The Moths of America North of Mexico

FASCICLE 13.2B

PYRALOIDEA

Pyralidae (Part)

EUGENE MUNROE

1976

E. W. CLASSEY LIMITED AND
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Fascicle 20.2A **Bombycoidea,** Saturniidae (in part)
31 December 1971

Fascicle 20.2B **Bombycoidea**, Saturniidae (conclusion)
28 April 1972

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16 September 1976

The Moths of America North of Mexico

FASCICLE 13.2B

PYRALOIDEA

PYRALIDAE

COMPRISING THE SUBFAMILY

PYRAUSTINAE

TRIBE

PYRAUSTINI (CONCLUSION)

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BIOSYSTEMATICS RESEARCH INSTITUTE

AGRICULTURE CANADA

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DEDICATED TO THE MEMORY OF

GEORGE A. MOORE

ENTOMOLOGIST, OF MONTREAL

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GENUS
Pyrausta Schrank

Pyrausta Schrank, 1802, *Fauna Boica*, **2** (2): 163.
Type-species: *Phalaena Pyralis cingulata* Linnaeus, 1758. Designated by Grote, 1895, *Jour. New York Ent. Soc.*, **3**: 173.
NOTE—Earlier designations of *Phalaena Pyralis purpuralis* Linnaeus, 1758, by Curtis, 1826, *British Entomology*, **3**, folio 128, and of *Pyralis punicealis* [Denis and Schiffermüller], 1775, by Guenée, 1854, *Species Général des Lépidoptères*, **8**: 163, are invalid, as these species were not originally included in *Pyrausta* by Schrank. I am indebted to I. W. B. Nye and D. S. Fletcher for pointing out Grote's designation to me.

Botys Latreille, "An X [1801–1802]" (An XI [=22 Sept. 1802–21 Sept. 1803]), *Histoire Naturelle, Générale et Particulière des Crustacés et des Insectes*, **3**: 414.
Type-species: *Botys purpuraria* Latreille, 1802, an unjustified emendation and consequently a junior objective synonym of *Phalaena Pyralis purpuralis* Linnaeus, 1758. Designated by Curtis, 1830, *British Entomology*, **7**: 312.
NOTE—Long controversy has surrounded the use of this name. The root of the trouble is that *purpuraria* Linnaeus is the true name of a geometrid moth of somewhat similar size and appearance, described in *Phalaena Geometra*. However, Latreille, in the same work in which he described *Botys* and included in it *Botys purpuraria*, also listed the true *purpuraria* in its proper place on an earlier page. He wrote of *Botys* that it has two pairs of palpi, which is true of *purpuralis* Linnaeus but not of *purpuraria* Linnaeus. I think there is no doubt whatever that Latreille meant the type-species to be *purpuralis* and that he either wrote the name wrongly or decided to emend it. As he continued to use the name *purpuraria* in the pyralids in later, essentially copied works, I think it preferable to treat *purpuraria* Latreille as an emendation. This restores *Botys* to the Pyralidae from the Geometridae, to which it was relegated by Curtis, 1830, *loc. cit.*, followed by Warren, 1889, *Trans. Ent. Soc. London*, 1889: 275, and Sylvén, 1947, *Arkiv för Zoologi*, **38A** (13): 4. Subsequent designations of *Pyralis urticalis* Hübner, 1796, by Duponchel, 1831, *Histoire Naturelle des Lépidoptères ou Papillons de France*, **8** (2): 10, of *Crambus erigatus* Fabricius, 1798, by Stephens, 1834, *Illustrations of British Entomology, Haustellata*, **4**: 46, and of "*verticalis* Albin", by Guenée, 1854, *Species Général des Lépidoptères*, **8**: 337, are all invalid, because they postdate the first valid type-species designation. Also neither *urticalis* nor *verticalis* was originally included in the genus by Latreille and "*verticalis* Albin" is a pre-Linnean name, and therefore has no standing. The subsequent designation of *Pyralis angustalis* [Denis and Schiffermüller], 1775, = *Crambus erigatus* Fabricius, 1798, by de Joannis, 1929, *L'Amateur des Papillons*, **4**: 280, duplicates the invalid designation by Stephens, 1834. During much of the nineteenth century—from Treitschke 1829, to the closing work of Snellen in 1901—the name

Botys was used by the large majority of authors for a concept partly equivalent to *Pyrausta* as understood in the present work. However, Meyrick, Hampson and Dyar all followed Warren in dropping *Botys* from the Pyralidae, and under their influence the name *Pyrausta* was universally adopted for the same assemblage of species; though progressively restricted, it is still applicable to a genus of considerable size and almost worldwide distribution. I do not know whether *Botys* or *Pyrausta* was published first; so far as I know, the exact dates of neither the *Fauna Boica* nor the *Histoire Naturelle* have received thorough bibliographic attention. However, Griffin, 1938, *Jour. Soc. Bibl. Nat. Hist.*, **1**: 157, has shown that Volume 3 of the *Histoire Naturelle* was almost certainly published in "An XI", not in "An X", as stated on the title page. In the absence of more precise information we must assume under the *International Code of Zoological Nomenclature* that each work was published on the last day of its respective year: 31 Dec. 1802 for the *Fauna Boica*, and 21 Sept. 1803 for the *Histoire Naturelle*. *Pyrausta* thus has priority over *Botys*, but an uneasy priority, subject to upset by bibliographic research on the dates of publication, and also potentially by challenges to the interpretation of the name *purpuraria*, which might threaten a further reversal should *Botys* actually prove to be the older name. However, the use of *Pyrausta* in preference to *Botys* accords with the overwhelming weight of usage in this century, and indeed since the synoptic works of Hampson and of Meyrick in the 1890's. The only significant use of *Botys* since the earliest 1900's has been that of de Joannis, who, on the basis of his mistaken type-species designation (see above), used it in place of *Synaphe* Hübner, [1825], a palearctic genus of the subfamily Pyralinae. *Botys* has never been widely used in the Geometridae. If the geometrid *purpuraria* were taken as type-species, *Botys* would have priority over *Lythria* Hübner, 1823, a name in current use in Britain and continental Europe. I have also followed almost all recent usage in preferring the much junior family-group name Pyraustinae, as explained on page 7, Fasc. 13.2A.

Haematia Hübner, 1818, *Zuträge zur Sammlung Exotischer Schmettlinge* [sic], **1**: 22.
Type-species: *Haematia phoenicealis* Hübner, 1818. Monotypy.

Botis Swainson, 1821, *Zoological Illustrations*, **2**: pl. 77.
Type-species: *Botys purpuraria* Latreille, 1802.

NOTE—Swainson refers to *Botys* Latreille, but himself uses *Botis* in the generic heading and in two specific binomina. There seems no doubt that he intended an emendation. As an unjustified emendation, *Botis* has the same type-species as *Botys*. Swainson gives "*Ph. urticata*" as type, but this was not an originally included species, and therefore Curtis' 1830 designation prevails.

Syllythria Hübner, [1825], *Verzeichniss Bekannter Schmettlinge* [sic], 349.
Type-species: *Phalaena Pyralis sanguinalis* Linnaeus, 1767. Designated by Moore, 1885, *The Lepidoptera of Ceylon*, **3**: 268.

Panstegia Hübner, [1825], *Verzeichniss Bekannter Schmettlinge* [sic], 353.
Type-species: *Pyralis aerealis* Hübner, 1796. Designated by Marion, 1957, *L'Entomologiste*, **13**: 80.

Ennychia Treitschke, 1829, *Die Schmetterlinge von Europa*, **7**: 195.
Type-species: *Phalaena Geometra cingulata* Linnaeus, 1758. Designated by Westwood, 1840, *Synopsis of the Genera of British Insects*, 106.

Rhodaria Guenée, 1844, *in* Duponchel, *Catalogue Méthodique des Lépidoptères d'Europe*, 199.
Type-species: *Phalaena Pyralis sanguinalis* Linnaeus, 1758. Designated by Guenée, 1854, *Species Général des Lépidoptères*, **8**: 170.

Herbula Guenée, 1854, *Species Général des Lépidoptères*, **8**: 175.
Type-species: *Pyralis cespitalis* [Denis and Schiffermüller], 1775. Original designation.

Synchromia Guenée, 1854, *Species Général des Lépidoptères*, **8**: 188.
Type-species: *Synchromia cardinalis* Guenée, 1854. Monotypy.

Cindaphia Lederer, 1863, *Wiener Ent. Monat.*, **7**: 438. NEW SYNONYMY.
Type-species: *Cindaphia incensalis* Lederer, 1863. Monotypy.

NOTE—Lederer included *Asopia bicoloralis* Guenée, 1854, which he evidently had not seen, as a doubtful synonym of his *C. incensalis*. Under Article 68c of the *International Code of Zoological Nomenclature*, doubtfully identified species are to be excluded from consideration in determining monotypy.

Sciorista Warren, 1890, *Ann. Mag. Nat. Hist.*, (6) **6**: 475.
Type-species: *Rhodaria signatalis* Walker, [1866]. Original designation.

Autocosmia Warren, 1892, *Ann. Mag. Nat. Hist.*, (6) **9**: 432. NEW SYNONYMY.
Type-species: *Autocosmia concinna* Warren, 1892. Original designation and monotypy.

Trigonuncus Amsel, 1952, *Mitteil. Münchner Ent. Ges.*, **42**: 59. NEW SYNONYMY.
Type-species: *Cybalomia inglorialis* Hampson, 1900. Monotypy.

Moths mostly relatively small and slender. Frons most often flat and oblique, sometimes rounded and not prominent, rarely with rounded prominence or weakly wedge-shaped extension of anterior margin. Labial palpus porrect, with third segment concealed or almost so in conical or rarely bushy scaling of second; second segment weakly to moderately obliquely ascending, variable in length according to species. Maxillary palpus prominent, with distal scale tuft varying from almost undilated to broadly triangular, the latter condition more common in our species. Proboscis well developed, scaled at base. Eye large in almost all species, even diurnal ones. Ocellus well developed. Antenna filiform in both sexes; sensory surface finely pilose, dorsal surface smoothly though sometimes narrowly scaled. Body generally slender, abdomen most often somewhat exceeding anal angle of hindwing. Legs usually slender; midfemur sometimes thickened in male; outer spurs usually somewhat shorter than inner in both sexes; sometimes one or more outer spurs or one pair of spurs reduced. Wings highly variable in shape and pattern, though with connections traceable among the various species groups. Forewing usually broadly to somewhat narrowly subtriangular; apex acute to rectangular, but rarely rounded to any degree; termen oblique, usually slightly to strongly convex, rarely sinuate. Wing venation without evident peculiarities: cell of moderate size; only R_3 and R_4 stalked; R_5 straight and not basally approximated to R_{3+4}; M_2, M_3 and Cu_1 variably spaced around posterior angle of cell, not or only slightly approximated basally. Hindwing of variable width, with rounded or rarely sinuate termen. $Sc+R_1$ anastomosed with R_s. R_s and M_1 stalked. Discocellular concave distad, with posterior angle of cell prolonged. M_2, M_3 and Cu_1 variably spaced near or at posterior angle, not or weakly approximated.

In many species the female with shorter and narrower wings and forewing with less oblique or less convex termen than male.

Male genitalia with simple straight or decurved clasper, directed basad, sometimes recurved distad at tip, tapering to a rounded, flattened, pointed, or rarely ventrad-angled ending; dorsal surface with numerous erect setae and sometimes with narrow scales or a few wide ones near tip. Uncus variable, triangular, with triangular base and rounded, parallel-sided or weakly constricted distal part, or with convergent sides leading to a more or less rounded tip; in two species with truncate tip with a sharp laterally directed process from each posterior angle; dorsal surface of distal part almost always clothed with bifid, anteriorly directed setae for a greater or lesser distance. Tegumen of variable length, but not domed or inflated. Gnathos a simple transverse bridge or incomplete, rarely with knoblike setose processes from its base near midline. Transtilla triangular at each side, narrowed mesally, and with a ventrally directed tapering process on each side connecting with juxta. Juxta small, quadrate or rectangular, often with an X-shaped strengthening sclerotization, or the whole juxta X-shaped. Vinculum rather short, usually keeled on midline, sometimes produced into a moderately prominent saccus; in certain species groups with a prominent dependent corema on each side. Valve of simple outline, costa and ventral margin usually almost parallel and weakly curved dorsad; base of costa with a more or less obvious angular prominence; costa narrowly inflated throughout its length; tip of valve rounded, usually symmetrically; sacculus inflated to about base of clasper, its dorsal margin fairly even, but often with an angle or acute or thumblike process near clasper. Clasper as described at beginning of paragraph.

Female genitalia with ovipositor variable, even in closely related species, doubtless in correlation with egg-laying habits: lobes high, setose, narrow and well differentiated; variably degenerate, in the extreme to small, membranous, almost naked sacs, or sclerotized into bladelike distally rounded lamellae; apophyses varying from short and weak, particularly in species with normally developed lobes, and in these species posterior apophysis with well-developed, narrow vertical bar crossing shaft posteriorly to form a T-shaped

structure; in species with degenerate or modified lobes the apophyses usually long, either slender or thickened, the latter condition especially in species with bladelike lobes. Ostium without special armature. Ostial chamber usually narrow and membranous, followed by a shorter or longer, ventrally open, tubelike, sclerotized section of ductus bursae, extending to about junction of ductus seminalis; the latter usually simple and membranous, but sometimes expanded toward junction and in some species sclerotized or armed with internal spines in this zone; distad of junction the ductus bursae generally forming an enlarged and sclerotized, sometimes complex and distorted coil, and sometimes with internal spines or armature in this zone; rest of ductus bursae membranous, varying greatly in length in different species, generally coiled except where very short. Bursa oval or pyriform, generally membranous or finely scobinated; signum of the normal rhomboidal or mouth-shaped configuration of the tribe, spinulose, with a transverse keel, generally interrupted in middle, sometimes strongly serrate; lateral angles of signum sometimes roofed over. Accessory sac almost always well developed, membranous.

Larvae webbing and often rolling together leaves, shoots and flower heads of herbaceous plants. The majority of species, but not all, on members of the mint family, Labiatae. Differential larval characters of the genus not worked out, and not evident from the few species studied by Bollmann and by Hasenfuss.

As here understood this genus is equivalent to *Pyrausta* of Bradley, Fletcher and Whalley (1972), to *Pyrausta* plus *Panstegia* of Marion (1957) and of *Pyrausta*, subgenera *Pyrausta* and *Panstegia* of Hannemann (1964). Many species have been eliminated from McDunnough's (1939) concept of the genus, following Munroe (1950) and subsequent work, but *Autocosmia* and *Cindaphia* have been synonymized, and *Boeotarcha demantrialis* and *Titanio dapalis* have been transferred to *Pyrausta*, the type-species of *Boeotarcha* and *Titanio* being Odontiinae, and having nothing to do with the present group.

The history of *Botys* or *Pyrausta* has been one of progressive refinement over more than 100 years. Lederer (1863), followed by Snellen in many papers, used *Botys* for about half the Pyraustinae. Hampson (1896, 1899) and Meyrick (1890, 1895, [1928], *et al.*) distinguished between *Pyrausta*, with filiform maxillary palpus, longer outer tibial spurs, and certain venational characters, and *Pionea* or *Phlyctaenia*, with distally expanded maxillary palpus, shorter tibial spurs, and minor differences in venation. As shown by Müller-Rutz (1929) and in more detail by Sylvén in his excellent paper of 1947, these characters do not hold for the species to which they were supposed to apply, and even if they are rigidly construed they separate closely related species and unite species with basic differences of structure, pattern and biology. Many of these species are now referred to the tribe Spilomelini or to other subfamilies, such as Evergestinae and Odontiinae. The present interpretation of *Pyrausta* is purged of these elements, and also of a considerable number of groups of Pyraustini that have distinctive enough genital characters to warrant generic separation. As noted, it is essentially consistent with the classification used by modern authors for the European species.

There is still, as already indicated, a substantial range of variation in the structural characters, and I should have liked to have divided the genus into smaller units. However, although a number of natural groupings are evident, I have been unsuccessful in finding consistent defining characters that would separate meaningful genera. The decurved clasper of *Panstegia*, for example, is shared by species with different and varying uncus structures and female genitalia; also transitions to the decurved condition exist, and I think it has probably arisen in parallel more than once in the history of the genus. A number of species agree closely in structure with the type-species of *Autocosmia*, but these connect by gradual and perhaps multiple transitions to members of other species groups. *Cindaphia* represents two compact and closely related species complexes, but these are structurally almost identical, except for the waved termen of the wings, with the *onythesalis* group, which has the wing shape normal. The *onythesalis* group in turn seems to intergrade with other species groups. A group apparently as closely knit as *P. tuolumnalis*, *orphisalis* and *generosa* shows appreciable genital differences, and these three species appear to have separate relationships to corresponding palearctic species or groups. It may be that closer study, based on the world fauna, will lead to a more precise classification; however, I am satisfied that *Pyrausta* as conceived here is a monophyletic group and distinct from the other genera that I recognize in the tribe. I have therefore decided not to divide it, in spite of the range in structure and consequent problems in definition.

KEY TO NORTH AMERICAN SPECIES

1. Hindwing above red with contrasting blackish border; forewing above dark gray.....2
— Hindwing above not red with blackish border.....3

2. Length of forewing over 7 mm; black border of hindwing linear, less than one-eighth width of red area; a distinct black postmedial bar in cubital area.....*dapalis* p. 116
— Length of forewing under 5 mm; black border of hindwing about one-fourth width of red area; no black postmedial bar.....*coccinea* p. 103

3. Wings above blackish fuscous with contrasting white fringes; some specimens with weak yellowish postmedial line and cell spot.....*niveicilialis* p. 138
— Wings above not blackish fuscous with contrasting white fringes.....4

4. Body and wings above and beneath dark shining grayish fuscous, without markings.....*demantrialis* p. 92
— If both pairs of wings largely shining dark gray, then with definite wing markings.....5

5. Forewing above pink, red or purple, or mainly so.....6
— Forewing above not mainly pink, red or purple, though sometimes with markings of these colors.....24

6. Hindwing above red or brownish red.....7
— Hindwing above gray, buff or fuscous, with at most weak and restricted pink tints.....9

7. Forewing above with two wide yellowish bands and a discocellular dot of the same color.....*tyralis* p. 135
— Forewing above with two reddish bands, lighter than the ground, or with a single yellow band.....8

8. Forewing above dark red or reddish fuscous, with narrow, obscure, lighter red antemedial and postmedial bands and discal spot; hindwing above red, lighter and brighter than forewing and without yellow band.....*tyralis*, dark form p. 135
— Forewing and hindwing above of the same shade of brick red or brownish red, each with a yellowish postmedial band..*pseuderosnealis* p. 114

9. Forewing above without yellowish, orange, buff or greenish-gray markings.....10
— Forewing above with yellowish, orange, buff or greenish-gray markings.....12

10. Forewing above uniformly bright pink, with white-tipped fringe, otherwise unmarked; hindwing above gray, darker and weakly pinkish toward termen, with gray fringe, otherwise unmarked.....*inornatalis* p. 101
— Forewing above powdery grayish pink, with weak, excurved, slightly darker or paler postmedial line and traces of dark reniform spot.....11

11. Apex of forewing acute; postmedial line of forewing above sharply defined though not contrasting, light gray; length of forewing not over 8 mm; southern California and Arizona.....*roseivestalis* p. 94
— Apex of forewing blunt; postmedial line of forewing above with dark element predominating, poorly defined; length of forewing usually over 8 mm; Texas....*atropurpuralis* (part) p. 98

12. Forewing above with a strong, definite, yellowish postmedial line, straight or evenly curved parallel to termen.....13
— Forewing above without pale postmedial line, or with the line incomplete or sinuate, or weak and not parallel to termen.....14

13. Forewing above with antemedial line present, strongly angulate; ground color uniformly pink.....*volupialis* p. 97
— Forewing above with antemedial line absent; base of wing contrastingly greenish.....*corinthalis* p. 97

14. Forewing above with yellow postmedial line of even width or weakly expanding posteriad, curving regularly from subapical region behind costa to posterior margin near middle; or forewing above without

postmedial line, but with narrow yellow subterminal line parallel to termen.... ....*obtusanalis* (part) p. 137

— Pale postmedial line sinuate, not parallel to termen....15

15. Forewing above with postmedial line represented by a strong yellowish costal segment, posterior to this the line faint or even absent....16

— Forewing above with postmedial line not conspicuously strongest near costa, though sometimes narrowed or interrupted for a short distance in median area....18

16. Forewing above with fringe purplish, concolorous with wing; antemedial line absent ....*grotei* p. 99

— Forewing above with fringe yellowish; traces of pale antemedial line present....17

17. Forewing above dark purplish fuscous or purple; termen not yellow basad of fringe; yellow of fringe not united with postmedial bar along costa....*inveterascalis* p. 101

— Forewing above bright purple; termen and fringe broadly yellow; yellow terminal area united with yellow postmedial bar along costa....*pythialis* p. 101

18. Forewing above with postmedial line narrow, yellowish, sinuated and continuous; an antemedial line of similar width and color present as well as a small yellowish discocellular spot; ground color pink or light purple....*signatalis* p. 100

— Forewing above with postmedial band broad....19

19. Forewing above with postmedial band continuous, wide throughout....20

— Forewing above with postmedial band interrupted or greatly narrowed in median area....21

20. Forewing above with yellow postmedial band rather definite, anteriorly reaching costa....*flavofascialis* p. 110

— Forewing above with yellow or greenish-gray postmedial band rather diffuse, anteriorly not reaching costa....*laticlavia* (part) p. 135

21. Hindwing above concolorous with forewing; forewing above with wide antemedial orange-yellow band as well as the wide interrupted postmedial one; hindwing above with basal orange-yellow patch and orange-yellow postmedial band; length of forewing not over 8 mm; southeastern and south-central....*phoenicealis* (part) p. 110

— Hindwing above somewhat more fuscous and less reddish than forewing, and without distinct basal orange-yellow patch....22

22. Hindwing above with narrow linear yellowish postmedial line; length of forewing 7 mm or less; eastern....*acrionalis* (part) p. 136

— Hindwing above with broad, wedge-shaped, yellow postmedial band....23

23. Scaling of wings thin; length of forewing not over 7 mm; southeastern....*panopealis* (part) p. 111

— Scaling of wings thick and opaque; length of forewing at least 8.5 mm; southeastern and south central....*onythesalis* (part) p. 105

24. Termen of forewing sinuate; wings above with basal half yellow or orange yellow, distal half contrastingly dark brown or blackish fuscous....25

— Termen of forewing not sinuate; wings above not with basal half yellow or orange yellow and contrasting with dark-brown or blackish-fuscous distal half....26

25. Wings above with distal half brownish fuscous; basal margin of dark zone somewhat diffuse; definite traces of brown antemedial line and cell spots visible...*bicoloralis* p. 103

— Wings above with distal half blackish fuscous; basal margin of dark zone sharply defined; orange-yellow basal zone immaculate....*augustalis* p. 104

26. Forewing above mainly yellow or orange yellow....27

— Forewing above mainly white, gray, buff or brown....35

27. Forewing above with at most faint traces of a brown subterminal fascia.....*aurea* p. 107

— Forewing above with a distinct pink, brown or fuscous subterminal or subterminal and terminal fascia.....28

28. Forewing above with ground color bright yellow and markings pink or mostly so.....29

— Forewing above not bright yellow marked mainly with pink.....32

29. Forewing above with costa narrowly and termen broadly pink; pink terminal band of even width; a pink patch at middle of posterior margin, meeting or almost meeting the pink orbicular spot to form an outwardly oblique band; pink reniform spot large, but removed by at least its width from terminal band; forewing fairly narrow, with apex blunt; length of forewing not over 11 mm.....*laticlavia* (part) p. 135

— Forewing above with costa not completely pink; terminal band often narrowed opposite end of cell; no pink patch at middle of posterior margin; orbicular a small pink spot; posterior angle of reniform spot closely approaching subterminal or terminal band, unless reniform reduced to a linear bar; forewing wide, with sharp apex; length of forewing often more than 11 mm....30

30. Forewing above with terminal or subterminal pink band uniform in tone, not darker along basal edge; hindwing above with subterminal fuscous band expanded anteriorly, often filling apical region; no pink line at base of fringe, though sometimes diffuse pink tints between subterminal fuscous band and termen; Canadian prairies through Arizona and New Mexico to western Mexico.....*scurralis* p. 130

— Forewing above with basal part of terminal or subterminal pink band deeper in tone than distal part or infuscated; hindwing above with subterminal band at most weakly expanded anteriorly, normally not entering apical area; a pink line beyond it at base of fringe, at least in middle part of termen 31

31. Forewing above with basal edge of subterminal band sinuous, the terminal zone narrowed opposite end of cell; reniform spot large; Vancouver Island to southern California and western Arizona.....*perrubralis* p. 128

— Forewing above with basal edge of terminal or subterminal band oblique distad from costa to R_5, then almost parallel to termen, not distinctly sinuous, the terminal area not appreciably narrowed opposite end of cell; reniform spot usually reduced to a narrow bar; central and southern Arizona and adjacent parts of New Mexico.....*arizonicalis* *see Corrigenda, p. xviii* p. 131

32. Forewing above with basal part yellow, reticulated or dusted with maroon or ferrugineous, superficially appearing buff; terminal area contrastingly grayish fuscous.....59

— Forewing above orange yellow, with brown or reddish-brown terminal or subterminal fascia.....33

33. Forewing with termen weakly oblique; its upperside with terminal or subterminal fascia brownish fuscous, the basal margin of fascia evenly concave basad, more strongly curved than termen; scaling of wings thick and opaque; ground color above usually bright orange fulvous; southeastern and tropical.....*insignitalis* (part) p. 107

— Forewing with termen more strongly oblique; terminal or subterminal fascia of its upperside not regularly concave basad and not distinctly more strongly curved than termen.....34

34. Scaling of wings relatively opaque; hindwing relatively wide; upperside of forewing with terminal or subterminal band dark brown, with distinct projection basad at about vein M_1, setting off a squarish fulvous preapical patch; terminal area orange yellow, concolorous with fringe; southeastern and central.....*onythesalis* (part) p. 105

— Scaling of wings relatively translucent; hindwing relatively narrower; upperside of forewing with terminal band distinctly reddish brown, of almost even width, without distinct projection basad in the region of M_1; yellowish-fulvous preapical patch wedge-shaped; fringe yellow, but terminal area of wing itself at most narrowly so; southwestern and Mexican.....*pseudonythesalis* p. 105

35. Forewing above gray, brown, or with distal part gray and basal part brown;

postmedial line nearly straight, narrow, well defined, light gray, roughly parallel to termen..... *lethalis* p. 97

— Forewing with postmedial line otherwise: if pale, nearly straight and roughly parallel to termen, then of moderate width and at least somewhat diffuse, on a powdery greenish-gray ground.....36

36. Forewing with somewhat rounded tip, termen oblique in male, nearly erect in female; ground color of forewing above powdery dark greenish gray, unicolorous or with more or less obvious, somewhat diffuse, weakly sinuous, light greenish-gray postmedial line, and sometimes with a similarly colored pale mark between reniform and orbicular spots; hindwing fuscous, often with a whitish line, mark or patch near middle, in southern Californian males mostly white, infuscated along costa and at apex; transcontinental in the Northern States and southern Canada, extending south in the west to New Mexico, Arizona and southern California..... *unifascialis* p. 133

— Forewing not dark powdery greenish gray; markings different.....37

37. Hindwing above either mainly yellow or orange yellow, or with obvious yellow or yellowish band or bands, contrasting with a darker ground.....38

— Hindwing above without yellow, yellowish or orange ground color or contrasting bands, or at most with a narrow yellowish postmedial line 52

38. Hindwing above yellow or orange yellow, with fuscous discal spot and postmedial and subterminal lines or bands; or, in dark specimens, fuscous, with yellow or yellowish, often diffuse, postmedial and subterminal bands parallel to termen.....39

— Hindwing with at most one yellowish or orange band parallel to termen; if more than one band, these not all parallel to termen 40

39. Forewing above with triangular preapical and pretornal dark shades; hindwing above with dark postmedial band or inner edge of yellow postmedial band fairly evenly curved; dark bands of hindwing usually strong or dark areas predominating; generally distributed..... *subsequalis* p. 121

— Forewing above without triangular preapical and pretornal dark shades; hindwing above with dark postmedial band angled at Cu_2; dark bands always narrow, sometimes obsolescent; southwestern..... *tatalis* p. 125

40. Hindwing above unicolorous reddish brown, with short, straight, yellowish postmedial band in middle field; forewing concolorous and with similar but longer and less regular band; southern ..... *pseuderosnealis* (part) p. 114

— Hindwing above either with ground color not uniformly reddish brown or with more than one pale band; forewing above with different and usually more complex markings.....41

41. Hindwing above with pale band short, orange on a fuscous ground, divided obliquely by a short segment of the fine fuscous postmedial line; southeastern and south central..... *rubricalis* p. 112

— Band of upperside of hindwing not divided by fuscous postmedial line, though sometimes separated from the paler discal area by such a line.....42

42. Hindwing above with pale band either straight and wedge-shaped or with its basal margin straight to anal area, then angled toward anal margin.....43

— Hindwing above with pale band regularly curved, though sometimes narrowed posteriorly 48

43. Upperside of hindwing with pale band angled toward anal margin well before reaching termen; western: British Columbia to southern California..... *californicalis* p. 113

— Upperside of hindwing with pale band tapering to a point very close to termen near anal angle, there ending or angled basad 44

44. Hindwing above opaque, reddish brown, concolorous with forewing, with a yellow patch in basal area in addition to yellow postmedial band; length of forewing 8 mm

or less; southeastern and Gulf coastal ..... *phoenicealis* (part) p. 110

— Hindwing above without a yellow patch on basal area 45

45. Forewing above somewhat variegated dull brown, with yellowish-buff postmedial patch on costa; hindwing above grayish or brownish fuscous, thinly scaled, with pale yellowish-buff postmedial wedge; length of forewing about 10 mm; southwestern and Mexican ..... *flavibrunnea* p. 108

— Forewing above reddish brown, with yellowish patch on posterior margin as well as on costa 46

46. Hindwing above more thinly scaled and a little grayer than forewing; forewing above reddish brown, with postmedial costal yellow patch short and rectangular; length of forewing less than 8 mm; southeastern and tropical ..... *panopealis* (part) p. 111

— Hindwing above concolorous with forewing, scaling opaque; yellow band on a brown or reddish-brown ground 47

47. Forewing relatively narrow and blunt, length 7–9 mm; upperside of forewing with postmedial costal yellow marking wedge-shaped on a dark-fulvous or infuscated ground; fringe narrowly yellow; southeastern and tropical ..... *insignitalis* (part) p. 107

— Forewing relatively wide and sharp-tipped, length 8.5–11 mm; upperside of forewing with postmedial costal yellow marking squarish on a reddish-brown or dark-brown ground; fringe and termen more broadly yellow; southeastern and south central ..... *onythesalis* (part) p. 105

48. Forewing above with round pale subcostal spot immediately basad of dark postmedial line and with narrow pale costal fascia immediately distad of the line; these markings sometimes grayish, obscure and little contrasting with ground color 49

— Forewing above without round pale subcostal spot immediately basad of postmedial line, but with contrasting or obscure pale costal fascia immediately distad of line 50

49. Hindwing above with creamy-buff band; northwestern and Cordilleran ..... *tuolumnalis* p. 120

— Hindwing above with orange-yellow band; transcontinental in the North ..... *orphisalis* p. 119

50. Forewing above with pale costal fascia diffuse, buff; hindwing above with pale band narrow and diffuse; length of forewing about 10 mm; southeastern and south central ..... *homonymalis* p. 116

— Forewing above with pale costal fascia distinct, contrasting, yellow; hindwing above with pale band well defined, contrasting, yellow, wide anteriorly, tapering posteriorly; length of forewing not over 9 mm 51

51. Forewing above with pale costal fascia oblong, about twice as long as wide; length of forewing 8–9 mm; Atlantic to Alberta and Colorado ..... *generosa* p. 117

— Forewing above with pale costal fascia almost linear, about four times as long as wide; length of forewing about 7.5 mm; Sierra Nevada and Warner Mountains, California ..... *subgenerosa* p. 118

52. Forewing above silky fuscous, with distinct, sinuous, pale-buff postmedial line, more or less expanded anteriorly and posteriorly; usually also with narrow, less distinct, angular, pale-buff antemedial line; hindwing above usually with a pale-buff postmedial line, but this sometimes reduced to a short segment ..... *nicalis* p. 99

— Forewing above otherwise marked and colored 53

53. Forewing above dark gray with contrasting light-gray lines; costa contrastingly fulvous from base at least to end of cell 54

— Forewing above with costa not contrastingly fulvous from base to end of cell, though sometimes gray with a fulvous shade in cell ... 55

54. Forewing above with fringe dark gray; antemedial line narrow, distinct, angular, light gray; reniform spot with outwardly oblique light-gray outline on both basal and distal sides; postmedial line somewhat sinuate, light gray ..... *nexalis* p. 93

— Forewing above with fringe light buff, strongly contrasting with ground color of wing; antemedial line obsolete or hardly indicated; the dominant pattern from base to postmedial line formed by light-gray lines on veins; reniform spot with a single, basally oblique light-gray line; postmedial line regularly curved, light gray....*ochreicostalis* p. 96

55. Upperside of forewing milky white, with fine, faintly indicated postmedial line; fringe often tinged with orange...*pilatealis* (part) p. 96

— Upperside of forewing not milky white.....56

56. Upperside of forewing gray, sometimes with ochreous or fulvous suffusion on discal cell.....57

— Upperside of forewing brown or buff; if somewhat gray, then with strong brownish tinge.....59

57. Forewing above with markings basad of postmedial line consisting mainly of light-gray streaks along veins; antemedial line obsolete or largely obscured by streaks on veins.....*linealis* p. 95

— Forewing above without numerous light-gray streaks on veins; antemedial line light gray, angular, though often narrow and weak.....58

58. Forewing above without light-gray terminal line; apex less acute; size usually smaller (length of forewing not more than 8 mm); discal cell of upperside of forewing never with fulvous or ochreous suffusion..*zonalis* p. 94

— Forewing above with distinct light-gray terminal line; apex more acute; size usually larger (length of forewing up to 10 mm); discal cell of upperside of forewing suffused with ochreous or yellowish fulvous in some specimens.....*napaealis* p. 95

59. Forewing above yellow, with maroon or ferrugineous reticulation or dusting, general effect buff; hindwing above whitish buff; terminal area of both wings above almost wholly infuscated.....60

— Forewing above otherwise colored and marked.....61

60. Forewing above with basal area fuscous; postmedial line maroon, strongly dentate, its costal section strongly oblique distad; yellow costal fascia immediately distad of postmedial line relatively wide, strongly oblique distad; both forewing and hindwing above with basal edge of terminal fuscous zone diffuse.....*retidiscalis* p. 126

— Forewing above with basal area fuscous at costa only; postmedial line ferrugineous (perhaps sometimes maroon), not strongly dentate, its costal section only weakly oblique distad, about at right-angles to costa; pale costal fascia immediately distad of postmedial line relatively narrow, also at right-angles to costa; both forewing and hindwing above with basal edge of terminal fuscous zone sharply defined.....*andrei* p. 127

61. Forewing above pale buff; base, postmedial line and terminal line pale; somewhat irregular brownish-fuscous markings on disc; a regularly curved, brownish-fuscous subterminal band; hindwing above whitish buff; length of forewing not over 8 mm..*sartoralis* p. 93

— If forewing above pale buff, then not marked as described; length of forewing often over 8 mm.....62

62. Forewing above with dark-brown or fuscous postmedial line, subterminal band, or both...63

— Forewing above without dark-brown or fuscous postmedial line or subterminal band, immaculate or with narrow pale postmedial and/or subterminal line; western or southern...68

63. Forewing above grayish to pinkish fuscous, almost unicolorous, with very faintly darker round orbicular and lunular reniform spots, fine but very weak darker antemedial and postmedial lines and terminal shade; hindwing above gray, slightly darker distally; length of forewing 8–10 mm; Texas to New Mexico and Colorado...*atropurpuralis* (part) p. 98

— Not so.....64

64. Forewing above somewhat olivaceous buff; either apical third of wing suffused with reddish brown, or a light-fuscous cloud between reniform spot and postmedial line, separated by a light-buff postmedial band, triangularly enlarged at costa, sometimes interrupted medially, from a medially narrowed light-fuscous subterminal band;

hindwing above buff or fuscous, not as brown as forewing, but not contrasting greatly in tone, and with at most weak terminal infuscation; fringe of hindwing above brown or rufous; length of forewing 9–14 mm; western ..... *semirubralis* p. 132

— Forewing above not as described; fringe of hindwing above whitish or light buff 65

65. Forewing above reddish brown to dark brown, with yellowish or orange antemedial and postmedial fasciae, not reaching costa, sometimes united to form an orange or yellowish patch with complex indistinct darker markings; fringe yellowish; hindwing above grayish fuscous, with short, straight, narrow, yellowish-buff postmedial line and buff fringe; length of forewing 7 mm or less; eastern and central .. *acrionalis* (part) p. 136

— Forewing above without pale fasciae or areas, buff, pinkish brown, or reddish brown, usually with at least traces of a fuscous subterminal band; hindwing above whitish or yellowish buff or infuscated, with weak to very strong fuscous terminal or subterminal band, at least on anterior two-thirds of wing; length of forewing at least 9 mm 66

66. Forewing above deep glossy reddish brown, with strong wide terminal infuscation; hindwing above brownish fuscous, with dark grayish-fuscous terminal band, sometimes preceded basally by a buff wedge on costal two-thirds of wing; southwestern ..... *antisocialis* p. 141

— Forewing above buff or glossy pinkish brown; subterminal infuscated band narrower, concave distad; hindwing above whitish or yellowish buff, always with narrower subterminal or terminal fuscous band; if ground color somewhat infuscated, then with a fuscous postmedial line 67

67. Forewing above matt buff, with at most slight pinkish gloss; hindwing above with ground color usually whitish buff, sometimes, especially in female, brownish fuscous, then with distinct fuscous postmedial line; uncus of male genitalia distally rounded; transcontinental: northern and western ..... *fodinalis* p. 138

— Forewing above somewhat glossy pinkish buff, pale buff only in some western populations; hindwing above with ground color usually distinctly yellowish buff; postmedial line almost lacking; uncus of male genitalia distally truncate, with a sharp lateral projection at each distolateral angle; transcontinental: northern and western ..... *socialis* p. 140

68. Hindwing above dark fuscous, immaculate except for pale distal part of fringe, contrasting with the reddish-brown forewing; the latter with or without narrow, yellowish-buff antemedial and postmedial lines, the former irregularly erect, the latter irregularly sinuous; Florida ..... *shirleyae* p. 102

— Hindwing above not unicolorous dark fuscous contrasting with reddish-brown forewing; if unicolorous, then at darkest light grayish fuscous and forewing grayish tan, not reddish brown; west of the Mississippi 69

69. Forewing above with postmedial line lacking or pale and evenly curved 70

— Forewing above with postmedial line pale and sinuous 71

70. Forewing above reddish tan; apex pointed; lines if present inconspicuous; often a pale subterminal line parallel to termen; sometimes a pale postmedial line curving evenly from subapical region behind costa to middle of posterior margin; an inconspicuous, diffuse, fuscous spot at posterior angle of cell; hindwing above very pale pinkish buff, with very narrow pinkish-buff subterminal shade; length of forewing 8–11 mm ..... *obtusanalis* (part) p. 137

— Forewing above light yellowish buff to grayish fuscous; apex more rounded; upperside immaculate or with narrow, smoothly curved, pale postmedial line, oblique distad from costa, then recurved to posterior margin at three-fourths from base; sometimes with a dentate antemedial line; no fuscous shading at posterior angle of cell; hindwing above nearly concolorous or contrastingly whitish, with no subterminal shade; length of forewing 7–11 mm ..... *pilatealis* (part) p. 96

71. Forewing above pinkish buff, with weak, distally arcuate, pale-buff antemedial line; a pale-buff dot between reniform and orbicular spots; postmedial line fairly strong, sinuate, pale buff; fringe and sometimes a terminal line pale buff; hindwing above light grayish buff, with straight or narrowly wedge-shaped pale-buff postmedial line; zone distad of postmedial line slightly darker than basal part of wing; length of forewing 9–11 mm; southwestern ..... *klotsi* p. 108

— Forewing above dull grayish to pinkish brown; postmedial line weak, often evident only at costa; sometimes a faint darker marginal band; hindwing above light grayish fuscous; postmedial line hardly indicated, if visible then convex distad 72

72. Forewing with apex sharper and termen more oblique (plate 8, figures 24–28); length of forewing 6–9 mm; western and southwestern ..... *morenalis* p. 98

— Forewing above with apex rounder and termen less oblique (plate 8, figures 22, 23); length of forewing 9–10 mm; Texas to New Mexico and Colorado ..... *atropurpuralis* (part) p. 98

For convenience I have arranged the species in a number of species groups. I think these are for the most part natural, though perhaps not all of equal taxonomic value. For reasons given above I have not tried to define the groups rigidly, but I have given a brief characterization at the head of each. The order of the groups is not intended to be phylogenetic, though groups with similarities or relationships have been associated where possible. I think it likely that the forms with long membranous ductus bursae and with high, narrow, strongly setose ovipositor lobes are the more primitive, but the classification cannot be worked out definitively on the basis of the North American fauna only.

demantrialis GROUP

Wings uniformly silky grayish fuscous; penis with more complex armature of cornuti than usual; structure otherwise as in *nexalis* group.

Pyrausta demantrialis (Druce), NEW COMBINATION

PL. 7, FIGS. 34–37 (McD. 5518).

Blepharomastix(?) demantrialis Druce, 1895, *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera*, **2**: 270; **3**, pl. 63, fig. 6.

Type-locality: Amula, Guerrero, Mexico, 6000′. [BMNH]

NOTE—The species was described from four syntypes. The locality cited is that of the male figured in Druce's plate. I hereby designate this specimen as lectotype. It bears the following labels: "Amula,/Guerrero,/6000 ft./Sept. H. H. Smith"; "♂"; "Godman-Salvin/ Coll. 1904.–1./ /B.C.A. Lep. Het./ Blepharomastix/(?) demantrialis,/ Druce"; "Blepharomastix/demantrialis ♂./type Druce" [in Druce's hand]; "LECTOTYPE" [round purple-bordered label]; and "abdomen/missing" [on blue paper]. Two paralectotypes from Duenas, Guatemala, and San Geronimo, Guatemala, in the BMNH, also lack abdomens.

Pyrausta monotonigra Amsel, 1956, *Boletín de Ent. Venezolana*, **10**: 261, pl. 53, fig. 5, pl. 100, fig. 10. NEW SYNONYMY.

Type-locality: Venezuela (?Maracay). [ZSBS]

Moth with head, body and wings uniformly dark gray above; forewing and especially head and thorax smooth and shining, with strong bronzy luster. Wings the same color underneath, but underside of body light gray. Length of forewing 8–10 mm.

Male genitalia with uncus rather slender, with short spines at tip, setae basad of tip; clasper narrow, with narrow scalelike setae; penis with a long straight cornutus, a shorter bent one, a dense group of short but strong, spinelike cornuti, and many very fine spinules. Female genitalia with elongate pointed ovipositor, the lobes membranous with a few long setae and a dense clothing of microsetae; each posterior apophysis with vertical bar modified into a continuation of shaft extending to a blade at tip of ovipositor lobe. Anterior apophysis also long and strong. Ductus bursae short and wide; proximal part funnel-shaped, membranous, finely spinulose; ductus seminalis entering at beginning of short, twisted distal part of ductus bursae; this part containing a complex, twisted, partly spinulose sclerite; bursa ovoidal, wrinkled, membranous, with a rhomboidal, spinulose, transversely carinate signum.

Early stages unknown.

Ithaca and Long Island, New York, to Texas, Arizona and tropical America. Moth in July and August in New York and Pennsylvania, also in Arizona; to November in Texas.

nexalis GROUP

Moths mostly small; tip of forewing often but not always acute; maculation usually simple. Male genitalia with subtriangular uncus, inconspicuous coremata on vinculum, and straight, tapering, blunt-tipped clasper. Female genitalia with reduced, poorly differentiated ovipositor lobes, usually rather long apophyses, and reduced or bladelike vertical bar on posterior apophysis or the bar obsolete; ductus bursae short, tubular and sclerotized, after a short membranous ostial chamber; the sclerotized tube leading through a short coil or sclerotized zone directly into ductus bursae. A considerable number of species, mostly southwestern or western. The European *P. sanguinalis* (Linnaeus) is similar in external appearance to some of our species, but has a moderately long, coiled, membranous section in the ductus bursae and moderately large coremata on the vinculum of the male.

Pyrausta nexalis (Hulst)
PL. 7, FIGS. 32, 33 (McD. 5523, 5524).

Botis nexalis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 150.
Type-locality: Sierra Nevada Mts., California. [AMNH]

Autocosmia concinna Warren, 1892, *Ann. Mag. Nat. Hist.*, (9) **6**: 433. NEW COMBINATION with *Pyrausta.*
Type-locality: "N.W. America" Walsingham. [BMNH]

Moth easily recognized by the pattern of whitish lines on the forewing; base and costa with more or less strongly developed fulvous tints; length of forewing 6–9 mm.

Male genitalia with rather short, triangular uncus, dorsally with fine setae in distal part; clasper rounded at tip and bearing setae, not scales, aedoeagus with weak conical sclerite on one side near tip; vesica very finely spinulose, without deciduous cornuti in specimens examined. Female genitalia with poorly defined, squarish ovipositor lobes, surface very finely spiculate and bearing a few moderate-sized setae. Apophyses slender; vertical bar of posterior apophysis fishtail-shaped. Ductus bursae short, its ostial end membranous, a tubular sclerotization adjacent to bursa. Base of bursa contorted and irregularly sclerotized and spinose for a short distance; bursa oval, very finely spinulose, and with a strong, mouth-shaped, transversely carinate, spinulose signum.

Early stages unknown.

Washington to Montana, south to southern California and San Antonio, Texas. Moth in August and September in the north, June to August in California, and March to October in Texas.

The species varies in size and the amount of fulvous suffusion on the forewing, but I have been unable to separate the material I have seen sharply into two groups. Specimens from the California Sierras tend to be large, and those from the eastern part of the range to have more fulvous than those from the West, but more material is needed to assess the significance of this variation. Hampson (1899) did not recognize *nexalis*, but referred it provisionally to *Pyrausta*. Fernald (*in* Dyar, [1903]) transferred it to *Autocosmia* and sank *concinna* as a synonym, but Barnes and McDunnough (1917) and McDunnough (1939) listed the two as separate species of *Autocosmia* in their check lists.

Pyrausta sartoralis Barnes and McDunnough
PL. 8, FIGS. 38, 39 (McD. 5568).

Pyrausta sartoralis Barnes and McDunnough, 1914, *Contrib. Nat. Hist. Lep. N. Am.*, **2** (6): 242, pl. 1, fig. 26.
Type-locality: Loma Linda, San Bernardino Co., California. [USNM]

Moth easily distinguished from others of its group by the light-brown forewing with an oblique darker area before the pale-bordered postmedial line. Length of forewing 7–8 mm.

Male genitalia with triangular uncus of moderate length, with strong setae distally; clasper short, rounded at tip, weakly decurved, with rather thick clothing of flattened, pointed setae and with a rounded subbasal lobe; basal lobe of sacculus densely setose; penis cylindrical, with a thick spinelike deciduous cornutus and a bundle of numerous narrow ones, also with two areas of fixed spinules. Female genitalia with somewhat pointed, rather poorly defined lobes, with thick array of microsetae and a few sparsely distributed moderately long setae. Posterior apophysis slender, vertical bar of each side modified into a pointed continuation of the corresponding apophysis, extending toward, but not reaching, tip of lobe. Anterior apophysis about as long as posterior apophysis. Ductus bursae short, basally membranous, then with a somewhat fusiform sclerotized zone, followed by a pair of spinose sclerites

and a twisted, partly sclerotized diverticulum. Bursa pyriform, with a large, mouth-shaped, transversely carinate, spinose signum, surrounded by concentric folds.

Early stages unknown.

Known from the vicinity of San Bernardino, from Split Mountain Canyon and Borrego, San Diego County, in California, and from Yuma, Arizona. Rare in collections. Moth in March, April and May.

Pyrausta roseivestalis Munroe, NEW SPECIES
PL. 8, FIG. 41; PL. J, FIG. 3; PL. S, FIG. 5.

Pyrausta roseivestalis Munroe.
Type-locality: Vidal, California. [CNC]

DIAGNOSIS: Similar in size, shape and markings to *P. zonalis*, but upperside of forewing and terminal shading of hindwing pink, not gray.

DESCRIPTION: Frons flattened, buff or fuscous, with a distinct pale-buff line on each side. Vertex fuscous. Labial palpus rather short; labial and maxillary palpi fuscous, labial palpus whitish at base beneath. Basal scaling of proboscis buff. Antenna fuscous above, paler and pilose beneath. Eye and ocellus fuscous. Thorax above dull pink. Abdomen above brownish fuscous, posterior margins of segments pale buff. Body beneath and legs pale buff.

Forewing short and fairly wide; costa straight to near apex then gently arched; apex acute; termen oblique, weakly convex; tornus obtuse, narrowly rounded; posterior margin convex near base. Wing length 7–8 mm. Ground color of upperside dull pink. Antemedial line obscure; fuscous with some pale scaling on basal side, excurved from costa at one-third to anal fold, then indented between 2nd and 3rd A, and oblique distad to posterior margin at one-fourth from base. Postmedial line with pale shading distad of fuscous element; finely crenulate; excurved from costa at five-sixths from base as far as M_3, acutely retracted on Cu_2, acutely dentate toward termen on anal fold, obtusely angled basad on 2nd A, then oblique distad to posterior margin near tornus. Apical part of costa buff with fuscous interceptions. Terminal line fuscous. Fringe orange buff, with a broken fuscous line basad of middle.

Hindwing rather narrow; apex, termen and anal angle rounded. Ground color of upperside pale buff, heavily dusted in terminal area with dull pink. Terminal line fuscous. Fringe pale buff, with a weakly interrupted fuscous line basad of middle.

Underside of forewing fuscous. A narrow dark-fuscous lunule at end of cell. Postmedial line as on upperside. Terminal line fuscous, interrupted by longitudinal buff dashes between veins. Fringe buff, with traces of a fuscous line basad of middle.

Underside of hindwing pale buff, with some fuscous dusting in terminal area. Traces of a fuscous postmedial line on anterior part of wing. Terminal line strong, fuscous, interrupted between veins. Fringe as on forewing.

Male genitalia almost as in *P. zonalis*; uncus a little longer ($2\frac{1}{2}$ times basal width instead of twice basal width) and setose terminal zone longer in material examined. Female genitalia with ovipositor lobes considerably narrower than in *P. zonalis*; apophyses much more slender; anterior margin of eighth tergite straight, not strongly convex.

Early stages unknown.

TYPES: Holotype: ♂. Vidal, California; 4 Oct. 1947; D. Weedmark; genitalia slide EGM 4006. Type no. 13,237, CNC. Allotype: ♀. Congress Junction, Yavapai Co., Arizona; 20 Sept. 1940; Geo. Willett; genitalia slide EGM 4007. LACM. Paratypes: 2♂♂; 2 ♀♀. Madera Canyon, Santa Rita Mts., Arizona; 1 Sept. 1952; Lloyd M. Martin (1 ♂). Tempe, Arizona; 26 Sept. 1921; E. V. Walter; at light; Tempe no. 5423; genitalia slide 4436, DK (1 ♂). Vidal, California; 3 Oct. 1947; Grace H. and John L. Sperry; genitalia slide 4435, DK (1 ♀). Palm Sprs., Riverside Co., California; 14 Oct. 1939; A. H. Rindge (♀, without abdomen). LACM; AMNH; USNM.

These specimens were all taken in the autumn, whereas *P. zonalis* appears to be a spring flier. It is possible that *P. roseivestalis* is only a seasonal form of *P. zonalis*, but if so the dichromatism is unusual.

Pyrausta zonalis Barnes and McDunnough
PL. 8, FIGS. 42–44 (McD. 5573).

Pyrausta zonalis Barnes and McDunnough, 1918, *Contrib. Nat. Hist. Lep. N. Am.*, **4**: 164, pl. 24, fig. 10.
Type-locality: Palm Sprs., Riverside Co., California. [USNM]

Moth small; forewing rather short (length $5\frac{1}{2}$ to 8 mm) and wide, but with acute tip and oblique

termen most like *P. napaealis* and immediate allies, with similar gray forewing and fine pale lines, but averaging smaller; antemedial line of forewing obscure or rather gently arcuate, not acutely angled distad; postmedial line rather evenly curved and finely and evenly denticulate, not smooth with irregular curves and angles; no pale adterminal zone; dark line of fringe interrupted, not continuous.

Male genitalia much as in *P. napaealis*, with triangular uncus, valve of fairly even width, with narrow, tapering, setose clasper, and cylindrical penis with fine spinules and larger deciduous cornuti. Female genitalia with ovipositor lobes poorly differentiated, squarish, densely clothed with fine microsetae and with a very few long setae. Apophyses long, strong, flattened, spatulate; vertical bar of posterior apophysis poorly developed. Ductus bursae of moderate length, tubular, the proximal two-thirds membranous, the distal third sclerotized, but not expanded as in *P. napaealis*. Bursa rather large, pyriform, membranous, with a spinulose mouth-shaped signum.

Early stages unknown.

Not uncommon in the drier parts of southern California, from Apple Valley, San Bernardino County, to Painted Gorge, Imperial County, and east to the Ivanpah and Palo Verde mountains. Moth in February to May.

Pyrausta napaealis (Hulst)
PL. 7, FIGS. 1–6 (McD. 5570).

Paraedis napaealis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 145.
Type-locality: California. [AMNH]

Moth smooth to powdery gray. Forewing of variable proportions, but apex always sharp and termen oblique. Transverse lines narrow; antemedial more or less strongly zigzagged, sometimes obsolete anteriorly or throughout, light gray with dark distal border; postmedial smoothly curved around cell or variously angulate near costa, slightly to acutely retracted on Cu_2, light gray with dark basal border. Orbicular and reniform spots obscure, dark gray. Cell and region beyond it often suffused with fulvous. Adterminal light-gray and terminal dark-gray lines variably developed. Hindwing gray with weak darker postmedial line and fuscous terminal shade, sometimes almost wholly infuscated. Length of forewing 7–10 mm.

Male genitalia with triangular uncus, two to three times as long as basal width, with very narrowly rounded tip, sides straight or weakly concave. Valve with parallel dorsal and ventral margins, slightly curved dorsad; costa narrowly inflated; tip rounded; clasper tapering to a narrowly rounded tip, scaled dorsally near its tip; sacculus with subtriangular dorsal flange near base. Penis cylindrical, apparently without deciduous cornuti. Female genitalia with ovipositor lobes poorly differentiated, blunt and almost naked. Posterior apophysis with vertical bar short and weak, shaft long and slender. Eighth tergite short. Anterior apophysis about as long as posterior, but with stronger dorsal subbasal triangular flange. Ostium fairly wide, displaced to left; ostial chamber narrowing immediately to a cylindrical, anteriorly weakly tapering, membranous, basal section of the ductus bursae, leading into a tubular, medially narrower, sclerotized section, opening terminally into a large, globular, sclerotized bulb. Bursa arising from this bulb, pyriform, membranous, with wide, short, weakly and incompletely keeled and hardly spinulose signum. Accessory sac globular, membranous.

Early stages unknown.

Washington to southern California and the Santa Rita Mountains of Arizona; also in northern Mexico; not recorded east of Washington, Nevada, and central Arizona; common and rather general in southern California, scarcer and more local elsewhere. Moth mostly in April and May in the south, later in the north.

There is an unusual amount of variation in this species, part of it geographically and ecologically related, but I have not been able to detect patterns consistent enough to justify the separation of species or subspecies. Further study is desirable.

P. napaealis is most likely to be confused with *P. zonalis* or *P. morenalis*. *P. zonalis* is similar in color, but is smaller, with the apex of the forewing sharper, with its reniform spot represented by a rather distinct oval clouding of darker gray, and with the postmedial line accentuated at the costa as an outwardly oblique pale element. *P. morenalis* is as large as or larger than *P. napaealis*; its forewing has the apex slightly more rounded and the ground color very even and silky, and distinctly reddish brown, not gray.

Pyrausta linealis (Fernald)
PL. 7, FIGS. 9–12 (McD. 5571).

Loxostege linealis Fernald, 1894, *Insect Life*, **6**: 255.
Type-locality: Argus Mts., California. [USNM]

Moth with powdery gray forewing with pale-gray veins, postmedial line and subterminal line and pale-buff fringe. Length of forewing 8–9 mm. Closest to *P. ochreicostalis* but darker and without the prominent fulvous costal area of that species.

Male genitalia with uncus rather long, heavily setose at tip; clasper with a mixture of scales and setae. Penis probably with deciduous cornuti (not seen in specimens examined). Female genitalia with ovipositor lobes poorly differentiated, squarish, bearing a few setae. Apophyses slender, posterior apophysis with vertical bar expanded into a triangular plate. Ductus bursae short, with a smooth, elongate sclerite at distal end, immediately followed by a coiled diverticulum at junction with bursa. Bursa ovate, with a strong, mouth-shaped, transversely carinate, spinulose signum.

Early stages unknown.

Interior of Washington to the Mojave Desert in California. Moth in May.

Pyrausta ochreicostalis Barnes and McDunnough

PL. 7, FIGS. 7, 8 (McD. 5572).

Pyrausta ochreicostalis Barnes and McDunnough, 1918, *Contrib. Nat. Hist. Lep. N. Am.*, **4**: 163, pl. 23, fig. 8.
Type-locality: Palm Sprs., Riverside Co., California. [USNM]

Moth with markings almost exactly as in *P. linealis*, but forewing a little paler and with extensive fulvous areas along costa and in cell. Length of forewing 7–10 mm.

Male genitalia as in *P. linealis*. Female genitalia much as in *P. linealis*, but with sclerotized zone of ductus bursae shorter and less regular, its margins distinctly spinulose; bursa proper with basal part long and narrow.

Early stages unknown.

Apple Valley to Borrego, California, and east to Valley of Fire in southern Nevada. Moth in May and June.

I have seen what appear to be intermediates between this species and *P. linealis* in the collection of Ron Leuschner, but the overwhelming majority of specimens seem clearly referable to one form or the other, so for the present I retain them as species.

Pyrausta pilatealis Barnes and McDunnough

PL. 8, FIGS. ?29, 30–37, ?40 (McD. 5569).

Pyrausta pilatealis Barnes and McDunnough, 1914, *Contrib. Nat. Hist. Lep. N. Am.*, **2** (6): 242, pl. 1, fig. 25.
Type-locality: Loma Linda, San Bernardino Co., California. [USNM]
NOTE—I hereby designate the specimen in the USNM labelled "Pyrausta pilatealis Type ♂ B. & McD." as lectotype.

Moth with almost unicolorous forewing, varying from milky white to dull buff. Postmedial line faintly indicated in most specimens, very fine, somewhat variable in course, but bent opposite cell; the line with an inner dark element, an outer pale element, or both. Reniform and orbicular spots faintly visible in many specimens, somewhat darker than ground. Antemedial line faintly indicated in a small proportion of specimens, somewhat irregularly oblique distad. Fringe strongly orange-tinted in some specimens, but paler than ground in others. Hindwing light fuscous or brownish fuscous; fringe paler. Underside white or light buff; much of forewing infuscated. Length of forewing 7–11 mm.

Male genitalia: uncus triangular, about three times as long as wide, tip sharp, dorsally setose for a short distance only, sides weakly concave; valve fairly wide, with symmetrically rounded tip; clasper short, triangular, fairly sharp, with numerous erect setae; penis cylindrical, with two stout cornuti and a bundle of slender barbed ones, all parallel, slightly sinuous, and deciduous. Female genitalia with ovipositor lobes square, membranous, naked; posterior apophysis slender and straight, with a subapical ventral spur marking rudiment of lower part of vertical bar; eighth tergite of moderate length, posteriorly emarginate; ductus bursae short, its sclerotized part wide, followed by a thick coil leading via a short straight membranous section to the bursa; signum wide, rhomboidal, weakly keeled; accessory sac round, membranous.

Early stages unknown.

Common in southern California, from the Clark, Ivanpah and Providence mountains to Los Angeles and San Diego counties; also on Santa Catalina Island, and with an apparently disjunct population in the dry interior of Washington. Moth from March to July in California, but mostly in April and May; in Washington in the latter half of May.

Specimens from the mountains of the Mojave Desert and from Washington are often smaller and more ochreous than those from southwestern California, but the differences are not constant.

Fulvous-tinted specimens from California and Arizona, such as those shown on plate 8, figures 29 and 40, possibly represent a different species, but I do not care to separate them with the limited material at hand.

Pyrausta lethalis (Grote)
PL. 7, FIGS. 13–22 (McD. 5642).

Botis lethalis Grote, 1881, *Can. Ent.*, **13**: 33.
Type-locality: [Havilah], California. [BMNH]
NOTE—Grote cited only "California", but the holotype is labelled "Havilah/California".

Moth easily recognized by the reddish-brown to grayish-brown forewing, with distinct, slightly bent, whitish-buff postmedial line almost parallel to termen, and pale-gray dusting in the area beyond postmedial line. Length of forewing 6 to 9 mm.

Male genitalia: uncus triangular, about 2½ times as long as basal width, sides straight, tip very narrowly rounded; valve short and wide, tip broadly rounded, clasper short and wide with rounded tip, sacculus with triangular subbasal dorsal flange; penis weakly curved, about six times as long as wide, armed with strong deciduous cornuti. Female genitalia with weak ovipositor lobes; apophyses slender and nearly straight, moderately long, anterior and posterior apophyses of about the same length. Ductus bursae short, with complex sclerotization through most of its length, a leaflike diverticulum near bursa; bursa pyriform, membranous, with a rather small, weakly keeled and denticulate, rhomboidal signum.

Early stages unknown.

Los Angeles, California, through the Mojave Desert to south-central Nevada, and east through southern Arizona to Big Bend, Texas. Moth from March to May in California, in July in Nevada, April, August and September in Arizona and New Mexico, and March to May in Texas.

As will be seen from the plate, there is substantial variation in different series. Texas specimens are small and fulvous-tinted; those from Arizona tend to be reddish. In California each sample seems to have its own characteristics. Further study is desirable.

Pyrausta corinthalis Barnes and McDunnough
PL. 6, FIG. 39 (McD. 5635).

Pyrausta corinthalis Barnes and McDunnough, 1914, *Contrib. Nat. Hist. Lep. N. Am.*, **2** (6): 243, pl. 1, fig. 27.
Type-locality: Palmerlee, Arizona. [USNM]
NOTE—I hereby designate as lectotype the specimen marked "Pyrausta/corinthalis/B. & McD./Type ♂" in the USNM. There are also two female paralectotypes.

Forewing of moth with almost straight pale postmedial line parallel to termen, as in *P. volupialis* and *P. lethalis* but thicker than in either of those. Antemedial line absent. Ground color olive basally, bright pink distally, not evenly pink as in *P. volupialis*, or reddish brown basally and gray distally or evenly gray or brown as in *P. lethalis*. Length of forewing 8 mm.

Male genitalia: Not examined. Female genitalia: ovipositor lobes elongate, distally rounded, almost without setae; posterior apophysis with slender, straight, fairly long shaft, vertical bar unrecognizable; eighth tergite short, V-shaped; anterior apophysis is a little shorter and thicker than posterior, with obtuse angulation and slender clawlike dorsal process not far from base; ductus bursae unusually short, ostial end unsclerotized, then a fairly short, incomplete, sclerotized collar, then an unsymmetrically expanded section, partly sclerotized on one side and with ductus seminalis joining it posteriorly; bursa oval, membranous, with mouth-shaped, transversely keeled signum and globular membranous accessory sac.

Early stages unknown.

Southern Arizona: Palmerlee; also collected at light at Rustler Park, Chiricahua Mountains, 8500 feet, in July, by Jerry Powell. Rare in collections.

Pyrausta volupialis (Grote)
PL. 6, FIGS. 36–38 (McD. 5634).

Botis volupialis Grote, 1877, *Bull. U.S. Geol. Geog. Surv. Terr.*, **3**: 799.
Type-locality: hills west of Denver, Colorado. [BMNH]

Moth with forewing above pink (or brownish in worn specimens); antemedial line pale, dentate; postmedial line also pale, stronger, parallel to termen. Distinguished from *P. corinthalis* and *P. lethalis* by the uniform ground color and distinct angular antemedial line of forewing. Length of forewing 8–10 mm.

Male genitalia: uncus slender, about three times as long as wide, with concave sides and acute tip, almost naked dorsally; valve of moderate

width, costa broadly inflated, clasper narrowing from a triangular base, distally setose, dorsal margin of sacculus with a rectangular prominence; penis cylindrical, with deciduous cornuti. Female genitalia: ovipositor lobes squarish, poorly defined, with dense coating of microsetae and few but rather strong normal setae; posterior apophysis very slender, its vertical bar also slender, with dorsal element at an acute angle to ventral; eighth tergum strongly emarginated at base of each apophysis, but not mid-dorsally; a row of setae along posterior margin of tergum; anterior apophysis of moderate length, thicker than posterior apophysis, and with triangular dorsal subbasal prominence; ductus bursae short; ostial end membranous, spinulose, tapering, followed by a sclerotized section, basally tubular, then expanded, twisted and spinulose, opening directly into bursa; the latter globular, membranous, with rhomboidal, dentate, transversely keeled signum and membranous accessory sac.

Early stages unknown.

Bosque County and Brownsville, Texas, to Colorado, Arizona, and Chiapas, Mexico. Moth in March to November in Texas, August and September in Colorado.

Pyrausta morenalis (Dyar)
PL. 8, FIGS. 24–28 (McD. 5640).

Metasia morenalis Dyar, 1908, *Proc. Ent. Soc. Washington*, **10**: 58.
Type-locality: Grapevine, California. [USNM]
NOTE—The species was described from four syntypes. The locality cited is that of the lectotype, hereby designated, in the USNM. The specimen is a male, collected on 29 June by G. H. Field, and bears the labels, "Metasia morenalis Type Dyar" and "Type 11692 U.S.N.M.", in addition to the locality and collector labels.

Moth closely similar to *P. atropurpuralis*, but with relatively larger, more acute-tipped forewing; base and postmedial area not pale; terminal area not contrastingly dusted with fuscous; postmedial line with pale element as conspicuous as dark element and accentuated near costa, somewhat irregularly curved around cell, but hardly denticulate. Ground color of forewing varying from dull brown to pinkish brown. Hindwing gray, with fuscous terminal area and often with weak fuscous postmedial line. Length of forewing 6–9 mm.

Male genitalia: Uncus triangular, about three times as long as basal width, with straight sides and sharp apex; valve of moderate length, almost straight, very weakly expanded distad, with tip symmetrically rounded; clasper blunt, with dorsally directed scales toward tip; subbasal flange of sacculus hardly developed; aedoeagus about eight times as long as wide, almost straight; vesica with a bundle of slender deciduous cornuti arising from a deciduous basal sclerite. Female genitalia with ovipositor lobes weakly developed, hardly setose; apophyses of moderate length, very slender, posterior apophysis with vertical element V-shaped, anterior apophysis with triangular dorsal subbasal expansion; eighth tergite U-shaped, with deep anterior emargination in mid-dorsal line; ductus bursae short, sclerotized, a posterior, medially constricted tubular section leading to a bulbous anterior section bearing a short blunt diverticulum; bursa oval, membranous, with rhomboidal signum and globular membranous accessory sac.

Early stages unknown.

Yakima County, Washington; Sonoma County, California, south to the San Bernardino Mountains, the Mojave Desert and Clark County, Nevada, and into Mexico; east to Texas. Not well represented in collections. Moth mostly taken in April and May, but in July and August in the San Bernardinos. For differential characters from *P. atropurpuralis* see the remarks under that species and the key.

Pyrausta atropurpuralis (Grote)
PL. 8, FIGS. 22, 23 (McD. 5641).

Botis atropurpuralis Grote, 1877, *Can. Ent.*, **9**: 104.
Type-locality: Texas, Belfrage, No. 362, Sept. 12. [BMNH]

Moth with forewing dull fulvous, often more or less heavily though finely dusted with purplish fuscous; basal area and a postmedial zone often brighter fulvous, though not contrasting; transverse lines when distinct fine, fuscous brown; the antemedial with a distally pointed angle behind anal fold, and with the dark element weakly bordered on the basal side with light buff; the postmedial finely denticulate, curved around cell, weakly retracted on Cu_2, and zigzagged to posterior margin, the dark element weakly bordered distally with pale buff. Orbicular and reniform often visible as small nebulous areas of fuscous dusting, the former round, the latter lunular. Terminal area often more or less widely

fuscous-dusted. Hindwing above gray, darker terminally; postmedial line absent or hardly indicated. Length of forewing 8 to 10 mm. Smaller and with relatively smaller and less acute-tipped forewing than *P. morenalis*, with postmedial line of forewing more strongly denticulate and more evenly curved around cell. Easily confused with certain dull western specimens of *P. signatalis* (plate 8, figure 21), but fine pale element of postmedial line if present weaker than dark element and without trace of pink color.

Male genitalia almost exactly as in *P. morenalis*, but with clasper relatively shorter and with sharper tip. Female genitalia like those of *P. morenalis*, but with apophyses relatively longer and thicker, and with signum less elongate transversely, more strongly dentate and with deeper keel.

Early stages unknown.

Not well represented in collections, but apparently common in eastern Texas; thence west to New Mexico and Colorado. Chris Durden has taken it in considerable numbers at Austin, Texas, in April, May and June.

Pyrausta nicalis (Grote)
PL. 7, FIGS. 24–31 (McD. 5638, 5639).

Stemmatophora nicalis Grote, 1878, *Bull. U.S. Geol. Geog. Surv. Terr.*, **4**: 671.
Type-locality: Sierra Nevada, California. [BMNH]

Botis uxorculalis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 153.
Type-locality: Sierra Nevada, California. [AMNH]

Syllythria subnicalis Warren, 1892, *Ann. Mag. Nat. Hist.*, (6) **9**: 177. NEW SYNONYMY.
Type-locality: California. [BMNH]
NOTE—The BMNH has five syntypes from "West U.S.A." collected by Walsingham. I hereby designate as lectotype a male from this series, with labels "Walsingham/West U.S.A./89.93/Camp 5" and "LECTOTYPE" [round label with purple border]. The remaining four syntypes become paralectotypes and are so labelled.

Moth with wings above smoothly fuscous; forewing sometimes faintly tinged with reddish or purple; hindwing a little paler from base to postmedial line. Forewing above with ordinary lines and spots weakly indicated as darker elements; a pale-buff line, wider on costa, bordering dark element of postmedial line distally and forming the most conspicuous feature of the forewing pattern. Hindwing above with incomplete pale-buff postmedial line. Length of forewing 9–12 mm.

Male genitalia: uncus long, tapering to a narrowly rounded tip; sides concave; tip setose for only a short distance dorsally; valve with small triangular prominence on costa near base; clasper weakly spatulate, with numerous short fine setae; basal prominence of dorsal margin of sacculus more or less triangular, setose; penis cylindrical, with one deciduous spinelike cornutus and a bundle of barbed, also deciduous cornuti, as well as numerous minute fixed spinules. Female genitalia: ovipositor lobes elongate, triangular, with dense vestiture of microsetae and a few slender setae of moderate length; posterior apophysis with long, thin, slightly curved shaft; dorsal element of vertical bar deflected to form a continuation of shaft, ventral element weak, ragged, flattened and tapering; eighth-ninth intersegmental membrane and eighth tergum long, the latter not obviously excavated; anterior apophysis shorter than posterior; ductus bursae short; ostial end spinulose and unsclerotized for a short distance, then a sclerotized zone, expanded, twisted and spinulose distally, opening directly into bursa; the latter membranous, with rhomboidal, spinulose, transversely keeled signum and tapering diverticulum.

Early stages unknown.

Shawinigan, Quebec, across Canada to British Columbia, and south to Colorado, Utah, the Ruby Mountains in Nevada, and the Sierra Nevada in California. Moth in late June and July.

All three names were based on material from the same region. Warren described *subnicalis* from small specimens with less strongly excurved postmedial line, but these characters are independently variable. There is some range of variation, part of it probably geographically correlated, but more detailed study will be needed to work this out.

Pyrausta grotei Munroe, NEW NAME
PL. 8, FIGS. 1, 2 (McD. 5636).

Pyrausta grotei Munroe.
Type-locality: Colorado. [BMNH]
NOTE—This is proposed as a replacement name for *Pyrausta augustalis* (Grote, 1881), a homonym of *Pyrausta augustalis* (Felder and Rogenhofer, 1874) (see p. 104). Felder and Rogenhofer described their species in *Botys*; Grote described his in *Botis*. Since *Botis*

Swainson, 1821, appears to be a deliberate emendation of *Botys* Latreille, 1802, the former ranks as a junior objective synonym, and the homonymy is secondary. Consequently the name *augustalis* Grote should be revived and used in preference to *grotei* Munroe by anyone who may subsequently place the present species and *augustalis* Felder and Rogenhofer in a different genera. Under the *International Code of Zoological Nomenclature* the replacement name has the same type-material—in this case a holotype female—and type-locality as the name it replaces. It is a pleasure to dedicate this elegant species to August Radcliffe Grote, its original describer, who made so many contributions to our understanding of the Pyralidae and of other Lepidoptera.

Botis augustalis Grote, 1881, *Bull. U.S. Geol. Geog. Surv. Terr.*, **6**: 273.
Type-locality: Colorado. [BMNH]
NOTE—The name has been misspelled "*angustalis*" by some authors.

Forewing deep purplish pink, with narrow postmedial wedge or dash of pale yellowish buff at costa, often continued into a fine, weakly indicated, pale-yellowish postmedial line. Usually larger than *P. signatalis* (length of forewing 7–11 mm, but nearer the latter in most specimens); antemedial line obsolete and postmedial much more weakly developed than in *P. signatalis* except at costal expansion.

Male genitalia: uncus relatively small, very narrow before tip, then slightly expanded and narrowly rounded at end, with dorsal setae on distal two-thirds at sides but almost lacking medially. Valve large; clasper rounded at tip, setose; dorsal prominence of sacculus more or less triangular, setose. Penis with many fixed spinules, also with deciduous spine and slender cornuti. Female genitalia: ovipositor lobes saclike, without setae, hardly differentiated; posterior apophysis rather thick, fairly long, pointed posteriorly, blunt anteriorly, without vertical bar; eighth tergite long; anterior apophysis of moderate length, thick, straight, with acute dorsal subbasal process; ostial chamber membranous, short and narrow; ductus bursae a short, sclerotized, medially somewhat narrowed tube, opening through a sclerotized coil directly into the round membranous bursa; signum quadrate; accessory sac round, membranous.

Early stages unknown.

Not well represented in collections, but rather widely distributed. Pullman, Washington; California, through Coast Range and Sierra Nevada to San Bernardino Mountains; Utah; Colorado; Wyoming; northern and southern Arizona. Moth in May and June in some California localities, otherwise mostly in July and August. Mainly a mountain species, ranging up to 10,000 feet in Arizona.

Pyrausta signatalis (Walker)

PL. 8, FIGS. 14–18, 21 (McD. 5633).

Rhodaria signatalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1282.
Type-locality: North America. [BMNH]

Botys (Rhodaria) vinulenta Grote and Robinson, 1867, *Trans. Amer. Ent. Soc.*, **1**: 17.
Type-locality: North America. [BMNH]
NOTE—Grote and Robinson proposed *vinulenta* "in the case that a new name be used for this species". Though their wording is not completely unambiguous, it appears that their proposal relates to possible homonymy of Walker's name with the previously published *Aethaloessa signatalis* Zeller. The name *vinulenta* Grote and Robinson would therefore have the same type-specimen and type-locality as *signatalis* Walker.

Moth with bright pink or purplish forewing, length of wing 7–10 mm; antemedial and postmedial lines narrow but usually distinct, pale yellowish buff, denticulate, the postmedial sinuous, at most very slightly widened at costa. Fringe grayish buff. Hindwing brownish gray, contrasting with forewing; postmedial line weak, pale; terminal area infuscated; fringe pale grayish buff. Closest to *P. pythialis* and *P. inveterascalis*, but with antemedial line of forewing not expanded at costa as in those species and with the yellow of the fringe not invading terminal area of forewing.

Male genitalia with uncus long and tapering, with narrowly rounded apex and with a short distal zone of setae; clasper rounded at tip, setose. Penis with numerous deciduous cornuti. Female genitalia with ovipositor lobes poorly differentiated, with only a few scattered setae. Apophyses very long and slender. Eighth tergum long and narrow, not obviously excised anteriorly. Ductus bursae fairly short, with membranous, spinulose, weakly tapering zone at ostial end, followed by a distally expanded, twisted and spinulose sclerotized zone, leading almost directly into the globular, membranous bursa. Signum

rhomboidal. Accessory sac globular and membranous.

Larva on horsemint, *Monarda* species, and doubtless on other members of the mint family. Larvae of related species in Europe make webs or silk tubes, mostly in the flower heads.

Ottawa, Ontario, to the Carolinas, Brownsville, Texas, southern Arizona and British Columbia. Moth in all months from May to September in the Northeast; also in March and April in Texas.

Pyrausta pythialis Barnes and McDunnough
PL. 6, FIGS. 7, 8 (McD. 5617).

Pyrausta pythialis Barnes and McDunnough, 1918, *Contrib. Nat. Hist. Lep. N. Am.*, **4**: 164, pl. 23, fig. 7.
Type-locality: Cartwright, Manitoba. [USNM]
NOTE—The locality given is that of the lectotype, hereby designated, the specimen figured by Barnes and McDunnough and labelled "Type ♂" by them. The legend to their plate cites this specimen as "Type ♂" but the text refers to "8 ♂. Types". I therefore think it wisest to consider this a lectotype rather than a holotype.

Moth with deep-pink forewing, marked with conspicuous yellow subapical triangle on costa and a yellow terminal band including fringe. Length of forewing 7–8 mm.

Male genitalia with uncus about 2½ times as long as its basal width, sides very weakly concave, converging to a very narrowly rounded tip; dorsal setae confined to distal fourth and mainly lateral. Clasper tapering to a narrowly rounded tip, setose, not scaled. Dorsal process of sacculus triangular, setose. Penis about eight times as long as wide, straight, with deciduous spine and slender cornuti, as well as fixed spinules. Female genitalia with squarish, poorly differentiated ovipositor lobes, with only a few setae; apophyses long and slender; posterior apophysis nearly straight, its vertical bar represented by an oblique, somewhat lunular expansion. Anterior apophysis a little thicker than posterior one, with a triangular subbasal expansion. Eighth tergum posteriorly emarginate. Ostial chamber membranous, tapering anteriad, opening into a cylindrical sclerotized section of the short ductus bursae; this in turn opening into a sclerotized coil containing a spinulose area, and opening directly into the pyriform, membranous bursa. Signum of medium size, strongly spinulose and with well-developed carina, sides concave, and lateral angles drawn out. Accessory sac not seen in the preparation examined, but doubtless present.

Early stages unknown; probably like those of *P. inveterascalis*.

Manitoba and Saskatchewan, perhaps more widely distributed. Close to *P. inveterascalis*, and perhaps only subspecifically distinct. Moth in June and July.

Pyrausta inveterascalis Barnes and McDunnough
PL. 6, FIGS. 5, 6 (McD. 5618).

Pyrausta inveterascalis Barnes and McDunnough, 1918, *Contrib. Nat. Hist. Lep. N. Am.*, **4**: 165, pl. 23, fig. 6.
Type-locality: New Brighton, Pennsylvania. [USNM]
NOTE—The species was described from two male syntypes. I hereby designate as lectotype the specimen in the USNM labelled "Pyrausta/inveterascalis/Type ♂ B. & McD." The other syntype becomes a paralectotype.

Moth closely similar to *P. pythialis*, but smaller (length of forewing 6–8 mm), ground color of forewing and hindwing above darker, yellow costal and terminal markings less extensive.

Genitalia not significantly different from those of *P. pythialis*.

Larva in seed clusters of a horsemint, *Monarda* species.

Western Pennsylvania to southern Ontario, Illinois and Missouri; probably more widely distributed. Moth in late May and June.

Pyrausta inornatalis (Fernald)
PL. 8, FIGS. 19, 20 (McD. 5632).

Botis inornatalis Fernald, 1885, *Can. Ent.*, **17**: 57.
Type-locality: Florida. [USNM]

Syllythria rosa Druce, 1895, *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera*, **2**: 206; **3**, pl. 60, fig. 19.
Type-locality: Presidio de Mazatlan, Mexico. [BMNH]
NOTE—This species was described from three syntypes. I hereby designate as lectotype the male from which Druce's figure was made. It bears the following labels: "Presidio,/ Mexico./ Forrer."; "Godman-Salvin/Coll. 1904–1./ B.C.A. Lep.-Het. / Syllythria / rosa, / Druce."; "Syllythria/rosa Type/Druce" [in Druce's hand]; and "LECTOTYPE" [round purple-bordered label]. The two paralectotypes have been so labelled. They are from Atoyac, Vera

Cruz; Schumann, and from Teapa, Tabasco; March; H.H. S[mith].

Moth easily distinguished by the acute, uniformly bright-pink forewing, unmarked except for the brown-based, buff-tipped fringe. Hindwing fuscous, pinkish terminally. Head and anterior part of thorax buff. Underside brownish, fringe of forewing whitish, hindwing paler. Length of forewing 6–7 mm.

Male genitalia: uncus narrowly triangular, sides weakly concave, apex acute with a few dorsal setae distally; valve of moderate proportions, distally rounded; sacculus with somewhat rounded dorsal prominence; clasper tapering, with a few narrow erect scales distally; penis weakly curved, doubtless with deciduous cornuti. Female genitalia not examined, only males being available at the time of writing.

Early stages unknown.

Florida; Texas west to the Big Bend National Park and south into Mexico. Not common in collections. Moth from March to October.

All other pink Pyraustinae in our fauna have more or less definite markings on the forewing, instead of being immaculate as in *P. inornatalis.*

Pyrausta shirleyae Munroe, NEW SPECIES
PL. U, FIGS. 1, 2, 5, 7.

Pyrausta shirleyae Munroe.
Type-locality: Pensacola, Florida. [CNC]

DIAGNOSIS: Moth similar in size and general appearance to *P. signatalis*, but forewing reddish brown, not pinkish purple, with distal part of fringe inconspicuously pale buff, not most of fringe contrastingly pale buff; pale transverse lines less distinct than in *P. signatalis* or obsolete; when present more strongly excurved around cell. Hindwing uniformly dark fuscous, veins somewhat more intensely so than membrane; without the dark terminal shading and pale posterior trace of postmedial line found in *P. signatalis.*

DESCRIPTION. Head above reddish brown, a white line at each side of frons and on basal part of antenna; eye and ocellus fuscous. Antenna filiform, somewhat thickened in male, ciliate beneath in both sexes; dorsal scaling reddish brown, alternate scale-rows raised. Thorax above reddish brown, abdomen above brown, posterior parts of segments somewhat paler. Labial palpus, head and body beneath whitish buff. Legs whitish buff; fore-coxa, femur and tibia fuscous anteriorly; midfemur fuscous dorsally.

Forewing subtriangular; costa straight to near apex, then arched; apex acute; termen oblique basad, straight to near tornus, then curved; tornus obtuse; posterior margin weakly convex. Ground color of upperside reddish brown, antemedial line fine, yellowish buff, dentate, erect from costa at one-fourth to posterior margin at one-third from base. Orbicular and reniform visible as diffuse fuscous dots. Postmedial line of same width and color as antemedial, weakly and irregularly dentate, dentations less pronounced than in *P. signatalis*; excurved around cell, moderately retracted on Cu_2 and erect to posterior margin. Basal part of fringe concolorous with wing, distal part obscure grayish buff. Pale transverse lines variable in width, sometimes obsolete.

Hindwing above translucent dark fuscous; veins somewhat darker by opacity; fringe basally dark fuscous, distally dull grayish buff. Termen rather sharply bent at cell Cu_1.

Wings beneath dull brownish fuscous, with slightly paler subterminal and darker terminal zones. Fringes as above.

Length of forewing 8 mm.

Male genitalia of normal *Pyrausta* configuration; uncus rather small, basal width about half length, sides with concave curvature, apex narrowly rounded, with long lateral and dorsal setae for a short distance. Valve short and wide, distally obliquely subtruncate on costal side; costa inflated and with a low hump at base; sacculus with a dorsally rounded and setose prominence occupying most of basal part of dorsal margin; clasper distally rounded and densely clothed with narrow scalelike setae. Penis curved; vesica presumably with deciduous cornuti.

Female genitalia with ovipositor lobes poorly differentiated, sparsely setose. Posterior apophysis slender, posteriorly forked, the arms short and diverging at right-angles to each other and about 45° to the shaft; anterior apophysis a little shorter and thicker than posterior and with a small, acute dorsal process at about one-third from posterior end. Eighth tergite rectangular, sparsely setose. Ostium unarmed. Ostial chamber narrowly barrel-shaped, sclerotized, finely spinulose. Ductus bursae shorter than bursa, unsymmetrical, sclerotized and spinulose on left side; ductus seminalis thick, twisted, arising from a sclerotized diverticulum at junction of ductus bursae and bursa.

Bursa oval, fluted, finely spinulose, with large, rhomboidal, spinulose and carinate signum and round distal accessory sac.

Early stages unknown.

TYPES: Holotype: ♂. Pensacola, Florida; March 1961; Shirley Hills; genitalia slide 4154, MS (type no. 15,001, CNC). Allotype: ♀. Same locality, collector, depository and type number; 21 March 1962. Paratypes: 1 ♂, 1 ♀. Shalimar, Florida; 19 and 23 March 1964; H. O. Hilton (CPK).

This is the species listed by Kimball (1965: 218, no. 5633,1) as *Pyrausta* sp., from Pensacola. I take pleasure in naming it for the collector, Shirley Hills.

Pyrausta coccinea Warren

PL. 7, FIG. 40 (McD. 5630).

Pyrausta coccinea Warren, 1892, *Ann. Mag. Nat. Hist.*, (6) **9**: 176.

Type-locality: California. [BMNH]

NOTE—The species was described from two syntypes, collected by Lord Walsingham. I hereby designate a male in the BMNH as lectotype. It has the following labels: "Walsingham/West U.S.A./89–93"; "LECTOTYPE" [round purple-bordered label]; and Michael Shaffer's determination label. The paralectotype female has the same data label information, and a round light-blue-bordered paralectotype label.

Moth superficially somewhat like *P. dapalis*, but much smaller (length of forewing under 5 mm); vestiture of head and body not hairy; forewing relatively narrower and with a distinct subapical white spot on costa; hindwing with relatively wider black border, narrowing behind, and without black postmedial spots or band.

Male genitalia: uncus triangular, about twice as long as wide, tip pointed, hardly setose dorsally; vinculum without conspicuous coremata; valve short, with parallel costal and ventral margins and symmetrically rounded tip; costa and sacculus basally inflated, costa with very weak basal prominence; clasper pointed, with erect scales distally; penis short, cylindrical, with deciduous cornuti. Female genitalia: ovipositor with quadrate, poorly differentiated, almost naked lobes; apophyses long, straight, very slender; eighth tergum and adjacent intersegmental membrane elongate; ductus bursae short: a short membranous ostial chamber leading to a cylindrical sclerotized tube, followed by a sclerotized expansion leading directly into bursa; the latter pyriform, membranous, with a small, rhomboidal, transversely keeled signum and globular membranous accessory sac.

Early stages unknown.

California: San Joaquin; Redwood Regional Park, Alameda County; Mount Diablo. Moth in May. Very few specimens known; perhaps overlooked because of small size.

bicoloralis GROUP

Moths with distal part of wings dark brown or fuscous, contrasting with the yellow or orange-yellow basal part. Termen of forewing sinuous and weakly falcate, of hindwing lobed in median area. Genitalia as in the *onythesalis* group.

These are the species that have been placed in *Cindaphia* Lederer. There are several more species, all neotropical.

Pyrausta bicoloralis (Guenée), NEW COMBINATION

PL. 5, FIGS. 26–30 (McD. 5565).

Asopia bicoloralis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 205.

Type-locality: North America. [BMNH]

NOTE—Guenée described this species from two syntypes, a female and a male, one from North America, the other from Brazil. I hereby designate as lectotype the female from North America. It has the following labels: "Am. bor."; "Ex Musaeo / Ach. Guenée"; "Ex Typicalibus/Speciminibus" [in red print]; "Paravicini Coll./B.M. 1937–383."; and "LECTOTYPE" [round purple-bordered label]. There are two other specimens in the BMNH with the Guenée "Ex Typicalibus Specimenibus" and the Paravicini Collection labels. One, a male, has additional labels as follows: "Canada"; "Bicoloralis/Gn. Am. mér. Sept."; and "Pionea Gn./bicoloralis Gn./245.53" [in pencil on orange paper]. The other, a female, has no locality information, but appears to match North American females. I consider it very doubtful that either of these is a syntype. The supposed synonyms listed by Hampson, 1899, *Proc. Zool. Soc. London*, 1899: 245, and cited in part in Dyar's, Barnes and McDunnough's, and McDunnough's lists, are all based on South American or West Indian material and refer to other, though closely related, species. Among these, the only ambiguity attaches to *Endotricha julialis* Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 389.

This was described from two syntypes, one from Brazil and one without locality. I hereby designate the Brazilian specimen, a male, type no. Lep. 1157, in the UMO, as lectotype, thus definitely removing the name from the synonymy of *P. bicoloralis*. The syntype in the BMNH becomes a paralectotype and it has so been marked.

Moth unlike any other in our territory, though closely similar to several related tropical American species.

Male genitalia: uncus slender, pointed, constricted at middle, distal fourth covered dorsally with spinelike, bifid setae; transtilla strongly constricted in the middle, laterally with ventral processes articulating with juxta; juxta H-shaped, with oblique sclerotized ridges in dorsal arms; vinculum with a short saccus and prominent lateral coremata; valve narrow, slightly curved dorsad, with oblique ventrodistal margin and narrowly rounded tip; costa narrowly inflated, sacculus basally inflated, with fairly even dorsal margin; clasper with triangular base, narrowly rodlike distal part, the extreme tip curved laterad and ventrad; penis cylindrical, with a group of fringed deciduous cornuti. Female genitalia: ovipositor lobes high, narrow and well differentiated, with numerous though short setae; posterior apophysis short and slender, shaft not much longer than vertical bar; eighth tergite short; anterior apophysis short and slender, subbasally obtusely angled and with a weak triangular dorsal prominence; ostial chamber membranous, narrowing to a short, cylindrical, sclerotized section of the ductus, opening into a sclerotized half coil at junction of ductus seminalis, followed by a long, coiled membranous section, leading into the oval, membranous bursa; signum rhomboidal, weakly keeled, fairly small; accessory sac small and membranous.

Early stages unknown.

Nova Scotia to Michigan, south to central Florida and Conroe in eastern Texas. Moth in June to August in the North, May to October in the South.

Pyrausta augustalis (Felder and Rogenhofer), NEW COMBINATION
PL. 5, FIGS. 31, 32 (McD. 5566).

Botys augustalis Felder and Rogenhofer, 1874, *Reise der Österreichischen Fregatte Novara um die Erde, Zoologischer Theil*, **2** (2): pl. 134, fig. 26.
Type-locality: Cuernavaca, Mexico. [BMNH]

Not to be confused with any other moth known from our fauna, though several closely similar species seem to occur sympatrically in southern Mexico and Guatemala. Among these are a smaller unnamed species, also the species described as *Pachyzancla xanthomela* Hampson, 1913, *Ann. Mag. Nat. Hist.*, (8) **11**: 515, with type-locality Purulha, Guatemala. The latter species becomes *Pyrausta xanthomela* (Hampson), NEW COMBINATION. The type-series of *P. xanthomela* is itself mixed, the paratypes mostly belonging to another undescribed species. The application of the name *augustalis* to the North American species is somewhat doubtful, but our species is at least very close to the true *augustalis*, and this name can be applied until the species group is critically revised.

The male (not illustrated) has the abdomen longer and more slender and the forewing relatively a little longer and more acute than in the female. Length of forewing 8.5–10 mm.

Male genitalia: uncus narrowly subtriangular, about $2\frac{1}{2}$ times as long as basal width, sides sinuate, tip acutely pointed, dorsally densely setose for nearly half its length. Valve narrow, weakly curved dorsad, costa and sacculus inflated, tip unsymmetrically rounded, extending farthest distad near costa; clasper slender, somewhat expanded and curved mesad at tip. Penis subcylindrical, slightly curved, with a bundle of fimbriated cornuti; aedoeagus relatively longer than in *P. bicoloralis*. Female genitalia much like those of *P. bicoloralis*; tubular sclerotized section at ostial end of ductus bursae relatively wider, and with a small setose tubercle midventrally; sclerotized first coil of ductus relatively narrower than in *P. bicoloralis*.

Early stages unknown.

Texas, from Brownsville and Santa Ana Wildlife Refuge to Sinton and San Antonio; south through Mexico to Central America. Moth from February to November in Texas.

onythesalis GROUP

Moths generally fulvous or yellowish, with normal pyraustine pattern, and often with pink, reddish-brown or dark-brown terminal or subterminal band, in some species with additional costal and medial bands; forewing in male with termen usually more oblique than in female. Male genitalia with uncus slender and elongate, with sinuate sides and pointed, strongly dorsally

setose tip; valve long and usually curved dorsad, tip often unsymmetrically rounded or oblique; clasper slender, with few sparse distal setae, in several species with tip angled ventrad. Female genitalia with several membranous coils of ductus bursae between sclerotized zone and bursa; ovipositor lobes high, narrow, well differentiated and thickly setose; apophyses short, posterior apophysis with well-developed vertical bar. Eighth tergite short.

The species referred to this group are widely distributed in tropical and warmer temperate regions of the Americas. The group is close structurally to the *bicoloralis* group, which has a similar geographical distribution, and is also very close to the widely distributed tropical and warm-temperate *phoenicealis* group.

Pyrausta onythesalis (Walker)

PL. 6, FIGS. 26, 27; PL. J, FIG. 4; PL. S, FIG. 6 (McD. 5615).

Botys onythesalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **18**: 734.

Type-locality: unknown. [BMNH]

NOTE—This species was described from two syntypes, a male and a female. I hereby designate as lectotype the female in the BMNH, bearing the labels: "Type" [round green-bordered label]; "LECTOTYPE" [round purple-bordered label]; "324 BOTYS ONYTHESALIS"; and "Pyralidae/Brit. Mus./Slide No./1428♀."

Moth like *P. insignitalis* and *P. pseudonythesalis*; larger than the former (length of forewing 8.5–11 mm), with more dark suffusion on the costal and discal areas of the forewing than in most specimens of *P. insignitalis*, and with the suffusion reddish brown, not dark brown; posterior parts of ante- and postmedial lines more strongly angulate; basal margin of dark subterminal band of forewing irregular, not evenly curved; yellow zone beyond subterminal band wider and more conspicuous. A little larger and distinctly more robust than *P. pseudonythesalis*; basal and medial parts of wings with much more extensive reddish-brown suffusion; posterior parts of antemedial and especially postmedial lines more strongly angulate, the latter slanting basad, not distad; subterminal band generally darker and less reddish; forewing with apex less acute and termen less oblique; hindwing wider and with more strongly flexed termen. Larger than *P. phoenicealis* and with different pattern.

Male genitalia: uncus with triangular base and slender shaft, constricted medially, pointed at tip, dorsally setose on distal part; juxta trapezoidal; vinculum carinate, with prominent lateral coremata; valve fairly narrow, curved dorsad, distally rounded, costa with small sharp subbasal prominence, sacculus wide, with prominent medial angulation of dorsal margin, clasper basally triangular and setose, distally narrow, the extreme tip angled ventrad, but not as long as in *P. insignitalis*; penis curved, with a strong, slender, spinelike cornutus and numerous finer deciduous cornuti. Female genitalia with high, fairly well differentiated, moderately setose ovipositor lobes; apophyses short, vertical element of posterior apophysis narrow; eighth tergite narrow; ductus bursae with basal part weakly sclerotized, expanding anteriad from ostium, then expanded and distorted, but still sclerotized, finally a short, wide, coiled, membranous region leading into the globular, membranous bursa; signum very small, rhomboidal, transversely keeled; accessory sac membranous.

The larva has been reared on *Salvia* species by Roy Kendall, Miss Murtfeldt and others.

Pensacola, Florida, and Clark County, Georgia, to Sioux City, Iowa, through Kansas and Oklahoma to Kerrville, Texas. Moth in April to August.

This is species 5633,1 of Kimball's Florida list.

Pyrausta pseudonythesalis Munroe, NEW SPECIES

PL. 6, FIGS. 28, 29; PL. J, FIG. 5; PL. S, FIG. 7.

Pyrausta pseudonythesalis Munroe.

Type-locality: Vidal, California. [CNC]

DIAGNOSIS: Moth similar in general appearance to *P. insignitalis* and *P. onythesalis*. Ground color of wings paler than in *P. insignitalis*, scaling more translucent; forewing with apex more acute and termen more strongly oblique, subterminal band uniformly reddish, of about even width, its inner edge nearly straight but slightly irregular and somewhat oblique distad from costa to R_5; size a little larger (length of forewing 9–10 mm), body relatively longer and thinner. Smaller than *P. onythesalis*, with relatively longer, more slender body and with more acute apex and more oblique termen in forewing, scaling of wings thinner, reddish-brown suffusion averaging less intense on forewing and almost lacking on hindwing; postmedial line of forewing separated from

subterminal dark band by a wedge-shaped light zone beginning at costa, not by a suboval or subquadrate expansion separated from costa by a dark stripe, as in most specimens of *P. onythesalis*. Male genitalia with clasper weakly curved distally, ending in a narrowly rounded tip, not angled ventrad at right-angles, as in *P. insignitalis* and *P. onythesalis*. Female genitalia with somewhat longer apophyses than in *P. insignitalis* and *P. onythesalis*; ostial end of ductus bursae narrow, straight, cylindrical, leading into a single narrow sclerotized coil, followed by a long, narrow, membranous region with several coils; bursa rather small, oval, membranous, with a moderately large, rhomboidal, transversely keeled signum and a membranous accessory sac.

DESCRIPTION: Frons brown, with a whitish-buff line along each side; gena brown. Vertex with erect, mixed whitish-buff and light-fulvous scaling. Labial palpus dark brown, its base contrastingly white beneath. Maxillary palpus with scaling somewhat expanded distally, dark brown, narrowly tipped with whitish buff. Basal scaling of proboscis whitish buff. Antenna fulvous, a white anterior streak on basal part of shaft. Eye and ocellus dark brown or black. Body above light fulvous; some scattered yellow or light-buff scales on thorax; posterior margins of abdominal segments whitish buff. Body beneath and legs whitish buff; outer spurs of midtibia and outer preapical spurs of hindtibia much shorter than inner in both sexes, but outer apical spurs of hindtibia short and subequal in both sexes.

Forewing with costa nearly straight, arched in a short zone before apex; apex subacute; termen oblique, more strongly so in male than in female, but more strongly so in each sex than in the corresponding sex of *P. insignitalis* or *P. onythesalis*, very weakly convex; tornus obtuse; posterior margin convex near base. Ground color of upperside light orange fulvous, scaling rather thin; variable but rarely heavy reddish-brown suffusion over area between base and postmedial line; usually an area free of suffusion in distal part of cell. Antemedial line fine, reddish brown, oblique distad from costa at one-fourth from base to anal fold, thence almost erect to 3rd A, and again oblique distad to posterior margin at three-fifths from base. Orbicular a weak reddish-brown dot, reniform a curved reddish-brown line on discocellular. Postmedial line fine, reddish brown, arising from costa at about three-fourths from base, following a slightly irregular but usually nearly straight course somewhat obliquely distad to middle of cell Cu_1, retracted to vein Cu_2 behind posterior angle of discal cell, thence somewhat irregular, but usually oblique distad, to posterior margin at about three-fourths from base. Immediately beyond postmedial line a band of unsuffused yellowish-fulvous ground color, tapering from costa to a narrow constriction at the retraction, much wider behind it to posterior margin. A broad, fairly even, very reddish-brown subterminal band, widest at costa, partly separated from a similarly colored narrow terminal line by a narrow interrupted line of the fulvous ground. Fringe bright yellowish fulvous.

Hindwing rather narrow, apex rounded, termen evenly convex; anal angle broadly rounded; anal margin weakly convex. Scaling thin. Upperside with ground color light buff, unevenly suffused with yellowish fulvous. A fine, weak and incomplete, externally convex, reddish-brown postmedial line. Subterminal band anteriorly wide, tapering to a point before anal angle, partly separated by a fine yellowish-fulvous line from the reddish-brown terminal line or completely fused with it. Fringe bright yellowish fulvous.

Underside of wings like upperside, but with transverse lines diffuse or obsolete.

Length of forewing 9–10 mm.

Male genitalia: uncus narrow, somewhat constricted medially, tip narrowly rounded, distal half dorsally setose; juxta subquadrate, with X-shaped strengthening; vinculum ventrally somewhat rounded, weakly keeled in midline, and with a pair of strong coremata laterally; valve straight, rounded at tip, costa narrowly inflated, with a sharp subbasal prominence, sacculus of moderate width, its dorsal margin with a weak angulation near middle; clasper triangular at its base, rodlike near its tip, tip not angled downward, a number of erect setae along whole clasper; penis weakly curved, with a number of long deciduous cornuti. Female genitalia: ovipositor with moderately high, narrow, weakly setose lobes; posterior apophysis with shaft slender, short, but about twice as long as the slightly expanded and crescentic vertical bar; eighth tergite short, tapering ventrad on each side; anterior apophysis longer than posterior, bent ventrad at the junction of the slender, acute dorsal process; ostial chamber short, narrow, membranous, followed immediately by a cylindrical sclerotized tube about four times as long as wide, with ductus

seminalis entering at its distal end; immediately beyond this a single sclerotized and somewhat thickened coil, followed by a fairly long membranous tube with several coils, leading to the rather small oval bursa; signum moderately large, rhomboidal, spinulose, with transverse keel; accessory sac globular, membranous.

Early stages unknown.

TYPES: Holotype: ♂. Vidal, California; 15 Sept. 1947; D. Weedmark (type no. 13,930, CNC). Allotype: ♀. Same locality, collector and type number; 3 Oct. 1947 (CNC). Paratypes: 45 ♂♂, 34 ♀♀; 8 unsexed. Same locality and collector as holotype; Sept., Oct. 1947 (8 ♂♂, 3 ♀♀). Palm Sprs., California; 10 June 1937; E. C. Johnston (1 ♂, 1 ♀). Borrego, California; 7 March 1950, 30 April 1952; Grace H. and John L. Sperry (3 ♀♀); July 1946; Noel Crickmer (1 ♂). Tub Canyon, Borrego, California; April 1952; Crickmer (3 ♂♂). Julian, California; Sept. 1948; Noel Crickmer (1 ♂). Essex, California; 30 May 1938; Grace H. and John L. Sperry (2 ♂♂). Needles, San Bernardino Co., California; 11 April 1952; D. F. Hardwick (1 ♂). Mexican Wells, California; 7 July 1937; Grace H. and John L. Sperry (2 ♂♂, 2 ♀♀). Split Rock Tank, Mojave Desert, California; 20 and 31 May 1938; Grace H. and John L. Sperry (8 ♂♂, 5 ♀♀). Antelope Spr., 8 mi SW of Deep Spr., Inyo Co., California; 7 July 1962; W. A. Foster (1 ♂). Valley of Fire, Nevada; 28 May 1938; Grace H. and John L. Sperry (1 ♀). 4 mi N of Prescott, Yavapai Co., Arizona; 21 Aug. 1972; Lloyd M. Martin (1 ♂). Madera Canyon, Santa Rita Mts., Arizona; 2 Aug. 1947, 16 Aug. 1949, 24 Aug. 1951; Lloyd M. Martin (2 ♂♂, 1 ♀). Madera Canyon, 4880′, Santa Rita Mts., Santa Cruz Co., Arizona; 8 July 1959; J. G. Franclemont (1 ♀). Golden Age, Arizona; 29 May 1938; Grace H. and John L. Sperry (2 ♂♂). Portal, Arizona; 10 June 1956; H. Howden (2 ♀♀). Alamogordo, Otero Co., New Mexico; 10 May 1950; E. C. Johnston (1 ♂). The Basin, Big Bend National Park, Texas; 4, 21 and 24 May 1959; M. R. MacKay (7 ♂, 11 ♀♀). Boquillas Canyon, Big Bend National Park, Texas; 23 May 1959; M. R. MacKay (2 ♀♀). Fort Davis, Texas; 29 May 1959; M. R. MacKay (1 ♂). Brownsville, Texas; 20 Oct. 1938; Grace H. and John L. Sperry (3 ♂♂, 2 ♀♀). Type no. 13,930, CNC; LACM; UCB; JGF. Also 8 unsexed paratypes from the following localities in Texas: Sierra Diablo Wildlife Management Area, July; Government Spr., Big Bend National Park, Sept.; Mt. View Acres, San Antonio, Sept.; Chihuahuan Desert near Nugent Mt., Sept.; Junction, Sept.; K-Bar Research Station, Big Bend National Park, Sept.; Utopia, Uvalde Co., Oct.; all collected by A. and M. E. Blanchard. AB.

This is a common species, but it has been mixed in collections with *P. onythesalis* and *P. insignitalis*. McDunnough misidentified it in the CNC as "*Phlyctaenia*" *taeniolalis* (Guenée). For some years I consistently misidentified it as *P. onythesalis* and wrongly supposed the true *onythesalis* to be undescribed.

Pyrausta insignitalis (Guenée)

PL. 6, FIGS. 24, 25; PL. J, FIG. 6; PL. S, FIG. 8.

Rhodaria insignitalis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 173.

Type-locality: [Rio Maroni], Cayenne. [BMNH]

NOTE—I hereby designate as lectotype one of the two syntypes, both females in the BMNH. It has the following labels: "Guyane française/ Rio Maroni/Bar." [printed label from Paravicini-Oberthür collection]; "Insignitalis/Gn. Cayen."; "Cotype"; "Paravicini Coll./B.M. 1937-383"; "LECTOTYPE" [round purple-bordered label]; and "Pyralidae/Brit. Mus./ Slide No./1429 ♀". The paralectotype has similar locality, cotype and BMNH registration labels, also an old round label saying on one side "Cayen./ Bar/49", and on the other "49/Bar"; and a round pale-blue-bordered paralectotype label.

Moth resembling *P. onythesalis* and *P. pseudonythesalis*, but in general more orange, and with basal border of subterminal dark band of forewing regularly curved. Length of forewing 7–9 mm.

Male genitalia much like those of *P. onythesalis*, but with distal part of clasper narrower, its ventrally angled terminal part longer, sacculus narrow, its dorsal margin almost straight. Female genitalia much as in *P. onythesalis*.

Early stages unknown.

Wedge Plantation, McClellanville, South Carolina, to southern Florida; West Indies; Central and South America. Moth in all months in southern Florida.

Pyrausta aurea (Hampson), NEW COMBINATION

PL. 6, FIGS. 30, 31.

Pachyzancla aurea Hampson, 1913, *Ann. Mag. Nat. Hist.*, (8) **11**: 515.

Type-locality: Presidio, Mexico. [BMNH]

Moth orange fulvous. Wing shape and disposition of lines much as in *P. onythesalis*, but dark lines more diffuse and hardly contrasting with ground color. Pale zones distad of postmedial line narrow and linear, not expanded as in allied species. Reddish-brown subterminal band, and indeed all rufous or dark shades, absent. Length of forewing 9–11 mm.

Male genitalia with uncus slender, its apical part parallel-sided and acutely pointed, dorsally spinulose; valve rather narrow, tip with ventral margin oblique; clasper slender and tapering, of normal shape. Penis somewhat curved and tapering, probably with deciduous cornuti. Female genitalia most like those of *P. onythesalis*, but basal part of ductus bursae narrower, with restricted spinulose and rugose areas, base of ductus seminalis much less strongly inflated.

Early stages unknown.

Widespread in Mexico; taken occasionally along the southern borders of the United States, from Brownsville, Texas, to the Baboquivari Mountains in Arizona. Moth in February, March and doubtless other months.

Pyrausta flavibrunnea Hampson
PL. 6, FIG. 43.

Pyrausta flavibrunnea Hampson, 1913, *Ann. Mag. Nat. Hist.*, (8) **12**: 32.
Type-locality: Cuernavaca, Mexico. [BMNH]
NOTE—The species was described from two female syntypes. The lectotype bears the label: "Pyrausta / flavibrunnea / type ♀ Hmpsn."; "Cuernavaca/Morelos/June H.H.S."; "Type" [round red-bordered label]; "LECTOTYPE" [round purple-bordered label]; "Godman-Salvin/Coll. 1904.–1./B.C.A. Lep.-Het./Syllythria/phoenicealis/Hübn." The paralectotype has the same data and B.C.A. labels, but has a round light-blue-bordered paralectotype label.

Moth with markings somewhat reminiscent of those of *P. onythesalis* and *P. pseudonythesalis*, but color duller, dark areas grayer and pale areas light buff, not fulvous; subterminal dark band very weak, narrowed in middle on forewing; no yellow terminal band, instead a narrow, broken, fuscous terminal line; postmedial line of forewing strongly excurved around cell. Distinguished from *P. morenalis* and *P. atropurpuralis* by the pale-buff postmedial wedge of the hindwing, absent in those species. Length of forewing about 10 mm.

Male genitalia resembling those of *P. onythesalis* and allies; uncus slender, narrowed medially, tip acute and dorsally setose; valve with sharp subbasal projection from costa; sacculus narrow, dorsal margin evenly concave; clasper with tip angularly downturned. Uncus longer and narrower than in *P. onythesalis* and valve wider than in that species. Female genitalia with high, narrow, thickly setose ovipositor lobes; apophyses and eighth tergite short; ostial chamber short, membranous; ductus bursae continued as a sclerotized tube, open along midline, followed by an irregular membranous expansion, leading to a long membranous tube; bursa oval, membranous, with narrow rhomboidal signum and membranous accessory sac.

Early stages unknown.

A common species in Mexico, known in our territory from the Chiricahua Mountains and Madera Canyon, Arizona, and Big Bend National Park, Texas, and probably occurring elsewhere along the southwestern border. The color and pattern distinguish the species easily from others in our territory.

Pyrausta klotsi Munroe, NEW SPECIES
PL. 6, FIGS. 32, 33; PL. J, FIG. 7; PL. T, FIG. 1.

Pyrausta klotsi Munroe.
Type-locality: Ramsey Canyon, Huachuca Mts., Arizona. [AMNH]

DIAGNOSIS: Moth somewhat like *P. signatalis* in general maculation, but much larger (length of forewing 9–11 mm), apex of forewing more acute and termen more oblique; forewing brown, sometimes with a pinkish tinge, but never bright pink. Hindwing brownish, not contrastingly dark grayish fuscous. Not easily confused with any other species.

DESCRIPTION: Frons and gena olivaceous brown; frons flat and oblique, smoothly scaled; a white line at each side of frons, the two curving to meet on anterior margin. Vertex with erect pinkish-brown scaling. Labial palpus smoothly scaled, olivaceous brown above, base beneath contrastingly white. Maxillary palpus olivaceous brown, scaling distally expanded, extreme tip pale buff. Basal scaling of proboscis light grayish buff. Eye blackish fuscous, with paler reticulations. Ocellus fuscous. Antenna filiform in both sexes; ventral surface buff, finely pubescent; dorsal surface with rather narrow zone of dark-brown scaling; on basal part a narrow anterior white line. Thorax above anteriorly pinkish brown,

posteriorly dull tan. Abdomen above dull tan, posterior margins of segments lighter. Body beneath and legs whitish buff. Outer midtibial and preapical hindtibial spurs about one-third length of inner, apical hindtibial spurs about equal in length; relative lengths about the same in both sexes.

Forewing of moderate width; costa straight to near apex, then arched; apex acute, more so in male than in female; termen oblique, more strongly so in male than in female, weakly convex, the curvature increasing posteriad; tornus obtuse; posterior margin convex, most strongly so in basal part. Ground color of upperside dull pinkish brown; markings obscure. Antemedial line narrow, a little darker than ground color, oblique distad from costa at one-fifth from base to anal fold, thence almost erect to posterior margin; obsolete in some specimens, preceded by a faint yellowish zone in many. Orbicular and reniform a faintly darkened dot and curved bar, respectively. Postmedial line a little stronger than antemedial, and always followed by a narrow yellowish zone; beginning from costa at three-fourths from base, weakly oblique distad then basad, to form shallow angles on R_5 and M_1, excurved around discal cell and retracted behind it on Cu_2, thence erect and shallowly dentate to posterior margin at two-thirds from base. Fringe a little paler than ground color; often a narrow terminal zone and base of fringe orange yellow.

Hindwing rather narrow; apex narrowly rounded; termen evenly rounded; anal angle rounded; anal margin weakly convex. End of abdomen considerably exceeding anal angle, especially in male. Ground color above translucent grayish buff, suffused with yellow toward anal margin. A diffuse fuscous postmedial line and broad but weak terminal fuscous zone, the latter tapering to a point behind; the wing as a whole duller than, but not contrasting strongly with, forewing. Fringe yellowish buff, with a weak fuscous line in basal half.

Wings beneath much as above, but with forewing more grayish and less pinkish and markings of hindwing less distinct.

Length of forewing 9–11 mm.

Male genitalia: uncus slender, narrowing from base to middle, then almost parallel-sided to near tip, sides finally curved to a point; dorsal surface of distal third clothed with bifid setae; juxta shallowly H-shaped; vinculum ventrally broadly rounded, laterally with a pair of well-developed coremata; valve fairly long, very slightly curved dorsad, weakly expanding distally, tip rounded, costa inflated, clasper tapering to a somewhat hooked tip, dorsally setose, dorsal margin of sacculus even; penis weakly curved, with a bundle of deciduous cornuti. Female genitalia: ovipositor with high, narrow, weakly setose lobes; posterior apophysis with fine shaft, not much longer than the somewhat thicker vertical bar; eighth tergite very short, tapering ventrally; anterior apophysis about 1½ times as long as posterior one, bent and with a moderately acute dorsal process subbasally; ostial chamber narrow, membranous, tapering to a tubular sclerotized section of ductus bursae, this leading into a further sclerotized section with complex lobes, beyond this a membranous section with about four coils, opening into the oval membranous bursa; signum small, rhomboidal, transversely keeled; accessory sac globular, membranous.

Early stages unknown.

TYPES: Holotype: ♂. Ramsey Canyon, Huachuca Mts., Arizona; 10–15 July 1941; A. B. Klots (AMNH, *ex* ABK). Allotype: ♀. Madera Canyon, Santa Rita Mts., Arizona; 12 July 1956; Lloyd M. Martin, John A. Comstock, and William A. Rees. LACM. Paratypes: 126 ♂♂, 45 ♀♀. Same data as for holotype (4 ♂♂). Same locality as for holotype; 16 July 1948; C. and P. Vaurie (2 ♂♂, 2 ♀♀). Palmerlee, Miller Canyon, Huachuca Mts., Arizona; 24 June 1955; R. J. Ford (1 ♂, 3 ♀♀). Old Palmerlee, Miller Canyon, Huachuca Mts., Arizona; 23–24 July 1955; Lloyd M. Martin (1 ♀). Madera Canyon, Santa Rita Mts., Arizona, 4880–5900′; May, June, July, Aug.; J. A. Comstock, R. J. Ford, J. G. Franclemont, Lloyd M. Martin, W. A. Rees (11 ♂♂, 4 ♀♀). Upper Camp, Pinery Canyon, Chiricahua Mts., Arizona; 26, 27 June 1955, 4–9 July 1956; J. A. Comstock, R. J. Ford, Lloyd M. Martin, W. A. Rees, R. H. Reid (76 ♂♂, 24 ♀♀). Southwestern Research Station, 5 mi W of Portal, Chiricahua Mts., Cochise Co., Arizona; July and Aug.; various collectors (24 ♂♂, 8 ♀♀). Cave Creek, Chiricahua Mts., Arizona; 21 Aug. 1957; Lloyd M. Martin (1 ♂). East Turkey Creek, Chiricahua Mts., Cochise Co., Arizona; 19 Aug. 1967; J. G. Franclemont (1 ♀). Pine Crest, Mt. Graham, Pinaleno Mts., Graham Co., Arizona, 7300′; 28 June 1955; Lloyd M. Martin (1 ♂). Sitting Bull Falls, SW of Carlsbad, Eddy Co., New Mexico, 4800′; 26–28 June 1964; F., P. and M. Rindge

(3 ♂♂, 2 ♀♀). The Basin, Big Bend National Park, Texas; 9 May 1959; M. R. MacKay (1 ♂). AMNH; type no. 13,238, CNC; LACM; JGF.

Though apparently common in the area of its occurrence, this species has been collected only in comparatively recent years. It should not be mistaken for any other *Pyrausta*.

Pyrausta flavofascialis (Grote)
PL. 6, FIGS. 34, 35 (McD. 5627).

Botis flavofascialis Grote, 1882, *Bull. U.S. Geol. Geog. Surv. Terr.*, **6**: 577.
Type-locality: New Mexico. [BMNH]

Moth most like *P. laticlavia* in appearance, but larger (length of forewing 9–12 mm); upperside of forewing dull purplish fuscous rather than bright pink; postmedial yellow fascia well defined, much wider and stronger than basal or antemedial pale markings, and showing in its narrowest part a fine dark marking representing the median loop of the true postmedial line; hindwing with pale areas light buff, not yellow, generally restricted to a postmedial wedge on a light-fuscous ground, but sometimes occupying most of the wing.

Male genitalia: uncus rather long and slender, sides slightly concave basally then convex, converging to a very narrowly rounded tip; distal half of dorsal surface with short, forked, anteriorly directed setae medially and longer, more slender setae laterally. Valve rather long and slender, with small subbasal triangular prominence on costa. Clasper rather sharply triangular, its setae long and slender. Penis of moderate length, with relatively long, deciduous, spine and barbed cornuti. Female genitalia: ovipositor lobes high, narrow and well defined, with strong vestiture of setae. Posterior apophysis with vertical bar well defined, only weakly broadened into a narrow fishtail shape; shaft of moderate length, rather narrow, straight. Anterior apophysis somewhat longer and thicker, with a roughly triangular dorsal expansion. Ductus bursae of medium length, with membranous, spinulose, weakly tapering ostial end, then a short, straight sclerotized section leading to a spinulose zone at the junction of the spinulose ductus seminalis; distad of this a membranous section of about three coils, leading to the elongate bursa. Signum rhomboidal, spinulose, transversely carinate. Accessory sac membranous.

Early stages unknown.

Western Texas to Santa Rita Mountains, Arizona, south in Mexico at least to Durango. Moth in May to September, not common in collections.

phoenicealis GROUP

General appearance as in *onythesalis* group, but size smaller (length of forewing not over 8 mm). Male genitalia resembling those of *onythesalis* group, but with clasper somewhat paddle-shaped and vinculum without dependent coremata, though with sessile lateral tufts of setae. Female genitalia with ovipositor and apophyses as in *onythesalis* group; ductus bursae short and wide, with a twisted sclerotized zone connecting the straight proximal sclerotized zone with the bursa; bursa elongate, with large, mouth-shaped signum and well-developed, nearly terminal accessory sac.

A pantropical group, extending into the warmer parts of the temperate zones of both hemispheres. There appear to be two species in Florida, but they are very close, and their relationship to each other and to tropical forms deserves further study.

Pyrausta phoenicealis (Hübner)
PL. 6, FIGS. 9–12 (McD. 5613, in part).

Haematia phoenicealis Hübner, 1818, *Zuträge zur Sammlung Exotischer Schmettlinge* [sic], **1**: 22, pl. [20], figs. 115, 116.
Type-locality: Florida. [NHMV?]
NOTE—The plate was published earlier than the text ([1809]–[1813], according to Hemming, 1937: 466), but without any accompanying name. The figure was designated by the name *Heliaca punicalis* in Hübner's *Erste Zuträge*, 1808: 5, but that work is now considered unpublished, and in any event *punicalis* is probably only an emendation of *punicealis* [Denis and Schiffermüller], to which Hübner compares *phoenicealis* in his 1818 text. A male (?) in the Naturhistorisches Museum, Vienna, bearing the label "Podevin." is perhaps the holotype, but the identity of the species is in any event clear from Hübner's plate.

Rhodaria flegialis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 316.
Type-locality: New York. [BMNH]
NOTE—The species was described from two male syntypes, both now in the BMNH. The lectotype, hereby designated, has labels as follows: "46.110/U.S."; "Rhodaria/flegialis/ Walk. Type"; "Type" [round green-bordered

label]; "LECTOTYPE" [round purple-bordered label]; and "Pyralidae/Brit. Mus./Slide No. 2358♂". The paralectotype lacks the abdomen; it has labels "46.110/U.S."; and "531"; and also a round light-blue-bordered paralectotype label.

Rhodaria noraxalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 926.
Type-locality: unknown (from the Milne collection). [BMNH]

Moth somewhat like *P. onythesalis* or dark specimens of *P. insignitalis* in appearance, but smaller (length of forewing 7–8 mm), with relatively short abdomen and less oblique forewing termen. Forewing above dark reddish brown with irregular paler fulvous bands across wing before middle and immediately beyond postmedial line; the distal fulvous band usually constricted at middle; terminal zone dark; fringe with basal half fuscous, distal half yellow. Hindwing similarly colored, with distinct fulvous basal patch and postmedial band; fringe gray or yellowish gray.

Male genitalia with uncus rather long and slender, sides somewhat sinuate, tip pointed, dorsal surface of distal part with bifid setae; vinculum short, without dependent coremata; tip of valve rounded; clasper with narrow base, somewhat paddle-shaped tip, the flattened part thickly setose dorsally; penis cylindrical, somewhat curved, with numerous deciduous cornuti. Female genitalia: ovipositor lobes fairly high and narrow, with dense vestiture of short setae; posterior apophysis with shaft slender, nearly twice as long as vertical bar, the latter weakly crescentic; eighth tergite narrow; anterior apophysis a little longer than posterior, somewhat thicker, and with a subbasal thickening and weak flexure, bearing very small acute projections dorsally and ventrally; ostial chamber short and membranous; distad of it a short cylindrical sclerotized section, followed by a considerably longer and wider, irregularly sclerotized, somewhat twisted section leading directly into the bursa; the latter oval, membranous, with a large mouth-shaped, transversely keeled signum and with a small, round, membranous, nearly terminal accessory sac.

Larva found by Larry Bottimer on flower heads of a bee-sage, *Mesosphaerum rugosum* (L.) Pollard, in Texas.

Monroe County, Florida, to the Wedge Plantation, McClellanville, South Carolina, and west through Louisiana to Liberty and Smith Point in eastern Texas. Moth in April to June, September, and doubtless in other months.

Very close to *P. panopealis*, but a little larger, darker, wings with scaling more opaque, fringes with contrasting fuscous basal and pale distal parts, hindwing almost exactly concolorous with forewing and with distinct fulvous basal patch.

Unlike *P. panopealis*, *P. phoenicealis* seems to be confined to the southeastern part of the United States.

Pyrausta panopealis (Walker), REVISED STATUS
(McD. 5613, in part).

Rhodaria panopealis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 318.
Type-locality: China. [BMNH]
NOTE—The species was described from two supposedly male syntypes. I hereby designate as lectotype the specimen which has for many years been labelled "Type" in the BMNH. It appears to be a female. It has the following labels: "Type" [round green-bordered label]; "LECTOTYPE" [round purple-bordered label]; "China" and on the reverse "45.65"; and "19. RHODARIA PANOPEALIS".

Botys? coecilialis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **18**: 581.
Type-locality: Santo Domingo. [BMNH]

Rhodaria probalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 923.
Type-locality: Rio de Janeiro. [UMO]

Rhodaria ocellusalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 923.
Type-locality: Sierra Leone. [BMNH]

Rhodaria catenalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1282.
Type-locality: Santo Domingo. [BMNH]

Rhodaria juncturalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1283.
Type-locality: South Hindostan. [BMNH]
NOTE—The holotype is a female.

Rhodaria concatenalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1284.

Type-locality: Darjeeling. [lost]

NOTE—The holotype, originally in the BMNH, appears to be lost. I follow the most probable interpretation of the traditional synonymy.

Myriostephes heliamma Meyrick, 1885, *Trans. Ent. Soc. London*, 1885: 448.

Type-locality: Duaringa, Queensland. [BMNH]

NOTE—This nominal species was described from one male and one female. I hereby select the male as lectotype. Though it has lost the abdomen, it is the only specimen in Meyrick's series of "*Pyrausta phoenicealis*" from the type-locality. It has labels as follows: "Duaringa/ Queensland/G.B./83" [in Meyrick's hand]; "LECTOTYPE" [round purple-bordered label]; "Meyrick Coll./B.M. 1938–290"; "Myriostephes / heliamma / $\frac{1}{4}$ Meyrick / in Meyrick Coll."; "Pyrausta/phoenicealis Hübner/4/9 E. Meyrick det."; and "abdomen/missing".

Moth much like *P. phoenicealis*, but on the average smaller (length of forewing 6–7 mm); wings lighter, more thinly scaled; forewing with dark areas redder and light areas yellower; hindwing lighter and not as red as forewing, pale areas weakly contrasting; no distinct fulvous patch at base; fringes with basal parts yellow or with a few reddish scales, distal parts whitish.

Male genitalia: as in *P. phoenicealis*, but with basal part of clasper relatively longer and flattened part shorter. Female genitalia: much as in *P. phoenicealis*, but with apophyses thinner and cylindrical part of ductus bursae apparently narrower.

Early stages: Larva on a bee-sage or ironwort, *Hyptis capitata* Jacquin, 1787, in Puerto Rico, according to Schaus, 1940, *New York Acad. Sci., Sci. Surv. Porto Rico and Virgin Is.*, **12**: 375.

Southern Georgia through Florida to the West Indies; widespread in the tropics. Moth from February to October in Florida.

This species has generally been put in the synonymy of *P. phoenicealis*, but I believe the two are distinct. There is some variation in West Indian material, which should be studied more closely. The moth will be figured in a later fascicle.

rubricalis GROUP

Moths in size and general appearance somewhat like those of the *phoenicealis*, *aurata* and *acrionalis* groups, but yellowish transverse band of hindwing strong, straight and posteriorly angulate or else wider, shorter and divided by the postmedial line, not curved as in the *aurata* group or narrow and obsolescent as in the *acrionalis* group; forewing without the contrasting fulvous antemedial band of the *phoenicealis* group.

Male genitalia much as in *aurata* group; clasper wide and blunt and with erect scales along the ventral edge of its somewhat obliquely truncate tip. Female genitalia with high, strongly setose ovipositor lobes and short apophyses, with well-developed vertical bar on posterior apophysis; ductus bursae of moderate length, about four coils following the sclerotized tubular section, the basal one sclerotized; bursa round, with rather broadly rhomboidal signum, its lateral angles narrowly decked over.

Two species, both North American, one southeastern, the other western.

Pyrausta rubricalis (Hübner)

PL. 6, FIG. 15; PL. T, FIG. 2 (McD. 5619, in part).

Pyralis rubricalis Hübner, 1796, *Sammlung Europäischer Schmetterlinge*, **6**: 22, pl. 16, fig. 106.

Type-locality: ["Europe"]. [?NHMV]

NOTE—Hübner gave no explicit locality, but said his figure was based on a specimen from the Radda collection, in Vienna. The holotype is probably lost, but some of Radda's material survives in the Hungarian National Museum in Budapest and some of Hübner's in the Vienna Museum. Lederer's footnote to his description of *Botys similalis* (see page 113) suggests that the holotype female was in the Vienna Museum in 1863, but I did not look for it on my visits there. The identity of the species seems clear from Hübner's figure.

Rhodaria nescalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 315.

Type-locality: [United States, 1837–38]. [BMNH]

NOTE—The species was described from four female syntypes, said to be from New York and Illinois, presented by E. Doubleday to the BMNH. I hereby designate as lectotype the female which has for many years been labelled "Type" in the BMNH. It has labels as follows: "Type" [round green-bordered label]; "LECTOTYPE" [round purple-bordered label]; "9. RHODARIA NESCALIS"; and "46.110/ U.S." The three paralectotypes each have the label "46.110/U.S." and have had round light-blue-bordered paralectotype labels affixed. One has lost the abdomen; another has the number "530"; the third has the number "677".

Botys similalis Lederer, 1863, *Wiener Ent. Monat.*, **7**: 367, 460.

NOTE—Though accompanied by a description, by a reference to specimens and by the locality North America, this name was published as a synonym (see Lederer's footnote on p. 460), and does not thereby become available under the *International Code*. So far as I know, it has never been cited except in the synonymy of *P. rubricalis*. My designation of a lectotype (Munroe, 1958, *Can. Ent.*, **90**: 510) therefore has no validity and should be ignored.

Moth like *P. californicalis*, but with termen of forewing less regularly curved; apex of hindwing sharper; hindwing with a small fulvous patch crossing postmedial line, the latter not obviously angled, as compared with the yellow or fulvous band basally bounded by a sharply angled postmedial line seen in *P. californicalis*. Somewhat like *P. phoenicealis*, but with hindwing fuscous, not concolorous with forewing, and without a fulvous patch in basal area. Also somewhat like *P. acrionalis*, but with white, not yellowish, fringe, and with termen of forewing fuscous, not yellowish. Length of forewing 6–7 mm.

Male genitalia not seen. Female genitalia much like those of *P. californicalis*, but with ostial chamber and adjacent tubular sclerotization relatively longer and thinner; curved expansion distad of junction of ductus seminalis relatively shorter; membranous part of ductus bursae longer and with four coils.

Early stages unknown.

New York (?) to the Wedge Plantation, South Carolina, and probably into Florida; west to Edwardsville, Illinois, and Baton Rouge, Louisiana. Not common in collections. Moth from May to September.

Pyrausta californicalis (Packard), REVISED STATUS

PL. 6, FIGS. 16–23; PL. T, FIG. 3 (McD. 5619, in part).

Botys californicalis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 260.
Type-locality: California. [MCZ?]

Moth in general similar to *P. rubricalis*, with which it has in the past been synonymized, and to *P. orphisalis*. Most easily distinguished from the former by the postmedial line of the hindwing, which is often broad and forms the inner boundary of a prominent postmedial yellow, fulvous or yellowish-buff band. In *P. rubricalis* the postmedial line of the hindwing is fine and crosses a short and restricted fulvous postmedial band. Wings more rounded than in *P. rubricalis*, and postmedial line of forewing rather close to dark terminal band, not diverging from it posteriorly as in *P. rubricalis*. *P. rubricalis* occurs from Illinois southward and eastward; *P. californicalis* is confined to the Pacific states and provinces. *P. orphisalis* is distinguished by the inwardly oblique antemedial line of the forewing, preceded by a double orange spot; in *P. californicalis* the antemedial line is arcuate a little distad and the fulvous scaling that precedes it is diffuse or obsolete. *P. orphisalis* occurs with *P. californicalis* in the northern part of its range, but is rare south of British Columbia.

Male genitalia considerably smaller relative to size of moth than in *P. orphisalis*, valve relatively narrower and clasper considerably shorter. Female genitalia: ovipositor lobes high, narrow, well differentiated, moderately setose; apophyses short; posterior apophysis with straight shaft and weakly expanded, crescentic vertical bar; eighth tergite short; anterior apophysis short, with rhomboidal expansion at obtuse subbasal flexure; ostial chamber membranous, tapering anteriad; a cylindrical sclerotized section of ductus bursae leading past junction of ductus seminalis, gradually expanding and entering an inflated, sclerotized half coil; thence the ductus bursae membranous and coiled about three times to the globular membranous bursa; signum of moderate size, broadly mouth-shaped, with strong transverse carina and reflexed margins adjacent to lateral angles. General aspect of female genitalia very different from those of *P. orphisalis*, but like those of *P. rubricalis* except as noted under that species.

Reared from mint, *Mentha* sp., by Lange, Pollard, Rindge and Dammers.

Widespread from southern British Columbia to southern California. I recognize two subspecies.

Pyrausta californicalis californicalis (Packard)

PL. 6, FIGS. 16, 19–23; PL. T, FIG. 3.

Botys californicalis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 260.
Type-locality: California. [MCZ?]

Moth in general small and bright-colored, though variable in detail. Forewing fulvous, with reddish-brown suffusion and dusting, terminal area contrastingly infuscated in many specimens.

Hindwing almost always with a broad, wedge-shaped, yellow or fulvous postmedial band, often angled sharply basad near posterior margin. Length of forewing rarely over 9 mm.

Armstrong, British Columbia, and Thurston County, Washington, south through coastal and interior California to the San Bernardino Mountains and the Los Angeles area. Moth from February to September in southern California, from May to October in the San Francisco-Petaluma region, from June to July in Washington and early August in interior British Columbia. Larva on mint, *Mentha* sp. at Half Moon Bay and in southern California.

I have not seen the holotype, but there seems no doubt as to the identity of the species and the nominate subspecies. It is clearly distinct from the southeastern *P. rubricalis*.

Pyrausta californicalis sierranalis Munroe, NEW SUBSPECIES
PL. 6, FIGS. 17, 18.

Pyrausta californicalis sierranalis Munroe.
Type-locality: Mineral Spr., Tulare Co., California. [USNM]

Moth larger than the nominate subspecies (length of forewing 9 to 10 mm). Pale areas of forewing restricted, yellowish buff rather than reddish fulvous; dark areas brownish fuscous, usually with little reddish tint; transverse lines fuscous, hardly dentate, tending to be lost in ground color; a distinct, contrasting, yellowish-buff to fulvous, rather narrow band bordering postmedial line on distal side. Hindwing mostly blackish fuscous, with narrow, yellowish-buff, posteriorly tapering, postmedial band, averaging much narrower than in the nominate subspecies, sometimes angled basad at 1st A. Underside largely infuscated, not fulvous or suffused with reddish brown.

Early stages unknown.

TYPES: Holotype: ♂. Mineral Spr., Tulare Co., California; 1–7 July; *ex* Barnes coll. USNM. Allotype: ♀. Deer Park Sprs., L. Tahoe, California; 8–15 July; *ex* Barnes coll. USNM. Paratypes: 8 ♂♂, 2 ♀♀. Mineral Spr., Tulare Co., California; 24–30 June, 1–7 July; *ex* Barnes coll. (3 ♂♂). Yosemite, California; *ex* Hulst coll. (1 ♂). Emigrant L., Tuolumne Co., California; 7 Aug. 1942, 22 Aug. 1944; G. E. Pollard (1 ♂, 1 ♀). Glen Alpine, Fallen Leaf L., California; 11 Aug. 1909; F. X. Williams (2 ♂♂). Deer Park Sprs., L. Tahoe; 8–15 July; *ex* Barnes coll. (1 ♀). Nevada City, Nevada Co., California; 18 May 1946; Fred H. Rindge (1 ♂). USNM; AMNH; CAS; type no. 13,931, CNC.

The following material is referred to this subspecies, but is excluded from the type-series because the specimens are smaller and more reddish tinted, though the pale bands are restricted as in the type-series: a series from Lassen National Park, California; 20 June [?] and 20 July 1937; John A. Comstock, in the LACM, and a series from Mt. Shasta, California, 7000′; 16–23 and 24–31 July; *ex* Barnes coll., in the USNM.

This subspecies appears to be a higher-altitude population concentrated in the Sierra Nevada, but reappearing in attenuated form in the high mountains farther north. At first sight it gives the impression of a different species, but the similarity of structure and pattern and the occurrence of intermediate individuals indicate that the differences are not specific.

pseuderosnealis GROUP

Moth of distinctive appearance, with uniform reddish-brown wings with a single narrow postmedial yellowish-buff postmedial line on each wing.

Male genitalia not differing significantly from those of the *nexalis* group. Female genitalia with well-differentiated, high, narrow, but short-setose ovipositor lobes; apophyses short; posterior apophysis with distinct vertical bar; ostial chamber small; only a short sclerotized collar following it; rest of ductus bursae slender, membranous, forming about six coils; signum narrowly rhomboidal, its lateral angles decked over.

Only one species, widely distributed in the southern United States.

Pyrausta pseuderosnealis Munroe, NEW SPECIES
PL. 8, FIGS. 9–13; PL. J, FIG. 8; PL. T, FIG. 4.

Pyrausta pseuderosnealis Munroe.
Type-locality: Georgetown, Texas. [CNC]

DIAGNOSIS: Forewing and hindwing almost concolorous; brick red to purplish fuscous, with conspicuous, though somewhat diffuse, yellow to orange postmedial band on both wings, on hindwing often incomplete; forewing in some specimens

with traces of a yellowish antemedial line, much less distinct than postmedial; pale cell spot lacking. General aspect much like that of *P. tyralis*, and especially its dark form *erosnealis*, but forewing not as rosy red, hindwing as dark as forewing, and postmedial yellow band of hindwing much better developed than in *P. tyralis*. Male genitalia with clasper straight, not decurved as in *P. tyralis*.

DESCRIPTION: Frons flat and oblique, smoothly scaled, brownish fuscous, with a contrasting white line on each lateral margin from dorsal margin of eye to anterior margin of frons a little mesad of corner. Vertex with erect, rather smooth, brownish-fuscous scaling. Labial palpus porrect, smoothly scaled, pointed, exceeding frons by about length of head; fuscous, most of under surface contrastingly white. Maxillary palpus prominent, somewhat dilated with scales distally; fuscous, with some whitish scaling at extreme tip. Proboscis with whitish basal scaling. Eye large, dark fuscous. Ocellus well developed, dark fuscous. Antenna in male somewhat prismatic, in female filiform; ventral surface short-ciliate, dorsal surface smoothly scaled; color blackish fuscous; front of basal segment white, leading to a diminishing white line on basal segments, the line breaking into a row of segmental dots then fading out before middle of antenna. Body above brick red to purplish brown. Body beneath pale buff. Foreleg anteriorly fuscous, tarsus banded with white; posteriorly white. Midleg white, femur and dorsal surface of tibia contrastingly fuscous. Hindleg pale buff.

Forewing of moderate width; apex rounded; termen convex and somewhat oblique; tornus obtuse; posterior margin almost straight. Ground color of upperside varying from brick red to purplish brown. Forewing in some specimens with traces of a diffuse, yellow to orange or reddish antemedial band; always with a stronger, weakly sinuate, diffuse, yellow to orange or reddish postmedial band. Hindwing with a similarly colored postmedial band on middle field of wing, sometimes reaching costa and anal margin. Length of forewing 6–8 mm.

Male genitalia: uncus fairly wide, of moderate length, with convex convergent sides and pointed apex; distal part setose dorsally and laterally. Valve fairly narrow, nearly straight, curved dorsad distally; apex symmetrically rounded; costa narrowly inflated; sacculus broadly inflated, its dorsal margin even and rounded; clasper short, straight, of moderate width, weakly setose. Penis short and straight, with one relatively strong, thornlike deciduous cornutus and a bundle of fine serrate ones. Female genitalia: ovipositor with moderately well developed, high, setose lobes. Apophyses short and fine. Ductus bursae long, coiled and membranous, with a short sclerotized section near ostial end. Bursa globular, membranous, with a sharply rhomboidal, keeled, weakly spinulose signum and a membranous accessory sac.

Early stages unknown.

TYPES: Holotype: ♀. Georgetown, Texas; 7 April 1937; L. J. Milne. Type no. 13,932, CNC. Allotype: ♂. Austin NW, Travis Co., Texas; 22 May 1972; at light, A.M.; C. J. Durden, no. 72143A 16, Texas Memorial Museum, Austin. Paratypes: 24 ♂♂, 24 ♀♀; 6 unsexed. Same locality and collector as allotype; April–June 1972 (5 ♂♂, 4 ♀♀, 3 unsexed). Belton Reservoir, Bell Co., Texas; 6 April 1970, 6 May 1970; A. and M. E. Blanchard (3 ♂♂, 3 unsexed). Mercedes, Hidalgo Co., Texas; 3 Nov. 1958; H. Smalzried (1 ♀). Alpine, Brewster Co., Texas; 20–25 Aug. 1926; O. C. Poling (1 ♂). 8 mi NW of Paducah, Texas, 1800′; 24 Sept. 1968; D. F. Hardwick (1 ♀). Kerrville, Texas; July 1906; H. Lacey (1 ♀). Same locality; no date or collector (1 ♂). Texas (1 ♂). Texas; Belfrage; 3/5, 4/5 and 4/6 (3 ♂♂). Titusville, Florida; 14 Feb.; Engel coll.; genitalia slide 4139, DK (1 ♂). Lutz, Florida; July 1913; CM Acc. 7963; genitalia slide 4138, DK (1 ♀). Winter Park, Florida; 8 Aug. 1939; H. T. Fernald (1 ♀). Stemper, Florida; 1 March and 13 April 1911; G. Krautwurm (2 ♂♂). Winnfield, Louisiana; 16–23 June; Barnes coll. (1 ♀). Baton Rouge, Louisiana; 16 Aug. 1969; G. Strickland (1 ♂). Devil's Den State Park, Washington Co., Arkansas; 5–10 June 1966; R. W. Hodges (8 ♀♀). Blue Sprs. State Park, E of Springdale, Madison Co., Arkansas; 6 July 1968; J. R. Heitzman (1 ♀). 4 mi NW of Warsaw, along State Road UU, Benton Co., Missouri; 22 April 1972, 29 July 1972; at black light; J. R. Heitzman (3 ♂♂; 2 ♀♀). Coolie L., Clay Co., Missouri; marsh and open forest; 22 July 1972; at black light; J. R. Heitzman (1 ♀). Edgebrook, Illinois; 27 June 1914; A. Kwiat; genitalia slide 18 July 1943 no. 4, CH (1 ♂). Cheyenne, Oklahoma; 9 July 1937; Standish-Kaiser; genitalia slide 1917, DK (1 ♂). Broken Bow, Oklahoma; 29 June 1937; Standish-Kaiser (1 ♀). Ciudad Monte, Tamaulipas, Mexico;

27 July 1960; H. Howden; at light (1 ♀). No locality (1 ♂). Type no. 13,932, CNC; AB; AMNH; USNM; CM; JRH; GS.

Several specimens from California (Oroville; Eel River, Mendocino County; and The Geysers, Sonoma County) average a little larger but appear to be conspecific. I exclude these from the type series.

dapalis GROUP

Moth with bushy palpi, dark forewing and red, black-margined hindwing. Male genitalia of normal configuration. Female genitalia with well-differentiated, setose ovipositor lobes, but with long, strong apophyses, the vertical bar of the posterior apophysis expanded; ductus bursae fairly long, tubular sclerotized section distally expanded and curved, membranous section forming about six coils; signum mouth-shaped.

Only one species, found in California.

Pyrausta dapalis (Grote)
PL. 7, FIGS. 38, 39, 41, 42 (McD. 5534).

Botis dapalis Grote, 1881, *Can. Ent.*, **13**: 17.
Type-locality: California. [BMNH]

Moth with dark forewing and red, black-margined hindwing, resembling in its genus only the smaller *P. coccinea*, distinguishable by the characters given in the key. To be differentiated also from *Pogonogenys proximalis* (Fernald) (subfamily Odontiinae, Fascicle 13.1, plate 8, figures 37–39), from *Loxostege* species, especially *L. immerens* (Harvey) (Fascicle 13.2A, plate 4, figures 55–58), and from Noctuidae of the genus *Annaphila* Grote.

Male genitalia with uncus rather long, somewhat rounded at tip, with distal part densely setose. Clasper weakly downturned, rounded at tip, with mixture of scales and setae. Basal prominence of sacculus rounded, with a few rather short thick setae. Penis slightly curved, with numerous fine spinules and a dense group of many deciduous cornuti, including a thick spine. Female genitalia with rather well differentiated ovipositor lobes, with a moderate number of setae, including some longer ones arising from perforations in the somewhat expanded vertical bar of the posterior apophysis. Anterior apophysis and shaft of posterior apophysis strong, somewhat irregular, of moderate length, anterior apophysis with unusually long and thick dorsal process. Ductus bursae fairly long: ostial chamber tapering, membranous and spinulose; then a tubular sclerotized section, distally expanded, curved and spinulose, joining the beginning of a membranous tubular section of about six tight coils; bursa globular, with broadly mouth-shaped, spinulose, transversely keeled signum.

Larva reared by Jerry Powell from leaves, shoots and flower heads of pitcher sage, *Salvia spathacea* Greene, and from coyote-mint, *Monardella villosa* Benth., feeding up quickly in the spring and diapausing in the cocoon until emergence early the following spring. To be expected on additional species of the mint family.

California: in the coastal ranges from Lake and Sonoma counties to San Diego; also collected by Dyar at Truckee, in the Sierra Nevada. Moth in March and April in the North, in late January and February in Los Angeles County.

aurata GROUP

Moths with fuscous, brown or reddish-brown forewing, with pale costal fascia immediately distad of postmedial line, and with fuscous hindwing with curved yellowish or orange postmedial fascia. Genitalia variable. Male with subtriangular uncus and wide, distally scaled clasper, the latter sometimes angled ventrad but not decurved. Female with poorly differentiated ovipositor lobe, elongate apophyses with poorly developed vertical bar on posterior apophysis; ductus bursae typically long and membranous, with short sclerotized subbasal section, but much shorter in *P. homonymalis*.

The group has five known North American species, and additional species in Europe and temperate Asia. *P. aurata* (Scopoli, 1763) is European.

Pyrausta homonymalis Munroe, NEW NAME
PL. 5, FIGS. 15–17.

Herbula? submarginalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1288. Not *Herbula? submarginalis* Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1286.
Type-locality: unknown. [BMNH]
NOTE—So far as I know, the primary homonymy of these two species, described two pages apart in the same work, has never been remarked. As the case is one of page priority, I am

obliged as first reviser to determine which should be considered the senior homonym. Fortunately the choice is easy. The species described on p. 1286, in addition to having page priority, is a relatively well known glyphypterigid, with type-locality Ceram, of which there is a substantial series in the BMNH, at present placed in the genus *Anthophila* Haworth = *Simaethis* Leach. The pyralid *submarginalis*, on the other hand, was omitted from North American lists until Kimball, 1965, *The Lepidoptera of Florida*, p. 217, where the original citation is given as p. 1286, not p. 1288, because of wrong information supplied by me. I therefore formally designate *Herbula? submarginalis* Walker, [1866]: 1288, as a junior primary homonym of *Herbula? submarginalis* Walker, [1866]: 1286, and I propose the above new name to replace it. The holotype of both the junior homonym and the replacement name *homonymalis* Munroe is a female in the BMNH, with labels as follows: "39/6.19/1157" [a BMNH registration number referring to the Milne collection]; "HERBULA? SUBMARGINALIS"; "Type" [round green-bordered label]; and "Pyrausta/homonymalis Munroe/(n.n. for Herbula?/submarginalis Walker/34: 1288 nec 34: 1286)/ HOLOTYPE" [red-bordered label].

Moth resembling *P. generosa*, but larger (length of forewing about 10 mm), broader-winged, and with markings much duller and more diffuse. Orbicular and reniform spots of forewing relatively far apart and without distinct yellow spot between them. Antemedial line obsolete. Subapical patch buff, diffuse, subtriangular, tending to be continued as a pale zone beyond postmedial line. Hindwing with postmedial band dull yellow, more diffuse and smaller than in *P. generosa*.

Male genitalia with uncus rather wide, subtriangular, distally rounded, tip weakly spined dorsally; valve rather short, distally rounded; clasper unusually wide, densely scaled, obliquely truncate distally; penis cylindrical, with a group of short deciduous cornuti. Female genitalia; ovipositor lobes degenerate, naked; posterior apophysis long, rather thick, straight, the apophyses of the two sides fused posteriorly into a V-shaped structure apparently adapted for wedging or piercing; eighth tergum fairly long; anterior apophysis shorter than posterior, of about the same thickness, with a triangular, acute, dorsal subbasal process, but not flexed subbasally; ostial chamber membranous, leading to an unsymmetrically sclerotized bulbous expansion; rest of ductus bursae fairly short, with about four coils; bursa round, with narrow rhomboidal signum and round, membranous accessory sac.

Early stages unknown.

Missouri to Virginia and south to Mississippi and Florida. Rare in collections. Moth in May and June.

Pyrausta generosa (Grote and Robinson)

PL. 5, FIGS. 11–14; PL. K, FIG. 1 (McD. 5624).

Botys generosa Grote and Robinson, 1867, *Trans. Amer. Ent. Soc.*, 1: 20, pl. 2, fig. 10.

Type-locality: Pennsylvania. [AMNH]

NOTE—Klots (1942) mentions a "cotype" female in the AMNH and notes that the original description cites only the male sex. However, I have seen and photographed a specimen in the AMNH type collection labelled "Pa." and "Botys/generosa/G. & R. ♂." Fred Rindge has kindly re-examined this specimen at my request and considers it to be a male. As there is also a badly damaged specimen in the USNM labelled "*Botis generosa* G. & R., Type, from Pennsylvania ex Fernald coll.", I hereby designate the AMNH specimen as lectotype, making the USNM specimen a paralectotype.

Moth like *P. orphisalis* in general appearance, but larger (length of forewing 8–9 mm), without orange spots in basal area, with antemedial line obliquely convex distad, not obliquely sinuate basad, with a distinct quadrate yellow spot between reniform and orbicular, with no fulvous patch basad of postmedial line in its curve, but with a contrasting, roughly oblong, yellow bar on costa immediately distad of postmedial line, continued backward as a fine yellow line bordering postmedial. Hindwing much as in *P. orphisalis*. Underside with a large fuscous patch in discocellular region of forewing, instead of a small spot as in *P. orphisalis*. Pattern much crisper and more contrasting than in the larger *P. homonymalis*; distinguished from that species particularly by the yellow patch between reniform and orbicular and the brighter, much more distinct, quadrate and yellow subapical costal spot of the forewing and by the much larger, brighter and sharper postmedial yellow band of the hindwing.

Male genitalia: uncus heavily sclerotized, basally emarginate, about twice as long as wide, dorsally arched, narrowly rounded at tip, sides convergent and very weakly convex in outline; a strong anterolaterally directed group of scalelike

setae from tip of uncus on each side, but mid-dorsal region almost bare. Tegumen long. Transtilla narrow but complete, with ventrally directed processes connecting with dorsal corners of juxta. Juxta oblong, about twice as wide as deep, with X-shaped internal strengthening. Vinculum with ventral part short and rounded, with median keel, but without conspicuous coremata. Valve about four times as long along ventral margin as maximum width; tip broadly rounded, the extreme tip somewhat ventral to longitudinal axis of valve; costa narrowly inflated; sacculus wide, with dorsal prominence ending in a 90-degree angle; clasper with triangular base and ventrally oblique, narrow, parallel-sided, blunt-tipped distal part, the base with strong dorsally directed setae and the tip with a group of narrow, dorsally directed scales. Penis irregularly cylindrical, about six times as long as wide, doubtless with deciduous cornuti, though these not seen in the specimens examined. Female genitalia much as in *P. orphisalis*, but with larger ovipositor lobes and signum and shorter apophyses and ductus bursae.

Life history unknown.

Point Pelee and Minaki, Ontario, west to southern Alberta, south to Punta Gorda, Florida, and to west-central Missouri. Moth in June and July in the North, in April and probably other months in Florida.

The species has been much confused with *P. orphisalis* (= *P. ochosalis*), but needlessly so. It is closest to *P. subgenerosa*, but is larger, has the subapical costal bar wider, the uncus more broadly rounded distally and the aedoeagus relatively shorter.

Pyrausta subgenerosa Munroe, NEW SPECIES
PL. K, FIG. 2.

Pyrausta subgenerosa Munroe.
Type-locality: Chipmunk Flat, near Sonora Pass, Tuolumne Co., California. [UCB]

DIAGNOSIS: Similar to *P. generosa*, but smaller (length of forewing 7–7.5 mm); labial palpus shorter; forewing uniformly dark brown, without yellowish variegation; yellow spot between orbicular and reniform minute, but distinct; yellow subapical costal bar narrower. Male genitalia with uncus rather broadly rounded at tip, not subtriangular; valve and aedoeagus relatively shorter than in *P. generosa*. Somewhat like dark specimens of *P. californicalis*, but distinguished from them by the broad, curved, pale-yellow band of the hindwing, and on the underside by the distinct dark-fuscous postmedial band on a pale-yellow, not orange-yellow ground. Distinguished from *P. orphisalis* and *P. tuolumnalis* by the lack of any trace of a pale spot between reniform spot and postmedial line on upperside of forewing.

DESCRIPTION: Frons prominent, rounded, dark brown, with whitish-yellow line at side. Vertex with fine, erect scaling, fuscous with some fulvous and buff intermixture. Labial palpus exceeding frons by less than length of head, second segment shorter and more strongly ascending than in *P. generosa*, scaling of third segment short and porrect; dorsal part dark fuscous, ventral part contrastingly whitish buff. Maxillary palpus prominent, with a dilated tuft of scales distally; fuscous, with a few whitish-yellow scales at tip. Basal scaling of proboscis whitish yellow. Eye and ocellus fuscous. Antenna filiform, fuscous, finely pubescent below, scaled above; a whitish-yellow line along anterior edge for a short distance near base. Body above dark brownish fuscous; posterior margins of abdominal segments narrowly buff; anal tuft whitish buff. Body beneath fuscous, mixed with buff. Legs mainly buff, with some fuscous admixture; anterior surfaces of coxae and femora fuscous; midtibia of male a little thickened and with modified, semierect scaling; outer tibial spurs shorter than inner, outer preapical spur of hindtibia shorter than the others.

Forewing above dark brownish fuscous; faint traces of orange-brown scaling, especially in medial area in front of posterior margin. Orbicular and reniform spots barely visible as a blackish dot and bar. Between them a small, square, yellow spot, relatively smaller than in *P. generosa*, but distinct. An outwardly oblique, orange-yellow postmedial bar from costa at four-fifths from base to M_2, much narrower than the corresponding bar of *P. generosa*, continued almost imperceptibly as a dull-orange postmedial line, running sinuously to posterior margin at four-fifths from base. Fringe concolorous with wing.

Hindwing above blackish fuscous, with wide, contrasting, yellow postmedial band, curved parallel to termen, not reaching either costal or anal margins, tapering posteriad, blunt anteriorly and posteriorly. Fringe blackish fuscous.

Forewing beneath yellow. Costa narrowly fuscous as far as postmedial line. A quadrate blackish-fuscous orbicular spot, larger than that of upperside. Reniform spot fused with dark

element of anterior part of postmedial line to form a large fuscous patch in and beyond end of discal cell; dark element of postmedial line extending from costa to this patch and as broken traces for some distance behind it. Beyond dark element a continuous yellow fascia from costa to posterior margin. Terminal zone broadly and evenly dark fuscous. Fringe dark fuscous.

Hindwing beneath yellow, matching forewing, with some sparse dark-fuscous dusting, especially near base and just basad of postmedial line. A curved dark-fuscous line on discocellular. A narrow but strong, dark-fuscous postmedial line parallel to termen, interrupted on veins. Terminal zone and fringe dark fuscous as on forewing.

Length of forewing 7–7.5 mm.

Male genitalia: much as in *P. generosa*, except for the differences noted in the diagnosis, above. Female genitalia unknown.

Early stages unknown.

TYPES: Holotype: ♂. Chipmunk Flat, near Sonora Pass, Tuolumne Co., California; 25 June 1962; J. A. Powell. UCB. Paratype: 1 ♂. Fandango Pass, Modoc Co., California; 6100′; 7 June 1970; J. Powell (1 ♂). Type no. 13,933, CNC.

This species is a geographical representative of the eastern *P. generosa*, but because of its smaller size, the difference in shape of the uncus and the apparently wide discontinuity in the geographical ranges, I accord it specific rank.

As the two available specimens come from fairly widely separated localities, the species will probably be found elsewhere in the Sierra Nevada and adjacent mountains. It has no doubt been overlooked in collecting because of its resemblance to *P. californicalis*, *P. orphisalis* and *P. tuolumnalis*.

The moth will be figured in a subsequent fascicle.

Pyrausta orphisalis Walker

PL. 5, FIGS. 5–10 (McD. 6523, 5625).

Pyrausta orphisalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 310.
Type-locality: St. Martin's Falls, Albany R., [Ontario]. [BMNH]
NOTE—This species was described from three supposedly female syntypes, two from the above locality and one from Nova Scotia. I hereby designate as lectotype a male (not a female as stated by Walker) in the BMNH, with labels as follows: "Type" [round green-bordered label]; "LECTOTYPE" [round purple-bordered label]; "St. Martin's Falls" and on the reverse "44.17"; and "Pyrausta/orphisalis/Walker, 1859/*E. Munroe* designated/1975". The two paralectotypes are females; one is a poor specimen from St. Martin's Falls, the other a specimen without abdomen, from Nova Scotia, collected by Redman. Each has a round pale-blue-bordered paralectotype label and Michael Shaffer's determination label.

Pyrausta ochosalis Dyar, 1903, *Proc. Ent. Soc. Washington*, **5**: 305. NEW SYNONYMY.
Type-locality: [New York]. [USNM]
NOTE—The locality given is that presumed by Dyar to be that of the lectotype, hereby designated, Fitch's specimen no. 406 in the USNM. The name was a manuscript one given by Fitch, and Dyar referred particularly to the lectotype in describing the species, though he cited material from several other localities. Holland also described the species, using Fitch's manuscript name, in the same year (*The Moth Book*, p. 398, pl. 47, fig. 57), but Dyar's description was published on 15 June 1903 and Holland's sometime after 8 September 1903.

In our fauna closest to *P. tuolumnalis* and *P. generosa*. Distinguished from the former by having the light-colored postmedial band of the hindwing wider, more strongly curved, and bright yellow, not light buff; from the latter by the smaller size (length of forewing 6.5–8 mm as compared with 8.5–10 mm) by the absence of a distinct quadrate yellow patch between the reniform and orbicular of the forewing, and by having a prominent yellowish subcostal patch basad of the postmedial line, much larger than the costal expansion of the latter. Even more closely related to the European *P. aurata* (Scopoli) and *P. meridionalis* (Staudinger); distinguished from the former by the more variegated forewing, and from the latter by the broader and more regularly curved yellow band of the hindwing.

Male genitalia: uncus narrowly subtriangular, sides somewhat sinuate, dorsal surface distally with bifid setae; subscaphium straplike, arising from a transverse bridge; tegumen with round lateral lobes; transtilla narrow and threadlike; juxta small, trapezoidal; vinculum with sides short, ventrally with a double keel; valve of moderate length, curved dorsad, distally rounded; costa with a basal flange and inflated for most of its length; sacculus with large, rounded, setose dorsal prominence, with a small distal tubercle; clasper subtriangular, distally narrowly rounded,

scaled for most of its length. Penis cylindrical, slightly curved, with a densely imbricated group of fine spinules, and also a spinelike cornutus in the middle of a bundle of slender deciduous cornuti. Female genitalia with elongate, poorly differentiated ovipositor lobes, bearing sparse short setae; posterior apophysis long and slender, but strongly sclerotized, its vertical bar with ventral part expanded and rectangular, its dorsal part slender and pointed, almost in line with shaft and extending toward apex of lobe; eighth tergum long, its anterior margin excavated ventrad of apophysis on each side; anterior apophysis shorter and thicker than posterior; ostial chamber sclerotized, weakly tapering; ductus bursae long, many-coiled, membranous; bursa globular, membranous; signum fairly small, its lateral angles rounded, its medial angles sharp but weakly sclerotized, denticulations strong; accessory sac globular and membranous.

Larva reared from savory, *Satureia hortensis* L., in Newfoundland, and from horsemint or a related plant, *Monarda* species, at Bobcaygeon, Ontario. Probably on a variety of species of the mint family, like the European *P. aurata.*

Newfoundland across southern Canada to the Fraser Valley of British Columbia, south to northern Florida, the Sierra Blanca of New Mexico, and Sonoma and Modoc counties, California. Moth flying mostly by day, but occasionally taken at light. Two generations in most of the Canadian range; at Ottawa the first flying in late May and early June, the second in July and early August. More generations southward.

Pyrausta tuolumnalis Barnes and McDunnough

PL. 5, FIGS. 1–4 (McD. 5626).

Pyrausta tuolumnalis Barnes and McDunnough, 1918, *Contrib. Nat. Hist. Lep. N. Am.*, **4**: 165, pl. 23, fig. 11.

Type-locality: Tuolumne Meadows, California. [USNM]

NOTE—This species was described from a series of 10 male and five female syntypes. I hereby designate as lectotype the specimen in the USNM labelled "Type ♂" by the authors.

Moth closely similar to *P. orphisalis*; forewing with grayer, less reddish ground; pale markings buff, not yellowish, patch before postmedial line smaller and less conspicuous. Pale postmedial band of hindwing narrower, less strongly curved, pale buff, not bright yellow.

Male genitalia like those of *P. orphisalis*, but with uncus not as narrow, sides concave and parallel for some distance subapically; valve relatively shorter; clasper wider; dorsal process of sacculus smaller, subtriangular. Female genitalia as in *P. orphisalis*, but ovipositor with somewhat less elongate and a little more strongly setose lobes; ostial chamber not tapering anteriorly; signum with lateral angles sharper.

Early stages unknown. Rearing records from lodgepole pine, *Pinus contorta* Dougl., and juniper, *Juniperus* species, are presumably spurious. The European *Pyrausta porphyralis* (Denis and Schiffermüller) lives in spun-up leaves of various species of the mint family, Labiatae.

Western Northwest Territories, Dawson, Yukon, and presumably Alaska, south through British Columbia and Alberta as far east as Lloydminster, and in mountains to Los Angeles County, California, and to northern New Mexico. Moth in June and July.

Very close to *P. porphyralis*, but forewing with antemedial line less oblique and costal element of postmedial line oblique distad. Staudinger's record of *P. porphyralis* from Kamchatka may possibly refer to this species, but I have not compared specimens. *P. porphyralis* is a two-generation species of moist temperate habitats, whereas *P. tuolumnalis* is northern and montane and seems to have only one generation a year.

Sympatric with *P. orphisalis* in some western localities, but distinguished by the characters given under that species.

cespitalis GROUP

Forewing of moth brown with dark pattern of varying intensity. Hindwing yellow or yellowish with dark discal spot and postmedial, subterminal and terminal bands, the last three of fairly even width and parallel to termen; sometimes the dark markings of the hindwing expanded so as to leave two yellowish bands on a dark ground. Male genitalia with triangular uncus, rather strongly setose dorsally; valve straight, with narrow, tapering, dorsally setose clasper; vinculum with inconspicuous coremata; penis straight, cylindrical, with fine deciduous cornuti. Female genitalia with high, narrow, well-differentiated but very short-setose lobes; apophyses short; posterior apophysis

with very slender shaft and crescentic, weakly expanded vertical bar; eighth tergite rather narrow; anterior apophysis a little thicker than posterior and with subbasal flexure and rhomboidal expansion; ductus bursae of moderate length, membranous except for a short subbasal collar, with several coils leading to the round, membranous bursa; signum sharply rhomboidal, transversely keeled; accessory sac globular, membranous, lateral.

Pyrausta cespitalis ([Denis and Schiffermüller], 1775) is European. It is hardly more than subspecifically distinct from our species. Additional subspecies or species range over the Palearctic Region and south through tropical America to Argentina and Chile.

Pyrausta subsequalis (Guenée)

PL. 5, FIGS. 18–25; PL. 9, FIGS. 1–18; PL. K, FIG. 3; PL. T, FIG. 5 (McD. 5621, 5622).

Herbula subsequalis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 177.
Type-locality: North America.
NOTE—This species was described from one male and two female syntypes, in the Paris Museum and Guenée's collection. No type-material remains in the Paris Museum, and I have not seen any in the BMNH or the USNM. Guenée's description seems to indicate clearly that his specimens belonged to the eastern-southeastern population to which the name has traditionally been applied.

Herbula insequalis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 447, pl. 8, fig. 3.
Type-locality: North America.
NOTE—Guenée proposed this as a replacement name for *Herbula subsequalis* Guenée, because Herrich-Schäffer had previously used the same specific name for a species of *Botys*. Under the *International Code of Zoological Nomenclature* this does not constitute homonymy, and the replacement name, not being required, is a junior objective synonym, with the same type-material and type-locality.

Isopteryx? madetesalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 946.
Type-locality: unknown. [BMNH]

Herbula repletalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1285.
Type-locality: North America. [BMNH]
NOTE—This species was described from two female syntypes from the Carter collection. I hereby designate as lectotype the specimen in the BMNH bearing the labels: "Type" [round green-bordered label]; "LECTOTYPE" [round purple-bordered label]; "HERBULA REPLETALIS"; "N. Amer." and on the reverse "42/85". The paralectotype has the same locality and BMNH registration labels, a pale-blue-bordered paralectotype label and Michael Shaffer's determination label.

Herbula? efficitalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1287.
Type-locality: [New York?]. [BMNH]
NOTE—Walker described the species from one female, for which he gave no type-locality. What purports to be the holotype has the label "New York", possibly in Walker's hand. It is a female lacking the abdomen and the right forewing. There is no other specimen in the BMNH that might be the holotype, and I see no value in rejecting it on the ground of "too much information".

Pyrausta borealis Packard, [1867], *Proc. Boston Soc. Nat. Hist.*, **11**: 53. Subsp.
Type-locality: Square Island, Labrador.

Botis (Pyrausta) matronalis Grote, 1875, *Bull. Buffalo Soc. Nat. Sci.*, **2**: 231.
Type-locality: Canada. [BMNH]
NOTE—The species was described from at least one male and one female from Canada, reared from larvae by William Saunders, No. 223. I hereby designate as lectotype a male in the BMNH, with labels as follows: "LECTOTYPE" [round purple-bordered label]; "Type" [round red-bordered label]; "223/larva"; "Botis Type/matronalis/Grote" [red-bordered label in Grote's hand]; and "Botis/borealis/Pack." [blue-bordered label in Grote's hand] and on the reverse "81.116". I do not know the whereabouts of the paralectotype or paralectotypes.

Pyrausta insequalis plagalis Haimbach, 1908, *Ent. News*, **19**: 263. Subsp.
Type-locality: Miller's Canyon, Huachuca Mts., Arizona. [USNM]

Moth variable individually, seasonally, sexually and geographically, but with characteristic basic pattern, differing in intensity, contrast, degree of olive-fuscous powdering, and in the yellow, orange or brown ground color. Not likely to be confused with any other North American species except *P. tatalis* and pale forms of *P. semirubralis*. Color almost always darker than in *P. tatalis*; hindwing with three dark bands beyond cell and a discocellular bar, unless obscured by fuscous suffusion;

the band nearest cell usually rounded and parallel to termen. Such bands hardly indicated in pale examples of *P. semirubralis*, and the general coloring much grayer in that species, or else the terminal third of the forewing with strong reddish tints never seen in *P. subsequalis*.

Male genitalia of normal *Pyrausta* configuration; uncus about twice as long as basal width, sides mostly convex, but concave for a short distance before the narrowly truncate tip; dorsal setae long, but mostly confined to lateral area except at extreme tip. Juxta X-shaped. Valve of moderate width, weakly curved dorsad, a little expanded and with tip symmetrically rounded; costa and basal part of sacculus weakly inflated, the latter with dorsal margin even and parallel to ventral margin; clasper of moderate length, weakly tapering, rounded at tip, with erect setae, not short, narrow and with appressed scales as in *P. dapalis*. Penis short, curved, with a bundle of deciduous cornuti. Female genitalia with ovipositor lobes high, narrow, moderately well differentiated, with fairly sparse vestiture of short setae. Posterior apophysis with slender, straight, moderately long shaft and hatchet-shaped vertical bar. Eighth tergite short. Anterior apophysis slender, a little longer than posterior apophysis, weakly sinuate, with wide rhomboidal subbasal expansion. Ostium narrow, unarmed. Ductus bursae of moderate length, with several coils, membranous, except for a short sclerotized collar near ostial end. Bursa pyriform, membranous, with wide rhomboidal signum, with strong transverse keel and produced lateral angles. Accessory sac small, round, membranous, subbasal.

Larva reported on thistle. That of the European *P. cespitalis* on various plantains, *Plantago* species.

Newfoundland and Labrador to Alaska, south to northern Florida, California, and the mountains of Arizona, New Mexico and Mexico. Similar forms in South America may or may not be conspecific. The European *P. cespitalis* and its representatives in temperate Asia are probably only subspecifically different.

I recognize four subspecies in North America, though there is probably much local differentiation within each of the four.

Pyrausta subsequalis subsequalis (Guenée)

PL. 5, FIGS. 18, 22 (McD. 5622).

Herbula subsequalis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 177.
Type-locality: North America. [USNM]

Herbula insequalis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 447, pl. 8, fig. 3.
Type-locality: North America. [USNM]

Isopteryx? madetesalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 946.
Type-locality: unknown. [BMNH]

Herbula repletalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1285.
Type-locality: North America. [BMNH]

Herbula? efficitalis Walker, [1886], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1287.
Type-locality: [New York?]. [BMNH]

Botis (Pyrausta) matronalis Grote, 1875, *Bull. Buffalo Soc. Nat. Sci.*, **2**: 231.
Type-locality: Canada. [BMNH]

Moth small (length of forewing 6–9 mm). Forewing above with contrasting dark maculation in both sexes; ground color brown in male, yellowish in female. Hindwing above with prominent dark bands on a fulvous ground in male and a yellow ground in female; basal and discal areas usually at most partly infuscated. Underside of wings orange yellow in male, yellow in female, with strong dark markings, but these usually irregular in intensity and somewhat angular.

Southern Nova Scotia and southern Ontario to Illinois, northern Florida, Mississippi and eastern Texas. Moth in June, July and August in the North, with more extended season farther south.

Pyrausta subsequalis borealis Packard

PL. 5, FIGS. 19–21, 23–25; PL. 9, FIGS. 13, 14, 17 (McD. 5621, in part).

Pyrausta borealis Packard, [1867], *Proc. Boston Soc. Nat. Hist.*, **11**: 53.
Type-locality: Square Island, Labrador.

Moth about the same size as the nominate subspecies but duller in color: male with forewing above brownish, with diffuse and inconspicuous darker markings, hindwing above mostly powdery brownish fuscous, with dull yellowish-buff postmedial and subterminal fasciae more or less parallel to termen; forewing of female above somewhat brighter, fulvous brown, with stronger dark markings, about as in male of the nominate subspecies, hindwing above with dark areas more intense than in male and pale areas yellow, most

of wing basad of postmedial band suffused with dark fuscous. Underside in both sexes yellowish brown, sometimes suffused with grayish brown, especially in male; dark markings much weaker and more diffuse than in the nominate subspecies, in particular the postmedial and subterminal dark bands often obsolescent.

Newfoundland, New Brunswick, Gaspé and Labrador across Canada to British Columbia, the Yukon Territory and Alaska (Big Delta and Mile 114, Steese Highway); found up to over 4000 feet altitude in the vicinity of Dawson, Yukon; interdigitating with *P. s. plagalis* in southern British Columbia, Alberta and Saskatchewan; replacing the nominate subspecies in the Ottawa Valley of Ontario and Quebec and in the Riding Mountain Park and Sandilands, Manitoba. Moth in June through most of its range, also in July in Labrador and Newfoundland, also in May in the Ottawa district and with a probable second generation in August, in May and June in Alaska.

There is very little variation through the extensive transcontinental range of the subspecies. McDunnough listed it as a species, but it probably intergrades insensibly with *P. s. subsequalis* along a rather narrow suture zone. Forbes, in my opinion correctly, considered it a "northern" variety.

Pyrausta subsequalis plagalis Haimbach
PL. 9, FIGS. 4–6, 10–12, 15, 16, 18; PL. K, FIG. 3 (McD. 5622a).

Pyrausta subsequalis plagalis Haimbach, 1908, *Ent. News*, **19**: 263.
Type-locality: Miller's Canyon, Huachuca Mts., Arizona. [USNM]

Moth variable in size, but on the average considerably larger than *P. s. subsequalis* and *P. s. borealis* (length of forewing 10–14 mm). Paler and brighter colored than the other subspecies. Forewing above with ground color mainly ochreous; orbicular and reniform spots large and conspicuous, generally brown, often pale-centered, sometimes black in females; subterminal shade brown, usually distinct, narrowed or interrupted medially; termen and fringe contrastingly dark brown. Hindwing above light ocherous in male, bright yellow or orange yellow in female, with contrasting though slightly diffuse brownish-fuscous or blackish-fuscous discocellular bar and postmedial, subterminal and terminal bands; fuscous suffusion limited or absent. Underside yellowish ocherous to bright yellow; reniform and orbicular spots of forewing and discocellular spot of hindwing distinct, dark and contrasting; transverse dark bands variable, but postmedial usually a narrow rather clearly defined line, subterminal often weak and diffuse, not usually with more intense blackish zones or spots.

Dry parts of southern Alberta and southern British Columbia south to Arizona and New Mexico. Canadian specimens are large and bright-colored; they are replaced by *P. s. borealis* in the adjacent mountains. In Arizona and New Mexico, specimens from drier localities are on the average duller than Canadian ones, but there is variation in this respect. At higher altitudes in the Southwest, smaller, more contrastingly marked specimens occur, which I refer to the same subspecies. At McGaffey, New Mexico, in open ponderosa-pine and scrub oak forest, with grassy glades, and near the boundary of the piñon-juniper parkland, I took short series of both forms together. The material is insufficient to show whether they retain their identities or intergrade. More study of western populations is obviously desirable.

Moth in June to August. More thorough sampling may show that the season is longer in the Southwest.

Pyrausta subsequalis petaluma Munroe, NEW SUBSPECIES
PL. 9, FIGS. 1–3, 7–9; PL. T, FIG. 5.

Pyrausta subsequalis petaluma Munroe.
Type-locality: Petaluma, Sonoma Co., California. [CNC]

Moth like *P. s. borealis* in appearance, but larger (length of forewing in male 9–14 mm, in female 8–13 mm); upperside of forewing in male rather uniformly suffused with brown, dark but paler than in *P. s. borealis*; subterminal and postmedial zones almost always brown-suffused, not with yellowish areas or bands as in many males of *P. s. borealis*; hindwing of male with markings, especially dark subterminal band, weaker and more diffuse than in *P. s. borealis*. Female more obviously brachypterous than in *P. s. borealis*; hindwing above with narrower and more contrasting dark postmedial, subterminal and terminal bands. More heavily suffused with brown, and in male with much less contrasting maculation, than *P. s. plagalis*; female more strongly brachypterous and with wider dark markings on hindwing.

TYPES: Holotype: ♂. Petaluma, Sonoma Co., California; 7 Dec. 1939; E. C. Johnston. Type no. 15,012, CNC. Allotype: ♀. Same locality, collector, repository and type-number as holotype; 12 Feb. 1940. Paratypes: 145 ♂♂, 57 ♀♀. Dexter Dam, Lane Co., Oregon; 29 Aug. 1969; J. Powell (1 ♂). 2 mi S of Coburg, Lane Co., Oregon; 27 Aug. 1969; J. Powell (1 ♂). Myrtle Creek, Douglas Co., Oregon; 25 July 1966; P. Rude (1 ♀). Pelton Dam, Jefferson Co., Oregon; 24 June 1962; C. A. Toschi (1 ♀). Eugene, Oregon; 4 March to 27 April 1905; *ex* Engel coll. (5 ♂♂). 6 mi SSW of Eugene, Oregon, 700′; 21 Sept. 1970; D. F. Hardwick (1 ♂). 3 mi SW of Camas Valley, Oregon, 1200′; 18 Sept. 1970; D. F. Hardwick (2 ♂♂). Portland, Oregon; 24 April (1 ♀). McMinnville, Oregon; 19 March 1931; K. M. Fender (1 ♂). Dunsmuir, Siskiyou Co., California; 17 June 1933; Grace H. and John L. Sperry (1 ♂). Orleans, Humboldt Co., California; 2 May 1950; Sternitzky (1 ♂). Kneeland, Humboldt Co., California; May 1923; J. A. Gray (3 ♂♂). 3 mi SE of Hoopa, Humboldt Co., California, 400′; 27 Sept. 1970; D. F. Hardwick (1 ♂). 5 mi E of Kneeland, Humboldt Co., California; 22 June–4 July 1969; J. Powell (4 ♂♂, 4 ♀♀). Samoa dunes, Humboldt Co., California; 10 and 25 June 1969; J. Powell (2 ♂♂, 1 ♀). Arcata, Humboldt Co., California; 23 July 1969; J. Powell (1 ♀). 2 mi SW of Helena, Trinity Co., California, 1500′; 28 Sept. 1970; D. F. Hardwick (3 ♂♂). Forest Glen, Trinity Co., California, 2300′; 15 Aug. 1965; E. and I. Munroe (1 ♂). Hayfork, Trinity Co., California; 23 May 1973; J. Powell (1 ♂). Hayfork Ranger Station, Trinity Co., California, 2300′; 23 and 24 May 1973; J. Powell (2 ♂♂, 1 ♀). Bell Creek, 2500′, 5 mi SW of Denny, Trinity Co., California; 2 July 1969; J. Powell (1 ♀). 3 mi E of Burnt Ranch, Trinity Co., California; 11 July 1954; R. O. Schuster (1 ♀). Willits, Mendocino Co., California; 8 Sept. 1935; E. C. Johnston (1 ♂, 2 ♀♀). Hartsoak Inn, Redwood Highway, California; 6 June 1939; Grace H. and John L. Sperry (1 ♂). Leggett, Mendocino Co., California; 19 July 1966; A. J. Slater (1 ♀). 12 mi NE of Rockport, Mendocino Co., California; 2 Nov. 1962; "Arctostaphylos"; C. W. O'Brien (1 ♂). 9 mi E of Albion, Mendocino Co., California; 2 July 1965; R. L. Langston (1 ♀). 2 air mi N of Howard L., Mendocino Co., California, 3750′; 10 June 1972; J. Powell (1 ♀). Eel River Ranger Station and vicinity, Mendocino Co., California, 1400–2100′; 10–13 June 1972; J. Chemsak, J. Powell, J. Shepard (10 ♂♂, 1 ♀). Covelo, Mendocino Co., California; 25 Aug. 1937; E. C. Johnston (1 ♀). Petaluma, Sonomo Co., California; all months from July to March, various years; E. C. Johnston (21 ♂♂, 2 ♀♀). Guerneville, Sonoma Co., California; Feb., March, June, Sept., Oct. and no date; Guedet (14 ♂♂, 1 ♀). Glen Ellen, Sonoma Co., California; 15 Aug. 1941; Guedet (1 ♂). Two Rock, Sonoma Co., California; 7 July 1939; E. C. Johnston (1 ♂). Bodega, Sonoma Co., California; 2 March 1938; E. C. Johnston (1 ♂). Sea View, Sonoma Co., California; 11 July 1937; E. C. Johnston (1 ♂, 1 ♀). Valley Ford, Sonoma Co., California; 11 Aug. 1935; E. C. Johnston (1 ♀). Bloomfield, Sonoma Co., California; 4 July 1935, 1 March 1936, 27 March 1937; E. C. Johnston (3 ♀♀). Monte Rio, Sonoma Co., California; 17 Sept. 1967; J. T. Doyen; black light (15 ♂♂, 2 ♀♀). Mill Valley, Marin Co., California; 23 March 1952, 8 Sept. 1948, 6 and 7 Oct. 1948; Hugh B. Leech; at light (3 ♂♂, 1 ♀). Tocaloma, Marin Co., California; 28 May 1935; E. C. Johnston (3 ♀♀). Carson Ridge, Marin Co., California; 3 March 1964; J. A. Powell (1 ♂). Same locality; 15 March 1968; Paul A. Opler (2 ♂♂). Inverness, Marin Co., California; March, July, Aug., Sept.; C. A. Toschi (5 ♂♂, 2 ♀♀). 4 mi SE of Corte Madera, Marin Co., California; 3 June 1964; P. Rude (2 ♀♀). 1.5 mi NW of Olema, Marin Co., California; 10 June 1962; C. A. Toschi (1 ♀). 2 mi S of Sausalito, Marin Co., California; 18 Sept. 1965; R. L. Langston (2 ♂♂). Same locality; 27 May 1969; P. Opler (1 ♂, 1 ♀). Hill SW of Paradise Cay, Marin Co., California; 23 May 1964; R. L. Langston (1 ♀). McClure's Beach, Marin Co., California; 8 July 1961; C. A. Toschi (1 ♀). San Quentin Pt., Marin Co., California; 7 July 1962; R. L. Langston (1 ♂). Alpine L., Marin Co., California; 6 Oct. 1961; J. Powell (1 ♂). Pt. Reyes, Marin Co., California; 30 April 1967; Paul A. Opler (1 ♂). Same locality; 22 Aug. 1968; no collector (1 ♂). Napa, Napa Co., California; 10 March, 9 July 1931; Guedet (1 ♂, 1 ♀). Richmond, Contra Costa Co., California; 3 Sept. 1961; R. L. Langston (1 ♀). Pt. Richmond, Contra Costa Co., California; 27 May 1964; R. L. Langston (1 ♂). Pt. San Pablo, Richmond, Contra Costa Co., California; 3 June 1964, 16 Aug. 1968; R. L. Langston, P. A. Opler, J. Scott (3 ♂♂, 3 ♀♀). Pt. Molato, Richmond, Contra Costa Co., California; Feb., March, April, May, June, Aug., Sept., Oct.; J. A. Powell, R. L. Langston (13 ♂♂. 4 ♀♀). El Cerrito, Contra Costa Co., California,

600′; 25 July 1963, 21 June 1964; D. D. Linsdale (1 ♂, 1 ♀). Tilden Park, Berkeley Hills, Contra Costa Co., California; 29 Sept. 1963; R. L. Langston (1 ♀). Berkeley, Alameda Co., California; Jan., Feb., March, Sept., Oct.; R. L. Langston (5 ♂♂, 1 ♀). Berkeley Hills, 1400′, NE of Oakland, Alameda Co., California; 5 Oct. 1971; J. A. Powell (1 ♂, 1 ♀). Joaquin Miller Park, Alameda Co., California; 3 June 1962; R. L. Langston (1 ♂, 1 ♀). Redwood Regional Park, Oakland, Alameda Co., California; 8 May 1952; D. F. Hardwick (1 ♂, 1 ♀). San Bruno Mts., San Mateo Co., California; 23 Feb. 1967; W. W. Middlekauff and D. C. Rentz (1 ♂). 1 mi W of Hillsborough, San Mateo Co., California; 7 Feb. 1964; C. N. Slobodchikoff (1 ♀). 9 mi NW of Lucia, Monterey Co., California; 28 Aug. 1961; J. A. Powell (2 ♂♂). Type no. 15,012, CNC; UCB; CAS; CM.

Specimens apparently referable to this subspecies occur in the central Sierra Nevada (Tuolumne, El Dorado and Nevada counties), but northward and eastward they are replaced by *P. s. plagalis*, probably in an interdigitating pattern.

tatalis GROUP

Moth closely similar in external appearance to *cespitalis* group, but with dark markings reduced, hindwing above dominantly orange or orange brown, postmedial band angulate at Cu_2. Male genitalia with uncus broadly rounded at tip, distal part with dense dorsal vestiture of bifid spinules; juxta constricted medially; clasper short, blunt, with a few prominent scales angled toward base of wing. Female genitalia with ovipositor lobes moderately well differentiated, high and narrow, weakly setose; posterior apophysis short, straight, moderately thick, with somewhat expanded and diffuse, lunular vertical bar; eighth tergite short; anterior apophysis short, moderately thick, with subbasal flexure, weak rhomboidal expansion, and weak dorsal and ventral angular projections; ostial chamber cylindrical, followed by a short, incomplete, sclerotized collar, then about five membranous coils leading to the round membranous bursa; signum rhomboidal with somewhat sinuous sides; accessory sac round, membranous, attached laterally.

The considerably different male genitalia suggest that this species may not be as closely related to the *cespitalis* group as its external appearance might indicate; however, I put it here for convenience, as that is the group with which it is most likely to be compared.

Pyrausta tatalis (Grote)

PL. 9, FIGS. 19–24; PL. K, FIG. 4; PL. T, FIG. 6 (McD. 5620).

Botis tatalis Grote, 1877, *Can. Ent.*, **9**: 106. Type-locality: [Texas, Belfrage,] No. 659, Nov. 7. [BMNH]

Moth similar in appearance to large pale specimens of *Pyrausta subsequalis* such as are often found in western populations, but with the dark bands of the orange-yellow hindwing incomplete and weakly developed. Easily distinguished by the postmedial line of the forewing, strongly retracted behind the cell in this species, hardly so in *subsequalis*. Length of forewing 9–11 mm.

Genitalia as described for the group, differing strongly from those of *Pyrausta subsequalis*.

Early stages unknown.

Southern California to Oklahoma and Texas; locally common but not well represented in collections. Moth from April to October, doubtless multiple-brooded.

I have seen two short series of specimens with dark-brown forewings, one from Dune Lakes, 3 miles south of Oceano, San Luis Obispo County, California, the other from Crooked Creek Laboratory, 10,150 feet, White Mountains, Mono County, California. In the latter series the dark markings of the hindwings are somewhat accentuated. More material from these areas is desirable.

deidamialis GROUP

Moth with broad forewing, ground color of forewing above yellow or orange, with fine, sinuate or dentate, fuscous or red, antemedial and postmedial lines and medial dusting or reticulation; hindwing above yellow or light buff; terminal area of forewing and hindwing infuscated. Male genitalia of normal *Pyrausta* type, with triangular uncus, with fairly long apical setae, rectangular juxta, inconspicuous coremata, simple, tapering clasper with dorsal setae and slender scales, and cylindrical penis with deciduous cornuti. Female genitalia with ovipositor lobes moderately differentiated, weakly setose; apophyses short, vertical bar of posterior apophysis curved or lunular; eighth tergite short; ostial chamber membranous, followed by a sclerotized

collar of about the same length; remainder of ductus bursae fairly long, narrow, membranous, straight or coiled; bursa round, membranous, with short wide signum and round membranous accessory sac.

A group with a number of closely related species in Mexico and tropical America generally; two species known from our southern border.

Pyrausta retidiscalis Munroe, NEW SPECIES
PL. T, FIG. 7.

Pyrausta retidiscalis Munroe.
Type-locality: The Basin, Big Bend National Park, Texas. [AB]

DIAGNOSIS: Related to *P. deidamialis* (Druce), from Central America, but differing in the yellow, not bright-fulvous, ground color of the forewing, the contrasting basal and terminal dark violaceous shading, the distinct fuscous reniform and orbicular spots, the dentate, reddish antemedial and postmedial lines, connected by reddish reticulation, and in many other details of the pattern. Closer to *P. andrei*, described below (p. 127), but larger (length of forewing 10 mm), forewing with more distinct maculation, base of forewing fuscous, not pale, costal part of postmedial line of forewing much more strongly oblique distad and followed by a wider, more contrasting and more strongly oblique yellowish fascia separating it from terminal shading; hindwing with terminal band somewhat more diffuse basally than in *P. andrei*. Female genitalia with ductus bursae much longer than in *P. andrei*, and forming about 15 coils; signum narrow, represented mainly by the keel.

DESCRIPTION: Frons moderately flat and oblique, fuscous, with some yellowish-buff admixture, and with whitish-buff lateral lines converging in front. Vertex with erect brown scaling. Labial palpus porrect, second segment moderately ascending; exceeding frons by less than length of head; color fuscous, contrastingly white at base beneath. Maxillary palpus fuscous, with moderately dilated distal scale tuft. Basal scaling of proboscis pale buff. Eye large, fuscous reticulated with brown. Ocellus well developed, fuscous. Antenna filiform, ciliated ventrally, smoothly scaled dorsally; fuscous, with some light-buff scaling anteriorly at base. Body above grayish brown; posterior margins of abdominal segments a little paler. Body beneath and legs light buff; outer midtibial spur (of female) about two-thirds length of inner, outer hindtibial spurs about half length of inner.

Forewing rather broad; costa arched at base and in distal third; apex rectangular; termen convex, becoming increasingly oblique posteriorly; tornus obtuse; posterior margin rather strongly convex. Ground color of upperside yellow. Basal area brownish fuscous. Costa fuscous from base to postmedial line. Disc reticulated with maroon. Antemedial line narrow, dentate, maroon, running from costal infuscation to a broader infuscated area on basal half of posterior margin. Orbicular a fuscous dot, reniform a curved bar, each narrowly outlined in maroon. Postmedial line narrow, maroon, oblique distad from costa at two-thirds from base to M_2, thence irregularly dentate and roughly parallel to termen to posterior margin near its middle. A conspicuous, strongly oblique, yellow fascia between anterior part of postmedial line and fuscous terminal zone. Terminal area and fringe broadly violaceous fuscous, the inner edge of the band narrowly outlined in maroon, and an inconspicuous yellow terminal line present.

Hindwing broadly rounded, translucent whitish buff above. Some fuscous scaling on anal area and a violaceous-fuscous terminal band, about as wide as that of forewing, but more diffuse inwardly, and narrowing somewhat at anal angle. Fringe yellowish at base, with a broad dark line before middle; distal part buff, with a diffuse darker line.

Wings beneath light yellowish buff, with weak violaceous iridescence. Forewing with fuscous costal stripe, orbicular and reniform spots, and broad subterminal band; a terminal row of black dots between veins. Hindwing with a similar row of black dots, otherwise unmarked.

Length of forewing 10 mm.

Male genitalia unknown.

Female genitalia: ovipositor lobes membranous, somewhat elongate, poorly differentiated, with only a few setae. Vertical bar of posterior apophysis parenthesis-shaped, not greatly expanded; shaft somewhat longer than vertical bar, weakly concave dorsad, tapering to a point anteriorly. Eighth tergite small and short. Anterior apophysis somewhat longer than posterior, substantially thicker, with subbasal thickening and short acute dorsal process, but hardly flexed at this point, anterior part very slightly downcurved, distally slightly expanded and truncate. Ostial chamber membranous, cup-shaped. A sclerotized collar of

about the same length but considerably narrower arising from its anteroventral end; rest of ductus bursae membranous, very long, forming about 15 coils, even in its coiled condition more than four times as long as seventh tergum. Bursa globular, membranous, with wide narrow signum, consisting mainly of keel, and with round membranous accessory sac.

Early stages unknown.

TYPES: Holotype: ♀. The Basin, Big Bend National Park, Texas; 4 Oct. 1967; A. and M. E. Blanchard. AB. Paratype: 1 ♀. Green Gulch, Big Bend National Park, Brewster Co., Texas; 15 Aug. 1969; Board and Hafernik (1 ♀). Texas A. & M. College, College Station Texas.

The moth will be figured in a later fascicle.

Pyrausta andrei Munroe, NEW SPECIES
PL. T, FIG. 8.

Pyrausta andrei Munroe.
Type-locality: Green Gulch, Big Bend National Park, Texas. [AB]

DIAGNOSIS: Closely similar to *P. retidiscalis*, but smaller (length of forewing 8.5 mm); forewing with ground color duller; base not infuscated; disc heavily dusted with orange brown; antemedial line fuscous, not maroon, and less strongly dentate; postmedial line maroon, but much more regular and less dentate, and with its costal section only weakly oblique; yellow fascia following costal section of postmedial line narrower and less oblique; terminal shading darker basally and paler toward termen, but with a broken dark-fuscous terminal line. Terminal area of hindwing more definitely bounded and narrowing to a point at anal angle; underside of wings more heavily marked. Female genitalia with ductus bursae straight and relatively much shorter.

DESCRIPTION: Frons moderately flat, oblique, fairly smoothly scaled; brownish fuscous, with anteriorly converging white lateral lines. Vertex with brown, erect scaling. Labial palpus porrect, second segment moderately ascending; exceeding frons by less than length of head; color fuscous, white at base beneath. Maxillary palpus fairly prominent, with somewhat expanded distal scale tuft, fuscous. Basal scaling of proboscis light buff. Eye large, fuscous reticulated with brown. Ocellus well developed, fuscous. Antenna filiform, densely short-pilose below, smoothly scaled above; fuscous, with a little whitish scaling anteriorly at base. Thorax above warm brown. Abdomen above grayish brown, posterior margins of segments paler. Body beneath and legs light buff; tibial spurs as in *P. retidiscalis*.

Forewing shaped as in *P. retidiscalis*. Ground color above yellow, extensively powdered with orange brown. Costa fuscous from base to postmedial line, but rest of basal area and posterior margin not infuscated, instead powdered with orange brown. Powdering less dense for a space basad of antemedial line. The latter narrow, indistinct, fuscous, oblique distad and shallowly sinuate from costa at two-fifths from base to posterior margin, also at two-fifths from base. Orbicular a fuscous dot, reniform a fuscous curved line. Postmedial line orange brown, narrow, irregularly sinuate, but not strongly dentate, nearly parallel to inner margin of dark terminal area; costal portion much less strongly oblique distad than in *P. retidiscalis*, and succeeding yellow costal fascia not as wide, as oblique, or as conspicuous. Terminal area broadly infuscated, the basal margin of the fuscous zone sinuous and narrowly edged with orange brown; distal part of infuscated zone paler and dusted with orange scales; a dark-fuscous terminal line, divided between veins. Fringe grayish buff with two diffuse fuscous bands.

Hindwing shaped as in *P. retidiscalis*. Upperside whitish buff, with some fuscous dusting on posterior half, and with a weak fuscous discocellular bar. A wide fuscous terminal band, fairly sharply defined on basal side, and tapering to a point at anal angle. Fringe light buff basally, with a fuscous band before middle, distal part light gray.

Wings beneath buff. Forewing dusted with fuscous, especially on anterior half. Orbicular and reniform spots fuscous. Costa weakly infuscated to reniform bar. A diffuse fuscous shade on anterior half of wing distad of reniform. A diffuse fuscous subterminal band. A row of T-shaped dark-fuscous terminal markings at ends of veins. Fringe brownish fuscous. Hindwing paler than forewing, with a costal zone of fuscous dusting. Discocellular bar stronger than on upperside. Some diffuse fuscous dusting in postmedial area. A rather narrow, diffuse fuscous-dusted subterminal band, regularly curved parallel to termen and narrowing to a point behind. A fuscous terminal line broken between veins. Fringe buff with two fuscous lines.

Length of forewing 8.5 mm.

Male genitalia unknown.

Female genitalia: Ovipositor lobes and posterior apophysis much as in *P. retidiscalis*, but vertical bar of apophysis more broadly lunular. Anterior apophysis not much wider than posterior, with considerably longer and more acute dorsal subbasal projection, and with apophysis sinuate ventrad at this point. Distal end of apophysis slender and pointed. Ostial chamber and succeeding sclerotized collar apparently relatively smaller than in *P. retidiscalis*; membranous part of ductus bursae relatively shorter, less than three times as long as seventh tergum, even though not significantly coiled in the holotype or paratype preparation. Bursa globular, membranous, with broadly mouth-shaped signum with weak keel. Accessory sac globular, membranous.

Early stages unknown.

TYPE: Holotype: ♀. Green Gulch, Big Bend National Park, Texas; 28 March 1971; A. and M. E. Blanchard. AB. Paratype: 1 ♀. Uruapan, Michoacan, Mexico; 13–14 Aug. 1971; R. L. Halbert. Texas A. & M. College, College Station, Texas.

It is surprising to find two species as closely related as this and *P. retidiscalis* in the same small area, but the observed differences leave me no choice but to separate them. There are several additional closely related species of the *P. deidamialis* group in tropical America. I take pleasure in naming this species for André Blanchard, co-collector of the holotype. The moth will be figured in a later fascicle.

perrubralis GROUP

Forewing above yellow, with broad pink subterminal band, often extending to termen, also with conspicuous and usually large pink postmedial spot, and often with other, finer pink markings. Hindwing above whitish, with fuscous subterminal band, and often with pink markings or suffusion along termen. Male genitalia: uncus long, with converging sides and broadly rounded tip, densely clothed dorsally with bifid spinules for some distance from tip. Juxta quadrate to pentagonal; valve of moderate width; clasper straight and tapering nearly to a point, dorsally setose; penis rather short and cylindrical, with fine spinules; but with no deciduous cornuti. Female genitalia: ovipositor lobes moderately differentiated, narrow, fairly high, with sparse but rather coarse setae; posterior apophysis of moderate length, with fine shaft and hatchet-shaped vertical bar; eighth tergum of moderate length; anterior apophysis a little longer than posterior, slender; ostial chamber membranous, tapering to a short sclerotized collar; rest of ductus bursae membranous, long, moderately narrow, many-coiled; bursa round, membranous, with rhomboidal, weakly spinulose and keeled signum and with round, membranous, subbasal accessory sac.

A small group of closely related species found in the western part of our territory and in Mexico.

Pyrausta perrubralis (Packard)

PL. 9, FIGS. 49–56 (McD. 5612, in part).

Botys perrubralis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 264.
Type-locality: California.

Pyrausta perrubralis saanichalis Munroe, 1951, *Can. Ent.*, **83**: 166, pl. 1, fig. 5. Subsp.
Type-locality: Duncan, British Columbia. [CNC]

Moth with deep-yellow, pink-marked forewing and whitish, fuscous- and pink-marked hindwing; differing from the related *P. scurralis* in having the basal part of the postmedial band infuscated, darker pink than the distal part, or occasionally the basal part only narrowly pink, diffusing into the yellow subterminal area; differing also in having the termen of the hindwing distinctly pink over much of its length, not whitish; differing from *P. arizonensis* in the larger discal spot, more sinuate postmedial line and broader terminal field of the forewing. Length of forewing 9–13 mm.

Male genitalia: uncus about as long as basal width of valve; sides parallel in middle part, converging distad in basal and distal parts, tip rounded, dorsally spinose; valve with clasper very weakly decurved, subtriangular, tapering to a narrowly rounded tip, nearly as long as width of valve at base of clasper, basal width of clasper less than one-third length of clasper; penis with a small cylindrical cornutus and a number of minute, though strongly sclerotized spinules. Female genitalia with deep, well-formed, strongly setose ovipositor lobes; posterior apophysis slender, a little longer than depth of ovipositor lobe, its vertical bar well developed, expanded and truncate ventrally; anterior apophysis slender, its

anterior part obtusely bent ventrad; ostial chamber membranous; sclerotized collar short, somewhat oblique, incomplete midventrally; rest of ductus bursae long, many-coiled, membranous, but the coil adjacent to the collar expanded and weakly sclerotized; bursa round, with rhomboidal signum, and with round membranous accessory sac.

Early stages unknown.

West coast from Vancouver Island to southern California, also in the Sierra Nevada. Three subspecies.

In my 1951 paper I considered *P. scurralis* a subspecies, but much more material is available now, and the following facts have led me to change my opinion: *P. scurralis* is constantly different in maculation over a wide geographical range; the two species appear to be separated by a wide zone in the interior Cordillera, the Great Basin and the California deserts where no representative occurs; *P. scurralis* occurs sympatrically with *P. arizonensis*, a form even more closely similar in some ways to *P. perrubralis*, in a number of localities in Arizona; and, finally, the claspers appear to differ somewhat in proportions in these three species, as noted in the description of the male genitalia, above.

Pyrausta perrubralis perrubralis (Packard)
PL. 9, FIGS. 49–51 (McD. 5612, in part).

Botys perrubralis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 264.
Type-locality: California.

Moth with ground color of forewing usually slightly orange or brownish yellow; dark markings usually more brown than pink; antemedial line, orbicular spot, and usually the posterior part of the true postmedial line, evident, the last appearing as a fine irregular line from reniform spot to posterior margin; subterminal area usually with considerable infusion of yellowish ground color. Hindwing with postmedial shade fuscous, narrow and diffuse but strong; termen narrowly dark brown or pinkish brown for most of its length. Length of forewing 9–12 mm.

Coastal zone of California, from Mendocino to Orange counties, and probably farther north and south. April to September in the San Francisco Bay region and to November in southern California. Autumn specimens are smaller than spring ones, with more brown-suffused forewings and heavier dark markings.

Pyrausta perrubralis saanichalis Munroe
PL. 9, FIGS. 55, 56.

Pyrausta perrubralis saanichalis Munroe, 1951, *Can. Ent.*, **83**: 166, pl. 1, fig. 5.
Type-locality: Duncan, British Columbia. [CNC]

Moth like nominate subspecies, but with dark markings narrow and on forewing almost without brown or fuscous tones, bright rose pink; posterior part of postmedial line weak or absent; subterminal space with extensive yellow infusion; hindwing with postmedial band faint or obsolete; termen narrowly pink or concolorous with ground; fringe pink. Length of forewing 11–12 mm.

British Columbia: southern Vancouver Island; moth in July and August.

Pyrausta perrubralis shastanalis Munroe,
NEW SUBSPECIES
PL. 9, FIGS. 52–54.

Pyrausta perrubralis shastanalis Munroe.
Type-locality: Mt. Shasta, California. [CNC]

Moth large; ground color of forewing clear yellow to somewhat orange yellow; antemedial line usually weak; postmedial line with posterior element weak or obsolete; entire terminal area usually solidly deep pink, somewhat darker proximally, often with an inconspicuous terminal row of yellow dashes, rarely with some yellow infusion; fringe pink. Hindwing with postmedial band conspicuous though diffuse, fuscous; termen and fringe mostly pink; terminal pink and postmedial fuscous zones often fused or almost so. Length of forewing 12–13 mm.

TYPES: Holotype: ♂. Mt. Shasta, California; 19 Aug. 1939; E. C. Johnston. Type no. 13,934, CNC. Allotype: ♀. Same data and type no. CNC. Paratypes: 14 ♂♂, 10 ♀♀. McBride Sprs., Mt. Shasta, California, 5000′; 21 July 1966; P. A. Opler; black light (1 ♂). S. Fork, Sacramento R., Siskiyou Co., California, 3200′; 9 Sept. 1953; H. P. Chandler (1 ♂). 6 mi ENE of Mt. Shasta, California, 7400′; 26 Aug. 1967; D. F. Hardwick (1 ♀). 2 mi NW of Almanor, Plumas Co., California, 4500′; 1 Aug. 1965; E. and I. Munroe; black light (5 ♂♂, 1 ♀). Near Susanville, Lassen Co., California; 17 July 1937; John A. Comstock (1 ♀). Blue L., So. Warner Mts., Lassen Co., California; 15–19 Aug. 1962; W. Rees and R. Reed (1 ♂, 1 ♀). Ward Creek, 2 mi S of Tahoe

City, Placer Co., California; 15, 23, 30 Sept. 1965, 2 Sept. 1966, 8, 26, 31 Aug., 24 Sept. 1968; Nils Westerland (4 ♂♂, 4 ♀♀). Truckee, California; 10 Aug. 1913; Ximina McGlashan (1 ♀). Camp 19, Yosemite National Park, California; 16 July 1937; F. L. Cramer (1 ♀). 7 mi WSW of Lee Vining, California, 9600'; 14 Aug. 1967; D. F. Hardwick (4 ♂♂). LACM; UCB; type no. 13,934, CNC.

The following material matches this subspecies well, but is excluded from it because no material is available from geographically intermediate areas: Toutle, Cowlitz Co., Washington; 23 July 1949; E. C. Johnston (2 ♂♂). Tenino, Thurston Co., Washington; 1 July 1947; E. C. Johnston (1 ♂). CNC.

Pyrausta scurralis (Hulst), REVISED STATUS
PL. 9, FIGS. 59–65 (McD. 5612, in part).

Botis scurralis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 155.
Type-locality: Arizona. [AMNH]

Pyrausta postrubralis Hampson, 1899, *Proc. Zool. Soc. London*, 1899: 262.
Type-locality: Arizona. [BMNH]

NOTE—This species was described from syntypes from Arizona and Mexico. I hereby designate as lectotype the specimen marked "Type" in the British Museum (Natural History), with labels: "LECTOTYPE" [round purple-bordered label]; "Arizona"; "Pyrausta/postrubralis/Type ♂." [in Hampson's hand], and on the reverse "97.177." The Mexican paralectotype or paralectotypes are not in the BMNH.

Moth in general similar to *P. perrubralis*, but with markings of forewing uniformly bright pink, terminal area usually more or less broadly of the yellow ground color, and fringe almost always yellow. Hindwing whitish, with diffuse but strong fuscous postmedial band, uniform in color, expanded anteriorly to fill apical area; terminal area and fringe of ground color, not pink-tinted or infuscated. Length of forewing 10–13 mm.

Male genitalia like those of *P. perrubralis*, but with clasper only about twice as long as its basal width. Female genitalia as in *P. perrubralis*.

Life history unknown.

Manitoba and Saskatchewan to Arizona, New Mexico and the state of Durango, Mexico; at moderate elevations in the north, but up to at least 9500 feet in Arizona and Mexico. Two subspecies in our territory.

Pyrausta scurralis scurralis (Hulst)
PL. 9, FIGS. 59–63 (McD. 5612, in part).

Botis scurralis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 155.
Type-locality: Arizona. [AMNH]

Pyrausta postrubralis Hampson, 1899, *Proc. Zool. Soc. London*, 1899: 262.
Type-locality: Arizona. [BMNH]

Moth with postmedial pink band of forewing averaging wider than in *P. s. awemealis*, sometimes expanded nearly to termen; postmedial fuscous band of hindwing strong, generally wide, especially anteriorly.

Arizona, widely distributed in the mountains and high plains. New Mexico: Zuñi Mountains; Colorado, Bruce. Late July to September.

This subspecies is sympatric with *P. arizonensis* over much of Arizona, but is the more numerous form at higher altitudes, in the more northern parts of the state, and later in the season. However, there is extensive overlap in all these variables, and Sternitzky has taken both species in the same light trap in the Huachuca Mountains, Arizona.

Pyrausta scurralis awemealis Munroe,
NEW SUBSPECIES
PL. 9, FIGS. 64, 65.

Pyrausta scurralis awemealis Munroe.
Type-locality: Aweme, Manitoba. [CNC]

Moth as in the nominate subspecies, but with pink postmedial band of forewing narrow in all specimens seen; postmedial band of hindwing narrower and paler than in the nominate subspecies, often obsolescent. Length of forewing 11–11.5 mm.

Genitalia as in the nominate subspecies.

TYPES: Holotype: ♂. Aweme, Manitoba; 17 July 1920; E. Criddle. Type no. 13,935, CNC. Allotype: ♀. Bald Head Hills, 13 mi N of Glenboro, Manitoba; 9 Aug. 1958; J. G. Chillcott. Type no. 13,935, CNC. Paratypes: 16 ♂♂, 1 ♀. Aweme, Manitoba; 16 July 1914, 15 Aug. 1920, 19, 22, 26 and 28 July 1921, 26 July 1922; N. Criddle (14 ♂♂). Beulah, Manitoba; J. Dennis (1 ♂). Bald Head Hills, 13 mi N of Glenboro, Manitoba; 8 Aug. 1958; R. B. Madge (1 ♀). Willow Bunch, Saskatchewan; 27 July 1955; C. D. Miller (1 ♂). Type no. 13,935, CNC; type lot no. 438, CM.

Pyrausta arizonensis Munroe, NEW SPECIES
PL. 9, FIGS. 57, 58.

Pyrausta arizonensis Munroe.
Type-locality: Prescott, Yavapai Co., Arizona. [CNC]

DIAGNOSIS: Moth similar to *P. perrubralis* and *P. scurralis*, but averaging smaller (length of forewing 10–11.5 mm). Forewing with reniform spot a small bar, not a broad patch as in *P. perrubralis* and *P. scurralis*; postmedial line of forewing extending obliquely distad a short distance from costa, then bending rather sharply and running almost parallel to termen, not sinuate opposite cell, as in most specimens of *P. perrubralis* and *P. scurralis*; postmedial line of forewing generally infuscated or darker pink than the zone following it; whole area between postmedial line and termen often pink; fringe and termen always pink or pinkish brown, as in *P. perrubralis*. Hindwing with fuscous postmedial band fairly well developed, somewhat diffuse, little expanded anteriorly, usually not reaching costa, and rarely expanded into apical zone; ground yellowish buff; area beyond postmedial line extensively pink-suffused in most specimens; termen mainly pink or pinkish brown; fringe mostly pinkish. Close to the Mexican *P. euchromistes* Dyar, but the latter distinguished by almost immaculate hindwing, with white termen and fringe.

DESCRIPTION: Moth with frons pinkish brown to brown, a contrasting buff line bordering each side. Vertex pinkish brown or brown. Labial palpus exceeding frons by about length of head; brown above, pale buff at base beneath. Maxillary palpus brown. Basal scaling of proboscis pale buff. Eye and ocellus dark fuscous. Antenna pale buff. Thorax above orange yellow to yellowish brown, with darker brown or rose suffusion anteriorly. Abdomen above pale yellowish buff. Body beneath and legs light buff, legs whitish buff distally.

Forewing above deep yellow, usually with extensive, fine, pink dusting, giving an orange or brown tint. Costa with pink suffusion, narrowed or interrupted for a short distance just beyond postmedial line. Antemedial line absent, or weakly indicated near posterior margin. Orbicular spot absent or indicated by a pinkish dot in cell. Reniform reduced to a pinkish bar on discocellular. True beginning of postmedial line indicated as a faint pink bar on costa. Apparent beginning an outwardly oblique fuscous or pink shade arising just distad of postmedial narrowing of pink costal shade, sometimes seen only as basal border of a broad pink subterminal or terminal zone; this shade or border bending rather abruptly opposite cell and proceeding to posterior margin in a line more or less parallel to termen. Whole area beyond postmedial line often bright pink; in other specimens a more or less well-developed zone of ground color between pink postmedial and terminal zones. Some specimens with a narrow yellow terminal line. Fringe deep pink, with an obscure fuscous line in distal half.

Hindwing above pale yellow. A diffuse but fairly dark, almost straight, fuscous postmedial band, usually incomplete anteriorly and posteriorly, but rarely expanded into apical area as in *P. scurralis*. Area beyond postmedial line more or less strongly suffused with pink or brownish fuscous; a bright-yellow terminal line or an interrupted brownish-fuscous terminal line present in some specimens; fringe with two wide pink stripes on a yellowish ground.

Underside like upperside, but duller and with reduced pink shades.

Length of forewing 10–11.5 mm.

Male genitalia like those of *P. perrubralis* and *P. scurralis*, but with clasper intermediate in proportions, its length about 2½ times its basal width. Female genitalia like those of *P. perrubralis* and *P. scurralis*.

Early stages unknown.

TYPES: Holotype: ♂. Prescott, Yavapai Co., Arizona; 6 May 1950; E. C. Johnston. Type no. 13,936, CNC. Allotype: ♀. Todd's Lodge, Oak Creek Canyon, Arizona; 17 June 1941; Grace H. and John L. Sperry. Type no. 13,936, CNC. Paratypes: 34 ♂♂, 45 ♀♀. Same locality and collectors as allotype; 12 June 1942 (2 ♀♀). Granite Dells, 4 mi N of Prescott, Yavapai Co., Arizona; 30 June, 19 and 29 Sept., and 12 Oct. 1970; Lloyd M. Martin (3 ♂♂, 2 ♀♀). Wheeler Canyon, Hualapai Mts., Mohave Co., Arizona; 16–23 May (1 ♂). Hualapai Mts., Mohave Co., Arizona; 24–31 May (1 ♀). Mohave Co., Arizona; 1–7 June, 8–14 July, 8–15 Aug. (2 ♂♂, 1 ♀). White Mts., Arizona, 7200′; 1–15 July 1925; O. C. Poling (1 ♂). Tonto Creek Campground, near Kohls Ranch, Gila Co., Arizona; 25–27 June 1956; Martin, Comstock and Rees (3 ♂♂, 4 ♀♀). Pine Mt. L. Lodge, Hualapai Mts., Mohave Co., Arizona; 18 June 1965; R. J. Ford (1 ♂). Tonto

Creek State Fish Hatchery, Gila Co., Arizona, 6400′; 30 June 1956 (2 ♀♀). Christopher Creek, Mogollon Rim, Gila Co., Arizona, 5800′; 18 June 1957 (1 ♀). Todd's Lodge, Oak Creek Canyon, Arizona; 17 June 1941, 12 June 1942; Grace H. and John L. Sperry (1 ♂, 2 ♀♀). Babaquivera [*sic*] Mts., Pima Co., Arizona (1 ♂). Santa Rita Mts., Arizona; 13 June 1898; E. A. Schwarz (1 ♂). Madera Canyon, Santa Rita Mts., Arizona; April, May, June, Aug., Sept.; various years and collectors (8 ♂♂, 10 ♀♀). Sycamore Canyon, Atascosa Mts., Santa Cruz Co., Arizona, 4000′; 25 Sept. 1959; J. G. Franclemont (1 ♀). Huachuca Mts., Arizona; 26 May 1933, 27 May, 1 and 2 June 1935; John A. Comstock, Grace H. and John L. Sperry (4 ♂♂, 3 ♀♀). Ramsey Canyon, Huachuca Mts., Arizona, 15 mi S of Sierra Vista, 6000′; 24 May 1967; R. F. Sternitzky (1 ♀). Redington, Arizona (1 ♀). Palmerlee, Arizona (1 ♀). Paradise, Cochise Co., Arizona; May and Aug. (2 ♂♂, 2 ♀♀). Southwestern Research Station, Chiricahua Mts., Cochise Co., Arizona; 3–21 April 1961; Carl W. Kirkwood (1 ♂, 10 ♀♀). South Fork Camp, Cave Creek, Chiricahua Mts., Arizona; 21 and 23 May 1963; Lloyd M. Martin (3 ♂♂, 1 ♀). Frijoles Canyon, Bandelier National Monument, New Mexico, 6050′; 15 July 1962; E. and I. Munroe (2 ♂♂). USNM; LACM; JGF; CPK; type no. 13,936, CNC.

semirubralis GROUP

Moth with pattern of forewing above much like that of the *P. cespitalis* group, but weaker and grayish brown, or ground color warm brown and distal third of wing more or less heavily suffused with reddish brown. Male genitalia with triangular, weakly setose uncus, with downcurved margins; clasper with rounded tip, ventral surface flattened and weakly concave, but the clasper not conspicuously downturned. Female genitalia with ovipositor lobes small and weakly setose; apophyses long and slender, vertical bar of posterior apophysis almost obsolete; ostial chamber membranous, followed by a sclerotized collar and bulge, then a membranous section of ductus bursae in three coils; signum small, rhomboidal.

One species, confined to western North America.

Pyrausta semirubralis (Packard)
PL. 9, FIGS. 40–48 (McD. 5610).

Botys semirubralis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 263.
Type-locality: California.

Moth with brown forewing and brown or brownish-fuscous hindwing; typically with distal third of forewing extensively suffused with reddish brown, but this suffusion duller and even gray brown in many specimens, particularly those from northern and interior localities; at least terminal area of hindwing suffused with fuscous, if most of wing brownish fuscous, then a light-brown postmedial band generally indicated; fringe of hindwing reddish brown; basal part of hindwing whitish in three males from Vancouver Island. Length of forewing: male, 10–14 mm; female 9–11 mm.

Male genitalia: uncus with margins more strongly downcurved than in *P. unifascialis*; clasper shorter, with tip rounded dorsally, flattened and weakly concave ventrally, but not conspicuously downturned; cornuti considerably shorter. Female genitalia: ovipositor lobes small and poorly differentiated, with only a few small setae; apophyses long and very slender, vertical bar of posterior apophysis absent, but a small triangular flange on dorsal side of shaft at about one-third from rear, and a flexure near front; anterior apophysis a little shorter and with an acute subbasal dorsal prominence, ostial chamber cup-shaped, membranous, followed by a short sclerotized tube and a sclerotized bulge, then a membranous section of ductus bursae in three coils; bursa small, oval, membranous; signum small, rhomboidal, spinulose, with weak transverse carina; a small membranous globular accessory sac.

Early stages apparently unknown.

Southern British Columbia (Victoria, Vancouver, Kaslo) to Riverside County, California (Lake Hemet); common in the Sierra Nevada; also seen from Nevada, Colorado, and Oak Creek Canyon, Arizona. Sea level to 12,600 feet in California.

Moth in May and June in the North, in May, July and August at Mount Shasta, in July and August in the Sierra Nevada, and in June in Colorado and Arizona.

The variation deserves further study, in conjunction with the life history and with geographical and ecological influences.

Strongly colored individuals are not likely to be confused with anything else, but paler ones are

reminiscent of some specimens of *Pyrausta subsequalis*; the latter is distinguishable by the yellow color and distinct postmedial and subterminal lines of the hindwing.

aerealis GROUP

Our species with olivaceous-gray forewing, with diffuse pattern of pale dusting or immaculate; hindwing usually fuscous, but with extensive whitish areas in some populations. Male genitalia like those of the *semirubralis* group, but with strongly downturned clasper; differing from those of other groups with downturned clasper in the triangular, weakly setose uncus, with downturned margins.

Holarctic and South American; our species is very close to the European *P. aerealis* (Hübner, 1796), and perhaps is only subspecifically distinct. The biogeography and taxonomy of this species group closely parallel those of the *cespitalis* group.

Pyrausta unifascialis (Packard)
PL. 9, FIGS. 66–84 (McD. 5607).

Botys unifascialis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 261.
Type-locality: California.

Botys subolivalis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 261. Subsp.
Type-locality: Maine.
NOTE—Packard gave the localities Brunswick and Orono; as I have not seen syntypes and as there is no present need for an exact type-locality, I refrain from designating a lectotype or restricting the type-locality.

Botis hircinalis Grote, 1875, *Bull. Buffalo Soc. Nat. Sci.*, **2**: 232. Syn. of subsp.
Type-locality: Center, New York. [BMNH]
NOTE—The holotype was collected on 13 June 1873.

Botis obnigralis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 153.
Type-locality: Sierra Nevada, California. [AMNH]

Pyrausta unifascialis arizonensis Munroe, 1957, *Can. Ent.*, **89**: 93, fig. 5. Subsp.
Type-locality: Wildcat Creek, White Mts., Arizona. [CNC]

Pyrausta unifascialis rindgei Munroe, 1957, *Can. Ent.*, **89**: 93, figs. 6, 7. Subsp.
Type-locality: Rancho La Sierra, near Arlington, Riverside Co., California. [CNC]

Moth with powdery greenish-gray forewing, unicolorous or with pale postmedial band and cell streak, with or without reniform and orbicular showing as dark shades; hindwing brownish fuscous, sometimes partly or almost wholly white; fringe of forewing concolorous with ground, of hindwing whitish. Length of forewing: male, 10–14 mm; female, 7–12 mm.

Male genitalia: Uncus subtriangular, longer than wide, narrowly rounded at tip; clasper strongly downcurved, narrowed almost to a point at tip; penis very weakly curved, with a dense group of fairly long cornuti. Female genitalia: ovipositor lobes small, rounded, sclerotized, without setae; apophyses long and thick; posterior apophysis without vertical bar; ostial chamber short, cylindrical, followed by a sclerotized tube of about the same length and a sclerotized, enlarged half coil, then a membranous full coil leading into the oval membranous bursa; signum small, rhomboidal, with spinules and transverse carina; accessory sac not observed.

Larva on pussy's toes, *Antennaria* species. Larva of the very closely related European *P. aerealis* (Hübner) on composites of the everlasting group, *Gnaphalium* species and *Helichrysum arenarium* (L.) DC.; also mugwort, *Artemisia vulgaris* L. (a member of the sagebrush genus); thyme, *Thymus serpyllum* L.; figwort, *Scrophularia* species; and meadow rue, *Thalictrum* species; under leaves, also in the flower heads. *P. unifascialis* probably has a similar host range.

Quebec and Maine to New York, west to the Pacific and south in the western part of the range to southern Arizona and southern California. Moth in April to August, depending on locality and altitude, but single-brooded in most if not all places.

Female smaller and more intensely marked than male; much individual, local, and probably environmental, variation. The species has close relatives in Europe, temperate Asia, the Andes and Chile. I recognize four subspecies in North America, but the variation needs further study.

Pyrausta unifascialis subolivalis (Packard)
PL. 9, FIGS. 66–72 (McD. 5607a).

Botys subolivalis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 261.
Type-locality: Maine.

Botis hircinalis Grote, 1875, *Bull. Buffalo Soc. Nat. Hist.*, **2**: 232.
Type-locality: Center, New York. [BMNH]

Moth with forewing almost uniformly powdery greenish gray in male; shorter and more truncate, with darker ground and with diffuse pale cell-streak, postmedial band and subterminal band in female. Hindwing above fuscous in male, with faint darker postmedial band and terminal suffusion, fringe pale; in female dark fuscous, with pale fringe, generally unmarked. Underside of hindwing in male whitish, but generally with some grayish infuscation, especially along costa, and with at least traces of dark postmedial line; in female with heavy dark-fuscous discocellular bar, postmedial band and subterminal row of spots, often connected by partial or complete radial fuscous bars between veins.

Nova Scotia to Alberta, south to New Jersey, Pennsylvania and Illinois, intergrading with the nominate subspecies in Alberta and Montana. Moth in late May and early June, flying mostly by day in grassy places; common, but rather local. Occasionally taken at light.

Pyrausta unifascialis unifascialis (Packard)
PL. 9, FIGS. 73–80 (McD. 5607).

Botys unifascialis Packard, 1873, *Ann. Lyceum Nat. Hist. New York*, **10**: 261.
Type-locality: California.

Botis obnigralis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 153.
Type-locality: Sierra Nevada, California. [AMNH]

Moth similar in general aspect to *P. u. subolivalis*, but with ground color of forewing above paler and greener in both sexes and with pale postmedial and subterminal lines and cell streak usually plainly evident; dark orbicular and reniform spots often indicated. Hindwing above with a pale postmedial spot or line segment in cubital area; ground paler in female than in *P. u. subolivalis*; pale fringe more strongly contrasting in both sexes. Underside of hindwing in male almost immaculate white, rarely with costal infuscation; in female much less strongly marked than in *P. u. subolivalis*.

Somewhat variable individually and locally, but surprisingly constant over a wide area. Southern British Columbia and Rocky Mountains of Alberta south to Colorado, the southern Sierra Nevada of California and the San Francisco Bay region; in this last area (perhaps where the type material of *unifascialis* was collected) transitional features to *P. u. rindgei* are already evident, but the cline or suture zone between the two subspecies has not been investigated in detail.

Moth in April to August, though with a short flight period in any one locality.

Pyrausta unifascialis rindgei Munroe
PL. 9, FIGS. 81, 82.

Pyrausta unifascialis rindgei Munroe, 1957, *Can. Ent.*, **89**: 93, figs. 6, 7.
Type-locality: Rancho La Sierra, near Arlington, Riverside Co., California. [CNC]

Moth with forewing above rather uniformly powdery greenish gray; pale markings hardly indicated in male, weak in female. Upperside of hindwing in male mostly white, a fuscous subterminal band, widest apically, often obsolete behind; some specimens with more or less extensive grayish-fuscous basal dusting or suffusion, but always leaving a wide white band beyond middle. Upperside of hindwing in female dark fuscous, but lighter than in nominate subspecies, and with a conspicuous whitish postmedial band curving across middle half of wing. Underside of hindwing in both sexes immaculate white.

Southern California: mountains of Los Angeles and western San Bernardino and Riverside counties; perhaps more widely distributed. Moth from April to June.

Pyrausta unifascialis arizonensis Munroe
PL. 9, FIGS. 83, 84.

Pyrausta unifascialis arizonensis Munroe, 1957, *Can. Ent.*, **89**: 93, fig. 5.
Type-locality: Wildcat Creek, White Mts., Arizona. [CNC]

Resembling large, strongly marked representatives of *P. u. unifascialis*, such as the male figured on plate 9, figure 79, but with even more conspicuous pale bands; the specimen referred to is the most strongly marked in a variable series from Tuolumne Meadows, whereas the male of *P. u. arizonensis* figured (plate 9, figure 83) is the most weakly marked of a relatively constant series. The single female seen is more contrastingly marked than any female of the nominate subspecies in the extensive series examined.

White Mountains, Arizona, June. A male from the Kaibab Plateau, also taken in June, is similar, but a male from Ramsey Canyon, in the Huachuca Mountains, taken in April, is much darker, and resembles specimens from Tuolumne Meadows, California.

tyralis GROUP

Moths small; forewing red or pink with transverse yellow or greenish-gray bands; hindwing pink or red at least at termen. Male genitalia with uncus basally tapering, then almost parallel-sided, tip rounded, dorsally with bifid spinules for some distance; clasper strongly downturned, somewhat recurved, with a few scalelike setae at tip. Penis with deciduous cornuti. Female genitalia with ovipositor lobes moderately developed; apophyses short and slender, posterior apophysis with weakly expanded and curved crossbar; ductus bursae long, with short sclerotized zone and long, many-coiled membranous section. Signum rhomboidal, keeled.

Two species, both southern, one ranging as far as the West Indies and Venezuela.

Pyrausta tyralis (Guenée)
PL. 8, FIGS. 3–8 (McD. 5629).

Rhodaria tyralis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 169.
Type-locality: Cuba.

Pyrausta erosnealis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 311.
Type-locality: United States. [BMNH]

Rhodaria agathalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **17**: 318. NEW SYNONYMY.
Type-locality: Venezuela. [BMNH]

Botys diffissa Grote and Robinson, 1867, *Trans. Amer. Ent. Soc.*, **1**: 19, pl. 2, fig. 16.
Type-locality: Not fixed.
NOTE—The status of the type-series is not very clear. Grote and Robinson had both sexes, and they had material from the Atlantic District, Louisiana (including one specimen from New Orleans) and Cuba. Klots (1942: 420) mentions only one "cotype" without locality data as being in the AMNH. There are two specimens in the BMNH from the Grote collection. One is labelled "4/1" and "368" and has Grote's blue-bordered determination label. The other is labelled "345". It is not clear that either of these is a syntype. More investigation is needed.

Botis bellulalis Hulst, 1886, *Trans. Amer. Ent. Soc.*, **13**: 149.
Type-locality: Texas. [AMNH]
NOTE—The species was described from one male and three females. Rindge (1955: 158) refers to the "Type male, Texas, May" in the AMNH. I hereby designate this specimen as lectotype.

Syllythria idessa Druce, 1895, *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera*, **2**: 206; **3**, pl. 60, fig. 20. NEW SYNONYMY.
Type-locality: San Geronimo, Guatemala. [BMNH]

Moth with forewing red, often more or less infuscated; typically with two broad, yellow, transverse bands and a yellow cell spot, but the bands reduced and suffused with red in the variety *erosnealis*. Hindwing red or orange red, a little paler than forewing, darkened terminally, usually with a narrow, incomplete postmedial yellow line. Length of forewing 6–7 mm.

Male genitalia: uncus slender, basally tapering, distally weakly spatulate, rounded at tip; distal part of dorsal surface with short forked setae medially, longer slender ones laterally. Clasper blunt, very strongly downturned, with about half a dozen large leaflike scales distally and a few normal setae basally. Penis with two strong fixed cornuti, one claw-shaped, the other truncate. Female genitalia: ovipositor lobes fairly well developed, with a moderate number of long setae. Apophyses slender; vertical bar of posterior apophysis slightly widened and narrowly fishtail-shaped. Eighth tergum trapezoidal, its posterior half with numerous setae. Ductus bursae long; ostial section short, membranous, spinulose, with a pair of small pouches; then a short sclerotized collar, then a long, many-coiled membranous section. Bursa membranous, globular, with a membranous accessory sac; signum narrowly rhomboidal, dentate, with transverse keel and with anterior and posterior angles rolled over.

Larva according to Kimball (1965: 217) on a wild-coffee, *Psychotria undata* [Jacquin, 1798], [a synonym of *P. nervosa* Sweet, 1788], family Rubiaceae; probably also on other plants, as the moth is more widely distributed than this host genus.

Southern New York to Illinois, Florida and western Texas; south through Mexico and the West Indies as far as Venezuela. Moth in all months of the year in Florida, March to November in Texas; common in the South.

Pyrausta laticlavia (Grote and Robinson)
PL. 6, FIGS. 1–4 (McD. 5628).

Botys laticlavia Grote and Robinson, 1867, *Trans. Amer. Ent. Soc.*, **1**: 17, pl. 2, fig. 12.
Type-locality: Pennsylvania. [AMNH]

NOTE—The locality cited is that of the lectotype, a male in the AMNH designated by Klots, 1942, *Bull. Amer. Museum Nat. Hist.*, **79**: 420.

Botys cinerosa Grote and Robinson, 1867, *Trans. Amer. Ent. Soc.*, **1**: 18, pl. 2, fig. 13.
Type-locality: Pennsylvania.
NOTE—Klots did not mention type-material of this species in his list of the AMNH holdings. There is a Grote specimen in the BMNH with labels "15/10" and "Botis/cinerosa/G. & R." [blue-bordered label in Grote's hand]. It is not clear that this is a syntype.

Moth somewhat like *P. tyralis* but less deeply colored and usually larger (length of forewing 7–11 mm). Forewing typically bright pink, with more or less well defined yellow antemedial and postmedial fasciae and cell spot. Hindwing pinkish fuscous or fuscous with yellow postmedial fascia, or yellow with pinkish or fuscous terminal band. The name *cinerosa* was based on a variety with both yellow and pink areas infuscated (plate 6, figures 3, 4). All transitions to the nominate form occur.

Male genitalia: uncus about twice as long as basal width, broadly rounded distally; distal third scaled in middle dorsally, setose at sides. Clasper somewhat removed from base of valve, strongly downturned, bearing a few large distal scales and scattered setae. Sacculus somewhat expanded, with a low setose prominence near base of dorsal margin. Penis curved, with long spinulose deciduous cornuti. Female genitalia: ovipositor lobes of moderate size, high, well defined, oblique, fairly strongly setose. Posterior apophysis with long slender shaft and somewhat expanded, narrowly fishtail-shaped vertical bar. Eighth tergum fairly short, with scattered setae, its anterior edge emarginate at junction of apophysis on each side. Anterior apophysis a little longer than posterior, with sharp dorsal process. Ductus bursae long; ostial section weakly tapering, membranous, finely spinulose; then a narrow sclerotized collar; remainder long, tubular, membranous, at first straight, then forming about ten coils. Bursa globular, membranous, with large, heavily dentate and transversely keeled, rhomboidal signum, with rolled anterior and posterior corners. Accessory sac globular, membranous.

Early stages unknown.

New Jersey to southern Florida, Missouri, southern Texas, Oklahoma and southern California. Moth from February to November in Florida, March to November in Texas.

acrionalis GROUP

Moth small; forewing with sharp apex; its upperside pinkish brown to dark brown, with complex fulvous maculation on disc and with orange-yellow terminal area and fringe; hindwing contrastingly grayish fuscous with narrow, incomplete, buff postmedial line. Male genitalia: uncus narrow, with sinuous sides and pointed tip, dorsal surface clothed with bifid spinules for some distance distally. Clasper thicker and shorter than in *tyralis* group, but strongly decurved, with scalelike setae distally; penis with deciduous cornuti; vinculum with prominent decumbent coremata, as in *onythesalis* group. Female genitalia: ovipositor with high, narrow, strongly setose lobes; apophyses short, posterior apophysis with well-developed, though somewhat expanded, vertical bar; ductus bursae with short sclerotized collar and long, coiled membranous section; signum large, mouth-shaped, transversely keeled.

One species, eastern North America.

Pyrausta acrionalis (Walker)
PL. 6, FIGS. 13, 14 (McD. 5616).

Rhodaria acrionalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 925.
Type-locality: unknown. [BMNH]

Rhodaria acuphisalis Walker, 1859, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **19**: 926.
Type-locality: unknown. [BMNH]

Botys proceralis Lederer, 1863, *Wiener Ent. Monat.*, **7**: 367, 460.
Type-locality: North America. [BMNH]
NOTE—The name *Botys rubicundalis* published by Lederer in the synonymy of *B. proceralis* has never been used and under Article 11 (d) of the *International Code of Zoological Nomenclature*, 1964, it has no standing. In my lectotype designation of *B. proceralis*, Munroe, 1958, *Can. Ent.*, **90**: 510, I wrongly transcribed the manuscript name as given on the specimen label as "Rubiundalis", it should be "Rubicundalis".

Pyrausta sumptuosalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1281.
Type-locality: North America. [BMNH]
NOTE—The species was described from two syntypes in the BMNH; both now lack abdomens. I hereby designate as lectotype a female, with labels as follows: "LECTOTYPE" [round purple-bordered label]; "Type" [round green-bordered

label]; "42./85" and on the reverse "N./ Amer."; and "PYRAUSTA SUMPTUOSALIS". The paralectotype has a locality and registration-number label like that of the lectotype and also a pale-blue-bordered paralectotype label.

Botys haruspica Grote and Robinson, 1867, *Trans. Amer. Ent. Soc.*, **1**: 19, pl. 2, fig. 14.
Type-locality: Atlantic district (Massachusetts to Pennsylvania). [AMNH]
NOTE—Klots (1942: 420) designated a lectotype male in the AMNH. The specimen has no locality label. There is a paralectotype labelled "Pa." in the BMNH.

Botis rufifimbrialis Grote, 1881, *Can. Ent.*, **13**: 34.
Type-locality: Massachusetts. [BMNH]

Moth resembling *P. phoenicealis* and allies, but ranging much farther north; distinguished from them by the anterior part of the postmedial line of the forewing, broadly excurved around cell and adjoining reddish terminal band, not straight, oblique, and separated from terminal band by a fulvous patch. Variable in depth of color, but easily recognized. Length of forewing 6–7 mm.

Male genitalia: uncus relatively wide, rounded at tip, dorsally setose laterally and scaled medially for nearly half its length. Clasper near base of valve, short, strongly decurved, scaled. Sacculus without dorsal prominence. Penis short, with strongly spinose deciduous cornuti. Female genitalia: ovipositor with short, high, relatively well formed, strongly setose lobes. Posterior apophysis short, vertical bar somewhat expanded, narrowly fishtail-shaped. Eighth tergite triangular, with scattered setae. Anterior apophysis somewhat larger than posterior, with weak dorsal expansion. Ductus bursae long; ostial end membranous and spinulose, with short cylindrical expansion, followed by a short sclerotized tube, open ventrally; rest of ductus tubular, membranous, forming about seven coils. Bursa globular, membranous, spinulose, with large, mouth-shaped, transversely keeled, spinose signum, and membranous accessory sac.

Life history unknown.

Nova Scotia to Ontario, Missouri, northern Florida and western Texas. Moth from May to late August in Ontario and New York, probably triple-brooded; February to December in Florida; February to November in Texas.

obtusanalis GROUP

Moth with forewing acute-tipped; above pink to brown, immaculate except for a weak fuscous shade at end of cell, or with parallel or weakly diverging, curved, pink or brown bands on a buff ground. Hindwing paler, with brown terminal line. Genitalia as in *tyralis* group.

One species. Southwestern and Mexican.

Pyrausta obtusanalis Druce

PL. 6, FIGS. 40, 41.

Pyrausta obtusanalis Druce, 1899, *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera*, **2**: 550; **3**, pl. 100, fig. 12.
Type-locality: Jalapa, Mexico. [USNM]

Moth somewhat variable in size and markings, in maculation resembling a small *Ostrinia* more than most species of *Pyrausta*. Well-marked specimens recognizable by the rather sharp-pointed fulvous forewing, with most of postmedial line curved parallel to termen, with only a small angular retraction at Cu_2 and bordered both basally and distally by fairly wide, even, brown or pink bands; this suite of curved bands somewhat reminiscent of Odontiinae of the *Frechinia* group (Fasc. 13.1, p. 150); indistinct reniform and orbicular dark spots. Poorly marked specimens with forewing almost uniformly fulvous, but retaining a fine brown terminal line on hindwing, distinguishing them from members of the *Pyrausta pilatealis* complex. Length of forewing 8–11 mm.

Male genitalia with uncus relatively shorter and wider than in *P. niveicilialis*, rounded and dorsally spinose distally. Valve fairly narrow, curved dorsad, rounded at tip; costa narrowly inflated, with subbasal angular projection; sacculus with a low basal hump; clasper strongly downcurved, somewhat recurved distad and with rounded tip; a few large dorsal scales. Penis tapering, not very long, without obvious armature, though possibly with deciduous cornuti. Female genitalia: ovipositor lobes moderately well formed. Apophyses a little longer and stronger than in *P. niveicilialis*. Ductus bursae with a narrow, tubular, sclerotized ostial section, and long, membranous, coiled distal portion, not separated by a spinulose expansion as in *P. niveicilialis*. Bursa globular, membranous, with rhomboidal, keeled, weakly spinulose signum and membranous lateral accessory sac.

Early stages unknown.

Southern California: Borrego, January; Palm Springs, March; Arizona: Organ Pipe National Monument, May; Madera Canyon, 4880 feet, May, June; south into Mexico. Rare in collections.

niveicilialis GROUP

Moth relatively large; wings blackish fuscous, with contrasting white fringes; usually with traces of a buff postmedial line. Genitalia much as in the *obtusanalis* and *tyralis* groups.

One species, eastern and central North America.

Pyrausta niveicilialis (Grote)
PL. 9, FIGS. 25, 26 (McD. 5646).

Botis niveicilialis Grote, 1875, *Bull. Buffalo Soc. Nat. Sci.*, **2**: 232.
Type-locality: New York. [BMNH]

Moth blackish fuscous, with white fringes, and usually with a trace of a buff postmedial line, at least at costa of forewing. Length of forewing 10–12 mm.

Male genitalia: uncus slender, distally rounded, distal part spinose above. Valve narrow, fairly straight, rounded at tip; costa with subbasal angulate prominence; clasper decurved, rounded at tip, dorsally scaled. Penis short, straight, tapering, with a short, blunt, fixed cornutus and a bundle of deciduous ones. Female genitalia: ovipositor with well-formed but delicate, normally setose lobes; apophyses short and slender. Ductus bursae with short, unsymmetrical, sclerotized tube at ostial end, then an expanded spinulose region, followed by a long, slender, coiled, membranous portion. Bursa small and globular, with rhomboidal, keeled, finely spinulose signum and membranous lateral accessory sac.

Early stages unknown.

Southern Canada to Escambia County, Florida, and west to Colorado. Moth in May and June. Widespread and conspicuous, but not very common in collections.

fodinalis GROUP

Moth with forewing buff to reddish brown, with more or less developed, diffuse, dark subterminal or terminal shade; usually also with traces of a fine brown postmedial line, reniform and orbicular spots, and other markings. Hindwing whitish, yellowish, or infuscated, with at least traces of a fuscous subterminal or terminal band. Genitalia as in *niveicilialis* group, or with tip of uncus in male truncate and with sharp lateral processes at posterior angles.

Three species, all North American.

Pyrausta fodinalis (Lederer)
PL. 9, FIGS. 27–32; PL. K, FIG. 5; PL. T, FIG. 9 (McD. 5609, in part).

Botys fodinalis Lederer, 1863, *Wiener Ent. Monat.*, **7**: 369, 461, pl. 8, fig. 9.
Type-locality: California. [BMNH]

Moth closely similar in appearance to *P. socialis*, and confused with it in older literature. Forewing usually with transverse lines better marked and with subterminal shade rarely strong and complete; ground more variegated, and in eastern specimens paler and with much weaker rufous tints. Hindwing whitish buff without yellowish tints. The differences less obvious in some western specimens, especially those with reduced dark markings. Length of forewing 10–15 mm; wings smaller in females than males.

Male genitalia easily distinguished from those of *P. socialis* by the rounded tip of the uncus, lacking the distal truncation and angular lateral projections of that species and *P. antisocialis*. Female genitalia much like those of *P. socialis* but with sclerotized regions of ductus bursae between ostium and coiled section considerably narrower.

Larva of *P. f. fodinalis* reared twice by Jerry Powell from coyote-mint, *Monardella villosa* Benth. Doubtless to be found also on other members of the mint family, Labiatae.

Gulf of St. Lawrence (north shore); western Ontario to Vancouver Island, south to Colorado, Utah, the Sierra Nevada and Carmel, California. I recognize three subspecies, though there is substantial local variation in each. More material may show that further subdivision is warranted.

Pyrausta fodinalis fodinalis (Lederer)
(McD. 5609, in part).

Botys fodinalis Lederer, 1863, *Wiener Ent. Monat.*, **7**: 369, 461, pl. 8, fig. 9.
Type-locality: California. [BMNH]

Moth relatively large, length of forewing in male often of the order of 15 mm. Forewing pinkish buff, markings weak and not contrasting. Hindwing in male whitish buff, with some yellow tints toward anal angle; subterminal shade narrow and weak, generally present only on anterior part of wing. Female considerably smaller (length of forewing 10–13 mm), with forewing somewhat darker and more heavily marked; hindwing somewhat infuscated, especially at base, on a pale-buff ground, and with fairly well-marked fuscous

postmedial line and with stronger and more extensive subterminal band than in male.

California, in the coastal zone: Trinity, Mendocino, Sonoma, San Mateo, Alameda, Santa Clara, Santa Cruz, San Benito, Monterey, San Luis Obispo, and doubtless other neighboring counties. Moth in May to August.

Lederer's figure is poor, but the holotype, of which I have a color photograph, clearly matches the present subspecies. The moth will be figured in a later fascicle.

Pyrausta fodinalis monticola Munroe,
NEW SUBSPECIES
PL. 9, FIGS. 30–32.

Pyrausta fodinalis monticola Munroe.
Type-locality: Mt. Shasta, Siskiyou Co., California. [CNC]

Moth similar in size and general appearance to the nominate subspecies. Forewing on the average somewhat less pink; transverse lines and subterminal shade stronger; hindwing of male with considerably stronger subterminal shade, fuscous, and usually extending almost to anal angle; hindwing of female more extensively infuscated and with heavier subterminal band.

TYPES: Holotype: ♂. Mt. Shasta City, Siskiyou Co., California; 19 July 1936; E. C. Johnston. Type no. 13,937, CNC. Allotype: ♀. Same collector and type number as holotype; Mt. Shasta, California; 15 July 1936. CNC. Paratypes: 24 ♂♂, 13 ♀♀. Same locality and collector as holotype; 15–19 July 1936 (4 ♂♂, 2 ♀♀). Timberline, Mt. Shasta, Siskiyou Co., California; 20 July 1936; E. C. Johnston (1 ♀). Mt. Shasta, 8000–9000′, Siskiyou Co., California; 21 July 1966; P. A. Rude (1 ♂). Ski Lodge, Mt. Shasta, Siskiyou Co., California, 7900′; 28 July 1966; P. A. Opler (1 ♀). McBride Sprs., Mt. Shasta, California, 4800′, 5000′; 20–24 July 1965; E. and I. Munroe; also 21 July 1966; J. Powell, P. A. Opler (5 ♂♂, 1 ♀). Wagon Camp and Wagon Camp Road, Mt. Shasta, Siskiyou Co., California; 8 July 1934; Grace H. and John L. Sperry (4 ♂♂, 1 ♀). Mile 9.5, Everitt Memorial Highway, Mt. Shasta, California, 6500′; 24 July 1965; E. and I. Munroe (2 ♂♂). Siskiyou Co., California; Koebele (1 ♀). 1 mi NW of Bartle, Siskiyou Co., California; 20 July 1966; J. Powell, P. A. Opler, P. Rude (4 ♂♂, 6 ♀♀). Castle L., Siskiyou Co., California, 5300′; 20 July 1968; G. A. Gorelick (4 ♂♂). Type no. 13,937, CNC; CAS; UCB.

A substantial amount of additional material is referred for the present to this subspecies, but is excluded from the type series. The following localities are represented: Mt. Wetmore Campground, Baker Co., Oregon; Ashland, Jackson Co., Oregon, 7100′; Almanor and 2 mi NW of Almanor, Plumas Co., California, 4500′; Blodgett Forest, 13 mi E of Georgetown, El Dorado Co., California; Sagehen and Upper Sagehen Creek, near Hobart Mills, Nevada Co., California; Ebbetts Pass, Alpine Co., California, 8730′; Sonora Pass, Tuolumne Co., California; Bodie, Mono Co., California; 1 mi W of Sonora Junction, Mono Co., California; 16 mi N of Tom's Place, Mono Co., California; Mono L., Mono Co., California; 7 mi WSW of Lee Vining, Mono Co., California, 9600′; Crooked Creek Lab., White Mts., Mono Co., California, 10,150′; Cottonwood Creek, Mono Co., 9300′; Carson City, Nevada; Austin Summit, Lander Co., Nevada; Big Creek Campground, 16 mi S of Austin, Lander Co., Nevada; Currant Creek Campground, Nye Co., Nevada; Secret Pass, Elko Co., Nevada; East Humboldt Mts., Elko Co., Nevada; Logan, Utah; Jenny L., Teton Co., Wyoming; Moran, Teton Co., Wyoming; Wyoming, Burnett, 7500′; Estes Park, Colorado, 7500′.

Specimens from lower and more easterly localities tend to be paler buff, with less reddish tints in the ground of the forewing.

Jerry Powell found moths of this subspecies associated with a plant of the mint family, *Monardella odoratissima* Benth., ssp. *parvifolia* (Greene) Epl., at Sonora Pass.

Pyrausta fodinalis septentrionicola Munroe,
NEW SUBSPECIES
PL. 9, FIGS. 27–29; PL. K, FIG. 5; PL. T, FIG. 9.

Pyrausta fodinalis septentrionicola Munroe.
Type-locality: Scandia, Alberta. [CNC]

Moth similar in general aspect to pale specimens of *P. f. monticola*, but smaller in average size (length of forewing in male 11–13 mm, in female 10–12 mm); forewing with at most weak pink tints, transverse lines fairly distinct, subterminal shade weak; hindwing whitish buff in both sexes, with weak postmedial line, a little stronger in female than in male, and with strong, dark, wedge-shaped subterminal band, narrower, but usually more strongly contrasting than in *P. f. monticola*.

TYPES: Holotype: ♂. Scandia, Alberta; 9 July 1956; E. E. Sterns. Type no. 13,938, CNC. Allotype: ♀. Same locality, collector and type no.; 10 July 1956. CNC. Paratypes: 17 ♂♂, 15 ♀♀. Scandia, Alberta; 4, 10 July 1956; E. E. Sterns (3 ♂♂, 1 ♀). Lethbridge, Alberta; 22 June, 5 July 1922; H. L. Seamans; 27 July 1956; E. E. Sterns (3 ♂♂). Elkwater, Alberta; 18–21 July 1956 [1 specimen labelled 20 June, probably in error]; E. E. Sterns (4 ♂♂, 1 ♀). Hanna, Alberta, 2500′; 16 July 1960; D. F. Hardwick (2 ♀♀). Edmonton, Alberta; 24 July 1942; K. Bowman (1 ♀). 12 mi W of Turner Valley, Alberta, 4700′; 31 July 1961; D. F. Hardwick (1 ♂). Sweetgrass Hills, Whitlash, Montana; 19 July 1951; D. F. Hardwick (3 ♂♂, 4 ♀♀). Cypress Hills, near Maple Creek, Saskatchewan; 3 June 1926; C. H. Young (2 ♀♀). Cut Knife, Saskatchewan; 21 June 1940; A. R. Brooks (2 ♂♂). Waskesiu L., Saskatchewan; 15 July 1939; A. R. Brooks (1 ♂). Harlan, Saskatchewan; 9 June 1942; P. F. Bruggemann (1 ♀). Katepwa L., Saskatchewan; 25 June 1925; J. J. deGryse (2 ♀♀). Indian Head, Saskatchewan; 10 June 1931; Kenneth Stewart (1 ♀). Type no. 13,938, CNC.

Material from the following additional localities is referred for the present to this subspecies, but is excluded from the type series; British Columbia: Victoria; Saanich District; Esquimault; Goldstream; Rayleigh; Fernie; Radium Hot Sprs. Alberta: Waterton L.; Calgary [probably Head of Pine Creek]. Manitoba: Aweme. Ontario: Minaki; Sand L. Quebec: Natashquan. The specimens from British Columbia, Calgary and the Waterton Lakes are larger on the average and have the forewings pinker than in the type series; the three specimens from Vancouver Island have the subterminal band of the hindwing reduced and are transitional to the nominate subspecies. The specimens from Aweme are of the same size as the type series, but have the forewings somewhat pinker and the terminal band of the hindwings somewhat narrowed. The specimens from Ontario and Quebec match the type series reasonably well. The isolated occurrence of a colony of the species at Natashquan, hundreds of miles from the nearest occurrence in Ontario, is remarkable, but additional collecting may close the gap.

Pyrausta socialis (Grote)

PL. 9, FIGS. 33–37; PL. K, FIG. 6; PL. T, FIG. 10 (McD. 5609, in part).

Botis socialis Grote, 1877, *Can. Ent.*, **9**: 107. Type-locality: Canada [probably near London, Ontario]. [BMNH]

NOTE—The species was described from syntypes from Canada (Saunders) and Buffalo, New York (Zesch). I hereby designate as lectotype a female in the BMNH with labels as follows: "Botis/socialis/Type Grote" [red-bordered label in Grote's hand] and on the reverse "81.116"; "Type" [round red-bordered label] and "LECTOTYPE" [round purple-bordered label]. There is no locality label on the specimen, but there is a marginal label "Canada" opposite it. The paralectotype, also a female, has Grote's blue-bordered determination label, a pale-blue-bordered paralectotype label and a marginal label "Buffalo" opposite the specimen.

Moth similar to *P. fodinalis*; forewing with ground color more uniform, in the nominate subspecies warm pinkish brown with well-marked violaceous luster, subterminal band complete and fuscous, but in some western specimens ground color paler brown and less lustrous, subterminal band often incomplete. Hindwing with uniformly yellowish ground color; subterminal band usually strong, rather narrow, straight, dark fuscous, weak only in some western specimens; a fine fuscous terminal line; fringe light gray or grayish buff. Length of forewing 10–13 mm.

Male genitalia easily distinguished from those of *P. fodinalis* by the distally truncate uncus, with lateral thornlike processes at the posterior angles. Female genitalia with basal sclerotization of ductus bursae less than twice as long as subbasal sclerotization, not three times as long, as in *P. fodinalis*.

Early stages unknown.

Southern Quebec to British Columbia, south to New York, Colorado and Oregon. Two subspecies.

More closely related to *P. antisocialis* than to *P. fodinalis*. For differential characters see the diagnosis of *P. antisocialis*.

Pyrausta socialis socialis (Grote)

PL. 9, FIGS. 33, 34, 37; PL. K, FIG. 6; PL. T, FIG. 10 (McD. 5609, in part).

Botis socialis Grote, 1877, *Can. Ent.*, **9**: 107. Type-locality: Canada [probably near London, Ontario]. [BMNH]

Moth with forewing above deep reddish or pinkish brown, with well-marked purplish luster; subterminal band dark, complete and conspicuous. Subterminal band of hindwing almost always dark and well developed.

Ontario to Alberta; specimens from southern Alberta, Montana and Colorado appear to be on the average paler, with lighter brown, less lustrous forewing and weaker and narrower subterminal band on the hindwing; however, the differences appear to be inconstant, and as much of the western material is in worn condition they may be in part illusory. The few specimens seen from British Columbia (from Kaslo, Rayleigh and Canim Lake in the interior, and from Duncan and Departure Bay on Vancouver Island) are varied in appearance, but may be referred to the nominate subspecies for the time being.

Moth mostly in late June and early July in the East, in July and August on the Plains; in June and August in British Columbia.

Pyrausta socialis perpallidalis Munroe, NEW SUBSPECIES
PL. 9, FIGS. 35, 36.

Pyrausta socialis perpallidalis Munroe.
Type-locality: Kusshi Canyon, Yakima Co., Washington. [CNC]

Moth with forewing very light brown; subterminal band weak or obsolete on forewing, narrow or obsolescent on hindwing; ground color of hindwing whitish buff, suffused to a varying extent with yellowish, especially on posterior half of wing. Superficially much like *P. fodinalis*, but easily distinguished by male genitalia.

TYPES: Holotype: ♂. Kusshi Canyon, Yakima Co., Washington; 5 Sept. 1948; E. C. Johnston. Type no. 13,939, CNC. Allotype: ♀. Same data and type no. as holotype. CNC. Paratypes: 6 ♂♂, 4 ♀♀. Same data as holotype (5 ♂♂, 4 ♀♀). 8 mi SSW of Ruch, Oregon, 1700′; 16 Sept. 1970; D. F. Hardwick (1 ♂). Type no. 13,939, CNC.

Pyrausta antisocialis Munroe, NEW SPECIES
PL. 9, FIGS. 38, 39; PL. K, FIG. 7; PL. T, FIG. 11.

Pyrausta antisocialis Munroe.
Type-locality: McGaffey, Zuñi Mts., McKinley Co., New Mexico, 7500′. [CNC]

DIAGNOSIS: Moth similar in size and appearance to *P. socialis*, but much darker. Upperside of forewing dark reddish brown, most of area beyond postmedial line heavily suffused with dark fuscous. Upperside of hindwing brownish fuscous, not yellowish buff, with broad dark-fuscous terminal band. Male genitalia as in *P. socialis*, but with uncus relatively shorter and narrower, its basal part with sides convex, not straight to concave, as in *P. socialis*.

DESCRIPTION: Frons dark brown, with a pale-buff lateral line. Vertex dark brown. Labial palpus dark brown, base pale buff beneath. Maxillary palpus dark brown. Basal scaling of proboscis light buff. Eye large, fuscous. Ocellus fuscous. Antenna dark brown; in male somewhat thickened and with dense even vestiture of silvery setae on sensory surface, the setae about half as long as diameter of antennal shaft; female antenna thinner and with much shorter sensory setae; basal segments in both sexes with an erect seta about as long as diameter of shaft on each segment. Thorax above dull reddish brown. Abdomen above grayish buff. Body beneath and legs light buff; other spurs of male about half, of female about two-thirds, length of inner.

Forewing broad; costa arched for a short distance at base and apex, otherwise straight; apex rectangular; termen weakly oblique and weakly convex; tornus obtuse; posterior margin weakly convex. Ground color of upperside brown, suffused with darker reddish brown; general effect chestnut brown. Transverse lines fine, fuscous and very weakly indicated, sometimes absent. Antemedial line irregularly convex distad from costa at one-fifth from base to posterior margin at one-third from base. Orbicular spot a dot. Reniform spot small and lunular. Both dark fuscous and fairly well defined. Postmedial line oblique distad from costa at four-fifths from base to R_5, thence dentate and generally parallel to termen as far as Cu_2, there retracted to behind cell, and erect and dentate to posterior margin at three-fifths from base. A broad fuscous subterminal shade filling most of area distad of postmedial line. Fringe fuscous, extreme distal part narrowly light grayish buff. Whole upper surface of forewing with a purplish gloss.

Hindwing broad; termen evenly rounded. Ground color of upperside brown, more or less heavily infuscated except in costal area and in a wedge-shaped zone distad of postmedial line. The latter diffuse, fuscous, weakly indicated or lost in the general fuscous shading. A broad, dark-fuscous terminal zone, tapering posteriorly. Fringe basally dark fuscous, distally silvery gray.

Underside of forewing light buff. A fulvous streak running through cell and toward apex. Antemedial line absent. Orbicular and reniform

spots darker and better defined than on dorsal surface. Postmedial line blackish fuscous, wider than above, not dentate, but broken by pale lines on veins into blackish patches, those behind R_5 often indistinguishably fused with subterminal shade; the retracted part of the line behind cell very weak or obsolete. Subterminal shade as on upperside, but stronger and more contrasting. A fine fuscous terminal line. Fringe irregularly mixed grayish fuscous and buff.

Hindwing beneath light buff; distal parts of veins and area beyond subterminal shade fulvous. A weak brown discocellular bar. Postmedial line weak, consisting of a straight dark-fuscous line on anterior part of wing only, interrupted by pale streaks on veins. Subterminal shade weaker and more restricted than on upperside, not extending behind Cu_2, and interrupted by fulvous streaks on veins. Fringe as on underside of forewing.

Length of forewing 9–12 mm.

Male genitalia: uncus with truncate apex and a small, acute, laterally directed projection from each lateroposterior angle, as in *P. socialis*, but uncus considerably smaller than in that species, and distinctly bottle-shaped; sides of basal part convex, of distal part almost parallel; dorsal surface finely spinulose distally. Tegumen and vinculum narrow. Juxta bipartite. Valve much as in *P. socialis*. Penis narrower than in *P. socialis*, and with a fine bundle of deciduous cornuti. Female genitalia: ovipositor with well-formed but rather slight lobes, their posterior surfaces moderately setose. Posterior apophysis with short, thin shaft and well-developed, somewhat expanded vertical bar. Eighth tergite short, tapering to a point on each side ventrally. Anterior apophysis longer than posterior, weakly thickened and obtusely angled at about one-third from base. Ostium narrow, unarmed. Basal part of ductus bursae with a short cylindrical sclerotized zone, somewhat longer than wide, emarginate on ventral side posteriorly and on each side of midventral line anteriorly; anterior to this a considerably shorter and narrower, obliquely set, sclerotized zone, leading into a spiral, heavily spinulose, valvelike structure, and thence into a coiled membranous zone. Bursa globular, membranous, with mouth-shaped, transversely keeled, spinulose signum and membranous accessory sac.

Early stages unknown.

TYPES: Holotype: ♂. McGaffey, Zuñi Mts., McKinley Co., New Mexico, 7500′; 21 July 1962; E. and I. Munroe; black light. Type no. 13,940, CNC. Allotype: ♀. Same locality, collectors and type number as holotype; 20 July 1962. CNC. Paratypes: 11 ♂♂, 12 ♀♀. Same locality, collectors and type number as holotype; 20, 21 and 24 July 1962 (9 ♂♂, 6 ♀♀). Bar Pond Park, Chiricahua Mts., Cochise Co., Arizona, 8000′; 6 Aug. 1927; J. A. Kusche (1 ♀). Diamond Rock, White Mts., Arizona; 1 Sept. 1947; Grace H. and John L. Sperry (1 ♂, 1 ♀). Greer, White Mts., Arizona, 8500′; 5 Aug. 1962; E. and I. Munroe; black light (1 ♀). Hart Prairie, 8500′, 10 mi NNW of Flagstaff, Coconino Co., Arizona; 29 June, 12 and 22 July 1961; R. W. Hodges, J. G. Franclemont (1 ♂, 2 ♀♀). West Fork, 6500′, 16 mi SW Flagstaff, Coconino Co., Arizona; 7 Aug. 1961; J. G. Franclemont (1 ♀). Type no. 13,940, CNC; USNM; JGF.

Supplementary Note to the GENUS *Pyrausta*

The species listed in *Pyrausta* under the following numbers in McDunnough's 1939 *Check List* are members of the tribe Spilomelini and will be dealt with in Fascicle 13.3: 5574 to 5593, 5603 to 5606, 5608, 5611, 5631, and 5637. Species 5643 and 5644 of McDunnough belong to the subfamilies Evergestinae and Odontiinae, respectively, and can be found in Fascicle 13.1.

GENUS *Hyalorista* Warren

Hyalorista Warren, 1892, *Ann. Mag. Nat. Hist.*, (6) **9**: 299.
Type-species: *Rhodaria taeniolalis* Guenée, 1854. Original designation.

Pyraustopsis Amsel, 1956, *Boletín Ent. Venezolana*, **10**: 265. NEW SYNONYMY.
Type-species: *Rhodaria taeniolalis* Guenée, 1854. Original designation and monotypy.

External characters of moth basically as in *Pyrausta*. Labial palpus exceeding frons by about length of head; maxillary palpus prominent and strongly dilated with scales distally; M_2 and M_3 of forewing with basal parts somewhat approximated.

Male genitalia: uncus slender, of nearly uniform width to the rounded tip; distal fourth densely clothed with bifid setae dorsally. Subscaphium narrow and straplike. Transtilla a narrow bridge. Juxta arrowhead-shaped, point up. Valve of

moderate width, somewhat irregular in outline; costa with a prominent angular process basally, connecting with transtilla and with a slender ventrally directed process articulating with juxta; costa inflated for most of its length, the inflation broad opposite angular basal projection, narrowing from base of clasper to a point near end of costa; distal margin somewhat truncate; ventral margin with a rounded prominence at about middle; sacculus not well differentiated, but with a rodlike projection extending dorsad for a short distance opposite prominence of ventral margin, and with some enlarged setae along basal part of ventral margin; clasper prominent, slender, downturned, and with several large scales at its tip; a ridge extending diagonally distad from base of clasper to ventral margin of valve at three-fourths from base. Penis straight and cylindrical, with a bundle of spine-fringed deciduous cornuti. Female genitalia: ovipositor with high, flat, moderately wide, moderately setose lobes. Posterior apophysis with shaft slender, about twice as long as vertical bar, the latter flattened and crescentic. Anterior apophysis not much longer than posterior, but thicker, the basal part wide and nearly as long as distal part, with triangular dorsal and ventral projections at their junction. Ostium narrow. Ostial end of ductus bursae cylindrical, narrow, sclerotized to just basad of junction of ductus seminalis, thence long, tubular, slender, in about a dozen regular coils to bursa. Bursa small, round, with large, heavily sclerotized, rhomboidal, toothed signum, with strong, high, serrate, transverse keel. Accessory sac relatively large, globular, membranous.

Early stages unknown.

Distinguished from *Pyrausta* by the arrowhead-shaped juxta, distorted valve, and thumblike process of the sacculus. One species, of mainly neotropical distribution, entering our territory.

Hyalorista taeniolalis (Guenée)

PL. 6, FIG. 42; PL. K, FIG. 8; PL. T, FIG. 12 (McD. 5614).

Rhodaria taeniolalis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 172.

Type-locality: Cayenne.

NOTE—This species was described from two syntypes in the Guenée collection, one from Brazil and the other from Cayenne. I hereby select as lectotype the specimen from Cayenne.

Moth of characteristic appearance; distinct in maculation and genitalia from any other species in our fauna. Length of forewing 6–7 mm. Genitalia as described under the generic heading, above.

Early stages unknown.

Brownsville, Texas, through Mexico to Central and South America. Common in the tropics, and to be expected elsewhere on our southern borders.

GENUS

Portentomorpha Amsel

Portentomorpha Amsel, 1956 (1 June), *Boletín de Ent. Venezolana*, **10**: 267.

Type-species: *Botys incalis* Snellen, 1875, generally considered a synonym of *Botys xanthialis* Guenée, 1854. Original designation and monotypy.

Apoecetes Munroe, 1956 (1 July), *Rev. Française d'Ent.*, **23**: 125. NEW SYNONYMY.

Type-species: *Botys xanthialis* Guenée, 1854. Original designation and monotypy.

Moth of moderate size: length of forewing over 10 mm. Frons flat and oblique. Labial palpus with first segment curved; second segment strongly ascending, shorter than first; both first and second segments with a triangular tuft of short wide scales at anteroapical angle; third segment porrect and cylindrical. Maxillary palpus prominent, weakly dilated with scales distally. Proboscis strong. Praecinctorium weakly bilobed. Male with a large anal tuft of black scales. Forewing broadly subtriangular, termen weakly convex and slightly oblique. Discal cell about half as long as wing. R_5 basally curved and approximated to R_{3+4}. M_2, M_3 and Cu_1 curved and approximated basally. Hindwing broadly rounded, with cell less than half as long as wing; $Sc+R_1$ and R_s anastomosed beyond end of cell for a considerable distance. Discocellular erect anteriorly, bent at middle and oblique distad to posterior angle of cell. M_2, M_3 and Cu_1 curved and approximated basally.

Male genitalia with complex armature of three long, differently shaped processes, the largest club-shaped and setose, on costa of valve, articulating with a process from articulation of tegumen and vinculum. A long process bearing an oarlike corema base extending from vinculum. Female genitalia with high, setose ovipositor lobes; short apophyses; short, wide, spinulose, anteriorly narrowing ostial chamber, connecting by a sclerotized constriction at the junction of the

ductus seminalis with the bursa; the latter long, oval, membranous, with a large, kite-shaped, coarsely spinulose signum and a subproximal, round, membranous accessory sac joined to the bursa by a narrow duct.

Early stages unknown.

The genus contains only one species. Martin (1956: 236) placed it together with two African species in his genus *Cryptosara*. The African species have the anterior scaling of the labial palpus long, fine and fimbriated, and R_5 of the forewing straight and divergent from R_{3+4}. I therefore consider *Cryptosara* distinct. For those who wish to unite the genera, *Cryptosara* is junior to both *Portentomorpha* and *Apoecetes*, having been published in the "4e trimestre" of 1956. These genera belong to a complex well developed in the tropics of the Old World, and include *Isocentris* Meyrick and *Hyalobathra* Meyrick among others. The single species of *Portentomorpha* is an isolated outlier of this group. Although the male genitalia are so specialized, the female genitalia clearly indicate the relationship of these genera with the other Pyraustini.

Portentomorpha xanthialis (Guenée)
PL. U, FIGS. 3, 4, 6, 8.

Botys xanthialis Guenée, 1854, *Species Général des Lépidoptères*, **8**: 343.
Type-locality: Cuba. [BMNH]
NOTE—This species was described from two male syntypes from Cuba. I hereby designate as lectotype a male in the BMNH with labels "COTYPE" [round yellow-bordered label], "LECTOTYPE" [round purple-bordered label], and "*Botys xanthialis* Guenée, LECTOTYPE, E. Munroe designated, 1976." The remaining syntype becomes a paralectotype and will be so labelled.

Botys superbalis Walker, [1866], *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, **34**: 1397. NEW COMBINATION with *Portentomorpha*.
Type-locality: Cuenca. [BMNH]

Botys incalis Snellen, 1875, *Tijdschrift voor Ent.*, **18**: 202, pl. 11, fig. 13.
Type-locality: New Granada, Rio Magdalena. [Leiden Museum]
NOTE—A lectotype was designated by Munroe, Diakonoff and Martin, 1958, *Tijdschrift voor Ent.*, **101**: 77, though because of a typographical error the original reference was wrongly cited.

Botys incalis var. *rosealis* Möschler, 1890, *Abhandl. Senckenbergischen Naturforschenden Ges.*, **16**: 285. NEW COMBINATION with *Portentomorpha*.
Type-locality: Puerto Rico. [HUMB]
NOTE—This taxon was described from four syntypes, of which I have seen a photograph of one. Not having type-specimens for examination, I refrain from designating a lectotype.

Moth easily recognized by the broad, bright-yellow wings, with reticulate reddish-brown pattern and broad reddish-brown subterminal band on both forewing and hindwing. *Pyrausta retidiscalis* and *andrei* are not nearly as brightly colored or sharply marked, have the reticulate markings confined to the forewing, and lack the conspicuous black anal tuft on the male abdomen.

Length of forewing 11–13 mm.

Early stages unknown.

Widespread in the American tropics from the West Indies and Mexico to Bolivia. Recorded by Kimball (1965) from Tavernier, Florida, in August. Present also in southern Texas (Kingsville; 13 Sept. 1973; J. R. Gillaspy).

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COLOR PLATES

Pyraloidea

PLATE 5

Pyraloidea

PYRALIDAE

figs. 1–42

TWICE NATURAL SIZE

1. *Pyrausta tuolumnalis* B. & McD., ♂. Tuolumne Meadows, Yosemite Park, Calif., 19 July 1938, E. C. Johnston (CNC). (p. 120).
2. *Pyrausta tuolumnalis* B. & McD., ♀. Tuolumne Meadows, Yosemite Park, Calif., 19 July 1938, E. C. Johnston (CNC). (p. 120).
3. *Pyrausta tuolumnalis* B. & McD., ♂. Nordegg, Alta., 15 June 1921, J. McDunnough (CNC). (p. 120).
4. *Pyrausta tuolumnalis* B. & McD., ♂. Solomon Dome, Dawson, Y.T., 4080′, 3 July 1949, P. F. Bruggemann (CNC). (p. 120).
5. *Pyrausta orphisalis* Wlk., ♀. Sonoma Co., Calif., 16–23 June, *ex* Barnes coll. (USNM). (p. 119).
6. *Pyrausta orphisalis* Wlk., ♂. Eatonville, Cumberland Co., N.S., 8 July 1955, D. C. Ferguson (USNM). (p. 119).
7. *Pyrausta orphisalis* Wlk., ♂. Lyn, Ont., 9 Aug. 1926, F. P. Ide (CNC). (p. 119).
8. *Pyrausta orphisalis* Wlk., ♀. Moosonee, Ont., 17 July 1934, G. S. Walley (CNC). (p. 119).
9. *Pyrausta orphisalis* Wlk., ♂. Aweme, Man., 19 July 1922, N. Criddle (CNC). (p. 119).
10. *Pyrausta orphisalis* Wlk., ♂. Waterton Lakes, Alta., 29 June 1929, J. H. Pepper (CNC). (p. 119).
11. *Pyrausta generosa* (G. & R.), ♂. Pittsburgh, Pa., 23 June 1907, Henry Engel (USNM). (p. 117).
12. *Pyrausta generosa* (G. & R.), ♂. Cincinnati, Ohio, 29 May 1904, Annette F. Braun (USNM). (p. 117).
13. *Pyrausta generosa* (G. & R.), ♂. Aweme, Man., 28 June 1921, N. Criddle (CNC). (p. 117).
14. *Pyrausta generosa* (G. & R.), ♂. Indian Head, Sask., 6 July 1924, J. J. deGryse (CNC). (p. 117).
15. *Pyrausta homonymalis* Mun., ♀. Cranberry Glades, Pocahontas Co., W. Va., 22 June 1968, Thelma M. Clarke (USNM). (p. 116).
16. *Pyrausta homonymalis* Mun., ♂. Tryon. N.C., "5–18", Fiske (USNM). (p. 116).
17. *Pyrausta homonymalis* Mun., ♀. Devil's Den State Park, Washington Co., Ark., 24 May 1966, R. W. Hodges (USNM). (p. 116).
18. *Pyrausta subsequalis subsequalis* (Gn.), ♂. Decatur, Ill., 8–15 Aug., *ex* larva, thistle, *ex* Barnes coll. (USNM). (p. 122).
19. *Pyrausta subsequalis borealis* Pack., ♂. Mt. Lyall, Que., 1500′, 27 June 1933, W. J. Brown (CNC). (p. 122).
20. *Pyrausta subsequalis borealis* Pack., ♂. Gillam, Man., 11 June 1950, J. F. McAlpine (CNC). (p. 122).
21. *Pyrausta subsequalis borealis* Pack., ♂. Dawson, Y.T., 1500′, 15 June 1949, P. F. Bruggemann (CNC). (p. 122).
22. *Pyrausta subsequalis subsequalis* (Gn.), ♀. Decatur, Ill., 1–7 Sept., *ex* larva, thistle, *ex* Barnes coll. (USNM). (p. 122).
23. *Pyrausta subsequalis borealis* Pack., ♀. Mt. Lyall, Que., 1500′, 27 June 1933, W. J. Brown (CNC). (p. 122).
24. *Pyrausta subsequalis borealis* Pack., ♀. Gillam, Man., 16 June 1950, J. F. McAlpine (CNC). (p. 122).
25. *Pyrausta subsequalis borealis* Pack., ♀. Dawson, Y.T., 1500′, 1 July 1949, P. F. Bruggemann (CNC). (p. 122).
26. *Pyrausta bicoloralis* (Gn.), ♂. Hamden, New Haven Co., Conn., 6 June 1966, D. C. Ferguson (USNM). (p. 103).
27. *Pyrausta bicoloralis* (Gn.), ♀. Simcoe, Ont., 9 Aug. 1939, T. N. Freeman (CNC). (p. 103).
28. *Pyrausta bicoloralis* (Gn.), ♂. Wedge Plantation, McClellanville, S.C., 12 July 1970, R. B. Dominick, at light (WPC). (p. 103).
29. *Pyrausta bicoloralis* (Gn.), ♀. Wedge Plantation, McClellanville, S.C., 18 Aug. 1967, Charles W. Porter (WPC). (p. 103).
30. *Pyrausta bicoloralis* (Gn.), ♀. Wedge Plantation, McClellanville, S.C., 20 March 1968, R. W. Hodges (WPC). (p. 103).
31. *Pyrausta augustalis* (F. & R.), ♀. San Benito, Tex., 24–31 July, *ex* Barnes coll. (USNM). (p. 104).
32. *Pyrausta augustalis* (F. & R.), ♀. Brownsville, Tex., 10 March 1937, T. N. Freeman (CNC). (p. 104).
33. *Pseudopyrausta santatalis* (B. & McD.), ♀. Royal Palm Park, Fla., 3 July 1940, Sweadner (CM). (p. 17).
34. *Pseudopyrausta santatalis* (B. & McD.), ♂. Oneco, Manatee Co., Fla., 22 March 1957, J. G. Franclemont (JGF). (p. 17).
35. *Xanthostege plana* (Grt.), ♂. Baboquivari Mts., Pima Co., Ariz., 15–30 June 1924, O. C. Poling, genitalia slide 1897 DK (USNM). (p. 56).
36. *Xanthostege plana* (Grt.), ♀. Tempe, Ariz., 2 Aug. 1920, at light, E. V. Walter, M. Martinez, Tempe no. 4640–19, genitalia slide 1898 DK (USNM). (p. 56).
37. *Xanthostege roseiterminalis* (B. & McD.), ♂. Nueces R., Zavalla Co., Tex., 26 April 1910, at light, Hunter and Pratt, genitalia slide 1899 DK (USNM). (p. 55).
38. *Xanthostege roseiterminalis* (B. & McD.), ♀. Nueces R., Zavalla Co., Tex., 26 April 1910, at light, Hunter and Pratt, genitalia slide 1900 DK (USNM). (p. 55).
39. *Perispasta caeculalis* Zell., ♂. Hamden, New Haven Co., Conn., 9 June 1967, D. C. Ferguson (USNM). (p. 28).
40. *Perispasta caeculalis* Zell., ♀. 6 mi NW Newcastle, Wyo., 23 June 1965, R. W. Hodges (USNM). (p. 28).
41. *Oenobotys vinotinctalis* (Hamp.), ♀. Brownsville, Tex., 20 Feb. 1937, T. N. Freeman (CNC). (p. 18).
42. *Oenobotys vinotinctalis* (Hamp.), ♀. University Conservation Reserve, Welaka, Fla., 11 March 1962, D. C. Ferguson (USNM). (p. 18).

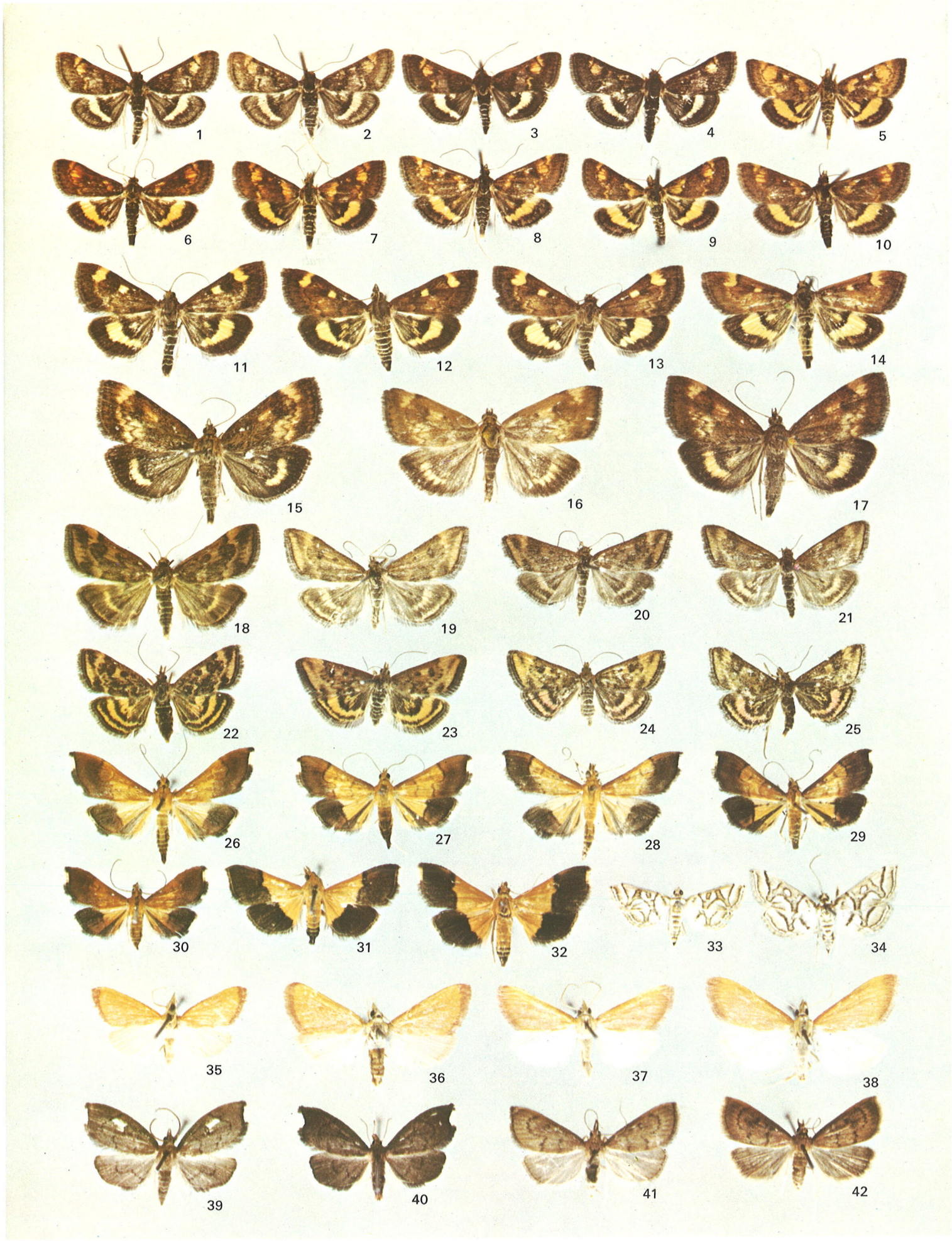
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PLATE 6

Pyraloidea

PYRALIDAE

figs. 1–43

TWICE NATURAL SIZE

1. *Pyrausta laticlavia* (G. & R.), ♂. Devil's Den State Park, Washington Co., Ark., 26 May 1966, R. W. Hodges (USNM). (p. 135).
2. *Pyrausta laticlavia* (G. & R.), ♀. Five Mile Beach, N.J., 5 Aug. 1905, F. Weigand (CNC). (p. 135).
3. *Pyrausta laticlavia* (G. & R.), dark form, ♂. San Antonio, Tex., 16–23 March, *ex* Barnes coll. (USNM). (p. 135).
4. *Pyrausta laticlavia* (G. & R.), dark form, ♀. University Conservation Reserve, Welaka, Fla., 15 March 1972, D. C. Ferguson (USNM). (p. 135).
5. *Pyrausta inveterascalis* B. & McD., ♂. Pittsburgh, Pa., 29 June 1906, Henry Engel (CM). (p. 101).
6. *Pyrausta inveterascalis* B. & McD., ♀. Oak Station, Allegheny Co., Pa., 2 July 1910, Fred Marloff (CM). (p. 101).
7. *Pyrausta pythialis* B. & McD., ♂. Paralectotype. Aweme, Man., 27 June 1904, Criddle (CNC). (p. 101).
8. *Pyrausta pythialis* B. & McD., ♀. Cartwright, Man., E. P. Heath, *ex* Barnes coll. (USNM). (p. 101).
9. *Pyrausta phoenicealis* (Hbn.), ♂. 3 mi E of Liberty, Tex., 30 Sept. 1923, Bottimer Exp. no. 71, flower heads of Pl. 84, *ex Mesosphaerum rugosum* (USNM). (p. 110).
10. *Pyrausta phoenicealis* (Hbn.), ♂. Fort Myers, Fla., 24–30 Aug., ♂ genitalia slide 13 July 1933, CH no. 1 (USNM). (p. 110).
11. *Pyrausta phoenicealis* (Hbn.), ♀. Fort Myers, Fla., 1–7 May (USNM). (p. 110).
12. *Pyrausta phoenicealis* (Hbn.), ♂. Opelousas, La., Pilate (CM). (p. 110).
13. *Pyrausta acrionalis* (Wlk.), ♂. Six Mile Creek, Ithaca, N.Y., 13 May 1956, D. C. Ferguson (USNM). (p. 136).
14. *Pyrausta acrionalis* (Wlk.), ♂. Ottawa, Canada, 16 June 1906, C. H. Young (CNC). (p. 136).
15. *Pyrausta rubricalis* (Hbn.), ♂. Home, Baton Rouge, E. Baton Rouge Parish, La., 30 Sept. 1970, G. Strickland 1954 (GS). (p. 112).
16. *Pyrausta californicalis californicalis* (Pack.), ♂. Santa Rosa, Calif., 26 June 1937, E. C. Johnston (CNC). (p. 113).
17. *Pyrausta californicalis sierranalis* Mun., ♂. Paratype. Glen Alpine, Fallen Leaf L., Calif., 11 July 1909, F. X. Williams (CAS). (p. 114).
18. *Pyrausta californicalis sierranalis* Mun., ♀. Allotype. Deer Park Sprs., L. Tahoe, Calif., 8–15 July, *ex* Barnes coll. (USNM). (p. 114).
19. *Pyrausta californicalis californicalis* (Pack.), ♂. Sacramento, Calif., 27 July 1931, Keifer (USNM). (p. 113).
20. *Pyrausta californicalis californicalis* (Pack.), ♀. Summerland, Santa Barbara Co., Calif., 7 Aug. 1962, Carl W. Kirkwood (CNC). (p. 113).
21. *Pyrausta californicalis californicalis* (Pack.), ♂. Camp Baldy, San Bernardino Mts., Calif., 1–7 July, *ex* Barnes coll. (USNM). (p. 113).
22. *Pyrausta californicalis californicalis* (Pack.), ♀. Camp Baldy, San Bernardino Mts., Calif., 16–23 July, *ex* Barnes coll. (USNM). (p. 113).
23. *Pyrausta californicalis californicalis* (Pack.), ♂. Vancouver, Wash. 26 June 1931, J. F. Clarke (USNM). (p. 113).
24. *Pyrausta insignitalis* (Gn.), ♂. Oneco, Manatee Co., Fla., May 1954, Paula Dillman (CNC), (p. 107).
25. *Pyrausta insignitalis* (Gn.), ♀. Oneco, Manatee Co., Fla., 15 June 1954, Paula Dillman (CNC). (p. 107).
26. *Pyrausta onythesalis* (Wlk.), ♂. Sam Houston State Park, Calcasieu Parish, La., 20 April 1969, G. Strickland, 1886 (GS). (p. 105).
27. *Pyrausta onythesalis* (Wlk.), ♀. Jackson, Hinds Co., Miss., 13 April 1963, Bryant Mather, 12,466 (BM). (p. 105).
28. *Pyrausta pseudonythesalis* Mun., ♂. Holotype. Vidal, Calif., 15 Sept. 1947, D. Weedmark (CNC). (p. 105).
29. *Pyrausta pseudonythesalis* Mun., ♀. Paratype. Madera Canyon, 4880′, Santa Rita Mts., Santa Cruz Co., Ariz., 8 July 1959, J. G. Franclemont (JGF). (p. 105).
30. *Pyrausta aurea* (Hamp.), ♂. Brownsville, Tex., 4 March 1937, T. N. Freeman, genitalia slide EGM 1629 (CNC). (p. 107).
31. *Pyrausta aurea* (Hamp.), ♀. Baboquivari Mts., Pima Co., Ariz., 15–30 June 1924, O. C. Poling, ♀ genitalia slide 7 May 1951, no. OBP 206 (USNM). (p. 107).
32. *Pyrausta klotsi* Mun., ♂. Paratype. Madera Canyon, 5600′, Santa Rita Mts., Santa Cruz Co., Ariz., 17 May 1963, J. G. Franclemont (JGF). (p. 108).
33. *Pyrausta klotsi* Mun., ♀. Paratype. East Turkey Creek, 6400′, Chiricahua Mts., Cochise Co., Ariz., 19 Aug. 1967, J. G. Franclemont (JGF). (p. 108).
34. *Pyrausta flavofascialis* (Grt.), ♂. Onion Saddle, 7600′, Chiricahua Mts., Cochise Co., Ariz., 13 July 1966, J. G. Franclemont (JGF). (p. 110).
35. *Pyrausta flavofascialis* (Grt.), ♀. Onion Saddle, 7600′, Chiricahua Mts., Cochise Co., Ariz., 11 July 1966, [? J. G. Franclemont] (JGF). (p. 110).
36. *Pyrausta volupialis* (Grt.), ♂. The Basin, Big Bend National Park, Tex., 4 May 1959, M. R. MacKay (CNC). (p. 97).
37. *Pyrausta volupialis* (Grt.), ♀. The Basin, Big Bend National Park, Tex., 8 May 1959, M. R. MacKay (CNC). (p. 97).
38. *Pyrausta volupialis* (Grt.), ♀. Kerrville, Tex. (USNM). (p. 97).
39. *Pyrausta corinthalis* B. & McD., ♀. Paralectotype ("Type ♀"). Palmerlee, Ariz., *ex* Barnes coll. (USNM). (p. 97).
40. *Pyrausta obtusanalis* Druce, ♀. Madera Canyon, 4880′, Santa Rita Mts., Santa Cruz Co., Ariz., 27 June 1963, J. G. Franclemont (JGF). (p. 137).
41. *Pyrausta obtusanalis* Druce, ♂. Organ Pipe Cactus National Monument, Ariz., 17 April 1947, Grace H. and John L. Sperry (CNC). (p. 137).
42. *Hyalorista taeniolalis* (Gn.), ♂. Brownsville, Tex., *ex* Barnes coll. (USNM). (p. 143).
43. *Pyrausta flavibrunnea* Hamp., ♀. Madera Canyon, 4400′, Santa Rita Mts., Pima Co., Ariz., 3 July 1963, J. G. Franclemont (JGF). (p. 108).

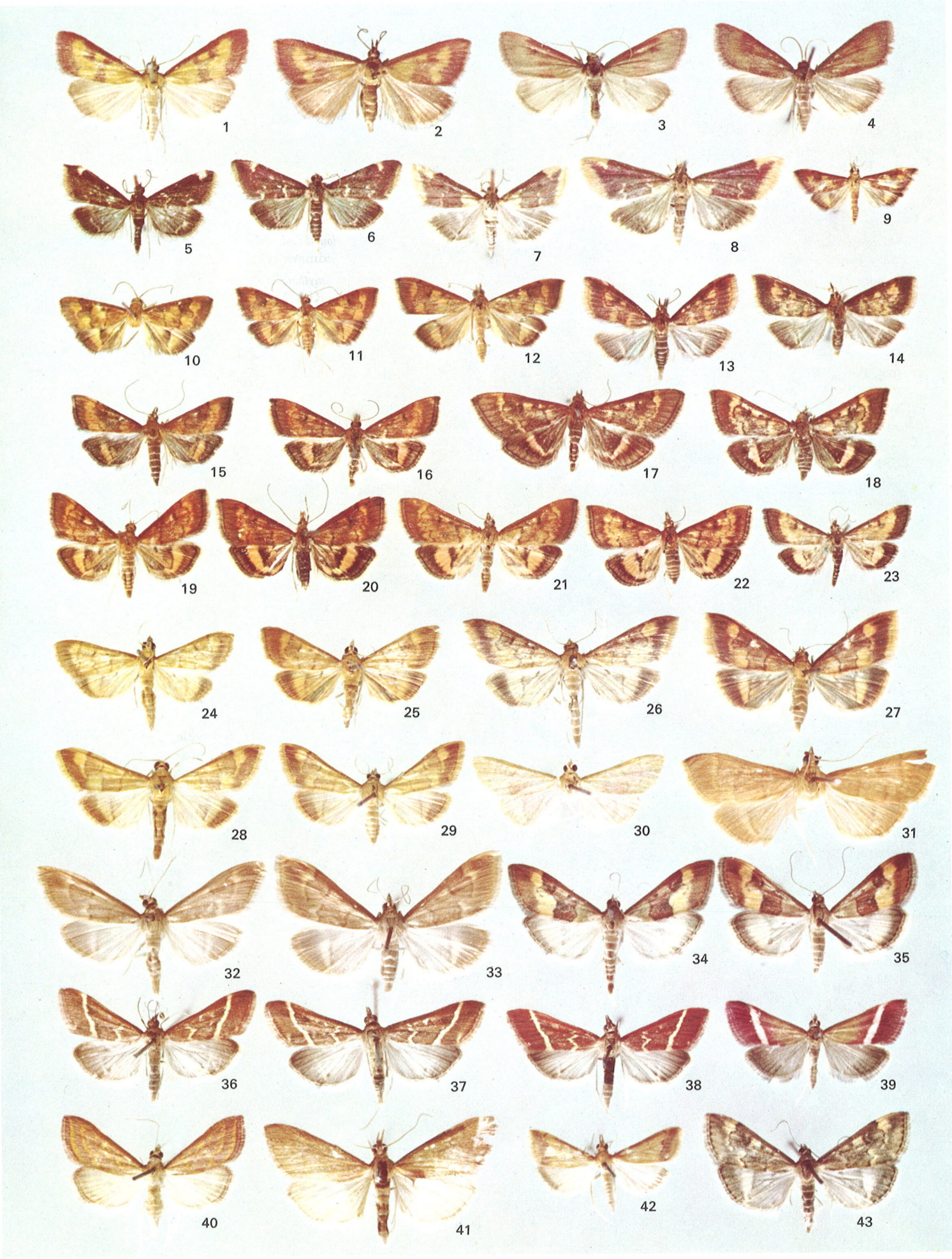
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PLATE 7

Pyraloidea

PYRALIDAE

figs. 1–42

TWICE NATURAL SIZE

1. *Pyrausta napaealis* (Hulst), ♂. Spring Mt., Napa Co., Calif., 2 April 1950, E. C. Johnston (CNC). (p. 95).
2. *Pyrausta napaealis* (Hulst), ♀. Chino Canyon, Palm Sprs., Calif., 19 April 1950, E. C. Johnston (CNC). (p. 95).
3. *Pyrausta napaealis* (Hulst), ♂. Borrego, Calif., 5 May 1941, Grace H. and John L. Sperry (CNC). (p. 95).
4. *Pyrausta napaealis* (Hulst), ♂. Madera Canyon, Santa Rita Mts., Santa Cruz Co., Ariz., 4880′, 8 April 1963, J. G. Franclemont (JGF). (p. 95).
5. *Pyrausta napaealis* (Hulst), ♂. Ibanpah Mts., Calif., 29 April 1935 (CNC). (p. 95).
6. *Pyrausta napaealis* (Hulst), ♂. Entiat, Wash., 9 May 1934, A. N. Gartrell (CNC). (p. 95).
7. *Pyrausta ochreicostalis* B. & McD., ♂. 29 Palms, San Bernardino Co., Calif., 20 April 1950, E. C. Johnston (CNC). (p. 96).
8. *Pyrausta ochreicostalis* B. & McD., ♀. Providence Mts., Calif., 10 May 1936, Grace H. and John L. Sperry (CNC). (p. 96).
9. *Pyrausta linealis* (Fern.), ♂. 29 Palms, San Bernardino Co., Calif., 21 April 1950, E. C. Johnston (CNC). (p. 95).
10. *Pyrausta linealis* (Fern.), ♂. Little Rock, Los Angeles Co., Calif., 23 April 1935, J. A. Comstock (CNC). (p. 95).
11. *Pyrausta linealis* (Fern.), ♀. Satus Creek, Yakima Co., Wash., 30 May 1939, E. C. Johnston (CNC). (p. 95).
12. *Pyrausta linealis* (Fern.), ♂. Toppenish, Wash., 16 May 1940, E. C. Johnston (CNC). (p. 95).
13. *Pyrausta lethalis* (Grt.), ♂. Walker Pass, Calif., 5 May 1940, E. C. Johnston (CNC). (p. 97).
14. *Pyrausta lethalis* (Grt.), ♀. Walker Pass, Calif., 5 May 1940, E. C. Johnston (CNC). (p. 97).
15. *Pyrausta lethalis* (Grt.), ♂. The Basin, Big Bend National Park, Tex., 4 May 1959, M. R. MacKay (CNC). (p. 97).
16. *Pyrausta lethalis* (Grt.), ♂. Walnut Canyon, 6500′, 6-1/3 mi ESE by E of Flagstaff, Coconino Co., Ariz., 16 Aug. 1964, J. G. Franclemont (JGF). (p. 97).
17. *Pyrausta lethalis* (Grt.), ♀. Palm Sprs., Riverside Co., Calif., 16–23 March, *ex* Barnes coll. (USNM). (p. 97).
18. *Pyrausta lethalis* (Grt.), ♂. Quinlan Mts., Ariz., 22 April 1938, Grace H. and John L. Sperry (CNC). (p. 97).
19. *Pyrausta lethalis* (Grt.), ♂. Essex, Calif., 7 April 1935, Grace H. and John L. Sperry (CNC). (p. 97).
20. *Pyrausta lethalis* (Grt.), ♂. Olancha, Inyo Co., Calif., Aug., *ex* Barnes coll. (USNM). (p. 97).
21. *Pyrausta lethalis* (Grt.), ♀. Palm Sprs., Riverside Co., Calif., 16–23 March, *ex* Barnes coll. (USNM). (p. 97).
22. *Pyrausta lethalis* (Grt.), ♀. Palm Sprs., Riverside Co., Calif., 16–23 March, *ex* Barnes coll. (USNM). (p. 97).
23. *Glaucodontia pyraustoides* Mun., ♂. Holotype. Richfield, Utah, 28 May 1930, light trap, "554", ♂ genitalia slide 8 Oct. 1931, CH (USNM). (Fascicle 13.1B, p. 193).
24. *Pyrausta nicalis* (Grt.), ♂. Point Pelee, Ont., 4 July 1927, F. P. Ide (CNC). (p. 99).
25. *Pyrausta nicalis* (Grt.), ♂. Hymers, Ont., 8–15 July, *ex* Barnes coll. (USNM). (p. 99).
26. *Pyrausta nicalis* (Grt.), ♂. Aweme, Man., 16 July 1920, N. Criddle (CNC). (p. 99).
27. *Pyrausta nicalis* (Grt.), ♀. Churchill, Man., 3 July 1947, T. N. Freeman (CNC). (p. 99).
28. *Pyrausta nicalis* (Grt.), ♀. Waskesiu L., Sask., 15 July 1939, A. R. Brooks (CNC). (p. 99).
29. *Pyrausta nicalis* (Grt.), ♂. Moran, Teton Co., Wyo., Wallace and Bauer (CM). (p. 99).
30. *Pyrausta nicalis* (Grt.), ♂. Fernie, B.C., 6 July 1934, Hugh B. Leech (CNC). (p. 99).
31. *Pyrausta nicalis* (Grt.), ♀. Moccasin Prairie, Ochoco National Forest, Ore., 25 June 1970, J. F. G. Clarke (USNM). (p. 99).
32. *Pyrausta nexalis* (Hulst), ♀. Dry Falls, Wash., 11 Sept. 1945, E. C. Johnston (CNC). (p. 93).
33. *Pyrausta nexalis* (Hulst), ♂. Atascadero, Calif., 27 July 1935, E. C. Johnston (CNC). (p. 93).
34. *Pyrausta demantrialis* (Druce), ♂. Oak Station, Allegheny Co., Pa., 1 Aug. 1909, Fred Marloff (CM). (p. 92).
35. *Pyrausta demantrialis* (Druce), ♀. Pittsburgh, Pa., 14 Aug. 1906, Henry Engel (CM). (p. 92).
36. *Pyrausta demantrialis* (Druce), ♂. West Turkey Creek, 6400′, Chiricahua Mts., Cochise Co., Ariz., 19 Aug. 1967, J. G. Franclemont (JGF). (p. 92).
37. *Pyrausta demantrialis* (Druce), ♀. Pinery Canyon, 7000′, Chiricahua Mts., Cochise Co., Ariz., 11 Aug. 1966, J. G. Franclemont (JGF). (p. 92).
38. *Pyrausta dapalis* (Grt.), ♂. The Geysers, Sonoma Co., Calif., 19 March 1939, E. C. Johnston (CNC). (p. 116).
39. *Pyrausta dapalis* (Grt.), ♀. San Luis Obispo, Calif., March, A. H. Vachell (USNM). (p. 116).
40. *Pyrausta coccinea* Warr., ♂. San Joaquin, Calif., May 1877, Cook (USNM). (p. 103).
41. *Pyrausta dapalis* (Grt.), ♂. Truckee, Calif., 29 April 1921, H. G. Dyar (USNM). (p. 116).
42. *Pyrausta dapalis* (Grt.), ♂. Truckee, Calif., 29 April 1921, H. G. Dyar (USNM). (p. 116).

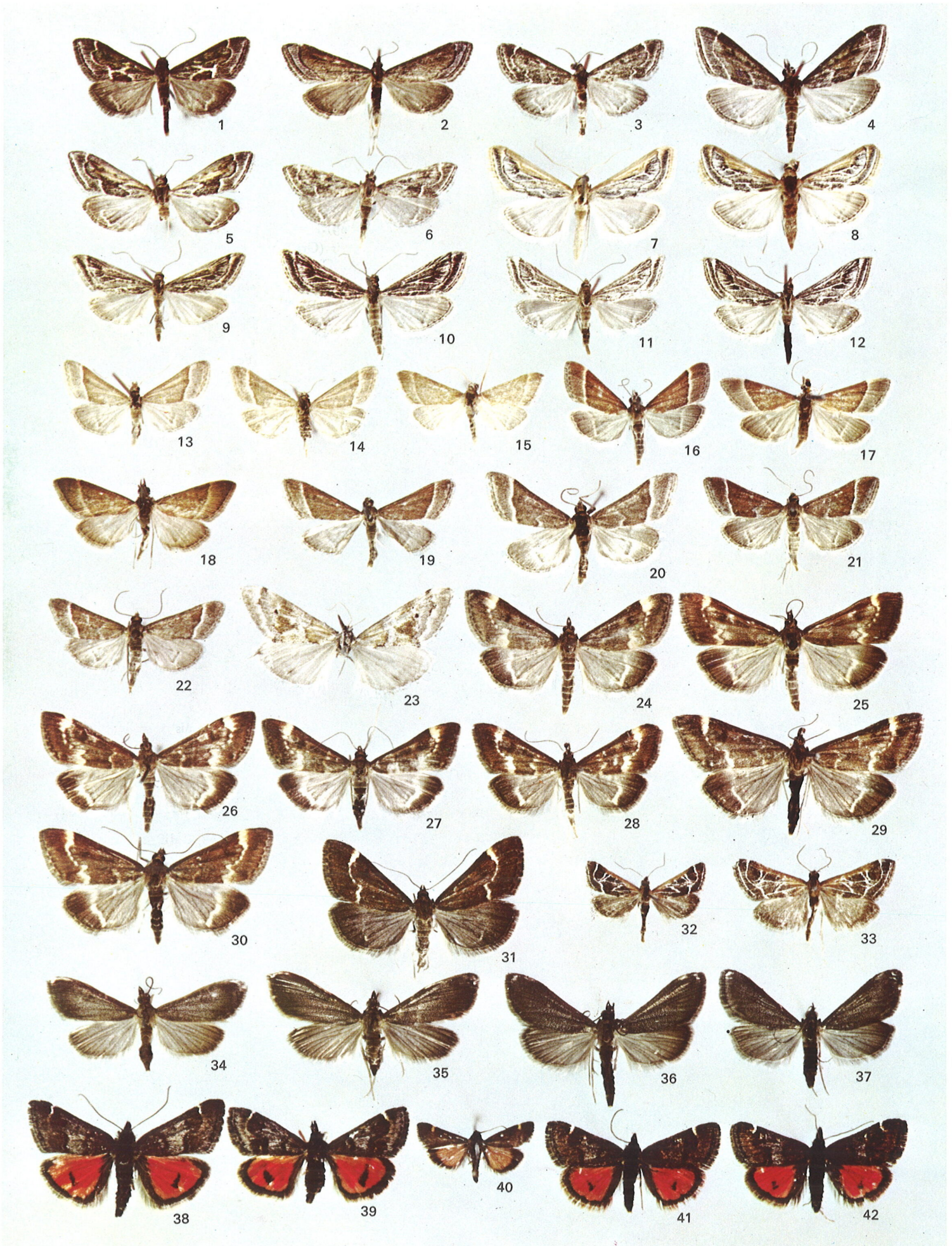
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PLATE 8

Pyraloidea

PYRALIDAE

figs. 1–44

TWICE NATURAL SIZE

1. *Pyrausta grotei* Mun., ♂. Hart Prairie, 8500′, 10 mi NNW Flagstaff, Coconino Co., Ariz., 9 July 1964, J. G. Franclemont (JGF). (p. 99).
2. *Pyrausta grotei* Mun., ♀. W. Fork, 6500′, 16 mi SW Flagstaff, Coconino Co., Ariz., 21 July 1965, J. G. Franclemont (JGF). (p. 99).
3. *Pyrausta tyralis* (Gn.), dark form, ♀. Brownsville, Tex., 7 March 1937, T. N. Freeman (CNC). (p. 135).
4. *Pyrausta tyralis* (Gn.), dark form, ♀. Siesta Key, Sarasota Co., Fla., 3 April 1952, C. P. Kimball (CPK). (p. 135).
5. *Pyrausta tyralis* (Gn.), ♂. Archbold Biological Station, L. Placid, Highlands Co., Fla., 28 March 1962, D. C. Ferguson (USNM). (p. 135).
6. *Pyrausta tyralis* (Gn.), ♂. Devil's Den State Park, Washington Co., Ark., 19 June 1966, R. W. Hodges (USNM). (p. 135).
7. *Pyrausta tyralis* (Gn.), ♀. Devil's Den State Park, Washington Co., Ark., 5 July 1966, R. W. Hodges (USNM). (p. 135).
8. *Pyrausta tyralis* (Gn.), ♀. Forestburg, Tex., 22 Sept. 1941, L. H. Bridwell (CNC). (p. 135).
9. *Pyrausta pseuderosnealis* Mun., ♀. Paratype. Devil's Den State Park, Washington Co., Ark., 5 June 1966, R. W. Hodges (USNM). (p. 114).
10. *Pyrausta pseuderosnealis* Mun., ♂. Paratype. Winter Park, Fla., 8 Aug. 1939, H. T. Fernald, at light (USNM). (p. 114).
11. *Pyrausta pseuderosnealis* Mun., ♀. Paratype. Winfield, La., 16–23 June, *ex* Barnes coll. (USNM). (p. 114).
12. *Pyrausta pseuderosnealis* Mun., ♂. Paratype. Devil's Den State Park, Washington Co., Ark., 6 June 1966, R. W. Hodges (USNM). (p. 114).
13. *Pyrausta pseuderosnealis* Mun., ♂. Oroville, Calif., 28 April 1927, H. H. Keifer (USNM). (p. 114).
14. *Pyrausta signatalis* (Wlk.), ♂. Devil's Den State Park, Washington Co., Ark., 17 June 1966, R. W. Hodges (USNM). (p. 100).
15. *Pyrausta signatalis* (Wlk.), ♀. Wedge Plantation, McClellanville, S.C., 2 Aug. 1967, James W. Porter (WPC). (p. 100).
16. *Pyrausta signatalis* (Wlk.), ♂. Spearfish Creek, T3N, R1E, S6, S.D., 9 July 1965, R. W. Hodges (USNM). (p. 100).
17. *Pyrausta signatalis* (Wlk.), ♀. White['s] City, Eddy Co., N.M., 14 May 1950, E. C. Johnston (CNC). (p. 100).
18. *Pyrausta signatalis* (Wlk.), ♀. Paradise, Cochise Co., Ariz., *ex* Barnes coll. (USNM). (p. 100).
19. *Pyrausta inornatalis* (Fern.), ♂. Kerrville, Tex., Sept. 1906, R. Lacey (USNM). (p. 101).
20. *Pyrausta inornatalis* (Fern.), ♂. Brownsville, Tex., 31 Oct. 1938, Grace H. and John L. Sperry (CNC). (p. 101).
21. *Pyrausta signatalis* (Wlk.), ♂. Southwestern Research Station, Chiricahua Mts., Cochise Co., Ariz., 2 June 1960, Carl W. Kirkwood (CNC). (p. 100).
22. *Pyrausta atropurpuralis* (Grt.), ♂. Comfort, Tex., Lucock (CM). (p. 98).
23. *Pyrausta atropurpuralis* (Grt.), ♀. Comfort, Tex., April 1912, Lucock (CM). (p. 98).
24. *Pyrausta morenalis* (Dyar), ♂. Jacumba, Calif., 11 June 1937, E. C. Johnston (CNC). (p. 98).
25. *Pyrausta morenalis* (Dyar), ♀. Apple Valley, Calif., 1 May 1955, D. F. Hardwick (CNC). (p. 98).
26. *Pyrausta morenalis* (Dyar), ♂. Satus Creek, Yakima Co., Wash., 30 May 1949, E. C. Johnston (CNC). (p. 98).
27. *Pyrausta morenalis* (Dyar), ♀. Satus Creek, Yakima Co., Wash., 30 May 1949, E. C. Johnston (CNC). (p. 98).
28. *Pyrausta morenalis* (Dyar), ♀. Del Mar, San Diego Co., Calif., 14 July 1940, J. A. Comstock (CNC). (p. 98).
29. *Pyrausta ?pilatealis* B. & McD., var., ♂. Vidal, Calif., 18 Sept. 1947, D. Weedmark (CNC). (p. 96).
30. *Pyrausta pilatealis* B. & McD., ♂. Toppenish, Wash., 16 May 1940, E. C. Johnston (CNC). (p. 96).
31. *Pyrausta pilatealis* B. & McD., ♂. Satus Creek, Yakima Co., Wash., 29 May 1949, E. C. Johnston (CNC). (p. 96).
32. *Pyrausta pilatealis* B. & McD., ♀. Satus Creek, Yakima Co., Wash., 29 May 1949, E. C. Johnston (CNC). (p. 96).
33. *Pyrausta pilatealis* B. & McD., ♀. Borrego, Calif., 17 March 1950, Grace H. and John L. Sperry (CNC). (p. 96).
34. *Pyrausta pilatealis* B. & McD., ♀. Ivanpah Mts., Calif., 28 May 1935, Grace H. and John L. Sperry (CNC). (p. 96).
35. *Pyrausta pilatealis* B. & McD., ♂. Upper Santa Ana R., San Bernardino Co., Calif., 25 July 1947, Grace H. and John L. Sperry (CNC). (p. 96).
36. *Pyrausta pilatealis* B. & McD., ♂. Mt. Lowe, Calif., 8 June 1921, Karl R. Coolidge (CNC). (p. 96).
37. *Pyrausta pilatealis* B. & McD., ♂. Palm Sprs., Riverside Co., Calif., 16–23 March, *ex* Barnes coll. (USNM). (p. 96).
38. *Pyrausta sartoralis* B. & McD., ♀. Split Mt. Canyon, San Diego Co., Calif., 12 April 1939, Grace H. and John L. Sperry (CNC). (p. 93).
39. *Pyrausta sartoralis* B. & McD., ♂. Rialto, Calif., 18 May 1936, Grace H. and John L. Sperry (CNC). (p. 93).
40. *Pyrausta ?pilatealis* B. & McD., var., ♀. Golden Age, Ariz., 24 May 1938, Grace H. and John L. Sperry (CNC). (p. 96).
41. *Pyrausta roseivestalis* Mun., ♂. Paratype. Tempe, Ariz., 26 Sept. 1921, E. V. Walter, at light, Tempe no. 5423 (USNM). (p. 94).
42. *Pyrausta zonalis* B. & McD., ♀. Painted Gorge, Imperial Co., Calif., 18 April 1950, E. C. Johnston (CNC). (p. 94).
43. *Pyrausta zonalis* B. & McD., ♂. Chino Canyon, Palm Sprs., Calif., 19 April 1950, E. C. Johnston (CNC). (p. 94).
44. *Pyrausta zonalis* B. & McD., ♀. Borrego, Calif., 26 Feb. 1950, Grace H. and John L. Sperry (CNC). (p. 94).

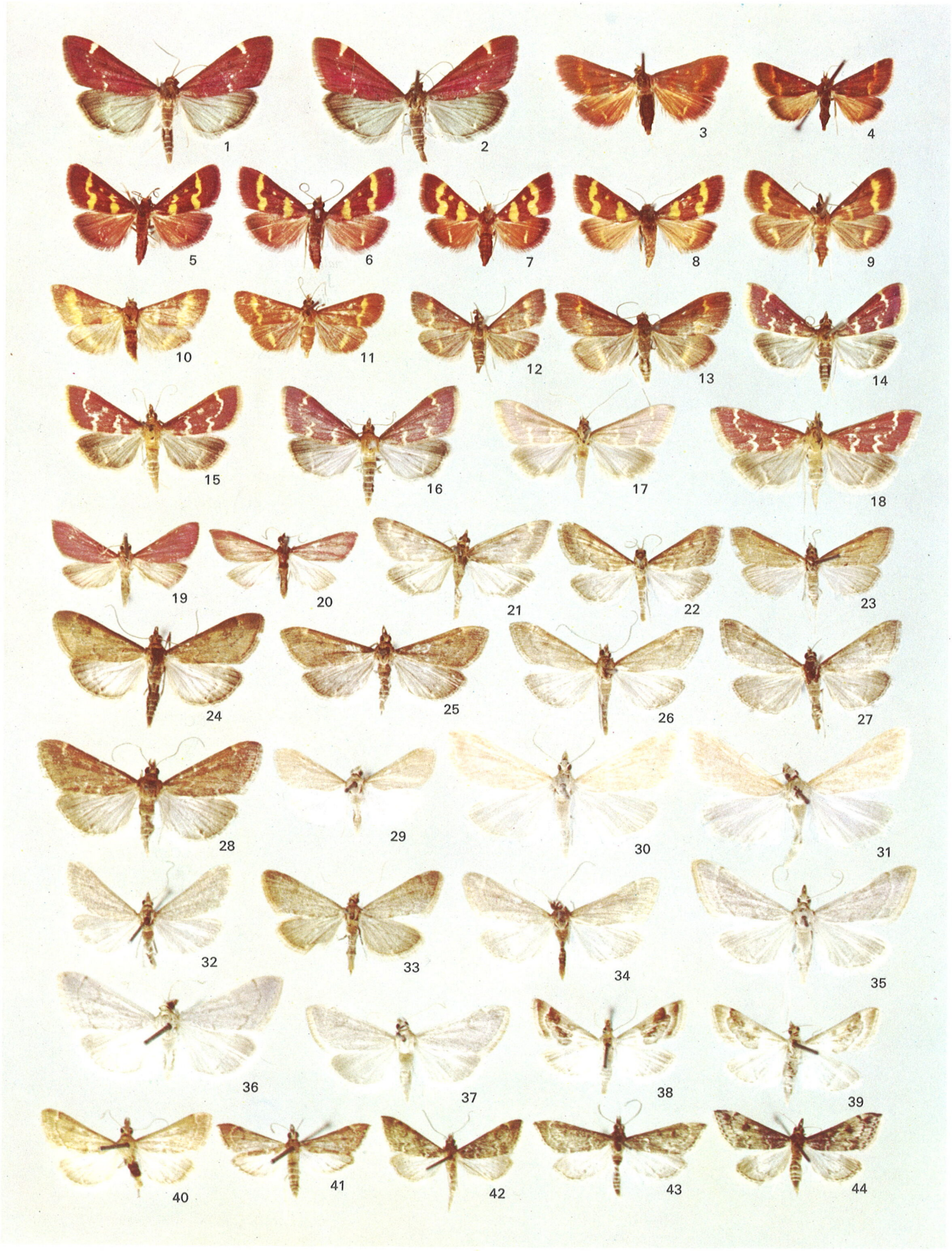
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PLATE 9

Pyraloidea

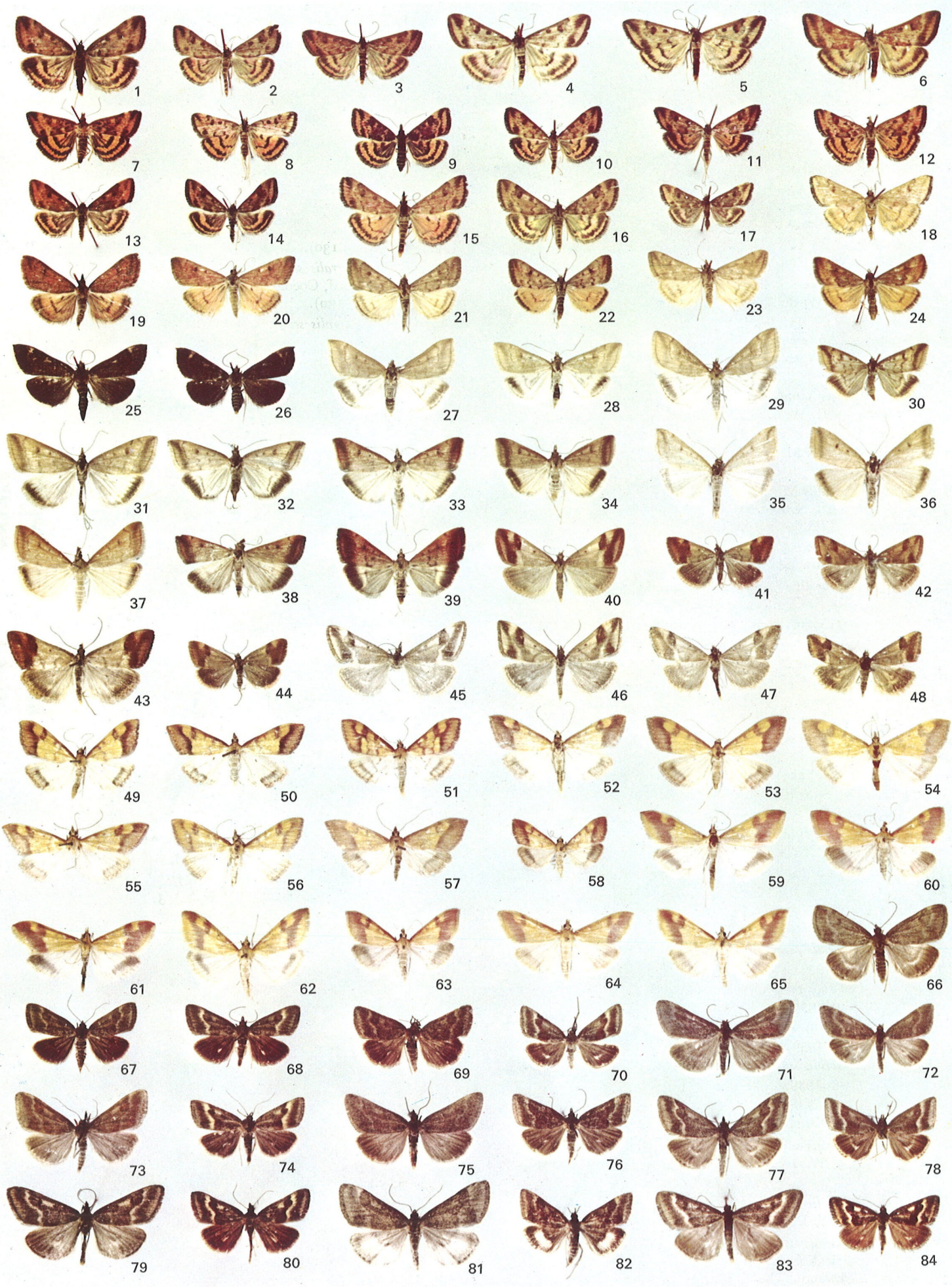
PYRALIDAE

figs. 1–84

NATURAL SIZE 1:1

1. *Pyrausta subsequalis petaluma* Mun., ♂. Holotype. Petaluma, Calif., 7 Dec. 1939, E. C. Johnston (CNC). (p. 123).
2. *Pyrausta subsequalis petaluma* Mun., ♂. Paratype. Mill Valley, Marin Co., Calif., 4 Sept. 1948, Hugh B. Leech (CAS). (p. 123).
3. *Pyrausta subsequalis petaluma* Mun., ♂. Paratype. Petaluma, Calif., 24 Sept. 1937, E. C. Johnston (CNC). (p. 123).
4. *Pyrausta subsequalis plagalis* Haim., ♂. Evanston, Wyo., 29 July 1935, Grace H. and John L. Sperry (CNC). (p. 123).
5. *Pyrausta subsequalis plagalis* Haim., ♂. McGaffey, Zuñi Mts., McKinley Co., N.M., 7500′, 21 July 1962, E. and I. Munroe (CNC). (p. 123).
6. *Pyrausta subsequalis plagalis* Haim., ♂. Seton L., B.C., 21 July 1933, J. McDunnough (CNC). (p. 123).
7. *Pyrausta subsequalis petaluma* Mun., ♀. Paratype. Sea View, Sonoma Co., Calif., 11 July 1937, E. C. Johnston (CNC). (p. 123).
8. *Pyrausta subsequalis petaluma* Mun., ♀. Paratype. Covelo, Mendocino Co., Calif., 25 Aug. 1937, E. C. Johnston (CNC). (p. 123).
9. *Pyrausta subsequalis petaluma* Mun., ♀. Allotype. Petaluma, Calif., 19 Feb. 1940, E. C. Johnston (CNC). (p. 123).
10. *Pyrausta subsequalis plagalis* Haim., ♂. Fort Valley, 7350′, 7½ mi NW Flagstaff, Coconino Co., Ariz., 3 Aug. 1964, J. G. Franclemont (JGF). (p. 123).
11. *Pyrausta subsequalis plagalis* Haim., ♂. McGaffey, Zuñi Mts., McKinley Co., N.M., 7500′, 24 July 1962, E. and I. Munroe (CNC). (p. 123).
12. *Pyrausta subsequalis plagalis* Haim., ♀. Oliver, B.C., 1000′, 4 July 1953, D. F. Hardwick (CNC). (p. 123).
13. *Pyrausta subsequalis borealis* Pack., ♂. Table Mt. Plateau, near Cape Ray, Nfld., 1700′, 6 July 1959, D. C. Ferguson (USNM). (p. 122).
14. *Pyrausta subsequalis borealis* Pack., ♂. Mt. Uniacke, N.S., 8 June 1950, D. C. Ferguson (USNM). (p. 122).
15. *Pyrausta subsequalis plagalis* Haim., ♂. Dominion Range Station, Manyberries, Alta., 3 Aug. 1951, D. F. Hardwick (CNC). (p. 123).
16. *Pyrausta subsequalis plagalis* Haim., ♂. Lethbridge, Alta., 3 July 1915 (CNC). (p. 123).
17. *Pyrausta subsequalis borealis* Pack., ♂. Clinton, B.C., 11 June 1938, J. K. Jacob (CNC). (p. 122).
18. *Pyrausta subsequalis plagalis* Haim., ♂. Oliver, B.C., 13 Aug. 1953, D. F. Hardwick (CNC). (p. 123).
19. *Pyrausta tatalis* (Grt.), ♂. Barton Flats, San Bernardino Co., Calif., 2 Oct. 1945, Grace H. and John L. Sperry (CNC). (p. 125).
20. *Pyrausta tatalis* (Grt.), ♂. Barton Flats, Calif., 16 June 1947, Melander (CNC). (p. 125).
21. *Pyrausta tatalis* (Grt.), ♂. Limpia Canyon, Jeff Davis Co., Tex., 20 May 1950, E. C. Johnston (CNC). (p. 125).
22. *Pyrausta tatalis* (Grt.), ♀. Carlsbad, Eddy Co., N.M., 17 May 1950, E. C. Johnston (CNC). (p. 125).
23. *Pyrausta tatalis* (Grt.), ♂. Kerrville, Tex., 11 April 1907, F. C. Pratt (USNM). (p. 125).
24. *Pyrausta tatalis* (Grt.), ♀. Kerrville, Tex., 11 April 1907, F. C. Pratt (USNM). (p. 125).
25. *Pyrausta niveicilialis* (Grt.), ♂. New Brighton, Pa., 18 May 1902, H. D. Merrick (USNM). (p. 138).
26. *Pyrausta niveicilialis* (Grt.), ♀. New Brighton, Pa., 29 May 1902, H. D. Merrick (USNM). (p. 138).
27. *Pyrausta fodinalis septentrionicola* Mun., ♂. Sand L., Ont., 28 June 1926, F. P. Ide (CNC). (p. 139).
28. *Pyrausta fodinalis septentrionicola* Mun., ♂. Paratype. Cut Knife, Sask., 21 June 1940, A. R. Brooks (CNC). (p. 139).
29. *Pyrausta fodinalis septentrionicola* Mun., ♂. Hardy W.C., T3N, R1E, S30, S.D., 15 July 1965, R. W. Hodges (USNM). (p. 139).

30. *Pyrausta fodinalis monticola* Mun., ♀. E. Humboldt Mts., Elko Co., Nev., 23 June 1934, Grace H. and John L. Sperry (CNC). (p. 139).
31. *Pyrausta fodinalis monticola* Mun., ♂. Holotype. Mt. Shasta City, Siskiyou Co., Calif., 19 July 1936, E. C. Johnston (CNC). (p. 139).
32. *Pyrausta fodinalis monticola* Mun., ♀. Allotype. Mt. Shasta, Siskiyou Co., Calif., 15 July 1936, E. C. Johnston (CNC). (p. 139).
33. *Pyrausta socialis socialis* (Grt.), ♂. Normandale, Ont., 27 June 1939, T. N. Freeman (CNC). (p. 140).
34. *Pyrausta socialis socialis* (Grt.), ♀. Normandale, Ont., 28 June 1939, T. N. Freeman (CNC). (p. 140).
35. *Pyrausta socialis perpallidalis* Mun., ♂. Holotype. Kusshi Canyon, Yakima Co., Wash., 5 Sept. 1948, E. C. Johnston (CNC). (p. 141).
36. *Pyrausta socialis perpallidalis* Mun., ♀. Allotype. Kusshi Canyon, Yakima Co., Wash., 5 Sept. 1948, E. C. Johnston (CNC). (p. 141).
37. *Pyrausta socialis socialis* (Grt.), ♂. 6 mi NW Newcastle, Wyo., 15 July 1965, R. W. Hodges (USNM). (p. 140).
38. *Pyrausta antisocialis* Mun., ♂. Holotype. McGaffey, Zuñi Mts., McKinley Co., N.M., 7500′, 21 July 1962, black light, E. and I. Munroe (CNC). (p. 141).
39. *Pyrausta antisocialis* Mun., ♀. Paratype. Hart Prairie, 8500′, 10 mi NNW Flagstaff, Coconino Co., Ariz., 22 July 1961, J. G. Franclemont (JGF). (p. 141).
40. *Pyrausta sermirubralis* (Pack.), ♂. Tuolumne Meadows, Tulare Co., Calif., 24–31 July, *ex* Barnes coll. (USNM). (p. 132).
41. *Pyrausta semirubralis* (Pack.), ♀. Twin Lakes, Alpine Co., Calif., 21 Aug. 1936, E. C. Johnston (CNC). (p. 132).
42. *Pyrausta semirubralis* (Pack.), ♀. Goldstream, B.C., "8.6.02", *ex* Barnes coll. (USNM). (p. 132).
43. *Pyrausta semirubralis* (Pack.), ♂. Pinnacles, San Benito Co., Calif., 12 May 1937, E. C. Johnston (CNC). (p. 132).
44. *Pyrausta semirubralis* (Pack.), ♀. Glen Alpine, L. Tahoe, Calif., 16–23 July, *ex* Barnes coll. (USNM). (p. 132).
45. *Pyrausta semirubralis* (Pack.), ♂. Crooked Creek, 9500′, White Mts., Mono Co., Calif., 3 airline mi N Inyo Co. line, 22 June 1961, J. Powell, genitalia slide 4048 MS (UCB). (p. 132).
46. *Pyrausta semirubralis* (Pack.), ♂. Satus Creek, Yakima Co., Wash., 29 May 1949, E. C. Johnston (CNC). (p. 132).
47. *Pyrausta semirubralis* (Pack.), ♂. Bryce, Utah, 8215′, 16 July 1949, C. A. Thomas (CNC). (p. 132).
48. *Pyrausta semirubralis* (Pack.), ♀. Todd's Lodge, Oak Creek Canyon, Ariz., 13 June 1941 (CNC). (p. 132).
49. *Pyrausta perrubralis perrubralis* (Pack.), ♂. Inverness, Marin Co., Calif., 30 April 1940, E. C. Johnston (CNC). (p. 129).
50. *Pyrausta perrubralis perrubralis* (Pack.), ♀. Mill Valley, Marin Co., Calif., 8 June 1950, Hugh B. Leech (CNC). (p. 129).
51. *Pyrausta perrubralis perrubralis* (Pack.), ♂. Mill Valley, Marin Co., Calif., 15 May 1935, E. C. Johnston (CNC). (p. 129).
52. *Pyrausta perrubralis shastanalis* Mun., ♂. Holotype. Mt. Shasta, Calif., 19 Aug. 1939, E. C. Johnston (CNC). (p. 129).
53. *Pyrausta perrubralis shastanalis* Mun., ♀. Allotype. Mt. Shasta, Calif., 19 Aug. 1939, E. C. Johnston (CNC). (p. 129).
54. *Pyrausta perrubralis shastanalis* Mun., ♀. Paratype. Truckee, Calif., 10 Aug. 1913, Ximena McGlashan (USNM). (p. 129).
55. *Pyrausta perrubralis saanichalis* Mun., ♂. Holotype. Duncan, B.C., 28 July 1919, W. Downes, genitalia slide EGM 1186 (CNC). (p. 129).
56. *Pyrausta perrubralis saanichalis* Mun., ♀. Paratype. Duncan, B.C., 28 July 1919, W. Downes (CNC). (p. 129).
57. *Pyrausta arizonensis* Mun., ♀. Paratype. Southwestern Research Station, Chiricahua Mts., Cochise Co., Ariz., 8 April 1962, Carl W. Kirkwood (CNC). (p. 131).
58. *Pyrausta arizonensis* Mun., ♀. Paratype. Sycamore Canyon, 4000′, Atascosa Mts., Santa Cruz Co., Ariz., 25 Sept. 1959, J. G. Franclemont (JGF). (p. 131).
59. *Pyrausta scurralis scurralis* (Hulst), ♂. 2 mi SE Green's Peak, White Mts., Apache Co., Ariz., 9500′, 5 Aug. 1962, black light, E. and I. Munroe (CNC). (p. 130).
60. *Pyrausta scurralis scurralis* (Hulst), ♀. Greer, White Mts., Apache Co., Ariz., 8500′, 9 Aug. 1962, black light, E. and I. Munroe (CNC). (p. 130).
61. *Pyrausta scurralis scurralis* (Hulst), ♂. Greer, White Mts., Apache Co., Ariz., 8500′, 5 Aug. 1962, black light, E. and I. Munroe (CNC). (p. 130).
62. *Pyrausta scurralis scurralis* (Hulst), ♂. Fort Valley, 7350′, 7½ mi NW Flagstaff, Coconino Co., Ariz., 31 July 1961, R. W. Hodges (JGF). (p. 130).
63. *Pyrausta scurralis scurralis* (Hulst), ♀. East Turkey Creek, 6300′, Chiricahua Mts., Cochise Co., Ariz., 13 Aug. 1967, J. G. Franclemont (JGF). (p. 130).
64. *Pyrausta scurralis awemealis* Mun., ♂. Holotype. Aweme, Man., 17 July 1920, E. Criddle (CNC). (p. 130).
65. *Pyrausta scurralis awemealis* Mun., ♂. Paratype. Aweme, Man., 22 July 1921, N. Criddle (CNC). (p. 130).
66. *Pyrausta unifascialis subolivalis* (Pack.), ♂. Coldbrook, Kings Co., N.S., 4 June 1951, D. C. Ferguson (USNM). (p. 133).
67. *Pyrausta unifascialis subolivalis* (Pack.), ♀. Coldbrook, Kings Co., N.S., 4 June 1951, D. C. Ferguson (USNM). (p. 133).
68. *Pyrausta unifascialis subolivalis* (Pack.), ♀. Coldbrook, Kings Co., N.S., 4 June 1951, D. C. Ferguson (USNM). (p. 133).
69. *Pyrausta unifascialis subolivalis* (Pack.), ♀. Meach L., Que., 8–15 Sept., *ex* Barnes coll. (USNM). (p. 133).
70. *Pyrausta unifascialis subolivalis* (Pack.), ♀. Aweme, Man., 14 June 1921, N. Criddle (CNC). (p. 133).
71. *Pyrausta unifascialis subolivalis* (Pack.), ♂. Sunnydale, Lloydminster, Alta., 4 July 1948, P. F. Bruggemann (CNC). (p. 133).
72. *Pyrausta unifascialis subolivalis* (Pack.), ♂. Hanna, Alta., 2550′, 16 July 1960, D. F. Hardwick (CNC). (p. 133).
73. *Pyrausta unifascialis unifascialis* (Pack.), ♂. Crowsnest Pass, *ca.* 4500′, Alta., 17 July 1966, D. C. Ferguson (USNM). (p. 134).
74. *Pyrausta unifascialis unifascialis* (Pack.), ♀. Shingle Creek Road, Keremeos, B.C., 9 July 1936, A. N. Gartrell (CNC). (p. 134).
75. *Pyrausta unifascialis unifascialis* (Pack.), ♂. Cle Elum, Wash., 9 May 1931, A. N. Gartrell (CNC). (p. 134).
76. *Pyrausta unifascialis unifascialis* (Pack.), ♀. Pullman, Wash., 8 June 1930, J. F. Clarke (USNM). (p. 134).
77. *Pyrausta unifascialis unifascialis* (Pack.), ♂. Kamiack Butte, Wash., 25 May 1935, reared from *Antennaria insularis*, J. F. Clarke (USNM). (p. 134).
78. *Pyrausta unifascialis unifascialis* (Pack.), ♀. Kamiack Butte, Wash., 11 May 1937, reared from *Antennaria*, J. F. Clarke (USNM). (p. 134).
79. *Pyrausta unifascialis unifascialis* (Pack.), ♂. Tuolumne Meadows, Calif., 14 July 1935, E. C. Johnston (CNC). (p. 134).
80. *Pyrausta unifascialis unifascialis* (Pack.), ♀. Tuolumne Meadows, Calif., 14 July 1935, E. C. Johnston (CNC). (p. 134).
81. *Pyrausta unifascialis rindgei* Mun., ♂. Pine Valley, San Diego Co., Calif., 17 April 1950, E. C. Johnston (CNC). (p. 134).
82. *Pyrausta unifascialis rindgei* Mun., ♀. Paratype. Summit, Mint Canyon, Los Angeles Co., Calif., 3 May 1945, J. A. Comstock (CNC). (p. 134).
83. *Pyrausta unifascialis arizonensis* Mun., ♂. Paratype. Wildcat Creek, White Mts., Ariz., 13 June 1937, Grace H. and John L. Sperry (CNC). (p. 134).
84. *Pyrausta unifascialis arizonensis* Mun., ♀. Wildcat Creek, White Mts., Ariz., 13 June 1937, Grace H. and John L. Sperry (CNC). (p. 134).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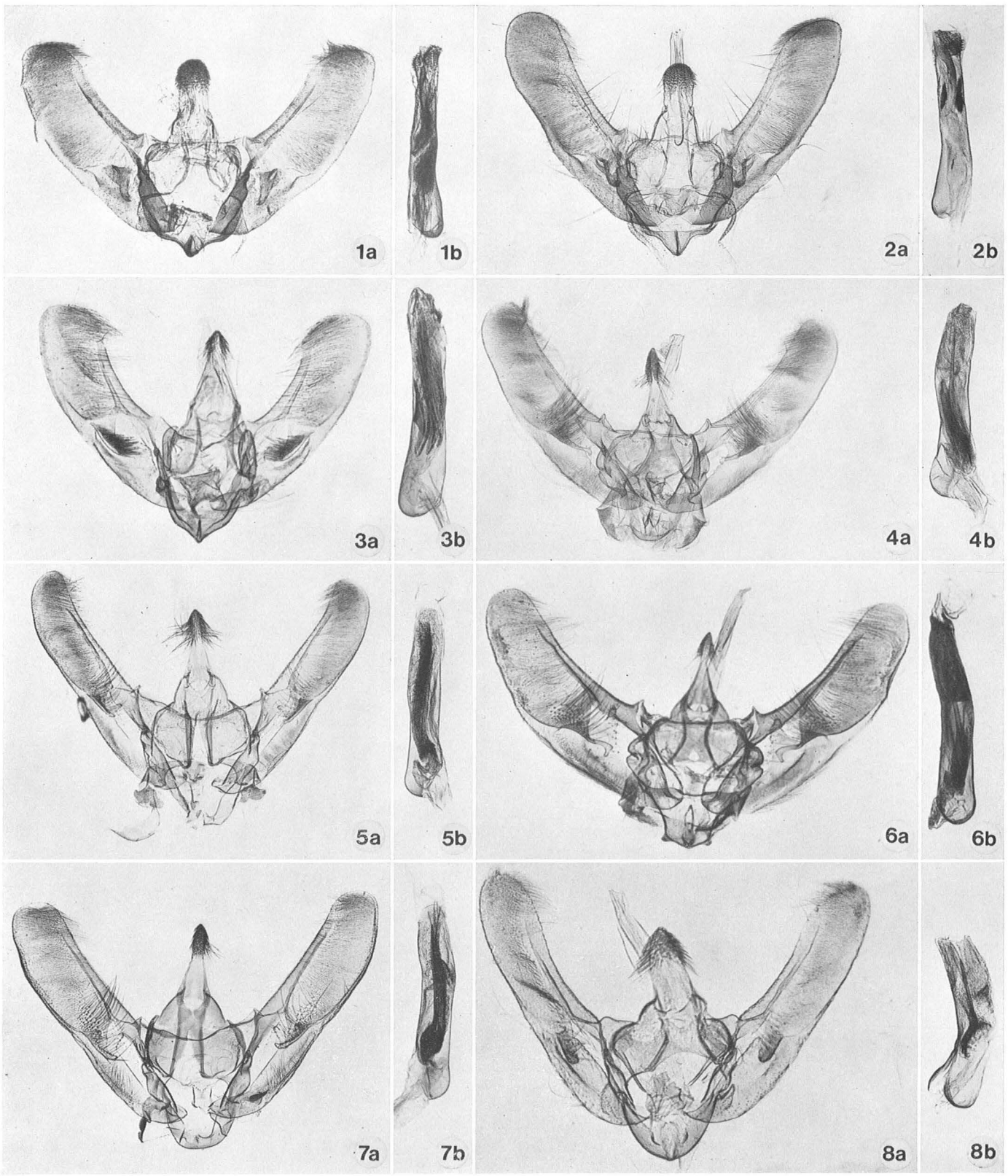


1 a, b. *Loxostege commixtalis* (Wlk.), ♂. Mistassini Post, Que., 6 July 1956, J. R. Lonsway, genitalia slide 4395 DK (CNC). (p. 77). a, genitalia without penis; b, penis.

2 a, b. *Loxostege cereralis* (Zell.), ♂. Simcoe, Ont., 6 Aug. 1959, Freeman and Lewis, genitalia slide 3963 DK (CNC). (p. 77). a, genitalia without penis; b, penis.

3 a, b. *Pyrausta roseivestalis* Mun., ♂, paratype. Tempe, Ariz., 26 Sept. 1921, E. V. Walter, at light, Tempe No. 5423, genitalia slide 4436 DK (USNM). (p. 94). a, genitalia without penis; b, penis.

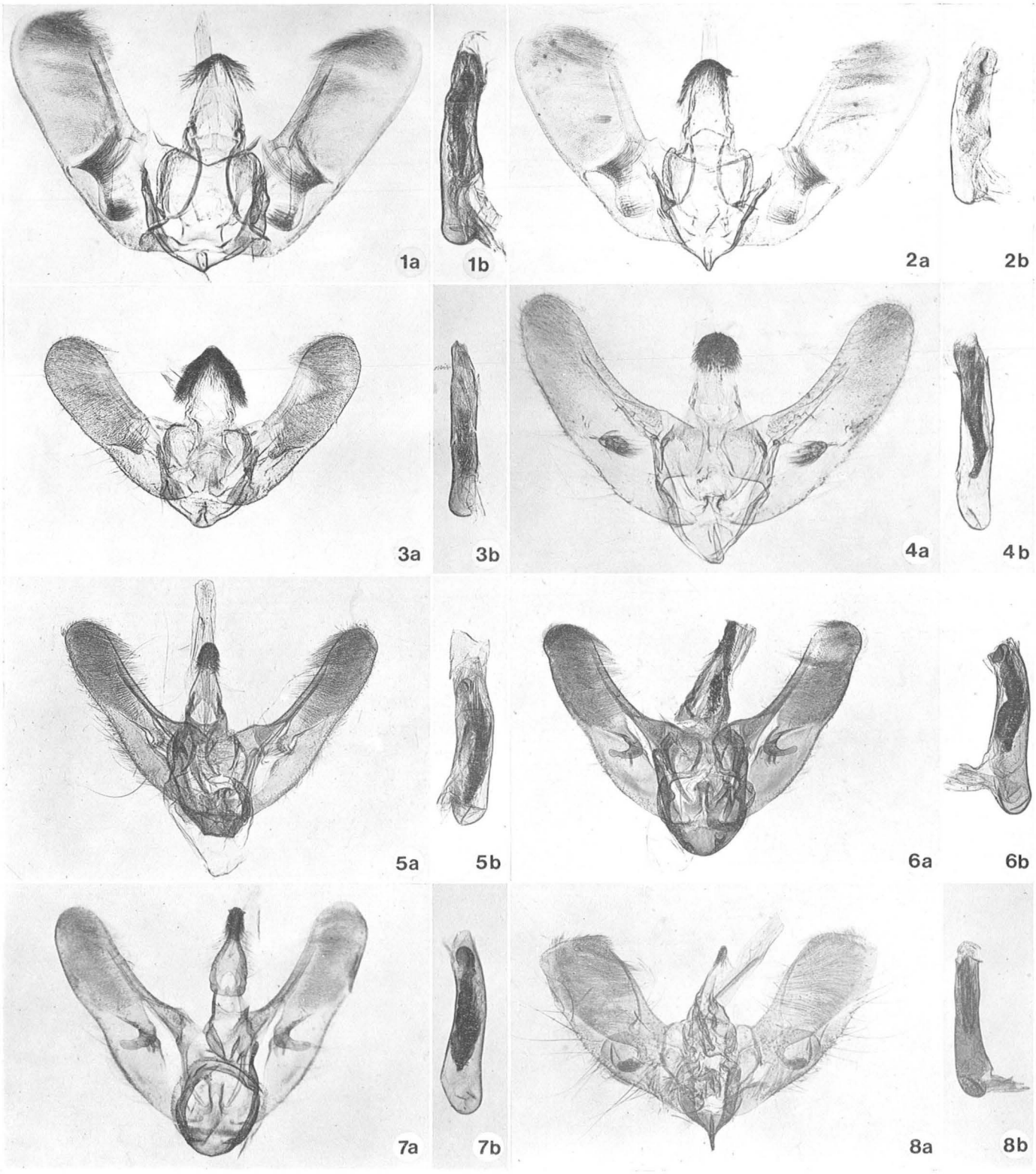
4 a, b. *Pyrausta onythesalis* (Wlk.), ♂. Near Warsaw, Benton Co., Mo., 29 Aug. 1968, at U/V light, J. R. Heitzman, genitalia slide 4129 DK (JRH). (p. 105). a, genitalia without penis; b, penis.

5 a, b. *Pyrausta pseudonythesalis* Mun., ♂, paratype. Vidal, Calif., 18 Sept. 1947, D. Weedmark, genitalia slide 4371 DK (CNC). (p. 105). a, genitalia without penis; b, penis.

6 a, b. *Pyrausta insignitalis* (Gn.), ♂. Homestead, Fla., 25 Sept. 1958, D. O. Wolfenbarger, genitalia slide 4470 DK (CNC). (p. 107). a, genitalia without penis; b, penis.

7 a, b. *Pyrausta klotsi* Mun., ♂, paratype. Upper Camp, Pinery Canyon, Chiricahua Mts., Ariz., 6 July 1956, Lloyd M. Martin, John A. Comstock, William A. Rees, genitalia slide 4537 DK (LACM). (p. 108). a, genitalia without penis; b, penis.

8 a, b. *Pyrausta pseuderosnealis* Mun., ♂, paratype. Titusville, Fla., 14 Feb., *ex* Engel coll. (CM). (p. 114). a, genitalia without penis; b, penis.



1 a, b. *Pyrausta generosa* (G. & R.), ♂. Philadelphia, Pa., 4 July 1904, genitalia slide 4364 DK (CNC). (p. 117). a, genitalia without penis; b, penis.

2 a, b. *Pyrausta subgenerosa* Mun., ♂, holotype. Chipmunk Flat, near Sonora Pass, Tuolumne Co., Calif., 25 June 1962, J. Powell, genitalia slide 4339 DK (UCB). (p. 118). a, genitalia without penis; b, penis.

3 a, b. *Pyrausta subsequalis plagalis* Haim., ♂. McGaffey, Zuñi Mts., McKinley Co., N.M., 7500′, 20 July 1962, E. and I. Munroe, black light, genitalia slide 4062 DK (CNC). (p. 123). a, genitalia without penis; b, penis.

4 a, b. *Pyrausta tatalis* (Grt.), ♂. White's City, Eddy Co., N.M., 15 May 1950, E. C. Johnston, genitalia slide 1891 DK (CNC). (p. 125). a, genitalia without penis; b, penis.

5 a, b. *Pyrausta fodinalis septentrionicola* Mun., ♂. Waterton Lakes, Alta., 24 June 1923, J. McDunnough, genitalia slide 3404 DK (CNC). (p. 139). a, genitalia without penis; b, penis.

6 a, b. *Pyrausta socialis socialis* (Grt.), ♂. Toronto, Ont., genitalia slide 3400 DK (USNM). (p. 140). a, genitalia without penis; b, penis.

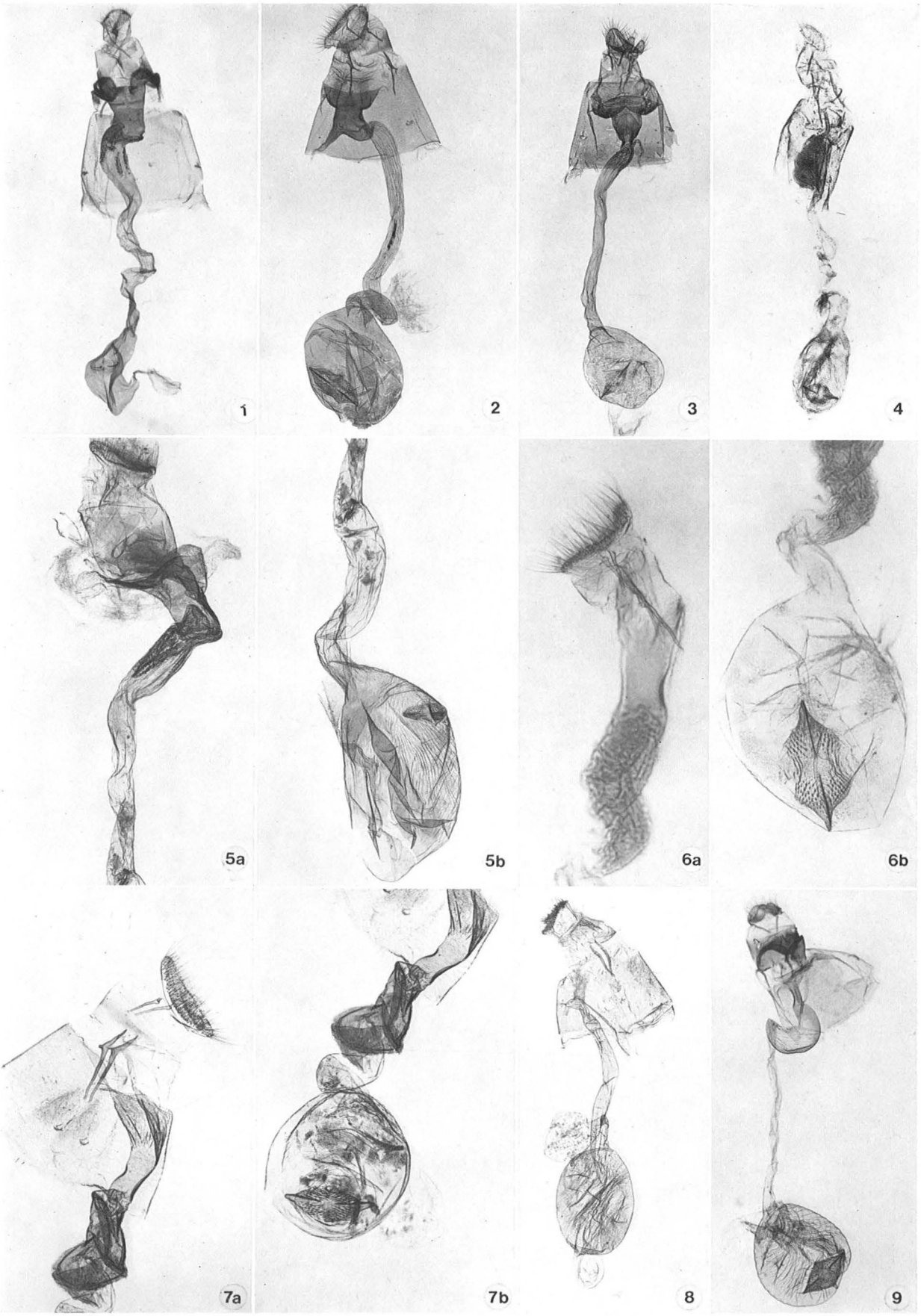
7 a, b. *Pyrausta antisocialis* Mun., ♂, paratype. McGaffey, Zuñi Mts., McKinley Co., N.M., 7500′, July 1962, E. and I. Munroe, black light, genitalia slide 1417 DK (CNC). (p. 141). a, genitalia without penis; b, penis.

8 a, b. *Hyalorista taeniolalis* (Gn.), ♂. Middlesex, Stann Cr. Distr., Br. Honduras, 7 Aug. 1964, E. C. Welling, genitalia slide 3526 DK (CNC). (p. 143). a, genitalia without penis; b, penis.

PLATE L *on facing page*

1. *Munroeodes thalesalis* (Wlk.), ♀. Cameron Co., Tex., 6 July 1968, Roy O. and C. A. Kendall, *ex* larva on *Citharexylum berlandieri* Robins, genitalia slide 3632 DK (CNC). (p. 12).

2. *Saucrobotys fumoferalis* (Hlst.), ♀. Seton L., Lillooet, B.C., 15 June 1926, J. McDunnough, genitalia slide 3418 DK (CNC). (p. 13).



3. *Nascia acutella* (Wlk.), ♀. Mt. Uniacke, N.S., 19 July 1946, D. C. Ferguson, genitalia slide 4538 DK (CNC). (p. 15).

4. *Pseudopyrausta santatalis* (B. & McD.), ♀. Homestead, Fla., D. O. Wolfenbarger, genitalia slide 4424 DK (CNC). (p. 17).

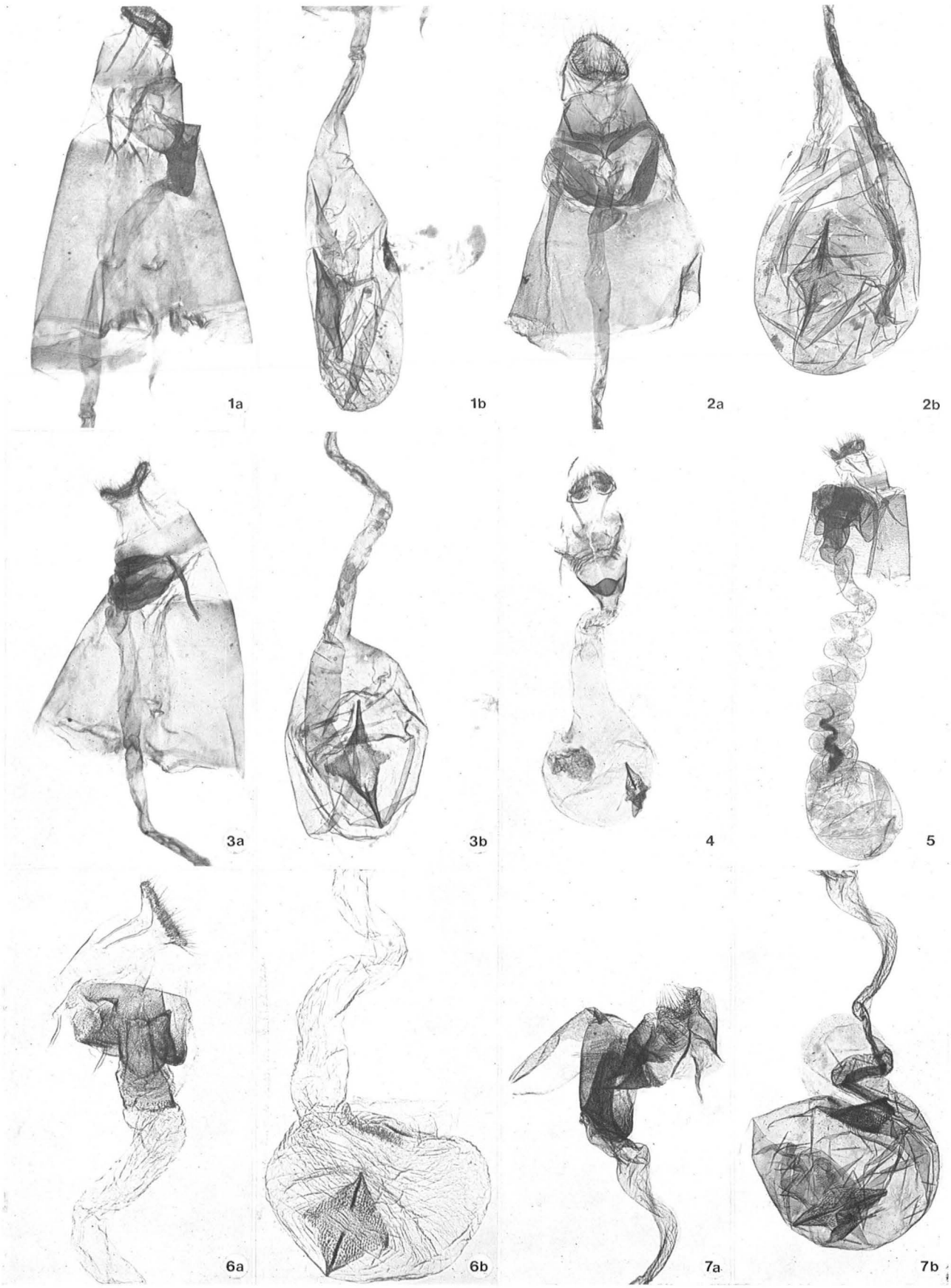
5 a, b. *Epicorsia oedipodalis* (Gn.), ♀. Homestead, Fla., 15 April 1937, M. E. Forsyth, genitalia slide EGM 1417 (CNC). (p. 16). a, posterior part; b, anterior part.

6 a, b. *Oenobotys vinotinctalis* (Hmps.), ♀. Punta Gorda, Fla., April 1952, I. R. Vockeroth, genitalia slide 1851 DK (CNC). (p. 18).

7 a, b. *Oenobotys texanalis* Mun. & A. Blanch., ♀. Big Bend, SW Texas, 15–30 April 1936, O. C. Poling, genitalia slide 3553 DK (LEM). (p. 18). a, posterior part; b, anterior part.

8. *Triuncidia eupalusalis* (Wlk.), ♀. Bartica, Guayana, 15 Jan. 1913, R. S. Parish, genitalia slide 4434 DK (CM). (p. 20).

9. *Crocidophora serratissimalis* Zell., ♀. Laval des Rapides, Que., 25 July 1962, A. C. Sheppard, genitalia slide 3393 DK (CNC). (p. 21).



1 a, b. *Ostrinia penitalis* (Grt.), ♀. Bolton, Hinds Co., Miss., 23 Aug. 1960, Lancaster, genitalia slide 4432 DK (CNC). (p. 24). a, posterior part; b, anterior part.

2 a, b. *Ostrinia obumbratalis* (Led.), ♀. Allegheny Co., Pa., Aug. 1900, genitalia slide 4457 DK (CM). (p. 25). a, posterior part; b, anterior part.

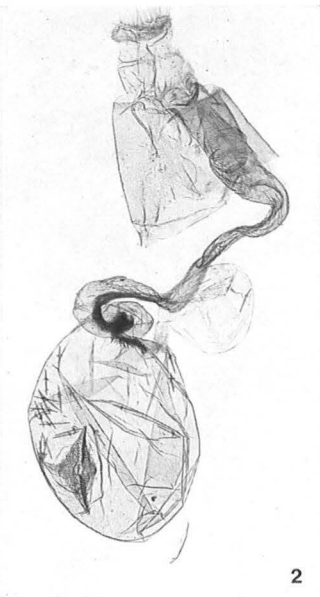
3 a, b. *Ostrinia nubilalis* (Hbn.), ♀. Black Sturgeon L., Ont., 17 Sept. 1963, trap light, genitalia slide 4431 DK (CNC). (p. 26). a, posterior part; b, anterior part.

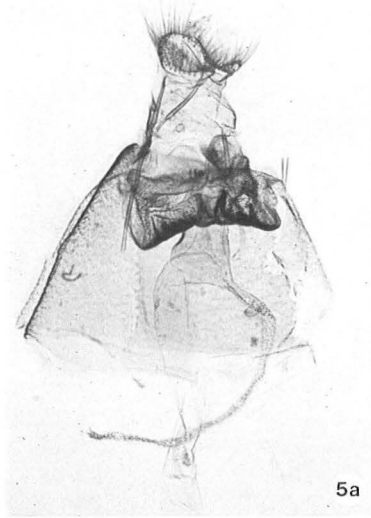
4. *Perispasta caeculalis* Zell., ♀. Seton L., Lillooet, B.C., 22 July 1933, J. McDunnough, genitalia slide 1843 DK (CNC). (p. 28).

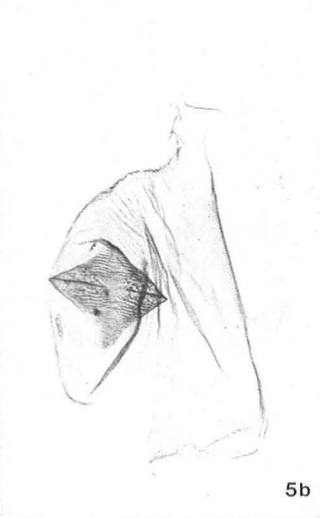
5. *Eurrhypara hortulata* (L.), ♀. L. à la Tortue, Laviolette Co., Que., 14 July 1947, E. G. Munroe, genitalia slide 3399 DK (CNC). (p. 29).

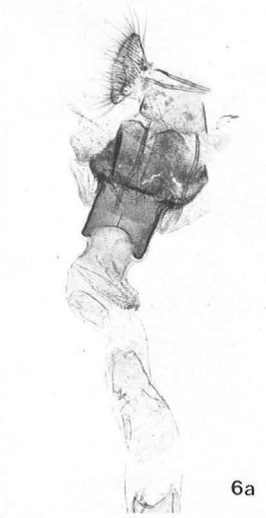
6 a, b. *Phlyctaenia coronata tertialis* (Gn.), ♀. Hamilton, Ont., 23 July 1940, M. Plomley, genitalia slide 1849 DK (CNC). (p. 31). a, posterior part; b, anterior part.

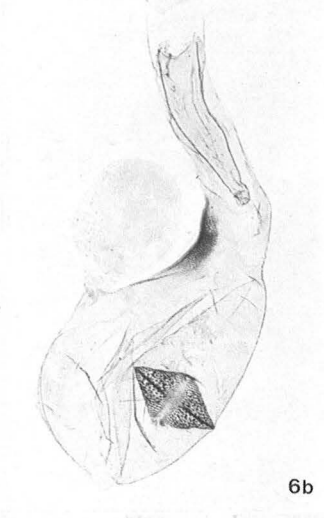
7 a, b. *Phlyctaenia quebecensis* Mun., ♀, paratype. L. à la Tortue, Laviolette Co., Que., 20 July 1947, E. G. Munroe, genitalia slide 4439 DK (CNC). (p. 31). a, posterior part; b, anterior

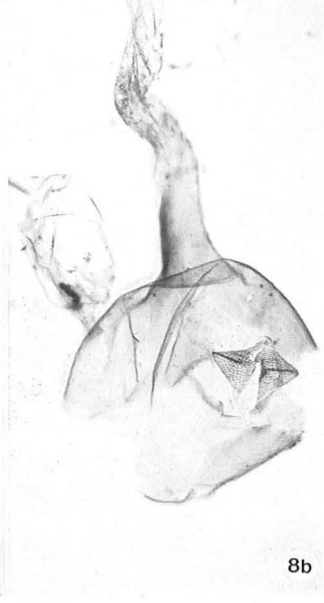












1. *Nealgedonia extricalis dionalis* (Wlk.), ♀. S. Milford, N.S., 25 June 1934, J. McDunnough, genitalia slide 3375 DK (CNC). (p. 34).
2. *Mutuuraia mysippusalis* (Wlk.), ♀. Monroe Co., N.Y., 23 June 1947, C. P. Kimball, genitalia slide 3397 DK (CNC). (p. 35).
3. *Anania funebris glomeralis* (Wlk.), ♀. Gillam, Man., 15 June 1950, J. F. McAlpine, genitalia slide 3389 DK (CNC). (p. 37).
4. *Hahncappsia alpinensis* (Capps), ♀, paratype. Montague Co., Tex., 3 July 1940, L. H. Bridwell, genitalia slide HWC 17,672 (CNC). (p. 41).

5 a, b. *Hahncappsia fordi* (Capps), ♀, paratype. Borrego, Calif., June

6 a, b. *Hahncappsia marculenta* (G. & R.), ♀. Near Warsaw, Benton Co., Mo., 25 May 1972, J. R. Heitzman, at black light, genitalia slide 2828 DK (JRH). (p. 41). a, posterior part; b, anterior part.

7 a, b. *Hahncappsia pseudobliteralis* (Capps), ♀, paratype. Madera Canyon, Pima Co., Ariz., 5–12 Sept. 1952, William Hammer, genitalia slide HWC 17,628 (CNC). (p. 42). a, posterior part; b, anterior part.

8 a, b. *Hahncappsia neobliteralis* (Capps), ♀, paratype. Hemmingford, Que., 5 Aug. 1924, C. E. Petch, genitalia slide HWC 17,627 (CNC). (p. 42). a, posterior part; b, anterior part.

1 a, b. *Hahncappsia neomarculenta* (Capps), ♀, paratype. Skyland, Va., 5–11 July, genitalia slide HWC 10,631 (USNM). (p. 42). a, posterior part; b, anterior part.

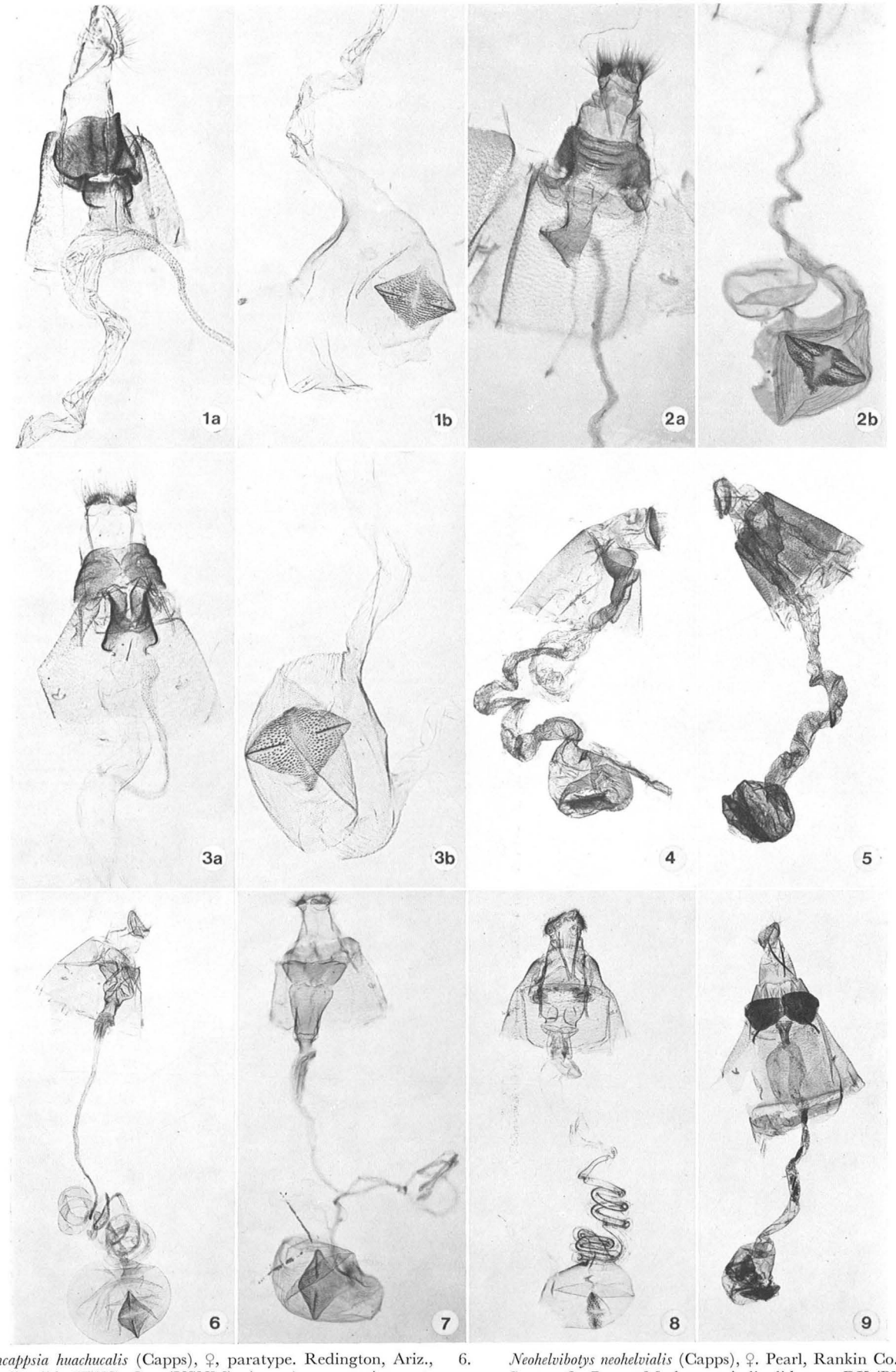
2 a, b. *Hahncappsia jaralis* (Schs.), ♀. Oaxaca, Mex., genitalia slide HWC 6016 (USNM). (p. 43). a, posterior part; b, anterior part.

3 a, b. *Hahncappsia mancalis* (Led.), ♀. Independence, Jackson Co., Mo., 4 June 1968, J. R. Heitzman, black light, genitalia slide 2820 DK (JRH). (p. 43). a, posterior part; b, anterior part.

4 a, b. *Hahncappsia pergilvalis* (Hlst.), ♀. Leamington, Ont., 7 Sept. 1954, W. R. M. Mason, genitalia slide HWC 17,638 (CNC). (p. 43). a, posterior part; b, anterior part.

5 a, b. *Hahncappsia cochisensis* (Capps), ♀, paratype. Madera Canyon, Sta. Rita Mts., 15 Aug. 1949, genitalia slide HWC 10,021 (USNM). (p. 44). a, posterior part; b, anterior part.

6 a, b. *Hahncappsia coloradensis* (G. & R.), ♀. Rock Creek Canyon, Colorado Sprs., Colo., 1 July 1960, Margot May, genitalia slide 3386 DK (CNC). (p. 44). a, posterior part; b, anterior



1 a, b. *Hahncappsia huachucalis* (Capps), ♀, paratype. Redington, Ariz., genitalia slide HWC 7839 (USNM). (p. 45). a, posterior part; b, anterior part.

2 a, b. *Hahncappsia mellinialis* (Druce), ♀. Badger, Ariz., 31 July 1924, E. P. VanDuzee, genitalia slide HWC 17,633 (CNC). (p. 45). a, posterior part; b, anterior part.

3 a, b. *Hahncappsia ramsdenalis* (Schs.), ♀. Jalapa, Mex., genitalia slide HWC 7867 (USNM). (p. 44). a, posterior part; b, anterior part.

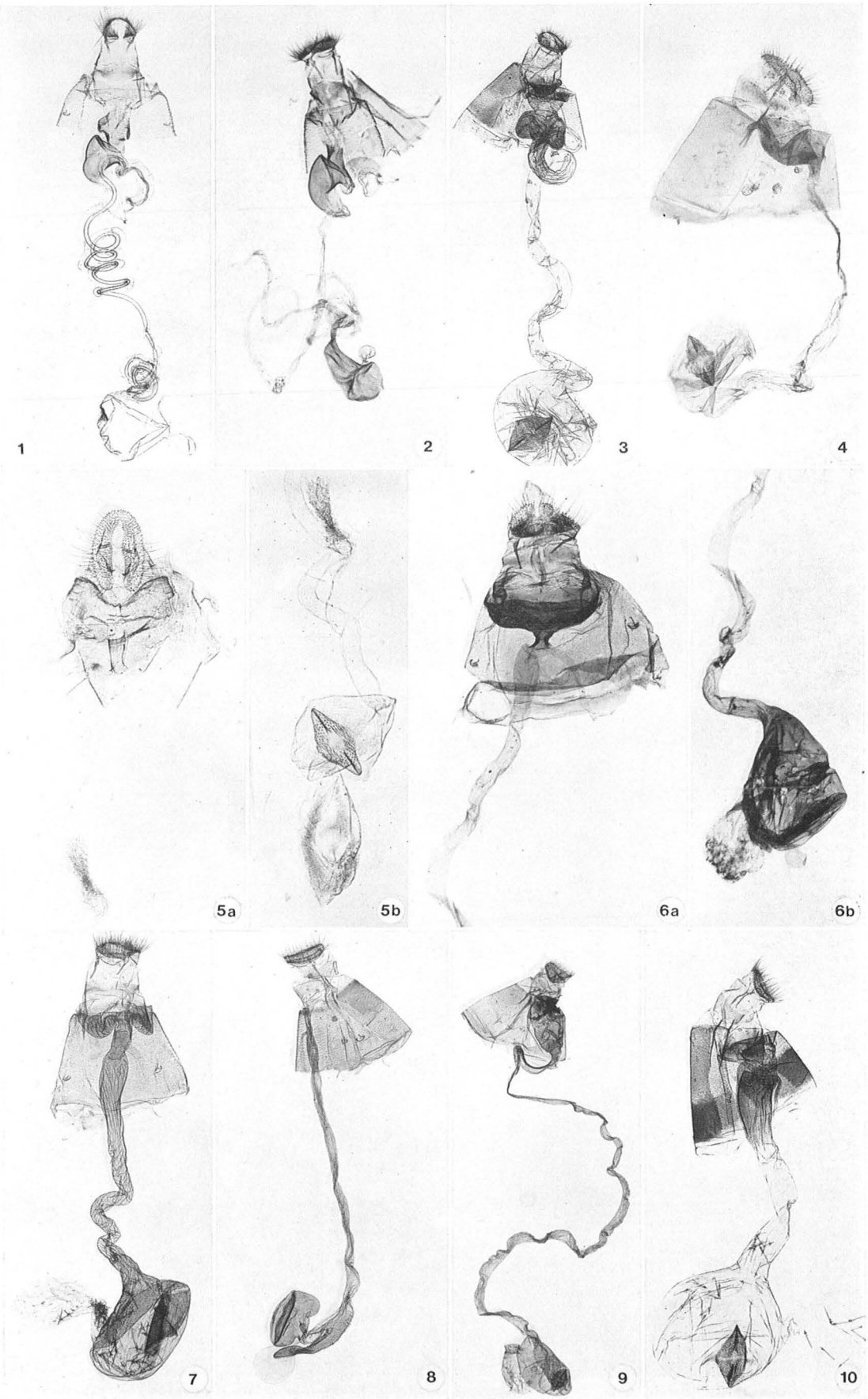
4. *Achyra rantalis* (Gn.), ♀. Norman, Okla., 16 Aug. 1953, W. J. Reinthal, genitalia slide 4418 DK (CNC). (p. 47).

6. *Neohelvibotys neohelvialis* (Capps), ♀. Pearl, Rankin Co., Miss., 14 Sept. 1963, Bryant Mather, genitalia slide 3095 DK (BM). (p. 49).

7. *Neohelvibotys arizonensis* (Capps), ♀, paratype. Madera Canyon, Pima Co., Ariz., 5–12 Sept. 1951, William Hammer, genitalia slide HWC 17,683 (CNC). (p. 49.)

8. *Neohelvibotys polingi* (Capps), ♀, paratype. Lakeland, Fla., genitalia slide HWC 7844 (USNM). (p. 49).

9. *Fumibotys fumalis* (Gn.), ♀. Butler, Pa., 19 June 1945, Preston trapping experiments, genitalia slide 4539 DK (CM). (p. 28).



1.
Helvibotys helvialis (Wlk.), ♀. San Benito, Tex., 24–30 April, genitalia slide HWC 7964 (USNM). (p. 50).

2.
Helvibotys pseudohelvialis (Capps), ♀, paratype. Madera Canyon, Pima Co., Ariz., 5–12 Sept. 1951, William Hammer, genitalia slide HWC 17,654 (CNC). (p. 51).

3.
Sitochroa dasconalis (Wlk.), ♀. W. Tisbury, Mass., 15 July 1947, genitalia slide 3369 DK (CNC). (p. 53).

4.
Arenochroa flavalis (Fern.), ♀. Apple Valley, Calif., 8 May 1955, D. F. Hardwick, genitalia slide 3587 DK (CNC). (p. 54).

5 a, b.
Xanthostege roseiterminalis (B. & McD.), ♀. Brownsville, Tex., 26 March 1937, T. N. Freeman, genitalia slide EGM 1580 (CNC). (p. 55). a, posterior part; b, anterior part.

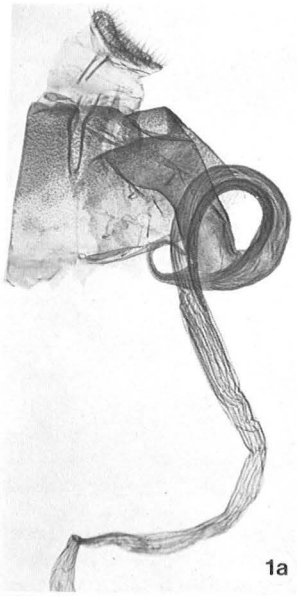
6 a, b.
Xanthostege plana (Grt.), ♀. Madera Canyon, Santa Rita Mts., Ariz., 20 Aug. 1946, genitalia slide 4834 DK (CNC). (p. 56). a, posterior part; b, anterior part.

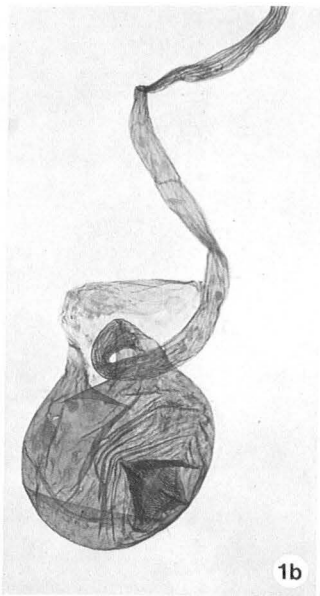
7.
Sericoplaga externalis Warr., ♀. Clinton, Hinds Co., Miss., 11 July 1959, B. Mather, No. 1914, genitalia slide 3403 DK (BM). (p. 56).

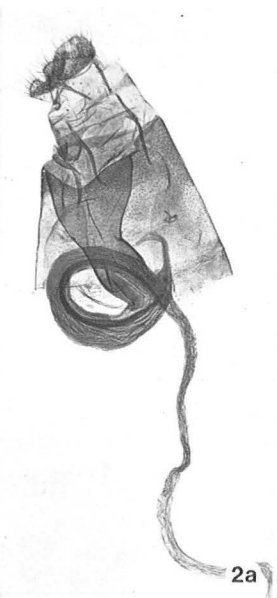
8.
Uresiphita reversalis (Gn.), ♀. Mesa Grande, Calif., 29 Dec. 1939, lupine, genitalia slide 3401 DK (CNC). (p. 57).

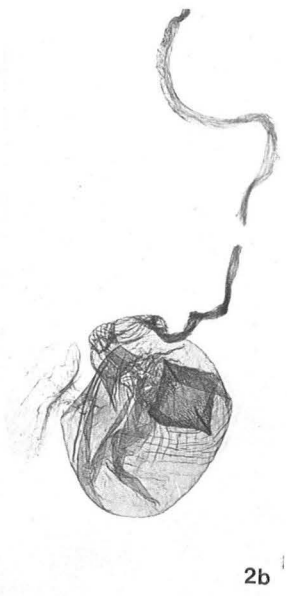
9.
Loxostege unicoloralis (B. & McD.), ♀. Phoenix, Ariz., 17 Sept. 1907, R. C. Kunzé, genitalia slide 3408 DK (CNC). (p. 62).

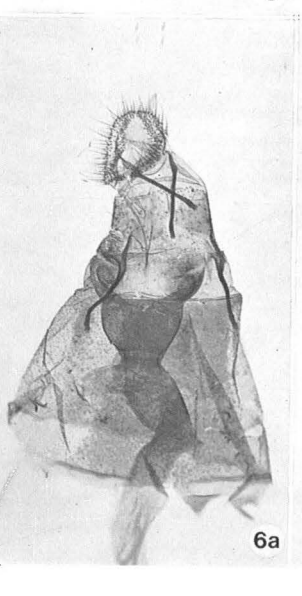
10.
Loxostege sticticalis (L.), ♀. Glenboro, Mass., 17 June 1958, R. L. Hurley, genitalia slide 3373 DK (CNC). (p. 65).

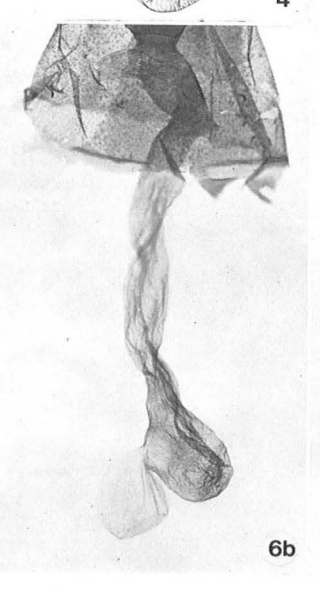












1 a, b.
Loxostege oberthuralis Fern., ♀. 8 mi S of Pioche, Nev., 4500′, 3 Sept. 1965, D. F. Hardwick, genitalia slide 3603 DK (CNC). (p. 63). a, posterior part; b, anterior part.

2 a, b.
Loxostege egregialis Mun., ♀, paratype. Paradise, Cochise Co., Ariz., 8–15 May, *ex* Barnes coll., genitalia slide 3601 DK (USNM). (p. 64). a, posterior part; b, anterior part.

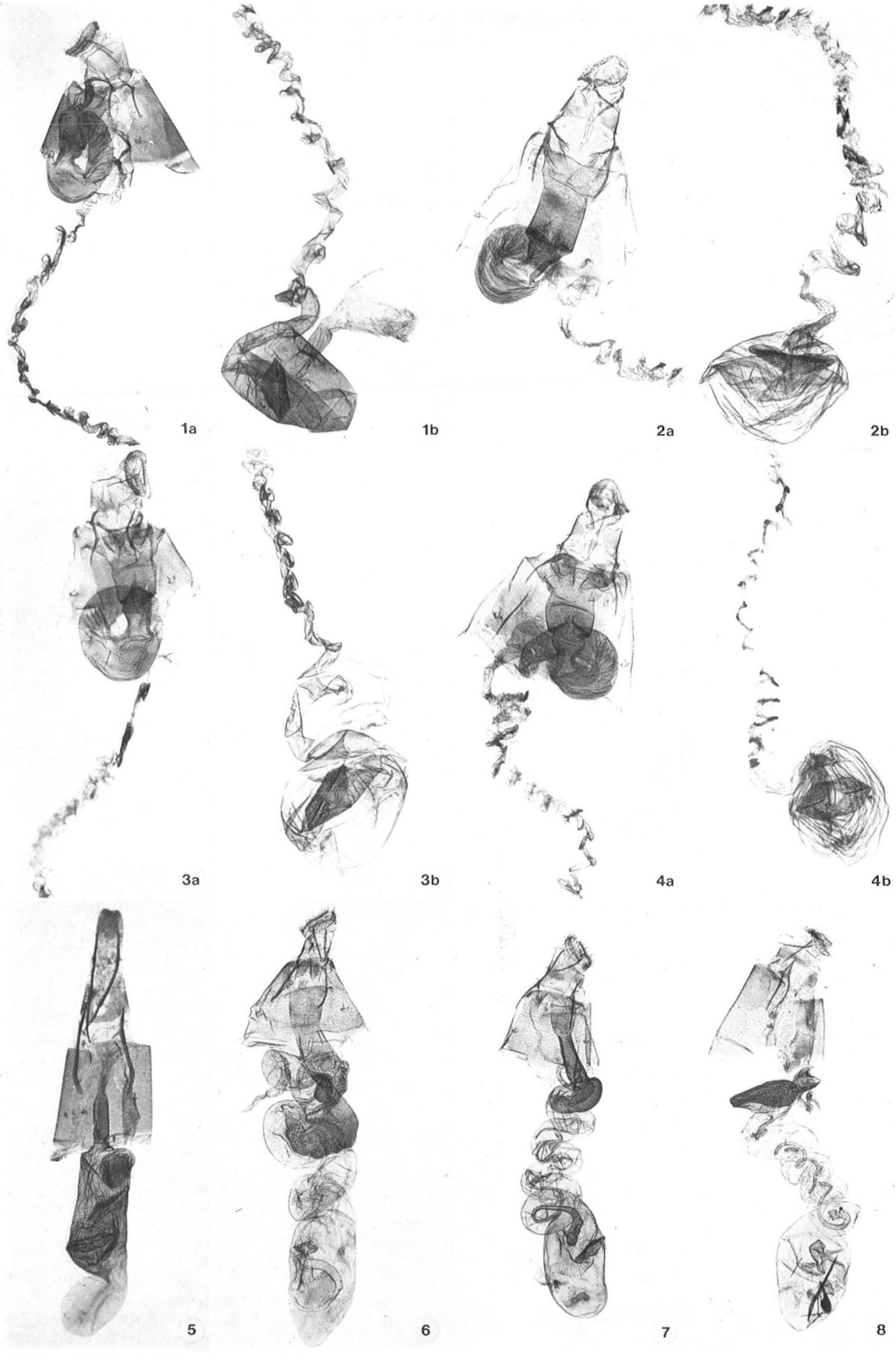
3.
Loxostege mojavealis Capps, ♀. Mt. Audubon, Boulder Co., Colo., 10,000′, 15 July 1955, R. H. Leuschner, genitalia slide 3607 DK (RHL). (p. 66).

4.
Loxostege kingi Mun., ♀, paratype. Big Pine Creek, 5 mi W of Big Pine, Inyo Co., Calif., 5000′, 22 May 1967, Lloyd M. Martin, genitalia slide 4427 DK (LACM). (p. 67).

5 a, b.
Loxostege annaphilalis (Grt.), ♀. Tie Can., San Gabriel Mts., Calif., 28 Mar. 1959, C. L. Hogue, genitalia slide 3618 DK (LACM). (p. 68). a, posterior part; b, anterior part.

6 a, b.
Loxostege immerens (Harv.), ♀. El Segundo sand dunes, Los Angeles Co., Calif., 30 March 1939, Lloyd M. Martin, genitalia slide 3613 DK (CNC). (p. 69). a, posterior part; b, anterior part.

7 a, b.
Loxostege thallophilalis (Hlst.), ♀. Searles Peak, Rainier Natl. Pk., Wash., 23 July 1936, E. C. Van Dyke, genitalia slide 4535 DK (CAS). (p. 72). a, posterior part; b, anterior part.



1 a, b.
Loxostege brunneitincta Mun., ♀, paratype. Mt. Lassen, Calif., 7000′, 14 July 1934, E. P. VanDuzee, genitalia slide 4413 DK (CAS). (p. 73). a, posterior part; b, anterior part.

2 a, b.
Loxostege sierralis tularealis Mun., ♀, paratype. Mineral King, Tulare Co., Calif., 20 July 1936, genitalia slide 4390 (LACM). (p. 76). a, posterior part; b, anterior part.

3 a, b.
Loxostege commixtalis (Wlk.), ♀. Cartwright, Labr., 25 Aug. 1955, E. E. Sterns, genitalia slide 4394 DK (CNC). (p. 77). a, posterior part; b, anterior part.

4 a, b.
Loxostege cereralis (Zell.), ♀. Samoa Dunes, Humboldt Co., Nev., 25 June 1969, J. Powell, genitalia slide 4386 DK (UCB). (p. 77). a, posterior part; b, anterior part.

5.
Pyrausta roseivestalis Mun., ♀, paratype. Vidal, Calif., 3 Oct. 1947, D. Weedmark, genitalia slide 4435 DK (CNC). (p. 94).

6.
Pyrausta onythesalis (Wlk.), ♀. Independence, Jackson Co., Mo., 29 Aug. 1968, J. R. Heitzman, U/V light, genitalia slide 4131 DK (JRH). (p. 105).

7.
Pyrausta pseudonythesalis Mun., ♀, paratype. Borrego, Calif., 30 April 1952, Grace H. and John L. Sperry, genitalia slide 4373 DK (CNC). (p. 105).

8.
Pyrausta insignitalis (Gn.), ♀. Oneco, Manatee Co., Fla., 25 Aug. 1954, Paula Dillon, genitalia slide 4347 DK (CNC). (p. 107).

1.
Pyrausta klotsi Mun., ♀, paratype. Madera Canyon, Sta. Rita Mts., Sta. Cruz Co., Ariz., 4880′, 5 July 1963, J. G. Franclemont, genitalia slide 4354 DK (JGF). (p. 108).

2.
Pyrausta rubricalis (Hbn.), ♀. Edwardsville, Ill., 5 Sept. 1951, R. S. Funk, tungsten light, genitalia slide 4350 DK (JRH). (p. 112).

3.
Pyrausta californicalis californicalis (Pack.), ♀. Los Angeles, Calif., 24 Aug. 1942, F. H. Rindge, *ex* larva on mint, genitalia slide 4357 DK (AMNH). (p. 113).

4.
Pyrausta pseuderosnealis Mun., ♀, paratype. Lutz, Fla., 7 July 1913, Acc. 7963, genitalia slide 4138 DK (CM). (p. 114).

5.
Pyrausta subsequalis petaluma Mun., ♀, paratype. Webber Cr., near Camino, El Dorado Co., Calif., 25 June 1960, D. D. Linsdale, genitalia slide 4059 DK (UCB). (p. 123).

6.
Pyrausta tatalis (Grt.), ♀. Dune Lakes, 3 mi S Oceano, S. Luis Obispo Co., Calif., 6 June 1973, J. Powell, genitalia slide 4058 DK (UCB). (p. 125).

7.
Pyrausta retidiscalis Mun., ♀, holotype. The Basin, Big Bend Natl. Pk., Tex., 4 Oct. 1967, A. and M. E. Blanchard, genitalia slide 4130 DK (AB). (p. 126).

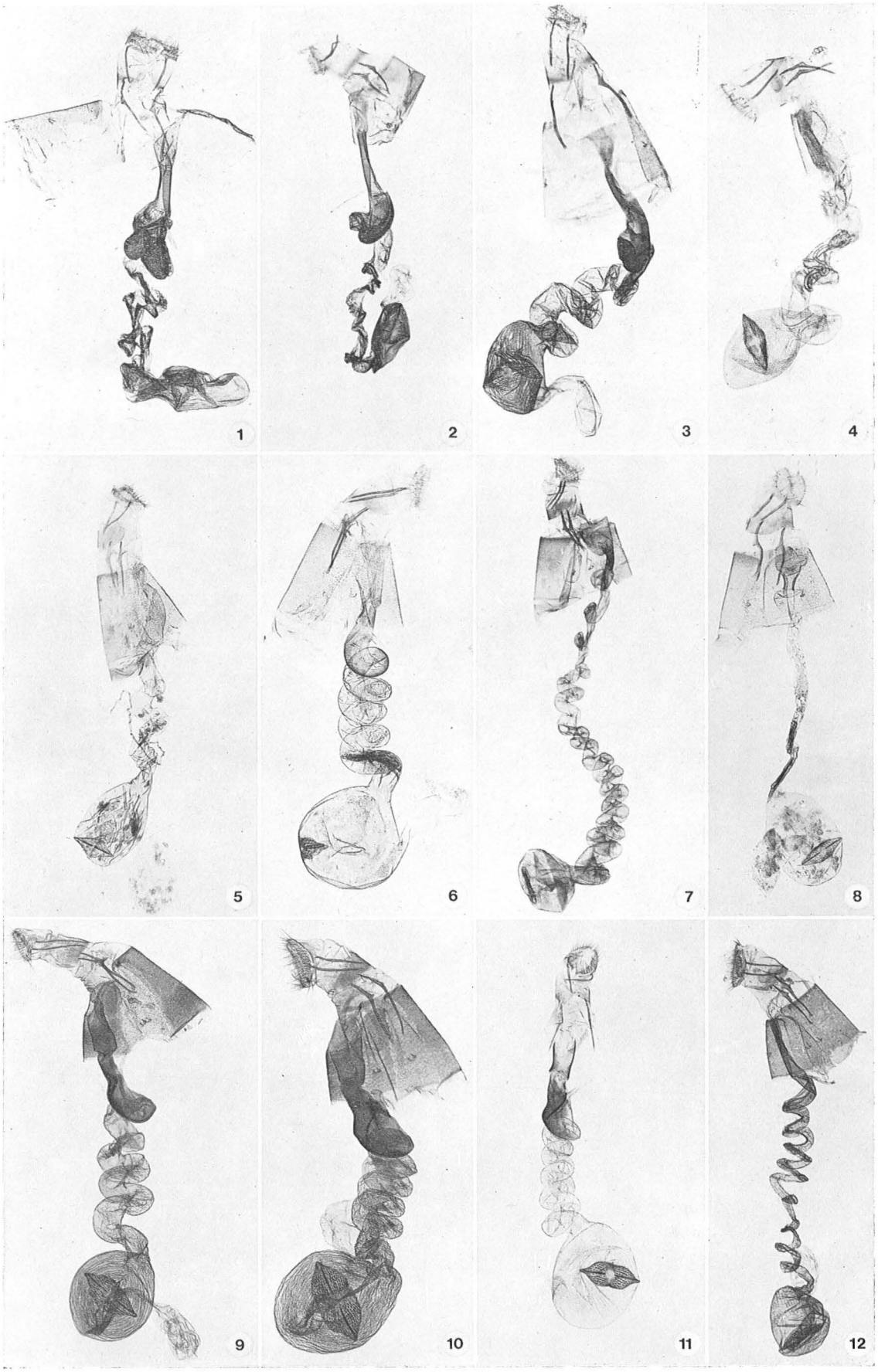
8.
Pyrausta andrei Mun., ♀, holotype. Green Gulch, Big Bend Natl. Pk., Tex., 28 March 1971, A. and M. E. Blanchard, genitalia slide 4134 DK (AB). (p. 127).

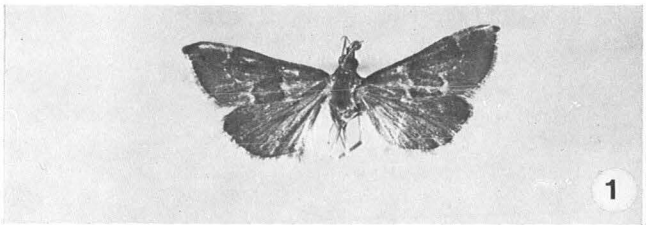
9.
Pyrausta fodinalis septentrionicola Mun., ♀, paratype. Katepwa L., Sask., 25 June 1925, J. J. deGryse, genitalia slide 3405 DK (CNC). (p. 139).

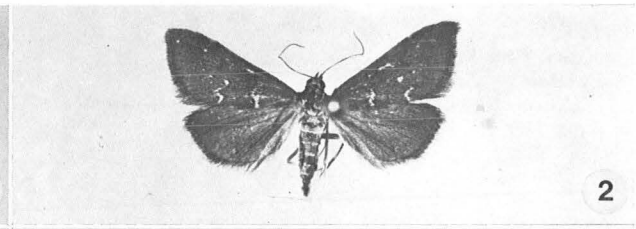
10.
Pyrausta socialis socialis (Grt.), ♀. Simcoe, Ont., 28 June 1939, G. M. Freeman, genitalia slide 3407 DK (CNC). (p. 140).

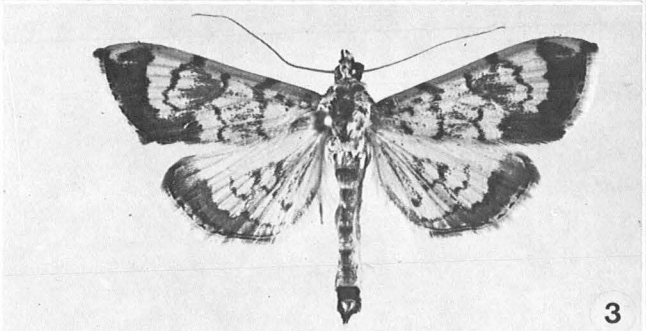
11.
Pyrausta antisocialis Mun., ♀, paratype. McGaffey, Zuñi Mts., McKinley Co., N.M., July 1962, E. and I. Munroe, black light, genitalia slide 1418 DK (CNC). (p. 141).

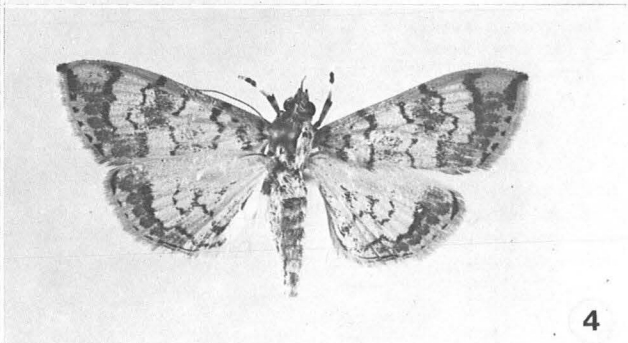
12.
Hyalorista taeniolalis (Gn.), ♀. Middlesex, Stann Cr. Distr., Br. Honduras, 5 Aug. 1964, E. C. Welling, genitalia slide 3525 DK (CNC). (p. 143).

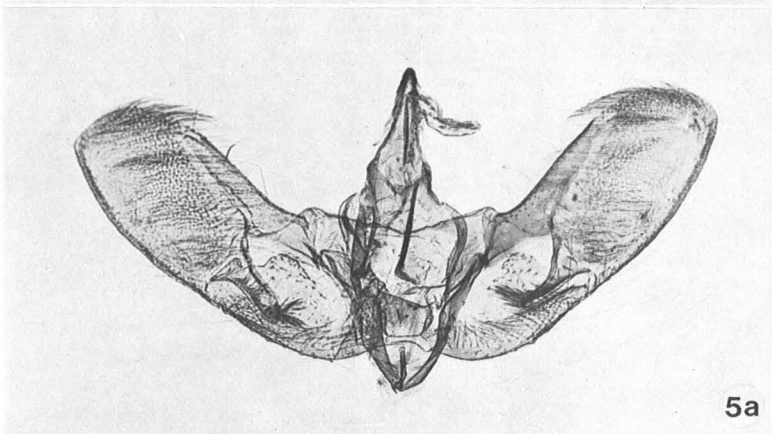


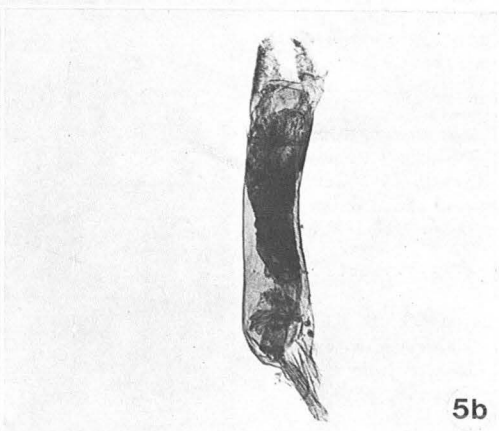


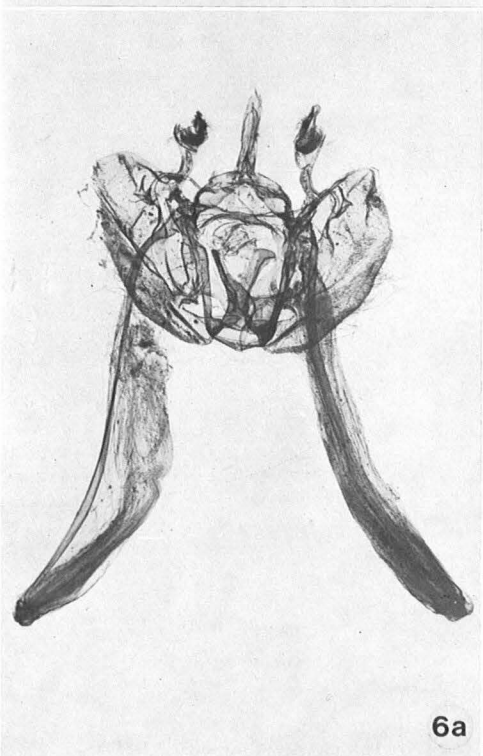


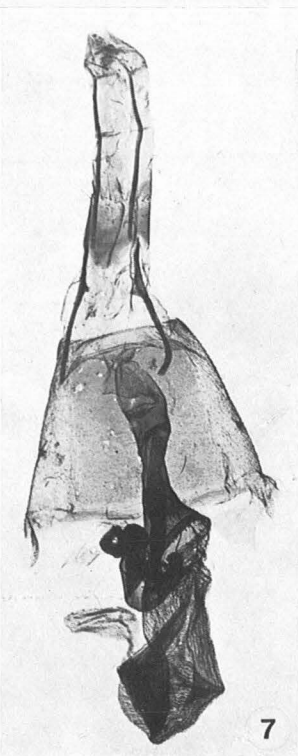


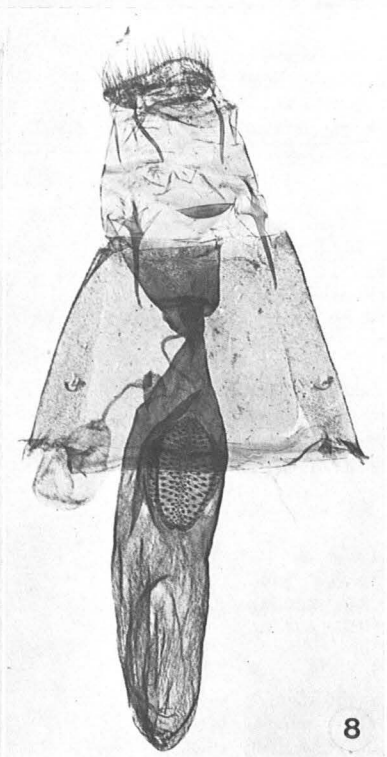












1. *Pyrausta shirleyae* Mun., ♂, holotype. Pensacola, Fla., March 1961, Shirley Hills, genitalia slide 4154 MS (CNC). (p. 102).
2. *Pyrausta shirleyae* Mun., ♀, allotype. Pensacola, Fla., 21 March 1962, Shirley Hills (CNC). (p. 102).
3. *Portentomorpha xanthialis* (Gn.), ♂. Upper Rio Chipiriri, Chapare District, Bolivia, 400 m, 4 Sept. 1953. W. Forster (ZSBS). (p. 144).
4. *Portentomorpha xanthialis* (Gn.), ♀. Rio Vermelho, Sta. Catarina, Brazil, April 1956, A. Maller (CNC). (p. 144).
5. a, b. *Pyrausta shirleyae* Mun., ♂, paratype. Shalimar, Fla., 19 March 1964, H. O. Hilton, genitalia slide 4701 DK (CPK). (p. 102). a, genitalia without penis; b, penis.
6. a, b. *Portentomorpha xanthialis* (Gn.), ♂. Todos Santos, Chapare, Cochabamba, Bolivia, 300 m, Nov. 1955, F. Steinbach, genitalia slide 4686 DK (CNC). (p. 144). a, genitalia without penis; b, penis.
7. *Pyrausta shirleyae* Mun., ♀, paratype, genitalia. Shalimar, Fla., 23 March 1964. H. O. Hilton, genitalia slide 4700 DK (CPK). (p. 102).
8. *Portentomorpha xanthialis* (Gn.), ♀, genitalia. Rio Vermelho, Sta. Catarina, Brazil, April 1956, A. Maller, genitalia slide 4687 DK (CNC). (p. 144).

NOTES

1. ABBREVIATIONS FOR COLLECTORS AND COLLECTIONS

AB	André Blanchard
ABK	Alexander B. Klots
AEB	A. E. Brower
AFB	Annette F. Braun
AMNH	American Museum of Natural History
ANSP	Academy of Natural Sciences, Philadelphia
BH	Bernard Heineman
BM	Bryant Mather
BMNH	British Museum (Natural History)
CAS	California Academy of Sciences, San Francisco
CM	Carnegie Museum
CNC	Canadian National Collection
CPK	C. P. Kimball
CU	Cornell University
DCF	D. C. Ferguson
FMNH	Field Museum of Natural History
GS	Gayle Strickland
HUMB	Museum Alexander Humboldt, Berlin University
INHS	Illinois Natural History Survey
JGF	J. G. Franclemont
JN	John Newman
JRH	J. R. Heitzman
KWP	K. W. Philip
LACM	Los Angeles County Museum of Natural History
LEM	Lyman Entomological Museum
MCZ	Museum of Comparative Zoology, Harvard University
MNSA	Museu Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires
MOG	Murray O. Glenn
MSU	Michigan State University
NHMV	Naturhistorisches Museum, Vienna
NSM	Nova Scotia Museum
PMBC	Provincial Museum of British Columbia
RHL	Ronald H. Leuschner
ROK	R. O. Kendall
ROM	Royal Ontario Museum, University of Toronto
SAH	Sidney A. Hessel
UA	University of Alberta
UBC	University of British Columbia
UCB	University of California, Berkeley
UCD	University of California, Davis
UM	University of Michigan
UMO	University Museum, Oxford
USNM	United States National Museum
WEM	William E. Miller
WPC	Wedge Plantation Collection (R. B. Dominick)
YPM	Peabody Museum of Natural History, Yale University
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich

2. COMMON NAMES

The use of an asterisk* in the text denotes a name listed in *Common Names of Insects Approved by The Entomological Society of America* (1970).

French-language common names have been taken from Auclair, J. L., *et al.*, 1964, *French Names of Insects of Canada*, 3rd edition, published for the Quebec Society for the Protection of Plants by Department of Agriculture and Colonization, Quebec. The abbreviation "m." after a name indicates that it is masculine, "f." that it is feminine.

3. CITATIONS OF AUTHORITIES

Authors' names without parentheses indicate that the specific name is associated with the genus in which it was described.

Authors' names in parentheses indicate that the specific name has been transferred from the genus in which it was described to another genus.

4. WING LENGTHS

Wing length is the measurement in millimeters from the base to the apex of the forewing.

5. LOCATION OF TYPE-SPECIMEN

The current location of the type-specimen is given by the appropriate abbreviation in square brackets immediately following the type-locality.

INDEX TO ANIMAL NAMES

Principal entries are given in bold face
Plate references are given as (1:4)

Generic names cited only in combination with specific names, whether in synonymy or text, are not given in the index. Look for such entries under the specific name. For example, *Pyralis urticalis* will be found under *urticalis*, but not under *Pyralis*.

INDEX

INDEX TO PLANT NAMES

CORRIGENDA

FASCICLE 13.2A

page

44 *Hahncappsia cochisensis* plate reference line should read PL. 3, FIG. 72, 76; PL. E, FIG. 2; PL. 0, FIG. 5.

FASCICLE 13.2B

128 col. 2, line 33, for *P. arizonensis* read *P. arizonicalis*.

129 col. 1, line 22, for *P. arizonensis* read *P. arizonicalis*.

130 col. 2, line 17, for *P. arizonensis* read *P. arizonicalis*.

131 col. 1, lines 1 and 3, for *Pyrausta arizonensis* read *Pyrausta arizonicalis*.

plate

9 figs. 57 and 58, for *Pyrausta arizonensis* read *Pyrausta arizonicalis*.