this structure, and that it is represented in only a relatively few individuals.

ETYMOLOGY: The specific name is from the Latin *petilus*, thin or slender, in reference to the shape of the furca.

GROUP II

The male genitalia can be recognized by the extremely short knoblike furca, which is 0.05 to 0.10 mm. in length and about the same measurement in width and is without any spines; the gnathos has a swollen median process bearing numerous short spines. The female genitalia have elongate, sclerotized papillae anales that have a sclerotized dorsal keel-like strip; the apophyses are long and thick, with the posterior ones being from 3.2 to 4.0 mm. in length, and the anterior ones 1.5 to 2.1 mm. long; the signum is symmetrical.

Nearly all the females examined have the papillae anales extending beyond the end of the abdomen, so it is usually easy to examine them for the presence or absence of the sclerotized dorsal keel-like strip; the latter is always present in this group.



FIGS. 54–59. Female genitalia of *Somatolophia*. 54. *S. vatia*, new species, allotype, North Kaibab, Arizona, June 30, 1974 (R. Wielgus; AMNH). 55. *S. petila*, new species, allotype, Sierra Diablo Wildlife Management Area, Texas, September 1, 1970 (A. and M. E. Blanchard; AMNH). 56–58. *S. simplicia* (Barnes and McDunnough), Borrego, California, May 1, 1941 (G. H. and J. L. Sperry; AMNH). 56. Papillae anales, 2× other illustrations. 57. Posterior portion. 58. Anterior portion. 59. *S. cuyama* Comstock, Cuyama Valley, California, June 10, 1937 (D. Tiemann; LAM).

Somatolophia simplicia
(Barnes and McDunnough)
Figures 14, 48–51, 56–58

Gonodontis ? simplicius Barnes and McDunnough, 1918, p. 155, pl. 20, figs. 4 (paratype male), 5 (type female).

Meris simplicius: McDunnough, 1938, p. 171.

Somatolophia simplicius: Comstock, "1939" [1940], p. 173, pl. 39A (male genitalia).

DIAGNOSIS: In color and maculation this species is similar to *desolata*, a member of Group I; see the diagnoses of the two groups for their respective characters. The present species can be separated from the other member of Group II by the females being fully winged, by the brownish black maculation, by the male antennae having the terminal seven segments simple, by the male genitalia having a longer uncus (1.1 to 1.2 mm. in length), and by the female genitalia having longer apophyses posteriores (3.6 mm. average length).

MALE: Head with vertex, front, and palpi gray, with or without some pale gray scales; antennae with from 49 to 52 segments, terminal seven simple, longest pectinations 1.75 mm. in length. Thorax above gray or grayish brown, patagia with relatively few long and very slender scales; below white or grayish white; legs grayish white, with variable number of brown and gray scales. Abdomen above and below grayish white to gray, with variable number of brown and gray scales.

Upper Surface of Wings: All wings with mixture of grayish white, dark gray, and brownish black scales, with terminal areas paler; maculation obsolescent to complete, brownish black; forewings with t. a. line angled in cell, then curving to inner margin; discal dot black, small; t. p. line outwardly curved below costa, then swinging basad and more or less paralleling outer margin, tending to be inwardly pointed on veins; subterminal area dark, prominent in most specimens, with irregular outer margin having inward bend in cell M_3 . Hind wings with angled median line; most specimens without discal spot; subterminal area broadly darkened, with irregular outer margin.

Under Surface of Wings: All wings gray or grayish brown, with paler terminal area; maculation absent except for small, dark discal dots on all wings, and darkened subterminal bands.

Length of Forewing: 14 to 22 mm.

FEMALE: Similar to male.

Length of Forewing: 15 to 19 mm.

MALE GENITALIA: Uncus 1.1 to 1.2 mm. in length, very slightly narrowed above base, apical portion flattened ventrally, apex with V-shaped or elongate point; socius 0.2 to 0.3 mm. in length; gnathos with swollen, elongate median process bearing variable number of short to moderately long, posteriorly directed spines; anellus with anterior margin rounded; manica smoothly sclerotized; furca with anterior portion weakly sclerotized, anteriorly rounded, medially produced dorsally into slender tubelike process; posterior portion of furca either medial or slightly on right side, rounded apically; aedeagus 2.1 to 2.7 mm. in length, 0.30 to 0.35 mm. in width; vesica, when exerted, extending posterodorsally, with band of slender spines, approximately eight to 15 in number, longest spines equal to width of aedeagus.

FEMALE GENITALIA: Sterigma membranous, not differentiated; ostium bursae membranous, from 1.5 to 2.0 times as long as ductus bursae; ductus bursae 0.5 mm. in length, lightly sclerotized, slightly narrowed anteriorly; corpus bursae entirely membranous, posterior portion slightly narrowed, anterior portion elongate, rounded; signum small, variable in shape, smoothly sclerotized. Papillae anales 0.9 to 1.2 mm. in length, with prominent, sclerotized, keel-like strip 0.8 to 0.9 mm. in length, extending posteriorly beyond end of papillae anales by 0.05 mm.; apophyses posteriores 3.2 to 4.0 mm. in length (with average length 3.6 mm.); apophyses anteriores 1.5 to 2.1 mm. in length (with average length 1.9 mm.); dorsal surface of abdominal segment 8 1.8 to 2.3 mm. in length (with average length 2.0 mm.).

EARLY STAGES: Unknown.

FOOD PLANT: Unknown.

TYPE: Barnes and McDunnough described this species from eight male and eight female syntypes in the Barnes collection; six

males and four females are now in the USNM, and the remaining syntypes have not been located. I hereby designate, and have labeled, the specimen bearing Barnes and McDunnough's "Type ♂" label, with its genitalia mounted on slide HWC 332, as lectotype; it is in the USNM. The lectotype (see fig. 48) is in excellent condition.

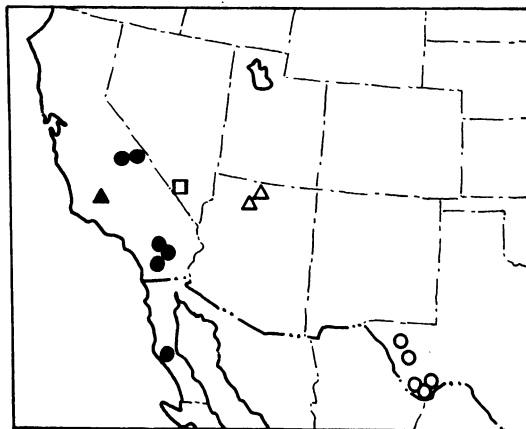
TYPE LOCALITY: Olancho, Inyo County, California.

DISTRIBUTION: The Mojave and Sonoran deserts of California, southern Nevada, and the State of Baja California (see map 3).

FLIGHT PERIOD: From March into June. Northern specimens, from the Mojave Desert, have been taken in May and June; southern examples, from the Sonoran Desert, are on the wing in March, April, and May.

REMARKS: One hundred forty-six specimens (99 males, 47 females) and 21 genitalic dissections (15 males, six females) have been studied.

Based upon the material before me, this species occurs in three areas, each separated by a gap of approximately 200 miles. This presumably represents more of a lack of collecting than the actual distribution of *simplicia*. The northern population, occurring in Inyo County, California and Clark County, Nevada, is found on the Mojave Desert. The specimens are relatively small, pale, and have rather weakly defined maculation. The central population, occurring in Riverside and San Diego counties, California, is found in the Lower Colorado Valley section of the Sonoran Desert. Here the moths are slightly larger, darker, and have a more contrastingly colored upper surface of the wings and stronger maculation, as compared with the first group. The southern population, occurring in the state of Baja California, is found in the Viscaíno Region of the Sonoran Desert. The males (no females have been seen) are the largest in size (20 to 22 mm. in wing length), have the most contrasting coloration and the heaviest maculation on the upper surface of the wings of any of the groups. The coloring and pattern of this southern population is so marked that I suspected they represented an undescribed species; a study of two dissections (from three specimens) of



MAP 3. Distribution of *Somatolophia incana*, new species (square), *S. vatia*, new species (open triangles), *S. petila*, new species (open circles), *S. simplicia* (Barnes and McDunnough; solid circles), and *S. cuyama* Comstock (solid triangle).

male genitalia showed no apparent differences from either the northern or central populations of *simplicia*, and so this Mexican group has been placed as the southern population of the species.

There is one specimen (in LAM) bearing the handwritten label "Providence 3-31-35" from the collection of M. L. Walton. This might refer to the Providence Mountains of eastern San Bernardino County, California; if so, it is the only known specimen from that county and area.

Somatolophia cuyama J. A. Comstock
Figures 15, 52, 53, 59

Somatolophia cuyama Comstock, "1939" [1940], p. 172, pls. 38 (holotype male), 39B (male genitalia), 40a-c (pupae).

DIAGNOSIS: This species is unique in the genus in having brachypterous females. The males can be separated from those of *simplicia* by having only the terminal four antennal segments simple, by the faintly reddish brown to brown color of the wings above, especially the subterminal areas, and by the more prominent maculation. In the male genitalia, *cuyama* has a shorter uncus (1.0 mm. in length) than does *simplicia*, and

the present species has shorter apophyses posteriores (3.3 mm. average length).

MALE: Head with vertex, front, and palpi pale brown; antennae with from 44 to 48 segments, terminal four simple, longest pectinations 1.7 mm. in length. Thorax above pale brown, with variable number of pale gray scales, patagia with numerous long and very slender scales; below pale gray, being pale brown anteriorly; legs pale gray, with variable number of brown scales. Abdomen above with mixture of pale brown and pale gray scales, some specimens with very narrow pale gray band posteriorly on each segment; below slightly paler than above.

Upper Surface of Wings: Similar to that of *simplicia* but with more brown and faintly reddish brown scales, especially in subterminal areas; maculation more prominent, with t. a. and t. p. lines complete, the latter straighter, not having inward projections on veins, and with both lines coming closer together at inner margin than in *simplicia*.

Under Surface of Wings: Similar to that of *simplicia* but browner.

Length of Forewing: 13 to 18 mm. (all reared specimens).

FEMALE: Brachypterous; wings long and slender, apex produced to sharp point; all wings above with mixture of pale gray and dark brown scales, without pattern except brown scales tend to be more numerous in subterminal area; below similar to upper surface but with fewer brown scales. Abdomen with tympanic organ about half the size of that of *simplicia*.

Length of Forewing: 6.5 to 9.0 mm. (all reared specimens).

MALE GENITALIA: Similar to those of *simplicia*, differing mainly as follows: uncus shorter and thicker, being 1.0 mm. in length; socius shorter, 0.2 mm. in length; gnathos with median process shorter and more projecting ventrally; valves with distal portion of costa more curved posteriorly; manica with posterolateral areas tending to be convoluted; furca with anterior portion more rectangular, medially produced posterodorsally into smaller digitate process; posterior portion of furca medial, triangular; aedeagus

2.3 to 2.4 mm. in length, 0.25 mm. in width, spines fewer in number.

FEMALE GENITALIA: Similar to those of *simplicia*, differing mainly as follows; ductus bursae shorter, 0.3 to 0.4 mm. in length; signum tending to be round or elliptical, with raised dentate anterior margin. Papillae anales 0.8 to 0.9 mm. in length, with sclerotized keel-like strip slightly less prominent than in *simplicia* and not extending beyond papillae anales quite as far, 0.7 mm. in length; apophyses posteriores 3.2 to 3.4 mm. in length (with average length 3.3 mm.); apophyses anteriores 1.8 to 2.0 mm. in length (with average length 1.9 mm.); dorsal surface of abdominal segment 8 1.8 mm. in length (for both examples).

EARLY STAGES: The mature larva and pupa were described, and the latter illustrated, by Comstock in the original description of this species ("1939" [1940], pp. 174-175, pl. 40a, b, c).

FOOD PLANT: *Hymenoclea salsola* Torrey and Gray (Compositae). Comstock (*op. cit.*) incorrectly spelled the generic name "*Hymenochloa*."

TYPE: Holotype, male, in LAM. Its genitalia are mounted on slide FHR 18547. The specimen is in excellent condition (see fig. 52).

TYPE LOCALITY: Cuyama Valley, southwestern San Luis Obispo County, California.

DISTRIBUTION: This species is known only from the type series, which was a single rearing (see map 3).

FLIGHT PERIOD: The reared moths emerged, in the laboratory, from June 3 through 10.

REMARKS: Fifteen specimens (10 males and five females) and five genitalic dissections (three males, two females) have been studied.

Apparently no one has caught an adult of this species; the late D. Tiemann found the larvae and took them to Dr. Comstock, who reared them. Until we get flown specimens, we will not know whether or not the brachypterous nature of the females is normal, or whether this was a result of being reared specimens.

LIST OF SPECIES WITH THEIR KNOWN DISTRIBUTION

Genus *Somatolophia* Hulst, 1896

Group I

- | | |
|---|---|
| 1. <i>desolata</i> , new species | California, Baja California |
| 2. <i>montana</i> , new species | California |
| 3. <i>ectrapalaria</i> (Grossbeck), 1908 | Southern Idaho and eastern Oregon, south to New Mexico, central Arizona, and California |
| 4. <i>monotonaria</i> (Dyar), 1920 | Distrito Federal, México, Puebla |
| 5. <i>sinaloa</i> , new species | Sinaloa |
| 6. <i>pallescens</i> McDunnough, 1940
<i>"obliterata"</i> (Warren), 1904 | Western Colorado, Utah, New Mexico, and Arizona |
| 7. <i>haydenata</i> (Packard), 1876
<i>umbripennis</i> Hulst, 1896 | Central Colorado, New Mexico, and western Texas |
| 8. <i>incana</i> , new species | Nevada |
| 9. <i>vatia</i> , new species | Northern Arizona |
| 10. <i>petila</i> , new species | Western Texas |

Group II

- | | |
|--|--|
| 11. <i>simplicia</i> (Barnes and McDunnough), 1918 | California, southern Nevada, Baja California |
| 12. <i>cuyama</i> J. A. Comstock, "1939" [1940] | California |

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