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THE CACTUS-FEEDING PHYCITINAE: A CONTRIBUTION
TOWARD A REVISION OF THE AMERICAN PYRALI-
DROID MOTHS OF THE FAMILY PHYCITIDAE

By CARL HEINRICH

INTRODUCTION

THIS paper is the first of a proposed series dealing with the American moths of the family Phycitidae. It is my intention to publish from time to time revisions of those groups that, in other orders, are usually designated as tribes, and to conclude with a general discussion of the family, synoptic keys to these groups and their genera, and, if circumstances permit, an illustrated catalog of the American species.

The cactus-feeding group is treated first because names are desired for certain undescribed species reared in connection with the investigations of the Commonwealth Prickly-Pear Board of Queensland. For several years A. P. Dodd and his associates on the board have been experimenting with cactus insects in an effort to eradicate or control the pricklypear in Australia. Apparently they have been successful. One phycitid species, *Cactoblastis cactorum* (Berg), has been liberated in Queensland and New South Wales and seems to have established itself and attacked the "pear" with phenomenal success. Mr. Dodd has in preparation a book dealing with the experiments of the board and the life histories of the insects they have studied. It is largely in anticipation of that book that the present taxonomic paper is offered.

Eighteen genera, 46 species, and 2 varieties are here treated. Of these, 8 genera and 8 species are described as new. The genus *Zophodia* Hübner is included because, although not a cactus insect, its structural characters link it closely with the cactus-feeding group and also because a number of cactus phycitids either have been described in that genus or later referred to it. In addition to *Zophodia* itself there are a few species now listed in *Eumysia* Dyar and *Laetilia* Ragonot that share most of the structural characters of the cactus-feeding group. To the best of my knowledge, however, they are not cactus insects and belong to a different though closely allied group. They will be treated separately in a later paper.

I am greatly obliged to Alan P. Dodd and R. C. Mundell, of the Australian Prickly-Pear Board, for specimens, larval and adult, of the tropical species. Nearly all the reared material in this group from South America has come to the National collection from Mr. Dodd, Mr. Mundell, and Mr. Haywood or has been received through them. Mr. Dodd also has sent me his unpublished notes on the distribution, food plants,¹ and larval habits of the tropical species. With his permission I am using such of this information as is needed for purely taxonomic purposes. His forthcoming book will contain more detailed accounts of the various species, their life histories and earlier stages.

The Phycitidae is a family of prime economic importance. For its size it probably contains a greater percentage of species of concern to the economic entomologist than any other family of the Lepidoptera. It is important, therefore, that its members be classified in something approaching a natural order, that the genera and their grouping conform to the facts of biology and host relationship, and that larvae and unassociated females may be identified as well as the male moths. In the cactus-feeding group, as also in some other groups, we have enough information to attempt such a classification; and in future papers I hope to be able to follow through the scheme here adopted, namely, a definition of genera based upon adult and, as far as they are known, larval structural characters, host associations, wing pattern, and biology. I do not flatter myself with the thought that I shall entirely succeed; but the trial at least is imperative.

At present the classification of the Phycitinae is a hopeless muddle. No one seems to know just what a generic concept stands for or to what genus a given species (which is not a genotype) should go. This is not so much the fault of any entomologist as it is of the phycitids themselves. The family is a fluid one. There are few obvious, hard-and-fast divisions anywhere, nor can real divisions, when established, be defined in simple, categorical terms; for there

¹ Plant names used in this paper follow Britton and Rose, "The Cactaceae," Carnegie Inst. Washington Publ. 248, vols. 1-4, 1919-1923.

is hardly a single structural character that does not break down somewhere. In any large series of any given species there are specimens wherein the venation, for example, varies from that of the genus or the larger group. The palpal characters grade into one another by almost imperceptible degrees and are apt to explode altogether. For example, a perfectly good *Dioryctria* may have an aigrettelike male maxillary palpus (which should place it in *Salebria*) while its most closely related species and one hardly distinguishable otherwise may have a perfectly normal squamous palpus. The male of one species may have a short cell and seven veins in the hind wing while its female exhibits a long cell and eight veins. Wing pattern and color also vary to some extent but on the whole are more reliable for specific placement than are venational, palpal, or antennal characters for genera. The genitalia, both male and female, seem to be more constant than other structures and to offer the best characters for the identification of species and genera; but they, too, must be used with caution. A classification based upon them alone would be as misleading as any other.

Up to the present only one serious and noteworthy attempt has been made to classify the family, that of Ragonot in his monumental "Monographie des Phycitinae et des Galleriinae."² He left the second volume unfinished at his death, but Hampson completed it from his notes, and Hampson himself was working on a generic revision of the Phycitinae when he retired from active entomological work. Ragonot's system was based chiefly upon venation, palpal structure, vestiture, and secondary male characters. In its broader outlines it was a natural classification; but its great reliance upon secondary male characters made it unworkable for unassociated females; and many species were then and later described from such females and had to be placed by guesswork. The genera themselves were more or less artificial entities and (except for the monotypic genera and some with very few species) usually included species not closely related to one another or not conforming on all definitive characters.

Hulst, who worked contemporaneously with Ragonot, followed, in his own careless fashion, the Ragonot system. He made some attempt to use the male genitalia, but his observations were entirely superficial and sporadic, and his statements concerning these structures are more often misleading than not. Dyar, Hampson, Meyrick, Caradja, and later authors have published only descriptions of new genera and species. Dr. A. J. T. Janse has made an extensive study of the South African Phycitidae and has given special attention to

² Mémoires sur les Lépidoptères, vol. 7, 1893; vol. 8, 1901.

the genitalia. He probably knows the family better than any living lepidopterist, but as yet he has not published any revisionary work on it.

From my own studies I feel that the only possible way to get a classification that will permit of workable keys and the ready identification of moths of both sexes is to make small genera, to limit them to only obviously related species, to define them rigidly, and in the definition to utilize every available character of structure, habitus, and biology. I do not suggest that I have done this here or shall be able to do it in future papers on the group; but such is the ideal.

Family PHYCITIDAE

Subfamily PHYCITINAE

Adult.—Labial palpus well developed. Maxillary palpus always present. Tongue developed; basal portion scaled. Fore wing entire (not divided); 11 veins or less; 7 absent; 8 and 9 stalked or united; 1c absent (represented by a fold or crease in the wing membrane); no areole. Hind wing with 8 veins or less; 8 closely approximate to, anastomosing or completely fusing with 7 beyond cell; 1c always present; a fringe of pecten on lower median vein at base; frenulum of female simple (a single strong spine).

Larva.—With primary setae only; two setae on prespiracular shield of prothorax; IV and V approximate and under the spiracle on abdominal segments 1 to 8; a sclerotized, pigmented ring encircling or partially encircling the tubercle of seta IIb on mesothorax and a similar ring encircling tubercle of seta III of eighth abdominal segment [this character absent from *Etiella zinckenella* (Treitschke) and *Ulophora grotei* (Ragonot)]. Prolegs normal; crochets in a complete circle.

GENERAL CHARACTERS OF THE CACTUS-FEEDING GROUP

Adult.—Antenna pectinate or pubescent; sometimes with modified setae on the basal segments or pectinations of the shaft, but never with sinus and strong scale tuft; basal segment simple. Labial palpus upturned, oblique or porrect, stout; third segment always exposed, never longer than second. Maxillary palpus alike in both sexes; usually squamous (with the scales spread on third segment), rarely filiform (fig. 134a) or flamboyant (fig. 126); never otherwise modified. Front rounded, the scales either appressed or conically projecting. Fore wing smooth, oblong, broadest toward termen; termen vertical or slanting; color blue-gray, grayish fuscous, whitish ochereous, or ochereous-fuscous, with dark markings fuscous or black,

color alike in both sexes; 11 veins, 10 from the cell, 4 and 5 stalked, 2 and 3 from near lower outer angle of cell, approximate or separate; no costal fold or other secondary sexual modifications. Hind wing with 7 veins; 7 and 8 approximate or anastomosing beyond cell (never completely fused); 3 and 5 connate or stalked; 4 absent; 2 from cell before (but near) lower outer angle; no sex scaling or other sexual modifications; structurally alike in both sexes; color white in the male (except in *Cactoblastis bucyrus* Dyar), white to fuscous in the female; cell about one-half the length of wing. Abdomen of male with a pair (rarely two pairs) of ventrolateral hair tufts at base of eighth segment or with eighth segment simple.³

Male genitalia with uncus broad, subtriangular, never hook-shaped or otherwise modified; the lateral edges sometimes slightly sinuate or concave; apex rounded; outer (dorsal) surface densely covered with bristlelike scales. Gnathos terminating in a flanged and hooked apical process, which is normally bifid but sometimes fused. Transstilla represented by a pair of separate, more or less elongate, and triangular plates; never forming a bridge or otherwise modified. Harpe simple, without clasper or extensions from sacculus or costa; apex broadly or obliquely rounded, rarely bluntly pointed (*Tucumania tapiacola* Dyar). Anellus U-shaped, either flat or slightly curved, the lateral arms often twisted slightly to rest against the lateral sides of the aedeagus, but otherwise unmodified. Aedeagus straight or slightly sinuate; usually smooth, but occasionally with a few very small scobinations at apex. Penis smooth, finely scobinate or with sclerotized wrinklins but not otherwise armed. Vinculum stout and broad, short or long, with terminal margin normally broadly rounded.

Female genitalia with bursa copulatrix membranous, smooth or with very minute scobinations on inner surface; signum frequently absent, when present consisting of a small ribbed, weakly serrate, finely scobinate or cupped plate; bursa never strongly sclerotized or pigmented. Ductus bursae membranous throughout, never strongly sclerotized; gradually widening into and not sharply differentiated from bursa copulatrix. Genital opening normally simple, sometimes minutely scobinate, rarely with sclerotized dorsal or ventral plates or a few setae on the inner surfaces of the ductus bursae at the opening; otherwise unmodified or unarmed. Ductus seminalis from bursa or, rarely, from ductus bursae near junction with bursa.

Larvae.—Internal feeders in the fruits and stems of various cacti.

³The eighth segment is considered to be simple when the sternite and tergite appear merely as flat narrow sclerotized plates (compare figs. 8d, 17d, 21d) and are not developed into sclerotized pockets or projecting processes, and when sensory hair tufts are absent.

KEY TO THE GENERA

For convenience of identification separate generic keys are given for males and females.

MALES

- | | |
|--|-----------------------------------|
| 1. Maxillary palpi squamous or flamboyant..... | 2 |
| Maxillary palpi filiform..... | 16 |
| 2. Hind wing with veins 3 and 5 connate (rarely, very shortly stalked)..... | 3 |
| Hind wing with veins 3 and 5 definitely stalked..... | 5 |
| 3. Hind wing with veins 7 and 8 approximate; antenna bipectinate; aedeagus smooth..... | 4 |
| Hind wing with veins 7 and 8 shortly anastomosed; antenna pubescent; apex of aedeagus finely spined..... | 3. <i>Olyca</i> Walker |
| 4. Labial palpus obliquely ascending..... | 2. <i>Olycella</i> Dyar |
| Labial palpus porrect..... | 1. <i>Melitara</i> Walker |
| 5. Eighth abdominal segment simple..... | 6 |
| Eighth abdominal segment with paired tufts..... | 13 |
| 6. Antenna bipectinate..... | 7 |
| Antenna pubescent..... | 8 |
| 7. Maxillary palpus not extending above middle of face (United States and Mexico)..... | 4. <i>Alberada</i> , new genus |
| Maxillary palpus extending above middle of face (South America)..... | 5. <i>Nanaia</i> , new genus |
| 8. Apical process of gnathos partially or completely fused..... | 9 |
| Apical process of gnathos bifid..... | 11 |
| 9. Apical process of gnathos partially fused..... | 6. <i>Cactoblastis</i> Ragonot |
| Apical process of gnathos completely fused..... | 10 |
| 10. Harpe without subbasal sclerotized pocket; anellus with base of plate narrowly sclerotized; aedeagus moderately long and sclerotized throughout..... | 7. <i>Cahela</i> , new genus |
| Harpe with subbasal sclerotized pocket; anellus with base of plate broadly sclerotized; aedeagus short and partially sclerotized..... | 8. <i>Rumatha</i> , new genus |
| 11. Labial palpus porrect..... | 9. <i>Yosemitia</i> Ragonot |
| Labial palpus upturned..... | 12 |
| 12. Anellus with arms rather long; aedeagus smooth..... | 10. <i>Tucumania</i> Dyar |
| Anellus shieldlike, with the arms short; aedeagus with a minutely scobinate flange at apex..... | 11. <i>Eremberga</i> , new genus |
| 13. Antenna pubescent..... | 14 |
| Antenna unipectinate..... | 13. <i>Parolyca</i> Dyar |
| Antenna bipectinate..... | 15 |
| 14. Antenna with basal segments of shaft bearing papillalike setae. | |
| Antenna without such setae on shaft..... | 12. <i>Salambona</i> , new genus |
| 15. Maxillary palpus flamboyant, reaching well above middle of face. | |
| Maxillary palpus squamous, not reaching above middle of face. | |
| | 14. <i>Sigelgaita</i> , new genus |
| | 15. <i>Amalafrida</i> , new genus |
| 16. Antenna pectinate or serrate and pubescent; labial palpus upcurved..... | 17. <i>Cactobrosis</i> Dyar |
| Antenna simple and pubescent; labial palpus oblique..... | 18. <i>Zophodia</i> Hübner |

FEMALES

- | | |
|---|-----------------------------------|
| 1. Maxillary palpi squamous or flamboyant..... | 2 |
| Maxillary palpi filiform..... | 16 |
| 2. Hind wing with veins 3 and 5 connate (rarely very shortly stalked).... | 3 |
| Hind wing with veins 3 and 5 definitely stalked..... | 5 |
| 3. Hind wing with veins 7 and 8 approximate; antenna bipectinate..... | 4 |
| Hind wing with veins 7 and 8 shortly anastomosed; antenna
pubescent..... | 3. <i>Olyca</i> Walker |
| 4. Bursa without signum..... | 1. <i>Melitara</i> Walker |
| Bursa with signum..... | 2. <i>Olycella</i> Dyar |
| 5. Labial palpus porrect..... | 6 |
| Labial palpus obliquely ascending..... | 16. <i>Ozamia</i> Ragonot |
| 6. Maxillary palpi flamboyant..... | 14. <i>Sigelgaita</i> , new genus |
| Maxillary palpi squamous..... | 7 |
| 7. Bursa with signum..... | 8 |
| Bursa without signum..... | 13 |
| 8. Signum a small, shortly spined plate..... | 9. <i>Yosemitia</i> Ragonot |
| Signum otherwise..... | 9 |
| 9. Ductus seminalis from middle of bursa copulatrix.... | 4. <i>Alberada</i> , new genus |
| Ductus seminalis from bursa near or at junction of bursa and
ductus bursae..... | 10 |
| 10. Ductus seminalis from bursa at junction of bursae and ductus
bursae, remote from signum..... | 6. <i>Cactoblastis</i> Ragonot |
| Ductus seminalis from bursa near (but not at) junction of
bursa and ductus bursae, more or less approximate to signum..... | 11 |
| 11. Habitat, South America..... | 10. <i>Tucumania</i> Dyar |
| Habitat, southwestern part of United States and northern Mexico..... | 12 |
| 12. Dark markings on fore wing longitudinal; no discal spot. | |
| | 7. <i>Cahela</i> , new genus |
| Dark markings on fore wing transverse (at least in part); discal
spot prominent..... | 8. <i>Rumatha</i> , new genus |
| 13. Ductus seminalis from ductus bursae..... | 11. <i>Eremberga</i> , new genus |
| Ductus seminalis from middle or from near end of bursa copulatrix.... | 14 |
| 14. Bursa copulatrix large..... | 15. <i>Amalafrida</i> , new genus |
| Bursa copulatrix small..... | 15 |
| 15. Ductus bursae finely scobinate at genital opening.... | 5. <i>Nanaia</i> , new genus |
| Ductus bursae smooth at genital opening..... | 12. <i>Salambona</i> , new genus |
| 16. Labial palpus oblique; bursa copulatrix large, without signum. | |
| | 17. <i>Cactobrosis</i> Dyar |
| Labial palpus porrect; bursa copulatrix small, with signum. | |
| | 18. <i>Zophodia</i> Hübner |

LIST OF GENERA AND SPECIES

- | | |
|--|------------------------------------|
| 1. <i>Melitara</i> Walker | 3. <i>Olyca</i> Walker |
| 1. <i>prodenialis</i> Walker | 1. <i>phryganoides</i> Walker |
| 2. <i>dentata</i> (Grote) | 4. <i>Alberada</i> , new genus |
| 2. <i>Olycella</i> Dyar | 1. <i>parabates</i> (Dyar) |
| 1. <i>junctolineella</i> (Hulst) | 2. <i>bidentella</i> (Dyar) |
| 2. <i>junctolineella pectinatella</i>
(Hampson) | 3. <i>holochlora</i> (Dyar) |
| 3. <i>nephelepasa</i> (Dyar) | 5. <i>Nanaia</i> , new genus |
| 4. <i>subumbrella</i> (Dyar) | 1. <i>substituta</i> , new species |

- | | |
|---|---|
| <p>6. <i>Cactoblastis</i> Ragonot</p> <ol style="list-style-type: none"> 1. <i>cactorum</i> (Berg) 2. <i>ronnai</i> (Brèthes) 3. <i>doddi</i>, new species 4. <i>mundelli</i>, new species 5. <i>bucyrus</i> Dyar <p>7. <i>Cahela</i>, new genus</p> <ol style="list-style-type: none"> 1. <i>ponderosella</i> (Barnes and McDunnough) <p>8. <i>Rumatha</i>, new genus</p> <ol style="list-style-type: none"> 1. <i>glaucatella</i> (Hulst) 2. <i>bihinda</i> (Dyar) 3. <i>polingella</i> (Dyar) <p>9. <i>Yosemitia</i> Ragonot</p> <ol style="list-style-type: none"> 1. <i>graciella</i> (Hulst) 2. <i>longipennella</i> (Hulst) 3. <i>fieldiella</i> (Dyar) 4. <i>didactica</i> Dyar <p>10. <i>Tucumania</i> Dyar</p> <ol style="list-style-type: none"> 1. <i>tapiacota</i> Dyar 2. <i>porrecta</i> Dyar <p>11. <i>Eremberga</i>, new genus</p> <ol style="list-style-type: none"> 1. <i>leuconips</i> (Dyar) 2. <i>creabates</i> (Dyar) 3. <i>insignis</i>, new species <p>12. <i>Salambona</i>, new genus</p> <ol style="list-style-type: none"> 1. <i>analamprella</i> (Dyar) | <p>13. <i>Parolyca</i> Dyar</p> <ol style="list-style-type: none"> 1. <i>asthenosoma</i> (Dyar) <p>14. <i>Sigclgaita</i>, new genus</p> <ol style="list-style-type: none"> 1. <i>chilensis</i>, new species 2. <i>huanucensis</i>, new species 3. <i>transilis</i>, new species <p>15. <i>Amalafrida</i>, new genus</p> <ol style="list-style-type: none"> 1. <i>leithella</i> (Dyar) <p>16. <i>Ozania</i> Ragonot</p> <ol style="list-style-type: none"> 1. <i>lucidalis</i> (Walker) 2. <i>odiosella</i> (Hulst) 3. <i>odiosella fuscocomaculella</i> (Wright) 4. <i>thalassophila</i> Dyar 5. <i>stigmaferella</i> (Dyar) 6. <i>hcmilutella</i> Dyar 7. <i>punicans</i>, new species <p>17. <i>Cactobrosia</i> Dyar</p> <ol style="list-style-type: none"> 1. <i>fernaldialis</i> (Hulst) 2. <i>longipennella</i> (Hampson) 3. <i>maculifera</i> Dyar 4. <i>insignatella</i> Dyar 5. <i>strigalis</i> (Barnes and McDunnough) <p>18. <i>Zophodia</i> Hübner</p> <ol style="list-style-type: none"> 1. <i>convolutella</i> (Hübner) |
|---|---|

1. Genus MELITARA Walker

Melitara WALKER, List of specimens of lepidopterous insects in the collection of the British Museum, vol. 27, p. 136, 1863.—HULST, Trans. Amer. Ent. Soc., vol. 17, p. 171, 1890.—RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 12, 1901.—DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 133, 1928. (Genotype: *Melitara prodenialis* Walker.)

Megaphycis GROTE, Can. Ent., vol. 14, p. 30, 1882. (Genotype: *Zophodia bollii* Zeller.)

Antenna of male bipectinate, of female shortly bipectinate. Labial palpus porrect. Maxillary palpus squamous. Hind wing with veins 7 and 8 approximate beyond cell; 3 and 5 connate (rarely very shortly stalked). Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid; harpe with apex evenly rounded; vinculum short; anellus with base of plate narrowly sclerotized, arms moderately long and stout; aedeagus stout, moderately long.

Female genitalia without signum, the latter replaced by a few very fine scobinations (not distinguishable in most preparations except under high magnification), bursa copulatrix otherwise simple; ductus seminalis from bursa near junction of ductus bursae and bursa copulatrix.

Larva bluish, not banded; sclerotic plates surrounding body setae rather small; 3 setae in group VII on abdominal segments 7 and 8.

The larvae feed gregariously in the joints of various species of *Platypuntia*.

Eggs laid in chains.

Remarks.—The genus as here defined is separated from other cactus-feeding phycitids by the following combination of characters: Antennae pectinate in both sexes; labial palpi porrect in both sexes; veins 7 and 8 of hind wing approximate; veins 3 and 5 of hind wing connate; eighth abdominal segment of male simple; larvae not banded or conspicuously spotted, gregarious in habit throughout feeding period.

Two species only are recognized as belonging to the genus, and its distribution is apparently limited to the United States and adjacent areas in northern Mexico.

KEY TO THE SPECIES OF MELITARA

1. Subterminal dentate line of fore wing with a rather shallow angulation between veins 5 and 6_____ 1. *prodenialis* Walker
- Subterminal dentate line of fore wing with a deep angulation between veins 5 and 6_____ 2. *dentata* (Grote)

1. MELITARA PRODENIALIS Walker

PLATES 23, 36, 44, 45; FIGURES 1-1f, 41-41a, 81, 83-83a, 84

Melitara prodenialis WALKER, List of specimens of lepidopterous insects in the collection of the British Museum, vol. 27, p. 137, 1863.—HULST, Trans. Amer. Ent. Soc., vol. 17, p. 171, 1890; U. S. Nat. Mus. Bull. 52, p. 429, 1903.—RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 13, 1901.—HUNTER, PRATT, and MITCHELL, Bur. Ent., U. S. Dept. Agr., Bull. 113, p. 28, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5693, 1917.—DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 27, 1927.—DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 133, 1928.

Zophodia bollii ZELLER, Verh. zool.-bot. Ges. Wien, p. 550, pl. 3, fig. 21, 1872.

Megaphycis bollii (Zeller) GROTE, Can. Ent., vol. 14, p. 30, 1882.

Melitara prodenialis bollii (Zeller) DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 133, 1928.

Melitara Bollii (Zeller) DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 29, 1927.

Male.—Palpi, head, and thorax cinereous-fuscous sparsely dusted with white, especially on basal segments of labial palpi; posterior margin of thorax blackish. Fore wing cinereous-fuscous with a heavy dusting of white on costal half; the fuscous and whitish areas contrasted but not sharply defined, the white dusting most pronounced between antemedial and subterminal lines and in subapical

area beyond subterminal line; a few black scales scattered over entire wing; antemedial line narrow, black, outwardly angled from basal fourth of costal margin, the apex of angle at vein 1b, strongly marked from costal margin to 1b, less sharply defined from there to inner margin; subterminal line narrow, black, outwardly margined by a narrow border of white, beyond which is a faintly dark shading which forms an obscure line paralleling the subterminal line, the parallel black lines most pronounced from costal margin near apex to vein 6; subterminal line irregularly dentate and sinuate, the angulations rather shallow; discal dots fused, forming a black line or smudge along discocellular vein; a row of black dots along termen at the vein ends; cilia grayish fuscous; underside of wing grayish fuscous, in some specimens with a more ochreous tint. Hind wing white, semihyaline with more or less fuscous suffusion at apex and along costal and terminal margins; cilia white with a narrow, dark, subbasal line.

Alar expanse, 31–38 mm.

Genitalia (figs. 1–1f) with outer margins of vinculum evenly curved; elements of transtilla rather broad.

Female.—Similar to the male except that pectinations of antenna are much shorter (fig. 84), and fuscous shadings on hind wings are more extended.

Alar expanse, 35–45 mm.

Genitalia (figs. 41–41a) with ductus bursae rather slender for most of its length.

Types.—In British Museum (*prodenialis*); in Cambridge Museum of Natural History (*bollii*).

Type localities.—"United States" (*prodenialis*); Texas (*bollii*).

Food plants.—*Opuntia (Platypuntia)* spp.

Distribution.—UNITED STATES: *Texas*, Dallas, Freeport, Utopia, College Station (Oct.), Brownsville; *Mississippi*, Biloxi (Sept.); *Oklahoma*, Wichita National Forest (June); *Florida*, Altamont (Sept., Oct.), Key West, Lakeland (Apr.), Crescent City (May), Miami (Oct.), St. Petersburg (March, June, Sept., Oct.), Fort Meade (Apr.), Fort Myers (Apr.), Venice (May); *North Carolina*, Southern Pines (June); *Delaware*, Indian River Bay (July); *New Jersey*, Lakehurst (Sept.); *New York*, Rye (July).

Eighty-two specimens examined.

Remarks.—Hulst, Ragonot, and, for several years, Dyar regarded *bollii* as nothing more than a synonym of *prodenialis*, and it has so appeared in our lists. Dodd treated it as a distinct species and applied the name to specimens from a restricted area in southern Texas. In a letter dated July 7, 1936, he writes me that "what we call *M. bollii* is a form with certain constant differences in habits and life-cycle

which attacks *O. lindheimeri* in the Laredo-Uvalde section of Texas. On the Gulf coast of Texas the *Melitara* attacking *O. lindheimeri* and other pricklypears we consider to be *prodenialis*, identical with Florida *prodenialis*. Hence we would continue to retain the Laredo-Uvalde insect as a distinct form." Upon similar information from Dodd, Dyar, in 1928, removed *bollii* from synonymy but did not give it full specific rank. He characterized the supposed race as follows: "Smaller than *prodenialis*, whiter and smoother, from Texas."

I am unable to see these distinctions and can find nothing in structure, color, or size to distinguish pinned specimens of the supposed *bollii* from equally small specimens of typical *prodenialis*. There may be a biological race or strain in southern Texas that can be distinguished in the field; but, if so, it is doubtful if the name *bollii* can be applied to it; for Boll's specimens (from which Zeller described his species) were collected in the neighborhood of Dallas, well north of the range of the supposedly distinct form.

Descriptions of eggs and larvae and a brief note on the life history are given in the Hunter, Pratt, and Mitchell bulletin.

2. MELITARA DENTATA (Grote)

PLATES 23, 36, 45; FIGURES 2-2c, 40, 85-85a, 86-86a

Zophodia dentata GROTE, Can. Ent., vol. 8, p. 158, 1876; Bull. U. S. Geol. and Geogr. Surv. Terr., vol. 3, p. 799, 1877.

Megaphycis dentata (GROTE), Can. Ent., vol. 14, p. 30, 1882.

Melitara dentata (Grote) HULST, Trans. Amer. Ent. Soc., vol. 17, p. 172, 1890; U. S. Nat. Mus. Bull. 52, p. 429, 1903.—KELLOGG, Kansas Univ. Quart., vol. 1, p. 39, 1892.—RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 14, 1901.—HUNTER, PRATT, and MITCHELL, Bur. Ent., U. S. Dept. Agr., Bull. 113, p. 28, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5694, 1917.—DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 29, 1927.—DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928.

Melitara doddalis DYAR, Insecutor Inscitiae Menstruus, vol. 13, p. 13, 1925; Proc. Ent. Soc. Washington, vol. 30, 134, 1928.—DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 29, 1927. (New synonymy.)

Melitara junctolineella HULST (in part), Can. Ent., vol. 32, p. 173, 1900.—BARNES and McDUNNOUGH, Contr. Nat. Hist. Lepid. North America, vol. 3, no. 3, p. 199, 1916.

Male.—General color and pattern as in *prodenialis* except as follows: Blackish shading on posterior margin of thorax less pronounced and in some specimens not distinguishable. Fore wing with white dusting rather evenly distributed over the entire wing, the whitish and fuscous areas not contrasted except (in some specimens) for a rather narrow pale suffusion along costal margin and a more or less pronounced dark shade from end of cell to middle of inner

margin; the subterminal line with no black shading beyond its white border except for a short distance from apex, markedly dentate and sinuate, the angulations deep, *the angulation between veins 5 and 6 reaching to the cell*. Hind wing semihyaline, almost pure white with little or no fuscous shading, the latter, when present, confined to a narrow band along costal margin and a fine line along termen; cilia white.

Alar expanse, 33-43 mm.

Genitalia (figs. 2-2c) with outer margins of vinculum slightly sinuate; elements of transtilla slightly narrower than those of *prodenialis*. Slight differences in the shape of the anellus in the two species are shown in figures 1d and 2b.

Female.—Similar to the male except that the pectinations of the antenna are shorter, the maxillary palpus is longer and the fuscous shadings are nearly always pronounced on the hind wing, though limited to a narrow border along the costal margin, a slight clouding at apex, and a thin line along the termen.

Alar expanse, 35-50 mm.

Genitalia (fig. 40) essentially like those of *prodenialis* except that the ductus bursae is normally stouter.

Types.—In British Museum (*dentata*); in United States National Museum (*doddalis*).

Type localities.—Clear Creek Canyon, Colo. (*dentata*); Mesilla Park, N. Mex. (*doddalis*).

Food plants.—*Opuntia (Platypuntia)* spp.

Distribution.—UNITED STATES: *Colorado*, Glenwood Springs (July, Aug., Sept.), Fort Collins, Denver, Rocky Ford (Sept.); *Utah*, Buckskin Valley (Iron County, June, July), Eureka (Aug.), Dividend (Aug., Sept.); *Kansas*, Manhattan (Sept.); *Arizona*, Mormon Lake (July), Douglas (Aug., Sept.), Oracle (Sept.), Globe (Sept.), Quijotoa Mountains (Oct.), Chiricahua Mountains; *New Mexico*, Mesilla Park (Sept.), Silver City (Sept.), Julimes (Sept., Oct.), Jemez Springs (July, Aug., Sept.); *Texas*, Uvalde (Sept., Oct., Nov.), Henrietta (Oct.), Trent (Oct.), Rock Springs, Laredo (Sept.), Shafter (Sept.), Albany, Panhandle (Aug.). MEXICO: Chihuahua City, Morelia (Oct.).

One hundred and forty specimens examined.

Remarks.—In his description of *doddalis*, Dyar pointed out a number of supposed differences in genitalic and palpal structure between his species and *dentata*. These differences are entirely imaginary. There is not a structural character separating the two forms. There are some slight color differences between specimens from Colorado and specimens from Texas, Arizona, and New Mexico. The latter seem to have a slightly denser dusting of white scales on the fore wing and

consequently appear somewhat more ashy gray than the Colorado specimens; but this pale suffusion also shows in Kansas specimens and in a number of those from Utah.

Dodd has also treated *doddalis* and *dentata* as separate species. He writes: "In our concept, *M. doddalis* is distinct from *M. dentata*. We would give the distribution of *dentata* from the Panhandle of Texas across to northern Arizona, north through Colorado, Utah, and Kansas to Idaho and Wyoming. *M. doddalis* occurs through western Texas and New Mexico to southern Arizona."

Possibly there may be local races involved, but if so their distribution does not correspond with any consistent differences in color or habitus, for, as stated, the Kansas specimens that fall within the supposed *dentata* area are more like typical *doddalis* than they are like Colorado *dentata*.

I think that the two names apply to nothing more than local variants of one rather variable species.

Descriptions of the egg, larva, and pupa are given in the paper by Kellogg.

As pointed out by Barnes and McDunnough, the female paratypes of *junctolineella* (from Colorado) are not conspecific with the male type (from Texas) but must be referred here. One of these paratypes is now in the National collection.

2. Genus OLYCELLA Dyar

Olycella DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928. (Genotype: *Melitara junctolineella* Hulst.)

Antenna of male bipectinate, of female shortly bipectinate. Labial palpus obliquely ascending (sometimes in the female the third segment is bent forward, which gives the palpus a porrect appearance, but the second segment is always deflected upward and reaches nearly as high as the top of the head). Maxillary palpus squamous. Hind wing with veins 7 and 8 approximate beyond the cell; 3 and 5 connate. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid; harpe with apex evenly rounded; vinculum short; anellus with base of plate narrowly sclerotized, arms moderately long and stout; aedeagus stout, moderately long.

Female genitalia with signum, the latter a small ridged plate; bursa copulatrix wrinkled, otherwise simple and without scobinations; ductus bursae with a pair of sclerotized plates on inner wall at genital opening; ductus seminalis from center of bursa.

Larva white with broad blackish or purplish cross bands on the caudal margins of the segments; sclerotized plates surrounding setae rather small; three setae in group VII on abdominal segments 7 and 8.

The larvae feed gregariously for a short period after hatching (probably during the first instar) but thereafter are solitary in habit. They feed in the joints of various *Platypuntias*.

Remarks.—In his description of the genus Dyar gives the male palpi as upturned and those of the female as oblique. Strictly speaking they are obliquely upturned in both sexes, though in many females the third joints are bent forward, which gives the palps a porrect appearance. The genus is close to *Melitara* and distinguished from it only by the following characters: Labial palpi obliquely ascending; larvae transversely banded and solitary in habit during most of the feeding period.

Three species and one local race are here recognized. They are remarkably alike in structure, whatever differences in genitalia there may be between specimens being individual rather than specific. The species, however, can be distinguished easily enough by the characters given in the following key:

KEY TO THE SPECIES OF OLYCELLA

- | | |
|---|---|
| 1. General color of fore wing ochreous-fuscous; hind tibia white with very little dark dusting----- | 2 |
| General color of fore wing grayish fuscous; hind tibia heavily dusted with fuscous----- | 3 |
| 2. Transverse markings of fore wing fairly distinct-- | 1. <i>junctolineella</i> (Hulst) |
| Transverse markings of fore wing obsolete. | 2. <i>junctolineella pectinatella</i> (Hampson) |
| 3. General color grayish with a slight brownish overtint (distribution, the central plateau of Mexico)----- | 3. <i>nephelepasa</i> (Dyar) |
| General color decidedly grayish (distribution, western Texas and Arizona to California and Utah)----- | 4. <i>subumbrella</i> (Dyar) |

1. OLYCELLA JUNCTOLINEELLA (Hulst)

PLATES 24, 36, 45; FIGURES 3-3c, 42-42a, 88-88a, 89-89a

Melitara junctolineella HULST, Can. Ent., vol. 32, p. 173, 1900; U. S. Nat. Mus. Bull. 52, p. 429, 1903.—HUNTER, PRATT, and MITCHELL, Bur. Ent., U. S. Dept. Agr., Bull. 113, p. 25, 1912.—BARNES and McDUNNOUGH, Contr. Nat. Hist. Lepid. North America, vol. 3, no. 3, p. 199, 1916.—DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 27, 1927.

Olyca junctolineella (Hulst) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5695, 1917.

Olycella junctolineella (Hulst) DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928.

Male.—Head, thorax, and fore wings ochreous-fuscous dusted with white and marked with patches and lines of black scales. Labial palpus with the apical ends of the segments blackish. Maxillary palpus cross-banded with black scales. Thorax with some black dusting on posterior margin. Fore wing with whitish dusting slightly intensified in costal

area; veins faintly outlined in black; a row of more or less obscure black dots on termen between the vein ends; antemedial line interrupted, sometimes obscure, in fresh, well-marked specimens its outer dentation much extended and meeting a shade from the inner angulation of the subterminal line at the fold (which indicates the normal position of the absent vein 1c); subterminal line interrupted, strongly indicated only between veins 5 and the fold and for a short distance from inner margin; black discal dots at end of cell more or less fused and pronounced; cilia ochreous-fuscous. Hind wing pure white.

Alar expanse, 38-45 mm.

Male genitalia as figured (figs. 3-3c). The genitalia (male and female) present no outstanding specific characters.

Female.—Similar to the male except that the antennal pectinations are shorter, the labial palpi appreciably longer, the fore wings a trifle darker, and the hind wings generally suffused with fuscous, the intensity of the fuscous shade differing in different specimens.

Alar expanse, 45-55 mm.

Female genitalia as figured (figs. 42-42a).

Type.—In Rutgers College collection.

Food plants.—*Opuntia* (*Platyopuntia*) spp.

Distribution.—UNITED STATES: *Texas*, Brownsville (Apr., June, July, Aug.), Corpus Christi (Sept., Oct.), Burnet County, San Benito (Mar., Aug., Sept.), Shovel Mountain (May), Kerrville (Apr.), Victoria (Oct., Nov.), Laredo (Sept.).

Forty-one specimens examined.

Remarks.—This species is most readily distinguished from the others in the genus by its ochreous-fuscous color, which seems to be constant. It is remarkably so in the specimens before me. *O. nephelepasa* and *subumbrella* are decidedly gray in appearance.

Rather full notes on the life history and larval habits of *junctolineella* are given in Dodd's bulletin and the bulletin by Hunter, Mitchell, and Pratt. The latter also contains descriptions of the larva and pupa.

2. *OLYCELLA JUNCTOLINEELLA PECTINATELLA* (Hampson)

PLATE 24, FIGURE 4

- Olyca pectinatella* HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 35, 1901.
Olyca junctolineella (Hulst) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5695, 1917 (in part).
Olycella junctolineella (Hulst) DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928 (in part).

In removing *pectinatella* from the synonymy of *junctolineella*, where it was placed by Barnes and McDunnough and by Dyar, I am doing so chiefly as a precautionary measure. Hampson described his

species from a single collected male. There is one other male in the National collection from the type locality. These two specimens are a trifle paler than normal *junctolineella* and are less clearly marked except for the pronounced discal spots. The transverse lines on the fore wing are almost obsolete and the veins very slightly indicated by dark shading.

Inasmuch as we have no larvae or females, or any information on the life history of the form from Jalapa (which is far south of the known range of typical *junctolineella*), I do not think we are justified in treating it as a mere synonym; or, on the evidence before us, as a distinct species.

Type.—In United States National Museum.

Type locality.—Jalapa, State of Veracruz, Mexico.

Known only from the two males from the type locality.

3. OLYCELLA NEPHELEPASA (Dyar)

PLATE 45, FIGURES 87-87a

Olyca nephelepasa DYAR, Insector Insectiae Menstruus, vol. 7, p. 55, 1919.

Olycella nephelepasa (DYAR), Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928.

Male.—Similar in pattern and general appearance to *junctolineella*; but darker. The fore wing is grayish fuscous with a slight brownish tint, but decidedly more grayish brown than ochreous-fuscous. Also the hind tibiae of *nephelepasa* are heavily dusted with fuscous, while those of *junctolineella* are nearly pure white.

Alar expanse, 42-44 mm.

The male genitalia cannot be distinguished from those of *junctolineella*.

Female.—Similar to the male except pectinations of antennae much shorter, labial palpi longer, and hind wings fuscous rather than white and semihyaline.

Alar expanse, 45-52 mm.

Female genitalia essentially like those of *junctolineella*.

Type.—In United States National Museum.

Type locality.—Tehuacan, Mexico.

Food plants.—*Opuntia* (*Platypuntia*) spp.

Distribution.—MEXICO: Tehuacan (Sept.), Mexico City, Cuernavaca, Aguascalientes, San Luis Potosi (June).

Eleven specimens examined.

Remarks.—The known distribution of this species is confined to the central plateau of Mexico. In the National collection there is one female (determined as *nephelepasa*) from Monclova, Mexico. This specimen is colored like typical *subumbrella* and is, I think, only a southern example of that species.

OLYCELLA SUBUMBRELLA (Dyar)

PLATE 36, FIGURE 43

Olyca subumbrella DYAR, Insecutor Inscitiae Menstruus, vol. 13, p. 14, 1925.
Olycella nephelepassa (DYAR), Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928
 (in part).

Male.—Similar to that of *nephelepassa* except that the fore wing is less brownish and more grayish than that of *nephelepassa*. The general color is decidedly gray rather than brownish or ochreous.

Alar expanse, 40–52 mm.

Male genitalia as in *nephelepassa* and *junctolineella*.

Female.—Similar to that of *nephelepassa* but without the brownish overtint characteristic of the latter.

Alar expanse, 43–55 mm.

Female genitalia (figured from paratype from the type locality) like those of *junctolineella*. Figure 43 shows the extreme variation from typical *junctolineella*; but the differences in the shape of the sclerotized areas of the collar of the eighth segment and the length of the supporting rods of the collar are not specific. Every intergrade between this and typical *junctolineella* may be found in each of the species in the genus.

Type.—In United States National Museum.

Type locality.—Carlsbad, N. Mex.

Food plants.—*Opuntia* (*Platypuntia*) spp.

Distribution.—UNITED STATES: *Texas*, El Paso (Mar.); *New Mexico*, Carlsbad (Sept.); *Arizona*, Dewey, Redington, Palmerlee, Paradise (Cochise County, Mar., Apr., May, June), Douglas (May, Aug.), Pinal Mountains (Apr.), Hualapai Mountains (May); *California*, Warner (Sept.), Santa Clara (Apr.); *Utah*, Dividend (May, June), Stockton (May), Richfield (May); *Nebraska*, Scotts Bluff (June).

Sixty-three specimens examined.

Remarks.—In addition to the above there are before me two specimens from Monclova, Coahuila, Mexico (E. Mortensen collection, Sept. 1926), which probably are referable here. One (a male) was in the collection under *junctolineella*, the other (a female) under *nephelepassa*. The male is in very poor condition but obviously belongs with the female. The latter is in fair shape, and its color is that of typical *subumbrella*. More material is needed from northern Mexico before we can determine what species inhabits that region.

In 1928 Dyar sank *subumbrella* as a synonym of *nephelepassa*; but Mr. Dodd informs me that the larval habits of the two are quite different. As he expects to publish his biological notes on the cactus-feeding Lepidoptera, I shall not discuss these differences, except to say that they seem sufficient, coupled with the different distributions

of the two forms and their slight, but apparently consistent, color differences to warrant their separation. I am therefore removing *subumbrella* from synonymy.

3. Genus *OLYCA* Walker

Olyca WALKER, List of specimens of lepidopterous insects of the British Museum, vol. 11, p. 725, 1857.—HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 34, 1901.—DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 133, 1928. (Genotype: *Olyca phryganoides* Walker.)

Antennae pubescent in both sexes (the pubescence longer in the male than in the female), slightly serrate in the male. Labial palpus of the male obliquely ascending; of the female porrect and down-curved. Maxillary palpus squamous. Hind wing with veins 7 and 8 shortly anastomosed beyond cell; 3 and 5 connate (occasionally very shortly stalked). Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid; harpe with apex evenly rounded; vinculum short; anellus with base of plate narrowly sclerotized, arms moderately long and stout; aedeagus stout, moderately long, apex armed with many minute, hairlike spines.

Female genitalia without signum; bursa copulatrix simple except for a few microscopic scobinations; ductus bursae short; ductus seminalis from bursa somewhat caudad of middle.

Larvae not banded, solitary in habit, feeding in *Platypuntias* (presumably in the stems).

Eggs unknown.

Remarks.—*Olyca* is readily separated from other genera of the cactus-feeding Phycitinae having veins 3 and 5 of hind wing connate by having the antennae pubescent in both sexes.

The male genitalia are similar to those of *Olycella*, differing only in slight details; the vinculum is slightly shorter, the uncus broader in proportion to its length, the cleft apical process of gnathos smaller, the elements of transtilla longer and straighter.

The females differ chiefly in that they lack the signum in the bursa and the sclerotized plates in the opening of the ductus bursae.

The genus as here defined contains only the type species from the West Indies.

1. *OLYCA PHRYGANOIDES* Walker

Plates 24, 37, 46; FIGURES 5-5c, 44-44a, 90, 91

Olyca phryganoides WALKER, List of specimens of lepidopterous insects of the British Museum, vol. 11, p. 726, 1857.—HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 35, 1901.—DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928.

Male.—General color (except hind wings) pinkish white, more or less spotted and suffused with black. Palpi, thorax, and underside of body heavily dusted and shaded with black. Fore wing with no dis-

tinguishable antemedial line, the latter being replaced by two more or less transversely extended black spots; subterminal line only partially and faintly indicated, irregularly dentate; vein ends marked with blackish dots or dashes; black discal spot large, conspicuous; below the discal dot a more or less extended black smudge. Hind wing white; a very narrow blackish-fuscous shade on terminal margin and a slightly wider dark shade along costal margin; cilia white with a dark subbasal line.

Alar expanse, 35–40 mm.

Male genitalia figure from specimen from Azuda, Hispaniola.

Female.—Similar to the male except for the sexual differences in palpi and antennae noted in the generic description and for the broader diffusion of the dark areas on fore and hind wings. About three-fourths of the fore wing is suffused with black, the pinkish-white color being strongly contrasted and limited to a rather narrow area along the costa, with a triangular projection at the end of the cell; terminal area and a patch on inner margin opposite discal spot also pale, but duller and less contrasted than the costal color. Hind wing with fuscous terminal and costal dark shading somewhat broader than in the male; veins outlined by fuscous scaling.

Alar expanse, 45–47 mm.

Female genitalia as figured (figs. 44–44a); bursa copulatrix with a scattering of microscopic scobinations, otherwise simple; scobinations in genital opening stronger and more dense, also in genital opening a few fine setae (the latter probably constitute a generic character).

Eggs unknown.

Larva.—"Cream or buff colored, with dark spiracular markings" (Dodd).

Type.—In the British Museum.

Type locality.—Hispaniola.

Food plant.—*Opuntia* (*Platypuntia*) sp.

Distribution.—SANTO DOMINGO: Azuda (Jan.). HAITI: Port-au-Prince (Jan.).

Seven specimens examined.

Remarks.—Nothing has been published on the life history of this species, and presumably little is known about it. What information I have on the larvae and larval habits is from notes supplied by Mr. Dodd. The larvae are presumably solitary in habit and confined to the *Platypuntias*. The distribution of *phryganoides* is probably confined to the West Indies. Druce,⁵ under the combination "*Euzophera phryganoides*," records it from two Mexican localities (Presidio and Jalapa); but this is an error. His figure suggests that what he iden-

⁵ *Biologia Centrali-Americana, Insecta, Lepidoptera—Heterocera*, vol. 2, p. 285, 1896.

tified as *phryganoides* is one of the species of *Cactobrosis*. If the figure is anything like the specimens Druce had, they cannot be *phryganoides*.

4. ALBERADA, new genus

Genotype.—*Melitara parabates* Dyar.

Antenna of male bipectinate, of female pubescent. Labial palpus porrect and downcurved. Maxillary palpus squamous. Hind wing with veins 7 and 8 anastomosing beyond cell; 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid, the two prongs rather widely separated; harpe with the apex evenly rounded; vinculum short; anellus with base of plate narrowly sclerotized, arms moderately long and stout; aedeagus stout, weakly sclerotized in middle except on midventer.

Female genitalia with signum developed as a ridged plate; bursa copulatrix finely scobinate and wrinkled; ductus seminalis from middle of bursa.

Larvae bluish. not banded; solitary feeders in the joints of *Cylindropuntias*.

Eggs laid singly or in masses of two or three.

Remarks.—The genus is close to *Melitara*, differing in the following characters: Veins 7 and 8 of hind wing anastomosed, 3 and 5 stalked, aedeagus only partially sclerotized, apical process of gnathos with prongs well separated, bursa copulatrix with signum.

The distribution is apparently limited to Mexico and the southwestern part of the United States.

KEY TO THE SPECIES OF ALBERADA

1. General color cinereous-fuscous; expanse 35 mm and over.

1. *parabates* (Dyar)

General color pale ochereous-fuscous; expanse 25 mm or less.

2. *bidentella* (Dyar)

3. *holochlora* (Dyar)

1. ALBERADA PARABATES (Dyar)

PLATES 25, 37, 46; FIGURES 7-7c, 45-45a, 92-92a, 93-93a

Melitara parabates DYAR, Proc. U. S. Nat. Mus., vol. 44, p. 322, 1913; Proc. Ent. Soc. Washington, vol. 30, p. 134, 1928.—BARNES and McDUNNOUGH, Contr. Nat. Hist. Lepid. North America, vol. 4, no. 2, p. 175, 1918.—DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 27, 1927.

Male.—Palpi, face, head, and thorax dark cinereous-fuscous, more or less dusted with dull ochereous; posterior margin of thorax blackish. Fore wing fuscous with area between lower vein of cell and costal margin and from antemedial to subterminal lines heavily

dusted with white; area between lower vein of cell and inner margin and from base to subterminal line suffused with ochreous-fuscous; on the middle of this area a more or less extended smudge of blackish brown; antemedial line black, bordered inwardly by a line of white scales, dentate and sinuate, a sharp dentation at vein 11, a longer one in the cell (extending nearly to middle of wing), another equally long and acute dentation at the fold, and two very slight dentations between 1b and inner margin; subterminal line black with a white outer border, dentate and sinuate, the angulations deep, the angulation between 5 and 6 reaching *almost* to cell; area beyond subterminal line dark fuscous, paler in some specimens; along termen a row of black dots at the vein ends; discal black dot at end of cell conspicuous in most specimens. Hind wing white, semihyaline; costal margin bordered with fuscous and a fine dark fuscous line on termen for a short distance from apex.

Alar expanse, 35–45 mm.

Genitalia (figs. 7–7c) over twice as large as those of *bidentella*; aedeagus more extensively sclerotized.

Female.—Similar to the male in color and markings except that, in many specimens, there is a somewhat stronger fuscous shading in the apical area of the hind wing. Labial palpi longer than those of the male.

Alar expanse, 36–48 mm.

Genitalia (figs. 45–45a) larger than those of the other species of the genus and with scobinations in bursa finer.

Eggs laid singly or in masses of two or three.

Type.—In United States National Museum.

Type locality.—Cerritos, San Luis Potosi, Mexico.

Food plants.—*Opuntia* (*Cylindropuntia*) *imbricata* (Haworth) and probably several other *Cylindropuntias*.

Distribution.—UNITED STATES: *California*, San Diego, Warner (Sept.), Palm Springs (Apr.), Oceanside (Aug.), Riverside (Oct.); *Arizona*, Christmas (Gila County), Fort Grant (July), Oracle (July), Redington, Santa Catalina Mountains (Sept.), Baboquivari Mountains (Apr., June, July, Aug., Sept., Oct.), Sells P. O. (Indian Oasis, Apr.), Douglas (June, Sept.), Mohave County (Aug.); *Texas*, Presidio County (July), Brewster County. MEXICO: San Luis Potosi, Cerritos (Aug.), Tamaulipas, Tula (June).

Ninety-five specimens examined.

Remarks.—The specimens before me are remarkably uniform in color and markings except for a male from Texas and two males from Riverside, Calif. These are darker than normal *parabates*. In the Riverside specimens there is no appreciable white dusting on head, thorax, or fore wing. The fore wing is almost entirely suffused with blackish scales, and the pale areas and lines (normally

white) are light ochereous-fuscous. The two specimens are otherwise normal and represent nothing more than an aberrant color form.

2. ALBERADA BIDENTELLA (Dyar)

PLATES 25, 37, 46; FIGURES 6-6c, 46, 95-95a, 96-96a

Zophodia bidentella DYAR, Proc. Ent. Soc. Washington, vol. 10, p. 114, 1908.

Eumysia bidentella (DYAR), Insecutor Inscitiae Menstruus, vol. 13, p. 221, 1925.

Male.—Much smaller and paler than that of *parabates* but with similar pattern, the ground color more ochereous than fuscous, the white dusting on fore wing heavier, the dentations of antemedial and subterminal lines shorter; discal dots distinct and not fused as is frequently the case in *parabates*.

Alar expanse, 20-24 mm.

Genitalia (figs. 6-6c) similar to those of *parabates* but much smaller and with central ventral part of aedeagus more narrowly sclerotized.

Female.—Similar to the male except for the normal sexual differences in antennae; the female palpi are little if any longer than those of the male.

Alar expanse, 19-23 mm.

Genitalia (fig. 46) appreciably smaller than those of *parabates*; bursa wrinkled and more coarsely scobinate.

Type.—In United States National Museum.

Type locality.—San Antonio, Tex.

Food plant.—Unknown.

Distribution.—UNITED STATES: *Texas*, San Antonio (July), San Benito (June, Aug., Sept.), Brownsville (June); *Arizona*, Phoenix, "route between Dewey and Salome."

Twenty-one specimens examined.

Remarks.—A uniformly marked and colored species, known only from collected specimens.

3. ALBERADA HOLOCHLORA (Dyar)

PLATES 37, 46; FIGURES 47, 94-94a

Zophodia holochlora DYAR, Insecutor Inscitiae Menstruus, vol. 13, p. 15, 1925.

This is probably a synonym or, at most, a variety of *bidentella*. The three females of the type series are the only specimens I have seen. They are a trifle smaller than typical *bidentella*, and there are some slight, though hardly significant, differences in the female genitalia (shown in figs. 46, 47). However, until males of *holochlora* are discovered and *bidentella* has been reared, it will be wiser to keep the two as separate species.

According to Mr. Dodd the larvae are solitary in habit and dark blue and the eggs laid singly.

Alar expanse, 18 mm.

Type.—In United States National Museum.

Type locality.—Uvalde, Tex.

Food plant.—*Opuntia* (*Cylindropuntia*) *leptocaulis* De Candolle.

5. NANAIA, new genus

Genotype.—*Nanaia substituta*, new species.

Antenna of male bipectinate; of female pubescent. Labial palpus obliquely porrect (second segment obliquely upturned nearly to top of face and third segment bent forward or slightly downcurved); third segment long (in the female as long as second segment), pointed in the male, blunt in the female. Maxillary palpus large, developed as a broad, curved, somewhat flattened tuft of scales which reaches well above middle of face. Hind wing with veins 7 and 8 anastomosing beyond cell; 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid, the two prongs narrowly separated; harpe with the apex somewhat tapering but bluntly rounded; vinculum moderately long (longer than broad); anellus with base of plate narrowly sclerotized, arms long, tapering and slightly twisted; aedeagus moderately stout, strongly sclerotized throughout.

Female genitalia without signum; ductus bursae and bursa copulatrix simple except for fine scobinations in ductus at genital opening; ductus bursae long; bursa copulatrix small; ductus seminalis from middle of bursa.

Larva bluish, not banded; sclerotized plates surrounding body setae small; 2 setae in group VII on abdominal segments 7 and 8.

The larvae are solitary feeders in the trunks of *Cylindropuntia* and *Trichocereus*.

Egg and egg-laying habits unknown.

Remarks.—This genus is close to *Alberada* but distinguished by several characters: The fore wings are distinctly narrower, the vinculum is longer in proportion to its width, the aedeagus more evenly sclerotized, the apical process of gnathos more narrowly cleft, the anellus more decidedly curved, the bursa simple, without signum or scobinations, the transverse markings on fore wing almost obliterated, and the maxillary palpi much larger. The maxillary palpi are similar to those of *Sigelgaita*, the moths of which resemble in general habitus those of *Nanaia*. The two genera, however, are easily distinguished by their different labial palpi, porrect in *Nanaia*, upturned in the males of *Sigelgaita*.

Known only from Peru.

1. NANAIA SUBSTITUTA, new species

PLATES 25, 42, 47; FIGURES 8-8d, 72-72a, 97-97a

Male.—General color (except hind wings) ochereous-fuscous peppered with black and white; the type darker than most of the paratypes. Fore wing with pale color confined to costal half of wing; terminal area and the area between cell and inner margin darker, with very little white dusting; in most specimens a rather pronounced, broad, longitudinal, ochereous-fuscous shade in the fold; transverse and discal markings almost obsolete; in a few specimens the antemedial line faintly indicated and in the palest of the paratypes the discal black dots distinguishable, also some black scaling along the veins. Hind wing white with a smoky tint toward apex and termen; terminal margin blackish fuscous; cilia smoky white with a dark subbasal line.

Alar expanse, 37-39 mm.

Genitalia (figs. 8-8c) figured from type.

Female.—Colored like the male except that the hind wing is darker, whitish ochereous rather than white.

Alar expanse, 38-40 mm.

Genitalia (figs. 72-72a) with no appreciable scobinations or granulations in bursa; ductus bursae minutely scobinate at genital opening, otherwise smooth.

Type and paratypes.—U. S. N. M. no. 52748. Paratypes also sent to Mr. Dodd.

Type locality.—Cuzco, Peru.

Food plant.—*Opuntia (Cylindropuntia) exaltata* Berger.

Remarks.—Described from male type and 5 male and 6 female paratypes, all from the type locality and reared by Dr. J. E. Wille from larvae feeding in the trunks of *Opuntia exaltata* ("Em. XII-6-8-36, 1-5-19, 37," Wille no. 336-36). I also have before me two specimens (male and female) that may be a variety of *substituta* but that are probably a distinct species. They were reared by Dr. Wille from larvae feeding in trunks of *Trichocereus* at Cocachacra, Peru ("Em. XII-12-36 and XII-19-36," Wille no. 333-36). Unfortunately these specimens lack abdomens and are otherwise in such poor condition that it is impossible to determine them any further than to the genus.

6. Genus CACTOBLASTIS Ragonot

Cactoblastis RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 15, 1901.—

DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928. (Genotype: *Zophodia cactorum* Berg.)

Neopyralis BRËTHES, Chacaras e Quinaes, vol. 20, no. 1, p. 18, 1920. (Genotype: *Neopyralis ronnai* Brêthes.) (New synonymy.)

Antenna of male pubescent, of female shortly pubescent. Labial palpus of male ascending (upcurved), of female porrect. Hind wing with veins 7 and 8 shortly anastomosed beyond cell; 3 and 5 shortly stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos partially fused, the prongs separated only for a short distance; harpe with apex evenly rounded; vinculum short; anellus with base of plate narrowly sclerotized, arms moderately long and rather slender, slightly twisted, very finely serrate on outer edges toward apices; aedeagus stout, moderately long.

Female genitalia with signum developed as a series of more or less fused plates; bursa copulatrix weakly and very finely scobinate; ductus seminalis from bursa at junction of ductus bursae and bursa copulatrix.

Larva bright orange or red, with rows of large black spots resembling broken cross bands; two setae in group VII on abdominal segments 7 and 8.

The larvae feed gregariously in the joints of *Platypuntia*, *Cylindropuntia*, *Trichocereus*, *Echinopsis*, and *Denmoza*.

Eggs laid in long chains.

Remarks.—The genus as here defined is distinguished from other cactus-feeding phycitids by the following combination of characters: Antennae of both sexes pubescent; labial palpi upcurved in the male, porrect in the female; veins 7 and 8 of hind wing shortly anastomosed; veins 3 and 5 shortly stalked; apical process of gnathos partially fused; eighth abdominal segment of male simple; larvae bright orange or red, with rows of large black spots resembling broken cross bands, gregarious in habit.

Four (possibly five) species are recognized as belonging to the genus. Its natural distribution is apparently limited to South America, south of the Equator; but at least one of its species (*cactorum*) has been introduced and become established in Australia.

KEY TO THE SPECIES OF CACTOBLASTIS

MALES

- | | |
|---|--------------------------|
| 1. Hind wings white..... | 2 |
| Hind wings brown..... | 5. bucyrus Dyar |
| 2. Hind wings semihyaline..... | 3 |
| Hind wings dull white..... | 4. mundelli, new species |
| 3. Fore wing with a row of 7 distinct black dots along termen. | 1. cactorum (Berg) |
| Fore wing without such terminal dots or with 3 or 4 very faintly indicated..... | 3. doddi, new species |

FEMALES

- | | |
|---|----------------------------------|
| 1. Hind wings semihyaline toward their bases..... | 1. <i>cactorum</i> (Berg) |
| Hind wings brownish or fuscous throughout..... | 2 |
| 2. Hind wings smoky fuscous..... | 3 |
| Hind wings brownish fuscous..... | 5. <i>bucyrus</i> Dyar |
| 3. Hind wings pale smoky fuscous..... | 4. <i>mundelli</i> , new species |
| Hind wings dark smoky fuscous..... | 3. <i>doddi</i> , new species |

1. CACTOBLASTIS CACTORUM (Berg)

PLATES 26, 38, 44, 47; FIGURES 9-9c, 48-48a, 80, 93-98a, 99

Zophodia cactorum BERG, Anal. Soc. Cient. Argentina, vol. 19, p. 276, 1885.

Cactoblastis cactorum (Berg) RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 16, 1901.—DODD, Council for Scientific and Industrial Research, Australia, Bull. 34, p. 30, 1927; Bull. Ent. Res., vol. 27, p. 509, 1936.—DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928.

Male.—Head sordid whitish ochereous. Palpi pale cinereous, the tips of the maxillary palpi and the ends of the segments of the labial palpi blackish fuscous. Thorax dull ochereous-fuscous rather heavily dusted with blackish fuscous on posterior half. Fore wing ochereous-fuscous more or less dusted with white on costal half between antemedial line and apex; antemedial line black, angulate, the apex of angle at vein 1b, sometimes obscure except on costal half; subterminal line black, with a narrow whitish outer border and beyond this a faint fuscous band, the black line straight from near apex to vein 6, thence sinuate and dentate to inner margin, the ends of the dentations rounded; a black spot at end of cell and a few scattered black scales on disc; along termen at vein ends a row of seven distinct black dots. Hind wing white, semihyaline, costal margin narrowly bordered with fuscous and on termen a fine black line, the latter not extending to inner angle. Mid tibia pale cinereous with a narrow, black, transverse band at outer fourth.

Alar expanse, 23-32 mm.

Genitalia not exhibiting any marked specific characters; the slight comparative differences from the genitalia of the other *Cactoblastis* species are shown in figures 9-9c, 10, 11, and 12-12c.

Female.—Hind wing white, semihyaline with some fuscous shading on the veins and a rather broad fuscous suffusion at apex and along termen for a short distance from apex. Otherwise similar to the male except for the normal sexual differences in antennae and labial palpi.

Alar expanse, 27-40 mm.

Genitalia (figs. 48-48a) not exhibiting any marked specific differences from those of other *Cactoblastis* species except perhaps in the narrower width of the eighth segment collar. This character, however, is individually variable.

Type.—Location unknown.

Type locality.—Argentina.

Food plants.—*Opuntia* (*Platypuntia*) spp. Apparently limited to the *Platypuntias*.

Distribution.—ARGENTINA: La Plata, Concordia, Tacanitas, Santiago del Estero. URUGUAY: Piriapolis. AUSTRALIA (introduced and established). According to Dodd "*cactorum* is a native of Uruguay and the northern Argentine provinces of Entre Rios, Corrientes, Sante Fe, Santiago del Estero, Tucuman, Salta, and Chaco." He also includes Paraguay and southern Brazil in its possible range; but we have no adult specimens from the latter localities.

Thirty-five specimens examined.

Remarks.—This is the species that has been used with such remarkable success in the biological campaign against the pricklypear in Queensland and New South Wales. In 1925, when some 2,750 eggs of *cactorum* were taken to Australia for rearing and distribution of the moths, about 60,000,000 acres had been overrun by pricklypear. By 1936 "approximately 25,000,000 acres of good grazing and agricultural land, previously a wilderness of dense pricklypear, had been retrieved to such an extent that they are rapidly being developed and brought into production. The remarkable results are due to the activities of one insect, the Argentine moth-borer, *Cactoblastis cactorum* Berg." Dodd's 1936 paper gives a detailed and moving account of the great campaign, probably the most spectacular in the history of economic entomology.

The species seems to be definitely established in Australia.

Descriptions of the larva are given by Berg and Ragonot. They are detailed and accurate but apply to the genus rather than to *cactorum* specifically.

2. CACTOBLASTIS RONNAI (Brèthes), new combination

Neopyralis ronnai BRÈTHES, in Ronna, Chacaras e Quinaes, vol. 20, no. 1, p. 18, 1920.—COSTA LIMA, Terceiro catalogo dos insectos que vivem nas plantas do Brazil, p. 268, no. 1031, 1936.

The description of Brèthes's supposed new genus and new species is misleading, and the placement of them in the Schoenobiinae obviously an error. Ronna states that the species was reared from caterpillars feeding in spineless cactus in Rio Grande do Sul. They are described as clear yellowish, with black transverse bands or rows of black spots on each segment. This description can hardly apply to any cactus larva other than *Cactoblastis*. Dodd writes that "Mr. Mundell carried out investigations in Rio Grande do Sul and Santa Catherina in May 1937. The only larva found attacking pricklypears was a *Cactoblastis*, which was generally distributed and often com-

mon. The main host plant was an *Opuntia* closely related to *O. vulgaris* Miller (= *O. monacantha* Haworth), the sole indigenous prickly-pear located in these states; the larvae were encountered in the spineless *O. ficus-indica* in garden plots. Mr. Mundell was unable to rear adults, but considered that the larvae and eggs were not typical *cactorum*. I think there can be little doubt that *Neopyralis ronnai* is the *Cactoblastis* of southern Brazil, which is either *C. cactorum* or an allied form."

Until the Brazilian form can be reared or Brèthes's types examined, *ronnai* must remain as an unrecognized *Cactoblastis*.

Type.—Location unknown.

Type locality.—Rio Grande do Sul, Brazil.

Food plant.—"Spineless cactus."

3. CACTOBLASTIS DODDI, new species

PLATES 26, 38; FIGURES 10, 49-49a

Cactoblastis bucyrus DODD (not Dyar), Council for Scientific and Industrial Research, Australia, Bull. 34, p. 30, 1927.

Male.—Similar to that of *cactorum* except as follows: White dusting on fore wing less contrasted, sparser; general color darker, decidedly grayish fuscous in specimens from Tucuman; dentations of subterminal line of fore wing acute and their ends pointed; black dots along termen very faintly indicated, normally altogether absent.

Alar expanse, 31-38 mm.

Genitalia similar to those of *cactorum*, differing chiefly in the shorter cleft between the prongs at apex of gnathos (fig. 10). This character, however, is subject to some individual variation, and should be used with discretion.

Female.—Similar in color to the male except that the hind wings are smoky fuscous throughout. Similar to the female of *bucyrus* except for the absence of terminal black dots on fore wing.

Alar expanse, 35-41 mm.

Genitalia (figs. 49-49a) with scobinations of bursa somewhat more uniformly distributed than in other species of *Cactoblastis*, not an altogether reliable or satisfactory character in this genus.

Type and paratypes.—U.S.N.M. no. 52749. Paratypes also sent to Mr. Dodd.

Type locality.—Tapia, Tucuman, Argentina.

Food plants.—*Opuntia* (*Platypuntia*) *sulphurea* G. Don, *Opuntia* (*Platypuntia*) *ficus-indica* (Linnaeus).

Remarks.—Described from male type, three male and four female paratypes from the type locality, reared in October 1936 by R. C. Mundell from larvae feeding in *O. sulphurea*; six males and eight

female paratypes from the type locality reared (by Mundell) in October 1936 from larvae in *O. ficus-indica*; six male and three female paratypes from Mendoza, Argentina, reared (by Mundell) in October 1937 from larvae in *O. sulphurea*; and three male and four female paratypes reared in Australia (Dodd no. 49).

Thirty-eight specimens examined.

According to Dodd, this species "is distributed along the eastern edge and foothills of the Andes from Mendoza right to the northern boundary of the Republic in *O. sulphurea*, and almost certainly into southern Bolivia at altitudes to 8,000 feet and probably more. Hence, as far as our information goes, No. 49 (*doddi*) inhabits territory lying in between that of *cactorum* and the Peruvian insect (*mundelli*)."

O. sulphurea seems to be the favored host of *doddi*. Mr. Dodd tells me that *cactorum* does not attack this cactus although it is abundant in territory within the range of that insect. He also states that there are consistent differences in the eggs and egg sticks between the two species and that their larvae can be distinguished in the field. I am unable to separate alcoholic specimens of the larvae with any certainty. The moths can be distinguished easily enough by the characters given in the key.

Named in honor of Alan P. Dodd.

4. CACTOBLASTIS MUNDELLI, new species

PLATES 26, 47; FIGURES 11, 100, 101

Male.—Head ochereous. Palpi cinereous, dusted with black. Thorax ochereous-fuscous, heavily dusted with white and black scales, especially on tegulae and posterior margin. Fore wing ochereous-fuscous with a fine dusting of white scales in costal area from base to apex; some black scaling on the veins; discal dot at end of cell somewhat obscured by a dark smudge which extends beyond the cell toward vein 1b; transverse black lines distinct and well contrasted against the ground color; dentations of subterminal line as in *doddi*; a row of seven small black dots on termen at the vein ends. Hind wing dull white with a faint smoky tint; veins faintly outlined in fuscous-ochereous; some fuscous shading along costa and a fine fuscous line on termen from apex to about vein 1b.

Alar expanse, 38–40 mm.

Genitalia with base of apical process of gnathos (fig. 11) nearly square when viewed from beneath.

Female.—Like the male in color and markings except that the hind wing is pale smoky fuscous.

Alar expanse, 42 mm.

Genitalia not specifically different from those of *cactorum* except for a somewhat shorter ductus bursae.

Type and paratypes.—U.S.N.M. no. 52750. Paratypes also sent to Mr. Dodd.

Type locality.—Arequipa, Peru.

Food plant.—*Opuntia (Cylindropuntia) exaltata* Berger.

Remarks.—Described from male type and five male and one female paratypes, all from the type locality and reared by R. C. Mundell (Oct.-Nov. 1936).

Apparently this species does not attack the Platypuntias. Mr. Dodd writes that "the Platypuntia, *O. ficus-indica* (which is a host of *cactorum* in Argentina), is grown in cultivations around Arequipa but seems to be immune from attack. Mr. Mundell states that he found larvae in *O. exaltata* growing alongside noninfested plants of *ficus-indica*."

The species is easily recognized by the color of the hind wings and the ocherous suffusion on the fore wings.

Named in honor of R. C. Mundell.

5. CACTOBLASTIS BUCYRUS Dyar

PLATES 26, 38; FIGURES 12-12c, 50-50b

Cactoblastis bucyrus DYAR, Insecutor Inscitiae Menstruus, vol. 10, p. 16, 1922; Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928.

Male.—Much darker than males of other species of *Cactoblastis*. Palpi and thorax heavily dusted with blackish scales. Head and collar ocherous. Fore wing brownish fuscous; white dusting inconspicuous, the pale scales more ocherous than white; black antemedial and subterminal lines somewhat obscured by the dark ground color, conspicuous only toward costa, dentations of subterminal line as in *doddi*; a row of seven black dots along termen at vein ends. Hind wing brownish fuscous.

Alar expanse, 30-32 mm.

Genitalia (figs. 12-12c) with arms of anellus somewhat shorter than those of *cactorum*, *doddi*, and *mundelli*.

Female.—In color and markings similar to the male, pale dusting on fore wing a trifle more noticeable, more whitish than ocherous.

Alar expanse, 40-41 mm.

Genitalia (figs. 50-50b) with bursa very minutely and sparsely scobinate. The signum, like that of other species of *Cactoblastis*, is individually variable. Extremes of variation are shown in figures 50 and 50b.

Type.—In United States National Museum.

Type locality.—Mendoza, Argentina.

Food plants.—*Trichocereus*, *Echinopsis*, *Denmoza*.

Distribution.—ARGENTINA: Tucuman, Tapia, Mendoza, Catamarca, Andalgalá.

Twelve specimens examined.

Remarks.—Concerning hosts, Mr. Dodd supplies the following note: "The food plants of *Cactoblastis bucyrus* in Tucuman are *Trichocereus terscheckii* (Parmentier) and *Echinopsis shaferi* Britton and Rose; *Stetsonia* is not a known host plant. Dyar described this insect from material reared by W. B. Alexander from *Echinocactus* (?) at Mendoza and from *Echinopsis* at Andalgalá. The '*Echinocactus*' from Mendoza is undoubtedly *Denmoza rhodacantha* (Salm-Dyck). The *Echinopsis* from Andalgalá is probably *E. tubiflora* (Pfeiffer)."

7. CAHELA, new genus

Genotype.—*Olyca ponderosella* Barnes and McDunnough.

Antennae of male and female pubescent, the pubescence shorter in the female. Labial palpus of male obliquely upturned, of female porrect, with third segment downcurved and second and third segments longer than those of male; male palpus not extending above middle of front and with third segment short. Maxillary palpus squamous. Hind wing with veins 7 and 8 shortly anastomosing beyond cell; 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos fused; harpe with apex evenly rounded; vinculum short; anellus with base of plate narrowly sclerotized, arms long and broad, slightly twisted; aedeagus stout, sclerotized throughout.

Female genitalia with signum developed as a ridged plate (a hollow, blunt, flattened, more or less thornlike projection into the bursa); bursa copulatrix large, finely scobinate especially in the neighborhood of the signum; ductus bursae scobinate at genital opening; ductus seminalis from bursa near signum.

Larvae whitish, not banded or conspicuously spotted; solitary in habit; stem borers in *Cylindropuntias*.

Eggs laid singly.

Remarks.—This genus and the following (*Rumatha*) are distinguished from all others in the cactus-feeding group by the complete fusion of the apical process of the gnathos. Several male characters distinguish the two genera from each other, but *Cahela* is most easily recognized by the black longitudinal lines between the veins on the fore wing.

The genus is apparently limited in distribution to the southwestern part of the United States and northern Mexico.

1. CAHELA PONDEROSELLA (Barnes and McDunnough)

PLATES 26, 38, 47; FIGURES 13-13f, 51-51a, 102-102a, 103-103a

Olyca ponderosella BARNES and MCDUNNOUGH, Contr. Nat. Hist. Lepid. North America, vol. 4, no. 2, p. 175, 1918.

Zophodia purgatoria DYAR, Insecutor Inscitiae Menstruus, vol. 13, p. 222, 1925. (New synonymy.)

Cactobrosis interstitialis DYAR, Insecutor Inscitiae Menstruus, vol. 13, p. 223, 1925; Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928. (New synonymy.)

Cactobrosis phoenicis DYAR, Insecutor Inscitiae Menstruus, vol. 13, p. 223, 1925; Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928. (New synonymy.)

Cactobrosis (?) *ponderosella* (Barnes and McDunnough) DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928.

Male.—Head, thorax, fore wings, and body dark fuscous-gray peppered with white and with pronounced, longitudinal, black lines on the fore wing; a long black line through the cell and extending from near base of wing to termen; another long black line from base to tornus running parallel and very close to the fold; in outer area, from beyond cell to apex and termen, five other shorter black lines, the longest and most pronounced above vein 6; all the black lines between and not on the veins; antemedial and subterminal lines normally obsolete; in a very few specimens a faint indication of a partial, black, antemedial line and in several specimens a dark shade from end of cell to middle of inner margin, but no trace of any transverse subterminal line; body somewhat paler than fore wing or thorax. Hind wing white, semihyaline, termen for a short distance from costa very faintly and narrowly edged with fuscous.

Alar expanse, 30-40 mm.

Genitalia (figs. 13-13f) figured from type. There is some variation in the shape and size of the terminal process of the gnathos in different specimens from any given locality. The extremes of variation are shown in figures 13-13c.

Female.—Similar to the male in color and markings except for a more pronounced fuscous shading along termen of hind wing.

Alar expanse, 26-42 mm.

Genitalia (figs. 51-51a) figured from paratype from the type locality. The size of the signum and bursa varies somewhat in different specimens, but the variations are slight and can be found in any series from one locality.

Types.—In United States National Museum (*ponderosella*, *purgatoria*, *interstitialis*, *phoenicis*).

Type localities.—Palm Springs, Calif. (*ponderosella*, *phoenicis*); Colorado Desert, Yuma County, Ariz. (*purgatoria*); Presidio, Tex. (*interstitialis*).

Food plant.—*Opuntia (Cylindropuntia) imbricata* (Haworth) and probably other *Cylindropuntias*.

Distribution.—UNITED STATES: *California*, Palm Springs (Apr., Aug.), San Bernardino (Apr., May); *Utah*, St. George (May, June); *Nevada*, Charlestown Mountains (July), Clark County (Apr., May, June); *Arizona*, Yuma County, Mohave County (Apr., May), Dewey (June), "en route from Dewey to Salome" (Apr.), Maricopa County (July), Prescott (Apr., June), Redington, Baboquivari Mountains (Pima County, May, July, Aug.), Phoenix (May), Tucson (June), Douglas (May), Christmas (Gila County), Paradise (Cochise County, June); *Texas*, Brewster County, Alpine (Apr.), Presidio.

One hundred and thirty-two specimens examined.

Dodd states that the range of the species includes the central plateau of Mexico, which is what we should expect. I have seen no Mexican specimens.

Remarks.—The species is remarkably uniform in color and markings but varies considerably in size, which accounts for some of the synonymy. Dyar described his *purgatoria* from an exceptionally small female (26 mm). There is a male in the National collection (from Phoenix, Ariz.) only 23 mm in expanse, but this is obviously an abnormal specimen. Its genitalia are correspondingly smaller than those of normal males. The usual expanse of both males and females is about 35 mm. When Dyar described his three species he had not seen the types of *ponderosella* and had very few specimens from any locality.

Superficially *ponderosella* is similar to both *Eremberga leuconips* (Dyar) and *Cactobrosis strigalis* (Barnes and McDunnough). They also are dark gray with conspicuous black longitudinal lines on their fore wings, but in *leuconips* and *strigalis* the black lines are on the veins, while in *ponderosella* they lie between the veins. This character at once distinguishes it from other known cactus phycitids.

8. RUMATHA, new genus

Genotype.—*Zophodia bihinda* Dyar.

Antenna of male shortly serrate and pubescent, of the female simple and pubescent, the pubescence shorter in the female than in the male. Labial palpi porrect in both sexes; third segment of palpus about half as long as second. Maxillary palpus squamous. Hind wing with veins 7 and 8 anastomosing beyond cell; 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos fused; harpe with apex evenly rounded and with a subbasal sclerotized pocket (*pkt*,

fig. 14) between sacculus and costa; uncus truncate and short in proportion to its breadth; vinculum short, truncate, almost square in outline; anellus with base rather broadly sclerotized, arms short, broad, slightly twisted; aedeagus very short, stout, partially sclerotized (on ventral half only). The entire genitalia have a squat appearance that is characteristic.

Female genitalia with signum developed as a ridged plate with inwardly projecting ridge bluntly serrate (except in *glaucatella*, in which the signum is as in *Cahela ponderosella*); bursa copulatrix large, finely scobinate, especially in neighborhood of signum; ductus bursae scobinate at genital opening and with a pair of more or less defined sclerotized plates on the dorsal membrane of the ductus at the opening; ductus seminalis from bursa near signum (but somewhat farther removed than in *Cahela*).

Larva of only one species (*glaucatella*) known; whitish, not banded or conspicuously spotted; solitary in habit; stem borer in *Cylindropuntia*.

Eggs laid singly.

Remarks.—This genus is very close to *Cahela*, and for some time I hesitated about erecting it, for both genera have similar larvae and host associations and a like structure of the gnathos; but there are too many other differences in male characters and adult habitus to permit their lumping. The partially sclerotized aedeagus, the short stout arms of the anellus, the squat appearance of the whole male genitalia, the porrect male labial palpi, and the serrate male antennae at once distinguish the males of *Rumatha* from those of *Cahela*; and the wing patterns readily separate both sexes. In *Rumatha* the discal dot is prominent and the transverse lines on the fore wing are well defined for at least half their length. In *Cahela* the distinctive wing markings are longitudinal.

Three species are recognized as belonging to the genus. Its distribution is limited apparently to the southwestern part of the United States and possibly the adjacent regions of northern Mexico, although as yet no specimens have been received from Mexico.

KEY TO THE SPECIES OF RUMATHA

1. Ground color of fore wing white; expanse 20 mm or less.
 1. *glaucatella* (Hulst)
- Ground color of fore wing fuscous; expanse 23 mm and over----- 2
2. Indentation of subterminal line of fore wing between veins 5 and 6 deep, extending to cell; no pinkish scaling on costal area of fore wing----- 2. *bihinda* (Dyar)
- Indentation of subterminal line of fore wing between veins 5 and 6 shallow, not extending to cell; a scattering of pinkish scales among white scales on costal area of fore wing----- 3. *polingella* (Dyar)

1. RUMATHA GLAUCATELLA (Hulst)

PLATES 27, 39, 48; FIGURES 16-16c, 52, 104-104a, 105-105a

Honora glaucatella HULST, Entomologica Americana, vol. 4, p. 117, 1888.*Zophodia glaucatella* (HULST), Trans. Amer. Ent. Soc., vol. 17, p. 174, 1890;

U. S. Nat. Mus. Bull. 52, p. 430, 1903.—RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 23, 1901.—BARNES and McDUNNOUGH, Check list of the

Lepidoptera of Boreal America, no. 5712, 1917.

Male.—Palpi, head, and thorax pale fuscous, sparsely sprinkled with white; posterior margin of thorax edged with blackish fuscous. Fore wing dull white, sparsely sprinkled with fuscous and with a very pale fuscous stain in a broad area bordering inner margin; antemedial line angulate, fuscous, rather faint but complete and always distinguishable; subterminal line double, consisting of two parallel, faint, pale-fuscous lines, almost vertical and but very slightly dentate; discal spot at end of cell blackish fuscous, prominent; a row of small blackish dots along termen between the vein ends. Hind wing whitish with a very pale fuscous line edging termen.

Alar expanse, 15-18 mm.

Genitalia (figs. 16-16c) much smaller than those of either *bihinda* or *polingella*; basal portion of aedeagus narrower in proportion; harpe with apex more bluntly rounded than that of *polingella* but with width of harpe less in proportion to its length than that of *bihinda*.

Female.—In color, markings, and palpal structures similar to the male. Pubescence of antenna much shorter.

Alar expanse, 16-20 mm.

Genitalia (fig. 52) with signum similar to that of *Cahela ponderosella*, the inwardly projecting edge not appreciably serrate; sclerotized plates in genital opening very weak, hardly distinguishable except under very high magnification.

Larvae.—Solitary in habit, white, not banded or conspicuously spotted.

Type.—In Rutgers College collection.*Type locality*.—Texas.*Food plant*.—*Opuntia* (*Cylindropuntia*) *leptocaulis* De Candolle.

Distribution.—UNITED STATES: Texas, San Benito (May, June, July, Aug.), Brownsville (June), San Diego (May), Laredo (July), San Antonio; Florida (one female, so labeled and without other locality, from the Fernald collection in the United States National Museum).

Seventeen specimens examined.

Remarks.—The labial palpus of the male is somewhat misleading. In natural position the third segment is projected forward as in fig. 104; but in relaxed and badly prepared specimens it may be bent

upward. The pattern markings (particularly the pronounced discal spot) and the male genitalia show that *glaucatella* belongs with *bihinda* and *polingella* rather than in *Cahela*.

2. RUMATHA BIHINDA (Dyar)

PLATES 27, 39, 48; FIGURES 14-14c, 54, 108-108a, 109-109a

Zophodia bihinda DYAR, Insector Inscitiae Menstruus, vol. 10, p. 173, 1922.

Eumysia bihinda (DYAR), Insector Inscitiae Menstruus, vol. 13, p. 221, 1925.

Male.—Palpi, head, thorax, fore wings, and abdomen dark fuscous, dusted with white, giving a decidedly grayish-fuscous appearance to the moth; the white dusting heavy on costal half of fore wing and upper surface of abdomen; discal spots and transverse markings on fore wings blackish fuscous. Fore wing with area between cell and inner margin brownish, with little or no white dusting and with transverse lines obscured; costal half (especially above cell) strongly suffused with white; transverse antemedial line blackish, distinct only from costa to fold; subterminal line markedly dentate and sinuate, blackish, oblique, broad and conspicuous from costa to vein 8, with a slight dentation between veins 8 and 6 and a deep angulation between veins 5 and 6 extending to cell, between vein 5 and the fold straight and inwardly slanting, thence obscure to inner margin of fore wing; discal dots at end of cell normally conspicuous and fused into a single black spot, obscure in a few specimens; a row of black dots along termen at the vein ends; in some specimens faint traces of a black longitudinal line through center of cell and a line of blackish scales along the fold. Hind wing white, semihyaline, with a fine, faint, fuscous line along termen and some fuscous shading on costal margin. Under surface of abdomen decidedly brownish fuscous, sparsely dusted with white. Legs with femora whitish, with some fuscous spotting; coxae uniformly dark brown, with no white dustings or markings, strongly contrasted against femora.

Alar expanse, 30-35 mm.

Genitalia (figs. 14-14c) appreciably larger than those of other species in the genus; harpe broader in proportion to its length and with apex more broadly rounded.

Female.—Similar to the male in color and markings. Labial palpus somewhat longer and pubescence of antenna appreciably shorter.

Alar expanse, 32-36 mm.

Genitalia (fig. 54) similar to those of *polingella* and hardly to be distinguished; signum with inner projecting edge irregularly and bluntly serrate.

Type.—In United States National Museum.

Type locality.—Jemez Springs, N. Mex.

Food plant.—Unknown.

Distribution.—UNITED STATES: *Texas*, Alpine (Apr.); *New Mexico*, Jemez Springs (June, July); *Arizona*, Yuma County (Apr.), "en route from Dewey to Salome" (Apr.), Dewey (May), Mohave County (March); *Nevada*, Clark County (March, Apr., May), Bellevue (Washington County, May).

Thirty-eight specimens examined.

Remarks.—This species has never been reared and its larva is unknown. From its close relationship to *glaucatella* we may expect that its host will prove to be one of the *Cylindropuntias*.

3. RUMATHA POLINGELLA (Dyar)

PLATES 27, 39, 48; FIGURES 15-15c, 53, 106-106a, 107-107a

Zophodia polingella DYAR, Journ. New York Ent. Soc., vol. 14, p. 31, 1906.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5713, 1917.

Male.—Similar in appearance to that of *bihinda* but with transverse antemedial and subterminal lines more distinctly continued to inner margin of fore wing; indentations of subterminal line not so deep as in *bihinda* and not extending to cell; a scattering of pinkish scales among the white scales on costal area of fore wing.

Alar expanse, 23-34 mm.

Genitalia (figs. 15-15c) similar to those of *bihinda* but with harpe narrower, apex of harpe more acutely rounded, and aedeagus slightly narrower in proportion to its length.

Female.—Similar to the male except for shorter pubescence on antenna.

Alar expanse, 26-35 mm.

Genitalia (fig. 53) essentially like those of *bihinda* except that the sclerotized plates in genital opening are not so distinct and the signum is on the average smaller.

Type.—In United States National Museum.

Type locality.—Southern Arizona.

Food plant.—Unknown, presumably a *Cylindropuntia*.

Distribution.—UNITED STATES: *Arizona*, Douglas (June, Aug.), Redington, Palmerlee, Paradise (Cochise County, July, Sept.), Pinal Mountains (Apr.), Baboquivari Mountains (June, July, Aug., Sept.), Santa Catalina Mountains (Aug.), "southern Arizona" (Apr.).

Seventy-one specimens examined.

Remarks.—This species also has not been reared, and its life history is unknown. It is obviously distinct from *bihinda* but evidently very close to that species and is quite similar to it in general appearance. The characters given in the key will separate it readily enough.

9. Genus YOSEMITIA Ragonot

Yosemitia RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 17, 1901. (Genotype: *Spermatophora graciella* Hulst.)

Yosemetia HULST, U. S. Nat. Mus. Bull. 52, p. 429, 1903.—DYAR, Insector Inscitiae Menstruus, vol. 13, p. 220, 1925. (Misspelling for *Yosemitia*.)

Antenna of male weakly serrate and pubescent, of female simple and shortly pubescent. Labial palpi obliquely porrect. Maxillary palpus fan-shaped and held vertically to the face. Hind wing with veins 7 and 8 anastomosing beyond cell; veins 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid; harpe with apex evenly rounded; vinculum moderately long; anellus with arms broad, short, slightly twisted, and base of plate broadly sclerotized; aedeagus short and slender, sclerotized throughout.

Female genitalia with signum developed as a small, shortly spined plate; ductus bursae short; bursa copulatrix finely scobinate, especially in area about signum; ductus seminalis from bursa near junction of bursa and ductus bursae.

Larva bluish, dark, not banded or conspicuously spotted.

The larvae feed gregariously (sometimes singly) in *Echinocereus*, *Coryphantha*, *Homalocephala*, and presumably also in *Echinocactus* and *Neomamillaria*.

Eggs laid singly.

Remarks.—This genus as here defined is distinguished by the following combination of characters: Male antenna serrate and pubescent; labial palpi porrect in both sexes; maxillary palpi fan-shaped; male genitalia with vinculum moderately long and rather narrow, apical process of gnathos bifid, anellus small and stout with broad short arms, aedeagus slender; eighth abdominal segment of male simple; female genitalia with signum a small, shortly spined plate, ductus bursae short and ductus seminalis from bursa copulatrix near junction of bursa and ductus bursae; larvae not banded and normally gregarious.

The male genitalia have a characteristic habitus which makes them easy to place generically; but the differences between species are very slight and not altogether trustworthy, hardly more than might be expected within specific limits.

Four species are recognized as belonging to the genus. Its distribution is the southwestern part of the United States and Mexico.

KEY TO THE SPECIES OF YOSEMITIA

- | | |
|---|-----------------------------|
| 1. A short blackish line on midcosta of fore wing----- | 4. <i>didactica</i> Dyar |
| No such line on midcosta of fore wing----- | 2 |
| 2. Subterminal line of fore wing interrupted between veins 6 and 5. | |
| | 1. <i>graciella</i> (Hulst) |

- Subterminal line not interrupted between veins 6 and 5----- 3
 3. A blackish curved line from antemedial line through cell to upper
 outer angle of cell----- 3. *fieldiella* (Dyar)
 No such blackish line connecting antemedial line and outer angle
 of cell----- 2. *longipennella* (Hulst)

1. YOSEMITIA GRACIELLA (Hulst)

Plates 28, 40, 44, 48; FIGURES 21-21d, 57, 79, 111-111a

Spermatophthora graciella HULST, Entomologica Americana, vol. 3, p. 134, 1887.*Zophodia graciella* (HULST), Trans. Amer. Ent. Soc., vol. 17, 173, 1890.*Yosemitia graciella* (HULST) RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 13, 1901.—BARNES and McDUNNOUGH, Contr. Nat. Hist. Lepid. North America, vol. 3, no. 3, p. 199, 1916; Check list of the Lepidoptera of Boreal America, no. 5699, 1917.*Yosemetia graciella* (HULST), U. S. Nat. Mus. Bull. 52, p. 429, 1903.—DYAR, Insector Inscitiae Menstruus, vol. 13, p. 220, 1925.

Male.—Palpi, face, head, and thorax pale brownish fuscous, the palpi sparsely dusted with white, the tegulae with posterior ends shaded with black. Fore wing pale brownish fuscous dusted and streaked with black and dusted with white scales; the white scaling concentrated on and strongly whitening the costal half of the wing; the black scaling thinly dusted over the lower half of the wing (between cell and inner margin) and outlining the veins; transverse lines incomplete, blackish; the antemedial line indicated only by a transverse dash in the cell and a dot or very short streak on inner margin; subterminal line prominent from costa near apex to vein 8 (sometimes to vein 6), inwardly slanting, *interrupted between veins* 6 and 5, obscure between vein 2 and inner margin; discal dots fused into a line of black scales on discocellular vein; a row of small black dots along termen between the vein ends. Hind wing whitish, shaded with very pale fuscous at apex, along costa, and narrowly along termen; cilia white with a very fine, pale fuscous, subbasal line.

Alar expanse, 25-30 mm.

Genitalia (figs. 21-21c) very little different from those of other species in the genus; the vinculum is not so broad as that of *fieldiella* or so long as that of *didactica*; the anelli of the several species (figs. 18b, 19b, 20b, 21b) seem to offer the best characters for separating the species on genitalic characters; those of *graciella* and *longipennella* are much alike, but in *didactica* the arms appear to be more sharply twisted and in *fieldiella* the basal portion is more narrowly sclerotized and the free arms, therefore, correspondingly longer. These characters, however, may not be constant in long series.

Female.—Superficially like the male except that the labial palpus is appreciably longer, the antennal pubescence shorter, and the hind wings very pale, smoky fuscous rather than white.

Alar expanse, 25-30 mm.

Genitalia (fig. 57) with signum a trifle smaller than that of any other *Yosemitia*, otherwise not specifically distinguished.

Larvae "dark, dull blue, and solitary or gregarious in habit" (Dodd).

Type.—In Rutgers College collection.

Type locality.—Blanco County, Tex.

Food plants.—*Echinocereus viridiflorus* Engelmann, *E. polyacanthus* Engelmann, and *Coryphantha aggregata* (Engelmann).

Distribution.—UNITED STATES: *Colorado*, Denver (July) and one specimen with only the State designation; *Nevada*, Clark County (Apr., May); *California*, San Bernardino County (Apr.), Providence Mountains (May), one specimen with only State designation (Apr.); *Arizona*, Yavapai County, Ajo (Pima County, March), Baboquivari Mountains (May), White Mountains (June), Pinal Mountains (Apr.), Quijotoa Mountains (June), Santa Rita Mountains (June), Sells P. O. (Pima County, May), "en route from Dewey to Salome" (Apr.), Mojave County (May), Roosevelt (June), Phoenix (March, Apr.), Redington, no locality except the state (2 specimens reared from *Coryphantha aggregata*, June); *New Mexico* (March); *Texas* (no specific locality, one specimen reared from *Echinocereus viridiflorus*, Apr.).

Seventy-six specimens examined.

Remarks.—This species bears a superficial resemblance to *Rumatha bihinda* (Dyar) and might easily be confused with that species. On other than structural characters it is most readily distinguished by the distinct black scaling outlining the veins and rather strongly contrasted against the white dusting on the costal half of the fore wing.

I follow Barnes and McDunnough (1916) and Hulst (1890) in reference to the type locality. According to the former the type is from Texas and not Colorado as given by Hulst in 1888.

2. YOSEMITIA LONGIPENNELLA (Hulst)

PLATES 28, 40, 48; FIGURES 20–20c, 58, 112–112a, 113–113a

Zophodia longipennella HULST, Entomologica Americana, vol. 4, p. 118, 1888.

Zophodia graciella (HULST, in part), Trans. Amer. Ent. Soc., vol. 17, p. 173, 1890.

Yosemitia graciella (Hulst, in part) RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 13, 1901.

Yosemetia graciella longipennella (HULST), U. S. Nat. Mus. Bull. 52, p. 429, 1903.

Yosemitia graciella longipennella (Hulst) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5699, 1917.

Yosemetia longipennella (Hulst) DYAR, Insector Inscitiae Menstruus, vol. 13, p. 220, 1925.

Male.—Similar to that of *graciella* except black dusting on fore wing sparse, veins not or but very faintly outlined by black scales,

transverse subterminal line *not interrupted between veins 6 and 5*, dentate.

Alar expanse, 21–25 mm.

Genitalia (figs. 20–20c) essentially like those of *graciella*.

Female.—Similar to the male in color and markings except that the hind wings have a very pale smoky tint, paler on the average than the hind wings of females of *graciella*.

Alar expanse, 22–26 mm.

Genitalia (fig. 58) similar to those of *graciella* but with signum a trifle larger.

Larvae “dark dull blue, gregarious in habit” (Dodd).

Type.—In Rutgers College collection.

Type locality.—Texas.

Food plant.—*Homalocephala texensis* (Hopffer).

According to Dodd the larvae also feed in *Neomamillaria*.

Distribution.—UNITED STATES: *Texas*, Uvalde (June), “Big Bend” (Apr.), San Antonio (June), Van Horn (June), San Diego (Apr.), San Benito (Apr., May).

Fifteen specimens examined.

Remarks.—When Hulst (1890) transferred his *graciella* from *Spermatophthora* to *Zophodia*, he sank *longipennella* as a synonym of *graciella*. Ragonot also treated them as one species. Dyar, in his catalog (1903), listed *longipennella* as a race or subspecies. Later (1925) he restored it to full specific rank. He was apparently justified in so doing, for, while the two species are close and the differences between them slight, these differences are constant. The host association, the smaller average size, and the shallow indentation of the subterminal line of the fore wing between veins 6 and 5 suggest that *longipennella* is a distinct species rather than a race or variety of *graciella*.

3. YOSEMITIA FIELDIELLA (Dyar)

PLATES 28, 49; FIGURES 18–18c, 114–114a, 115–115a

Zophodia fieldiella DYAR, *Insecutor Inscitiae Menstruus*, vol. 1, p. 35, 1913.—

BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5711, 1917.

Male.—Palpi pale brownish fuscous more or less dusted with white and with some black scaling on ends of maxillary palpi. Head and thorax paler brown, almost clay colored; tegulae tipped with blackish scales. Fore wing heavily dusted with white on costal half and with some scattered white scales on remainder of wing; area between inner margin and cell pale brownish, concolorous with thorax; ante-medial line incomplete, distinct only from costa to lower vein of cell; subterminal line complete but obscure except for the blackish costal dash, dentate, the incurvation between veins 6 and 5 shallow; from

antemedial line, where it meets the cell, a *thin, obscure, curved, blackish line extends to upper outer angle of cell*; discal dot small, obscure; on some specimens a few black scales outlining vein 6; on termen a row of obscure blackish dots lying between the vein ends. Hind wing white, with a very pale fuscous line along termen.

Alar expanse, 22 mm.

Genitalia (figs. 18-18c) with basal portion of anellus more narrowly sclerotized and arms correspondingly longer than in the other species of the genus; vinculum also broader and shorter.

Female.—Similar to the male in color and pattern except that the hind wings are very faintly tinted with smoky fuscous.

Alar expanse, 21-25 mm.

Genitalia similar to those of *longipennella*, but signum somewhat larger.

Type.—In United States National Museum.

Type locality.—La Puerta Valley, Calif.

Food plant.—Unknown.

Distribution.—UNITED STATES: *California*, La Puerta Valley (July); *Arizona*, Catalina Springs (May).

Remarks.—The only specimens I have seen are those of the type series in the National collection (one male and five females). The species has not been reared and its larva is unknown. It is easily distinguished from the other North American species of *Yosemiteia* by its paler color and the fine, curved, blackish line on the fore wing from the apex of the antemedial line to the outer end of the cell.

4. YOSEMITIA DIDACTICA Dyar

PLATES 28, 48; FIGURES 19-19c, 110-110a

Yosemiteia didactica DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 408, 1915.

Male.—Palpi pale brownish fuscous sparsely dusted with white. Head and thorax paler fuscous; tegulae shaded with blackish-fuscous scales at their apices. Fore wing heavily dusted with white on costal half; *a short blackish line on midcosta*; lower half of wing concolorous with thorax; antemedial line obscure, incomplete; discal dot at outer end of cell distinct, blackish; subterminal line complete, dentate, double for a short distance from apex and thence outwardly margined by a narrow pale shade, obscure toward inner margin, parallel to termen; veins 5 to 9 very faintly outlined by dark scaling; terminal row of dots almost obsolete. Hind wing whitish, faintly smoke-tinted, somewhat darker toward apex and along termen; cilia with a pale smoky subbasal line.

Alar expanse, 22 mm.

Genitalia (figs. 19–19c) with vinculum rather longer than that of any other species in the genus; anellus with arms bent about aedeagus.

Female.—Similar to the male in color and markings except that the hind wings are a trifle darker.

Alar expanse, 22–23 mm.

Genitalia similar to those of *graciella*.

Type.—In United States National Museum.

Type locality.—Tehuacan, Mexico.

Food plant.—Unknown.

Distribution.—MEXICO: Tehuacan (May, June), Orizaba.

Three specimens (one male and two females) examined.

Remarks.—This species resembles *graciella* but is somewhat paler and the male has slightly darker (smoky) hind wings. It is at once distinguished by the dark line on the midcosta of the fore wing. Its life history is unknown.

10. Genus TUCUMANIA Dyar

Tucumania DYAR, Insector Inscitiae Menstruus, vol. 13, p. 224, 1925. (Genotype: *Tucumania tapiacola* Dyar.)

Antenna of male shortly serrate and pubescent, of female simple and shortly pubescent. Labial palpus of male upturned, reaching almost to level of top of eye; of female porrect (the second segment oblique, the third slightly downcurved). Maxillary palpus squamous. Hind wing with veins 7 and 8 anastomosing for a short distance beyond cell; 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid; harpe with apex bluntly pointed or elliptically rounded; vinculum moderately long (it is somewhat foreshortened in fig. 17), broad; anellus with base of plate moderately sclerotized, arms rather broad and long, slightly twisted; aedeagus long, slender; penis weakly scobinate toward outer extremity.

Female genitalia with signum a small ridged or granulate plate; bursa copulatrix with some fine scobinations in the area about signum; ductus seminalis from bursa near junction of bursa and ductus bursae.

Larva purplish or wine colored with sclerotized areas about body tubercles dark brown and large; two setae in group VII on abdominal segments 7 and 8.

The larvae are solitary feeders in the joints of *Platypuntias*.

Eggs laid singly.

Remarks.—This genus is distinguished from others having serrate and pubescent male antennae and squamous maxillary palpi by its host association, its upturned male palpi, slender aedeagus, female

genitalia with signum and with ductus seminalis from the bursa. It is nearest to *Eremberga*, but that genus is broad-winged and has a flat, more strongly sclerotized anellus, a scobinate aedeagus, stouter male genitalia, no signum, and the ductus seminalis coming from the ductus bursae. In *Tucumania* the wings are long and rather narrow.

The known distribution is Argentina and Uruguay.

KEY TO THE SPECIES OF TUCUMANIA

1. General color of fore wings dark grayish fuscous; expanse 30 mm
or less----- 1. *tapiacola* Dyar
General color of fore wings pale purplish fuscous; expanse over
30 mm----- 2. *porrecta* Dyar

1. TUCUMANIA TAPIACOLA Dyar

PLATES 27, 40, 44, 49; FIGURES 17-17d, 59-59a, 82, 121-121a, 122

Tucumania tapiacola DYAR, *Insecutor Inscitiae Menstruus*, vol. 13, p. 225, 1925.

Male.—Palpi, face, head, thorax, and fore wings dark grayish fuscous with a sparse scattering of obscure whitish scales (Dyar states that the coxae and parts of the femora and tibiae of the legs are black, but even on these parts there is some scattered pale scaling and the ground color is fuscous rather than black). Fore wing almost uniformly dark, sometimes a very faint luteous tint in the median area and a slight pale suffusion in terminal area; transverse lines black but not strongly contrasted against the dark ground color; antemedial line bidentate, its apex extending almost to center of cell; subterminal line dentate, sinuate, the dentations short, bordered outwardly by a pale line and beyond this by a rather broad blackish band, from costa well before apex; apical spot at end of cell large; veins beyond cell faintly outlined by dark scaling; a row of black dots along termen at the vein ends. Hind wing whitish, semihyaline, strongly shaded with fuscous at apex and narrowly along margin of termen almost to anal angle.

Alar expanse, 27-28 mm.

Genitalia (figs. 17-17c) with apex of harpe bluntly pointed; anellus with the apices of the arms appreciably broadened. These are presumably specific characters. I have seen no males of any other species of *Tucumania*.

Female.—In color and markings like the male except that the fuscous shading on the hind wing is a trifle more extended.

Alar expanse, 30 mm.

Genitalia (figs. 59-59a) with scobinations of bursa very weak and distinguishable only in area surrounding signum; signum somewhat granulate.

Type.—In United States National Museum.

Type locality.—Tapia, Tucuman, Argentina.

Food plants.—*Opuntia (Platypuntia) discolor* Britton and Rose, *O. (Platypuntia) aurantiaca* Lindley.

Distribution.—ARGENTINA.

Remarks.—Only three specimens are before me, the male type and a pair (male and female) reared in Australia from Argentine stock and sent me by Mr. Dodd.

2. TUCUMANIA PORRECTA Dyar

PLATES 40, 49; FIGURES 60, 123

Tucumania porrecta DYAR, *Insector Inscitiae Menstruus*, vol. 13, p. 225, 1925.

Male.—Unknown.

Female.—Larger and paler than that of *tapiacola*. Thorax pale fawn color. Fore wing pale purplish fuscous with black markings diffused; antemedial and subterminal lines narrow, black, irregularly dentate, distinguishable throughout but somewhat interrupted; discal dots at end of cell rather large but not sharply contrasted against ground color of the wing because of scattered black dusting in the surrounding area; dots along termen distinct; a short black streak from base through middle of cell to apex of angulate antemedial line. Hind wing white, faintly smoke-tinted, especially toward apex. Legs pale purplish fuscous; femora and tibiae transversely banded with blackish fuscous on outer sides.

Alar expanse, 32–35 mm.

Genitalia (fig. 60) with scobinations of bursa very fine but denser than in *tapiacola*; a small patch of somewhat larger scobinations in neck of bursa; signum larger, with a thin even keel but no granulations.

Type.—In United States National Museum.

Type locality.—Paysandu, Uruguay.

Food plant.—*Opuntia (Platypuntia)* sp.

Distribution.—URUGUAY.

Remarks.—Represented in the National collection only by the type and paratype from the type locality (A. P. Dodd, Feb. 1925), both females.

11. EREMBERGA, new genus

Genotype.—*Cactobrosis leuconips* Dyar.

Antenna of male serrate and pubescent, of female simple and shortly pubescent. Labial palpus of male upturned, of female obliquely porrect. Maxillary palpus squamous. Hind wing with veins 7 and 8 very shortly anastomosed beyond cell; 3 and 5 stalked. Eighth abdominal segment of male simple.

Male genitalia with apical process of gnathos bifid; harpe with apex evenly rounded; vinculum broad and short; anellus with base of plate broadly and strongly sclerotized, arms short, broad, not twisted or bent and with apices pointed; aedeagus moderately long, rather slender, sclerotized throughout and with a minutely scobinate flange at apex.

Female genitalia without signum; bursa copulatrix smooth or with a few scattered microscopic scobinations; ductus bursae short, scobinate at genital opening; ductus seminalis from ductus bursae.

Larva white with dark spots forming incomplete cross bands; two setae in group VII on abdominal segments 7 and 8.

The larvae are solitary or semigregarious feeders in *Echinocereus*. The larva of only one species (*leuconips*) is known but the characters here given presumably apply to the genus.

Eggs laid singly.

Remarks.—This genus is close to *Tucumania* and has many characters in common with *Olyca*. The latter, however, has veins 3 and 5 of the hind wing connate, the ductus seminalis from the bursa rather than from the ductus bursae, the male labial palpus oblique, the aedeagus stout, and the basal plate of the anellus narrowly sclerotized. The characters separating *Eremberga* from *Tucumania* have been discussed in connection with the latter genus.

Three species are here recognized as belonging to *Eremberga*.

Its distribution is the southwestern part of the United States and Mexico.

KEY TO THE SPECIES OF EREMBERGA

- | | |
|--|----------------------------------|
| 1. A conspicuous, blackish, discal spot on fore wing at end of cell. | |
| No such discal spot on fore wing----- | 3. <i>insignis</i> , new species |
| 2. General color of fore wing pale slate-gray----- | 1. <i>leuconips</i> (Dyar) |
| Predominant colors of fore wing white and luteous----- | 2. <i>creabates</i> (Dyar) |

1. EREMBERGA LEUCONIPS (Dyar)

PLATES 29, 39, 49; FIGURES 22-22c, 55-55a, 118-118a, 119-119a

Cactobrosis leuconips DYAR, *Insecutor Inscitiae* MENSTRUUS, vol. 13, p. 224, 1925; Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928.

Male.—Palpi, head, thorax, and fore wings grayish fuscous densely sprinkled with white, giving the insect a pale slate color. Labial palpus banded with blackish fuscous toward the ends of the segments. Fore wing with veins 3 to 10 outlined in black, the black scaling especially strong on lower vein of cell; antemedial and subterminal lines very fine and faint but usually discernible, black; antemedial line acutely angulate and irregularly sinuate and dentate, more or less broken and normally obliterated at costa; subterminal line also ir-

regularly sinuate and dentate, decidedly slanting, obscured toward costa; no distinct discal marks at end of cell and no dots along termen. Hind wing glistening white, semihyaline with a band of fuscous shading along costa and a fine pale-fuscous line along termen for a short distance from apex.

Alar expanse, 27–37 mm.

Genitalia (figs. 22–22c) with lateral edges of anellus finely and irregularly serrate; vinculum with terminal margin evenly rounded, lateral margins not concave or excavate.

Female.—Color and markings as in the male except hind wings dark smoky fuscous, the fuscous shading extending into the cilia and strongly outlining most of the veins; hind wings paler toward their bases.

Alar expanse, 26–37 mm.

Genitalia (figs. 55–55a) without any trace of signum; bursa nearly smooth; ductus seminalis from ductus bursae a short distance from genital opening.

Type.—In United States National Museum.

Type locality.—Baboquivari Mountains, Ariz.

Food plant.—*Echinocereus polyacanthus* Engelm.

Distribution.—UNITED STATES: Arizona, Baboquivari Mountains (July, Sept.), Roosevelt (July), Oracle (July), Huachuca Mountains (Aug.), Chiricahua Mountains, Mohave County (Sept.).

Eighteen specimens examined.

Remarks.—This species bears a strong resemblance to *Cactobrosis strigalis* (Barnes and McDunnough) and might easily be confused with it. The latter, however, has filiform maxillary palpi while those of *leuconips* are distinctly squamous. Dyar seems to have overlooked this character in placing many of his species. Also there is a difference in the longitudinal markings. In *strigalis* the strongest black longitudinal line is that along the top of the cell and vein 6, while in *leuconips* the strongest line is that along the lower vein of the cell.

In two males and some of the females of *leuconips* there is a faint brownish-fuscous suffusion on the lower third of the fore wing (bordering the inner margin), but this is not distinguishable on all specimens and does not seem to be a specific character.

2. EREMBERGA CREABATES (Dyar)

Plates 29, 49; FIGURES 24–24c, 120–120a

Olyca creabates DYAR, Insecutor Inscitiae Menstruus, vol. 11, p. 29, 1923.

Cactobrosis creabates (DYAR), Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928.

Male.—Palpi grayish fuscous. Head grayish fuscous shaded with white. Thorax luteous, whitish toward anterior margin. Fore wing

with basal area (to antemedial line), and all the area between antemedial and subterminal transverse dark shade and the fold and costa, white; area between fold and inner margin luteous; outer area (beyond subterminal dark shade) ashy white, shading to luteous at tornus; transverse antemedial line well contrasted against ground color, thin, black, irrorate, forming a sharp angle at the fold, the apex of the angle extending almost to the middle of the fold; subterminal line obsolete, replaced by a dark, transverse shade below end of cell and some scattered blackish dusting toward apex; veins 2 to 10 and upper and lower veins of cell more or less outlined in black, the lines very faint on all the veins except vein 4; along termen, between the vein ends, a row of very faint blackish dots; no discal marks at end of cell. Hind wing shiny white, semihyaline, with a faint pale-fuscous shading along costa, on veins 6, 7, and 8, and at extreme apex.

Alar expanse, 34 mm.

Genitalia (figs. 24-24c) with lateral margins of anellus smooth; vinculum with terminal margin straight, rather broad, lateral margins excavate.

Female.—Unknown.

Type.—In United States National Museum.

Type locality.—San Diego, Calif. (July).

Food plant.—Unknown.

Remarks.—Known only from the unique male type. It is a striking species and should be easily recognized from the description and genitalic figures.

3. EREMBERGA INSIGNIS, new species

PLATE 29; FIGURES 23-23c

Male.—Palpi, face, head, thorax, and fore wing dark grayish fuscous. Fore wing very faintly dusted with white on costal half; lower half of wing faintly shaded with dull luteous-ocherous; antemedial and subterminal lines as in *leuconips*, except antemedial not obliterated toward costa; veins 2 to 9 very faintly outlined in black, the black lining most distinct on lower vein of cell; a conspicuous black spot at end of cell; along termen, between the vein ends, a row of rather conspicuous black dots. Hind wing shiny white, semihyaline, with a fuscous shade bordering costa and a pale fuscous line on termen for a short distance from apex.

Alar expanse, 35 mm.

Genitalia (figs. 23-23c) with lateral margins of anellus smooth; vinculum with terminal margin straight and narrow, lateral margins outwardly angled.

Female.—Unknown.

Type.—U.S.N.M. no. 52754.

Type locality.—San Luis Potosi, Mexico.

Food plant.—Unknown.

Remarks.—Described from male type dated July 26, 1930, and submitted by R. C. Mundell. The specimen may have been reared, but the label gives no food plant, and the assumption is that it was merely a collected specimen. A female, collected on July 19 in the same locality and sent as a presumptive female of the same species, is a *Yosemitia* close to and closely resembling *graciella*. I think it is undescribed and have figured the genitalia (fig. 56), but I am not naming it as the moth is in too poor condition for accurate determination.

E. insignis is easily distinguished from the other two species in the genus by the conspicuous discal spot on the fore wing. The palpi were not figured, as they are like those of *leuconips*.

12. SALAMBONA, new genus

Genotype.—*Zophodia analamprella* Dyar.

Antenna of male pubescent and slightly serrate, of female simple and shortly pubescent. Labial palpi of both sexes porrect with the third segments downcurved, the third segment slightly longer in the female than in the male. Maxillary palpus squamous. Hind wing with veins 7 and 8 anastomosed for more than one-half their length beyond the cell; 3 and 5 stalked. Eighth abdominal segment with a pair of strong ventrolateral hair tufts.

Male genitalia with apical process of gnathos bifid, small; uncus constricted toward apex; harpe with apex oblique; vinculum long; anellus with base of plate narrowly sclerotized, arms long, curved and twisted part way around aedeagus; aedeagus long, stout.

Female genitalia without signum or scobinations in bursa; bursa small, smooth; ductus bursae long, slender, smooth; ductus seminalis from near end of bursa.

Larvae "grayish-green or blackish" (Dodd), not banded or conspicuously spotted; solitary feeders in fruits of *Platypuntia*.

Eggs laid singly.

Remarks.—The genus is distinguished from other genera in the cactus-feeding group by the following combination of characters: Antenna of male serrate and pubescent; labial palpi of both sexes porrect and downcurved; maxillary palpus squamous; harpe of genitalia with apex oblique; vinculum long; eighth abdominal segment of male bearing a pair of ventrolateral tufts; bursa copulatrix of female small and without signum or scobinations (smooth); ductus seminalis from near end of bursa; larvae unbanded, dark, fruit feeders in *Platypuntia*.

Only the type species is recognized as belonging to the genus. It is known only from Argentina.

1. SALAMBONA ANALAMPRELLA (Dyar)

PLATES 30, 42, 49; FIGURES 26-26c, 69, 116-116a, 117-117a

Zophodia analamprella DYAR, *Insecutor Inscitiae Menstruus*, vol. 10, p. 17, 1922.

Male.—Palpi, head, thorax, and fore wings dark stone gray; the scales under magnification dark grayish fuscous tipped with dull white. Fore wing with the costa broadly margined (to top of cell) with white, the white streak diminishing toward base of wing and terminating before apex; no transverse lines, or discal or terminal dots. Hind wing semihyaline with a smoky shade along costa and a narrow smoke-brown line along termen.

Alar expanse, 25-27 mm.

Genitalia (figs. 26-26c) as figured; characters as given for the genus.

Female.—Color and markings as in the male, except that the smoky shade is somewhat more extended on the hind wing.

Alar expanse, 25-27 mm.

Genitalia (fig. 69) with bursa very small and ductus bursae long and very slender.

Type.—In United States National Museum.

Type locality.—Carmen Patagones, Argentina.

Food plant.—*Opuntia* (*Platypuntia*) *sulphurea* G. Don and probably other species of *Platypuntia*.

Distribution.—ARGENTINA: Carmen Patagones (Jan.), Andalgalá (Mar.), La Rioja.

Seven specimens examined.

Remarks.—Dodd states that "this insect is usually predacious on cochineal (*Dactylopius* spp.) but not uncommonly the larvae feed in *Opuntia* fruit and flower buds." From the genitalic and other structural characters of the moth I am inclined to doubt this. I think *analamprella* will prove to be primarily a cactus feeder and only secondarily predacious on the cochineal scales on the cactus. It is the other way around with *Laetilia coccidivora* (Comstock). The latter is a true predator and follows its coccid hosts no matter to what plant they may go. It also varies its diet somewhat by occasional feedings on buds and flowers. According to Dodd it sometimes feeds in *Opuntia* flowers; but this is a secondary habit and the association with *Opuntia* accidental. *Laetilia* is close to but not a part of the cactus-feeding group of Phycitinae. *Salambona*, on the other hand, is, in all adult characters, definitely a member of the group.

The species is a striking one, easily recognized by the white costal stripe on the fore wing. It most resembles some species now under *Epischnia*. The latter, however, have 8-veined hind wings and need not be confused.

13. Genus PAROLYCA Dyar

Parolyca DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 17, 1928. (Genotype: *Olyca asthenosoma* Dyar.)

Antenna of male unipectinate. Labial palpus of male upcurved. Maxillary palpus squamous. Hind wing with veins 7 and 8 shortly anastomosed beyond cell; 3 and 5 shortly stalked. Eighth abdominal segment with a strong pair of ventrolateral tufts.

Male genitalia with apical portion of gnathos bifid; uncus narrowed well before apex; harpe with apex oblique; vinculum long, its terminal margin rounded, its lateral margins excavate (probably a specific character only); anellus with base of plate broadly sclerotized, arms long, rather broad and slightly twisted; aedeagus long, stout; penis weakly scobinate.

Remarks.—The genus is known only from the male of its type species. Its biology is unknown, but from the genitalic and other structural characters of the adult its larvae are presumed to be cactus feeders. It is easily recognized, for it is the only genus in the cactus-feeding group with unipectinate antenna. The habitat is French Guiana.

1. PAROLYCA ASTHENOSOMA (Dyar)

PLATES 30, 49; FIGURES 25–25c, 124–124a

Olyca asthenosoma DYAR, Insecutor Inscitiae Menstruus, vol. 7, p. 55, 1919.

Parolyca asthenosoma (DYAR), Proc. Ent. Soc. Washington, vol. 30, p. 137, 1928.

Male.—Palpi, head, and thorax sordid white. Fore wing white, with a yellowish tint on area between fold and inner margin; antemedial band angulate, consisting of parallel black lines and a central white line; a black oblique dash in median area from inner margin to origin of vein 2; subterminal line broken, indicated by a pair of black dashes at apex, black dots on the veins, and a black spot on inner margin; a black discal dot at end of cell and some black scaling on bases of veins 2 to 4; a row of small black dots along termen, between the vein ends. Hind wing white, semihyaline, with a pale-fuscous shade along costa, a narrow fuscous line along termen, and some pale fuscous scaling on veins 2 to 8.

Alar expanse, 30 mm.

Genitalia (figs. 25–25c) with lateral margins of vinculum excavate.

Female.—Unknown.

Type.—In United States National Museum.

Type locality.—Maroni River, French Guiana.

Food plant.—Unknown.

Remarks.—Known only from the unique male type.

14. SIGELGAITA, new genus

Genotype.—*Sigelgaita chilensis*, new species.

Antenna of male bipectinate (in *transilis* with a few flattened setae on the inner row of pectinations of the first five or six segments of the shaft and also on the same segments); antenna of female shortly pubescent. Labial palpus of male upcurved, of female porrect (the second segment obliquely upturned, the third bent forward). Maxillary palpus large, extending above front, flamboyant. Hind wing with veins 7 and 8 anastomosing beyond cell; 3 and 5 stalked. Eighth abdominal segment with two pairs of thin hair tufts (very slight in *chilensis*).

Male genitalia with apical process of gnathos small, bifid; harpe with apex oblique; vinculum long; anellus with base of plate somewhat broadly sclerotized, arms moderately long, slightly twisted (in *transilis*); aedeagus moderately stout, long; penis weakly scobinate.

Female genitalia with signum weak or absent; bursa small and finely scobinate; ductus bursae moderately long, finely scobinate toward bursa and genital opening; ductus seminalis from middle of bursa.

Larva "blue or blue green" (Dodd), not banded or conspicuously spotted; two setae in group VII on abdominal segments 7 and 8.

The larvae are solitary feeders in the fruits of *Eulychnia*, *Trichocereus*, and *Platypuntia*.

Egg and egg-laying habits unknown.

Remarks.—This genus is closest to *Amalafrida* but in many characters more nearly resembles *Nanaia*. The maxillary palpi are long in both *Sigelgaita* and *Nanaia* but are not so closely appressed to the face in the former as in the latter. The labial palpi of the males (upcurved in *Sigelgaita*, porrect in *Nanaia*) readily separate the two genera.

KEY TO THE SPECIES OF SIGELGAITA

1. Fore wing with a dark shade from outer end of cell to inner margin; alar expanse over 30 mm.----- 2
- Fore wing with no such marking; alar expanse less than 30 mm.
 3. *transilis*, new species
2. General color of fore wing dark gray (from Chile).- 1. *chilensis*, new species
- General color of fore wing pale brownish fuscous (from Peru).
 2. *huanucensis*, new species

1. SIGELGAITA CHILENSIS, new species

PLATES 31, 42, 50; FIGURES 28-28c, 70-70a, 125-125a, 126

Male.—Palpus, head, and thorax fuscous, strongly irrorated with white; head and collar more whitish than fuscous; posterior margin of thorax shaded with black. Fore wing fuscous, dusted with white, giving the wing an ashy-gray (in some specimens a bluish-gray) color; a white suffusion filling the cell; antemedial line near middle of wing, black, outwardly angulate; from upper angle of cell to middle of inner margin a more or less prominent blackish shade; subterminal band dentate, consisting of a thin, black, inner line, a parallel outer black line, and a central pale line, the dentations of the outer line acute and extended in short dashes onto the veins; a row of black dots along termen between the vein ends. Hind wing whitish, smoky-fuscous toward termen, apex, and costa, and on the veins; cilia white with a pale-fuscous subbasal line.

Alar expanse, 31-42 mm.

Genitalia (figs. 28-28c) with harpe fairly broad, aedeagus somewhat stouter than in *transilis*, vinculum shorter.

Female.—Pattern and color as in the male except smoky-fuscous shading on hind wing somewhat more extended.

Alar expanse, 38-44 mm.

Female genitalia (figs. 70-70a) with signum present, the latter consisting of three or four minute, more or less coalesced, blunt spines.

Type and paratypes.—U.S.N.M. no. 52751. Paratypes also sent to Mr. Dodd.

Type locality.—Ovalle, Chile.

Food plants.—*Eulychnia acida* Philippi, *Trichocereus chiloensis* (Colla).

Remarks.—Described from male type and two male and four female paratypes from the type locality, reared March 7, 9, 10, and 11, 1937, from larvae feeding in fruits of *Eulychnia acida*; and two male and four female paratypes from La Serena, Chile, reared January 6, 12, 13, 1937, from larvae feeding in fruits of *Trichocereus chiloensis*.

Superficially this species and *huanucensis* resemble *Nanaia substituta*. The latter, however, lacks altogether the dark shade between the outer angle of the cell and the inner margin so characteristic of *chilensis* and *huanucensis*. The fore wings of the three species are similar, long and narrow and of about the same size and shape.

2. SIGELGAITA HUANUCENSIS, new species

PLATE 42; FIGURES 71-71a

Male.—Similar to that of *chilensis*, except as follows: Paler, white dusting on head, thorax, and fore wing more pronounced; general

color of fore wing brownish rather than gray; transverse dark shade from outer upper angle of cell to inner margin pale brown; antemedial and subterminal lines interrupted, the latter indicated only by blackish scaling on the veins; a pale brownish shade in area bordering inner margin; hind wing pure white, with a very faint fuscous shade along costa and a thin pale-fuscous line on termen for a short distance from apex.

Alar expanse, 45 mm.

Female.—Similar to the male in color and markings except that on the hind wing the fuscous line on the termen is a trifle broader and extends nearly to the anal angle of the wing. There is also some fuscous scaling on the veins.

Alar expanse, 45 mm.

Genitalia (figs. 71-71a) without signum.

Type and paratype.—U.S.N.M. no. 52752.

Type locality.—Huánuco, Peru.

Food plant.—*Opuntia (Platypuntia) ficus-indica* (Linnaeus).

Remarks.—Described from female type and male paratype from the type locality, reared December 12, 1928, by R. C. Mundell from larvae feeding in the fruits of *Opuntia (Platypuntia) ficus-indica*.

The male paratype was in rather poor condition when received and had no abdomen.

3. SIGELGAITA TRANSILIS, new species

PLATES 30, 50; FIGURES 27-27d, 127-127c

Male.—Palpi, head, thorax, and fore wing dark grayish fuscous finely peppered with white, giving them a slate-gray color. Fore wing with antemedial and subterminal lines obscured, indicated by faint whitish lines bordered, for a short distance from costa, by blackish streaks; discal spot at end of cell blackish, rather large; a row of black dots along termen between the vein ends.

Alar expanse, 26 mm.

Genitalia (figs. 27-27c) with harpe narrower than that of *chilensis*, vinculum considerably longer, and aedeagus slenderer and appreciably tapering toward apex.

Female.—Unknown.

Type.—U.S.N.M. no. 52753.

Type locality.—Santa Eulalia, Peru.

Food plant.—*Trichocereus* sp.

Remarks.—Described from male type reared November 26, 1936, by Johannes Wille from larva feeding in fruit of an undetermined species of *Trichocereus* (Wille no. 329-36).

On some of its characters this species would fit better in the following genus (*Amalafrida*) than in *Sigelgaita*. The male antenna (figs. 127a-c) has flattened setae on the first five or six segments of the shaft. In *transilis* these setae are on the shaft itself as well as on the inner row of pectinations. Neither *chilensis* nor *huanucensis* shows any trace of such setae. This one character, however, is all that suggests association with *Amalafrida leithella*. The maxillary palpus and the larval habits show that *transilis* belongs with *chilensis* and *huanucensis* rather than with *leithella*.

15. AMALAFRIDA, new genus

Genotype.—*Cactoblastis leithella* Dyar.

Antenna of male bipectinate; on each of the inner pectinations of the first five segments a row of from three to five flattened, spinelike setae (figs. 128a-c); antenna of female simple and finely pubescent. Labial palpus of male obliquely ascending, of female obliquely porrect. Maxillary palpus squamous. Hind wing with veins 7 and 8 anastomosing for over half their length beyond cell; veins 3 and 5 stalked. Eighth abdominal segment of male with two pairs of ventrolateral hair tufts.

Male genitalia with apical process of gnathos bifid; harpe with apex oblique; vinculum long; anellus with base of plate rather broadly sclerotized, arms long, slightly twisted; aedeagus long, moderately stout; penis scobinate.

Female genitalia without signum; bursa copulatrix large, weakly and scatteringly scobinate; ductus bursae long, slender; ductus seminalis from about middle of bursa.

Larvae "grayish in color with a tendency toward pale transverse bands after the manner of *Olycella* larvae" (Dodd); solitary tunnelers in *Platypuntia*.

Egg unknown.

Remarks.—The genus, at present, is represented by only the type species. When Dyar described the latter he had only one female before him. Had he seen a male he never would have placed it in *Cactoblastis*, to which the moth bears only a superficial resemblance. The new genus is closest to *Sigelgaita*, one species of which (*transilis*) also has setiferous pectinations on some of the basal segments of the male antennal shaft. The form of the maxillary palpi, as well as the shape of the fore wings, distinguishes the two genera. In *Sigelgaita* the fore wing is much longer in proportion to its width and the termen more rounded than is the case in *Amalafrida*. According to Dodd, *leithella* differs markedly from the species of *Sigelgaita* in larval and pupal habits.

I. AMALAFRIDA LEITHELLA (Dyar)

PLATES 31, 42, 50; FIGURES 29-29d, 68-68a, 128-128c, 129

Cactoblastis leithella DYAR, Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928.

Male.—Palpi whitish, peppered with pale fuscous. Head and thorax ochereous-fuscous with a very faint rufous tint, some white dusting on thorax and the thoracic hind margin shaded with black. Fore wing with the areas between cell and costa, between vein 1b and inner margin for a short distance, and along costal half of termen white with a scattering of black scales; ground color of remaining areas ochereous-fuscous, very faintly shaded with rufous above inner margin; transverse and discal markings black; antemedial line incomplete, indicated by a thin, blackish, irregular line from inner margin to cell and a broad black streak from costa to about middle of the fold (in some specimens this fuses with a black streak, which extends from middle of vein 1b to end of cell); subterminal line black, faint (obscured below vein 6 in some specimens), sinuate and dentate, outwardly bordered by a whitish line and beyond this by a second, very faint, parallel, pale-fuscous line; at end of cell a large, irregular, black spot; a line of distinct black dots along termen between the vein ends. Hind wing white, semihyaline, with a narrow pale-fuscous shade along costa and termen; cilia white with a fuscous basal band.

Alar expanse, 30-32 mm.

Genitalia (figs. 29-29c) with characters as given for the genus.

Female.—Similar to the male in color and markings except hind wing dark smoky fuscous shading to white toward base.

Alar expanse, 31-33 mm.

Genitalia (figs. 68-68a) with bursa very large and irregularly shaped, minutely scobinate.

Type.—In United States National Museum.

Type locality.—Curaçao, Dutch West Indies.

Food plant.—*Opuntia (Platypuntia)* sp.

Distribution.—DUTCH WEST INDIES: Curaçao (Jan.). VENEZUELA: Caracas (Jan.). COLOMBIA: Province of Colombia (Jan.).

Nine specimens examined.

Remarks.—Superficially *leithella* resembles *Cactoblastis cactorum* but is easily distinguished on structural characters of the male and female genitalia and of the male antennae.

16. Genus OZAMIA Ragonot

Ozamia RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 34, 1901. (Genotype: *Trachonitis lucidalis* Walker.)

Antenna of male serrate (except in *hemilutella* and *punicans*, where it is simple) and pubescent with a series of modified, papilla-

like setae on the inner side of several basal segments of the shaft (fig. 130a); antenna of the female simple and pubescent. Labial palpi obliquely ascending in both sexes. Maxillary palpus squamous. Hind wing with veins 7 and 8 anastomosing beyond the cell; 3 and 5 stalked. Eighth abdominal segment bearing one pair or two (*odiosella*) pairs of ventrolateral hair tufts.

Male genitalia with apex of gnathos small or moderately large, bifid; apex of harpe oblique (except in *punicans*); vinculum long; anellus with base of plate broadly rather than narrowly sclerotized, arms long, slightly twisted and curved; aedeagus rather long and moderately stout (except in *lucidalis*); penis scobinate.

Female genitalia with signum weak or absent (*lucidalis*), when present developed as a thin, short, scobinate or shortly thorned plate or a series or cluster of small, weak spines; bursa copulatrix minutely scobinate, at least toward ductus bursae (wrinkled in the South American species); ductus bursae long or moderately long, scobinate toward bursa; ductus seminalis from bursa near signum.

Larvae wine-colored, olive-green, or blackish, not banded or conspicuously spotted; with two setae in group VII of abdominal segments 7 and 8; solitary feeders in fruits and flower buds of *Opuntia* and *Cereus*, sometimes (some South American species) in the stems of *Cereus*.

Eggs laid singly.

Remarks.—This genus divides into two natural groups: The North American species with unwrinkled bursa and minutely scobinate ductus bursae, and all fruit or bud feeders, and the South American species with wrinkled bursa and coarsely scobinate ductus bursae and either fruit or stem feeders. The West Indian species (*lucidalis*) is anomalous in some genitalic characters (small abdominal tufts, rather slender aedeagus, long ductus bursae, and no signum), but on habitus and other characters it appears closely allied to the North American group. When males of all the species are known it may be possible to give a separate generic designation to the South American forms, but in the absence of definitive male characters that does not seem justified.

The papillalike setae in the male antennal shaft of *Ozamia* also occur in *Cactobrosis* and *Zophodia*, but the last two genera are distinguished by filiform maxillary palpi.

Seven species are here recognized as belonging to the genus. Its distribution appears to be the southwestern part of the United States, Central and South America, and the West Indies.

KEY TO THE SPECIES OF OZAMIA

1. Fore wing dark gray with white transverse antemedial and subterminal lines, but with very little white marking or dusting otherwise----- 4. *thalassophila* Dyar
 Fore wing sordid white or gray, heavily dusted with white in some areas----- 2
2. Predominant color of moth sordid white; ductus bursae of female finely scobinate (West Indies, North and Central America)----- 3
 Predominant color of moth gray; ductus bursae of female coarsely scobinate (South America)----- 5
3. Area bordering inner margin of fore wing shaded with ferruginous; female without signum (West Indies)----- 1. *lucidalis* (Walker)
 Area bordering inner margin of fore wing not ferruginous; female with signum (United States and Mexico)----- 4
4. Fore wing with a greenish tint on area bordering inner margin (discernible only in fresh specimens); signum of female a short line of minute spines (southern California).
 3. *odiosella fuscomaculella* (Wright)
 No such greenish tint on fore wing; signum of female a narrow, minutely spined plate (Texas and eastern Mexico)--- 2. *odiosella* (Hulst)
5. General color of fore wing dark gray; midcostal half of wing white finely peppered with black----- 5. *stigmaferella* (Dyar)
 General color of fore wing paler gray; midcostal half of wing ashy white (an even peppering of whitish and fuscous scales)----- 6
6. Fore wing with large pale rust-colored blotches at base and on inner half----- 7. *punicans*, new species
 Fore wing with area between lower vein of cell, vein 2, and inner margin clear yellow and unmarked----- 6. *hemilutella* Dyar

1. OZAMIA LUCIDALIS (Walker)

PLATES 32, 41; FIGURES 30-30e, 66-66a

Trachonitis lucidalis WALKER, List of specimens of lepidopterous insects in the collection of the British Museum, vol. 27, p. 39, 1863.

Ozamia lucidalis (Walker) RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 34, 1901.

Male.—Palpi, head, thorax, and fore wing sordid white. Fore wing with ferruginous-fuscous spottings on the area bordering inner margin; transverse markings black, shading to ferruginous-fuscous toward inner margin; antemedial line angulate, white, bordered on inner and outer sides by black or ferruginous, the outer black marking at costa a broad spot; subterminal line dentate, slanting from costa near apex to outer fourth of inner margin, bordered inwardly and outwardly by dark lines, shading from black to ferruginous; discal spot at end of cell irregular, frequently extended beyond cell into two short dashes, black; a row of black dots along termen at the vein ends. Hind wing white, semihyaline, with a fine fuscous line along termen; cilia white with a faint, dark, subbasal line. Abdominal tufts small.

Alar expanse, 25–26 mm.

Genitalia (figs. 30–30d) with apical process of gnathos small; end of vinculum bluntly rounded.

Female.—Similar to the male in color and markings, except for a stronger fuscous line on termen of hind wing.

Alar expanse, 26–30 mm.

Genitalia (figs. 66–66a) without signum; bursa and part of ductus bursae minutely scobinate; ductus bursae long, slender, bent at middle.

Type.—In British Museum.

Type locality.—Santo Domingo.

Food plant.—*Opuntia (Platypuntia)* sp.

Distribution.—WEST INDIES: *Cuba, Jamaica*, Kingston (Jan.). I have seen no specimens from the type locality.

Seven specimens examined.

Remarks.—This species is easily identified by the characters given in the key. It has the smallest bursa of any *Ozamia*, and there is no trace of a signum.

2. OZAMIA ODIOSSELLA (Hulst)

PLATES 33, 41; FIGURES 33–33d, 34, 64–64a

Nephopteryx odiosella HULST, Entomologica Americana, vol. 3, p. 132, 1887.

Salebria odiosella (HULST), Trans. Amer. Ent. Soc., vol. 17, p. 155, 1890;

U. S. Nat. Mus. Bull. 52, p. 425, 1903.—RAGONOT, Mémoires sur les Lépidoptères, vol. 7, p. 366, 1893.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5645, 1917.

Ozamia clarefacta DYAR, Insector Inscitiae Menstruus, vol. 7, p. 55, 1919.

(New synonymy.)

Male.—Ground color and markings similar to those of *lucidalis* except that transverse markings are blackish throughout, paling somewhat toward inner margin but not shading into ferruginous; no ferruginous coloring on fore wing. In fresh specimens a green shading on area bordering inner margin of fore wing and on collar of thorax. Abdominal tufts (fig. 33d) much stronger than in *lucidalis* and in two distinct pairs.

Alar expanse, 23–28 mm.

Genitalia (figs. 33–33c, 34) with apical process rather large; end of vinculum bluntly angulate.

Female.—Similar to the male in color and markings except that the fuscous line along the termen of the hind wing is a trifle stronger.

Alar expanse, 24–28 mm.

Genitalia (figs. 64, 64a) with signum a narrow, minutely spined plate; bursa copulatrix smooth except toward ductus bursae, where it is finely scobinate; ductus bursae of moderate length, swollen toward bursa.

Types.—In United States National Museum (*odiosella* and *clarefacta*).

Type localities.—Texas (*odiosella*); Orizaba, Mexico (*clarefacta*).

Food plants.—*Opuntia* (*Platypuntia*) spp.

Distribution.—UNITED STATES: Texas, Brownsville, Victoria (May), Burnet County (Oct.), Uvalde (June, July), Kerrville (May, June), San Benito (Aug.). MEXICO: Orizaba (Apr.), Jalapa.

Twenty-two specimens examined.

Remarks.—In the original description of *odiosella* Hulst called his specimen a male and gave the type locality as Colorado. In his 1890 paper he gives the locality as "central Texas" and shifts the species from *Nephopteryx* to *Salebria*. Why he ever put it in either genus is a mystery; for it obviously has but seven veins in the hind wing. What is presumably Hulst's original type is before me. It came from the Fernald collection and bears Hulst's label: "*Nephopteryx odiosella* Hulst, Type, Tex." It is a female, as is Dyar's type of *clarefacta*. Dyar evidently considered his name a synonym for he had all the North American specimens under *odiosella* with *clarefacta* placed after it. The two types are identical in genitalic structure, color, and markings.

3. OZAMIA ODIOSSELLA FUSCOMACULELLA (Wright), new combination

PLATES 32, 41, 50; FIGURES 31–31c, 67, 130–130a

Euzophera fuscomaculella WRIGHT, Ent. News, vol. 27, p. 27. 1916.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5723, 1917.

Ozamia heliophila DYAR, Insector Inscitiae Menstruus, vol. 13, p. 222, 1925. (New synonymy.)

This variety is distinguished from typical *odiosella* only by its distribution, the lack of any green shading along the inner margin of the fore wing (a character seen only in fresh specimens), and the character of the signum of the female. In *fuscomaculella* the signum consists of a thin, short line of minute spines. A paratype (male) of *fuscomaculella* from the Barnes collection is before me. It agrees in every detail with the male type of *heliophila*.

Types.—In collection of W. S. Wright (*fuscomaculella*); United States National Museum (*heliophila*).

Type localities.—San Diego, Calif. (*fuscomaculella*); Los Angeles, Calif. (*heliophila*).

Food plants.—*Opuntia* (*Platypuntia*) spp.

Distribution.—UNITED STATES: California, San Diego (May, June, Aug.), Los Angeles (July), Pasadena (Aug.).

Twelve specimens examined.

Remarks.—I was inclined to treat *fuscomaculella* and *heliophila* as nothing more than synonyms of *odiosella*, but Mr. Dodd informs

me moths of *odiosella* (= *clarefacta*), when alive, have a decidedly greenish tint, while living adults of *fuscomaculella* (= *heliophila*) are uniformly "gray" with no suggestion of green, and that this difference corresponds with the distribution of the two forms; namely, southeastern Texas and eastern Mexico as against the coastal region of southern California. Such differences seem to indicate geographical races, but, in view of the similarity of the two forms otherwise, not distinct species.

4. OZAMIA THALASSOPHILA Dyar

PLATES 41, 50; FIGURES 63-63a, 131-131a

Ozamia thalassophila DYAR, Insector Inscitiae Menstruus, vol. 13, p. 15, 1925.

Female.—Palpi, head, thorax, and fore wing dark grayish fuscous, lightly sprinkled with white. Fore wing with some white dusting on costal half and a slightly more brownish shade on inner half; antemedial and subterminal transverse lines whitish, bordered with black or blackish fuscous, the pattern as in *lucidalis* and *odiosella*; discal spot at end of cell curved, black; between this and subterminal lines one or two small, obscure, blackish dots; upper and lower veins of cell faintly outlined by white scales; a row of black dots along termen at or close to the vein ends; cilia pale ocherous-fuscous. Hind wing white with a narrow fuscous shade along termen; cilia white, with a fuscous subbasal line.

Alar expanse, 28 mm.

Genitalia (figs. 63-63a) with signum a small cluster of two or three more or less fused and minute spines; bursa copulatrix partially wrinkled (in the region of the signum); ductus bursae of moderate length, finely scobinate toward bursa.

Type.—In United States National Museum.

Type locality.—Oceanside, Calif.

Food plant.—*Opuntia* (*Cylindropuntia*) sp.

Remarks.—Known only from the unique female type, reared August 1924 from larva in a *Cylindropuntia*, presumably feeding in the fruit.

5. OZAMIA STIGMAFERELLA (Dyar), new combination

PLATE 41; FIGURES 62-62a

Zophodia stigmaferella DYAR, Insector Inscitiae Menstruus, vol. 10, p. 17, 1922.

Female.—Palpi, head, and thorax dark grayish fuscous sparsely sprinkled with white. Fore wing dark grayish fuscous; extreme base black; remainder of basal area and area between cell and costa and to the subterminal line white lightly dusted with black; antemedial line obsolete, indicated only by a large black spot on costa (cor-

responding to the black shade outwardly bordering the white antemedial line in the North American species of *Ozamia*); subterminal line whitish, dentate, bordered inwardly and outwardly by black; a short, dentate, black line from vein 8 to vein 2, midway between the end of cell and the subterminal line and parallel with the latter; a black curved mark at end of cell; a row of black dots along termen at or near the vein ends; a faint whitish color dusted with black in apical area. Hind wing white, semihyaline, with a fuscous shade at apex and for a short distance along termen; cilia whitish with a very faint fuscous subbasal line.

Alar expanse, 26 mm.

Genitalia (figs. 62-62a) with signum a small buttonlike thorn; bursa copulatrix wrinkled and finely scobinate; ductus bursae long, coarsely scobinate toward bursa.

Type.—In United States National Museum.

Type locality.—Catamarca, Argentina.

Food plant.—*Cereus validus* Haworth.

Remarks.—This species is known only from the female type reared March 7, 1921, by W. B. Alexander from a larva that had excavated a hollow in a stem of *Cereus validus*.

O. stigmaferella and the two following species (*hemilutella* and *punicans*) are the South American representatives of the genus and differ from the North American and West Indian forms in having the ductus bursae of the female coarsely scobinate and the bursa copulatrix decidedly wrinkled.

6. OZAMIA HEMILUTELLA Dyar

PLATES 33, 41; FIGURES 35-35d, 65-65a

Ozamia hemilutella DYAR, Insecutor Inscitiae Menstruus, vol. 10, p. 17, 1922.

Male.—Palpi, head, and thorax brownish fuscous, finely and evenly sprinkled with white, making the general color (to the naked eye) pale gray; collar of thorax with a slight yellowish tint. Fore wing with area between lower vein of cell, vein 2, and inner margin pale yellow without any markings; remainder of wing pale gray, concolorous with head and thorax; antemedial line obsolete: from costa just before middle to middle of lower vein of cell, a rather broad, transverse, brownish shade; a brown discal dot at end of cell and some brown shading just beyond; subterminal line faint, weakly dentate, parallel with termen, bordered inwardly and outwardly by thin faintly brownish lines; a row of minute black dots along termen at the vein ends; cilia pale gray. Hind wing white, semihyaline with a thin fuscous line along termen and some fuscous shading bordering the costa. Abdomen with one pair of strong tufts.

Alar expanse, 29 mm.

Genitalia (figs. 35-35c) with apical process of gnathos small; end of vinculum bluntly angulate.

Female.—Color and markings as in the male.

Alar expanse, 27-30 mm.

Genitalia (figs. 65-65a) with signum a single, weak, irregular, thornlike patch; bursa copulatrix wrinkled and finely scobinate; ductus bursae coarsely scobinate toward bursa.

Type.—In United States National Museum.

Type locality.—La Rioja, Argentina.

Food plant.—*Cereus validus* Haworth.

Distribution.—ARGENTINA: *Rioja*, La Rioja; *Santiago del Estro*.

Three specimens (one male and two females) examined.

Remarks.—The moth is easily identified by the clear yellow inner area of the fore wing. The larvae feed in the fruits and flower buds and, possibly, to some extent, in the stems of *Cereus*. Dodd states that they also attack fruits of *Platypuntias*.

7. OZAMIA PUNICANS, new species

PLATES 32, 40; FIGURES 32-32c, 61-61a

Male.—Palpi fuscous sprinkled with white. Head and thorax fuscous heavily dusted with white and more or less shaded with pale rust color, especially on top of head and on collar of thorax. Fore wing pale gray (fuscous heavily dusted with white) marked with darker gray and with large blotches of pale rust color; the rust shade filling about one-fourth of the basal area and nearly all the area between antemedial and subterminal lines, lower vein of cell, vein 2, and vein 1b; antemedial line obscure, indicated chiefly by a rather broad dark-gray shade from costa to lower vein of cell and a thin dark-gray line thence to inner margin; subterminal line faint, somewhat sinuate but not dentate, approximately parallel with termen, bordered inwardly and outwardly by obscure dark gray; apical mark at end of cell irregular, dark gray; between cell and subterminal line some faint rust shading in the interspaces between the veins; a row of black dots along termen between the vein ends; cilia pale rust-red. Hind wing white, semihyaline, with a fuscous shade in costal area to top of cell and vein 8, some fuscous shading on the vein ends, and a fine fuscous line along termen to vein 1b; cilia shiny white. Abdominal tufts as in *hemilutella*.

Alar expanse, 36-38 mm.

Genitalia (figs. 32-32c) with apical process of gnathos moderately large; apex of harpe more rounded than in other species of *Ozamia*; end of vinculum more rounded than angulate and lateral margins excavate; penis bearing a number of coarse spines.

Female.—Color and markings as in the male.

Alar expanse, 38–40 mm.

Genitalia (figs. 61–61a) larger than those of any other *Ozamia*; with signum a small granulose plate containing a stubby central thorn; bursa copulatrix wrinkled and finely scobinate; ductus bursae long, very coarsely scobinate toward bursa.

Type and paratypes.—U.S.N.M. no. 52755. Paratypes also sent to Mr. Dodd.

Type locality.—Tapia, Tucuman, Argentina.

Food plant.—*Cereus validus* Haworth.

Remarks.—Described from male type and two male and four female paratypes from the type locality and reared by R. C. Mundell October 19, 23, 25, 28, 29, and 31, 1936, and October 17, 1933, from larvae boring in the stems of *Cereus validus*.

According to Dodd *punicans* differs from other species of *Ozamia* in that it is a stem borer and apparently does not attack the fruits or flower buds. It differs also in that the apex of the harpe is not definitely oblique, and the maxillary palpi are somewhat narrowly scaled. However, the latter are of the squamous rather than the filiform type, and from its general habitus the species is obviously closely related to *hemilutella*. The moth can be easily identified by the rust-red cilia and blotches on the fore wing.

17. Genus CACTOBROSIS Dyar

Cactobrosis DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 406, 1915; Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928. (Genotype: *Moodna elongatella* Hampson.)

Antenna of male with a series of modified, papillalike setae on the inner sides of several basal segments of the shaft, bipectinate (*fernaldialis*, *longipennella*) or strongly serrate and pubescent (*maculifera*, *strigalis*); antenna of female simple and shortly pubescent. Labial palpus upturned in the male, oblique in the female. Maxillary palpus filiform (fig. 134a). Hind wing with veins 7 and 8 anastomosing beyond the cell; 3 and 5 shortly stalked. Eighth abdominal segment bearing a pair of ventrolateral hair tufts (the tufts long and dense except in *strigalis*).

Male genitalia with apex of gnathos large, bifid; apex of harpe evenly rounded; vinculum long (moderately long in *strigalis*); anellus with base of plate narrowly sclerotized, arms long, slender, slightly twisted; aedeagus long, stout (shorter and less stout in *strigalis*); penis more or less densely pubescent (armed with short hairlike spines).

Female genitalia without signum; ductus bursae long, finely scobinate only at genital opening or (in *strigalis* only) sparsely so at junction of bursa copulatrix and ductus bursae, with two small sclerotized dorsal plates and a single ventral plate at genital opening (the ventral plate absent in *strigalis*); bursa copulatrix large, smooth (except in *strigalis*, in which it has a few minute scobinations); ductus seminalis from near end of bursa.

Larvae bluish, not banded or conspicuously spotted; with two setae in group VII on abdominal segments 7 and 8; gregarious feeders in *Ferocactus*, *Echinocereus*, *Peniocereus*, and, probably, *Carnegiea*.

Eggs laid singly.

Remarks.—The genus as here defined is distinguished from all other genera of the cactus-feeding group by its filiform maxillary palpi. *Zophodia*, which it resembles in most structural characters, is not a cactus-feeding genus, has the male antenna unserrate, the labial palpus of the female porrect, and a small signum in the bursa copulatrix.

Five species are recognized as belonging to the genus. They are fairly easy to distinguish but subject to so much individual variation in wing markings that it is very difficult to key them satisfactorily.

The known distribution is the southwestern part of the United States and Mexico.

KEY TO THE SPECIES OF CACTOBROSIS

1. Fore wing without transverse markings and with veins strongly outlined in black, the strongest black line from base to termen along upper vein of cell and vein 6; abdominal tufts of male weak----- 5. *strigalis* (Barnes and McDunnough)
Fore wing normally with transverse markings and with some black scaling on veins; but if transverse markings are absent, veins are not strongly lined nor is there a conspicuous black line from base to termen; abdominal tufts of male strong----- 2
2. Fore wing with a strong, submedian, luteous shade; thorax pale clay color----- 3. *maculifera* Dyar
Fore wing sometimes with a faint ochereous-fuscous tint on submedian area, but never with a strongly contrasted luteous shade; thorax grayish fuscous----- 3
3. Fore wing without discal spot or transverse dark markings; a nearly uniform grayish fuscous with a faint brownish tint.
4. *insignatella* Dyar
Fore wing normally with dark discal spot and transverse dark shadings; when suffused, pale slate-gray without brownish overtint----- 4
4. Pectinations of male antenna (at middle) longer than width of segments----- 1. *fernaldialis* (Hulst)
Pectinations of male antenna not longer than width of segments.
2. *longipennella* (Hampson)

1. CACTOBROSIS FERNALDIALIS (Hulst)

PLATES 43, 51; FIGURES 73-73a, 134-134c, 135-135a

Megaphycis fernaldialis HULST, Trans. Amer. Ent. Soc., vol. 13, p. 163, 1886.*Euzophera gigantella* RAGONOT, Nouveaux genres et espèces de Phycitidae et Galleriidae, p. 32, 1888; Mémoires sur les Lépidoptères, vol. 8, p. 51, 1901.*Melitara fernaldialis* (HULST), Trans. Amer. Ent. Soc., vol. 17, p. 172, 1890; U. S. Nat. Mus. Bull. 52, p. 429, 1903.—SCHWARZ, Psyche, vol. 8, Suppl. 1, p. 13, 1899.—RAGONOT, Mémoires sur les Lépidoptères, vol. 8, p. 15, 1901.—HUNTER, PRATT, and MITCHELL, Bur. Ent., U. S. Dept. Agr. Bull. 113, p. 29, 1912.*Honora cinerella* HULST, Journ. New York Ent. Soc., vol. 8, p. 223, 1901; U. S. Nat. Mus. Bull. 52, p. 433, 1903.*Melitara fernaldalis* DYAR, Proc. Ent. Soc. Washington, vol. 7, p. 36, 1905. (Misspelling for *fernaldis* Hulst.)*Cactobrosis fernaldis* (DYAR), Proc. U. S. Nat. Mus., vol. 47, p. 407, 1915; Insector Inscitiae Menstruus, vol. 13, p. 223, 1925 (in part); Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928 (in part).*Cactobrosis fernaldialis* (Hulst) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5696, 1917.

Male.—Antenna bipectinate. Palpi, head, and thorax grayish fuscous dusted with white. Fore wing grayish fuscous dusted with white and more or less blotched with black; some specimens with a faint ochereous-fuscous tint in the middle of the cell and on the area between vein 1b and the cell; normally with antemedial and subterminal transverse markings indistinct, but indicated by whitish angulate and dentate bands shaded inwardly and outwardly by black; a blackish shade at end of cell, often extending to costa; below it on inner margin a similar dark spot; veins 2 to 8 faintly lined with black and in many specimens the fold to a little beyond its middle. Hind wing white, semihyaline, shaded in costal area above vein 6 and cell with pale fuscous, with some fuscous scaling on the veins and a fine fuscous line along termen; anal margin and adjoining cilia faintly ochereous; cilia otherwise white, with a narrow, fuscous, subbasal line.

Alar expanse, 36-47 mm.

Male genitalia essentially like those of *longipennella* but somewhat larger, in size and habitus like those of *maculifera*.

Female.—In color and markings like the male except that there is never any black streak on the fold of the fore wing; some specimens are heavily dusted with black over the entire base of the fore wing as far as the antemedial line; others have the transverse lines and contrasted dark spots almost obliterated and the wing of a pale slate-color with only the faintest remnants of the normal markings.

Alar expanse, 34-50 mm.

Genitalia (figs. 73-73a) with the sclerotized ventral plate in ductus bursae at genital opening smaller than those in *longipennella*, *insignatella*, and *maculifera*.

Types.—In Rutgers College collection (*fernaldialis*); United States National Museum (*cinerella*); Muséum National d'Histoire Naturelle, Paris (*gigantella*).

Type localities.—Arizona (*fernaldialis*, *gigantella*); Santa Rita Mountains, Ariz. (*cinerella*).

Food plants.—*Ferocactus wislizeni* (Engelmann) and probably other species of *Ferocactus*; *Peniocereus greggii* (Engelmann), one reared specimen from Maricopa County, Ariz., in National collection so labeled.

Distribution.—UNITED STATES: Arizona, Catalina Springs (Apr.), Oracle (July), Tucson (June), Baboquivari Mountains (Apr., May, June, July, Aug., Oct., Nov.), Christmas, Redington, Pinal Mountains, Santa Rita Mountains (May, June), Huachuca Mountains (Aug.), Douglas (Apr., May), Mohave County (May), Sells P. O. (Indian Oasis, Apr.), Dewey (June), Maricopa County (July), "en route from Dewey to Salome" (Apr., May); California, San Diego (May, Oct.).

Seventy-three specimens examined.

Remarks.—The synonymy as given here was established by Dyar. However (in 1915, 1925, and 1928), he also listed the Mexican species *longipennella* Hampson and its synonym *elongatella* under *fernaldialis*, incorrectly, I believe, because the forms from Mexico and the United States have different male antennae. In his original description of *gigantella* Ragonot gives the type locality as "Mexico or."; but in his Monograph of the Phycitinae he cites Arizona as the only locality. If the later citation is correct, *gigantella* is presumably a synonym of *fernaldialis*. If, however, eastern Mexico is the locality, the name *gigantella* will probably replace *longipennella* for the Mexican species. It is quite likely that *fernaldialis* also occurs in northern Mexico near the Arizona border; but we have no specimens from that country. All the specimens in the National collection that have been identified as *fernaldialis* are *longipennella*.

In addition to moths reared from *Ferocactus* and *Peniocereus* the National collection contains the moths referred to by E. A. Schwarz (Psyche, 1899) as reared from larvae "feeding in decaying pulp of the Giant Cactus." One of the specimens (a female) bears the following label in Schwarz's handwriting: "bred from cocoons under Giant Cactus. Em. Apr. 15." From this it would appear that *Carnegiea gigantea* (Engelmann) may also be an occasional host.

2. CACTOBROSIS LONGIPENNELLA (Hampson)

PLATES 34, 43, 51; FIGURES 37-37e, 74-74a, 136-136b

Moodna elongatella HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 269, 1901.

Cactobrosis longipennella (Hampson) DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 407, 1915.

Cactobrosis elongatella (Hampson) DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 407, 1915.

Cactobrosis fernaldialis (DYAR, in part), Insector Inscitiae Menstruus, vol. 13, p. 223, 1925; Proc. Ent. Soc. Washington, vol. 30, p. 135, 1928.

Male.—Like that of *fernalidialis* except that pectinations of antenna are about half the length of those on *fernalidialis* (compare figs. 134a, 134b, and 136a, 136b); transverse pale markings on fore wing obsolete in some specimens.

Alar expanse, 34-40 mm.

Genitalia (figs. 37-37d) figured from type of *elongatella*; similar to those of *fernalidialis* except smaller; harpe not so markedly creased.

Female.—Similar in color and markings to the female of *fernalidialis*.

Alar expanse, 33-43 mm.

Genitalia (figs. 74-74a) figured from specimen from Oaxaca; with sclerotized ventral plate in ductus bursae at genitalic opening larger and the opposing small plates on the dorsal wall of the ductus narrower than those of *fernalidialis*.

Types.—In British Museum (*longipennella*); United States National Museum (*elongatella*).

Type localities.—Tres Marias Islands, Mexico (*longipennella*); Orizaba, Mexico (*elongatella*).

Food plant.—Unknown, probably *Ferocactus*.

Distribution.—MEXICO: Orizaba, Oaxaca, Tehuacan (June), Cuernavaca (June, July), Zacualpan (March, Oct.).

Eleven specimens examined. I have seen no examples from the type locality of *longipennella*.

Remarks.—Dyar (1925) made the synonymy of *longipennella* and *elongatella* and sank both names to *fernalidialis*. The differences between their male antennae clearly indicate that *longipennella* and *fernalidialis* are distinct, if very close, species. The differences in female genitalia, while slight, appear to be constant. They are comparative, however, and apparent only when one has slides of both species before him.

3. CACTOBROSIS MACULIFERA Dyar

PLATES 35, 43, 51; FIGURES 38-38d, 75-75a, 137-137a

Cactobrosis maculifera DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 407, 1915; Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928.

Male.—Antenna strongly serrate and fasciculate. Palpi, head, and thorax pale clay color ("luteous"). Fore wing luteous-gray

shaded and spotted with dark grayish fuscous, the luteous tint pronounced on basal third of costa and over the submedian area of the wing; transverse antemedial and subterminal lines obsolete; a fuscous shade from costa before middle to cell, another from costa at middle, and below these corresponding streaks or spots on lower vein of cell and vein lb; a thin blackish line on the fold from its base to near its middle; a similar dark streak on vein lb at outer third; short, broken, dark streaks on the veins at or near the cell; a clouded fuscous spot at end of cell; outer half of costa shaded with fuscous; a row of dark spots along termen at or very close to the vein ends. Hind wing white, semihyaline with only the faintest indication of a fuscous line on termen toward apex.

Alar expanse, 32–45 mm.

Genitalia (figs. 38–38d) agreeing in size and nearly all details with those of *longipennella* except that the arms of the anellus are a trifle longer in *maculifera*.

Female.—In color and pattern like the male except that there is some gray shading on the head and thorax and considerably more gray on the fore wing (the single specimen before me is in much better condition than the males, which may account for some of the differences); basal third of wing clouded with dark fuscous; terminal area more faintly clouded; subterminal line faintly indicated, sharply angulate at middle, broken below; the luteous shade more contrasted than in the male, but restricted to middle of cell and the area between veins lb and the fold. Hind wing white, semihyaline with a narrow fuscous shade along termen and on the veins near their apices.

Alar expanse, 37 mm.

Genitalia (figs. 75–75a) similar to those of *insignatella* but with sclerotized ventral plate in ductus bursae at genital opening smaller.

Type.—In United States National Museum.

Type locality.—Oaxaca, Mexico.

Food plant.—Unknown.

Distribution.—MEXICO: *Oaxaca*, Salina Cruz (Sept.).

Eight specimens examined.

Remarks.—This species may be distinguished from other species of *Cactobrosis* by the strong luteous (pale clay) shade on the fore wing and the serrate-fasciculate male antenna.

4. CACTOBROSIS INSIGNATELLA Dyar

PLATE 43, FIGURE 76

Cactobrosis insignatella DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 407, 1915; Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928.

Male.—Unknown.

Female.—Palpi, head, thorax, and fore wing of a soft, nearly uniform grayish fuscous (with a more brownish than slate-gray tint). Fore wing without discal spot or transverse dark markings; costa at base very slightly paler than ground color of wing, concolorous with collar of thorax; an obscure pale shade on midcosta and the faintest indication of a pale subterminal line, the latter broadly angulate at middle; some faint dark shading on the veins from cell to termen and a row of small, dark dots along termen near the vein ends. Hind wing white, semihyaline, with a pale fuscous line along termen; cilia white with a narrow, pale fuscous, subbasal line.

Alar expanse, 37–40 mm.

Genitalia (fig. 76) with the dorsal plates in ductus bursae at genital opening strongly sclerotized; ventral plate at opening slightly larger than in any of the other species.

Type.—In United States National Museum.

Type locality.—Oaxaca, Mexico.

Food plant.—Unknown.

Remarks.—Known only from the female type and paratype from the type locality. These specimens resemble suffused specimens of *fernaldialis* and *longipennella* except that the latter are more slate colored. The slight genitalic differences seem to indicate that *insignatella* is a good species and not a mere color form.

5. CACTOBROSIS STRIGALIS (Barnes and McDunnough)

PLATES 35, 44, 51; FIGURES 39–39c, 77, 138–138a, 139–139a

Euzophera strigalis BARNES and McDUNNOUGH, Can. Ent., vol. 44, p. 127, 1912; Contr. Nat. Hist. Lepid. North America, vol. 1, no. 4, pl. 1, fig. 14, 1912.

Cactobrosis strigalis (BARNES and McDUNNOUGH), Check list of the Lepidoptera of Boreal America, no. 5697, 1917.—DYAR, Insector Inscitiae Menstruus, vol. 13, p. 224, 1925; Proc. Ent. Soc. Washington, vol. 30, p. 136, 1928.

Male.—Antenna strongly serrate. Palpi, head, thorax, and fore wing grayish fuscous sprinkled with whitish (the ends of the scales white) making the ground color a pale slate-gray. Fore wing with the veins outlined in black, the strongest black line being that along upper vein of cell and vein 6; transverse lines and discal mark absent; no dots along termen. Hind wing white, semihyaline, with a faint fuscous shade bordering costa, and a fine fuscous line along termen for a short distance from apex. Tufts on eighth abdominal segment weak.

Alar expanse, 30–43 mm.

Genitalia (figs. 39–39c) with vinculum moderately long, but considerably shorter than in other species of *Cactobrosis*; aedeagus also shorter.

Female.—Similar to the male in color and markings except that hind wing is more or less suffused with smoky fuscous beyond the base, especially along the veins and termen.

Alar expanse, 33–44 mm.

Genitalia (fig. 77) with sclerotized plates on dorsal wall of ductus bursae behind the genital opening well developed, but with opposing ventral sclerotized plate absent, replaced by minute scobinations; ductus bursae shorter than in other *Cactobrosis* species; bursa copulatrix not entirely smooth, having a few weak scobinations toward ductus.

Type.—In United States National Museum.

Type locality.—Eureka, Utah.

Food plants.—*Echinocereus rigidissimus* (Engelmann), *E. pectinatus* (Scheidweiler), and probably a number of other species of *Echinocereus*.

Distribution.—UNITED STATES: *Utah*, Eureka (Aug., Sept.), Dividend (Sept.); *California*, San Geronio Pass (July); *Arizona*, Tucson (Apr., July), *Texas*, Brewster County (July, Aug.), Alpine (Apr.). MEXICO, Mexico City (National University, male reared from *E. pectinatus*, June 3, 1931).

Eighteen specimens examined.

Remarks.—In a number of respects (its shorter vinculum and ductus bursae, its weak abdominal tufts, and its partially scobinate bursa copulatrix) this species fits badly into *Cactobrosis*. Eventually it may need a separate generic designation; but this had better be postponed until the life histories of the other species of *Cactobrosis* are more fully known.

The fore wing markings of *strigalis* resemble those of *Eremberga leuconips* (Dyar). The latter, however, is easily distinguished by its squamous maxillary palpi.

18. Genus ZOPHODIA Hübner

Zophodia HÜBNER, Verzeichniss bekannter Schmettlinge [sic], p. 370, [1825].—RAGONOT, Ent. Monthly Mag., vol. 22, p. 19, 1885.—HULST, Trans. Amer. Ent. Soc. vol. 17, p. 172, 1890.—HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 18, 1901.—SPULER, Die Schmetterlinge Europas, vol. 2, p. 207, 1910.—DYAR, Insector Inscitiae Menstruus, vol. 13, p. 220, 1925. (Genotype: *Tinea convolutella* Hübner.)

Dakruma GROTE, Bull. U. S. Geol. and Geogr. Surv. Terr., vol. 4, p. 702, 1878. (Genotype: *Dakruma turbatella* Grote.)

Antenna of male pubescent and with a series of modified, papilla-like setae on the inner sides of several basal segments of the shaft; of female simple and very shortly pubescent. Labial palpus oblique in the male, porrect in the female. Maxillary palpus filiform. Hind wing with veins 7 and 8 anastomosing beyond the cell; 3 and 5 con-

nate (in occasional specimens very shortly stalked). Eighth abdominal segment with a pair of weak ventrolateral hair tufts.

Male genitalia with apical process of gnathos bifid, large; apex of harpe evenly rounded; vinculum long; anellus with base of plate narrowly sclerotized, arms moderately long, slender, slightly twisted; aedeagus moderately long and stout; penis partially ribbed and pubescent.

Female genitalia with a small weak signum developed as a plate with an inwardly projecting flange; bursa copulatrix small, minutely and very weakly scobinate; ductus bursae minutely scobinate, with two rather large, sclerotized, dorsal plates at genital opening; ductus seminalis from bursa near signum.

Larva white or green, faintly striped longitudinally but without cross bands or conspicuous spots; with two setae in group VII on abdominal segments 7 and 8.

The larvae are solitary feeders in the fruits of gooseberry and currant.

Eggs laid singly.

Remarks.—This genus is close to *Cactobrosis* but is not one of the cactus-feeding group. I treat it here because so many cactus phycitids have been referred to it at one time or another and because in genitalic characters it (with some species now listed under *Laetilia* and *Euzophera*) resembles more closely the cactus feeders than any other group in the Phycitinae.

As here defined the genus is limited to its type species. Its distribution is central and southern Europe, the northern part of the United States, and southern Canada.

1. ZOPHODIA CONVOLUTELLA (Hübner)

PLATES 34, 44, 51; FIGURES 36-36c, 78-78c, 132-132a, 133-133a

Tinea convolutella HÜBNER, Sammlung europäischer Schmetterlinge, Horde VIII, Tineae, fig. 34, 1796.

Tinea grossulariella HÜBNER, Geschichte europäischer Schmetterlinge, Tineae II, C.a.b., fig. 2.a.b.c., [1807-1809] (larva).

Phycis grossulariella (Hübner) ZINCKEN, Magazin der Entomologie, vol. 3, p. 144, 1818.—TREITSCHKE, Die Schmetterlinge von Europa, vol. 9, pt. 1, p. 172, 1832; vol. 10, pt. 3, p. 275, 1835.—DUPONCHEL, Histoire naturelle des Lépidoptères, vol. 10, p. 206, pl. 279, fig. 9, 1836.

Zophodia grossularialis HÜBNER, Verzeichniss bekannter Schmettlinge [sic], p. 370, [1825]. (Emended spelling for *grossulariella* and to replace *convolutella*.)

Zophodia convolutella (HÜBNER), Verzeichniss bekannter Schmettlinge [sic], p. 370, [1825].—VON HEINEMANN, Schmetterlinge Deutschlands und der Schweiz, Abt. 2, vol. 1, no. 2, p. 190, 1865.—RAGONOT, Ent. Monthly Mag., vol. 22, p. 19, 1885.—HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 20, 1901.—STAUDINGER and REBEL, Catalog der Lepidopteren des palaearctischen

- Faunengebietetes, vol. 2, p. 25, 1901.—SPULER, Die Schmetterlinge Europas, vol. 2, p. 207, 1910.
- Myelois (Zophodia) convolutella* (Hübner) ZELLER, Isis von Oken, 1839, p. 178; 1848, p. 679.
- Homoeosoma convolutella* (Hübner) HERRICH-SCHÄFFER, Systematische Bearbeitung der Schmetterlinge von Europa, vol. 4, p. 107, 1849.
- Pempelia grossulariae* RILEY, 1st Ann. Rept. Ins. Missouri, p. 140, 1869; *Papilio*, vol. 1, p. 108, 1881 (suggests synonymy with *convolutella*).—PACKARD, Guide to the study of insects, p. 331, 1869.
- Dakrura turbatella* GROTE, Bull. U. S. Geol. and Geogr. Surv. Terr., vol. 4, pp. 702, 703, 1878; North Amer. Ent., vol. 1, p. 11, 1879.
- Myelois convolutella* (Hübner) PACKARD, Guide to the study of insects (ed. 7), p. 331, 1880.
- Dakrura grossulariae* (Riley) GROTE, North Amer. Ent., vol. 1, p. 68, 1880.
- Dakrura convolutella* (Hübner) GROTE, New check list of North American moths, p. 55, 1882. (Gives *grossulariae* and *turbatella* as synonyms.)
- Zophodia grossulariae* (Riley) HULST, Trans. Amer. Ent. Soc., vol. 17, p. 173, 1890; U. S. Nat. Mus. Bull. 52, p. 429, 1903.—HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 21, 1901.—DYAR, Proc. Ent. Soc. Washington, vol. 7, p. 37, 1905; Insector Inscitiae Menstruus, vol. 13, p. 221, 1925.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5705, 1917.—PACK, Utah Agr. Exp. Stat. Bull. 216, pp. 1–12, 1930.
- Euzophera franconiella* HULST, Trans. Amer. Ent. Soc., vol. 17, p. 177, 1890.—HAMPSON, Mémoires sur les Lépidoptères, vol. 8, p. 61, 1901.
- Zophodia bella* HULST, Can. Ent., vol. 24, p. 61, 1892.—DYAR, Proc. Ent. Soc. Washington, vol. 6, p. 228, 1904.
- Zophodia franconiella* (Hulst) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, no. 5706, 1917.
- Zophodia grossulariae franconiella* (Hulst) DYAR, Insector Inscitiae Menstruus, vol. 13, p. 221, 1925.
- Zophodia grossulariae ihouna* DYAR, Insector Inscitiae Menstruus, vol. 13, p. 221, 1925. (New synonymy.)
- Zophodia grossulariae dilativitta* DYAR, Insector Inscitiae Menstruus, vol. 13, p. 222, 1925. (New synonymy.)
- Zophodia grossulariae magnificans* DYAR, Insector Inscitiae Menstruus, vol. 13, p. 222, 1925. (New synonymy.)

Male.—Palpi, head, thorax, and fore wing fuscous dusted with white, the white color strongest in central costal area of fore wing, the general color gray. Fore wing with antemedial line outwardly oblique to lower vein of cell and notched between cell and inner margin, white, bordered outwardly by a more or less extended black shade; subterminal line oblique, slightly dentate and sinuate, white, bordered inwardly by a black line and outwardly by a narrow black line for a short distance from costa; the fold and veins at extreme base of wing and in area beyond subterminal line faintly outlined in black; discal mark at end of cell black, curved, rarely replaced by a pair of dots; a row of black dots along termen between the vein ends. Hind wing pale smoky white with a narrow dark line along termen.

Alar expanse, 25–35 mm.

Genitalia (figs. 36–36d) drawn from slide of European specimen. American examples are identical in all details. Vinculum with lateral margins broadly and shallowly excavate, posterior margin straight.

Female.—Color and markings as in the male, except hind wings slightly darker.

Alar expanse, 26–35 mm.

Genitalia (figs. 78–78c) with signum small and weak. The eighth segment collar is subject to considerable variation in the size and shape of the unsclerotized dorsal area. Some variations are shown in figures 78a, 78b, and 78c. These, however, do not conform to the varieties that have been named and can be found in any series from one locality.

Larva.—Body cream-white, becoming bright green toward maturity and just before pupation purplish green; a dusky green, longitudinal, dorsolateral stripe and a fainter, middorsal stripe extend from the prothorax to the tenth abdominal segment.

Types.—No known existing types for *convolutella*, *grossulariella*, or *grossulariae*; Rutgers College collection (*franconiella bella*); British Museum ? (*turbatella*); United States National Museum (*ihouna*, *dilativitta*, *magnificans*).

Type localities.—Germany (*convolutella*, *grossulariella*); Missouri (*grossulariae*); Oldtown, Maine (*turbatella*); Franconia, N. H. (*franconiella*); Massachusetts (*bella*); southern Utah (*ihouna*); San Diego, Calif. (*dilativitta*); Seattle, Wash. (*magnificans*).

Food plants.—*Ribes grossularia* Linnaeus and other *Ribes* species (larva feeding in the fruit).

Distribution.—EUROPE (central and southern). UNITED STATES: Maine, Orono; New Hampshire, Hampton (May), Durham; Missouri; Colorado, Manitou, Denver (Apr.), Fort Collins (Mar., Apr.), Utah, Logan ("June"), Beaver Canyon ("VII"); Oregon; California, San Diego; Washington, Seattle, Bellingham (Apr.). CANADA: Quebec, St. Johns County (Apr.), Mount St. Hilaire (May); Ontario, Hymers; Alberta, Edmonton (May), Bilby (May); British Columbia, Kaslo (Apr.), Wellington (Apr.), Alberni (May), Goldstream (May), Vancouver Island (Apr.).

The foregoing localities are for the specimens before me. The species is generally distributed over the northern part of the United States and southern Canada.

Seventy-four specimens examined.

Remarks.—As far back as 1880 Packard identified the gooseberry feeder in America with the European *convolutella*, and Grote (1882) listed *convolutella* with *grossulariae* and *turbatella* as synonyms.

Later writers, however, all treated *grossulariae* as a distinct species, and it so stands at present in our lists and economic literature. I see nothing either in pattern or genitalic structure to distinguish *grossulariae* from *convolutella* even as a geographic race. The supposed western races named by Dyar are nothing but color forms, differing less from typical European or eastern American forms than do many specimens from a single eastern State. His *ihouna* was described from two faded specimens and *dilativitta* from a single fresh and perfect female. His *magnificans*, though larger than most eastern examples, can be matched in any long series of specimens from Europe or eastern Canada.

The species does not feed upon cactus. It is treated here because its genus has been used as a receptacle for many cactus-feeding species and also because it is similar in genitalic structure to the cactus feeders. In this country it is popularly known as the gooseberry fruit-worm and has a rather extensive economic literature. Only one of the more recent economic references is quoted, but the foregoing synonymy is complete so far as I can judge, and the principal systematic references are cited.

It is the most important lepidopterous pest of the gooseberry here and abroad and often does serious injury. It also is recorded as an occasional enemy of currants.

There is one generation a year, moths flying from mid-April to early in June. About 10 months are passed in the pupal stage, the insects overwintering as pupae in loose cocoons on the ground under fallen leaves or other rubbish.

EXPLANATION OF PLATES

The drawings for the plates accompanying this paper were made under the author's supervision by Mrs. Eleanor A. Carlin, of the U. S. Bureau of Entomology and Plant Quarantine. The female genitalia and head structures were drawn to smaller scale than the male genitalia.

EXPLANATION OF SYMBOLS APPLIED TO GENITALIA

Male

- aGn*, Apical process of gnathos.
An, Anellus.
Hp, Harpe.
pkt, Sclerotized pocket in subbasal area of harpe.
Tn, Elements of a divided transtilla.
U, Uncus.
Vm, Vinculum.

Female

- Bc*, Bursa copulatrix.
Clr, Collar of eighth abdominal segment.
Db, Ductus bursae.
dp, Dorsal plate in ductus bursae at genital opening.
Ds, Ductus seminalis.
Go, Genital opening.
Sn, Signum.
vp, Ventral plate in ductus bursae at genital opening.

PLATE 23

- 1-1f. *Melitara prodenialis* Walker: 1, Ventral view of male genitalia with aedeagus and one harpe omitted; 1a, dorsal view of uncus and tegumen; 1b, gnathos; 1c, elements of divided transtilla; 1d, anellus; 1e, aedeagus, lateral view; 1f, aedeagus, ventral view.
2-2c. *Melitara dentata* (Grote): 2, Ventral view of male genitalia with aedeagus and one harpe omitted; 2a, elements of transtilla; 2b, anellus; 2c, aedeagus.

PLATE 24

- 3-3c. *Olycella junctolineella* (Hulst): 3, Ventral view of male genitalia with aedeagus and one harpe omitted (the apical process of gnathos shown bent somewhat to the side); 3a, elements of transtilla; 3b, anellus; 3c, aedeagus.
4. *Olycella junctolineella pectinatella* (Hampson): Gnathos of male genitalia (the apical process shown in full ventral view).
5-5c. *Olyca phryganoides* Walker: 5, Ventral view of male genitalia with aedeagus and one harpe omitted; 5a, elements of transtilla; 5b, anellus; 5c, aedeagus.

PLATE 25

- 6-6c. *Alberada bidentella* (Dyar): 6, Ventral view of male genitalia with aedeagus omitted; 6a, elements of transtilla; 6b, anellus; 6c, aedeagus.
 7-7c. *Alberada parabates* (Dyar): 7, Ventral view of male genitalia with aedeagus and one harpe omitted; 7a, elements of transtilla; 7b, anellus; 7c, aedeagus.
 8-8d. *Nanaia substituta*, new species: Ventral view of male genitalia with aedeagus and one harpe omitted; 8a, elements of transtilla; 8b, anellus; 8c, aedeagus; 8d, sternite and tergite of eighth abdominal segment of male.

PLATE 26

- 9-9c. *Cactoblastis cactorum* (Berg): 9, Ventral view of male genitalia with aedeagus and one harpe omitted; 9a, elements of transtilla; 9b, anellus; 9c, aedeagus.
 10. *Cactoblastis doddi*, new species: Gnathos of male genitalia.
 11. *Cactoblastis mundelli*, new species: Gnathos of male genitalia.
 12-12c. *Cactoblastis bucyrus* Dyar: 12, Ventral view of male genitalia with aedeagus and one harpe omitted; 12a, elements of transtilla; 12b, anellus; 12c, aedeagus.
 13-13f. *Cahela ponderosella* (Barnes and McDunnough): 13, Ventral view of male genitalia with aedeagus and one harpe omitted; 13a-c, various modifications of apical process of gnathos; 13d, elements of transtilla; 13e, anellus; 13f, aedeagus.

PLATE 27

- 14-14c. *Rumatha bihinda* (Dyar): 14, Ventral view of male genitalia with aedeagus and one harpe omitted; 14a, elements of transtilla; 14b, anellus; 14c, aedeagus.
 15-15c. *Rumatha polingella* (Dyar): 15, Ventral view of male genitalia with aedeagus and one harpe omitted; 15a, elements of transtilla; 15b, anellus; 15c, aedeagus.
 16-16c. *Rumatha glaucatella* (Hulst): 16, Ventral view of male genitalia with aedeagus omitted; 16a, elements of transtilla; 16b, anellus; 16c, aedeagus.
 17-17d. *Tucumania tapiacola* Dyar: 17, Ventral view of male genitalia with aedeagus omitted; 17a, elements of transtilla; 17b, anellus; 17c, aedeagus; 17d, sternite and tergite of eighth abdominal segment of male.

PLATE 28

- 18-18c. *Yosemitia fieldiella* (Dyar): 18, Ventral view of male genitalia with aedeagus omitted; 18a, elements of transtilla; 18b, anellus; 18c, aedeagus.
 19-19c. *Yosemitia didactica* Dyar: 19, Ventral view of male genitalia with aedeagus omitted; 19a, elements of transtilla; 19b, anellus; 19c, aedeagus.
 20-20c. *Yosemitia longipennella* (Hulst): 20, Ventral view of male genitalia with aedeagus omitted; 20a, elements of transtilla; 20b, anellus; 20c, aedeagus.
 21-21d. *Yosemitia graciella* (Hulst): 21, Ventral view of male genitalia with aedeagus omitted; 21a, elements of transtilla; 21b, anellus; 21c, aedeagus; 21d, sternite and tergite of eighth abdominal segment of male.

PLATE 29

- 22-22c. *Eremberga leuconips* (Dyar): 22, Ventral view of male genitalia with aedeagus and one harpe omitted; 22a, elements of transtilla; 22b, anellus; 22c, aedeagus.
- 23-23c. *Eremberga insignis*, new species: 23, Ventral view of male genitalia with aedeagus and one harpe omitted; 23a, elements of transtilla; 23b, anellus; 23c, aedeagus.
- 24-24c. *Eremberga creabates* (Dyar): Ventral view of male genitalia with aedeagus and one harpe omitted; 24a, elements of transtilla; 24b, anellus; 24c, aedeagus.

PLATE 30

- 25-25c. *Parolyca asthenosoma* (Dyar): 25, Ventral view of male genitalia with aedeagus and one harpe omitted; 25a, elements of transtilla; 25b, anellus; 25c, aedeagus.
- 26-26c. *Salambona analamprella* (Dyar): 26, Ventral view of male genitalia with aedeagus and one harpe omitted; 26a, elements of transtilla; 26b, anellus; 26c, aedeagus.
- 27-27d. *Sigelgaita transilis*, new species: 27, Ventral view of male genitalia with aedeagus and one harpe omitted; 27a, elements of transtilla; 27b, anellus; 27c, aedeagus; 27d, eighth abdominal segment of male, showing hair tufts.

PLATE 31

- 28-28c. *Sigelgaita chilensis*, new species: 28, Ventral view of male genitalia with aedeagus and one harpe omitted; 28a, elements of transtilla; 28b, anellus; 28c, aedeagus.
- 29-29d. *Amalafrida leithella* (Dyar): 29, Ventral view of male genitalia with aedeagus and one harpe omitted; 29a, elements of transtilla; 29b, anellus; 29c, aedeagus; 29d, eighth abdominal segment of male, showing hair tufts.

PLATE 32

- 30-30e. *Ozamia lucidalis* (Walker): 30, Ventral view of male genitalia with aedeagus and one harpe omitted (apical process of gnathos partly bent); 30a, gnathos (full ventral view); 30b, elements of transtilla; 30c, anellus; 30d, aedeagus; 30e, tufts of eighth abdominal segment of male.
- 31-31c. *Ozamia odiosella fuscomaculella* (Wright): 31, Ventral view of male genitalia with aedeagus and one harpe omitted; 31a, elements of transtilla; 31b, anellus; 31c, aedeagus.
- 32-32c. *Ozamia punicans*, new species: 32, Ventral view of male genitalia with aedeagus and one harpe omitted; 32a, elements of transtilla; 32b, anellus; 32c, aedeagus.

PLATE 33

- 33-33d. *Ozamia odiosella* (Hulst) (= *clarefacta* Dyar, type): 33, Ventral view of male genitalia with aedeagus and one harpe omitted; 33a, elements of transtilla; 33b, anellus; 33c, aedeagus; 33d, hair tufts on eighth abdominal segment of male.
34. *Ozamia odiosella* (Hulst), Texas specimen: Side view of male genitalia with one harpe omitted.

- 35-35d. *Ozamia hemilutella* Dyar: 35, Ventral view of male genitalia with aedeagus and one harpe omitted; 35a, elements of transtilla; 35b, anellus; 35c, aedeagus; 35d, hair tufts on eighth abdominal segment of male.

PLATE 34

- 36-36e. *Zophodia convolutella* (Hübner): 36, Ventral view of male genitalia with aedeagus omitted (apical process of gnathos bent to one side); 36a, ventral view of apical process of gnathos; 36b, elements of transtilla; 36c, anellus; 36d, aedeagus; 36e, tufts of eighth abdominal segment of male.
- 37-37e. *Cactobrosis longipennella* (Hampson) (= *elongatella* Hampson): 37, Ventral view of male genitalia with aedeagus omitted; 37a, dorsal view of uncus and tegumen; 37b, elements of transtilla; 37c, anellus; 37d, aedeagus; 37e, tufts of eighth abdominal segment of male.

PLATE 35

- 38-38d. *Cactobrosis maculifera* Dyar: 38, Ventral view of male genitalia with aedeagus and one harpe omitted; 38a, dorsal view of denuded harpe showing transverse creases; 38b, elements of transtilla; 38c, anellus; 38d, aedeagus.
- 39-39c. *Cactobrosis strigalis* (Barnes and McDunnough): 39, Ventral view of male genitalia with aedeagus and one harpe omitted; 39a, elements of transtilla; 39b, anellus; 39c, aedeagus.

PLATE 36

40. *Melitara dentata* (Grote): Female genitalia.
- 41-41a. *Melitara prodenialis* Walker: 41, Female genitalia; 41a, dorsal view of eighth segment collar.
- 42-42a. *Olycella junctolineella* (Hulst): 42, Female genitalia; 42a, collar of eighth abdominal segment, dorsal view.
43. *Olycella subumbrella* (Dyar): Collar of eighth abdominal segment, dorsal view.

PLATE 37

- 44-44a. *Olyca phryganoides* Walker: 44, Female genitalia; 44a, collar of eighth abdominal segment, dorsal view.
- 45-45a. *Alberada parabates* (Dyar): 45, Female genitalia; 45a, collar of eighth abdominal segment, dorsal view.
46. *Alberada bidentella* (Dyar): Female genitalia.
47. *Alberada holochlora* (Dyar): Female genitalia.

PLATE 38

- 48-48a. *Cactoblastis cactorum* (Berg): 48, Female genitalia; 48a, collar of eighth abdominal segment, dorsal view.
- 49-49a. *Cactoblastis doddi*, new species: 49, Female genitalia; 49a, collar of eighth abdominal segment, dorsal view.
- 50-50b. *Cactoblastis bucyrus* Dyar: 50, Female genitalia; 50a, collar of eighth abdominal segment, dorsal view; 50b, signum, showing extreme of reduction in the species.
- 51-51a. *Cahela ponderosella* (Barnes and McDunnough): 51, Female genitalia; 51a, collar of eighth abdominal segment, dorsal view.

PLATE 39

52. *Rumatha glaucatella* (Hulst): Female genitalia with eighth-segment collar and ovipositor omitted and with signum shown, much enlarged, to the side of bursa.
53. *Rumatha polingella* (Dyar): Female genitalia with eighth-segment collar and ovipositor omitted.
54. *Rumatha bihinda* (Dyar): Female genitalia.
- 55-55a. *Eremberga leuconips* (Dyar): 55, Female genitalia; 55a, collar of eighth abdominal segment, dorsal view.
56. *Yosemitia* sp.: Female genitalia (see remarks under *Eremberga insignis*, p. 379).

PLATE 40

57. *Yosemitia graciella* (Hulst): Female genitalia (signum shown to the side, much enlarged).
58. *Yosemitia longipennella* (Hulst): Female genitalia with eighth segment collar and ovipositor omitted (signum shown to the side, much enlarged).
- 59-59a. *Tucumania tapiacola* Dyar: 59, Female genitalia; 59a, collar of eighth abdominal segment, dorsal view.
60. *Tucumania porrecta* Dyar: Female genitalia with eighth-segment collar and ovipositor omitted (signum shown to the side, much enlarged).
- 61-61a. *Ozamia punicans*, new species: 61, Female genitalia; 61a, collar of eighth abdominal segment, dorsal view.

PLATE 41

- 62-62a. *Ozamia stigmaferella* (Dyar): 62, Female genitalia; 62a, collar of eighth abdominal segment, dorsal view.
- 63-63a. *Ozamia thalassophila* Dyar: 63, Female genitalia; 63a, collar of eighth abdominal segment, dorsal view.
- 64-64a. *Ozamia odiosella* (Hulst): 64, Female genitalia; 64a, collar of eighth abdominal segment, dorsal view.
- 65-65a. *Ozamia hemilutella* Dyar: 65, Female genitalia; 65a, collar of eighth abdominal segment, dorsal view.
- 66-66a. *Ozamia lucidalis* (Walker): 66, Female genitalia; 66a, collar of eighth abdominal segment, dorsal view.
67. *Ozamia odiosella fuscomaculella* (Wright): Female genitalia.

PLATE 42

- 68-68a. *Amalafriada leithella* (Dyar): 68, Female genitalia; 68a, collar of eighth abdominal segment, dorsal view.
69. *Salambona analamprella* (Dyar): Female genitalia.
- 70-70a. *Sigelgaita chilensis*, new species: 70, Female genitalia; 70a, collar of eighth abdominal segment, dorsal view.
- 71-71a. *Sigelgaita huanucensis*, new species: 71, Female genitalia; 71a, collar of eighth abdominal segment, dorsal view.
- 72-72a. *Nanaia substituta*, new species: 72, Female genitalia; 72a, collar of eighth abdominal segment, dorsal view.

PLATE 43

- 73-73a. *Cactobrosis fernaldialis* (Hulst): 73, Female genitalia; 73a, collar of eighth abdominal segment, dorsal view.
- 74-74a. *Cactobrosis longipennella* (Hampson) [= *elongatella* (Hampson)]: 74, Female genitalia; 74a, collar of eighth abdominal segment, dorsal view.
- 75-75a. *Cactobrosis maculifera* Dyar: 75, Part of female genitalia showing genital opening and eighth segment collar, ventral view; 75a, collar of eighth abdominal segment, dorsal view.
76. *Cactobrosis insignatella* Dyar: Female genitalia.

PLATE 44

77. *Cactobrosis strigalis* (Barnes and McDunnough): Female genitalia.
- 78-78c. *Zophodia convolutella* (Hübner): 78, Female genitalia; 78a-c, variations in the collar of eighth abdominal segment, dorsal views.
79. *Yosemitia graciella* (Hulst): Wings, showing venation.
80. *Cactoblastis cactorum* (Berg): Wings, showing venation.
81. *Melitara prodenialis* Walker: Wings, showing venation.
82. *Tucumania tapiacola* Dyar: Wings, showing venation.

PLATE 45

- 83-83a. *Melitara prodenialis* Walker: 83, Side view of head of male showing palpi; 83a, part of shaft of male antenna.
84. *Melitara prodenialis* Walker: Part of shaft of female antenna.
- 85-85a. *Melitara dentata* (Grote): 85, Side view of male head; 85a, part of shaft of male antenna.
- 86-86a. *Melitara dentata* (Grote): 86, Side view of female head; 86a, part of shaft of female antenna.
- 87-87a. *Olycella nephelepasa* (Dyar): 87, Side view of male head; 87a, part of shaft of male antenna.
- 88-88a. *Olycella junctolineella* (Hulst): 88, Side view of male head; 88a, part of shaft of male antenna.
- 89-89a. *Olycella junctolineella* (Hulst): 89, Side view of female head; 89a, part of shaft of female antenna.

PLATE 46

90. *Olyca phryganoides* Walker: Side view of male head.
91. *Olyca phryganoides* Walker: Side view of female head.
- 92-92a. *Alberada parabates* (Dyar): 92, Side view of male head; 92a, part of shaft of male antenna.
- 93-93a. *Alberada parabates* (Dyar): 93, Side view of female head; 93a, part of shaft of female antenna.
- 94-94a. *Alberada holochlora* (Dyar): 94, Side view of female head; 94a, part of shaft of female antenna.
- 95-95a. *Alberada bidentella* (Dyar): 95, Side view of male head; 95a, part of shaft of male antenna.
- 96-96a. *Alberada bidentella* (Dyar): 96, Side view of female head; 96a, part of shaft of female antenna.

PLATE 47

- 97-97a. *Nanaia substituta*, new species: 97, Side view of male head; 97a, part of shaft of male antenna.
- 98-98a. *Cactoblastis cactorum* (Berg): 98, Side view of male head; 98a, part of shaft of male antenna.
99. *Cactoblastis cactorum* (Berg): Side view of female head.
100. *Cactoblastis mundelli*, new species: Side view of male head.
101. *Cactoblastis mundelli*, new species: Side view of female head.
- 102-102a. *Cahela ponderosella* (Barnes and McDunnough): 102, Side view of male head; 102a, part of shaft of male antenna.
- 103-103a. *Cahela ponderosella* (Barnes and McDunnough): 103, Side view of female head; 103a, part of shaft of female antenna.

PLATE 48

- 104-104a. *Rumatha glaucatella* (Hulst): 104, Side view of male head; 104a, part of shaft of male antenna.
- 105-105a. *Rumatha glaucatella* (Hulst): 105, Side view of female head; 105a, part of shaft of female antenna.
- 106-106a. *Rumatha polingella* (Dyar): 106, Side view of male head; 106a, part of shaft of male antenna.
- 107-107a. *Rumatha polingella* (Dyar): 107, Side view of female head; 107a, part of shaft of female antenna.
- 108-108a. *Rumatha bihinda* (Dyar): 108, Side view of male head; 108a, part of shaft of male antenna.
- 109-109a. *Rumatha bihinda* (Dyar): 109, Side view of female head; 109a, part of shaft of female antenna.
- 110-110a. *Yosemitia didactica* Dyar: 110, Side view of male head; 110a, part of shaft of male antenna.
- 111-111a. *Yosemitia graciella* (Hulst): 111, Side view of female head; 111a, part of shaft of female antenna.
- 112-112a. *Yosemitia longipennella* (Hulst): 112, Side view of male head; 112a, part of shaft of male antenna.
- 113-113a. *Yosemitia longipennella* (Hulst): 113, Side view of female head; 113a, part of shaft of female antenna.

PLATE 49

- 114-114a. *Yosemitia fieldiella* (Dyar): 114, Side view of male head; 114a, part of shaft of male antenna.
- 115-115a. *Yosemitia fieldiella* (Dyar): 115, Side view of female head; 115a, part of shaft of female antenna.
- 116-116a. *Salambona analamprella* (Dyar): 116, Side view of male head; 116a, part of shaft of male antenna.
- 117-117a. *Salambona analamprella* (Dyar): 117, Side view of female head; 117a, part of shaft of female antenna.
- 118-118a. *Eremberga leuconips* (Dyar): 118, Side view of male head; 118a, part of shaft of male antenna.
- 119-119a. *Eremberga leuconips* (Dyar): 119, Side view of female head; 119a, part of shaft of female antenna.
- 120-120a. *Eremberga creabates* (Dyar): 120, Side view of male head; 120a, part of shaft of male antenna.
- 121-121a. *Tucumania tapiacola* Dyar: 121, Side view of male head; 121a, part of shaft of male antenna.
122. *Tucumania tapiacola* Dyar: Side view of female head.
123. *Tucumania porrecta* Dyar: Side view of female head.

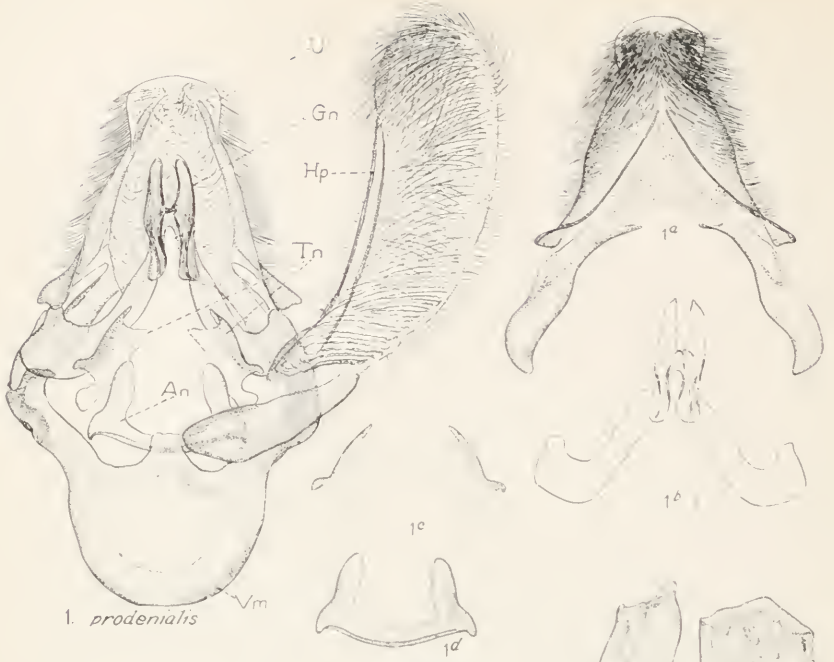
- 124-124a. *Parolyca asthenosoma* (Dyar): 124, Side view of male head; 124a, part of shaft of male antenna.

PLATE 50

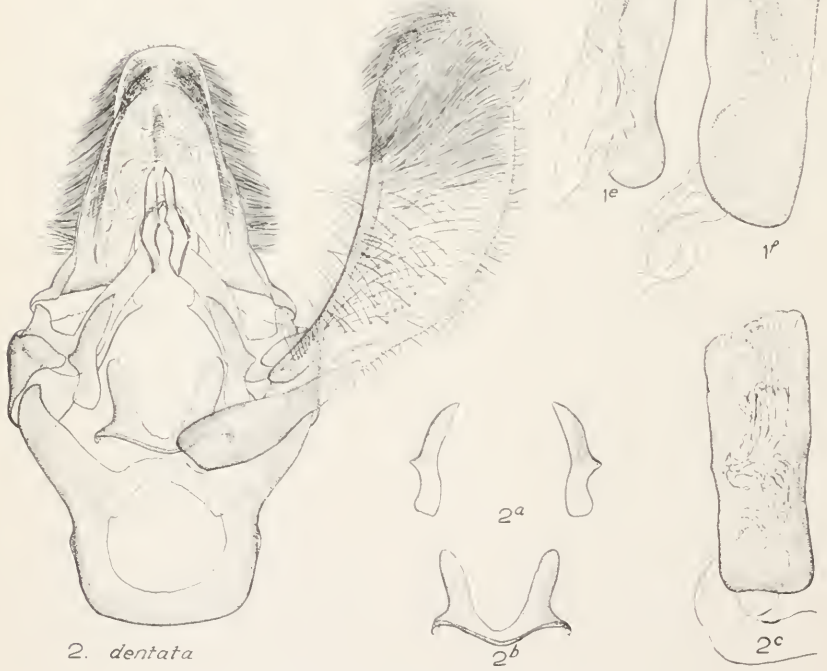
- 125-125a. *Sigelgaita chilensis*, new species: 125, Side view of male head; 125a, part of shaft of male antenna.
126. *Sigelgaita chilensis*, new species; Side view of female head.
- 127-127c. *Sigelgaita transilis*, new species: 127, Side view of male head; 127a-b, two views of basal segments of male antenna; 127c, three segments from basal part of shaft, greatly enlarged, showing attachment of modified setae to shaft and inner row of pectinations.
- 128-128c. *Amalafrida leithella* (Dyar): 128, Side view of male head; 128a-b, two views of basal segments of male antenna; 128c, inner pectination from one of basal segments of shaft showing attachment of modified setae (greatly enlarged).
129. *Amalafrida leithella* (Dyar): Side view of female head.
- 130-130a. *Ozamia odiosella fuscomaculella* (Wright): 130, Side view of male head; 130a, basal segments of male antenna.
- 131-131a. *Ozamia thalassophila* Dyar: Side view of female head; 131a, part of shaft of female antenna.

PLATE 51

- 132-132a. *Zophodia convolutella* (Hübner): 132, Side view of male head; 132a, basal segments of male antenna.
- 133-133a. *Zophodia convolutella* (Hübner): Side view of female head; 133a, part of shaft of female antenna.
- 134-134c. *Cactobrosis fernaldialis* (Hulst): 134, Side view of male head; 134a, maxillary palpus, greatly enlarged; 134b, part of shaft of male antenna, ventral view; 134c, basal segments of male antenna, lateral view.
- 135-135a. *Cactobrosis fernaldialis* (Hulst): 135, Side view of female head; 135a, part of shaft of female antenna.
- 136-136b. *Cactobrosis longipennella* (Hampson): 136, Side view of male head; 136a, part of shaft of male antenna, ventral view; 136b, basal segments of male antenna, lateral view.
- 137-137a. *Cactobrosis maculifera* Dyar: 137, Part of shaft of male antenna, ventral view; 137a, basal segments of male antenna, lateral view.
- 138-138a. *Cactobrosis strigalis* (Barnes and McDunnough): 138, Side view of male head; 138a, part of shaft of male antenna, lateral view.
- 139-139a. *Cactobrosis strigalis* (Barnes and McDunnough): 139, Side view of female head; 139a, part of shaft of female antenna.



1. *prodenialis*

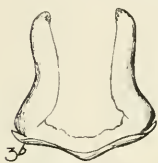


2. *dentata*

CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 406.



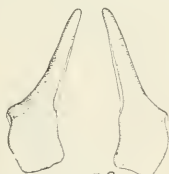
3. *junctolineella*



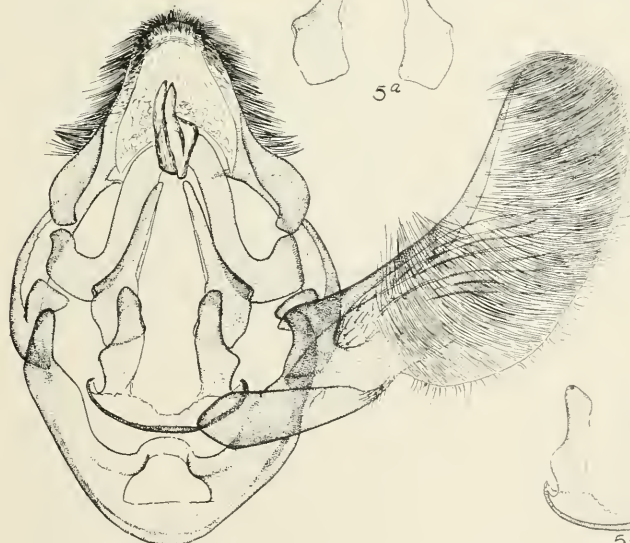
3^c



4. *pectinatella*



4^a



5. *phryganoides*

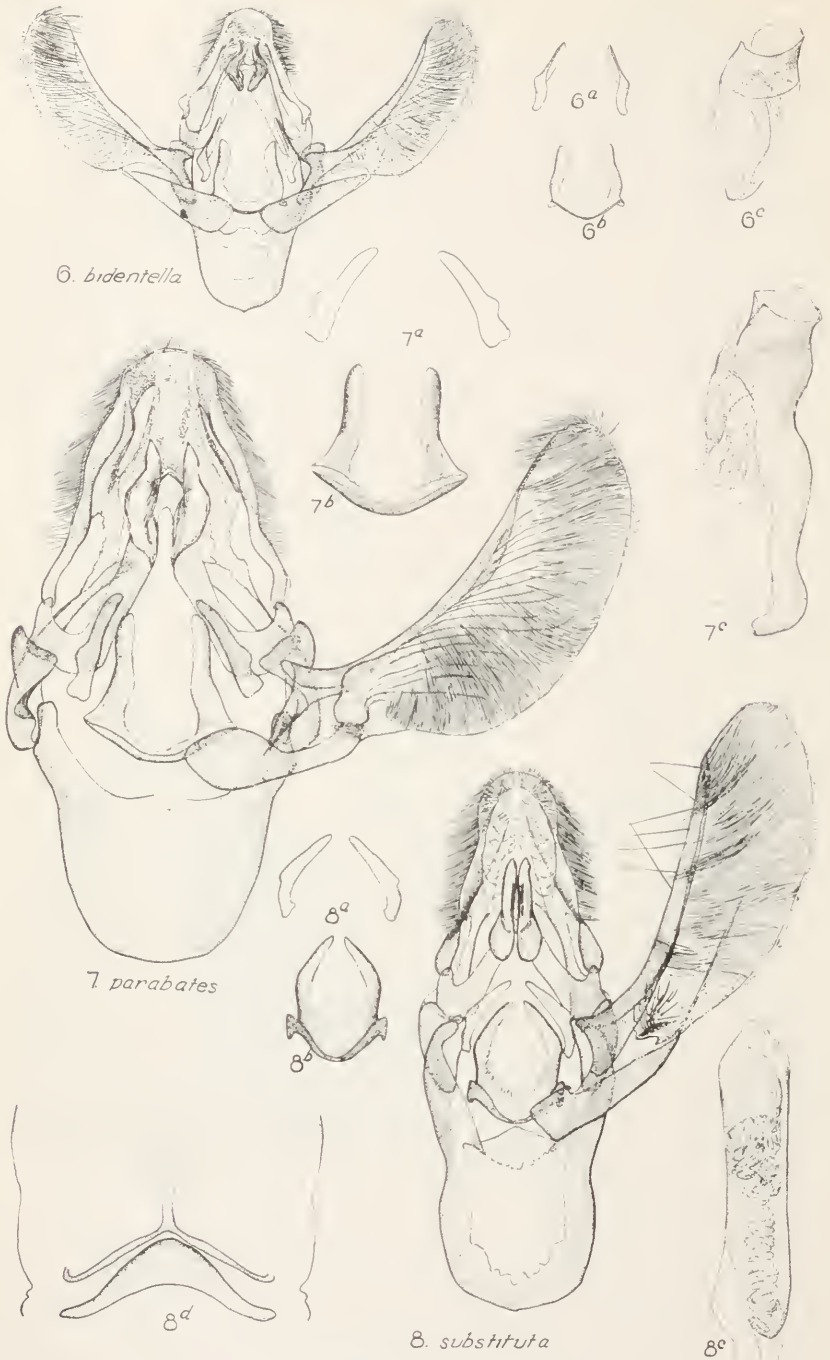


5^a



5^b

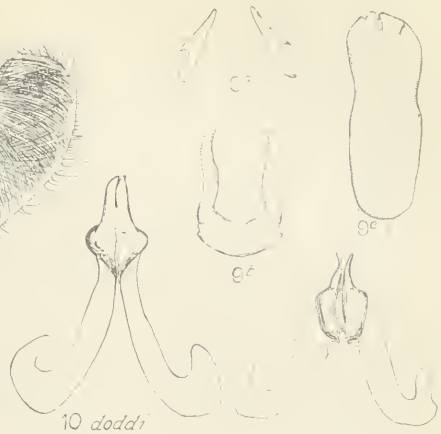
CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 436.



CACTUS-FEEDING PHYCITINAE.
 FOR EXPLANATION OF PLATE SEE PAGE 407.

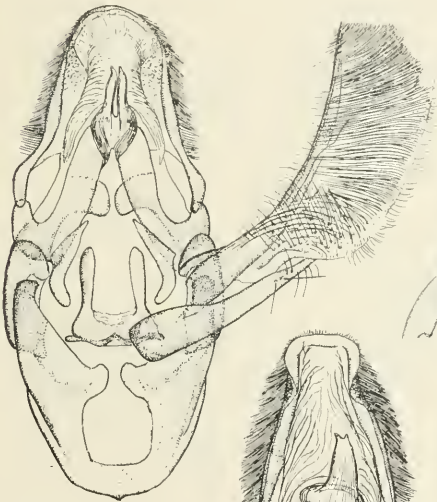


9. *cactorum*

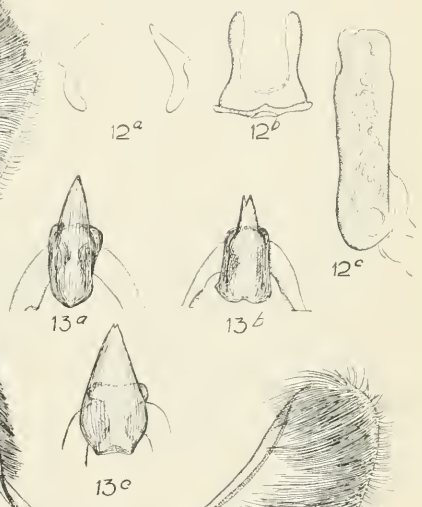


10 *doddi*

11. *mundelli*



12. *bucyrus*



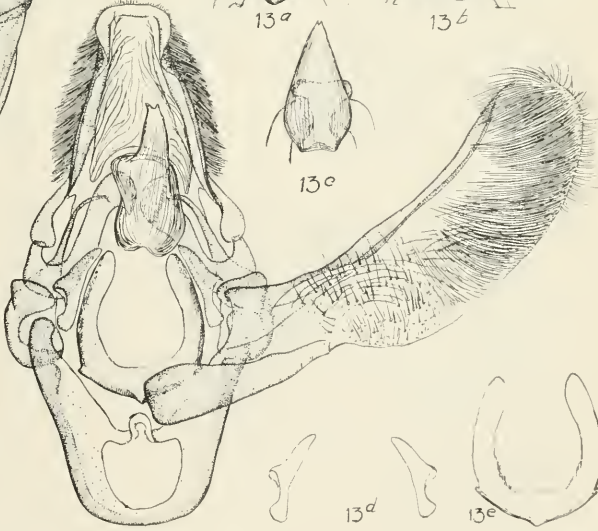
13a

13b

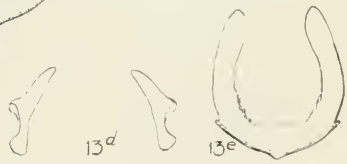
13c



13a



13. *ponderosella*

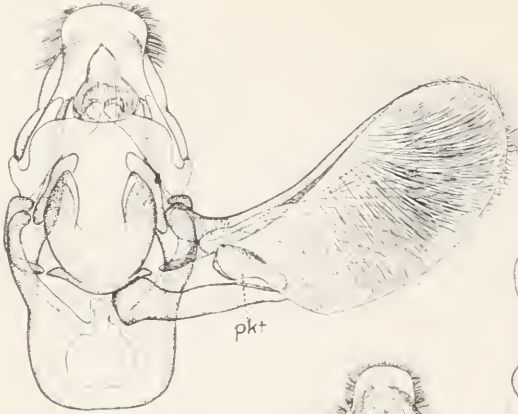


13d

13e

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 427.



14. *bihinda*



14^c



15^a

15^b



15^c



15 *polingella*



16^a



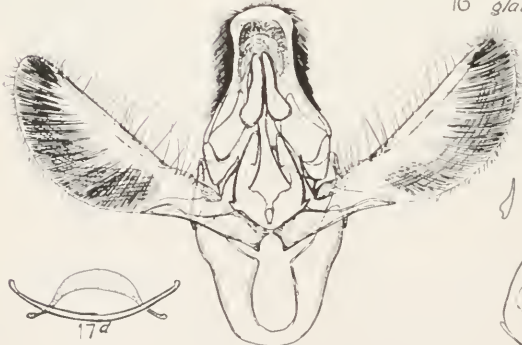
16^b



16^c



16 *glaucatella*



17. *tapiacola*



17^a



17^b



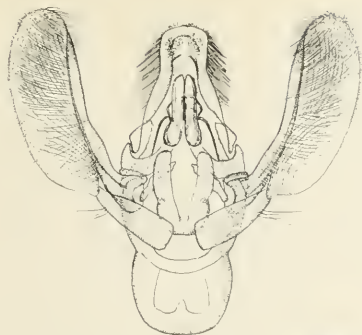
17^c



17^d

CACTUS-FEEDING PHYCITINAE.

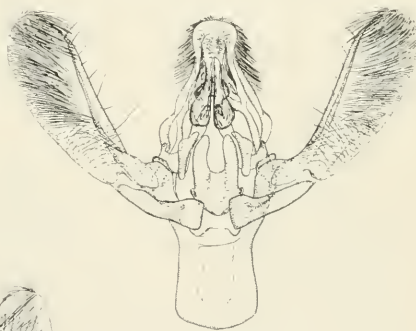
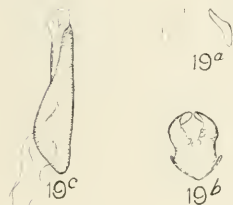
FOR EXPLANATION OF PLATE SEE PAGE 407.



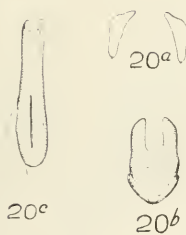
18. *fieldiella*



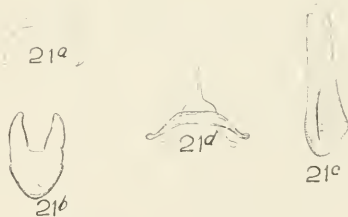
19. *didactica*



20. *longipennella*



21. *graciella*



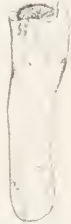
CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 407.



22 *leucomips*



22^c



23^c



23. *insignis*



23^a



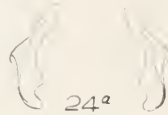
23^b



24. *creabates*



24^c



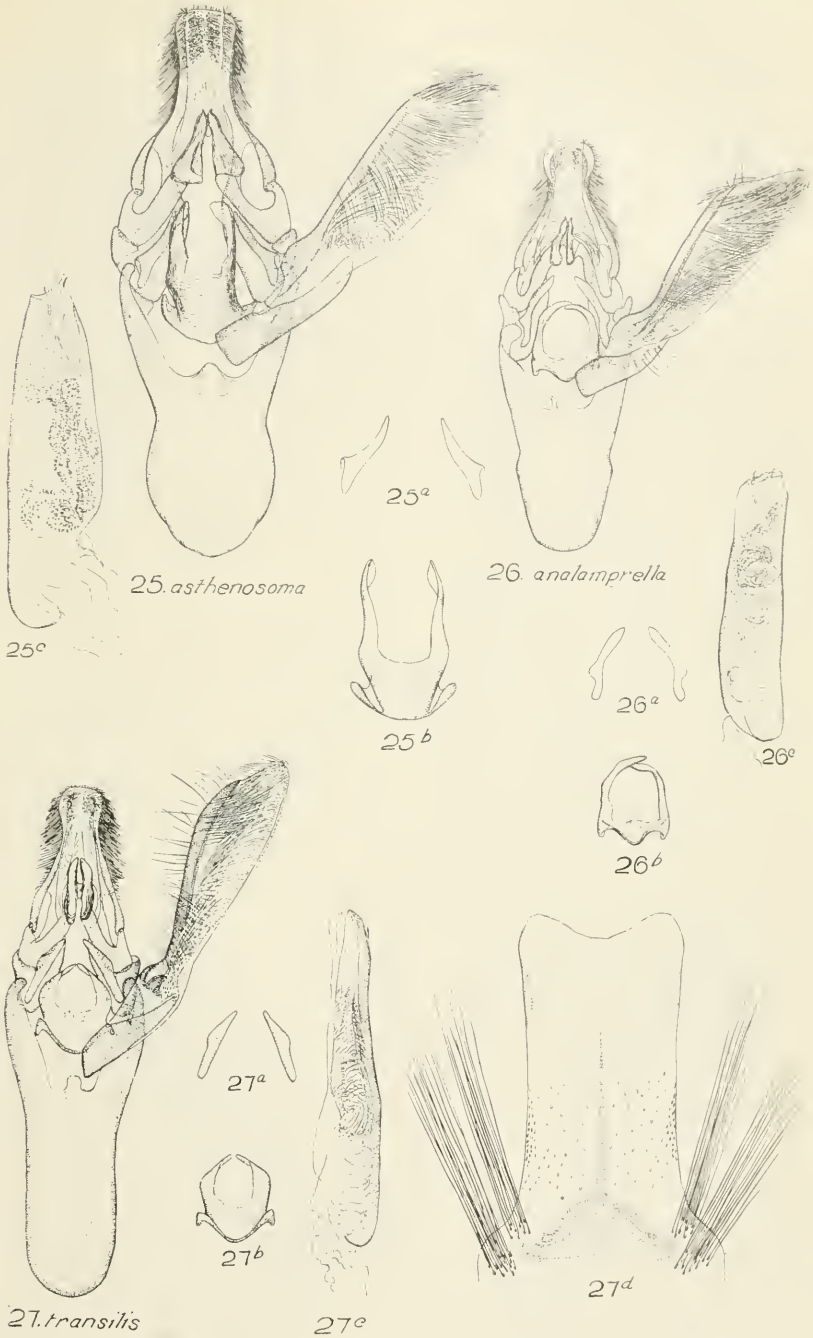
24^a



24^b

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 468.



25. asthenosoma

26. analamprella

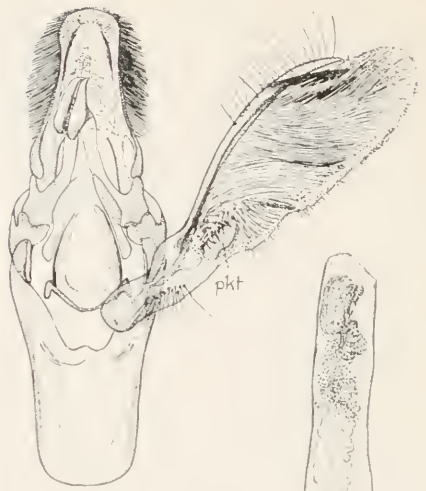
27. transitis

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 408.



29. leithella



28. chilensis



29^e



28^e



29^a



29^b



28^a



28^b

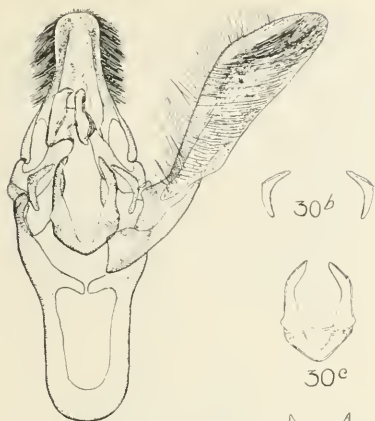


29^a



CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 408.



30. *lucidalis*



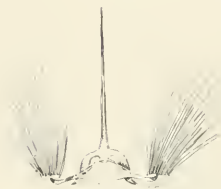
30^a



30^b



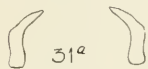
30^c



30^d



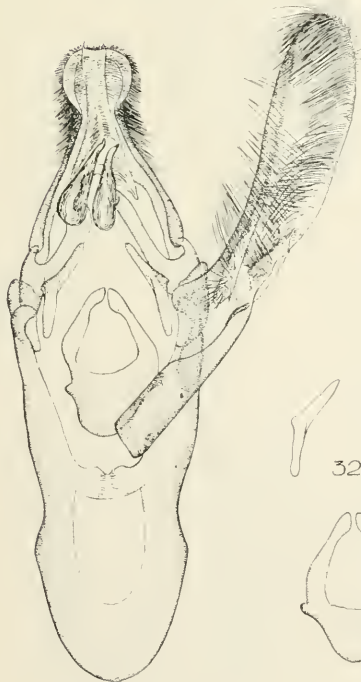
30^e



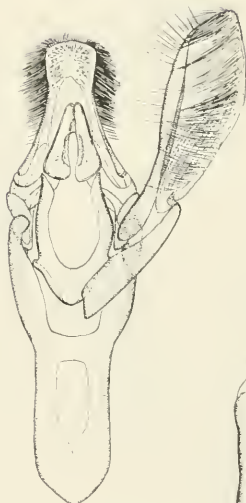
31^a



31^b



32. *punicans*



31. *fuscomaculella*



31^a



31^b



31^c



31^d

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 408.



33 *odiosella*



33^d



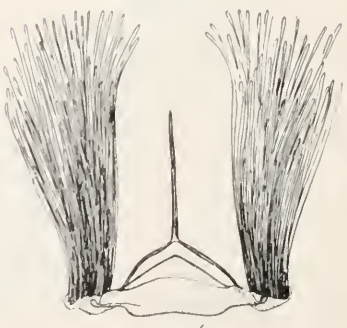
35 *hemilutella*



34 *odiosella*



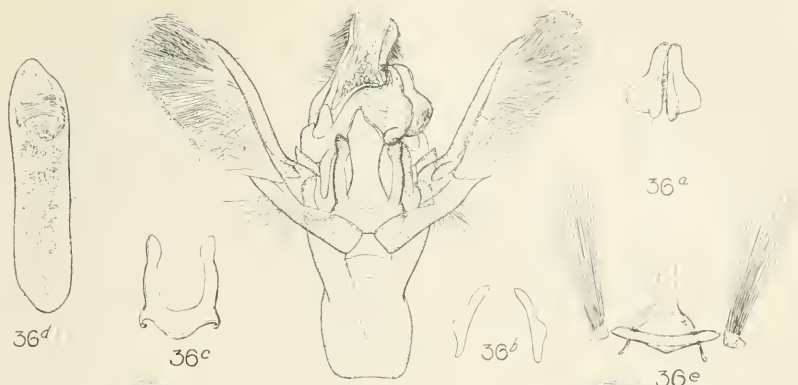
35^e



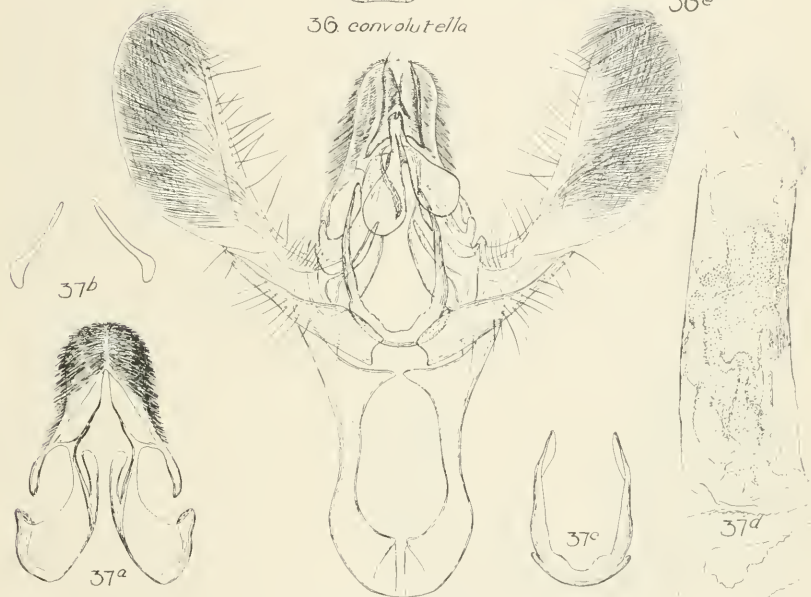
35^d

CACTUS-FEEDING PHYCITINAE.

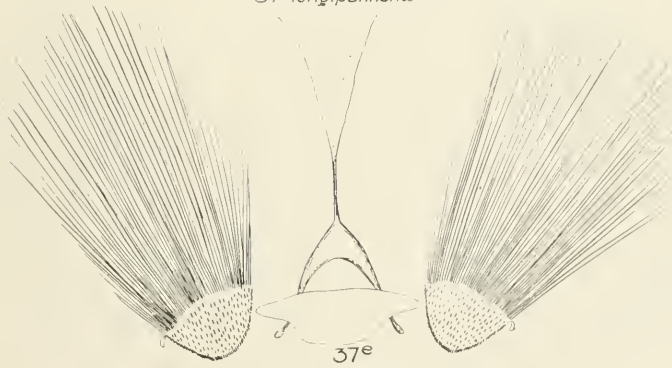
FOR EXPLANATION OF PLATE SEE PAGES 408, 409.



36 *convalutella*



37 *longipennella*

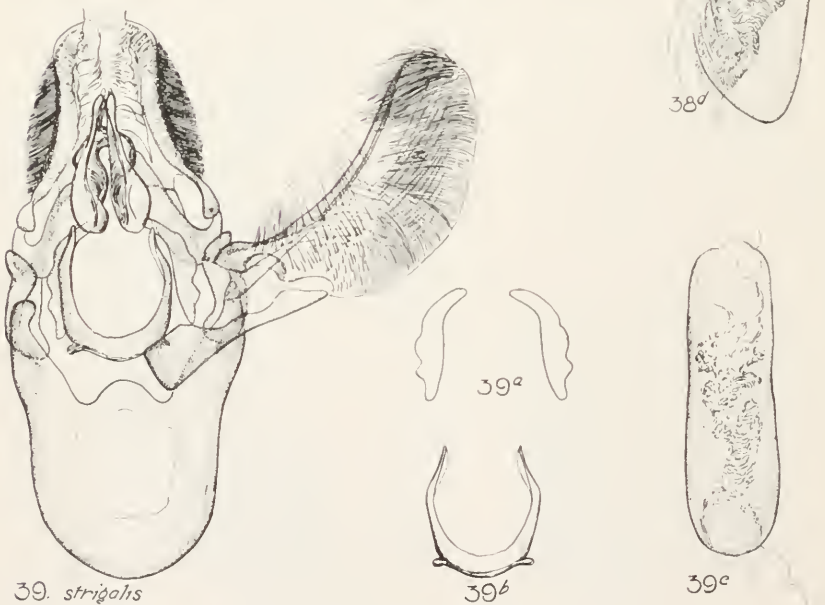


CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 409.

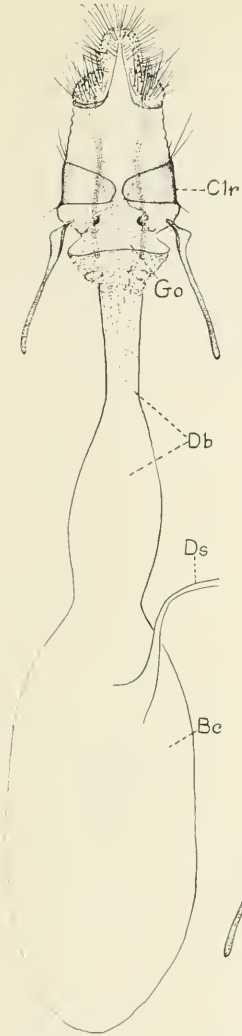


38 *maculifera*

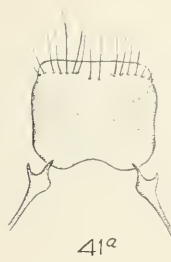


39. *strigalis*

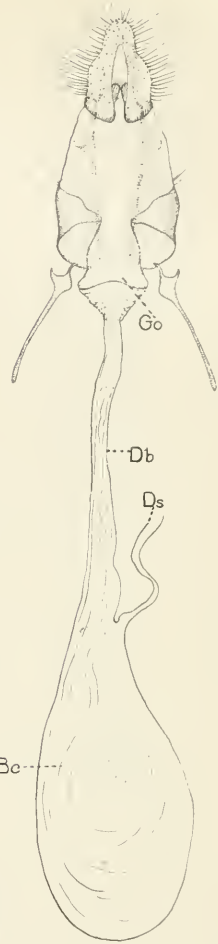
CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 419.



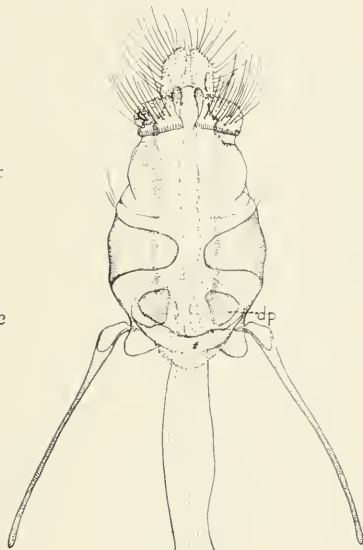
40. *dentata*



41^a



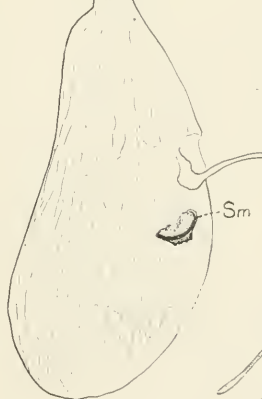
41. *prodenialis*



42. *junctolineella*



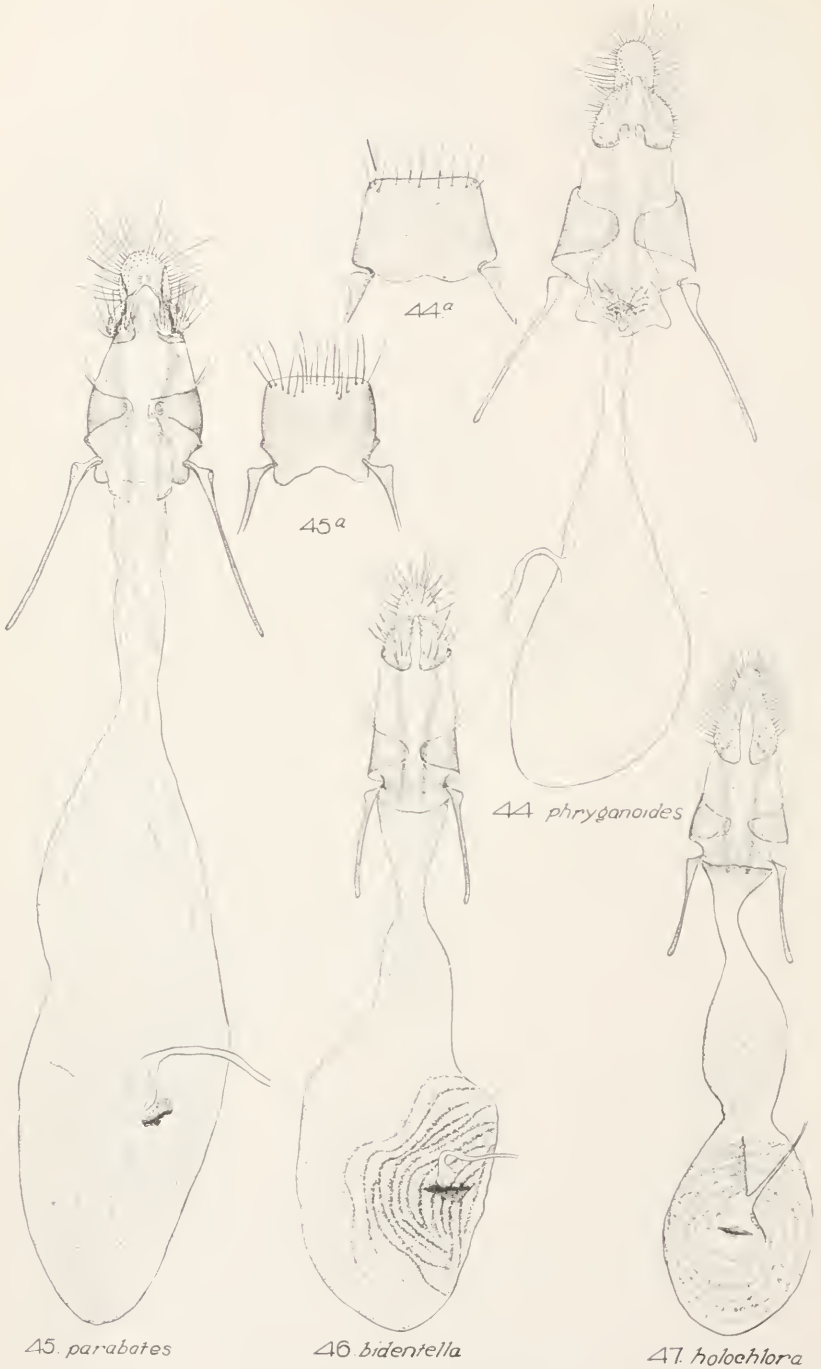
42^a



43 *subumbrella*

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 409.

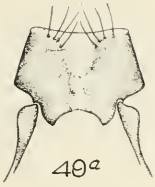


45. parabates

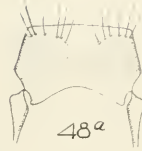
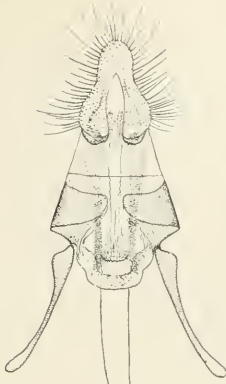
46. bidentella

47. holochlora

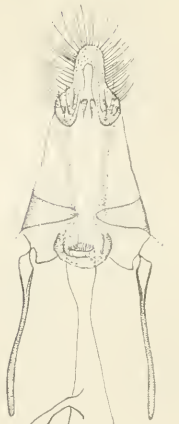
CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 469.



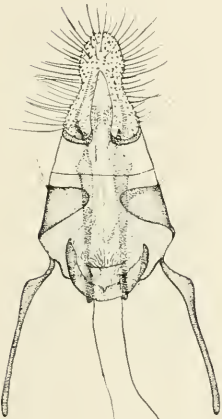
49^a



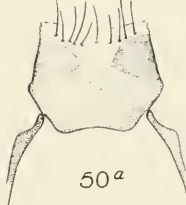
48^a



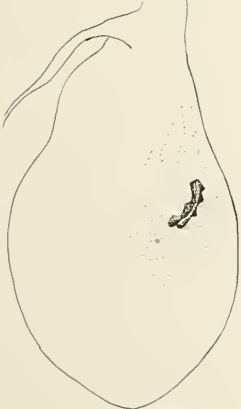
48. *cactorum*



49. *doddi*



50^a



50^b

50. *bucyrus*



51^a



51. *ponderosella*

CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 409.



52. glaucatella



55a



55. leucorips



53. polingella



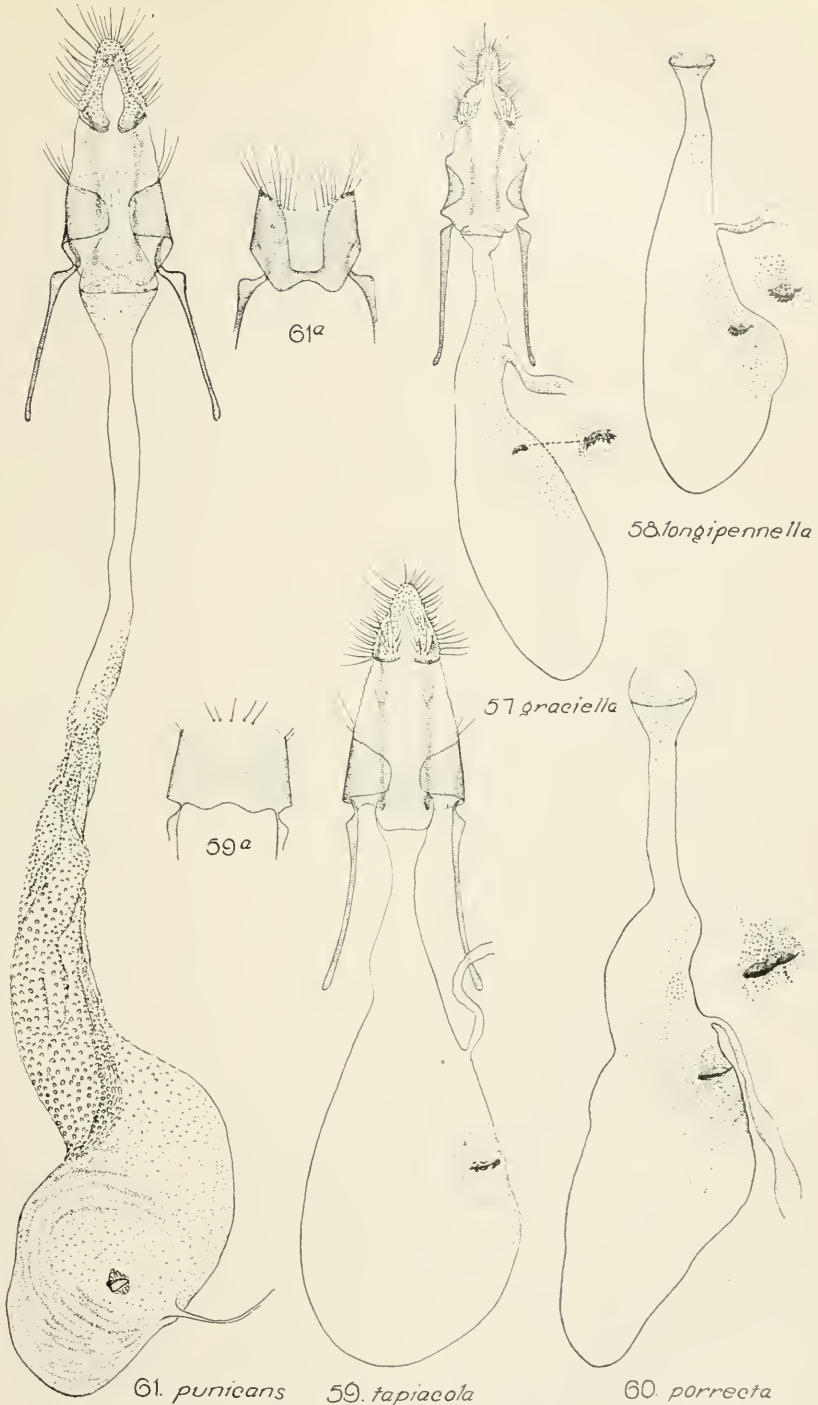
54. bishinda



56. yosemitia sp.

CACTUS-FEEDING PHYCITINAE.

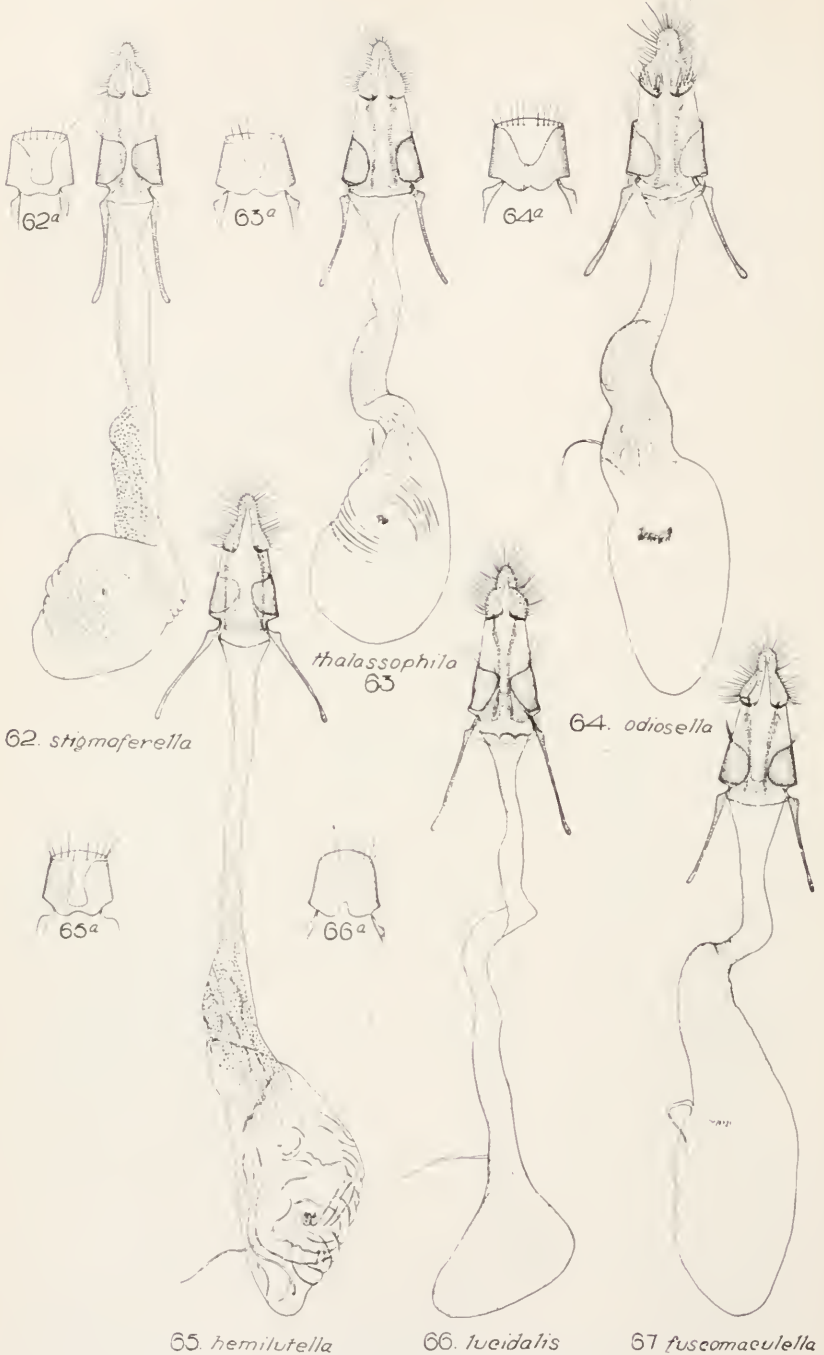
FOR EXPLANATION OF PLATE SEE PAGE 410.



61. punicans

59. tapiacola

60. porrecta



62. *stigmaferella*

thalassophila
63

64. *odiosella*

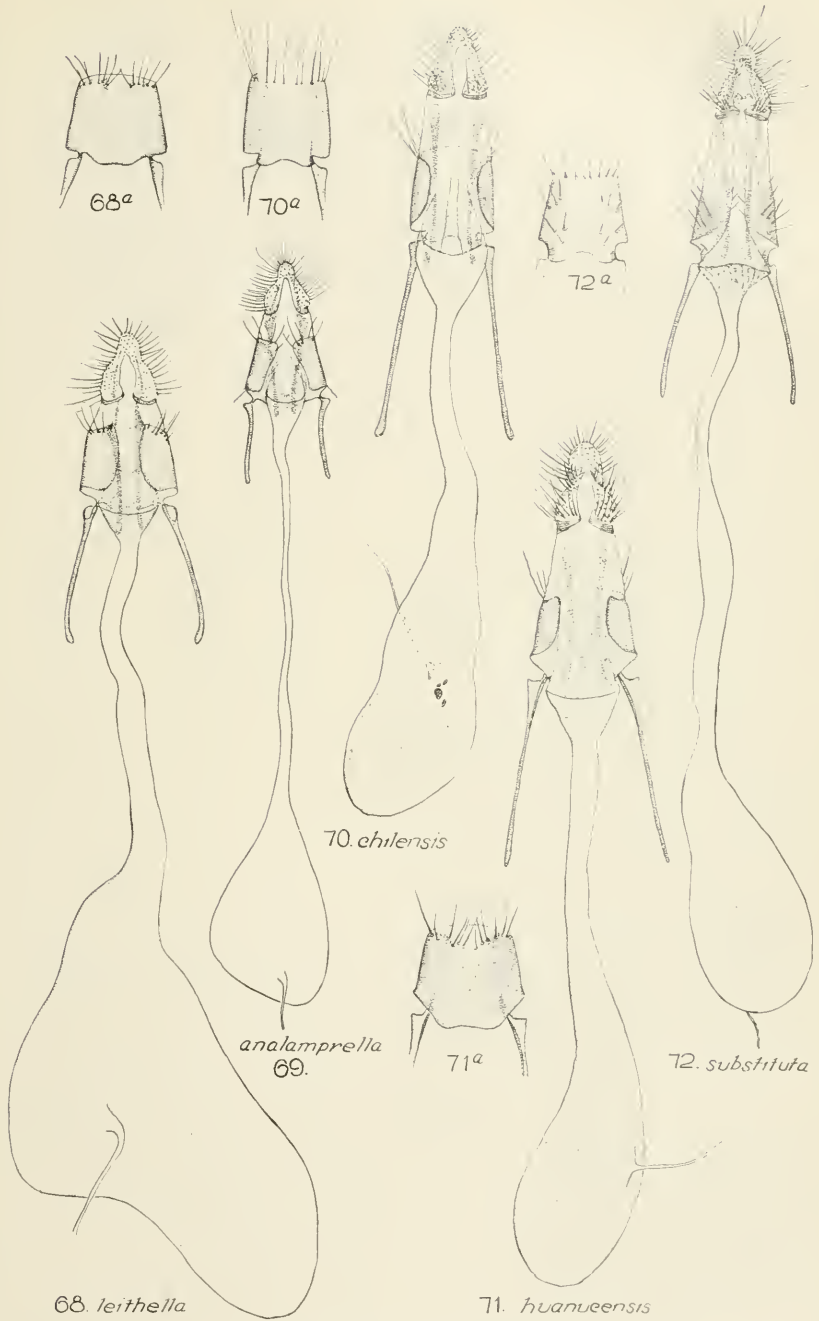
65. *hemilutella*

66. *lucidalis*

67. *fuscocomaculella*

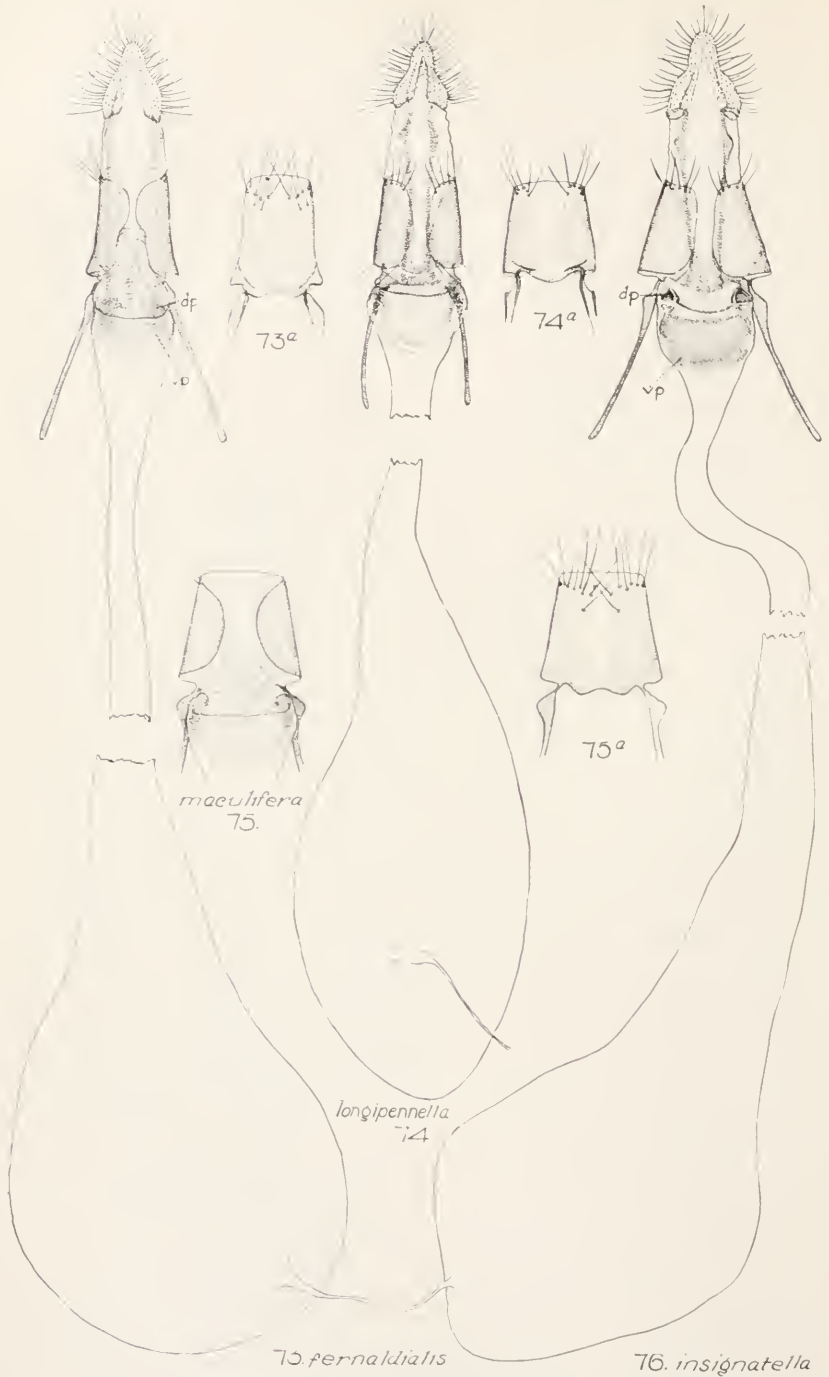
CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 410.



CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 410.



CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 411.



77 *strigalis*



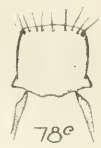
78. *convolutella*



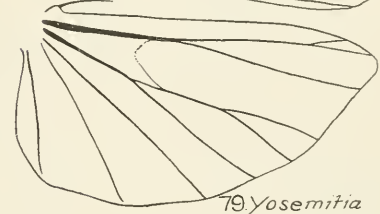
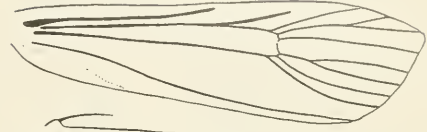
78^a



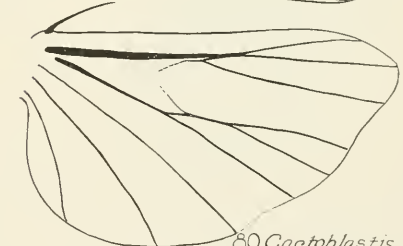
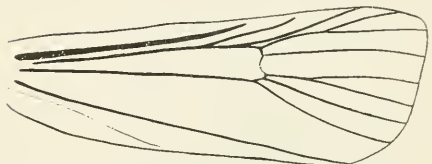
78^b



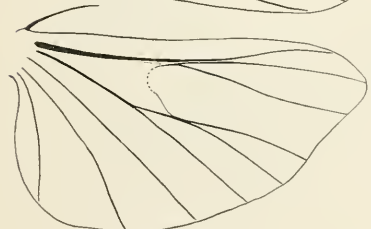
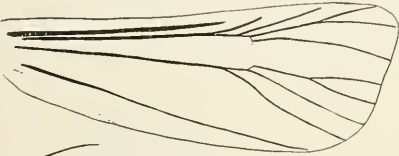
78^c



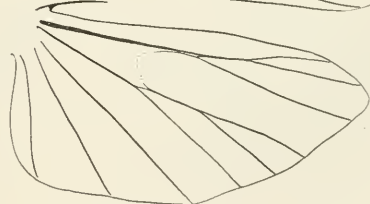
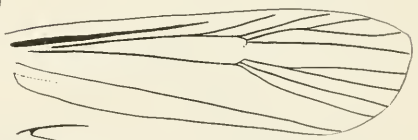
79 *Yosemitia*



80 *Cactoblastis*

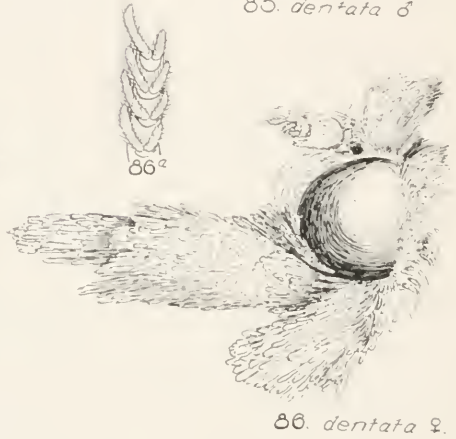
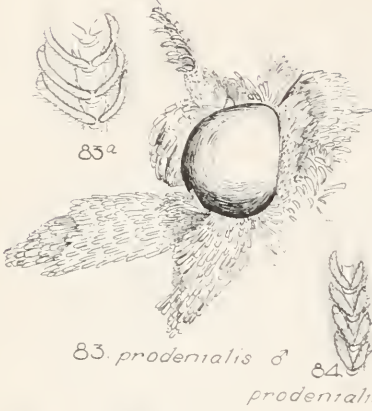


81. *Melitara*



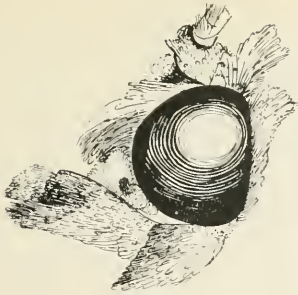
82 *Tucomania*

CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 411

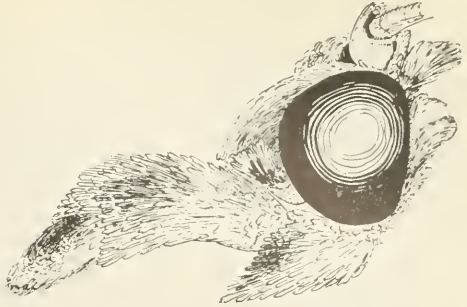


CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 411.



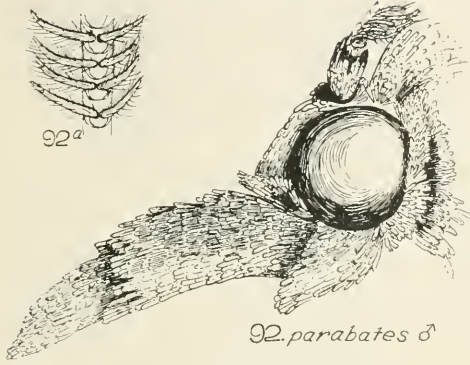
90. *phryganoides* ♂



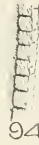
91. *phryganoides* ♀



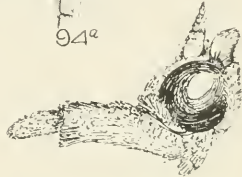
92^a



92. *parabates* ♂



94^a



94. *holochlora* ♀



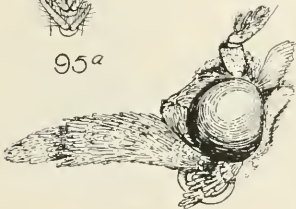
93^a



93. *parabates* ♀.



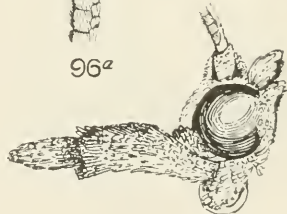
95^a



95. *bidentella* ♂

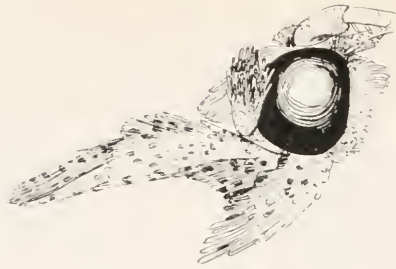


96^a

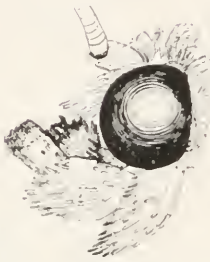


96. *bidentella* ♀

CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 411.

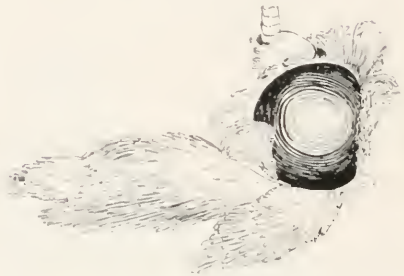


97. *substituta* ♂.



98^a

98. *caatorum* ♂



99. *caatorum* ♀



100. *mundelli* ♂



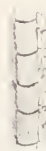
101. *mundelli* ♀



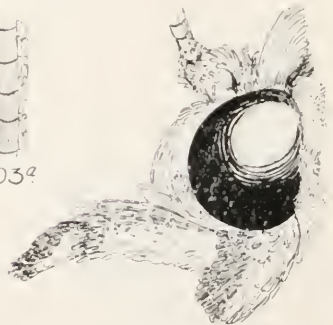
102^a



102. *ponderosella* ♂

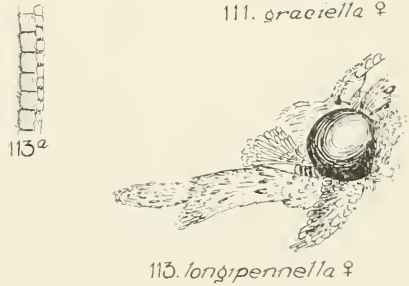
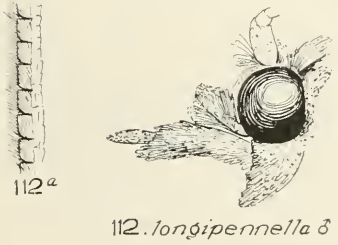
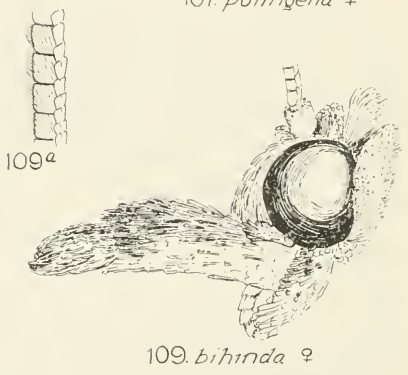
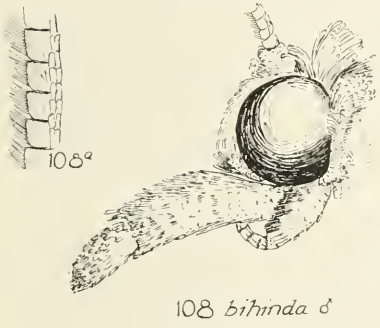
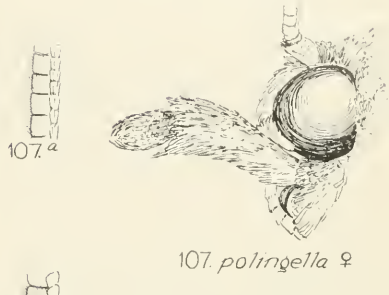
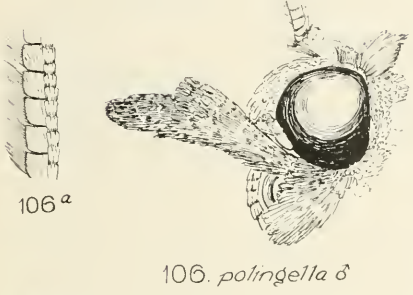
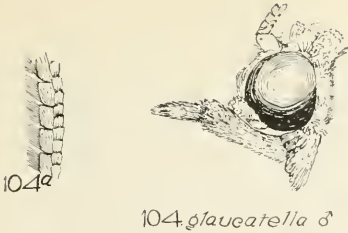


103^a



103. *ponderosella* ♀

CACTUS-FEEDING PHYCITINAE.
FOR EXPLANATION OF PLATE SEE PAGE 412.





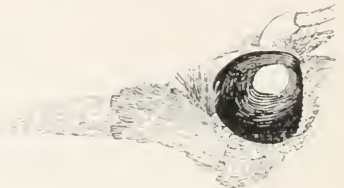
114. *fieldiella* ♂



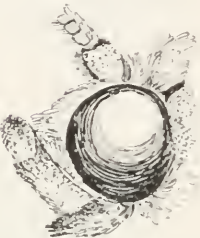
115. *fieldiella* ♀



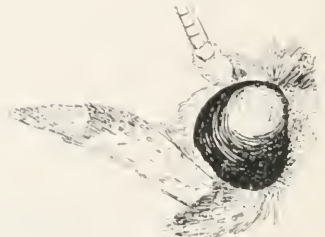
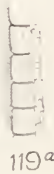
116. *analamprella* ♂



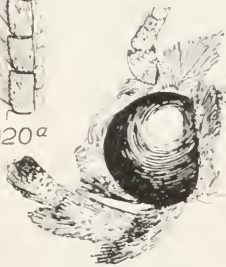
117. *analamprella* ♀



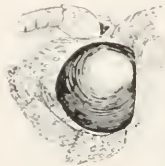
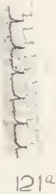
118. *leuconips* ♂



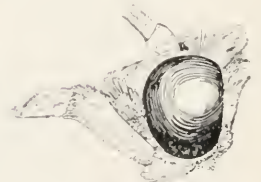
119. *leuconips* ♀



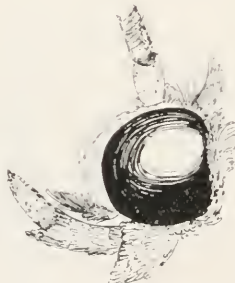
120. *creabates* ♂



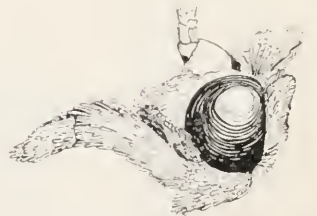
121. *tapiacola* ♂



122. *tapiacola* ♀



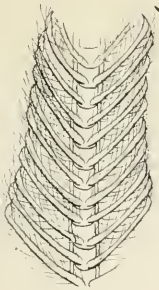
124. *asthenosoma* ♂



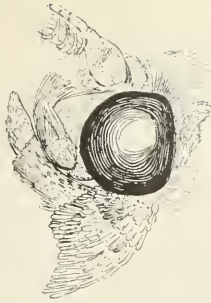
123. *porrecta* ♀

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGES 412, 413.



125^a



125. *chilensis* ♂



126. *chilensis*. ♀



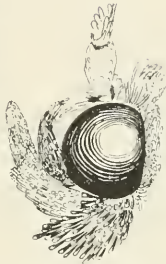
127^a



127^b



127^c



127. *transilis* ♂.



128. *leithella* ♂



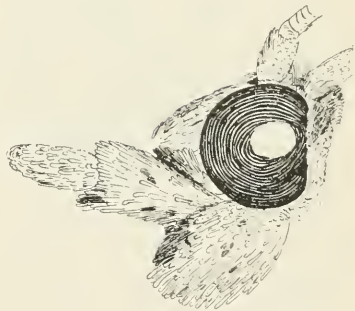
128^c



128^a



128^b



129. *leithella* ♀



130^a



130. *fuseomaculata* ♂



131^a



131. *thalassophila* ♀

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 413.

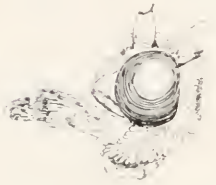


132^a



133^a

132. *convolutella* ♂



133. *convolutella* ♀



136^b



134^c



134^b



136^a



137
maculifera ♂



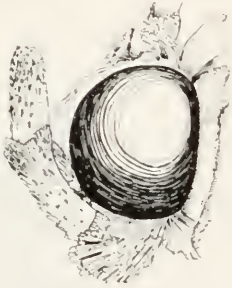
138^a



137^a



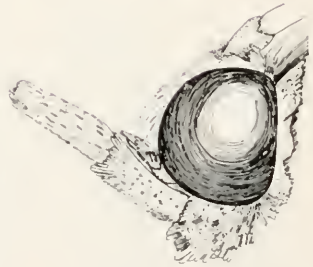
134^a



134. *fernaldialis* ♂



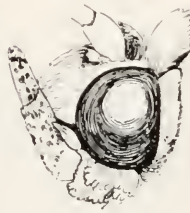
135^a



135. *fernaldialis* ♀



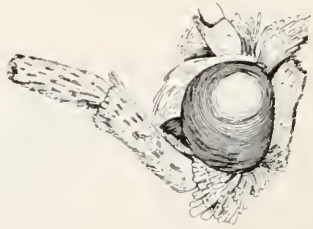
136. *longipennella* ♂



138. *strigalis* ♂



139^a



139. *strigalis* ♀

CACTUS-FEEDING PHYCITINAE.

FOR EXPLANATION OF PLATE SEE PAGE 413.

