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Descriptions of and Notes on North and Central American Species of *Argyrotaenia*, with the Description of a New Genus (Lepidoptera, Tortricidae)

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In the course of work on a generic revision of North American and Mexican Tortricidae, the present author examined many species of the genus *Argyrotaenia* Stephens, some of which proved to be new or to have been inadequately studied. On account of the scientific interest of these data, which cannot be completely used in the above revision, it seems reasonable to publish them as a separate paper.

The "Check list of the Lepidoptera of Canada and the United States of America" by McDunnough (1939) recorded 12 species of *Argyrotaenia*. Two of these (*velutinana* Walker and *lutosana* Clemens) are synonymous, and one (*gloverana* Walsingham) belongs to the genus *Acleris* Hübner. Freeman (1944) reviewed 15 North American *Argyrotaenia* species; in a more recent paper (Freeman, 1958), he brought this number up to 20, after he transferred to this genus five more species erroneously treated earlier as members of the genus *Tortrix* Linné. The species *gloverana* must be excluded from this total, and the species *purata* Meyrick does not belong to the North American fauna. Moreover, *purata* now becomes the type of a new genus which is described in the present paper.

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Quite recently Powell (1960) described six new *Argyrotaenia* species from the southwestern United States. None of the Central American species has ever been recorded as *Argyrotaenia*. In the present paper six North American species and one subspecies, and one Mexican species, are described as new; a new genus, *Subargyrotaenia*, is established for *purata* Meyrick; new systematic positions are proposed for some species; and new synonymy is established.

It is important to note that the categorical statement about *Argyrotaenia*, according to which "the genitalia of all the species in the genus are similar, and cannot be relied upon for specific recognition" (Freeman, 1958), needs some correction. It is quite true that in *velutinana* Walker and some allied species the genitalic differences are very minimal, or they cannot be detected at all. But in general the genitalia are, in the genus *Argyrotaenia*, not less important for the specific identification than in most other genera of the tribe Archipini and, as a rule, are quite usable for taxonomic purpose. The author intends to return to this problem in his revision of North American genera of the Tortricidae.

The author wishes to acknowledge with thanks the cooperation of Mr. J. D. Bradley of the British Museum (Natural History), Dr. J. F. Gates Clarke of the United States National Museum, Dr. T. N. Freeman of the Canadian National Collection, Dr. F. Kasy and Dr. R. Schönmann of the Naturhistorisches Museum in Vienna, Mr. C. P. Kimball, West Barnstable, Massachusetts, Dr. A. B. Klots and Dr. F. H. Rindge of the American Museum of Natural History, and Mr. J. A. Powell of the Department of Entomology, University of California, who allowed him to study the *Argyrotaenia* specimens in their charge.

Argyrotaenia montezumae montezumae (Walsingham), new combination
and status

Figures 1-11, 29

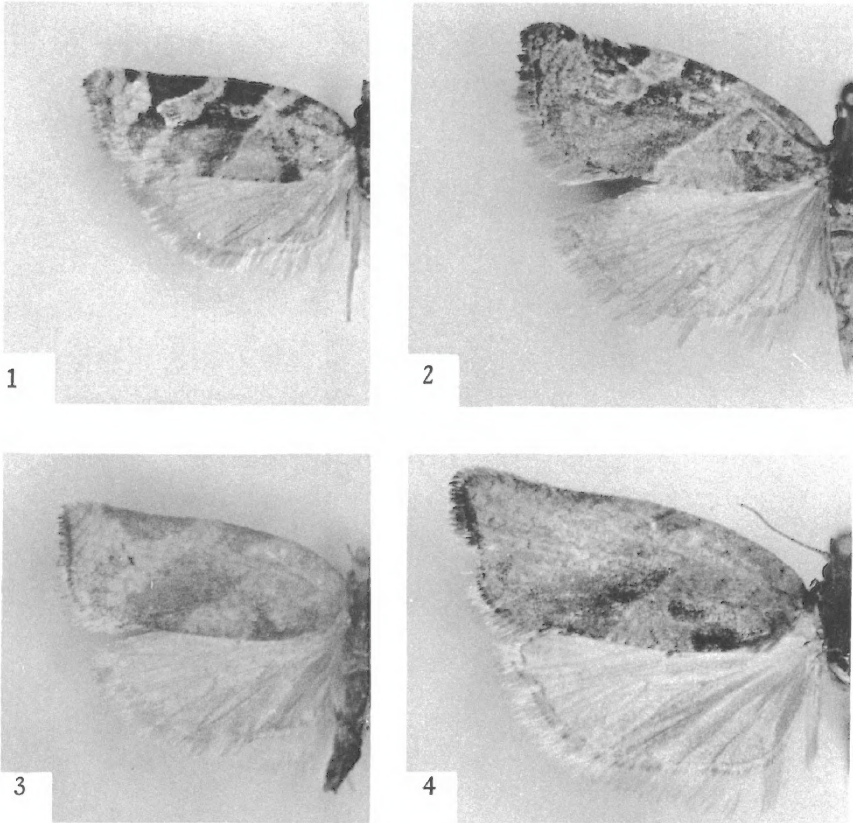
Tortrix montezumae WALSINGHAM, 1914, *Biologia Centrali-Americana*, Lepidoptera Heterocera, vol. 4, p. 280.

Tortrix impositana WALSINGHAM, 1914, *op. cit.*, vol. 4, p. 279. New synonym.

TYPES: Of *montezumae*: Holotype, male (genitalia on slide, No. 5342), Amula, Guerrero, Mexico, 6000 feet, August (H. H. Smith), deposited in the British Museum (Natural History); one male paratype (genitalia on slide, prepared by A. Busck on October 4, 1929), Las Vigas, Veracruz, 8000 feet, Mexico, 1887 (W. Schaus), deposited in the United States National Museum. Of *impositana*: Holotype, female (genitalia on slide, No. 5341), Senahu, Vera Paz, 2800 feet, Guatemala, November, 1879 (Champion), deposited in the British Museum (Natural History);

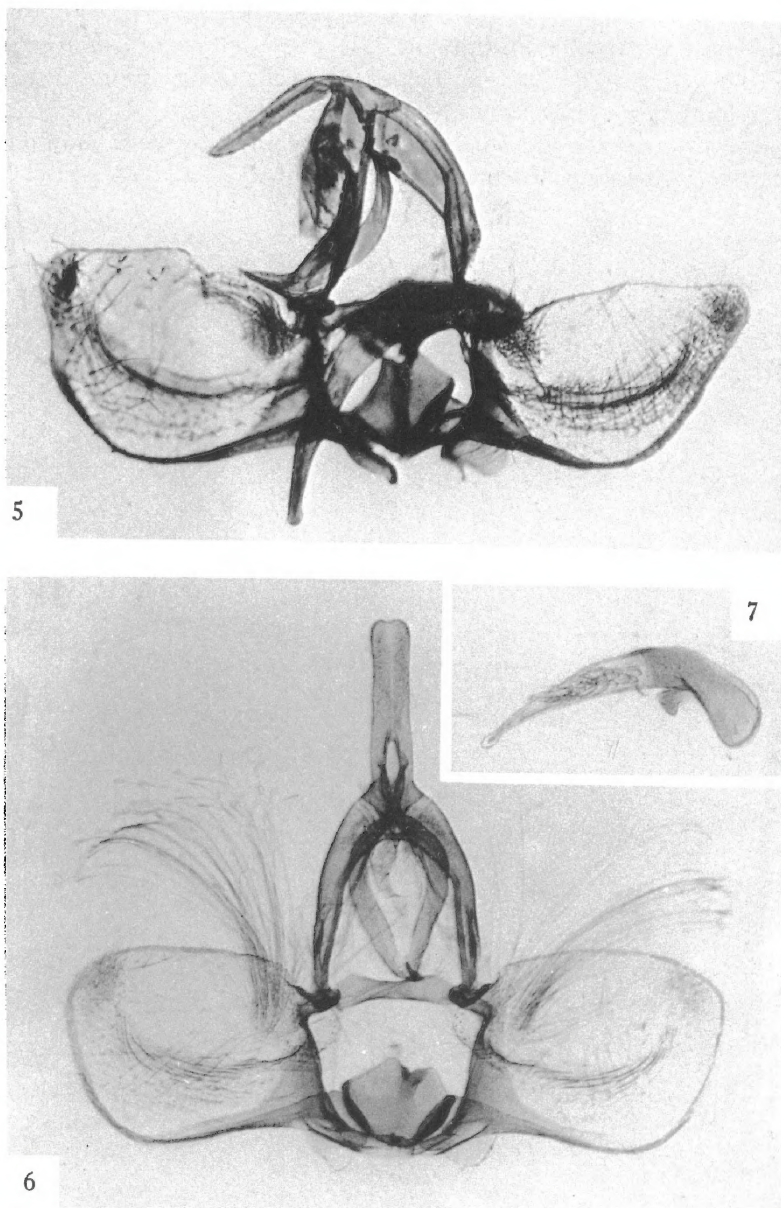
one female paratype (genitalia on slide, prepared by A. Busck on June 27, 1936), Volcan de Atitlan, Guatemala, 1881 (Champion), deposited in the United States National Museum.

OTHER SPECIMENS EXAMINED: *Mexico*: Two males (genitalia of one on slide, No. 524-Obr.), Puebla, Puebla, October 20 and 22, 1920 (C. C.



FIGS. 1-4. *Argyrotaenia montezumae montezumae* (Walsingham). 1, 2. Males. 1. Volcan Sta. Maria, Guatemala, October. 2. Mexico City, Mexico, December, 1908. 3, 4. Females. 3. Puralha, Guatemala. 4. San Angel, Mexico, December 8, 1929.

Hoffmann); one male (genitalia on slide, No. 600-Obr.), Chapultepec, Distrito Federal, June 21, 1939 (C. C. Hoffmann); two females (genitalia of one on slide, No. 526-Obr.), San Angel, Distrito Federal, October 22, 1920, and December 8, 1929 (C. C. Hoffmann); the above five specimens are deposited in the American Museum of Natural History;



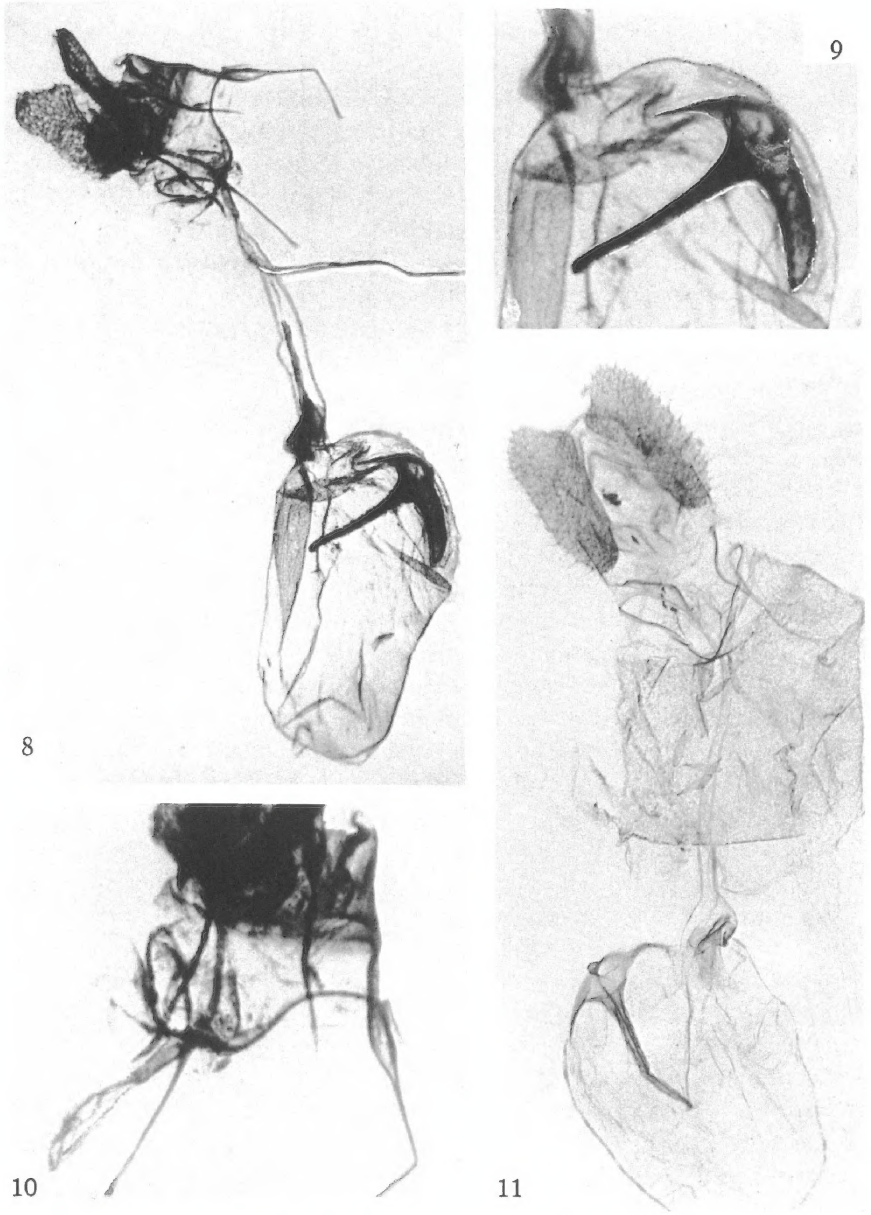
FIGS. 5-7. Male genitalia of *Argyrotaenia montezumae montezumae* (Walsingham). 5. Holotype of *montezumae* (slide No. 5342). 6, 7. Puebla, Mexico, October 23, 1920 (slide No. 524-Obr.). 6. Ventral view. 7. Aedeagus.

one male, Mexico City, December, 1908 (R. Muller); two males, Orizaba (W. Schaus); the above three specimens are deposited in the United States National Museum. *Guatemala*: Four males (genitalia of two on slides, prepared by A. Busck on November 16, 1929, and June 27, 1936), Volcan Santa Maria, July and October (W. Schaus and W. Barnes); one female, Purulha (W. Schaus and W. Barnes); one male, Palin (W. Schaus and W. Barnes); the above six specimens are deposited in the United States National Museum. *Honduras*: One male, Montaña del Socorro, Finca La Esperanza, reared from orange, emerged on June 25, 1956 (Hidalgo; 56-9563), deposited in the United States National Museum.

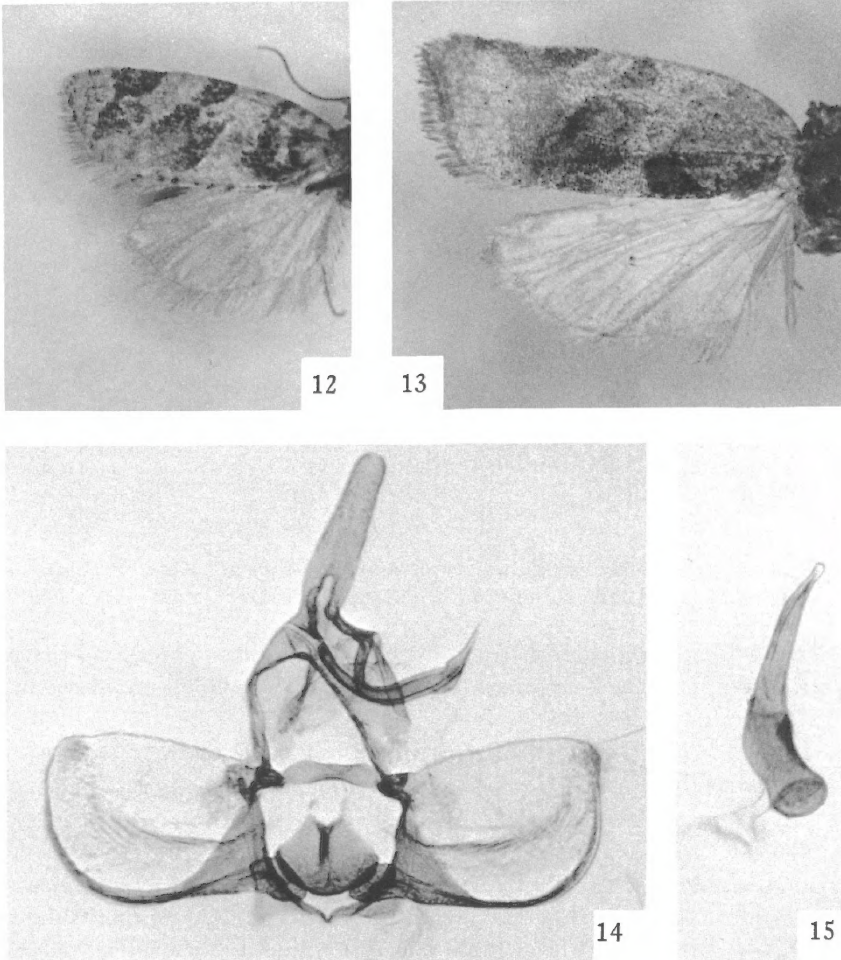
REMARKS: Walsingham (1914) wrote about *montezumae* that it is a species "extremely similar to *velutinana* Wkr., but it is a little larger, and the hindwings are paler—less uniformly clouded." As a matter of fact, this similarity exists only in the males; the females are quite distinct. Walsingham did not notice this circumstance, because he described the females of *montezumae* as a separate species, *impositana*.

In the males of *montezumae* the dark markings of the forewings are usually well defined and separated from the uniform, ochreous ground, while in *velutinana* they show a tendency to become confluent and to be lost on a darkened ground which normally is more or less whitish gray, rarely ochreous; in some specimens, especially at the wing base, slightly pinkish. The hind wings of *montezumae* are whitish; those of *velutinana*, more or less fuscous. The females of *montezumae* have the forewings concolorous with those of the males, but the markings are less developed, partly reduced. An oblique, blackish or chestnut-brown spot is present at the border of the first third of the dorsum. In females of *velutinana* the forewing markings are, on the contrary, better developed than in the males, and often occupy a larger surface of the wing; the blackish spot, if present, is not separate but is joined to other markings or enclosed by a darkened ground. Some females of *montezumae* could be compared to those of *Argyrotaenia repertana* Freeman, but all forewing markings of *montezumae* are more nearly obsolete, and the above-mentioned blackish dorsal spot is not present in *repertana*. A comparison of the male genitalia of *montezumae* with those of *velutinana* shows that the tip of the aedoeagus is slightly capitate in the former species; the coecum penis is more dilated and slightly more downcurved; and the tips of the cornuti are in *montezumae* a little thicker than in *velutinana*. In the female genitalia, the cestum has a longer and more acute cephalary angle in *montezumae*, and the sclerotized basis of the signum is more extended cephalad.

The Mexican specimens of *montezumae*, taken from October through December, have the ground of the forewings somewhat more yellowish



FIGS. 8-11. Female genitalia of *Argyrotaenia montezumae montezumae* (Walsingham). 8-10. Holotype of *impositana* (slide No. 5341). 8. Ventral view. 9. Signum. 10. Detail of ostium bursae. 11. Paratype of *impositana*.



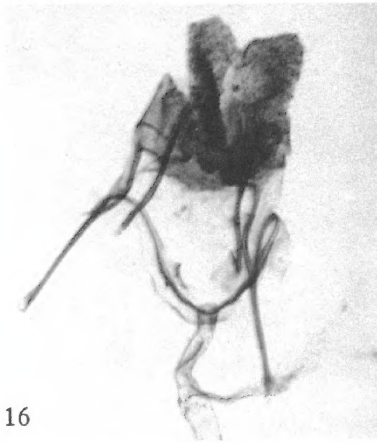
FIGS. 12-15. *Argyrotaenia montezumae huachucensis*, new subspecies. 12. Holotype, male. 13. Allotype, female. 14, 15. Male genitalia (holotype). 14. Ventral view. 15. Aedeagus.

and the markings considerably paler. They probably belong to some other generation of this species.

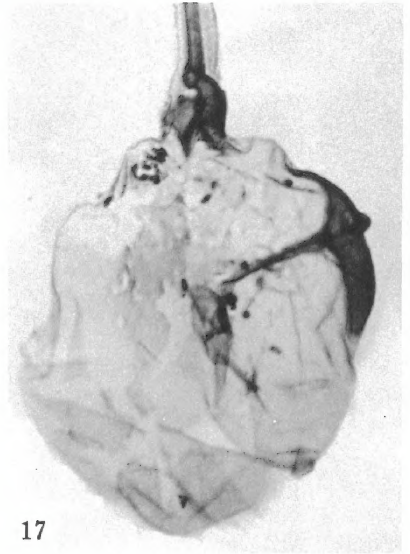
***Argyrotaenia montezumae huachucensis*, new subspecies**

Figures 12-17

MALE: Ground of forewings ochreous, paler than in the male of the nominate form of *montezumae*; markings as in that form, but more equally



16



17

FIGS. 16, 17. Female genitalia of *Argyrotaenia montezumae huachuensis*, new subspecies (allotype). 16. Detail of ostium bursae. 17. Corpus bursae.

pale orange-ochreous, sometimes slightly brownish in costal and preterminal areas; no dark terminal line. Length of forewing, 6–7 mm. Hind wings shining white.

FEMALE: Ground of forewings as in the male; base of forewing, median fascia, costal spot, and terminal line orange-ochreous. Length of forewing, 8 mm. Hind wings shining white.

TYPES: Holotype, male (genitalia on slide, No. 2-Obr. 6/24, 1960), Huachuca Mountains, Arizona, August, 1905 (H. Skinner); deposited in the United States National Museum. Allotype, female (genitalia on slide, No. 521-Obr.), and a male paratype (genitalia on slide, No. 601-Obr.), Ramsay Canyon, Huachuca Mountains, Arizona, July 10–15, 1941 (A. B. Klots); both allotype and paratype deposited in the American Museum of Natural History.

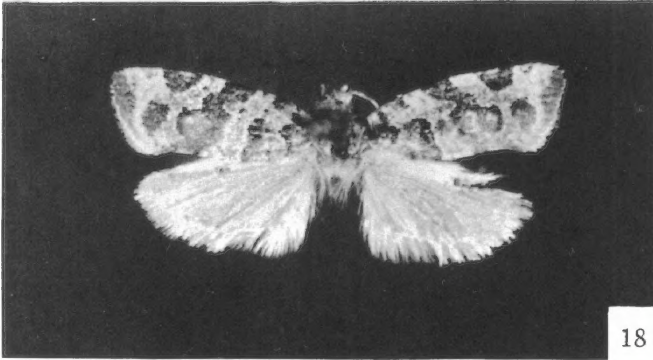
REMARKS: Much smaller than the Mexican specimens of subspecies *montezumae*, with the forewing ground paler, and the markings less darkened, more orange-ochreous and obliterate. Hind wings without any brownish gray suffusion. The genitalia as in the nominate form of *montezumae*.

***Argyrotaenia floridana*, new species**

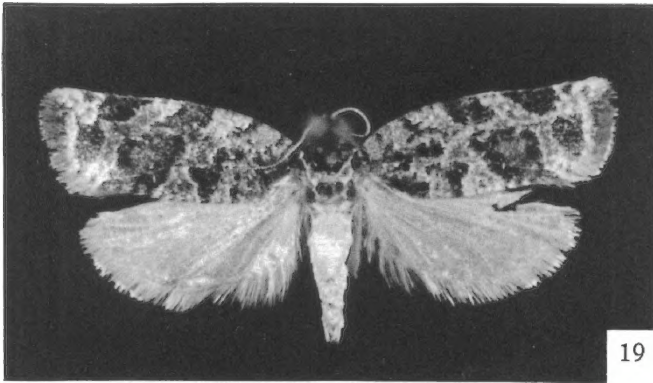
Figures 18–20, 23

Antennae dark brown, with broad, whitish annulation. Head chest-

nut-brown, mixed with ochreous behind eyes. Labial palpi chestnut-brown from outside, ochreous above and from inside. Thorax and tegulae chestnut-brown, mottled with ochreous; posterior thoracic crest orange-brown. Ground of forewings grayish white, shining; basal area brown, mixed with ferruginous, occupying about one-sixth of entire forewing surface; a darker, chestnut-brown, transverse fascia arising at about one-



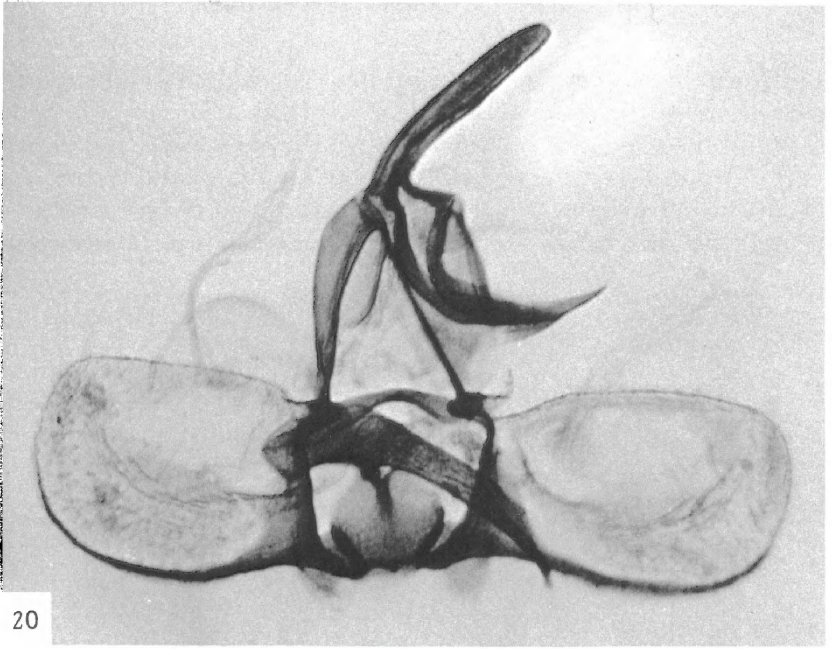
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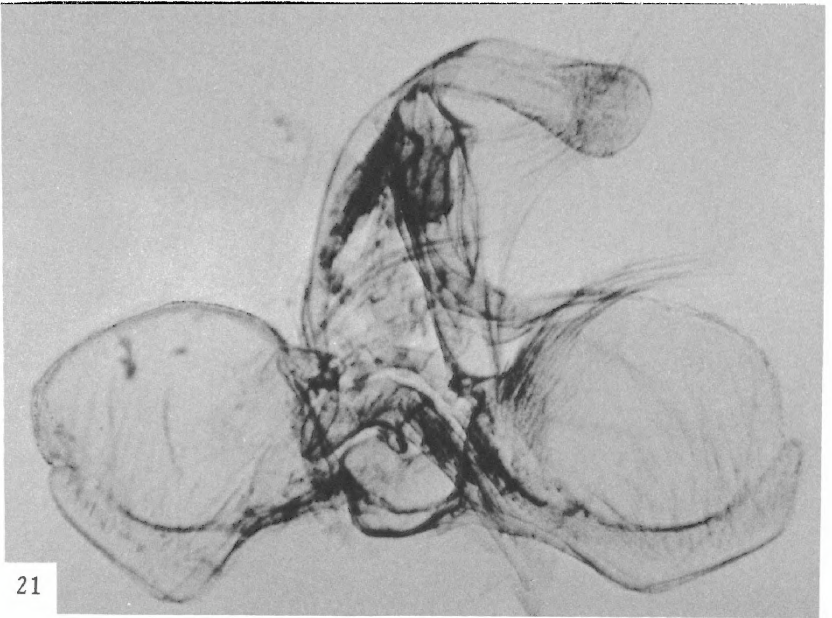
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FIGS. 18, 19. *Argyrotaenia floridana*, new species. 18. Holotype, male. 19. Allotype, female.

quarter of costa and reaching dorsum slightly behind one-third, interrupted at discal cell and continued below it as an elongate, dilated spot undulate from outside; in female, this fascia and basal area less distinctly separated one from the other than in male, with interspace mottled with brown; a rather broad, chestnut-brown, oblique median fascia arising from about middle of costa and directed to dorsum closely before tornus, widened and paler within in its lower part, not quite reaching



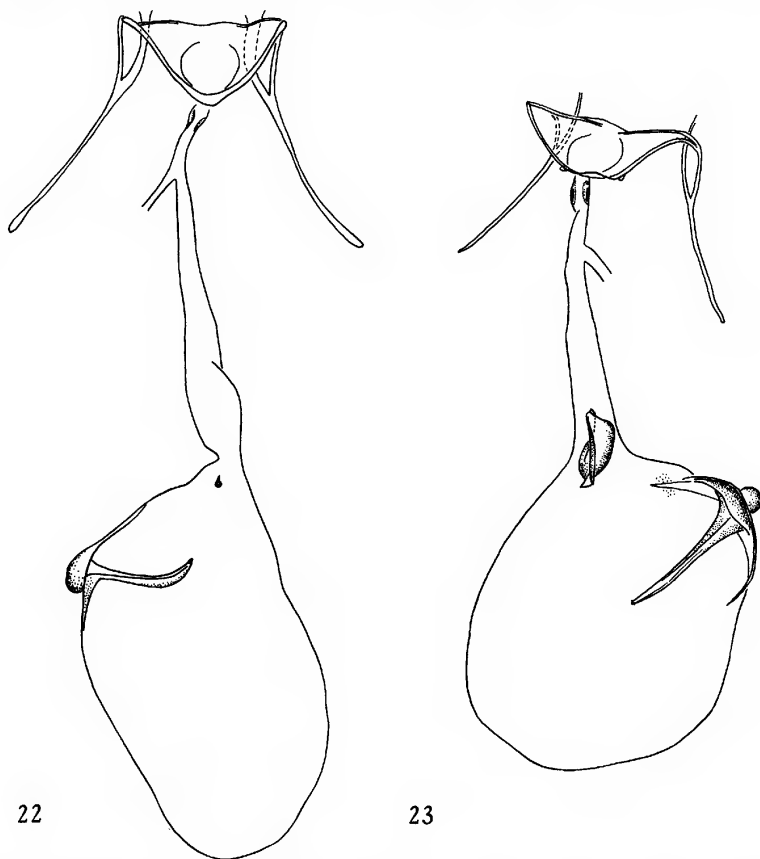
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FIGS. 20, 21. Male genitalia of *Argyrotaenia*. 20. *A. floridana*, new species, holotype. 21. *A. amatana* (Dyar), Delray Beach, Florida (slide No. 513-Obr.).

dorsum, but touching some dark, short, vertical lines on it; in discal cell a narrow tooth of light interspace, cutting this fascia from inside to middle, in male, or completely dividing it in two parts along discal cell, in female; a large, subtriangular or somewhat trapezoidal, brown costal spot about midway between this fascia and wing apex, in male followed



FIGS. 22, 23. Female genitalia of *Argyrotaenia*. 22. *A. amatana* (Dyar), holotype. 23. *A. floridana*, new species, allotype.

by an indistinct, brownish shadow; another large, brown spot between the above costal spot and tornus; a rather broad, brown terminal line, narrowed dorsad and not reaching tornus; some small, brown streaks in light interspaces along costa; some less distinct streaks along dorsum; almost all light interspaces with rather broad, shadowy lines along their length; cilia pale yellowish brown, whitish tornad; under surface of

forewings grayish ochreous, paler at apex and termen; along external part of costa, and in apical wing area, with grayish spots; base of costa yellowish brown. Length of forewing, 5.5 mm. in male; 7.5–9.0 mm. in female. Hind wings pale brownish ochreous, whitish basad; dark grayish reticulation externad, especially distinct on under surface; cilia yellowish white with an obliterate, gray basal line.

MALE GENITALIA: Uncus rather long, spatulate, equally broad along its length; no socii; gnathos with a long, acute middle process. Valvae subrectangular, rotundate; sacculus narrow, arched. Aedoeagus moderately curved, strongly narrowed apicad, with an obtuse tip; coecum penis with a short, thin appendage ventrocephalad, forming a common curve with aedoeagus.

FEMALE GENITALIA: Papillae anales elongate-ovate, slightly dilated caudad. Sterigma with small but distinct lateral angles; area around ostium bursae roundly deepened. Antrum moderate, elongate, with broad, lateral colliculi. Ductus bursae short. Corpus bursae rotundate; cestum a broad, rather long, single-spiraled plate; signum large, with strongly sclerotized base with capitulum, and a rather long, almost straight thorn slightly dentate at tip.

TYPES: Holotype, male (genitalia on slide, No. 329-Obr.), Port Sewall, Florida, November 13–14, 1938 (F. E. Watson and L. J. Sanford); allotype, female (genitalia on slide, No. 490-Obr.), the same data; two male paratypes, the same data but December 13–17, 1938. All type specimens are deposited in the American Museum of Natural History.

REMARKS: In the male genitalia *floridana* resembles *velutinana* Walker, but the uncus and the valvae are somewhat narrower. The female genitalia differ from those of *velutinana* in having the sterigma somewhat narrower, the antrum and the colliculi longer, the cestum more extended cephalocaudad, and the thorn of signum straighter and slightly dentate at tip. Externally these two species can be distinguished one from the other by the forewing markings which are in *floridana* more sharply outlined. Moreover, the forewing ground of *floridana* has a shining gloss, the inner border of the median fascia is cut through by a tooth of the ground color, and the costal spot is somewhat more remote from the wing apex. Absence of black patches on the forewing markings and paler hind wings are further characters of *floridana*, distinguishing it from *velutinana*. The new species can be confused with some specimens of *tabulana* Freeman, but it differs from that species in having the forewing markings chestnut-brown and the hind wings much paler. The uncus of *floridana* is not dilated at the middle as in *tabulana*, and the cestum of the female is not extended cephalad as a band. Some not quite fresh specimens of

floridana may be confused with males of *amatana* Dyar, but the uncus in the latter species is dilated apicad, the valvae are less elongate, the tip of the aedoeagus is more obtuse, and the coecum penis is bent downward under a right angle.

***Argyrotaenia kimballi*, new species**

Figures 24–28

MALE: Antennae chestnut-brown, somewhat ferruginous basad. Head ochreous, dappled with ferruginous at sides and on front. Labial palpi ochreous, mottled with ferruginous to chestnut-brown. Thorax chestnut-brown; tegulae ochreous, mottled with ferruginous to chestnut-brown. Forewings silky cream-white, with obliterate, grayish, transverse striation, dappled with ochreous; basal area, about one-quarter of entire wing length, composed of three to four rather broad, ferruginous to chestnut-brown, transverse bands; a rather broad, ferruginous median fascia, mottled (especially at costa and outer margin) with chestnut-brown, somewhat dilated dorsad, running from middle of costa to dorsum close to tornus; costa and dorsum with small, dark gray to chestnut-brown spots; three larger spots in outer third of costa, the second the largest; cilia pale ochreous, in some specimens rather white apicad and tornad; under surface of forewings ochreous, with traces of markings of upper surface. Length of forewing, 6–8 mm. Hind wings cream-white, suffused with gray at veins and externad.

FEMALE: Similar to the male but with forewing markings somewhat paler (perhaps because the examined specimen is not quite fresh).

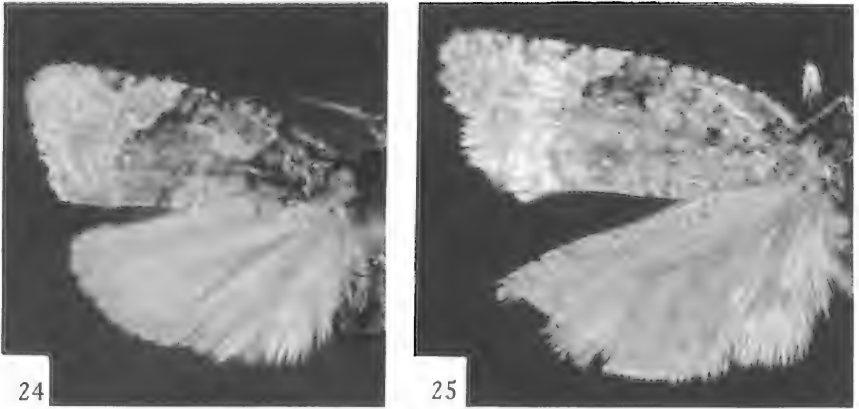
MALE GENITALIA: Uncus rather long, slightly narrowed at base, then dilated and somewhat narrowing again towards rotundate apex; no socii; middle process of gnathos moderately long. Valvae rotundate, slightly elongate; sacculus rather narrow. Aedoeagus rather long, moderately curved, tapering apicad, with tip slightly capitate; coecum penis wide, with plate-shaped appendage ventrocephalad.

FEMALE GENITALIA: Papillae anales elongate-ovate, rather broad. Sterigma wide, simple. Antrum slightly elongate, with narrow, lateral colliculi. Ductus bursae short. Corpus bursae slightly elongate; cestum a rather long, single-spiraled plate; sclerotized base of signum broad but rather short; capitulum moderate; thorn rather long, curved, acutely tipped.

TYPES: Holotype, male (genitalia on slide, No. 509-Obr.), Archbold Biological Station, Highlands County, Florida, February 10, 1958 (R. W. Pease, Jr.); allotype, female (genitalia on slide, No. 510-Obr.), the same data but February 22, 1958; both holotype and allotype deposited

in the American Museum of Natural History. Two male paratypes, the same data but December 25, 1957, and January 5, 1958; three male paratypes, the same locality, December 31, 1959, and January 5 and 14, 1960 (S. W. Frost); deposited in the collection of C. P. Kimball.

OTHER SPECIMENS EXAMINED: One male, Gulf Coast Station, Braden-

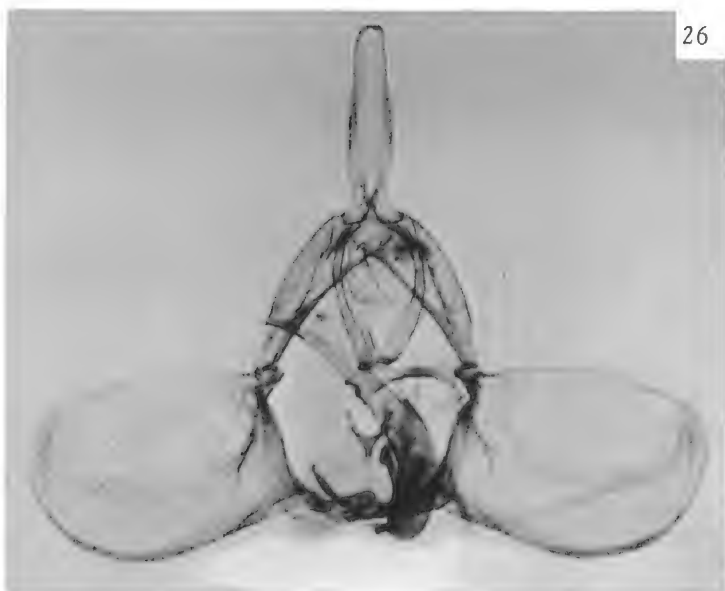


FIGS. 24, 25. *Argyrotaenia kimballi*, new species. 24. Holotype, male. 25. Allotype, female.

ton, Florida, May 25, 1955 (E. G. Helseimer); deposited in the collection of C. P. Kimball.

REMARKS: Externally this species rather reminds one of the Palearctic *Paraclepsis cinctana* (Schiffermiller and Denis) and some pale female specimens of *Argyrotaenia velutinana* (Walker). From this latter species, *kimballi* differs in having the basal area of forewings much paler costad, and the costal spot between the median fascia and wing apex consisting of three more or less distinctly separated parts. In both sexes, *kimballi* has the hind wings much paler than does *velutinana*. In the structure of the genitalia, the new species is undoubtedly closely related to *velutinana* and its allies, but differs from them in having the uncus slightly narrowed at the base, the aedoeagus slightly capitate, and the coecum penis bearing a well-developed plate. In the female genitalia, typical of the new species are the absence of lateral angles of sterigma and a longer cestum.

The present author has the pleasure of naming this new species for Mr. Charles P. Kimball, who kindly placed at the author's disposal his material on the Tortricidae of Florida, including the present new species.



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FIGS. 26-28. Genitalia of *Argyrotaenia kimballi*, new species. 26. Male genitalia of the holotype. 27, 28. Female genitalia of the allotype. 27. Caudal portion. 28. Corpus bursae.

Argyrotaenia repertana Freeman

Figures 31, 32

Eulia (*Argyrotaenia*) *gloverana*, FORBES (not Walsingham), "1923" [1924], Mem. Cornell Univ. Agr. Exp. Sta., no. 68, p. 490.

Eulia pinatubana (in part), KLOTS, 1942, Bull. Amer. Mus. Nat. Hist., vol. 79, p. 415.

Argyrotaenia repertana FREEMAN, 1944, Sci. Agr., vol. 25, p. 84, text fig. 1, pl. 1, figs. 7-12; 1958, Canadian Ent., vol. 90, suppl. 7, p. 46, figs. 209-213.

TYPES: Holotype, female, Waweig, New Brunswick, June 15, 1938 (T. N. Freeman); allotype, male, St. Andrews, New Brunswick, June 4, 1938 (T. N. Freeman); both types are deposited in the Canadian National Collection, not seen by the present author.

SPECIMENS EXAMINED: Four males, Redvers, Saskatchewan, May 27, 1908 (A. J. Croker); two males, Beulah, Manitoba (A. J. Dennis); one male, Aweme, Manitoba, June 16, 1904 (N. Criddle); one male and one female (genitalia on slides, Nos. 324-Obr., 89-Obr.), Halifax, Nova Scotia, February 26-27, 1951 (J. McDunnough); seven males (genitalia of one of them on slide, No. 334-Obr.), Winchendon, Massachusetts, May 9-26, 1902 (F. A. Merrick); all specimens are deposited in the American Museum of Natural History.

REMARKS: Forbes ("1923" [1924]) erroneously identified this species as "*Eulia gloverana* Walsingham" which is an *Acleris* species. Four males from Winchendon, Massachusetts, deposited in the American Museum of Natural History, were recorded as lectoparatypes of *Argyrotaenia pinatubana* (Kearfott) (Klots, 1942). They originate from the Kearfott Collection, and were collected between May 9 and 26, 1902. In the original description of *pinatubana*, Kearfott (1905, p. 9) mentioned only the specimens from Winchendon collected between May 26 and June 3. Thus the above four males cannot be treated as belonging to the original lot and are merely pseudoparatypes of *pinatubana*.

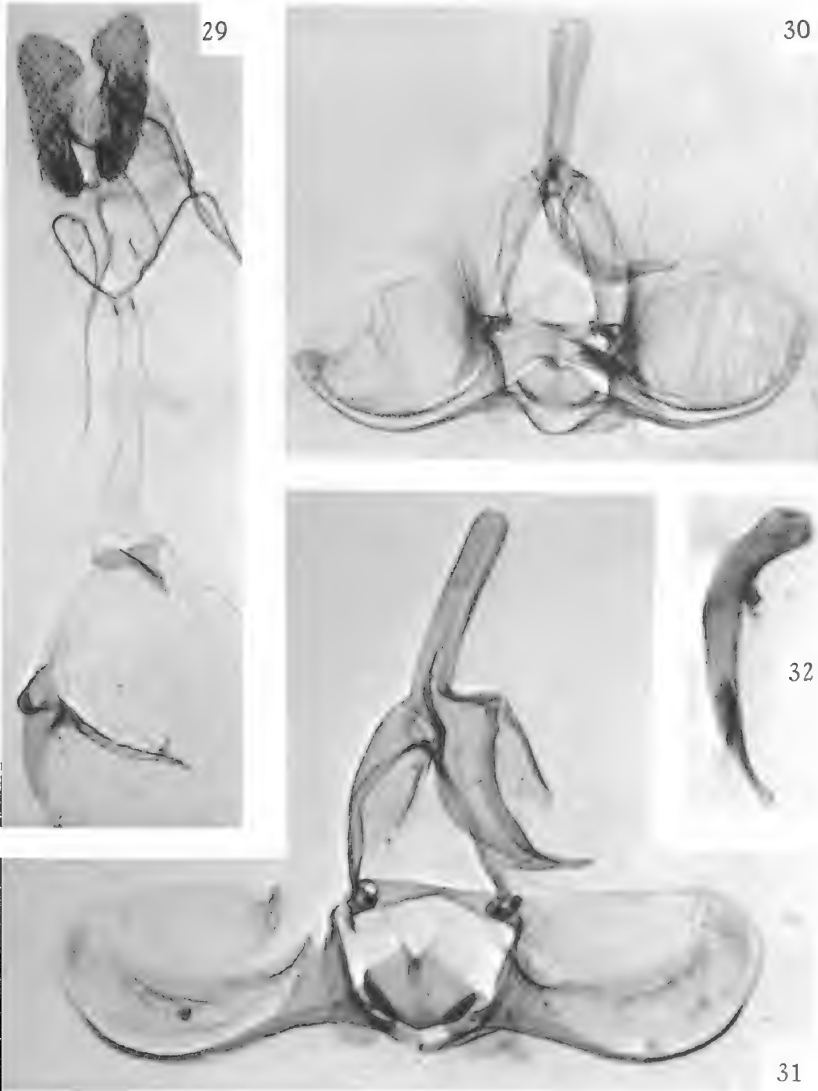
Argyrotaenia urbana (Busck), new combination

Figures 30, 33-36, 47

Tortrix urbana BUSCK, 1912, Proc. Ent. Soc. Washington, vol. 14, p. 86. WALSINGHAM, 1914, Biologia Centrali-Americana, Lepidoptera Heterocera, vol. 4, p. 281.

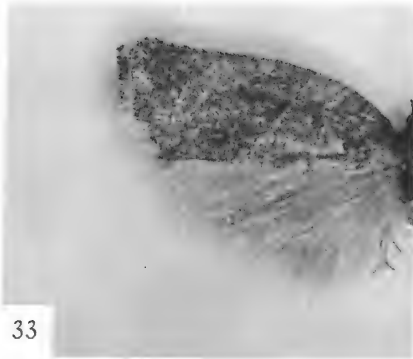
TYPE: Holotype, male (genitalia on slide, prepared by A. Busck on September 30, 1922), Mexico City, Mexico, November 11 (R. Muller), deposited in the United States National Museum.

OTHER SPECIMENS EXAMINED: Four males (genitalia of two of them on slides, prepared by A. Busck on September 30, 1921, and March 10, 1924), Mexico City, Mexico, November 23, and February 7, 1924 (A.



FIGS. 29-32. Genitalia of *Argyrotaenia* species. 29. *A. montezumae montezumae* (Walsingham), female, San Angel, Mexico (slide No. 526-Obr.). 30. *A. urbana* (Busck), male, Mexico City, Mexico, November 11. 31, 32. *A. repertana* Freeman, male, Halifax, Nova Scotia (slide No. 324-Obr.). 31. Ventral view. 32. Aedeagus.

Dampf), and November 11 (R. Muller); one male, Misantla, Mexico, November 10 (R. Muller); deposited in the United States National Museum. Two males, Chapultepec, Distrito Federal, Mexico, June 18



FIGS. 33-36. *Argyrotaenia urbana* (Busck). 33. Male, Mexico City, Mexico, November, 1923. 34. Male, Chapultepec, Mexico, June 16, 1939. 35, 36. Female genitalia (slide No. 527-Obr.). 35. Caudal portion. 36. Corpus bursae.

and 24, 1939 (C. C. Hoffmann); one female (genitalia on slide, No. 527-Obr.), San Angel, Distrito Federal, Mexico, May 23, 1917 (C. C. Hoffmann); deposited in the American Museum of Natural History.

Argyrotaenia tabulana Freeman

Argyrotaenia tabulana FREEMAN, 1944, Sci. Agr., vol. 25, p. 87, pl. 1, figs. 25-30. ?EVANS AND DYER, 1953, Ann. Rept. Canadian Dept. Agr., Forest Insects and Diseases Surv., for 1952, p. 131. FREEMAN, 1958, Canadian Ent., vol. 90, suppl. 7, p. 48, figs. 227-232.

Argyrotaenia tabluana, FREEMAN, 1958, *ibid.*, vol. 90, suppl. 7, p. 65 (misprint).

TYPES: Holotype, female, Constance Bay, Ontario, April 29, 1941 (J. McDunnough); allotype, male, Kazabazua, Quebec, June 7, 1927 (F. P. Ide); both types are deposited in the Canadian National Collection, not seen by the present author.

SPECIMENS EXAMINED: *British Columbia:* One male paratype (genitalia in vial, No. 1-Obr.), Peachland, May 23, 1936 (A. N. Gartrell); one female (genitalia in vial, No. 2-Obr.), Fernie, reared, January 21, 1943; both specimens deposited in the Canadian National Collection. *North Carolina:* Three males and two females (genitalia on slides, Nos. 498-Obr., 499-Obr., 500-Obr., and 507-Obr.), Black Mountain, "½ way" and "valley," June 5-12 (W. Beutenmuller); one female (genitalia on slide, No. 489-Obr.), Niagara, Moore County, September 18, 1953 (R. R. McElvare); deposited in the American Museum of Natural History; one male, Maxton, April 7, 1944 (A. B. Klots), in the collection of A. B. Klots. *Florida:* Nine males and four females (genitalia on slides, Nos. 511-Obr. and 512-Obr.), Weeki Wachee Springs, Hernando County, February 20 to March 4, March 29, and May 22, 1955 (J. F. May), deposited in the American Museum of Natural History and the collection of C. P. Kimball. *New York:* One male (genitalia on slide, No. 358-Obr.), Central Park, Long Island, April 17, 1912 (G. P. Engelhardt); one female, Melville, Long Island, May 11, 1924 (F. M. Schott); one female, Huntington, Long Island, April 27, 1924 (F. M. Schott); all three specimens are deposited in the American Museum of Natural History. *Mississippi:* One male (genitalia on slide, No. 1-Obr. 3/10, 1960), Gulfport, March 1, 1958 (R. H. Beal), deposited in the United States National Museum.

REMARKS: There are no genitalic characters distinguishing this species and *velutinana*, but externally they are very distinct. Freeman (1958) gives only Canada (Quebec, Ontario, Manitoba, and British Columbia) as the distribution of *tabulana*. The present author examined some specimens from the United States which, as he believes, belong to the same species. The specimens from the State of New York agree completely with those from British Columbia. One of them was reared from pitch pine (*Pinus rigida*). The specimens from North Carolina and Florida belong to a form in which the forewing markings are browner, mixed occasionally with black. The specimens from North Carolina show, in addition, a tendency to develop an elongate, black, longitudinal spot crossing the median fascia of the forewings on the level of the discal cell. In the structure of the genitalia these specimens completely correspond to *tabulana*, but could have been treated as a separate subspecies. The

only male from Mississippi was reared from loblolly pine (*Pinus taeda*). It differs much from all of the above specimens. The ground of the forewings is more pale gray, with the middle fascia obsolete, reddish brown in its dorsal two-thirds.

The systematic position of two specimens in the United States National Museum is somewhat doubtful, and they are not listed above. One male [Washington, D. C., April 6, 1909 (A. Busck); genitalia on slide, No. 3-Obr. 3/10, 1960] has dark, almost black, very contrasting markings of forewings and somewhat resembles one of the males from Black Mountain, North Carolina. One female specimen of unknown origin (the labels read "♀ 5478" and "sent to Ragonot 49"; genitalia on slide, No. 4-Obr. 3/10, 1960) is similar to the above-mentioned male from Washington but has the forewing markings confluent. Although the genitalia of both male and female do not differ from those of *tabulana*, additional material is necessary for confirmation of the correctness of the identification.

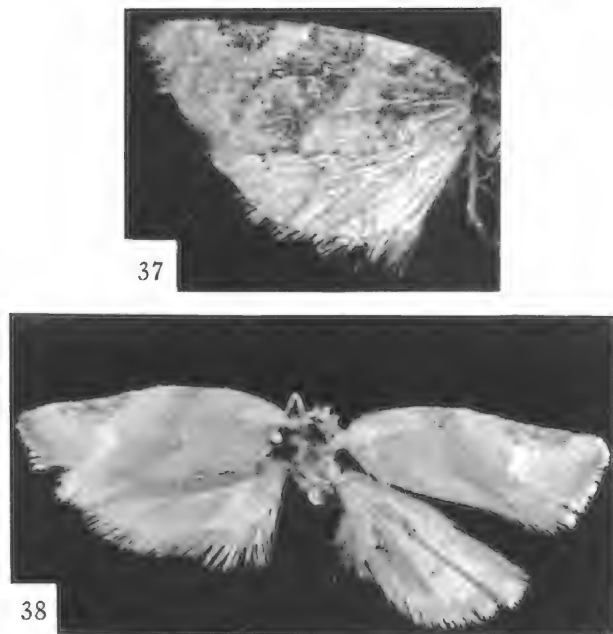
Argyrotaenia spaldingiana, new species

Figures 37-42

MALE: Antennae ochreous, with slightly darker, brownish annulation. Head and thorax ochreous. Labial palpi ochreous, slightly mottled with pale brown. Forewings ochreous, with pale pinkish brown suffusion; basal area, occupying about one-third of wing, brownish orange-ochreous, more intensively colored externad and therefore well separated; median fascia orange-ochreous, broad, oblique, from middle of costa to last third of dorsum; costal spot chestnut-brown mixed with orange-ochreous, semicircular, midway between the above fascia and wing apex; a minute, orange-ochreous costal dot before wing apex; some minute, orange-brown dots at dorsum; terminal line indistinct, indicated by a slight darkening of pinkish brown suffusion of wing ground; cilia pale ochreous; under surface of forewings ochreous, with slight orange indication of median fascia and costal spot of upper surface. Length of forewing, 7 mm. Hind wings and their cilia white, slightly creamy.

FEMALE: Similar to the male, but with ground of forewings paler, without pinkish brown suffusion; all markings less distinct, pale gray, darker at costa.

MALE GENITALIA: Uncus rather long, spatulate, slightly, gradually dilated towards rotundate apex; socii shaped as minute, hairy papillae; middle process of gnathos strong, acute. Valvae rotundate slightly elongate; sacculus narrow. Aedoeagus rather thick, very gently curved,

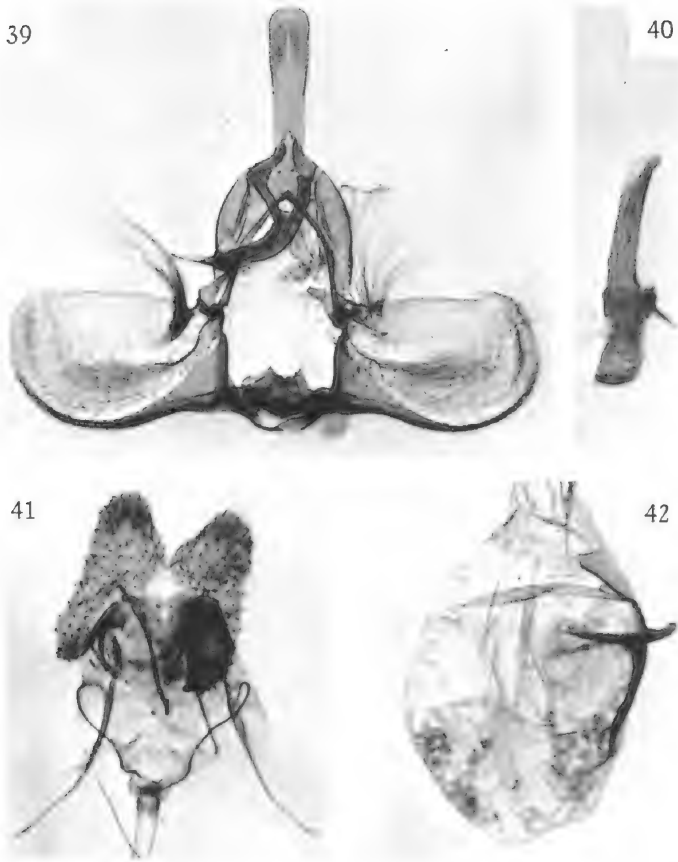


FIGS. 37, 38. *Argyrotaenia spaldingiana*, new species. 37. Holotype, male. 38. Female paratype (slightly less enlarged than the male).

shortly tapering apicad, with a short, obtuse tip; coecum penis (on the slide broken off from aedoeagus) dilated.

FEMALE GENITALIA: Papillae anales elongate-ovate, broad. Sterigma wide, narrowed around ostium bursae. Antrum slightly elongate, with lateral colliculi. Ductus bursae at least four times as long as antrum. Corpus bursae slightly elongate; cervix bursae very broad, abruptly narrowed shortly before orifice of ductus seminalis; no cestum; signum with basal sclerotization widely extended both cephalad and caudad; a triangular, weakly sclerotized area at caudal extension of basal sclerotization; capitulum narrow, rather long, slightly bent caudad; thorn of signum rather short.

TYPES: Holotype, male (genitalia on slide, No. 1-Obr. 6/24, 1960), Provo, Utah, August 1, 1908 (Tom Spalding), deposited in the United States National Museum. Allotype, female (genitalia on slide, No. 484-Obr.), Stockton, Utah, July 9, 1907 (Tom Spalding); one female paratype (genitalia on slide, No. 482-Obr.), Verdi, Nevada, June 20–30 (A. H. Vachell); both allotype and paratype deposited in the American Museum of Natural History.



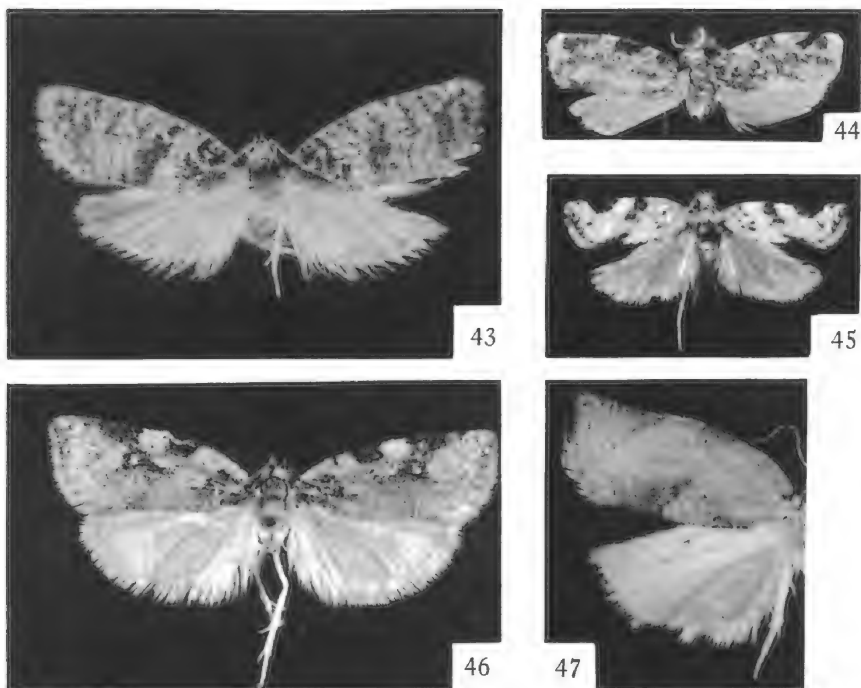
FIGS. 39-42. Genitalia of *Argyrotaenia spaldingiana*, new species. 39, 40. Male, holotype. 39. Ventral view. 40. Aedeagus. 41, 42. Female, allotype. 41. Caudal portion. 42. Corpus bursae.

REMARKS: The male resembles somewhat *Argyrotaenia pinatubana* (Kearfott), but differs in having a paler ground of the forewings, the median fascia widely dilated, and the hind wings white. In the genitalia it differs from that species in having the uncus distinctly dilated apicad, the aedeagus thicker, with a shorter and stouter distal end, and the coecum penis more dilated. The female reminds one of *Clepsia virescana* (Clemens) but differs from it in generic characters.

Argyrotaenia gogana (Kearfott), new combination

Figures 43, 48

Olethreutes gogana KEARFOTT, 1907, Trans. Amer. Ent. Soc., vol. 33, p. 8. HEIN-



FIGS. 43-47. *Argyrotaenia* species. 43. *A. gogana* (Kearfott), holotype, male. 44. *A. amatana* (Dyar), male, Perrine, Florida, June 8, 1923. 45. *A. kearfotti*, new species, holotype, male. 46. *A. klotsi*, new species, holotype, male. 47. *A. urbana* (Busck), female, San Angel, Mexico, May 23, 1917.

RICH, 1926, Bull. U. S. Natl. Mus., no. 132, p. 191. KLOTS, 1942, Bull. Amer. Mus. Nat. Hist., vol. 79, p. 414.

Olethreutes crepuscularis MEYRICK, 1912, Ent. Monthly Mag., vol. 48, p. 35 (substitute name).

Argyroploce gogana, BARNES AND McDUNNOUGH, 1917, Check list of the Lepidoptera of Boreal America, p. 168, no. 6845.

Tortrix gogana, McDUNNOUGH, 1939, Mem. Southern California Acad. Sci., vol. 2, p. 57, no. 7429.

TYPE: Holotype, male (genitalia on slide, No. 487-Obr., prepared by C. Heinrich under No. 547 on December 15, 1919), Wellington, British Columbia, April 4, 1902 (G. W. Taylor), deposited in the American Museum of Natural History.

REMARKS: The above holotype is the only specimen of *gogana* yet known. Heinrich (1926) was the first author to point out that this species does not belong to the genus *Olethreutes* Hübner, in which it was originally placed, but that it is a species in the Tortricinae.

Argyrotaenia amatana (Dyar)

Figures 21, 22, 44, 49, 50

Lophoderus amatana DYAR, 1901, Jour. New York Ent. Soc., vol. 9, p. 24; 1901, Proc. Ent. Soc. Washington, vol. 4, p. 468.

Cacoecia georgiana, DYAR (not Walker), 1901, Proc. Ent. Soc. Washington, vol. 4, p. 466.

Eulia amatana, FERNALD, "1902" [1903], Bull. U. S. Natl. Mus., no. 52, p. 485, no. 5422. MEYRICK, 1912, in Wagner, Lepidopterorum catalogus, pt. 10, p. 40; 1913, in Wytzman, Genera insectorum, fasc. 149, p. 39, BARNES AND MCDUNNOUGH, 1917, Check list of the Lepidoptera of Boreal America, p. 177, no. 7391.

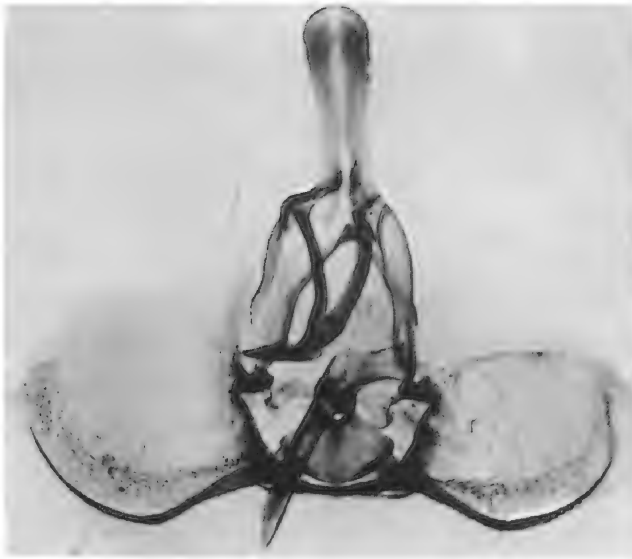


FIG. 48. Male genitalia of *Argyrotaenia gogana* (Kearfott), holotype.

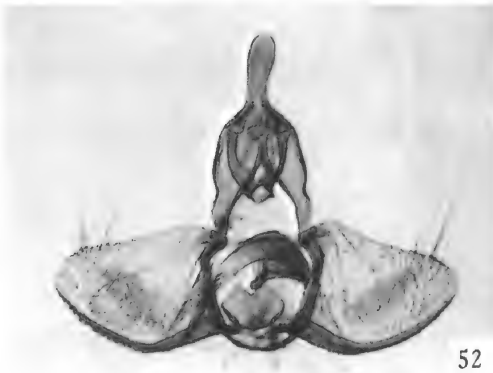
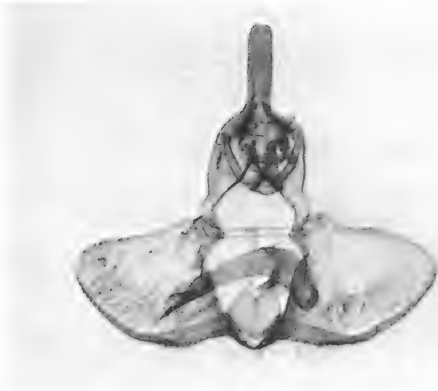
Tortrix chiocana KEARFOTT, 1907, Trans. Amer. Ent. Soc., vol. 33, p. 72. KLOTS, 1942, Bull. Amer. Mus. Nat. Hist., vol. 79, p. 413. New synonym.

Argyrotoxa chiococcana MEYRICK, 1912, in Wagner, Lepidopterorum catalogus, pt. 10, p. 52 (emendation); 1913, in Wytzman, Genera insectorum, fasc. 149, p. 50. New synonym.

Argyrotoxa chiocana, BARNES AND MCDUNNOUGH, 1917, Check list of the Lepidoptera of Boreal America, p. 178, no. 7408. MCDUNNOUGH, 1939, Mem. Southern California Acad. Sci., vol. 2, p. 58, no. 7467.

Argyrotaenia amatana, MCDUNNOUGH, 1939, *ibid.*, vol. 2, p. 58, no. 7446. FREEMAN, 1944, Sci. Agr., vol. 25, p. 91, pl. 1, fig. 54; 1958, Canadian Ent., vol. 90, suppl. 7, p. 52, fig. 256.

TYPES: Holotype of *amatana*, female (genitalia on slide, prepared by



FIGS. 49-54. *Argyrotaenia* species. 49, 50. *A. amatana* (Dyar). 49. Male, Delray Beach, Florida, April 22, 1959. 50. Female, holotype. 51. Male genitalia of *A. franciscana* (Walsingham) (slide No. 293-Obr.). 52. Male genitalia of *A. kearfotti*, new species (slide No. 481-Obr.). 53, 54. Female genitalia of *A. heureta* (Walsingham) (slide No. 525-Obr.). 53. Caudal portion. 54. Corpus bursae.

A. Busck on January 26, 1923), Palm Beach, Florida (*ex* collection of H. G. Dyar; No. 15773), deposited in the United States National Museum. Lectotype of *chiocana* (selected by Klots, 1942), male (genitalia

on slide, No. 382-Obr.), Palm Beach, Florida (*ex* collection of H. G. Dyar; No. 15615), deposited in the American Museum of Natural History.

OTHER SPECIMENS EXAMINED: *Florida*: One male (genitalia on slide, No. 513-Obr.), Delray Beach, Palm Beach County, April 22, 1959 (C. P. Kimball); one female (genitalia on slide, No. 480-Obr.), Coconut Grove (E. A. Schwarz); one female (genitalia on slide, No. 93-Obr.), Hastings, St. Johns County, April; all three specimens deposited in the American Museum of Natural History. One male (genitalia on slide, prepared by A. Busck on May 25, 1924), Perrine, Dade County, June 8, 1923 (G. F. Mozzette), deposited in the United States National Museum.

REMARKS: The forewing pattern of the male of *amatana* is rather variegated. The figure, published twice by Freeman (1944, pl. 1, fig. 54; 1958, fig. 256), is rather misleading because it was made from a badly worn specimen and was reproduced at a larger scale than that of the remaining *Argyrotaenia* specimens among which it was figured. The photographs in the present paper are, unfortunately, also not irrefragable, but they nonetheless show the forewing markings of the male of *amatana* quite accurately, at least at one side of the specimens figured. In the female of this species, the dark markings of the forewings are usually confluent, forming large, dark areas in the basal and external parts of the forewings. These dark areas are separated from one another by a light band of ground color crossing the forewing obliquely from the upper vein of the discal cell to the dorsum. This sexual dimorphism is inconstant, and females are also known that do not differ in their forewing pattern from the males.

Tortrix chioccana, established by Kearfott as a separate species and erroneously placed by Meyrick (1912) in the genus *Argyrotoxa*, is nothing else but the male of *amatana*. The type specimen of *chioccana* and its genitalia were examined by the present author, and there is no doubt that this species is synonymous with *amatana*.

Argyrotaenia franciscana (Walsingham)

Figure 51

Lozotaenia franciscana WALSINGHAM, 1879, Illustrations of typical specimens of Lepidoptera Heterocera, vol. 4, p. 13, pl. 63, fig. 5.

Tortrix franciscana, FERNALD, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 18. GROTE, 1882, New check list of North American moths, p. 58, no. 81. FERNALD, "1902" [1903], Bull. U. S. Natl. Mus., no 52, p. 483, no. 5403. MEYRICK, 1912, in Wagner, Lepidopterorum catalogus, pt. 10, p. 28; 1913, in Wytzman, Genera insectorum, fasc. 149, p. 30. BARNES AND McDUNNOUGH, 1917, Check list of the

Lepidoptera of Boreal America, p. 177, no. 7379. McDUNNOUGH, 1939, Mem. Southern California Acad. Sci., vol. 2, p. 57, no. 7426. HEDDERGOTT, 1953, in Blunck, Handbuch der Pflanzenkrankheiten, vol. 4, pt. 1, p. 127.

Argyrotaenia franciscana, KEIFER, 1933, Monthly Bull. Dept. Agr. State California, no. 22, p. 351. FREEMAN, 1958, Canadian Ent., vol. 90, suppl. 7, p. 54, fig. 201.

TYPE: Holotype, male (genitalia on slide, No. 5354), San Francisco, California, May 16, 1871 (Walsingham); deposited in the British Museum (Natural History).

OTHER SPECIMENS EXAMINED: *California*: Two males (genitalia of one of them on slide, No. 366-Obr.), no data but "California"; four males, San Diego, April 14, 1907, and June 22, 1909 (W. S. Wright); one male, San Luis Obispo, March (A. H. Vachell); one male, Lake Merced, April 11, 1909; 25 males (genitalia of two of them on slides, Nos. 302-Obr. and 602-Obr.), San Francisco; 16 males (genitalia of one of them on slide, No. 293-Obr.), Carmel, April and June (A. H. Vachell); all specimens deposited in the American Museum of Natural History.

REMARKS: Although *franciscana* resembles externally some forms of the variable *Argyrotaenia citrana* (Fernald), there is no doubt that each is a separate species. The costal spot of the forewings of *franciscana* is usually distinctly encircled by a whitish arch, or a whitish spot is present at the costa between the middle fascia and the costal spot. The middle fascia has at its middle a minute, more or less distinct, black spot, is not interrupted, and its tornal portion is joined to a subterminal line, so that they form together a common arch. The under surface of the forewings in *franciscana* is never whitish or ochreous, but is more or less dark gray or blackish brown, usually with a distinct white spot at the middle of the costa. The hind wings are fuscous. At least three of the above characters are present in any specimen of *franciscana* and give the basis for separation of this species from *citrana*. The male genitalia of both are very similar, but the uncus of *franciscana* is equally broad along its length; in *citrana* it is slightly dilated before the tip. The tip of the middle process of gnathos in *franciscana* is rounded more narrowly than in *citrana*. Moreover, *franciscana* is usually a smaller species than *citrana*. The male genitalia of *citrana* are figured in this paper (fig. 80).

Argyrotaenia kearfotti, new species

Figures 45, 52

MALE: Antennae brown, with cream-white annulation. Head and thorax brown, somewhat paler caudad. Labial palpi more or less dark brown. Abdomen ochreous brown; anal tuft cream-white. Forewings

cream-white; their basal quarter either indistinctly darker ochreous, in some specimens with black, irregularly shaped dots, or with costal area above discal cell entirely brown, or with both characters present; shortly before middle of costa, a rather large, blackish brown, subquadrate spot; from it, an oblique, brownish ochreous fascia bearing in some specimens another blackish brown spot below costal spot, and one more at dorsum before tornus; midway between this fascia and wing apex, a large, semi-ovate, blackish brown spot at costa; a small, concolorous spot at costa between the above-mentioned spot and wing apex; along dorsum, some small, blackish brown, widely separated dots; similar dots along termen, usually confluent and forming a terminal line continued in some specimens along tornus and reaching dorsal spot of median fascia; in some specimens some small, blackish brown dots in preterminal area; cilia dark brown at apex, ochreous below it, and often darkened again at tornus; under surface of forewings brownish gray, with darker areas corresponding to pale areas of upper surface; middle of costa with a whitish spot. Length of forewing, 6-7 mm. Hind wings whitish to dark fuscous; cilia usually much paler, in some specimens almost white.

FEMALE: Unknown.

MALE GENITALIA: Uncus spatulate, equally broad along its length, or slightly dilated towards rotundate apex; socii reduced to some few hairs on inner lobes of tegumen; middle process of gnathos acute, rather short. Valvae subtriangular, with apex subacute or somewhat rounded; sacculus narrow, strongly arched. Aedoeagus sharply pointed distad; coecum penis downcurved.

TYPES: Holotype, male, Carmel, California, June (A. H. Vachell); three male paratypes (genitalia of one specimen on slide, No. 368-Obr.), the same data but April and June; seven male paratypes (genitalia of one specimen on slide, No. 481-Obr.), San Luis Obispo, California, March (A. H. Vachell); all type specimens originate from Kearfott Collection and are deposited in the American Museum of Natural History.

REMARKS: The genitalia of this new species are very close to those of *Argyrotaenia franciscana* (Walsingham) and differ from them only in having the uncus a little shorter and relatively broader, with a more rotundate tip. The external appearance of *kearfotti* differs so much from that of *franciscana* that it is difficult even to suggest the conspecificity of these two forms. The cream-white ground color of the forewings, with blackish brown markings, distinguishes the new species from the remaining known members of the genus *Argyrotaenia*.

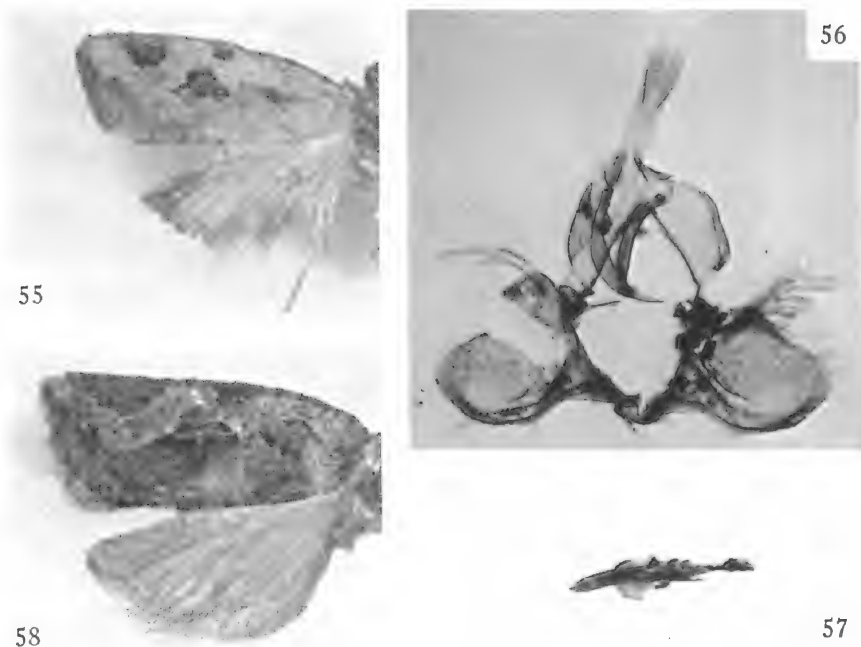
Argyrotaenia heureta (Walsingham), new combination

Figures 53, 54

Tortrix heureta WALSINGHAM, 1914, *Biologia Centrali-Americana*, Lepidoptera Heterocera, vol. 4, p. 281, pl. 8, fig. 19.

TYPE: Holotype, male, Quiché Mountains, 7000–9000 feet, Guatemala, August, 1880 (G. C. Champion), deposited in the British Museum (Natural History).

OTHER SPECIMEN EXAMINED: One female (genitalia on slide, No.



FIGS. 55–58. *Argyrotaenia dichroaca* (Walsingham). 55–57. Male paratype. 55. Moth. 56. Ventral view of genitalia (slide No. 2-Obr. 5/28, 1960). 57. Aedeagus. 58. Female paratype.

525-Obr.), Puebla, Puebla, Mexico, October 20, 1920 (C. C. Hoffmann), deposited in the American Museum of Natural History.

REMARKS: Although the above female specimen from Mexico differs a little from the male type of *heureta* from Guatemala in having the base of the antennae pale ochreous and the forewings not so bright reddish ferruginous, the entire forewing pattern is very similar in both specimens, and it is quite probable that they represent the two sexes of



FIGS. 59, 60. Female genitalia of *Argyrotaenia*. 59. *A. dichroaca* (Walsingham), allotype. 60. *A. dichotoma* (Walsingham), holotype.

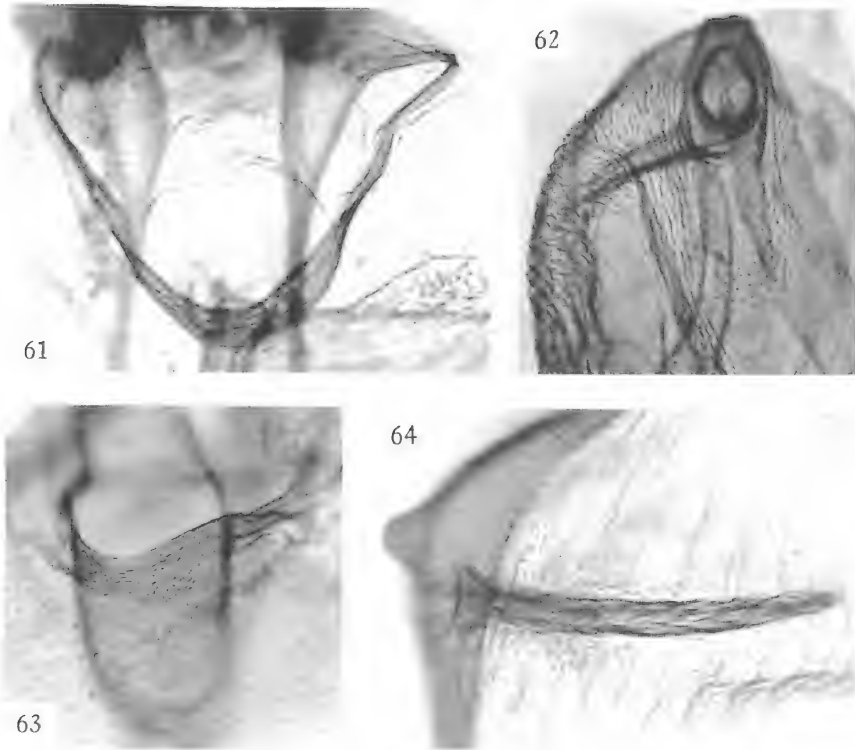
one species. The female has a long, narrow cervix bursae without cesum, rather long lateral appendages of the sterigma, and differs in this way from *dichroaca* Walsingham which it somewhat resembles in having almost the same but a more sharply defined pattern of the forewings.

Argyrotaenia dichroaca (Walsingham), new combination

Figures 55-59, 61, 62

Tortrix dichroaca WALSINGHAM, 1914, *Biologia Centrali-Americana*, Lepidoptera Heterocera, vol. 4, p. 279.

TYPES: Holotype, male (without abdomen), Rio Susio, Costa Rica (Rogers; No. 66526); allotype, female (genitalia on slide, No. 4722), the same data but No. 66527; both holotype and allotype are deposited in the British Museum (Natural History). One male paratype (geni-



FIGS. 61-64. Female genitalia of *Argyrotaenia*. 61, 62. *A. dichroaca* (Walsingham), allotype. 61. Detail of ostium bursae. 62. Signum. 63, 64. *A. dichotoma* (Walsingham), holotype. 63. Detail of ostium bursae. 64. Signum.

talia on slide, No. 2-Obr. 5/28, 1960), the same data but No. 66532; one female paratype (genitalia on slide, prepared by N. Obraztsov on August 30, 1957), Volcan de Irazu, 6000-7000 feet, Costa Rica (Rogers; No. 66536); both paratypes are deposited in the United States National Museum.

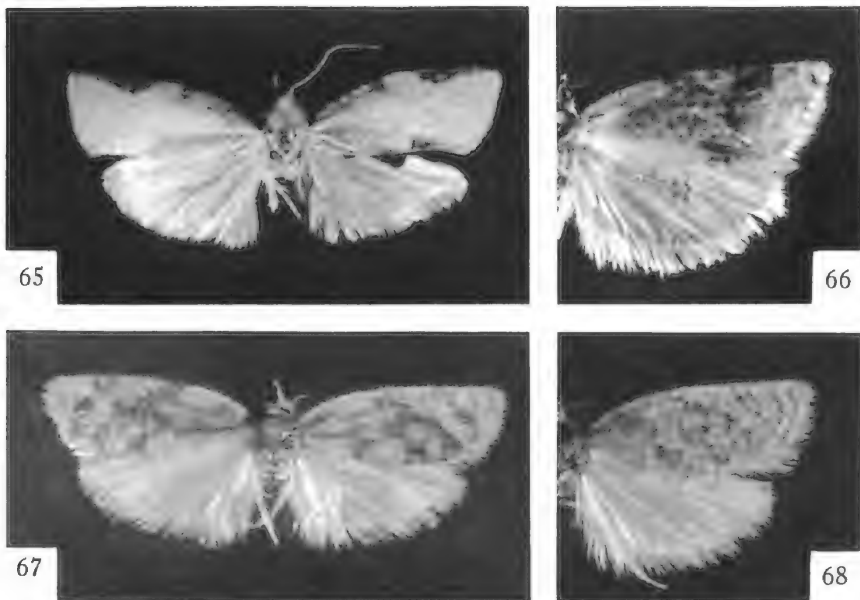
OTHER SPECIMEN EXAMINED: One female (genitalia on slide, No. 485-Obr.), Tacubaya, Mexico, October (*ex* Kearfott Collection); deposited in the American Museum of Natural History.

***Argyrotaenia polvosana*, new species**

Figures 65, 69, 70

MALE: Antennae ochreous, with grayish brown annulation; scapus dark brown from above. Head and thorax ochreous. Labial palpi ochreous, brown mottled from outside; terminal joint brown. Forewings

ochreous; basal third of costa and dorsum slightly ferruginous; shortly before middle of costa a ferruginous spot including some black dots, connected by a narrow, faintly indicated, pale ferruginous median fascia with a ferruginous, inwardly black-outlined, dorsal spot shortly before tornus; externad another, elongate, costal spot with some black dots in it, reaching wing apex; two inconspicuous, faintly ferruginous



FIGS. 65-68. *Argyrotaenia* species. 65. *A. polvosana*, new species, holotype, male. 66. *A. graceana* Powell, paratype, male. 67. *A. burroughsi*, new species. 67. Holotype, male. 68. Allotype, female.

lines from this spot to upper and inner portions of tornus, and a similar, slightly more sharply defined line parallel to termen; cilia ochreous; under surface of forewings ochreous, ferruginous costad, with some obliterate, ferruginous, oblique lines in external area of wing. Length of forewing, 8 mm. Hind wings pale ochreous, grayish dorsad; cilia pale ochreous.

FEMALE: Unknown.

MALE GENITALIA: Uncus moderately long, equally broad, its apex rotundate; socii reduced to some few hairs on inner lobes of tegumen; gnathos with a rather long, acute middle process. Valvae slightly elongate, with apex broadly rotundate; sacculus rather thick, scobinate and dentate, ending with a free, strong thorn; processus basales rotundate, sub-

costal; pulvinus rather inconspicuous. Fultura superior strongly bent. Aedoeagus curved, with a rather thick, obtuse tip.

TYPE: Holotype, male (genitalia on slide, No. 519-Obr.), La Polvosa, latitude 28° 09' N., longitude 108° 39' W., 6400 feet, Chihuahua, Mexico, August 16, 1958 (I. R. Commissaris), deposited in the American Museum of Natural History.

REMARKS: In its external appearance *polvosana* is rather similar to *Clepsis virescana* (Clemens), but it resembles also some female specimens of *Argyrotaenia montezumae* (Walsingham) and *A. dorsalana* (Dyar). In the male genitalia *polvosana* is close to *A. klotsi*, new species, *A. burroughsi*, new species, *graceana* Powell, but differs from all of them in having the sacculus ending with a strong thorn. In this character *polvosana* approaches *dorsalana*, but it has the sacculus less dilated, and the coecum penis shorter and comparatively broader. Moreover, the costal spot of the forewings of *polvosana* is situated somewhat closer to the wing apex than that of *dorsalana*. The genitalia of *montezumae* are of a quite different shape and have nothing in common with those of *polvosana*.

Argyrotaenia graceana Powell

Figure 66

Argyrotaenia graceana POWELL, 1960, Pan-Pacific Ent., vol. 36, p. 93, figs. 9, 10.

SPECIMEN EXAMINED: One male paratype (genitalia on slide, No. 518-Obr.), upper Santa Ana River, San Bernardino County, California, August 1, 1946 (*ex* collection of G. H. and J. L. Sperry); deposited in the American Museum of Natural History.

Argyrotaenia burroughsi, new species

Figures 67, 68, 71-74

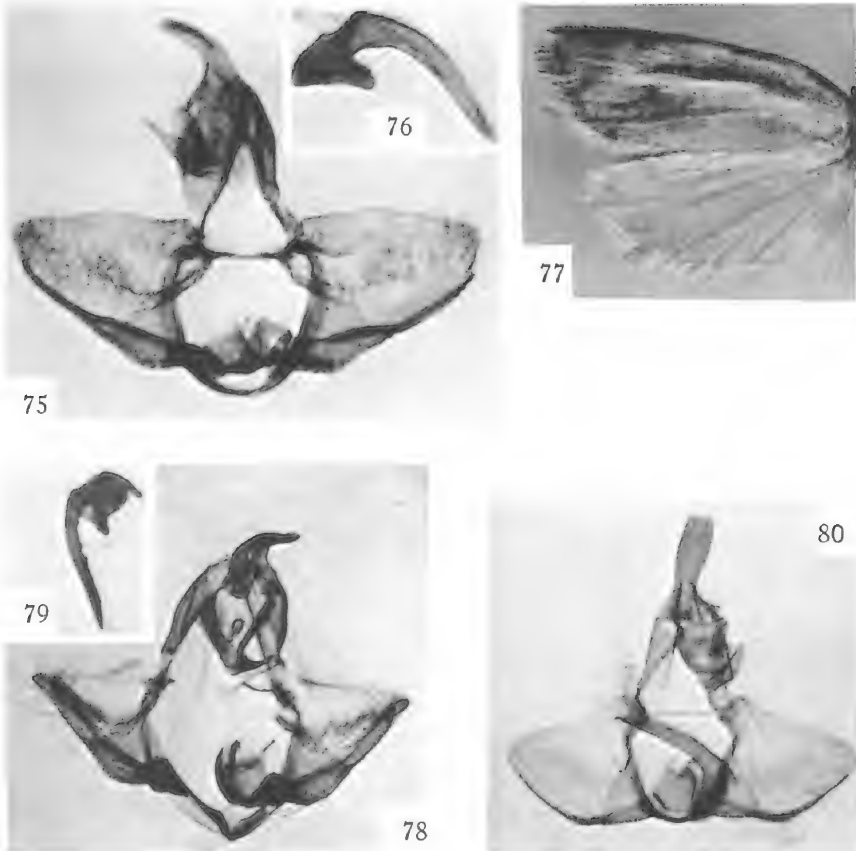
MALE: Head, antennae, and labial palpi more or less pale ochreous; antennae with a fine, dark, obliterate annulation; scapus of antennae, tips and upper edges of labial palpi, and some tufts of scales on head slightly ferruginous. Forewings pale ochreous to silvery white, with ferruginous markings as follows: basal area shadowed at base and indistinctly outlined by an angulate, rather broad, oblique band from close to base of costa to one-third of dorsum; median fascia from middle of costa, bifurcate at level of discal cell, with branches of this fork reaching basal and upper portions of tornus; a narrow band, parallel to the former, halfway between it and wing apex, bifurcate at costa and connecting it with middle of termen; some fine, obliterate streaks in interspaces of above bands; in some specimens a few solitary, brownish black scales arranged irregularly here and there; cilia pale ochreous,



FIGS. 69-74. Genitalia of *Argyrotaenia*. 69, 70. *A. polvosana*, new species, holotype, male. 69. Ventral view. 70. Aedeagus. 71-74. *A. burroughsi*, new species. 71, 72. Holotype, male. 71. Ventral view. 72. Aedeagus. 73, 74. Allotype, female. 73. Caudal portion. 74. Corpus bursae.

in some specimens whitish tornad; under surface of forewings pale ochreous, in some specimens with traces of a slightly darker, diffuse pattern matching that of upper surface. Length of forewing, 7.0-8.5 mm. Hind wings glossy white, in some specimens with a slight ochreous tint.

FEMALE: Similar to the male, but each of transverse bands of fore-



FIGS. 75-80. *Argyrotaenia* species. 75, 76. Male genitalia of *A. klotsi*, new species, holotype. 75. Ventral view. 76. Aedeagus. 77-79. *A. ponera* (Walsingham), male. 77. Moth, Popocatepetl Park, Mexico, 13,000 feet. 78, 79. Genitalia (slide prepared by A. Busck on September 30, 1922). 78. Ventral view. 79. Aedeagus. 80. Male genitalia of *A. citrana* (Fernald), Santa Clara, California, March 15 (slide No. 291-Obr.), in the American Museum of Natural History.

wings divided into some fine, subparallel lines; additional transverse lines in interspaces more numerous.

MALE GENITALIA: Uncus rather long, slightly tapering towards truncate apex. Socii reduced to few hairs on inner lobes of tegumen. Middle process of gnathos strong, acute. Valvae broad basad, somewhat narrowed externad, with a broadly rounded apex; sacculus swollen at middle, narrow externad, with an acute, upper angle at end of second third, and with four to five minute teeth between this angle and tip;

latter not free. Processus basales of valvae subcostal, rather short, ovate; pulvinus a narrow, slightly thickened, lower, inner edge of valvula. Fultura superior narrow, curved. Aedoeagus slightly curved downward, with an obtuse tip.

FEMALE GENITALIA: Papillae anales elongate-ovate, slightly dilated caudad. Sterigma narrowed cephalad, with smooth margins. Antrum rather wide, obconical, with broad, lateral colliculi. Ductus bursae rather short, slightly globose towards antrum. Corpus bursae shortly ovate; no cestum; signum with a large, sclerotized base with capitulum, and a rather straight, moderately long inner thorn.

TYPES: Holotype, male (genitalia on slide, No. 504-Obr.), Mesa Verde National Park, Colorado, July 20-22, 1957 (A. B. Klots); allotype, female (genitalia on slide, No. 505-Obr.), the same data; one male and three females, paratypes, the same data. All the above type specimens are deposited in the American Museum of Natural History.

REMARKS: This species has no resemblance to the known species of the genus *Argyrotaenia* but is rather like some specimens of the nominate subspecies of *Choristoneura lambertiana* (Busck). In the male genitalia the new species resembles two other new *Argyrotaenia* species, *klotsi* and *graceana*, but differs from them in having a longer uncus and valva of a different shape, especially in the presence of an angle and minute teeth on the upper margin of the sacculus, which is swollen at the middle.

At the suggestion of Prof. A. B. Klots, the collector, this species is named for Mr. Carrol Burroughs, Park Naturalist of Mesa Verde National Park, in appreciation of his and Mrs. Burroughs' hospitality and aid to visiting scientists.

***Argyrotaenia klotsi*, new species**

Figures 46, 75, 76

MALE: Antennae dark brown, with pale ochreous annulation. Labial palpi pale ochreous, from outside with scales dark brown at their tips. Head dark gray, mottled with pale ochreous, behind eyes entirely pale ochreous. Thorax concolorous with head; tips of tegulae ochreous. Forewings with ground color pale ochreous, dorsad somewhat brownish salmon, externad pale silvery gray; basal area of forewing dark gray, mottled and outlined with darker gray, about one-quarter of wing length; between it and median fascia a rather broad band of ground color, from costa to dorsum, widened dorsad and bisected lengthwise by a fine, blackish, obliterate line not reaching dorsum; median fascia brownish gray, obliterate dorsad, beginning with a blackish, subrectan-

gular costal spot shortly before middle of costa; between this fascia and wing apex an elongate, longitudinal, blackish costal triangle touching with its lower angle a dark gray, round spot encircled by a blackish frame with a cuneiform prolongation directed basad and dividing the median fascia; interspace at costa between two above-mentioned costal spots and round spot, of ground color; outer, silvery gray portion of forewing with indistinct reticulation formed by blackish and ochreous, obliterate lines along veins, and a transverse line widely forked costad, crossing these lines; darkest parts of forewing markings mixed with brown and bluish reflecting scales; a terminal line not reaching dorsum, composed of black and ochreous scales; cilia pale ochreous with gray, silvery-glossed dividing line; under surface of forewings pale ochreous, with slight, grayish traces of markings of upper surface. Length of forewing, 8.0–9.5 mm. Hind wings fuscous white; cilia pale ochreous, somewhat paler than those of forewings, divided by a pale gray line.

FEMALE: Unknown.

MALE GENITALIA: Uncus moderate, slightly tapering towards rotundate apex; socii reduced to few hairs on inner lobes of tegumen; gnathos with a strong, acute middle process. Valvae rather subtriangular, apex rotundate; sacculus thickened basad, slightly dentate externad, with a very short, free apex; processus basalis subcostal, short; pulvinus, a slightly thickened, lower internal edge of valvula. Fultura superior narrow, almost straight, abruptly dilated laterad. Aedoeagus curved downward, with an acute tip.

TYPES: Holotype, male (genitalia on slide, No. 221-Obr.), Panchuela Ranger Station, near Cowles, New Mexico, July 6–9, 1957 (A. B. Klots); two male paratypes, the same data; all type specimens are deposited in the American Museum of Natural History.

OTHER SPECIMENS EXAMINED: Two males (genitalia of one of them on slide, No. 550-Obr.), Wofford Lookout, near Cloudcroft, New Mexico, July, 1959 (A. B. Klots), deposited in the American Museum of Natural History; one male (genitalia on slide, No. 192, prepared by J. A. Powell), Chiricahua Mountains, Bar Foot Ridge, 8500–9700 feet, Cochise County, Arizona, August 5, 1927 (J. A. Kusehe), deposited in the Southern California Academy of Sciences; one male, Hannagan Meadows, 9000 feet, Blue Range of White Mountains, Greenlee County, Arizona, July 8, 1958 (J. M. and S. N. Burns), deposited in the collection of J. A. Powell.

REMARKS: This new species has no external similarity to the remaining known members of the genus *Argyrotaenia*, and takes an isolated position in it. In the shape of the male genitalia, *klotsi* belongs, how-

ever, to one group with *dorsalana* Dyar, *burroughsi*, new species, *graceana* Powell, and *polvosana*, new species. The species is named for Prof. A. B. Klots, in recognition of his kind assistance in the present author's work on the Nearctic Tortricidae.

Argyrotaenia ponera (Walsingham), new combination

Figures 77-79

Tortrix ponera WALSINGHAM, 1914, *Biologia Centrali-Americana*, Lepidoptera Heterocera, vol. 4, p. 279.

TYPE: Holotype, male (genitalia on slide, prepared by A. Busck on September 30, 1922), Popocatepetl Park, 13,000 feet, Puebla, Mexico, June, 1906 (W. Schaus); deposited in the United States National Museum.

OTHER SPECIMENS EXAMINED: Two males, the same data; deposited in the United States National Museum.

REMARKS: The two last-mentioned males are labeled "cotypes," but they do not belong to the original lot listed by Walsingham (1914) in his publication.

Argyrotaenia dichotoma (Walsingham), new combination

Figures 60, 63, 64

Tortrix dichotoma WALSINGHAM, 1914, *Biologia Centrali-Americana*, Lepidoptera Heterocera, vol. 4, p. 291.

TYPE: Holotype, female (genitalia on slide, No. 4723), Omilteme, 8000 feet, Guerrero, Mexico, August (H. H. Smith), deposited in the British Museum (Natural History).

SUBARGYROTAENIA, NEW GENUS

Figures 81-84

Tortrix (in part), MEYRICK, 1932, *Exotic Microlepidoptera*, vol. 4, p. 254. McDUNNOUGH, 1939, *Mem. Southern California Acad. Sci.*, vol. 2, p. 57. CLARKE, 1955, *Catalogue of the type specimens of Microlepidoptera in the British Museum (Natural History)* described by Edward Meyrick, vol. 1, p. 265.

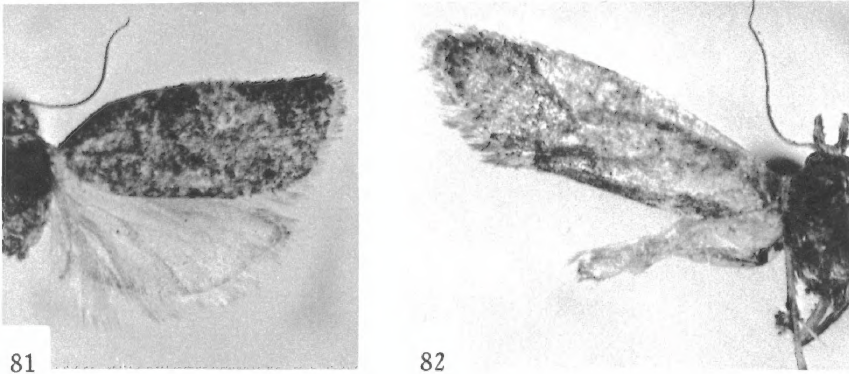
Argyrotaenia (in part), FREEMAN, 1958, *Canadian Ent.*, vol. 90, suppl. 7, p. 53.

TYPE SPECIES: *Tortrix purata* Meyrick, 1932.

In most external characters similar to the genus *Argyrotaenia*, but with labial palpi in female longer than in male. Forewings in male elongate, subtriangular; costa gently arched in its basal two-thirds, then slightly sinuate. In female, forewings narrower and longer; costa gently arched along entire length; termen more oblique; dorsum subparallel to costa. Twelve veins, all separate; R₁ from middle of discal cell; R₅ to termen;

basal fork of A_{2+3} one-quarter as long as entire vein. Hind wings with costa equally arched; apex rotundate; eight veins; S slightly curved; R and M_1 closely approximated basad; M_2 and M_3 subparallel; M_3 and Cu_1 connate.

MALE GENITALIA: Tegumen rather narrow; pedunculi narrow; saccus rotundate. Valvae rather weak, rotundate; costa not strengthened; sacculus moderately broad, without any free tip; pulvinus rudimentary, represented by a slightly swollen area at base of valva; processus basales well developed, precostal, spinose. Uncus rather long and narrow, spatulate, slightly bent. Gnathos strong, with large, acute middle proc-



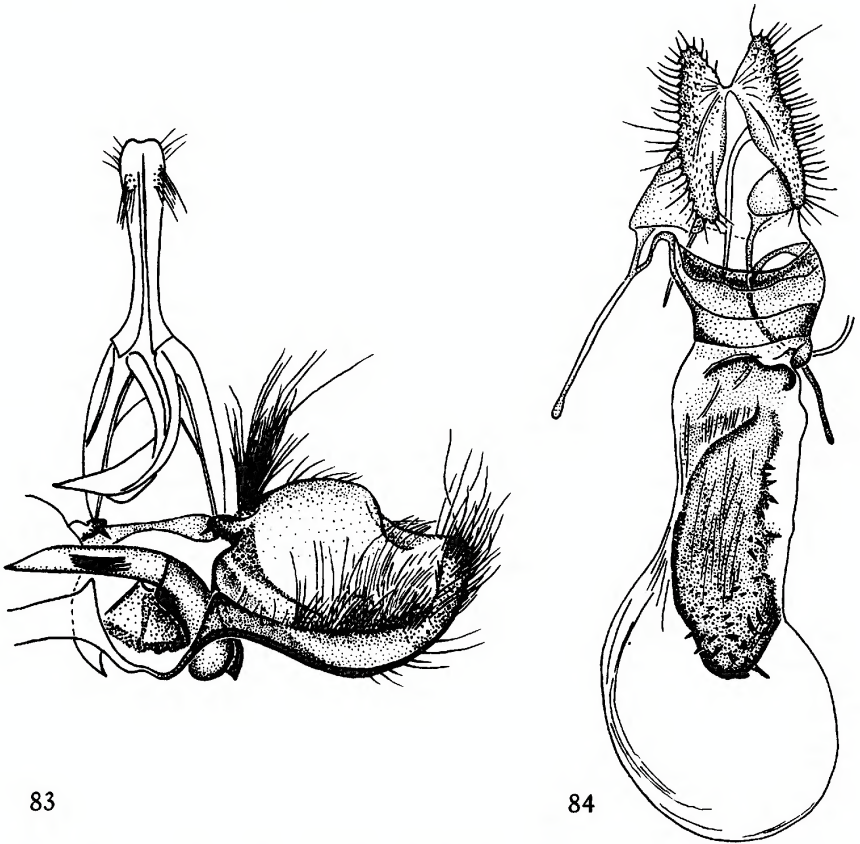
FIGS. 81, 82. *Subargyrotaenia purata* (Meyrick). 81. Lectotype, male. 82. Lectoallotype, female.

ess. No socii. Fultura superior a complete, transverse bar between upper internal angles of valvae, narrowed at middle and dilated laterad. Fultura inferior rotundate, narrowly sinuate dorsad; caulis short, from one-third of aedoeagus. Aedoeagus slightly thickened, rather straight externad; coecum penis large, directed downward; cornuti fine, deciduous needles with round section.

FEMALE GENITALIA: Papillae anales weak, elongate, distinctly narrowed cephalad. Sinus vaginalis wide; sterigma around it cingulate. Ostium bursae as broad as sinus vaginalis. No separate ductus bursae; ductus seminalis joining caudal part of cervix bursae, opening of which coincides with ostium bursae. Bursa copulatrix with a round corpus and a broad, rather long cervix. No signum; cestum large, elongate, scobinate, narrowed caudad, jutting out into corpus bursae.

REMARKS: The external characters of this new genus hardly differ from those of *Argyrotaenia*, but *Subargyrotaenia* shows merely a distinct

sexual dimorphism expressed in the length of the labial palpi and in the shape of the forewings, different in the male and the female. In the male genitalia *Subargyrotaenia* differs from *Argyrotaenia* in having the processus basales of the valvae spinose and the cornuti not flattened. It is especially noticeable that in *Subargyrotaenia* not only a normally developed fultura superior, but also the processus basales of the valvae are



FIGS. 83, 84. Genitalia of *Subargyrotaenia purata* (Meyrick). 83. Lectotype, male. 84. Lectoallotype, female.

present. These processus basales resemble somewhat those in the genus *Clepsia* Guenée, in which they replace a fultura superior, which is lacking. The female genitalia of the new genus are completely distinct from those of *Argyrotaenia*. The sinus vaginalis has an entirely different shape; the sterigma has nothing in common with that in *Argyrotaenia*; the duc-

tus bursae is not developed at all, and the cervix bursae opens directly into the sinus vaginalis; the bursa copulatrix has a very peculiar shape. A large, scobinate patch of the cervix bursae cannot be identified as a signum but is rather a modified cestum of a form never before observed in the tribe Archipini. Among the Tortricidae a similar cestum is known in a Papuan Cnephasiini species, *Dicellititis acrographa* Diakonoff. If there is no mistake in the identification of the only examined female of *Subargyrotaenia purata*, and it really belongs to this species, the present genus can be considered as one of the links connecting the tribes Archipini and Cnephasiini.

The genus *Subargyrotaenia* includes *purata* Meyrick as a single species. Some of the further members of this new genus will perhaps be found in the Neotropical fauna, but they are not yet known. Freeman (1958, p. 53) wrote about *purata* that its type is in the British Museum and originates from Venice, California, but Clarke (1955, p. 265) indicated the Vienna Museum of Natural History as a repository of the type of this species. The present author received from this latter museum two cotypes of *purata* for examination, and has selected the male as lectotype. The female belonging to the Vienna Museum is therefore merely a lectoallotype. It has the hind wings malformed, but in the remaining characters, except some sexual ones, it agrees well with the male.

RANGE: Costa Rica. The records for California and Arizona need proof. The present author had no opportunity to see any specimen of *purata* except the two cotypes mentioned above.

Subargyrotaenia purata (Meyrick), new combination

Figures 81-84

Tortrix purata MEYRICK, 1932, Exotic Microlepidoptera, vol. 4, p. 254. McDUNOUGH, 1939, Mem. Southern California Acad. Sci., vol. 2, p. 57, no. 7421. CLARKE, 1955, Catalogue of the type specimens of Microlepidoptera in the British Museum (Natural History) described by Edward Meyrick, vol. 1, p. 265.

Argyrotaenia purata, FREEMAN, 1958, Canadian Ent., vol. 90, suppl. 7, p. 53.

TYPES: Lectotype (selected by the present author), male (genitalia on slide, No. 1-Obr., 1958), Irazu, 2200-2500 meters, Costa Rica, May 21-28, 1930 (Reimoser); lectoallotype (selected by the present author), female (genitalia on slide, No. 2-Obr., 1958), the same data but July 17-23, 1930; both type specimens are deposited in the Naturhistorisches Museum in Vienna.

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