J. F. GATES CLARKE

The Lepidoptera of Rapa Island

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • 1971 NUMBER 56


HORIZONTAL SCALE 1:36 432 000 OR 575 MILES TO THE INCH AT THE EQUATOR
VERTICAL SCALE EXAGGERATED
OCTOBER 1969
PARKER SEAMOUNT
CASCADIA CHANNEL
ROCKY MOUNTAINS
GREAT LAKES
NORTH AMERICA
Mt Rainier
Pikes Peak
Mt Whitney
Death Valley
Mt. Mitchell
New York
Washington
Chicago
New Orleans
Vancouver
COASTAL PLAIN
HATTERAS ABYSSAL PLAIN
OUTER RIDGE
BLAKE PLATEAU
Miami
MISSISSIPPI CONE
CONTINENTAL SLOPE
GULF OF MEXICO
GULF OF CALIFORNIA
CENTRAL AMERICA
MIDDLE AMERICA TRENCH
CAYMAN TRENCH
HISPANIOLA
BEATA RIDGE
CARIBBEAN
TEHUANTEPEC RIDGE
SHIMADA BANK
CLIPPERTON FRACTURE ZONE
CLARION FRACTURE ZONE
MOLOKAI FRACTURE ZONE
MURRAY FRACTURE ZONE
ANDERSON SEAMOUNT
GALAPAGOS FRACTURE ZONE
COCOS RIDGE
CARNEGIE RIDGE
ANDES
PERU-CHILE TRENCH
EAST PACIFIC RIDGE
ALBATROSS CORDILLERA
TUAMOTU ARCHIPELAGO
EASTER ISLAND FRACTURE ZONE
NAZCA RIDGE
CHALLENGER FRACTURE ZONE
FERNANDEZ FRACTURE ZONE
PITCAIRN ISLAND
PACIFIC RIDGE
Mauna Kea
CHRISTMAS ISLAND

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Contents

ABSTRACT

Clarke, J. F. Gates. The Lepidoptera of Rapa Island. *Smithsonian Contributions to Zoology,* number 56, 282 pages, 1971.—One hundred thirty species of Lepidoptera are recorded from Rapa Island, of which 77 were previously unreported. Of these, 47 species and 2 subspecies are described as new to science. The adults or genitalia, or both, of all species are figured. Hosts are recorded where known.

J. F. Gates Clarke

The Lepidoptera of Rapa Island

Introduction

The first lepidopteron known from Rapa is a specimen of *Anatrachyntis incertulalla* (Walker), now in the British Museum, collected 18 April 1883 by J. J. Walker and previously recorded in the literature by Walsingham (1907, p. 515) as *Stagmatophora* (*Proterocosma*) *tridigitella*. It was not until 1925, when members of the British Saint George Expedition made collections on this island, that any considerable knowledge of the fauna was acquired. As a result of this expedition 53 species of Lepidoptera were recorded in the literature. In July of 1934 the Mangarevan Expedition, from the Bernice P. Bishop Museum, Honolulu, Hawaii, visited the island but there is no published record of Lepidoptera collected on Rapa at that time. In 1963 from 6 September to 15 December, my wife and I made collections on Rapa, facilitated by a grant-in-aid from the United States Office of Naval Research. This project has been further aided by Smithsonian Research Foundation Grant SG 0636056, and the results of our expedition are recorded in the following pages.

This paper is based on the study of 4,990 specimens, exclusive of pertinent types.

At the outset it was my intention to deal only with the Microlepidoptera of Rapa, but in order to bring together in one place a record of all species of Lepidoptera that are presently known to occur on this island, I have included the Macrolepidoptera. Aside from a few remarks, I have not attempted to expand the information on the butterflies or larger moths but have confined detailed treatment to the Microlepidoptera. Available names have been used, although it is well known that revisionary studies will lead to changes in the names of some species.

Comparatively few species from Rapa have been figured (Poulton and Riley, 1928; Collenette, 1928; Clarke, 1958). In most cases only the adult or the genitalia of one sex, or none at all, have been illustrated. Even in this work one or the other sex for a few species has not been figured because of the lack of examples.

For the male genitalia of the Cosmopterigidae one new term is proposed. The structure in question occurs in the articulation between the anellus and harpe, and may be paired or single. It is not clear whether the structure is part of the anellus or a basal projection of the harpe, but when the parts are disarticulated it sometimes remains attached to the anellus and other times to the harpe (Figures 122, 124). It is generally digitate or may be modified in several ways. For this structure I propose the name *prospicuus*.

The color descriptions are based on Ridgway, 1912, *Color Standards and Color Nomenclature*. Obviously, all colors and hues are not represented in Ridgway, but I have adhered as closely as possible to his standards. Where necessary I have endeavored to use a more descriptive term.

In this paper I am presenting, for the first time, maps of the distribution of some of the genera and species herein recorded. By no means should these maps be considered as representing the total distribution of these taxa, but rather a record of what collectors have found to date. When we consider the relatively few specimens that have been taken we must realize that our knowledge of these animals is very imperfect indeed. On the other hand, the distribution patterns of such species as *Vanessa itea* and of the genus *Tanaoctena* present a very clear picture of the area presently occupied by them. Moreover, the distribution maps of

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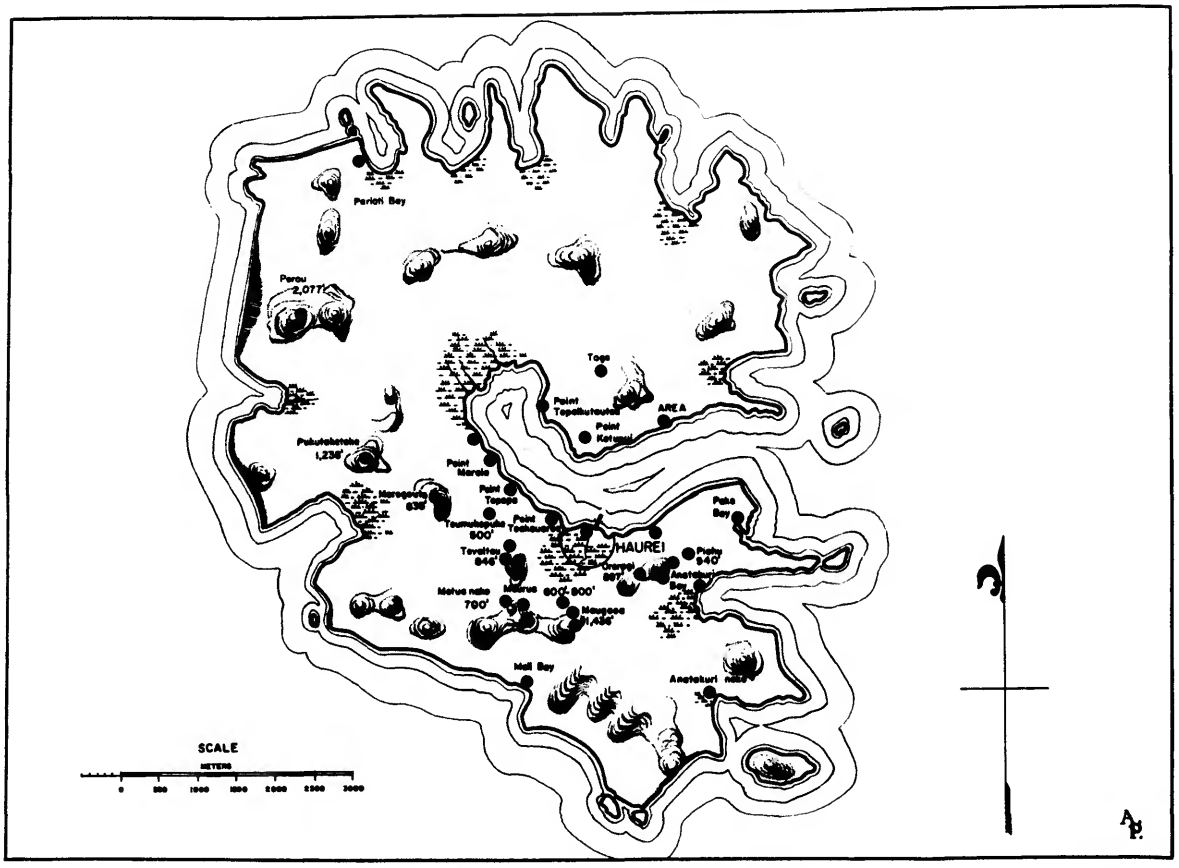


FIGURE 1.—Rapa Island showing collecting localities.

Praeacedes thecophora and *Decadarchis flavistriata,* to name but two, demonstrate with what great facility some species and genera may be dispersed over the world. Of the 7,000 islands in the Pacific and those in the Indo-Australian region we know comparatively little, and our meager knowledge of these vast areas can only give us a very slight indication of what will eventually be discovered, what relationships really exist, and what the widely scattered points of origin of the Pacific Fauna really are.

The distribution maps are based on specimens in the British Museum (Natural History), the Rijksmuseum van Natuurlijke Historie, Leiden, and the Smithsonian Institution.

The peculiarities of the microlepidopterous fauna, revealed by the specimens collected by members of the Saint George Expedition (1924–1925), induced Meyrick to postulate his theory of the existence of "Palaeonesia," in which he lowers and raises the sea level 12,000 feet in a few effortless paragraphs. There is no geological evidence to support Meyrick's contention that a land mass of 400 miles in length existed in the vicinity of Rapa, but it is interesting to note the conviction with which his proposal was made (1926, p. 271):

> I am satisfied that the extent and character of this endemic fauna postulates former conditions very different from those now existing, ... A rise of 12,000 feet in the sea bottom of the South Pacific is required to show these results, but I entertain no doubt that such an elevation must have existed since the Eocene period, because it is absolutely the only explanation possible. Such a rise would . . . convert Rapa into an elongate island some 400 miles in length . . . .

Meyrick further states (1929, 490):

> Its continued existence as a defined and isolated unit over a considerable period of time entitles it to a name for purposes of discussion and if it has not previously obtained this recognition, I suggest that of Palaeonesia.

FIGURES 2, 3.—2, Embarkation from Papeete, Tahiti, 1 September 1963, on "Manureva." Thelma Clarke seated; Mr. Gaston Allain, Administrator, Tubuäi (Austral) Islands, on gangplank. 3, Rugged southwest coast of Rapa.

FIGURES 4, 5.—4, Haurei Bay and harbor entrance from slope of Perau. Village of Haurei at upper right. 5, Village of Haurei from Point Teakauraee.

Despite Meyrick's apparent error with regard to the existence of "Palaeonesia" it was his fascinating theory that stimulated us to undertake our own expedition to the island. We were not prompted so much by a desire to prove or disprove his theory as by a wish to discover evidence of zoogeographical connections other than those already proposed. I had hoped to find evidence of some connection between Rapa, New Zealand, and Australia and southern South America. The evidence of zoological and botanical relationships between the Australian, southern South American, and South African regions is already well established. These relationships are carried to some of the Southern Hemisphere oceanic islands, but as far as I am able to ascertain, from a study of the material at hand, there is *no connection between the fauna of Rapa and that of the Americas,* with the possible exception of that suggested by the relationship between *Orinympha* and *Pseudorinympha.* There is very strong evidence of a relationship between the fauna of Rapa and those of New Zealand and Australia and the New Guinean Region.

A great many of the species found on Rapa are habitual wanderers; many are widespread and easily become established on out-of-the-way places. Strong flyers are known to cover wide expanses of ocean under their own power, others are blown willy-nilly from place to place, and exhibit great powers of survival. The refuse-feeders appear to exhibit no limits to their abilities to move from place to place, and they can always find an abundance of decaying vegetable matter on which to feed. Although the refuse-feeders can be blown from one place to another, or they may be transported on floating debris, their dispersal is undoubtedly effected primarily through the agency of man. As far as Rapa is concerned, dispersal by "rafting" for all intents and purposes can be ruled out unless ocean currents previously were vastly different from what they are today, because rarely does anything in the form of driftwood reach the shores of the island.

Although we can account for the arrival of refuse-feeders, and perhaps a few others, on the island through transportation by man either in the canoes of the early arrivals, or later during historic times in ships, how do we explain the presence of the endemic fauna and the species of other genera which are also found elsewhere? Meyrick's "Palaeonesia" was to him ". . . absolutely the only explanation possible," but, in view of recent discoveries, it seems that the most logical means of dispersal is through wind currents over long periods of time. The chance arrival, however remote, of a single or a few immigrant species may lead to a whole diverse fauna in a particular group such as the Cosmopterigidae of the Hawaiian Islands, or, to a lesser extent, the Crambidae of the Juan Fernandez Islands. Ladd (1960, p. 148) has calculated the number of typhoons in the western Pacific using 1957 as a typical year with 17 disturbances. Taking four typhoons as an average for each year there would have been 500,000 cyclonic disturbances that have occurred in the Pacific since the close of the Cretaceous and certainly these or lesser disturbances could account for a great deal of dispersal. Obviously, the mere presence of small Microlepidoptera on widely separated islands refutes the assertion that they are "delicate" insects.

The Island

The island of Rapa (Rapa Iti, Oparu or Rap-a) is situated in 27.37.15′ south latitude and 144.20.04′ west longitude. It is volcanic in origin and was probably formed as early as the Eocene period. It is one of the few oceanic islands on which coal has been found, the coal having been formed in a lake which once filled much of the ancient crater. The crater was subsequently breached, thus forming the present bay and harbor (Figure 4). Coal samples have been dated variously from over 1,000,000 to 25,000,000 years. As one might expect, the pollen grains of Cyperaceae predominate. This family of plants still constitutes a considerable proportion of the flora. Pollen of *Coprosma* in a form comparable to that of *C. cookei,* and *C. rapensis* is also present in the coal (Cranwell, 1964, p. 46).

The island is extremely rugged (Figures 3, 12, 13, 17). Water oozes and runs out at the lower levels almost everywhere, filling many of the trails, some of which have been worn to a depth of a foot or more, and it is nearly impossible to venture anywhere without getting wet. The highest point on the island is Perau (Figure 8), which reaches a height of 2,077 feet (639 m) and the island is noted for its numerous "aiguille" (needles) (Figures 12, 13). The periphery of the island is deeply cut by many bays (Figures 1, 4, 10), at the head of which each has an extensive swamp. Formerly, when the population was much

FIGURES 6, 7.—6, Looking east from outskirts of Haurei village. Taga, upper right; *Miscanthus* in foreground; beyond, mixed brushy area of *Hibiscus, Eugenia, Psidium, Rubus,* etc., and *Pandanus* on left. 7, Thelma Clarke beside tree of *Pandanus tectorius,* at Point Maraia, 9 October 1963.

FIGURES 8, 9.—8, Looking northwest. Perau (639 m, 2,077 feet) on right. Pukutaketake (369 m, 1,200 feet) on left. Note patches of indigenous vegetation on hillsides. 9, Looking west. Hiri Bay on left, Pukutaketake (369 m, 1,200 feet) extreme right background and Morogouta (246 m, 800 feet) extreme upper right.

FIGURES 10, 11.—10, Looking eastward from trail to Maugaoa. On right Anatakuri Bay and Point Temavee. "Rapa Iti" is small conical island at end of point. Central bushy area is mixed but consists principally of *Metrosideros*. 11, Maugaoa at 300 m, 950 feet. Bird nest fern (*Asplenium nidus*), *Rubus rosaefolius, Freycinetia,* etc.

larger than now, all of these swamps were used to grow taro (*Colocasia*), as evidenced by the extensive terracing, but now that the population is reduced to a few more than 300 [1] these areas are not so extensively cultivated and the terracing has fallen into disrepair.

It seems quite probable that before the island was heavily populated it was covered with a forest of fairly large trees, and indeed we found stumps of two or more feet in diameter. As fuel requirements increased with an increase in population, the forest was cut back so that now the lower slopes have had practically all trees removed and the original vegetation has been replaced by grasses, ferns, and other weeds (Figures 5, 8, 10). Dr. Elwood C. Zimmerman, who was a member of the Mangareva Expedition of 1934, after viewing our photographs, stated that there has been a noticeable reduction of forest since the time he visited the island.

Despite the deforestation some elements of the original forests, such as the giant tree fern, *Cyathea rapense,* and the myrtaceous *Metrosideros,* can still be found at sea level. The dominant grasses are *Miscanthus floridulus* (Labill.) Warberg (ex. Schum. and Laut.) and *Paspalum paniculatum* L., with such weedy plants as *Lycopodium cernum* L., *Ipomea gracilis* R. *Br.* (*I. littoralis* Bl.), *Rubus rosaefolius* J. E. Sm., *Bidens pilosa* L., *Rumex crispus* L., *Sonchus oleraceus* L., and the fern *Dicranopteris linearis* (Burm.) Underwood. The *Rubus* and *Dicranopteris* are harsh elements in the thick growth and are a constant annoyance to the bare-legged natives.

In all the wet places, but particularly in and around the taro patches, *Commelina diffusa* Burm. f. (*C. nudiflora* L.), and *Ludwigia adscendens* (L.) Hara, are abundant. Associated with these are cyperaceous plants and small grasses. Also in such areas will be found *Siegesbeckia orientalis* L., and other weedy species.

East of the village of Haurei (Figure 6) is an excellent collecting area of mixed vegetation. Besides the dominant *Miscanthus* (foreground), there will be found at least three species of *Hibiscus*: *Begonia* sp., *Eugenia jambos* L., *Psidium guajava* L., and *P. littorale* Raddi, gardenia, *Rubus, Manihot* sp. (*M. esculenta*?), *Ficus,* the weeds and wet area species mentioned above; *Dolichos lablab* L., *Bidens pilosa* L., *Pandanus tectorius* Solander, and other less conspicuous plants. This area and the lower valleys contain numerous cultivated species. Among them are lime, orange, banana, mango (*Mangifera indica* L.), avocado, fig, coffee, and such garden varieties as onion, carrots, lettuce, beans, peas, cabbage, raddish, potato, and beet. It is doubtful that the mangos produce fruit, and we saw none, although the trees produced flowers. Fifty coconut trees (*Cocos nucifera* L.) grow reluctantly but do not produce nuts because of the cold temperature. The coffee, the ripe beans of which are harvested from the ground, has an especially fine flavor but only a small amount is produced, a little of which is exported.

On the lower slopes mixed with the grasses and small ferns will be found *Vaccinium rapae* Skottsberg, the low, vinelike *Osteomeles anthyllidifolia* Lindl., *Carex? feanii* F. Brown, *Scirpus nodosus* Rottboel, *Metrosideros, Eugenia,* and *Ipomea.* The *Metrosideros* becomes more abundant with an increase in altitude until it is one of the dominant trees on the higher mountains. *Pandanus* was not found above 500 feet on the main island but the small satellite *Karapoo rahi,* at the southern tip of Rapa, is a virtual forest of this tree. At from 300 to 500 feet *Fitchia rapensis* F. Brown and *Oparanthus rapensis* (F. Brown) appear, and at about the same altitude *Oparanthus ?coriaceus* (F. Brown) and *Corokia* make their debut (Figures 14, 17), the latter becoming one of the dominants at higher altitudes. *Dodonaea viscosa* var. *stokesiana* F. Brown, which is the most attractive shrub to the large, conspicuous, endemic otiorhynchine weevils of Rapa, makes its appearance at about this point. A little higher *Veronica* (*Hebe*) *rapensis* F. Brown will be found on the exposed ridges, and all the steep slopes and steep-sided ridges are abundantly covered with *Freycinetia.* At the higher altitudes, besides the dominant *Cyathea* (Figure 16), other large ferns such as *Asplenium nidus,* mosses, and lichens become abundant. The endemic *Myoporum rapense* F. Brown was found at only one locality, Pariati Bay (Figures 18, 19, 20), along with *Scirpus nodosus* and *Pandanus.*

The weather is very unfavorable for the entomologist most of the time, the frequent heavy rains and strong winds greatly reducing the time that one can spend in the field. During our stay heavy rain occurred on 27 days and many other days were cold and windy. Probably the best months are December and January, the worst months, July and August. Following is a record of the rainfall for 1963. This can be taken as a reasonable example of what one can expect.

[1] 15 December 1963 population 308.

FIGURES 12, 13.—12, Maurua (550 m, 1,807 feet) center and Pukumaru (600 m, 1,960 feet) from slope of Maugaoa. White spots on slope are goats. 13, Maurua right, Maugaoa left. *Freycinetia* in foreground.

	mm	*inches*
January	45. 1	1. 8
February	248. 1	9. 5
March	188. 9	7. 5
April	286. 7	11. 4
May	248. 2	9. 9
June	167. 8	6. 7
July	115. 3	4. 6
August	358. 7	14. 3
September	93. 1	3. 7
October	258. 4	10. 3
November	87. 4	3. 5
December	171. 6	6. 8
Total	2, 269. 3	90. 0

Despite the poor weather and low temperatures the populations of some of the insects are enormous. During the month of September the *Tipulidae* occurred in such hordes that it was impossible to collect anything else at light because the sheet (Figure 15) was literally covered with a plethora of flies. On 14 October, at Anatakuri Bay, great quantities of a small moth came to light. In my field notes I wrote: "*Cosmopterix aphranassa* appeared in thousands nearly smothering us and greatly complicating collecting other things." On a third occasion, on 23 November, *Dichelopa sericopis* swarmed all over the sheet, leaving scarcely any room for anything else. It was interesting that copulation of many pairs took place on the collecting sheet.

Most of our collecting was accomplished with a "black light," powered by a six-volt automobile battery, suspended beneath a gasoline (petrol) pressure lamp (Figure 15), the two suspended in front of a white sheet. We also spent much time "beating" shrubs and trees. By this method we obtained no less than 14 species of Microlepidoptera from *Pandanus* alone; subsequently 12 of these species were reared from various parts of this tree.

Nearly 800 specimens in our collection were reared. My wife was responsible for the care of the larvae and their rearing, and it is to her conscientious effort that we owe our success in this phase of the project. The food plants and our numbers, and the native names, when known, are as follows:

	Species	*Family*	*Native name*
R 1.	*Psidium guajava* L.	Myrtaceae	tuvava
R 6.	*Psidium littorale* Raddi (or a form of *P. guajava*)	Myrtaceae	tuvava
R 2.	*Metrosideros collina* (Forster) A. Gray var. ? *glaberrima* A. Gray.	Myrtaceae	rata
R 3.	*Metrosideros collina* (Forster) var. ? *villosa* A. Gray	Myrtaceae	rata
R 7.	*Eugenia jambos* L.	Myrtaceae	kaika
R 8.	*Ipomoea gracilis* R. Br. (*I. littoralis* Bl.)	Convolvulaceae	eoe
R 9.	*Hibiscus australensis* Fosberg.	Malvaceae	urupuku
R 10.	*Commelina diffusa* Burm. f. (*C. nudiflora* L.)	Commelinaceae	maapuaturu
R 11.	*Bidens pilosa* L.	Compositae	nau
R 18.	*Sonchus oleraceus* L.	Compositae	
R 32.	*Fitchia rapensis* F. Brown	Compositae	
R 35.	*Oparanthus* ? *coriaceus* (F. Brown)	Compositae	
R 40.	*Oparanthus rapensis* (F. Brown)	Compositae	
R 39.	*Siegesbeckia orientalis* L.	Compositae	
R 12.	*Dolichos lablab* L.	Compositae	piti
R 13.	*Mangifera indica* L.	Anacardiaceae	vi rapa
R 14.	*Vaccinium rapae* Skottsberg	Ericaceae	
R 15.	*Rubus rosaefolius* J. E. Sm.	Rosaceae	mona
R 41.	*Osteomeles anthyllidifolia* Lindl.	Rosaceae	
R 19.	*Rumex crispus* L.	Polygonaceae	
R 20.	*Cyathea rapense* Copeland	Cyatheaceae	
R 21.	*Cyperus javanicus* Houtt (*C. pennatus* L.)	Cyperaceae	
R 27.	*Scirpus nodosus* Rottboell	Cyperaceae	
R 38.	*Carex? feanii* F. Brown	Cyperaceae	
R 25.	*Corokia collenettei* Riley	Escaloniaceae	
R 23.	*Corokia collenettei* Riley	Escaloniaceae	
R 26.	*Pandanus tectorius* Solander	Pandanaceae	fara
R 22.	*Veronica* (*Hebe*) *rapensis* F. Brown	Scrophulariaceae	
R 29.	*Ficus* sp.	Moraceae	
R 30.	*Manihot* sp. (probably *M. esculenta* Crantz)	Euphorbiaceae	

	Species	*Family*	*Native name*
R 31.	*Myoporum rapense* F. Brown	Myoporaceae	
R 37.	*Ludwigia adscendens* (L.) Hara	Onagraceae	
R 42.	*Dodonaea viscosa* var. *stokesiana* F. Brown	Sapindaceae	
R 28.	*Lycopodium cernuum* L.	Lycopodiaceae	
R 36.	*Dicranopteris linearis* (Burm.) Underwood	Polypodiaceae	
R 16.	*Miscanthus floridulus* (Labill.) Warb. (Ex. Schum. and Laut.).	Gramineae	
R 17.	*Paspalum paniculatum* L.	Gramineae	

Practically all of the records of food plants we recorded were previously unknown. It is strange that the food plants of several of the endemic species of moths are "weed" species which have been introduced and the original or native hosts are unknown. It is surprising, also, that the endemic *Corokia* does not constitute the food of any endemic microlepidopteron, as far as we know, although a single dried fruit of this plant contained a larva of *Stathmopoda perfuga* (Meyrick), which yielded an adult. This is not significant because the species of *Stathmopoda* feed on any dead vegetable matter.

Of the 95 species of Microlepidoptera, including pyralids, now recorded from the island, we were successful in rearing 35, approximately 36.5 percent.

The Fauna

In this paper 130 species and subspecies of Lepidoptera are recorded, both from the literature and from our own collecting. Before our visit 53 species were known from the collections of the Saint George Expedition. The species are as follows:

Species Previously Recorded

Rhopalocera

Hypolimnas bolina Linnaeus

Heterocera

Celama insularum Collenette
Callopistria meridionalis (Collenette) (*Eriopus*)
Prodenia litura (Fabricius)
Spodoptera mauritia (Boisduval)
Elydna nonagrica (Walker)
Chasmina tibialis (Fabricius)
Amyna natalis (Walker)
Phlegetonia delatrix (Guenée)
Achaea janata (Linnaeus)
Mocis frugalis (Fabricius)
Phytometra chalcites (Esper)
Phytometra albostriata (Bremer and Grey)
Anomis flava flava (Fabricius)
Anomis vitiensis (Butler)
Anticarsia irrorata (Fabricius)
Simplicia caeneusalis (Walker)
Hydrillodes melanozona Collenette
Hypena longfieldae Collenette
Luceria oculalis (Moore)
Hippotion celerio (Linnaeus)
Gymnoscelis erymna (Meyrick)
Cleora stenoglypta Prout
Cleora dodonaeae Prout
Homoeosoma inexplorata Meyrick
Eurohodope ardescens Meyrick
Piletocera signiferalis Wallengren
Hymenia fascialis Cramer
Tatobotys biannulalis (Walker)
Marasmia hemicrossa Meyrick
Marasmia trapezalis Guenée
Diasemia ramburialis Duponchel
Psara licarsisalis Walker
Isocentris illectalis Walker
Scoparia exterminata Meyrick
Scoparia psednopa Meyrick
Nesoscopa exsors Meyrick
Dichelopa honoranda Meyrick
Dichelopa sericopis Meyrick
Dichelopa deltozancla Meyrick
Dichelopa ceramocausta Meyrick
Dichelopa iochorda Meyrick
Dichelopa exulcerata Meyrick
Spilonota thyellopis Meyrick
Crocidosema plebejana Zeller
Argyroploce aprobola Meyrick
Stoeberhinus testaceus Butler
Cosmopterix aphranassa Meyrick
Ulochora perfuga Meyrick
Gracillaria hilaropis Meyrick
Gracillaria crypsidelta Meyrick
Decadarchis pelotricha Meyrick
Decadarchis sphenacma Meyrick

Of the material collected by the Saint George Expedition, that recorded as *Gymnoscelis erymna* Meyrick was misdetermined and is, in fact, *Gymnoscelis concinna* Swinhoe. Also, *Tatabotys biannulalis* (Walker) and *Isocentris illectalis* Walker were misidentified and are, respectively, *Cometura picrogramma* Meyrick and *Hyalobathra variabilis*, new species. *Gracillaria crypsi-*

delta Meyrick is a synonym of *Gracillaria hilaropis* Meyrick, leaving 53 valid species known from the island up to the time of our visit.

Thirty previously described species were collected by us and are:

Species Newly Recorded

Rhopalocera

Vanessa (*Bassaris*) *itea* (Fabricius)

Heterocera

Utetheisa pulchelloides Hampson
Tiracola plagiata (Walker)
Platysenta illecta (Walker)
Mythimna loreyi (Duponchel)
Peridroma saucia (Hübner)
Gymnoscelis concinna Swinhoe
Cometura picrogramma Meyrick
Cadra cautella (Walker)
Strepsicrates holotephras (Meyrick)
Bactra litigatrix Meyrick
Phthorimaea operculella (Zeller)
Cosmopterix melanarches Meyrick
Trissodoris honorariella Walsingham
Echinoscelis hemithia Meyrick
Anatrachyntis incertulella (Walker)
Anatrachyntis megacentra Meyrick
Anatrachyntis similis Bradley
Labdia dicyanitis Meyrick
Anthophila chalcotoxa Meyrick
Plutella xylostella (Linnaeus)
Lissocnemitis argolyca Meyrick
Setomorpha rutella Zeller
Monopis crocicapitella Clemens
Praeacedes thecophora (Walsingham)
Erechthias zebrina (Butter)
Choropleca terpsichorella (Busck)
Decadarchis minuscula (Walsingham)
Decadarchis flavistriata (Walsingham)
Opogona aurisquamosa (Walsingham)

Species and Subspecies Described as New

1. *Euplexia vetula*
2. *Chloroclystis pitoi*
3. *Lathroteles obscura*
4. *Hyalobathra variabilis*
5. *Glyphodes eudoxia*
6. *Tirsa fiona*
7. *Uresiphita polygonalis ochrocrossa*
8. *Metasia chionostigma*
9. *Metasia gnorisma*
10. *Metasia empelioptera*
11. *Piletocera signiferalis isola*
12. *Scoparia tivira*
13. *Stangeia rapae*
14. *Dichelopa messalina*
15. *Dichelopa rhodographa*
16. *Dichelopa anthracodelta*
17. *Dichelopa dendrophila*
18. *Dichelopa vaccinii*
19. *Dichelopa lupicinia*
20. *Dichelopa myopori*
21. *Dichelopa argyrospiloides*
22. *Dichelopa pulcheria*
23. *Tritopterna galena*
24. *Cryptophlebia nythobia*
25. *Carposina paracrinifera*
26. *Carposina apousia*
27. *Palintropa peregrina*
28. *Autosticha merista*
29. *Trissodoris thelmae*
30. *Semolina leucotricha*
31. *Iressa neoleuca*
32. *Batrachedra monophthalma*
33. *Tebenna bradleyi*
34. *Tanaoctena indubitata*
35. *Pseudorinympha laeta*
36. *Terthroptera eremosesia*
37. *Ochromolopis incrassa*
38. *Stathmopoda percnophthalma*
39. *Stathmopoda argyrosticha*
40. *Gracillaria verina*
41. *Petula phalarata*
42. *Nesoxena pandani*
43. *Decadarchis cirrhogramma*
44. *Decadarchis pagophila*
45. *Decadarchis phaeoptera*
46. *Decadarchis melanospila*
47. *Decadarchis coprosoma*
48. *Biastolemma coarctata*
49. *Opogona allaini*

The families are represented by the following 29 genera in the Rhopalocera and Macroheterocera: *Hypolimnas, Vanessa, Hippotion, Celama, Utetheisa, Peridroma, Tiracola, Platysenta, Mythimna, Euplexia, Luceria, Callopistria, Spodoptera, Prodenia, Elydna, Chasmina, Amyna, Chrysodeixis, Achaea, Mocis, Anticarsia, Anomis, Phlegetonia, Simplicia, Hydrillodes, Hypena, Chloroclystis, Gymnoscelis,* and *Cleora.* Of these 29 genera not one is endemic on Rapa.

In the Microlepidoptera there are 57 genera: *Lathroteles, Eurhodope, Homoeosoma, Cadra, Scoparia, Diasemiopsis, Marasmia, Spoladea, Glyphodes, Uresiphita, Tirsa, Herpetogramma, Cometura, Hyalobathra, Metasia, Piletocera, Stangeia, Dichelopa, Nesoscopa, Strepsicrates, Crocidosema, Platypeplus, Tritopterna, Cryptophlebia, Bactra, Carposina, Stoeberhinus, Phthorimaea, Autosticha, Palintropa, Cosmopterix,*

382-271 O—71——2

Trissodoris, Echinoscelis, Labdia, Iressa, Semolina, Anatrachyntis, Batrachedra, Anthophila, Tebenna, Tanaoctena, Terthroptera, Pseudorinympha, Stathmopoda, Lissocnemitis, Ochromolopis, Gracillaria, Parectopa, Monopis, Praeacedes, Nesoxena, Decadarchis, Erechthias, Petula, Biastolemma, Choropleca, and Opogona.

Of the microlepidopterous genera seven are endemic and one, *Lathroteles,* forms the basis for a new and endemic family.

The 86 genera are distributed in the following 21 families:

Nymphalidae 2	Gelechiidae 4
Sphingidae 1	Cosmopterigidae 7
Arctiidae 2	Momphidae 1
Noctuidae 21	Glyphipterigidae 2
Geometridae 3	Yponomeutidae 3
Lathrotelidae 1	Heliodinidae 2
Pyralidae 15	Epermeniidae 1
Alucitidae 1	Gracillariidae 2
Tortricidae 2	Tineidae 8
Olethreutidae 6	Lyonetiidae 1
Carposinidae 1	

Because of the remoteness of the island one would expect to find on it an unusually interesting fauna. Such is the case.

It is obvious that the origins of the diverse fauna are multiple, some very ancient with present-day indications of remote relationships to continental areas, and some of more recent connections, which are only of importance because they demonstrate the ease with which some species are dispersed and become established.

Of the genera of the Macrolepidoptera not one is endemic. Both butterflies are "wanderers" and are not confined to Rapa. The noctuid genera are well known outside the island but five species in this family are unknown elsewhere.

Three of the Geometridae are endemic but one, *Gymnoscelis concinna* Swinhoe is, presumably, an introduction from the Indian Region.

To find a new family in Lepidoptera at this late date is, to say the least, an unexpected surprise. Such is the case, however, with what I have dubbed the Lathrotelidae. As expressed by Dr. Eugene Munroe, world authority on the Pyralidae, "Unless you want to redescribe the family Pyralidae you must define a new family." Unfortunately, the tiny moth, which is the basis for the new family, is represented by only two examples, both females, so that not much can be said about it. It would appear, however, that this is a relic species and very ancient in origin.

There are 21 species in the Pyralidae divided as follows: *Scoparia* (3), *Metasia* (3), *Marasmia* (2), and the remaining 13 genera with one each. The six species in *Scoparia* and *Metasia* are endemic and probably represent in each genus derivatives of a single ancient immigrant species. Both species of *Marasmia* are grass feeders, are fairly widespread, particularly in the case of *M. trapezalis,* and could have arrived on the island in ancient or modern times. As to time of arrival the same can be said for *D. ramburialis, S. recurvalis,* and *H. licarsisalis.* These three seem to disperse easily. *S. recurvalis* is known to be subject to variation in various islands, and in the Hawaiian Islands some examples are marked very strikingly with yellow—so much so that one was described as a distinct species, *Hymenia exodias* Meyrick. The same tendency to yellow appears in some Marquesan examples, but the Rapa series seems to be normal with only a suggestion of variation in one or two specimens.

Under *Uresiphita polygonalis ochrocrossa* I will discuss the differences between some of the populations of this species. Since these various populations are isolated it is obvious that incipient speciation is taking place, but since nothing is known of the genetics of *polygonalis* it is not possible to relate the changes under the various environmental conditions to time. I suspect that the dispersal was ancient and random, but perhaps is a continuing phenomenon, and that, so far, there has been no opportunity for recombination of characters between the various elements of the world population. The same might be said of *Piletocera signiferalis isola,* but the differences between the various populations of this species are not as striking as in the case of *polygonalis.*

One genus of Pyralidae, *Tirsa,* is described as new and certainly it is not clear from what or where it is derived because no close relatives have been recognized. *Glyphodes eudoxia,* new species, in its somber coloration is a considerable departure from other members of this widely distributed genus and is probably a remnant of a more extensive but unsuccessful fauna on the island.

The genus *Stangeia* (Alucitidae) with the one endemic species *rapae* was proposed for a European species, but finds its greatest development in Australia. We must conclude, therefore, that *Stangeia* is Australian and that *rapae* derives its origin from that

continent. Since *rapae* feeds in *Siegesbeckia orientalis,* a weed species, it probably was imported with it. When the Australian species of *Stangeia* have been carefully studied, it is possible that *rapae* may fall as a synonym to one of them.

All of the Tortricidae on Rapa are endemic. The genus *Nesoscopa* has one species and it was not until 1962 that a second species was discovered in the New Hebrides. From this meager information and the distribution of the two species we might infer that their origin was in New Guinea. Up until the time of this writing the second tortricid genus, *Dichelopa,* was represented by 27 described species; in this paper 9 more are described as new. The 27 previously described species are known from the Marquesas (13), Tahiti (2), Australia (6), and Rapa (6). No other areas, either insular or continental, are known to have representatives of the genus; nor do they have anything closely related. This suggests a very early origin and proliferation of endemic species peculiar to the area—similar to, but not nearly as extensive as that found in the genus *Hyposmocoma* of the Hawaiian Islands. Undoubtedly more species of *Dichelopa* will be discovered, particularly in the Marquesas, Society, and Tubuai islands. Its pattern of distribution is followed by other genera or species described below, but it is strange that the genus has not yet been discovered in the Hawaiian Islands.

Seven species in six genera of Olethreutidae are found on Rapa. Of these, three species are endemic. The genus *Cryptophlebia,* with one endemic species, is widely distributed from Australia to Africa, throughout the western and central Pacific to Japan and the Hawiian Islands, with a single species in Argentina. This appears to be an ancient group with its origin probably in the Southern Hemisphere. *Crocidosema plebejana* presents an interesting case. It is probably American in origin but has been distributed to the four corners of the earth. Actually, *plebejana* is a complex "species" with widely separated populations developing independently within its great range. There is an American population that differs from the Rapa segregate as demonstrated by the male genitalia (Figures 104*c, d*); another population in the Juan Fernandes Islands, known only from females, with a constant venational difference; presumably three distinguishable segregates in Hawaii; and undoubtedly others in various localities throughout the world. The genus *Tritopterna,* with one endemic species, is rather rare but is fairly widespread in the Pacific. Its point of origin is probably New Guinea.

The two species of Carposinidae, both endemic, are related to the Hawaiian forms and are part of the well-known endopacific endemic fauna.

In the Gelechiidae there are four genera, each with one species. The refuse-feeding *Stoeberhinus testaceus* is strictly a Pacific insect and is widely distributed in that area. Although it does not flourish in the cold climate of Rapa, it undoubtedly will be able to maintain itself. The ubiquitous *Phthorimaea operculella* is distributed in commerce and will be found just about everywhere that potatoes are eaten. *Autosticha* is another common Oriental and Pacific genus and has only one species on the island. Next, let us consider an interesting example of so-called "discontinuous distribution." The genus *Palintropa* contains two closely related, but distinct species, separated by 9,000 miles: *hippica* from Ceylon and *peregrina* from Rapa. The species are close but distinct, and despite the 9,000 miles separating them there is no question of their affinities. It seems obvious in this case that the distributional pattern of this genus is a result of the lack of collecting. The point is, though, is this an Indian form that has reached Rapa or an ancient Rapan form that has reached Ceylon?

The Cosmopterigidae find their greatest development in the Pacific area, particularly in Hawaii where extensive evolutionary radiation has produced hundreds of species. "Little Rapa" has its share of eleven species in seven genera but of these only four species are endemic. *Cosmopterix* is a worldwide genus with two species. One, *melanarches,* was previously known from the Society Islands; the other, *aphranassa,* is endemic. *Trissodoris* has two species: *thelmae* which is endemic and *honorariella* which is the type-species of the genus and is distributed all the way from Pitcairn Island and Hawaii to Rapa, Borneo, and Ceylon. The origin of the genus was probably in Australia where there are related forms, but its distribution is limited *only* by the distribution of *Pandanus.* Although this species can be, and probably is, dispersed by convection currents and cyclonic disturbances, its chief mode of dispersal is undoubtedly by the agency of man, particularly ancient man; the Polynesians and other Pacific races use *Pandanus* extensively in building their houses or making such items as mats and baskets. In the construction of their houses they use the dry, hanging leaves, and it is these leaves that are infested with *Tris-*

FIGURES 14, 15.—14, Maugaoa at 300 m, 950 feet. Mixed vegetation dominated by *Oparanthus, Corokia, Metrosideros, Rubus,* and *Freycinetia.* 15, Collecting sheet at same point as Figure 14. "Black light" shows as white bar below pressure lamp.

sodoris species and which are transported from place to place. The same might be said for the distribution of the very closely related genus *Echinoscelis,* the larva of which also feeds in *Pandanus* (see Figure 21). *Labdia dicyanitis* is probably a central Pacific species, presently known only from the Marquesas Islands and Rapa. *Iressa* and *Semolina* are known only from Rapa and each has one species. One other genus, *Anatrachyntis,* occurs on Rapa and contains three species, all widely distributed in the Pacific and each apparently dependent on *Pandanus* as a host.

In the Momphidae there is a single endemic species, *Batrachedra monophthalma,* which feeds in a cyperaceous plant. This group probably was more extensively represented in ancient times when the Cyperaceae were so common on the island, but has died out with the decline in the abundance of hosts.

The family Glyphipterigidae has two species on Rapa: *Anthophila chalcotoxa* and *Tebenna bradleyi.* The former was described from Tonga and the larva feeds on *Ficus.* It is easy, therefore, for *chalcotoxa* and other members of the genus *Anthophila* to become dispersed because of the abundance of *Ficus* throughout the Pacific. *Tebenna bradleyi* is obviously a migrant to Rapa from Australia or New Zealand.

The yponomeutid genus, *Tanaoctena,* presents an interesting, but restricted, distribution which is similar to that of *Dichelopa.* There are only four species: one in New Zealand, one each in Tasmania and Australia, and one on Rapa (Figure 132). The Rapa species is most nearly related to *dubia* of New Zealand. Even the family assignment of this peculiar genus is suspect, but regardless of its placement the species are obviously related. The two other yponomeutid genera, *Pseudorinympha* and *Terthroptera,* each with one species, are endemic, but it is the former that conjurs speculative thought as to its origin and relationship. The only significant difference between *Pseudorinympha* and the North American *Orinympha* is the absence of an ocellus in the former and presence in the latter. Although the presence or absence of ocelli is generally considered important, it is not known to what extent this may be significant. If in fact these two genera are related, as they appear to be, then the relationship must be very ancient and the connection was probably by way of Antarctica when its climate was more moderate than it is today. Although this relationship may seem highly improbable and remote, it is certainly not any more impossible than the presence of the yponomeutid genus *Melitonympha* in the Juan Fernandes Islands, Chile, and Texas!

Of the four species of Heliodinidae, three are endemic and the fourth, *Lissocnemitis argolyca,* is found also only in the Marquesas.

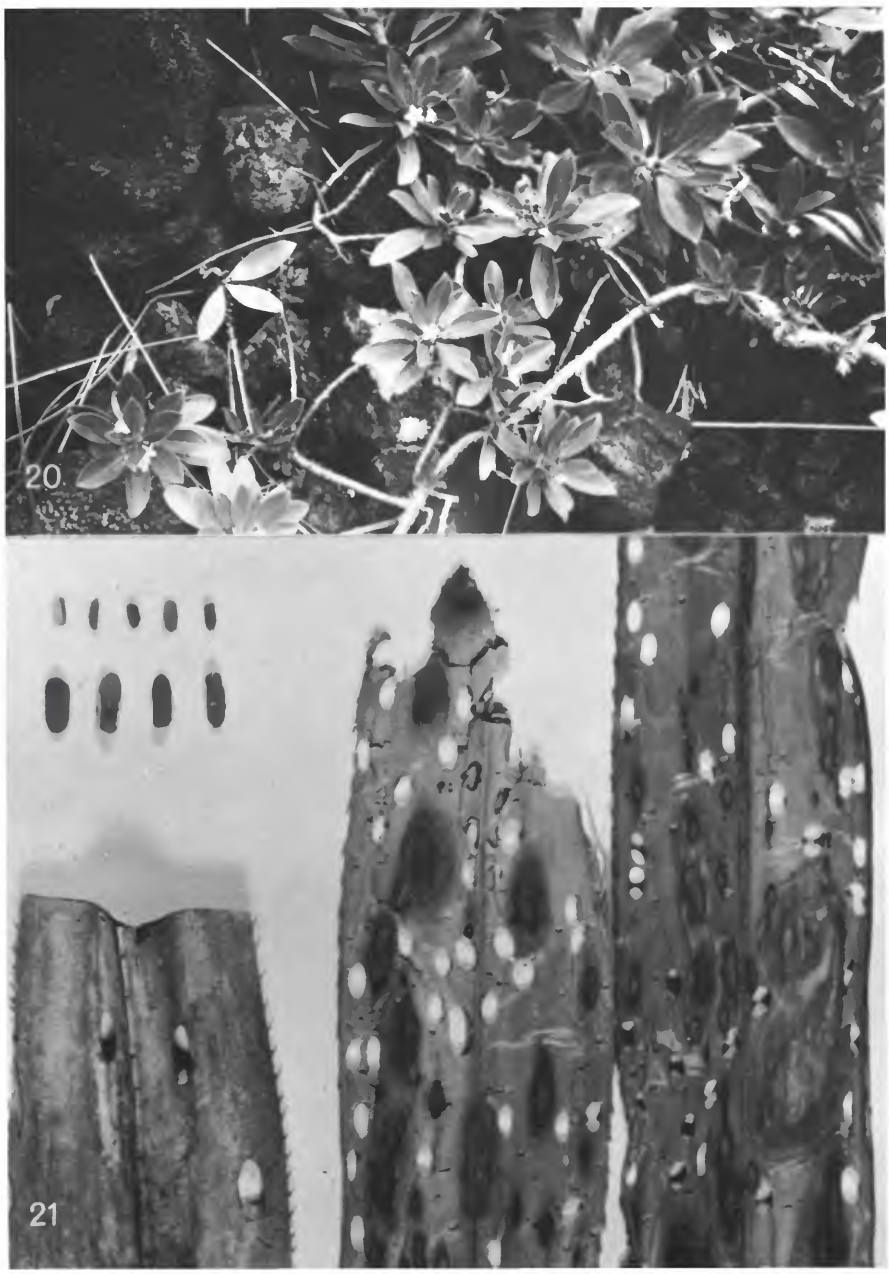
The Gracillariidae are represented by three species—two endemic, one apodemic. It is the latter, *Parectopa pontificalis,* that presents a host-species relationship that is interesting and conforms, to a large extent, with the south central Pacific distribution pattern. It was described from Rurutu, one of the Austral Islands not very distant from Rapa, and it occurs on Rapa.

The host of *pontificalis* is *Metrosideros,* which is found commonly in the Australian-New Zealand area as well as in the Hawaiian Islands, Austral Islands, and South Africa. The relatives of *pontificalis* (*miniella, pyrelictis, hieranthes, paradisia, thriambica, gamelia, coccinea, zehntneri, haemataula, collischema,* and *tegulata*) are from New Zealand, Samoa, Ceylon and Java, India, and Assam, following very closely the distribution of *Metrosideros* (Figure 141). Although *Metrosideros* occurs in the Hawaiian Islands and South Africa, no relative of *pontificalis* has yet been found—undoubtedly a matter of collecting.

Six of the 17 Tineidae might be termed "tramp species" and are undoubtedly distributed around the world in commerce. These are: *Monopis crocicapitella, Praeacedes thecophora, Decadarchis flavistriata,* D. *minuscula, Setomorpha rutella,* and *Erechthias zebrina.* All are refuse-feeders, stored products pests, or feed in dead and decaying vegetable matter. Except for the ease with which they are transported, they are of no particular importance zoogeographically. *Decadarchis* is largely a Pacific genus, except for the two nearly pan-tropical species mentioned above. On Rapa there are ten species, all but two of them endemic. The little known and closely related genus *Nesoxena* is presently recorded only from Tahiti, Rapa and Ontong Java, and the Tuamotus although it will probably be found through much of the tropical Pacific where its food plants, *Pandanus* and *Cocos,* are common. The two endemic genera, *Biastolemma* and *Petula,* do not have any known close relatives and their origin is very obscure. The nearly ankylosed male genitalia of *B. coarctata* are unlike anything else known in the Tineidae. *Opogona* of the Lyonetiidae is a large and well-known genus in the Old World and the Pacific Islands, but its place of origin, like that of the coconut, is obscure.

FIGURES 16, 17.—16, The tree fern, *Cyathea,* on slope of Maugaoa at 308 m, 1,000 feet. 17, Teumukopuke (154 m, 500 feet). *Pandanus, Fitchia, Metrosideros* in foreground. Tevaitau (fort) center, Maugaoa, left background, Mauŋrua upper right.

FIGURES 18, 19.—18, *Pariati Bay. Scirpus nodosus* and *Pandanus tectorius*. 19, Pariati Bay. *Myoporum rapense* (left) and *Scirpus nodosus*. Thelma Clarke examining *Dichelopa myopori*, new species, attached to *Myoporum*.



FIGURES 20, 21.—20, *Myoporum rapense* growing among rocks at Pariati Bay, 30 October 1963. 21, Larval work of *Trissodoris honorariella* and *Echinoscelis hemithia*. Large holes and cases at upper left made by former, small holes and small cases made by latter.

In a considerable number of the Microlepidoptera of Rapa there is the peculiar feature of the black or gray-tipped whitish hind wing. It is noticeable in three families, Lathrotelidae, Pyralidae, and Tortricidae, and is present in *Lathroteles obscura, Metasia chionostigma, M. gnorisma, M. empelioptera, Scoparia psednopa, S. tivira, S. exterminata, Dichelopa sericopis, D. myopori, D. lupicinia, D. deltozancla, D. dendrophila, D. rhodographa, D. honoranda, D. anthracodelta, D. vaccinii,* and to a lesser extent in *D. exulcerata.* I know of no restricted geographical area such as Rapa where such a feature is present.

Endemicity

On an island as remote as Rapa one should expect to find a high percent of endemicity in the fauna. The fact is, however, that it is unexpectedly low. Neither of the butterflies is endemic and of the total of Macrolepidoptera recorded only 8 out of 32 species, or 25 percent, are endemic. Of the 96 Microlepidoptera, 60 or 62.5 percent are endemic.

Acknowledgments

Many individuals have aided with this project in one way or another. Among these I wish to give special thanks to Dr. Sidney Galler, assistant secretary for science, Smithsonian Institution, formerly with the Office of Naval Research, who was instrumental in securing with his office the contract under which this project was undertaken. This project received further support in the form of a Smithsonian Research Foundation Grant. To Gaston Allain, Administrator of the Austral Islands (Tubuai Islands), without whose help we could not have reached Rapa, and who, upon our return, received us most cordially and hospitably in his home, our gratitude. To Dr. Paul-Emile Victor, of Paris and Papeete, I am deeply grateful for his intercession with the governor of French Polynesia and for his great interest in our entomological exploration of Rapa.

I wish to express my appreciation to the authorities of the British Museum (Natural History) for permission to examine and study pertinent types; and to my friends and colleagues there, especially D. S. Fletcher, Paul E. S. Whalley, M. Shaffer, A. H. Hayes, and W. H. T. Tams, who aided with determinations. John D. Bradley, Commonwealth Institute of Entomology, is, as usual, due special thanks for his unselfish help, not only with determinations, but also for answering numerous questions. I wish to thank Dr. J. Linsley Gressitt, Department of Entomology, Bernice P. Bishop Museum, Honolulu, for the privilege of studying *Caryolestis praedatrix* Meyrick and other pertinent types. I wish to express my appreciation to Dr. Eugene Munroe, Canada Department of Agriculture, Ottawa, for advice and help with certain of the pyraloids.

My colleagues at the Smithsonian Institution are always a source of help in many ways, and I wish to express my appreciation to Drs. E. L. Todd, Donald R. Davis, Ronald Hodges, and Donald Duckworth. For botanical names I am indebted to Drs. Dan H. Nicholson, William Stern, Jason Swallen, and Raymond Fosberg. For verification of names I wish to thank Dr. Allan Hanson, Department of Anthropology, University of Kansas.

The drawings for this paper were made by André del Campo Pizzini and Mrs. Jung Lea Smith, staff artists. The color plates were executed by Mr. Pizzini as were the maps. The photographs of the moths and food plants were taken by Jack Scott and Victor Kranz, except Plate 3 *a*, *b* and the figures on Plate 6 for which I am indebted to the authorities of the British Museum (Natural History). All illustrations of the island and people are reproduced from photographs by my wife and me.

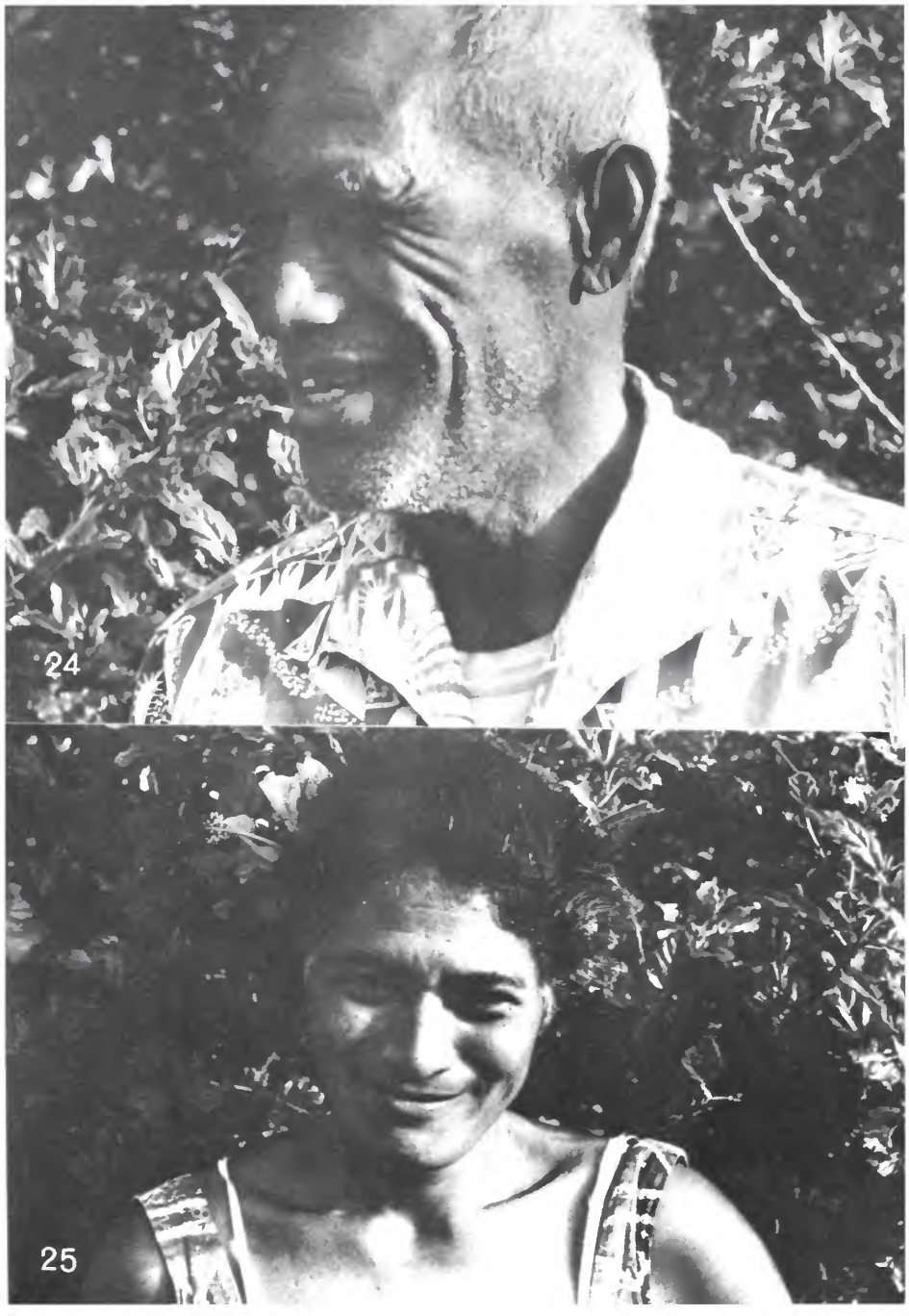
We owe the deepest appreciation to Teone and Teone Vahine,[2] who allowed us to use their home during our stay on the island, without which we would have been unable to work. We wish to thank "Doc" Taupua,[3] Medical Aid, for help on many occasions and for transportation in his boat to places on the "outside" of the island. I owe a special debt of gratitude to my chief guide, Teretina, a most reliable aid on all night excursions into the mountains.

Last, I wish to express my deep appreciation to my wife, Thelma. She accompanied me to Rapa as a volunteer aid, as she has on several less difficult expeditions, and it was she who performed the successful rearing of the Microlepidoptera, one of the most important phases of the expedition. In addition, she undertook all household chores, freeing me for other pursuits. Thus she merits a lasting debt of gratitude.

[2] Known to us as Mr. and Mrs. Sam Pito.

[3] Recently drowned on one of his "outside" trips.

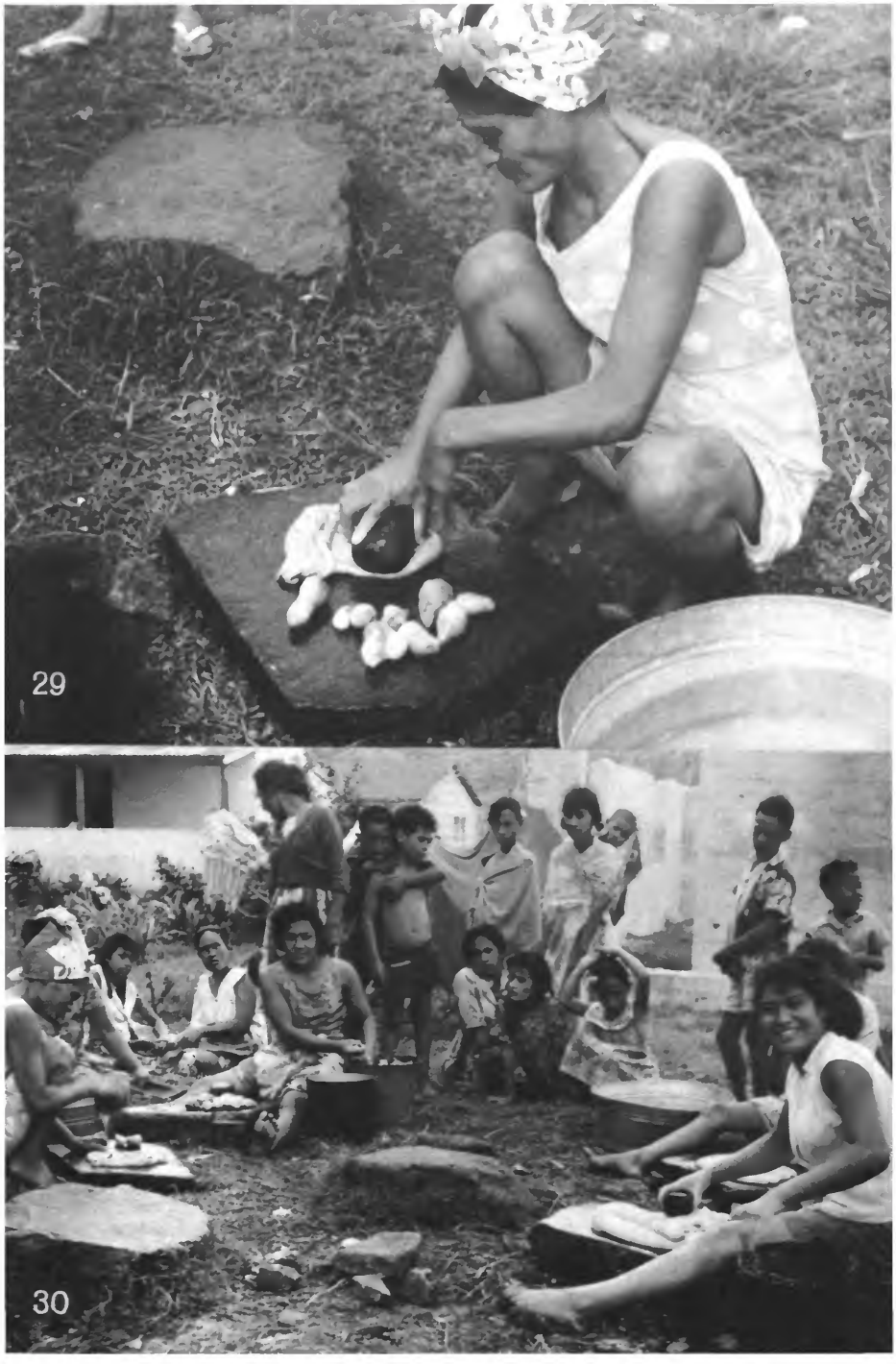
FIGURES 22, 23.—22, Point Teakauraee. Larval work of *Parectopa pontificalis on Metrosideros collina* var. *glaberrima*. 23, Same as above, enlarged. At left, cones constructed by larvae.



FIGURES 24, 25.—24, Teone. 25, Teone Vahini.

FIGURES 26, 27.—26, "Doc" Taupua, medical aid. 27, Chief guide, Teretina.

FIGURE 28.—"Doc" Taupua and family.



FIGURES 29, 30.—29, Teone Vahini making "popoi." 30, "Popoi" making—a social event.

Disposition of Specimens

The holotypes of all species are deposited in the National Museum of Natural History, Smithsonian Institution, unless otherwise indicated. Paratypes will be placed in the National Museum of Natural History, and in the Museum d'Histoire Naturelle, Paris, and the British Museum (Natural History), London. Specimens of previously described species, where series are sufficiently large, will also be placed in the museums in Paris and London.

Family NYMPHALIDAE

Genus *Hypolimnas* Hübner

Hypolimnas bolina (Linnaeus)

PLATE 3*a, b*

Papilio bolina Linnaeus, 1758, p. 479.
Hypolimnas bolina (Linnaeus), Seitz, 1908, p. 549, fig. 118b.—Poulton and Riley, 1928, p. 460.—Hudson, 1928, p. 32, pl. 5: figs. 18, 19.

The inclusion of this species is based on the extensive treatment given by Poulton and Riley of the material collected by Collenette while he was a member of the Saint George Expedition. During our stay on the island, from early September to mid-December, *bolina* did not appear.

I am indebted to the authorities of the British Museum (Natural History) for the illustrations of specimens from Rapa in that collection.

Genus *Vanessa* Fabricius

Vanessa (Bassaris) itea (Fabricius)

PLATE 3*c*

Papilio itea Fabricius, 1775, p. 498.—Donovan, 1805, pl. 26: fig. 1.
Vanessa itea (Fabricius), Godart, 1819, p. 321, no. 57.—White, 1855, pl. 2: figs. 2, 2.—Hudson, 1928, p. 35, pl. 4: fig. 8.
Bassaris itea (Fabricius), Hübner, 1821, p. 2, pl. 24.
Pyrameis itea (Fabricius), Doubleday, 1849, p. 202.—Seitz, 1908, p. 526, figs. 117 *d, e*.

This beautiful species, described from New Zealand and also found in Australia, was first seen by us on Rapa on 18 November in the morning of a warm, sunny day. The species is restless and fast in flight, but because of its habit of returning to its "territory" this individual was seen several times during the day and ultimately captured late in the afternoon. During the next month several specimens were observed, usually flying parallel to a cliff-face high up in the hills. One of the older residents of the island, Mr. Pito, told us that *itea* was formerly very common but that the numbers had decreased in recent years.

Hudson (1928, p. 35) states that the food plant is *Urtica incisa* but we did not find the host on Rapa. Apparently this is the first record of the occurrence of *itea* on this island. It was not recorded (Poulton and Riley, 1928) by the Saint George Expedition, nor by the Bishop Museum Mangareva Expedition which visited the island in July 1934. Nothing has been reported on any Lepidoptera collected on Rapa by the latter expedition.

It is interesting, however, that Collenette (1925, p. 260) states, "We could only record one species of butterfly, but another seen at close quarters on the last day of our visit, sitting on a bush overhanging a stream, answered to the descriptions of none of the island butterflies and must remain as a subject of speculation unless and until one of its kind is taken by some other visitor." Collenette did not describe the specimen but in all probability it was *itea*.

Family SPHINGIDAE

Genus *Hippotion* Hübner

Hippotion Hübner, 1819, p. 135. (Type-species: *Sphinx celerio* Linnaeus, 1758, p. 491 [subsequent designation by Rothschild and Jordan, 1903, p. 747].)

Hippotion celerio (Linnaeus)

PLATE 6*j*

Sphinx celerio Linnaeus, 1758, p. 491.
Hippotion celerio (Linnaeus), Collenette, 1929, p. 487.

We did not see any evidence of this species but Collenette reared three specimens from larvae feeding on *Colocasia antiquorum* Schott.

Family ARCTIIDAE

Subfamily NOLINAE

Genus *Celama* Walker

Celama Walker, 1865, p. 500. (Type-species: *Celama liparisalis* Walker, 1865, p. 500 [by monotypy].)

Celama insularum Collenette

PLATE 6*a*

Celama insularum Collenette, 1928, p. 469, pl. 21: fig. 2.

C. insularum is based on the ♂ holotype and ♀ allotype, collected by C. L. Collenette when the Saint George Expedition visited Rapa. We did not see this species.

Subfamily ARCTIINAE

Genus *Utetheisa* Hübner

Utetheisa Hübner, 1819, p. 168. (Type-species: *Noctua ornatrix* Linnaeus, 1758, p. 511 [subsequent designation by Kirby, 1892, p. 345].)

Utetheisa pulchelloides Hampson

FIGURE 31; PLATE 4*a*

Utetheisa pulchelloides Hampson, 1907, p. 239.

A single male of this was collected 22.X.1963 on Maurua, 600′(181 m).

Family NOCTUIDAE

Subfamily AGROTINAE

Genus *Peridroma* Hübner

Peridroma Hübner, 1821, p. 227. (Type-species: *Phalaena Noctua saucia* Hübner, [1803]–[1808] [subsequent designation by Tutt, 1892, p. 8; also by Grote, 1895, p. 20].)

Peridroma saucia (Hübner)

FIGURE 32; PLATE 4*h*

Phalaena Noctua saucia Hübner, [1803]–[1803], fig. 378.

Four females of *saucia* were collected at Haurei from 10–15.IX.1963. This is another nearly cosmopolitan species.

Genus *Tiracola* Moore

Tiracola Moore, 1881, p. 351. (Type-species: *Agrotis plagiata* Walker, 1857, p. 740 [by monotypy].)

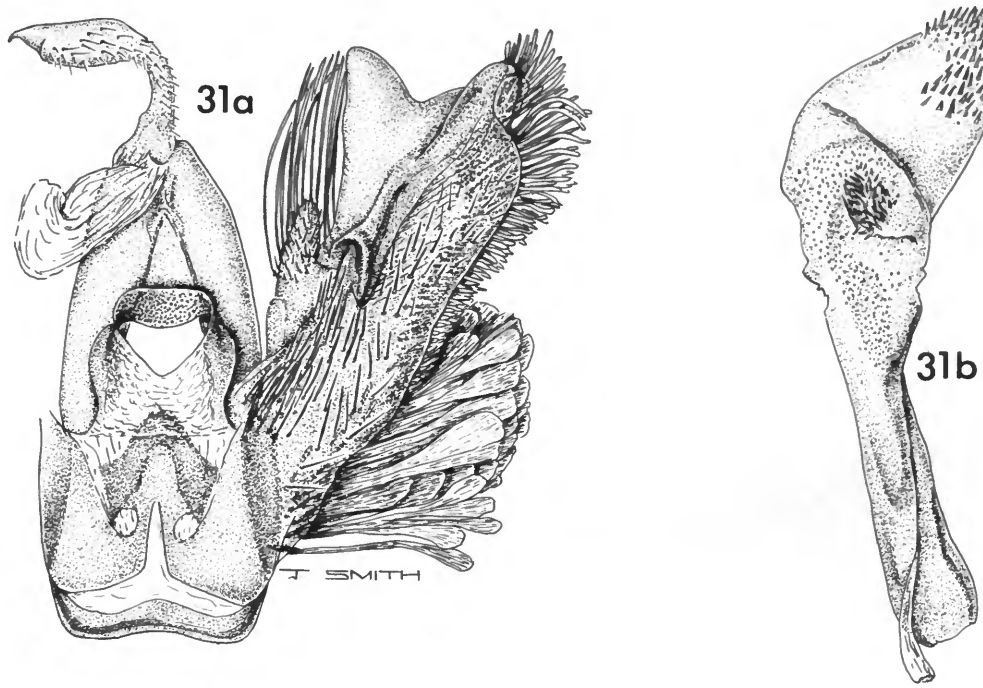


FIGURE 31.—*Utetheisa pulchelloides* Hampson: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.

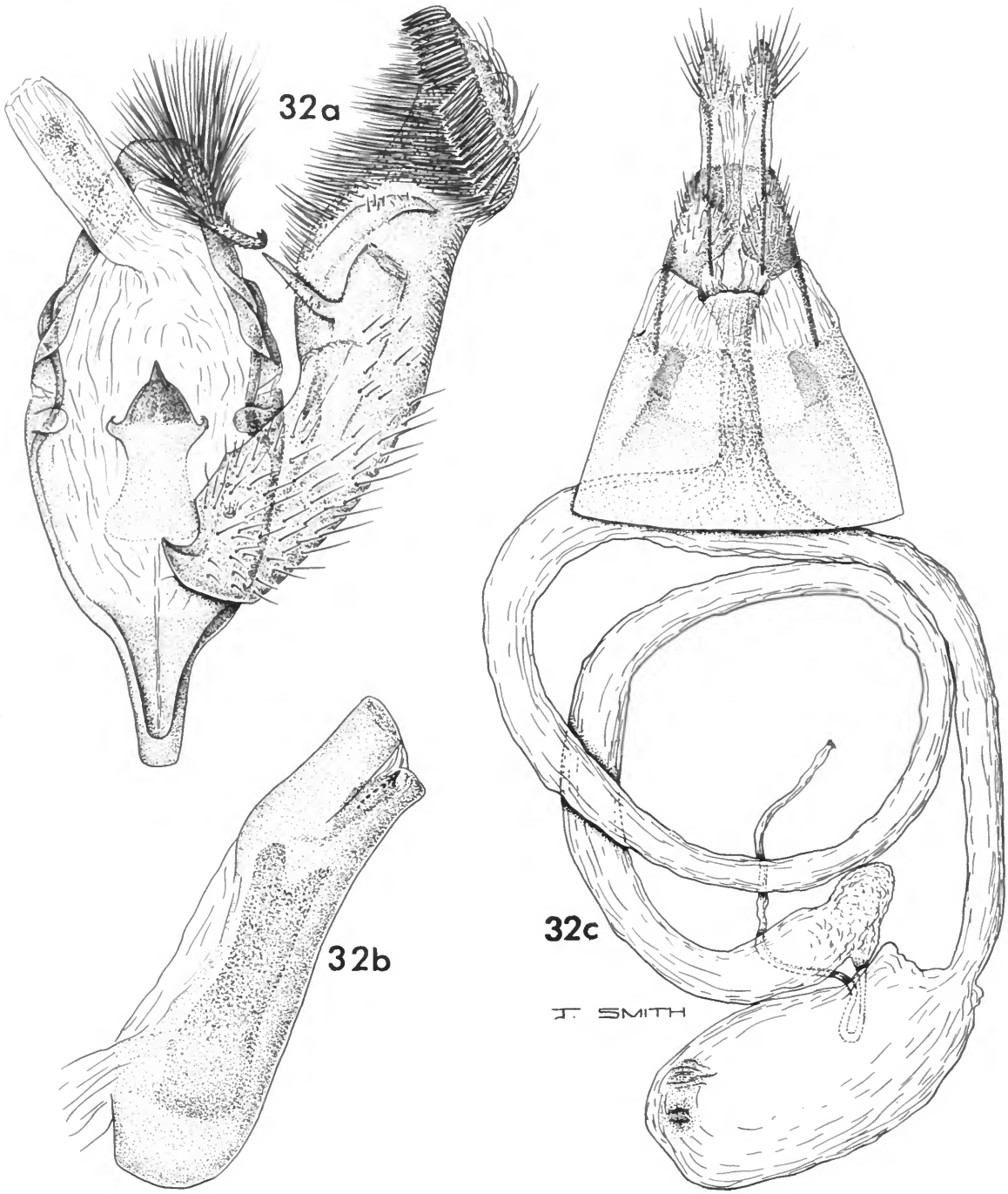


FIGURE 32.—*Peridroma saucia* (Hübner): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

382-271 O—71——3

Tiracola plagiata (Walker)

FIGURE 33; PLATE 4*d*

Agrotis plagiata Walker, 1857, p. 740.

A single male specimen of *plagiata* was collected on Maurua, 600′(181 m), 22.X.63. Although we record this specimen as *plagiata,* a complex of species is involved here which must await revision before a proper application of names can be made. The figure of the genitalia should provide easy identification at a later date.

Subfamily AMPHIPYRINAE

Genus *Platysenta* Grote

Platysenta Grote, 1874, p. 28. (Type-species: *Platysenta atriciliata* Grote, 1874, p. 28 [subsequent designation by Grote, 1874; p. 20].)

Platysenta illecta (Walker)

FIGURE 34; PLATE, 4*f*

Perigea illecta Walker, 1865, p. 684.

This Asiatic species was moderately common on Rapa. We have 8 specimens as follows: Maugaoa, 750′ (231 m), 2 ♂♂ (18.IX.1963)); Piahu, 750′ (231 m), ♂ (11.X.1963); Haurei, 2 ♂♂, ♀ (13.IX.1963); Tevaitau, 750′(231 m), ♂ (11.X.1963); 200′(61 m) ♀ (21.IX.63).

The species was recently established in Hawaii (Todd, 1962).

Genus *Mythimna Ochsenheimer*

Mythimna Ochsenheimer, 1816, p. 78. (Type-species: *Phalaena Noctua turca* Linnaeus, 1761, p. 322 [designated by Samouelle, 1819, p. 251].)

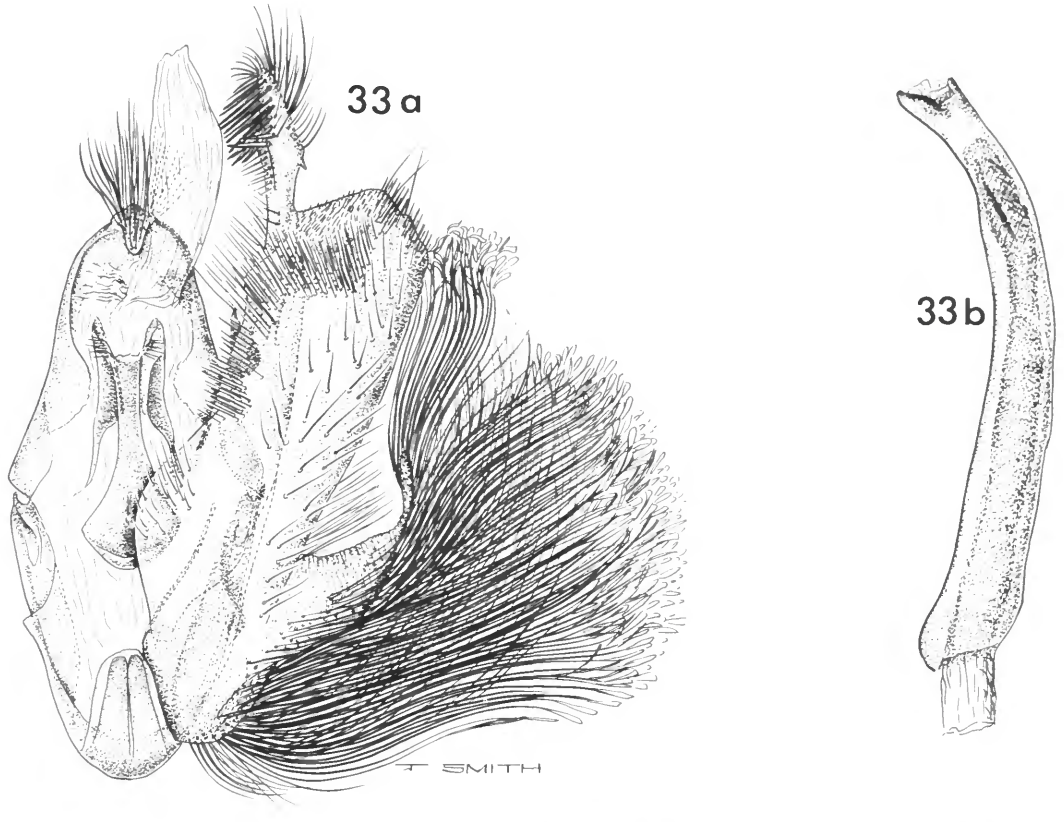


FIGURE 33.—*Tiracola plagiata* (Walker): *a,* ventral view of male genitalia with left harpe and aedeagus removed; *b,* aedeagus.

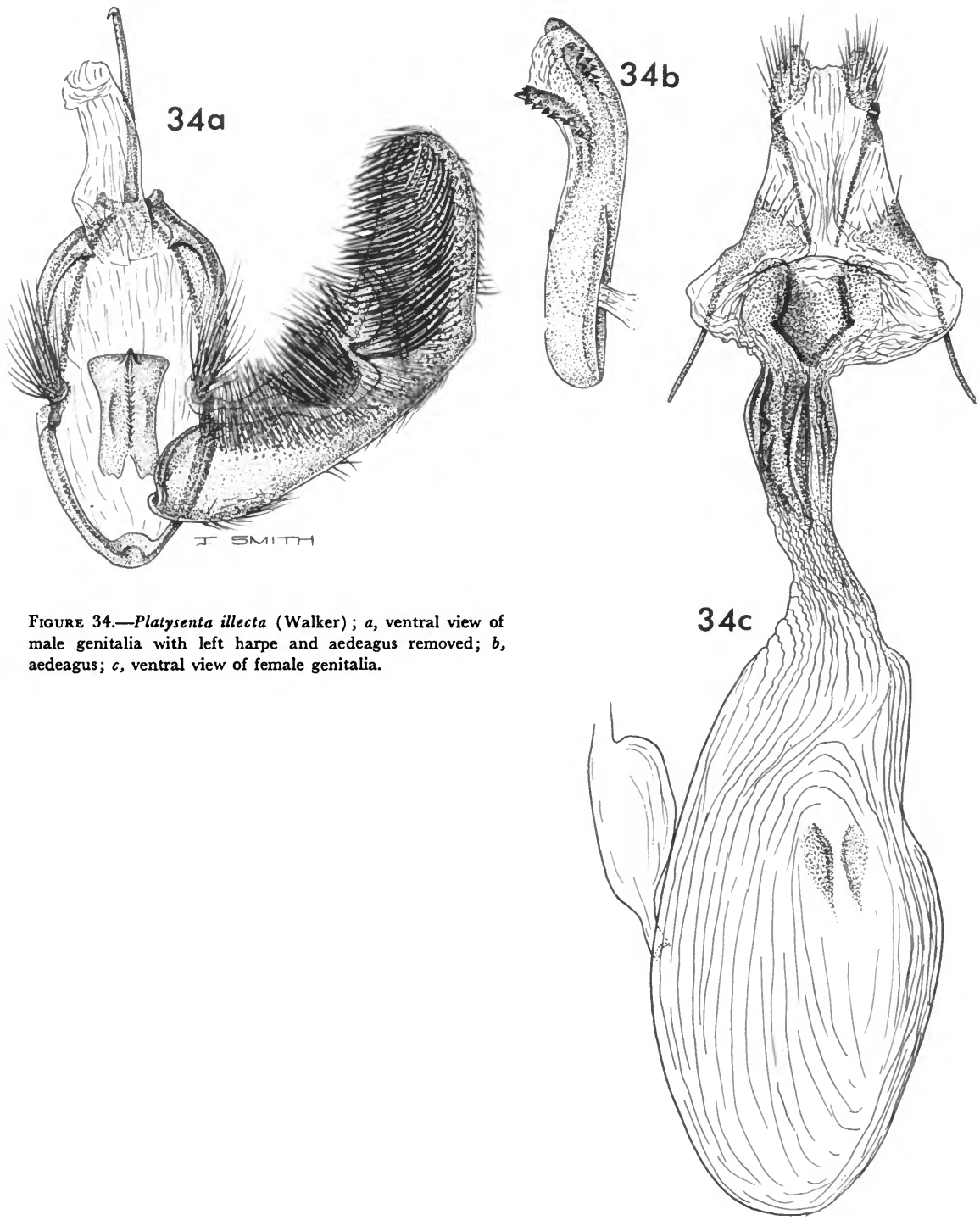
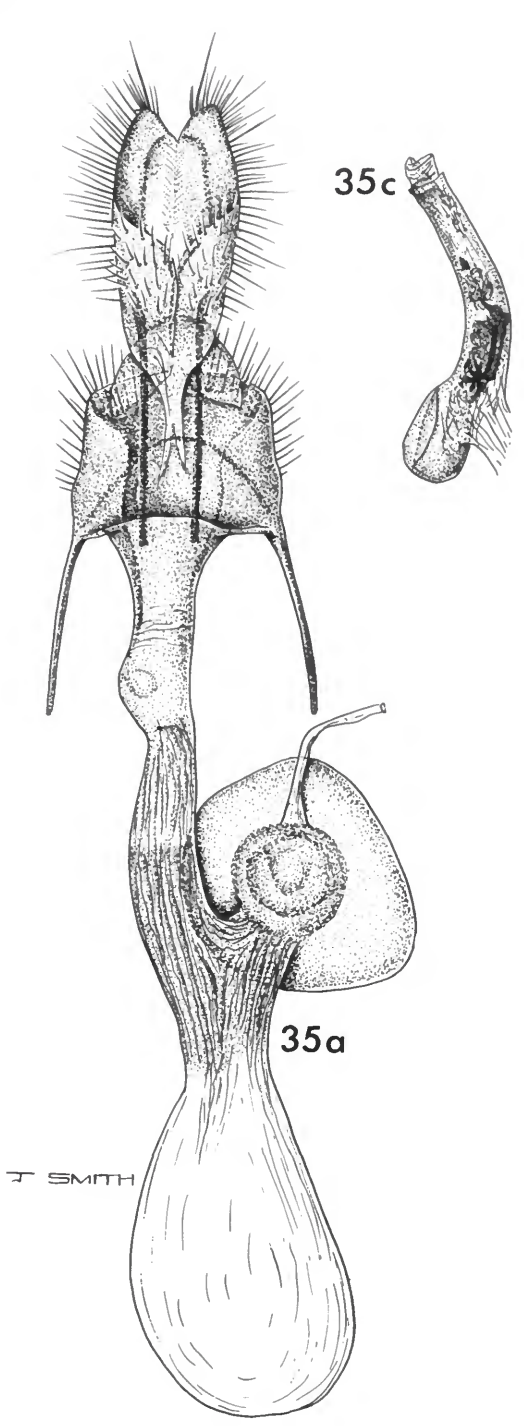


FIGURE 34.—*Platysenta illecta* (Walker); *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.



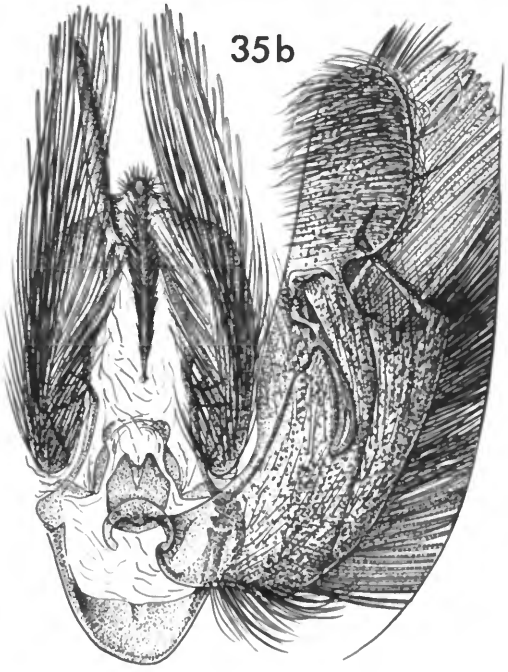


FIGURE 35.—*Mythimna loreyi* (Duponchel): *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus.

Mythimna loreyi (Duponchel)

FIGURE 35; PLATE 4*g*

Noctua loreyi Duponchel, 1827, p. 81, pl. 105: fig. 7.

In our series of *loreyi* from Rapa there are 6 ♂♂ and 18 ♀♀. Most are from Haurei, 6 ♂♂, 16 ♀♀ (8–17.IX.1963); also a ♀ from the same locality, which was reared from a pupa found in a dead tree fern (*Cyathea*) frond. The moth emerged 12.XII.1963. One ♀ is from Piahu, 750′(231 m) (11.X.1963).

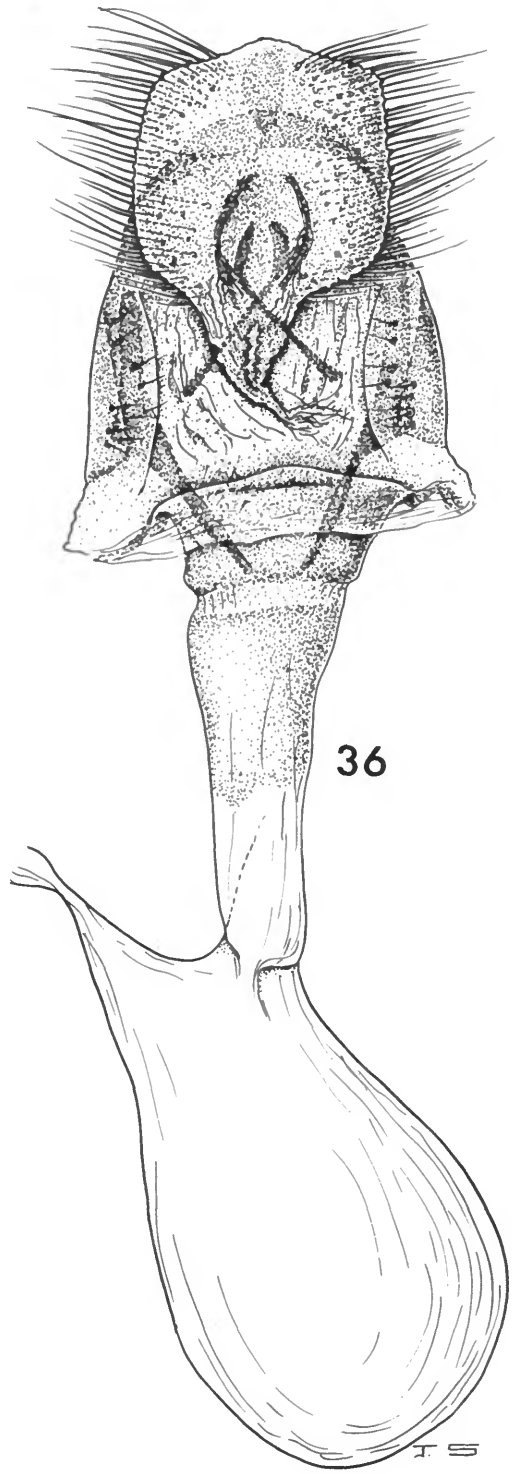
Genus *Euplexia* Stephens

Euplexia Stephens, 1829, p. 41. (Type-species: *Phalaena Noctua lucipara* Linnaeus, 1758, p. 518 [by monotypy].)

Euplexia vetula, new species

FIGURE 36; PLATE 5*d*, *h*

Alar expanse 44–52 mm.



Labial palpus blackish fuscous with some mixture of brown scales. Antenna fuscous, narrowly and indistinctly annulated blackish fuscous. Head fuscous mixed with light brown. Thorax fuscous, posterolaterally mixed with grayish scales. Forewing ground color fuscous with slight leaden cast; basal dash consisting of black and buff scales; orbicular and reniform slightly lighter than ground color and contained within a large, blackish-fuscous triangular patch; (in one specimen the reniform is almost wholly buff and the orbicular contains some buff scales); on outer third of costa three, very small, pale spots; subterminal line consisting of a series of small, confluent blackish-fuscous triangles edged outwardly with buff or clay color; terminal line blackish fuscous; veins indicated by scattered blackish-fuscous scales; fringe fuscous. Hind wing light sepia; discal mark obsolete; exterior line fuscous; outer margin fuscous. Foreleg blackish fuscous; tarsal segments narrowly annulated brownish apically; midleg blackish fuscous; tibial spurs black, annulated buff basally and apically; hind leg fuscous with scattered buff scales; tibial spurs black with buff basal and apical annulations; tarsal segments with a few buff scales apically. Abdomen fuscous mixed with gray and buff scales, the gray and buff abundant posteriorly.

Female genitalia slide JFGC 11795. Ostium broad, ventral edge convex. Inception of ductus seminalis at posterior end of bursa copulatrix laterally. Ductus bursae membranous anteriorly, posterior three-fifths sclerotized. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70070.

TYPE LOCALITY.—Rapa, Maurua, 600′ (181 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♀ holotype (25.X.1963) and 3 ♀♀ paratypes, Maurua, 600′ (181 m) (22 & 25.X.1963); Maugaoa, 950′ (292 m) (7.XI.1963).

This species is assigned to *Euplexia* with some misgiving, but until the group to which it belongs is revised, it is as well placed here as anywhere. Unfortunately, the male of *vetula* is unknown, and were it known perhaps a better generic placement could be made.

FIGURE 36.—*Euplexia vetula*, new species. Ventral view of female genitalia.

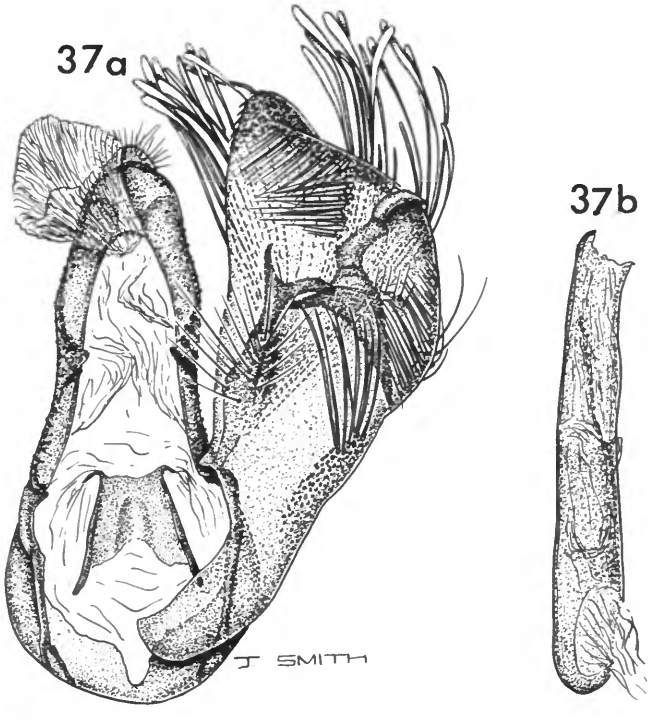
This striking moth has at least two forms as shown on Plate 5*d, h*. Of the four specimens collected three are like that illustrated in Plate 5*h*.

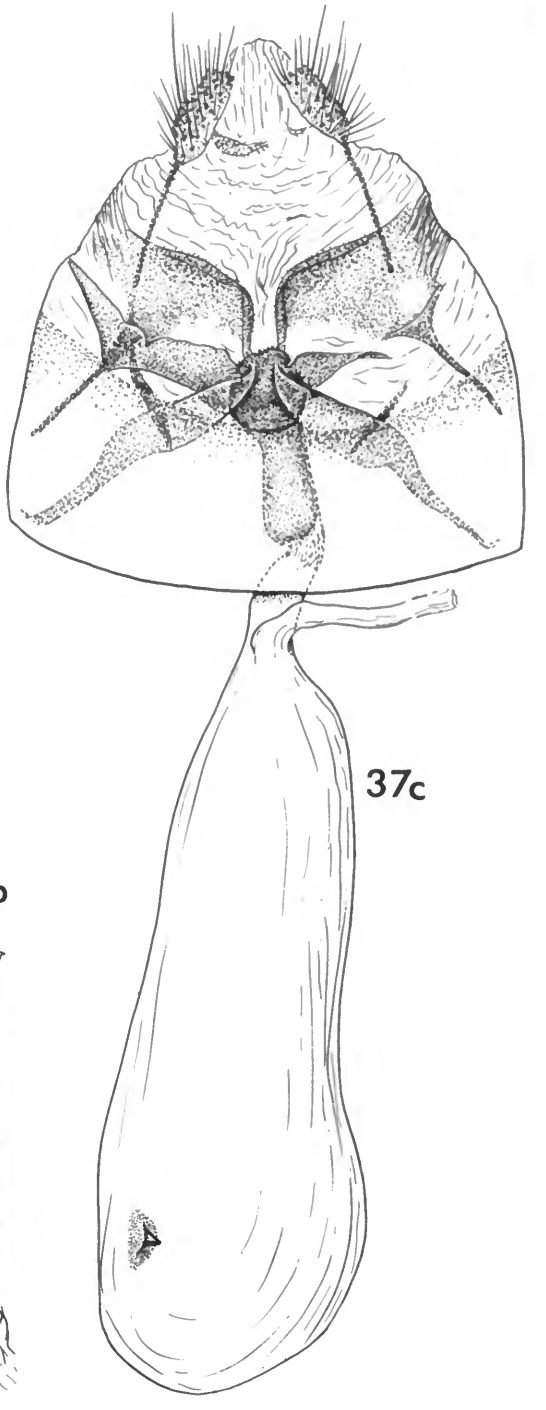
Genus *Luceria* Walker

Luceria Walker, 1859, p. 853. (Type-species: *Luceria novatusalis* Walker, 1859, p. 854 [by original designation].)

NOTE: The preface to vol. 19 (Walker) is 12 November 1859 but the actual date of publication is 10 December 1859. Walker's name may be preoccupied by *Luceria* Heinemann, 1859, preface dated 14 November 1859 [actual date of publication?]. Hampson, 1895, Fauna of British India, 3:95, lists *Luceria* Walker, 1859, as a junior synonym of *Chusaris* Walker, 22 January 1859, with type-species: *Chusaris retatalis* Walker, 1859 [by monotypy].

FIGURE 37.—*Luceria oculalis* (Moore): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.





Hampson's synonymy is open to question, and I am unable to ascertain the actual date of publication of Heinemann's work so am retaining *Luceria* Walker.

Luceria oculalis (Moore)

FIGURE 37; PLATE 22*a*

Rivula oculalis Moore, 1877, p. 614.
Luceria oculalis (Moore), Collenette, 1928, p. 485.

We found *oculalis* rather commonly at low elevations (never over 750′ (231 m), principally in September and none after late October. It was present at sea level in April (Collenette, 1928, p. 485).

Genus *Callopistria* Hübner

Callopistria Hübner, 1821; p. 216. (Type-species: [=*Noctua pteridis* Fabricius, 1794, p. 90, no. 269] *Eriopus juventina* Cramer, 1782, pl. 400: fig. 4 [subsequent designation by Grote, 1874].)

Callopistria meridionalis Collenette

FIGURE 38; PLATE 5*a*

Callopistria meridionalis Collenette, 1928, p. 471, pl. 21; fig. 4.

Sixteen specimens of *meridionalis* were collected in April 1925 by Collenette. We found it in September and October but it was not common.

Genus *Spodoptera* Guenée

Spodoptera Guenée, 1852, p. 153. (Type-species: *Hadena mauritia* Boisduval, 1833, p. 92 [subsequent designation by Hampson, 1894, p. 248].)

Spodoptera mauritia (Boisduval)

FIGURE 39; PLATE 4*c*

Hadena mauritia Boisduval, 1833, p. 92.
Spodoptera mauritia (Boisduval), Collenette, 1928, p. 474.

This is another widespread species, not only found commonly on Pacific Islands, but also in continental areas.

Genus *Prodenia* Guenée

Prodenia Guenée, 1825, p. 159. (Type species: [=*Neuria retina* Herrich-Schäffer, 1846, p. 292, (supplement) pl. 29: fig. 145]. *Hadena littoralis* Boisduval, 1833, p. 91, pl. 13: fig. 8 [subsequent designation by Grote, 1874].)

Prodenia litura (Fabricius)

FIGURE 40; PLATE 4*b*

Noctua litura Fabricius, 1775, p. 601.
Prodenia litura (Fabricius), Collenette, 1928, p. 473.

A cosmopolitan species found on many Pacific islands where its polyphagus habits permit easy survival. It has been collected on Rapa in April, September, and October and probably occurs throughout the year.

Genus *Elydna* Walker

Elydna Walker, 1858, p. 1712. (Type-species: *Elydna transversa* Walker, 1858, p. 1712 [by mototypy].)

Elydna nonagrica (Walker)

FIGURE 41; PLATE 4*e*; PLATE 6*d*

Curgia nonagrica Walker, 1864, p.166.
Elydna nonagrica (Walker), Collenette, 1928, p. 474.

In the three and one-half months we spent on the island only two specimens of *nonagrica* were collected. Collenette (1928) recorded seven specimens collected in April, so obviously the species is much more common at that time of year.

Genus *Chasmina* Walker

Chasmina Walker, 1856, p. 146 (Type-species: *Chasmina cygnus* Walker 1856, p. 147 [subsequent designation by Hampson, 1910, p. 351].) Hampson (1910, p. 351) actually cites *Bombyx tibialis* Fabricius as the type species of this genus but on page 353 he indicates that *Chasmina cygnus* Walker, a species originally included in the genus, is a junior synonym of *Bombyx tibialis* Fabricius.

Chasmina tibialis (Fabricius)

FIGURES 42, 43; PLATE 5*e*

Bombyx tibialis Fabricius, 1775, p. 578.
Chasmina tibialis (Fabricius), Collenette, 1928, p. 474.

This widespread species was relatively common from sea level up to 750′ (231 m). Collenette (1928 p. 474) recorded it from low elevation in April, and it probably occurs throughout the year.

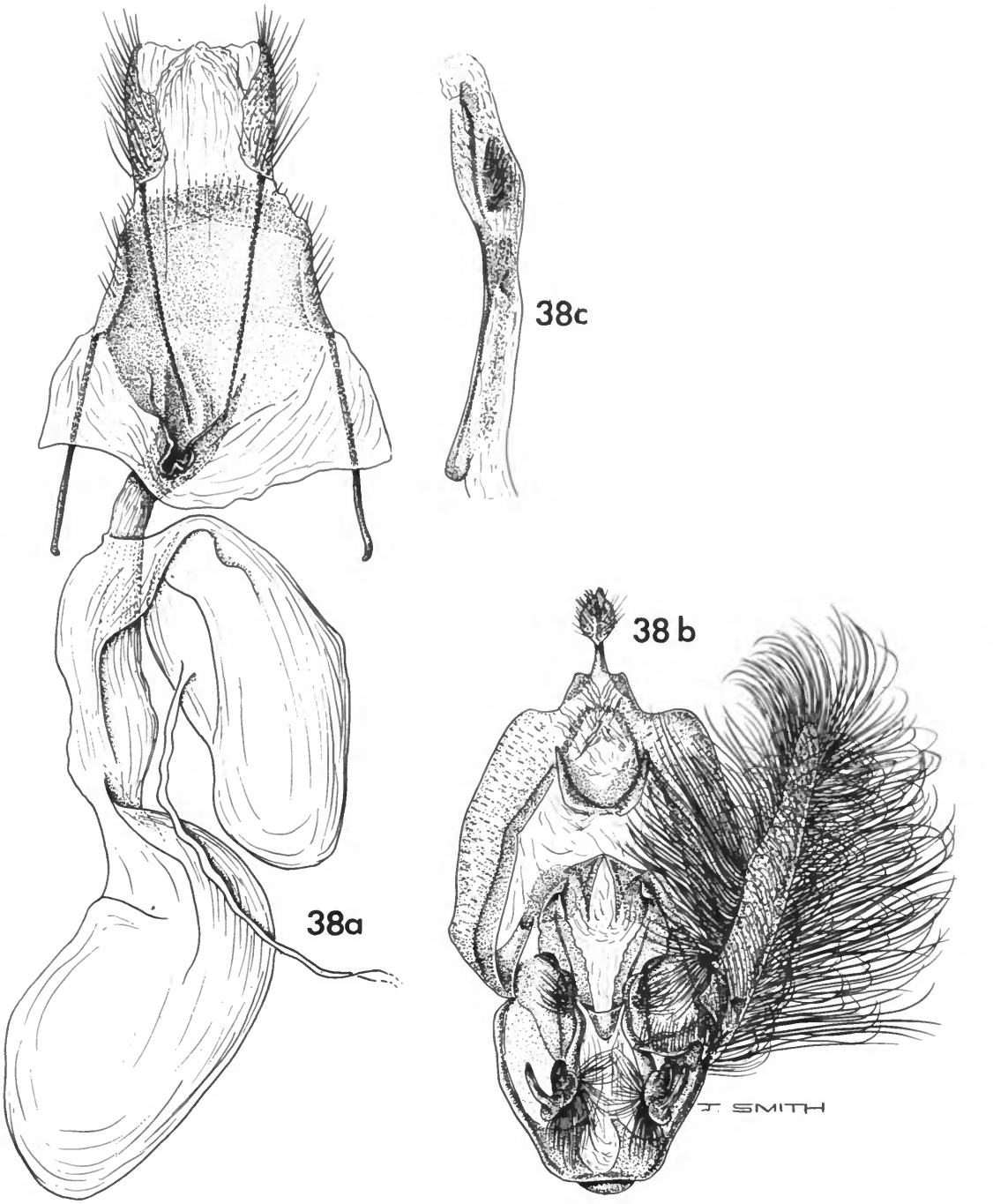


FIGURE 38.—*Callopistria meridionalis* Collenette: *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus.

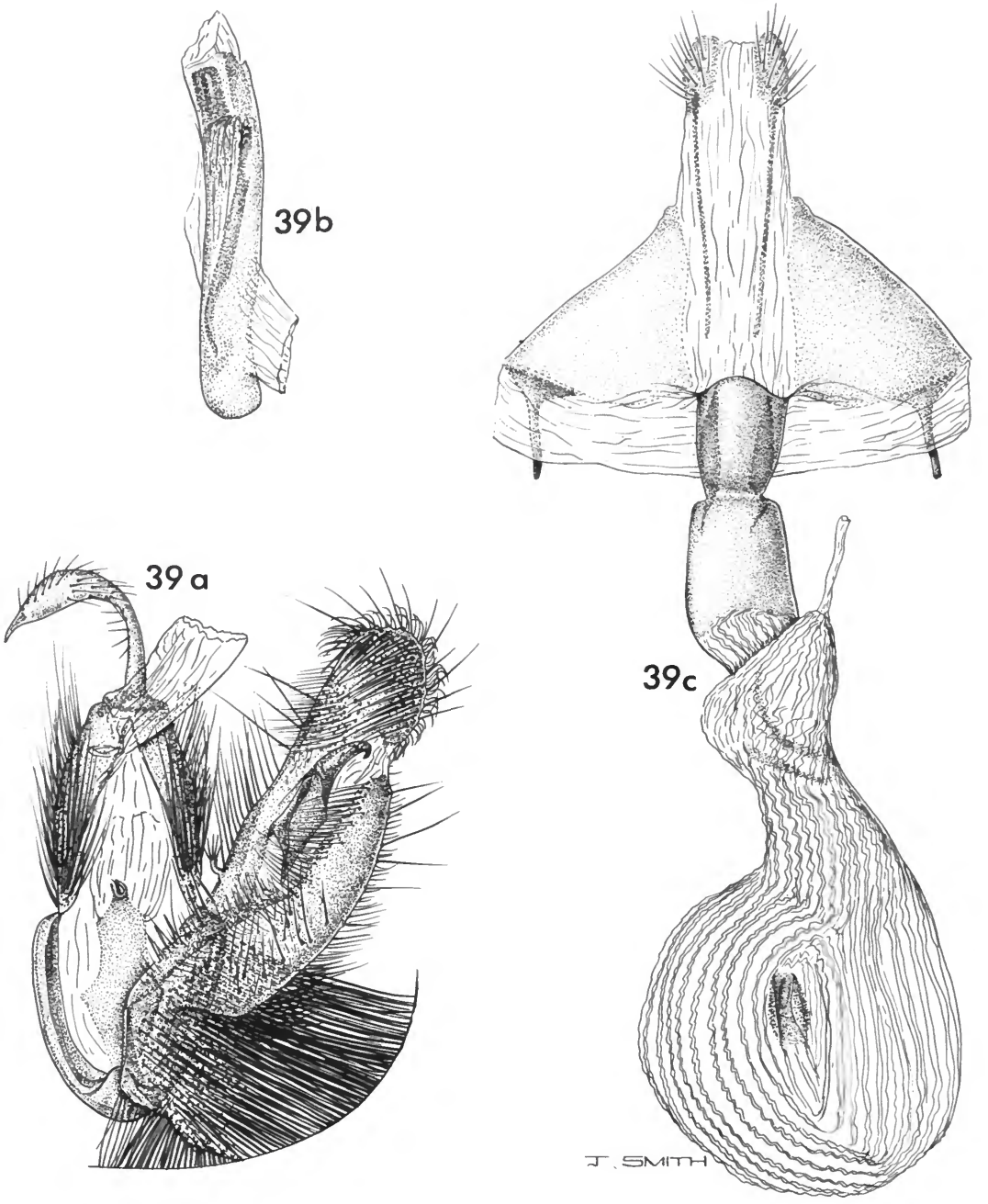


FIGURE 39.—*Spodoptera mauritia* (Boisduval): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

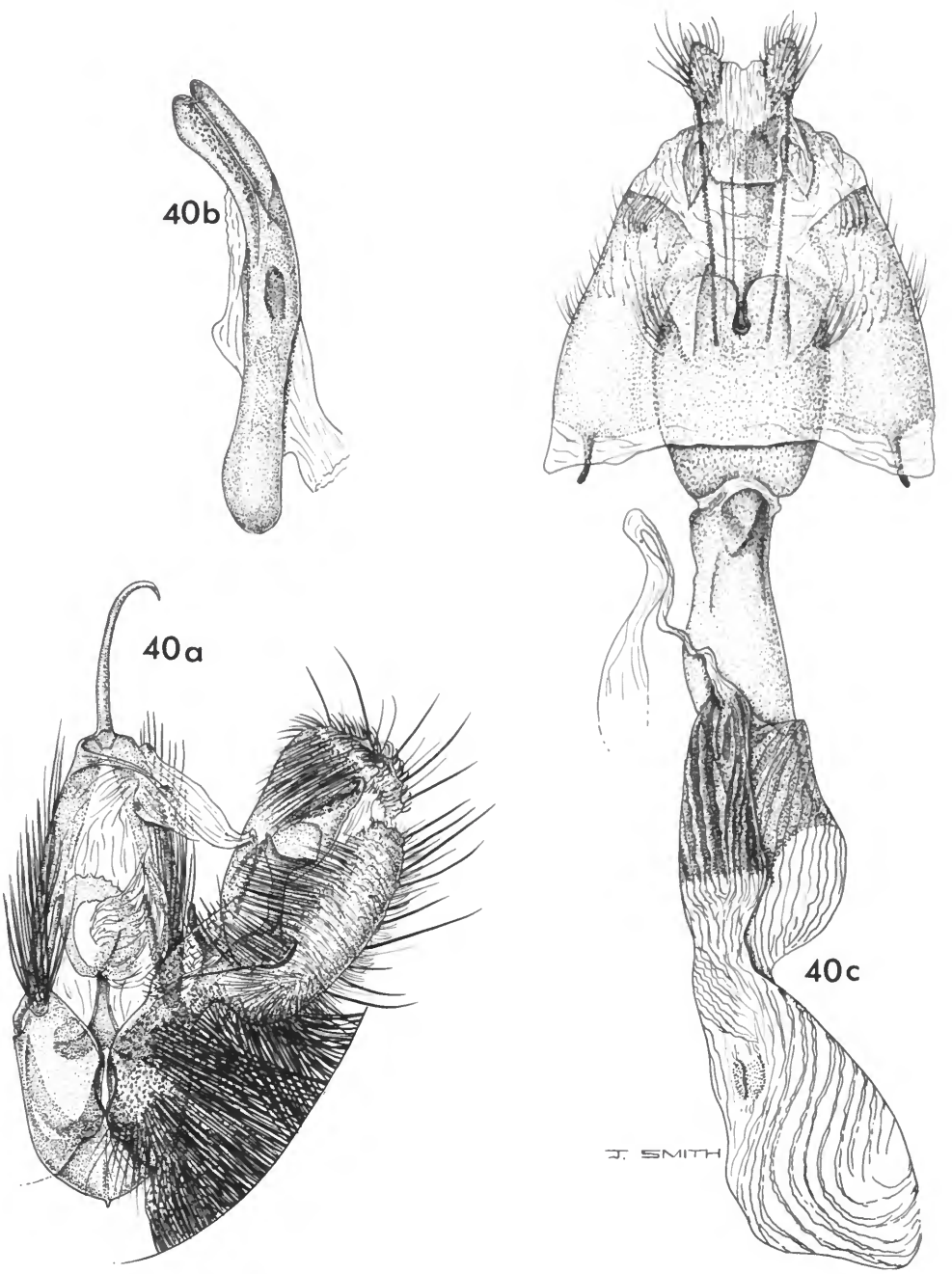


FIGURE 40.—*Prodenia litura* (Fabricius): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

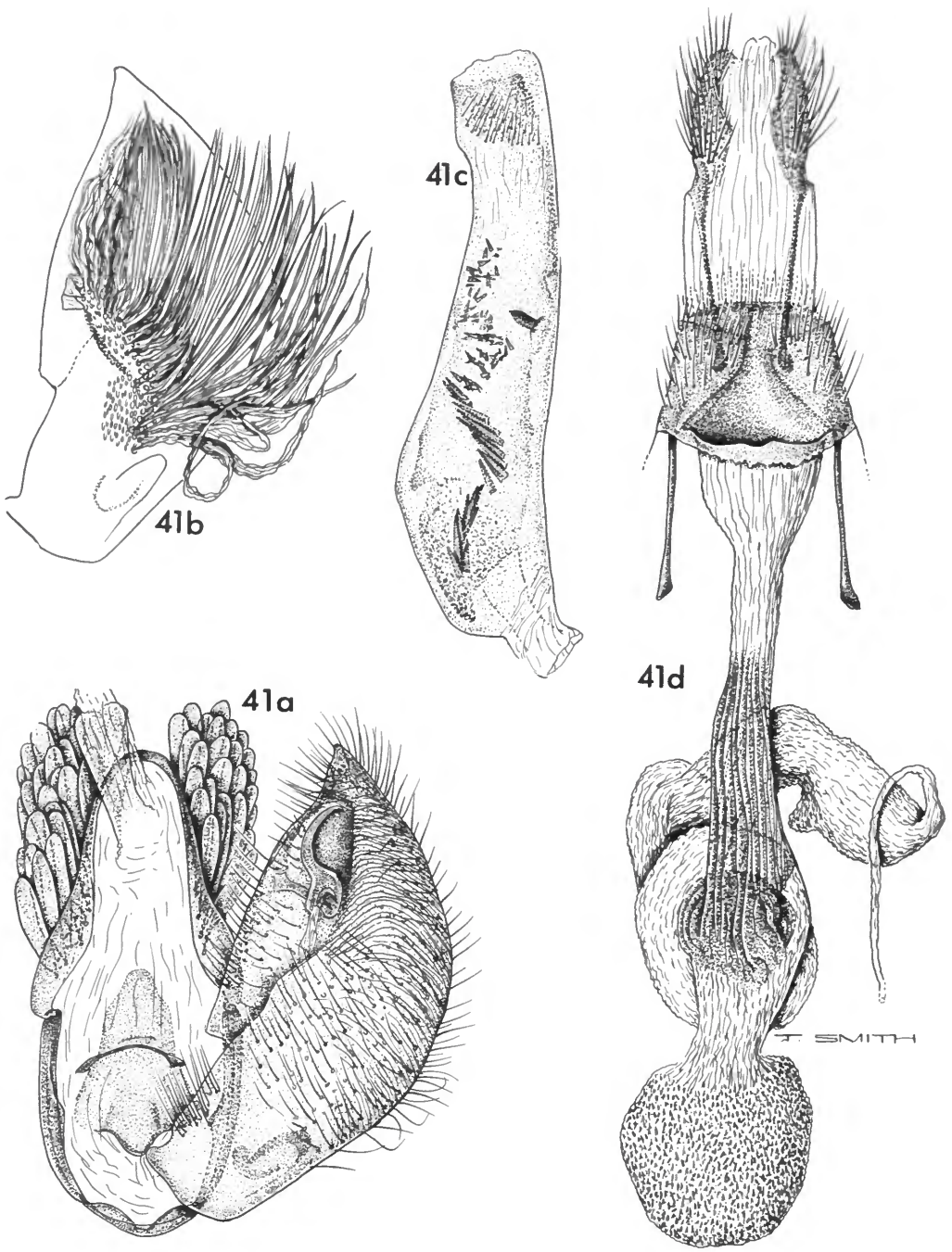


FIGURE 41.—*Elydna nonagrica* (Walker): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, outer side of harpe to show scale tuft; *c*, aedeagus; *d*, ventral view of female genitalia.

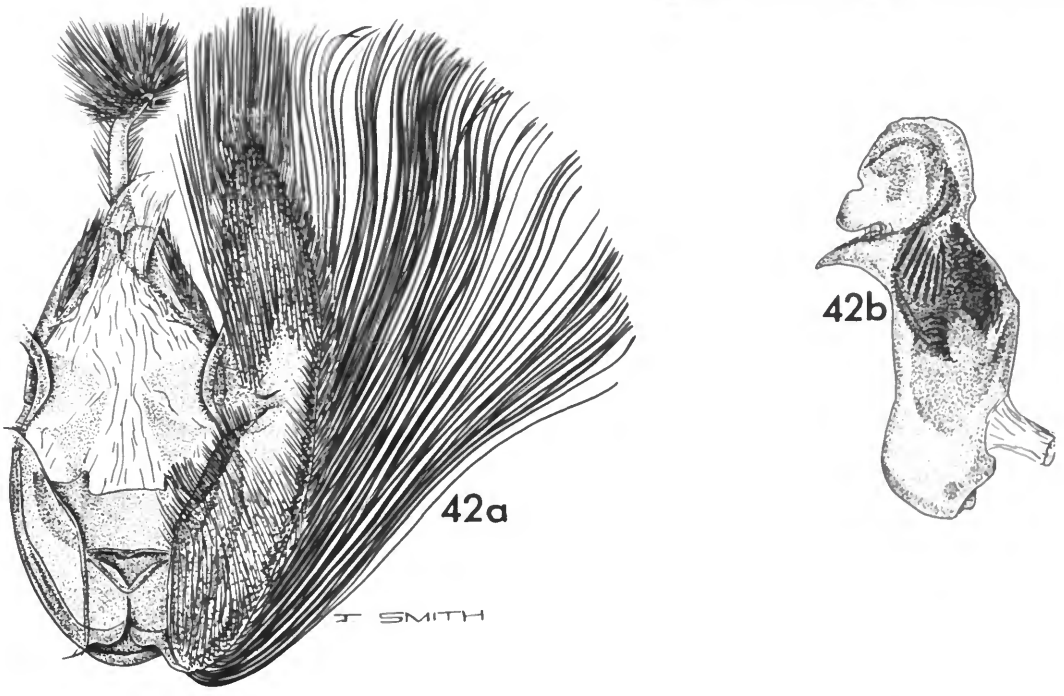
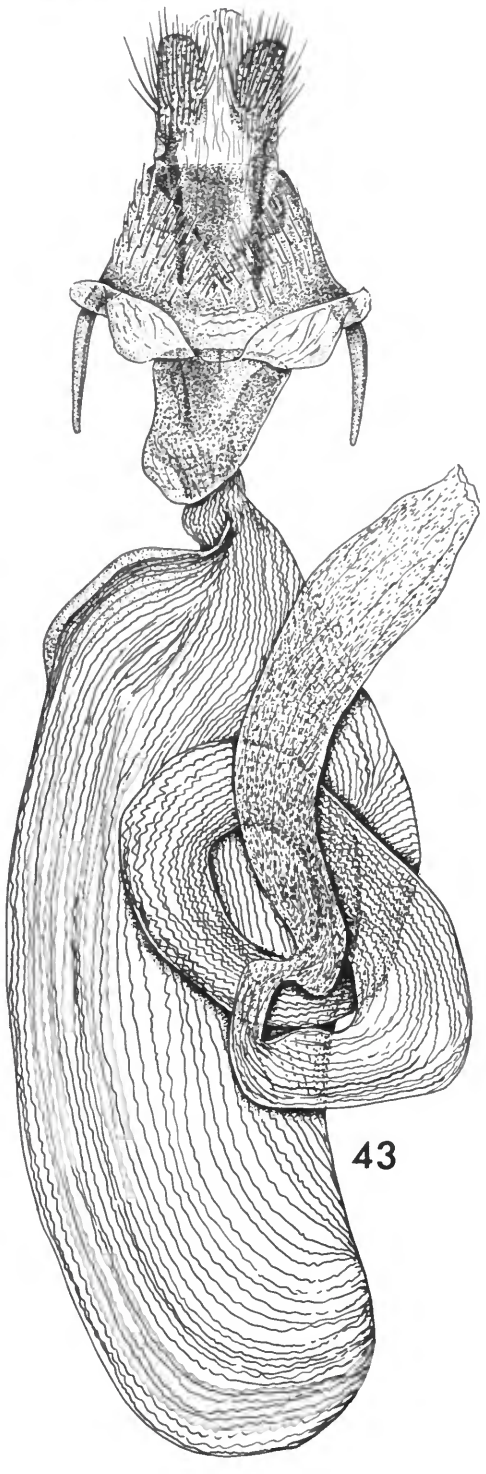


FIGURE 42.—*Chasmina tibialis* (Fabricius): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.



Subfamily ERASTRIINAE

Genus *Amyna* Guenée

Amyna Guenée, 1852, p. 406. (Type-species: *Amyna selenampha* Guenée, 1852 [subsequent designation by Hampson, 1894, p. 250].)

Amyna natalis (Walker)

PLATE 6*b, c*

Berresa natalis Walker, 1858, p. 214.
Amyna natalis (Walker), Collenette, 1928, p. 475.

The presence of *natalis* in the fauna of Rapa was recorded by Collenette (1928, p. 475) but we did not encounter the species.

Subfamily PHYTOMETRINAE

Genus *Chrysodeixis* Hübner

Chrysodeixis Hübner, 1821, p. 252. (Type-species: *Noctua chalcites* Esper, 1798, p. 447, pl. 141: fig. 3 [designated by Hampson, 1913, p. 452].)

Chrysodeixis chalcites (Esper)

FIGURE 44; PLATE 7*f*

Noctua chalcites Esper, 1798, p. 447, pl. 141; fig. 3.
Phytometra chalcites (Esper), Collenette, 1928, p. 479.

This is a common species which we found throughout our visit at practically all localities and all elevations.

Chrysodeixis albostriata (Bremer and Grey)

PLATE 6*g, h, i*

Plusia albostriata Bremer and Grey, 1853, p. 18.
Phytometra albostriata (Bremer and Grey), Collenette, 1928, p. 479.

The record of presence of this species in Rapa's fauna is based on the 7 specimens reared by Collenette; we did not see it.

FIGURE 43.—*Chasmina tibialis* (Fabricius). Ventral view of female genitalia.

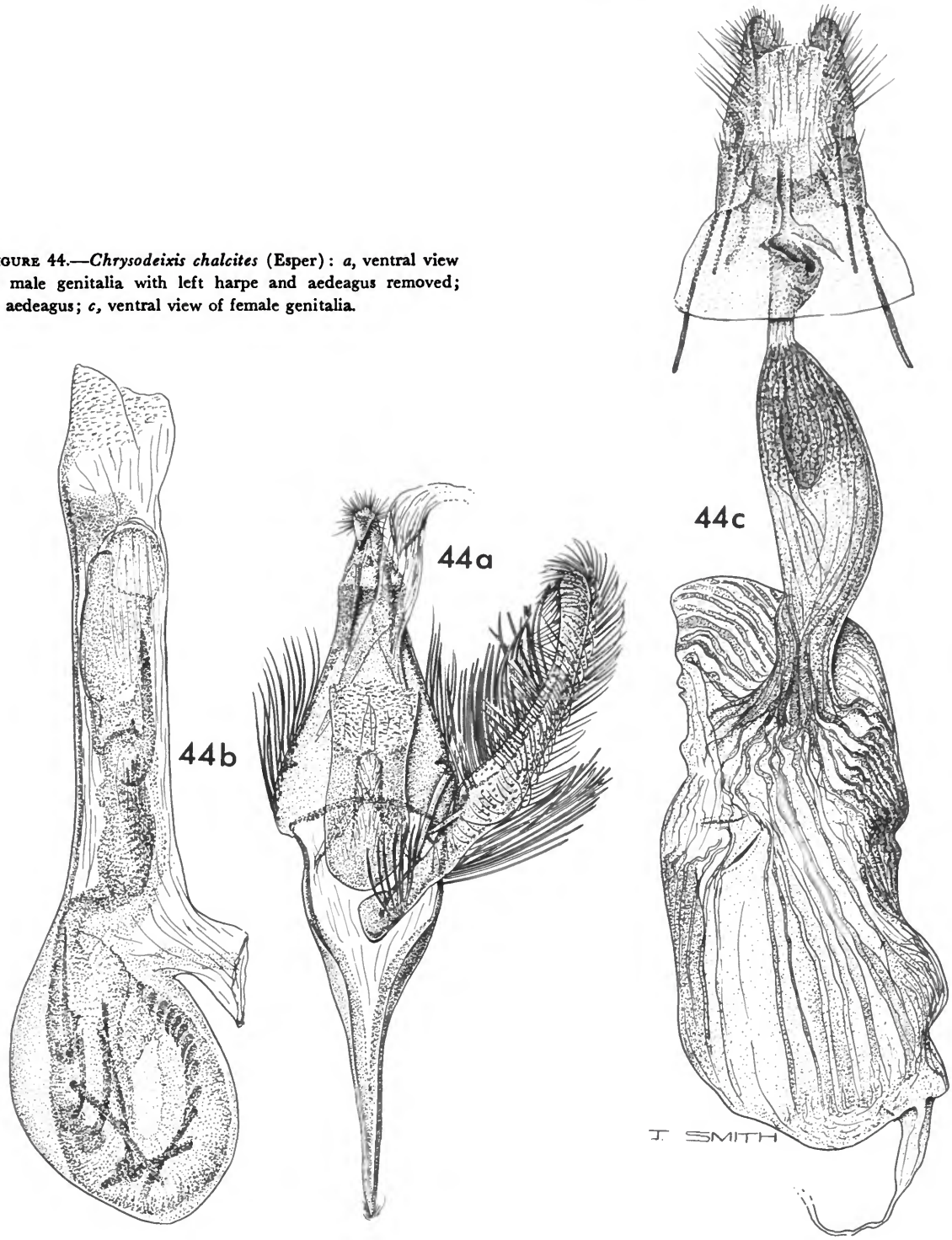


FIGURE 44.—*Chrysodeixis chalcites* (Esper): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

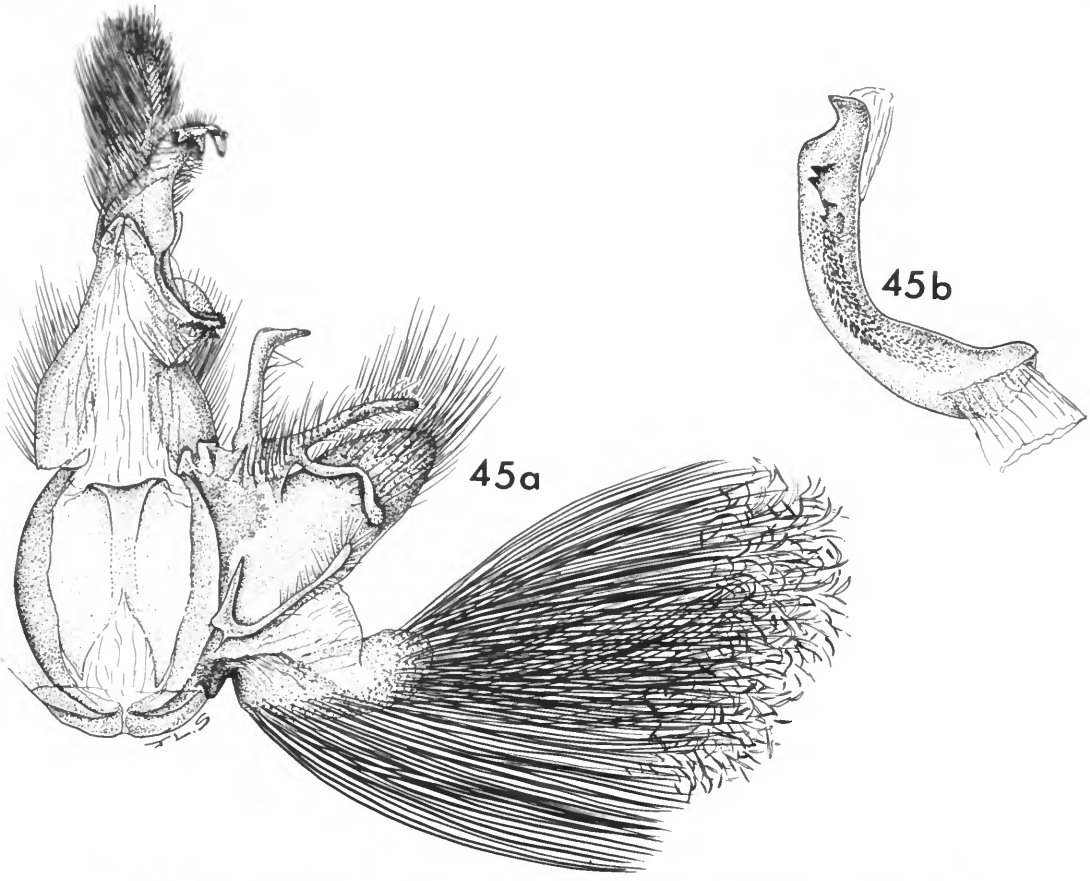


FIGURE 45.—*Achaea janata* (Linnaeus): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.

Subfamily CATOCALINAE

Genus *Achaea* Hübner

Achaea Hübner, 1823, p. 269. (Type-species: *Noctua melicerta* Drury, 1770 [1773], p. 46, pl. 23: fig. 1 [subsequent designation by Moore, 1885, p. 163].)

Achaea janata (Linnaeus)

FIGURES 45, 46; PLATE 7*c*

Geometra janata Linnaeus, 1758, p. 527.
Achaea janata (Linnaeus), Collenette, 1928, p. 477.

Although we observed this species on several occasions during the daytime it was, apparently, not as common as when the Saint George Expedition visited Rapa. We collected only three specimens, these in a worn condition, although others were seen flying in brushy areas during the daytime.

Genus *Mocis* Hübner

Mocis Hübner, 1823, p. 267. (Type-species: *Noctua undata* Fabricius, 1775, p. 600 [subsequent designation by Hampson, 1913, p. 76].)

Mocis frugalis (Fabricius)

FIGURE 47; PLATE 6*e*

Noctua frugalis Fabricius, 1775, p. 601.
Mocis frugalis (Fabricius), Collenette, 1928, p. 478.

We have eleven specimens as follows: Haurei, 2 ♂♂, 6 ♀♀ (8.IX.-to 4.XII.1963); Maugaoa, 750′ (231 m), ♀ (18.IX.1963); Point Teakauraee, ♂ (9.IX.1963); Point Tepapa, ♀ (9.XII.1963).

Genus *Anticarsia* Hübner

Anticarsia Hübner, 1825, p. 340. (Type-species: *Anticarsia gemmatilis* Hübner, 1818, pl. 27; figs. 153, 154 [subsequent designation by Grote, 1874, p. 44].)

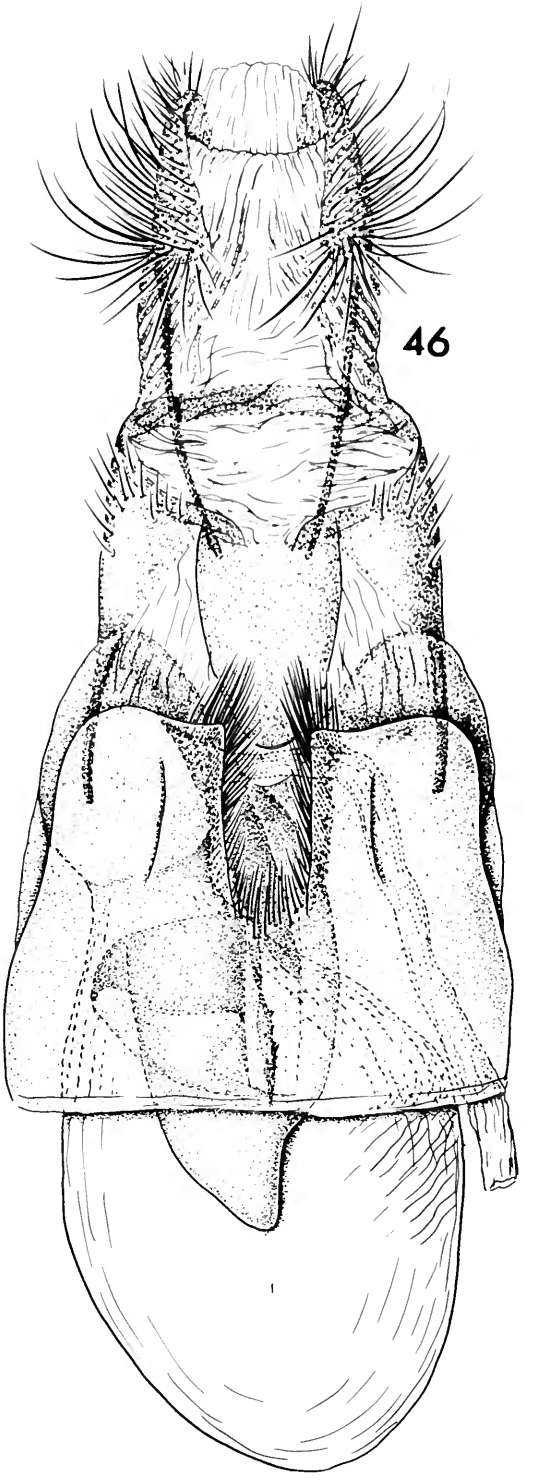


FIGURE 46.—*Achaea janata* (Linnaeus). Ventral view of female genitalia.

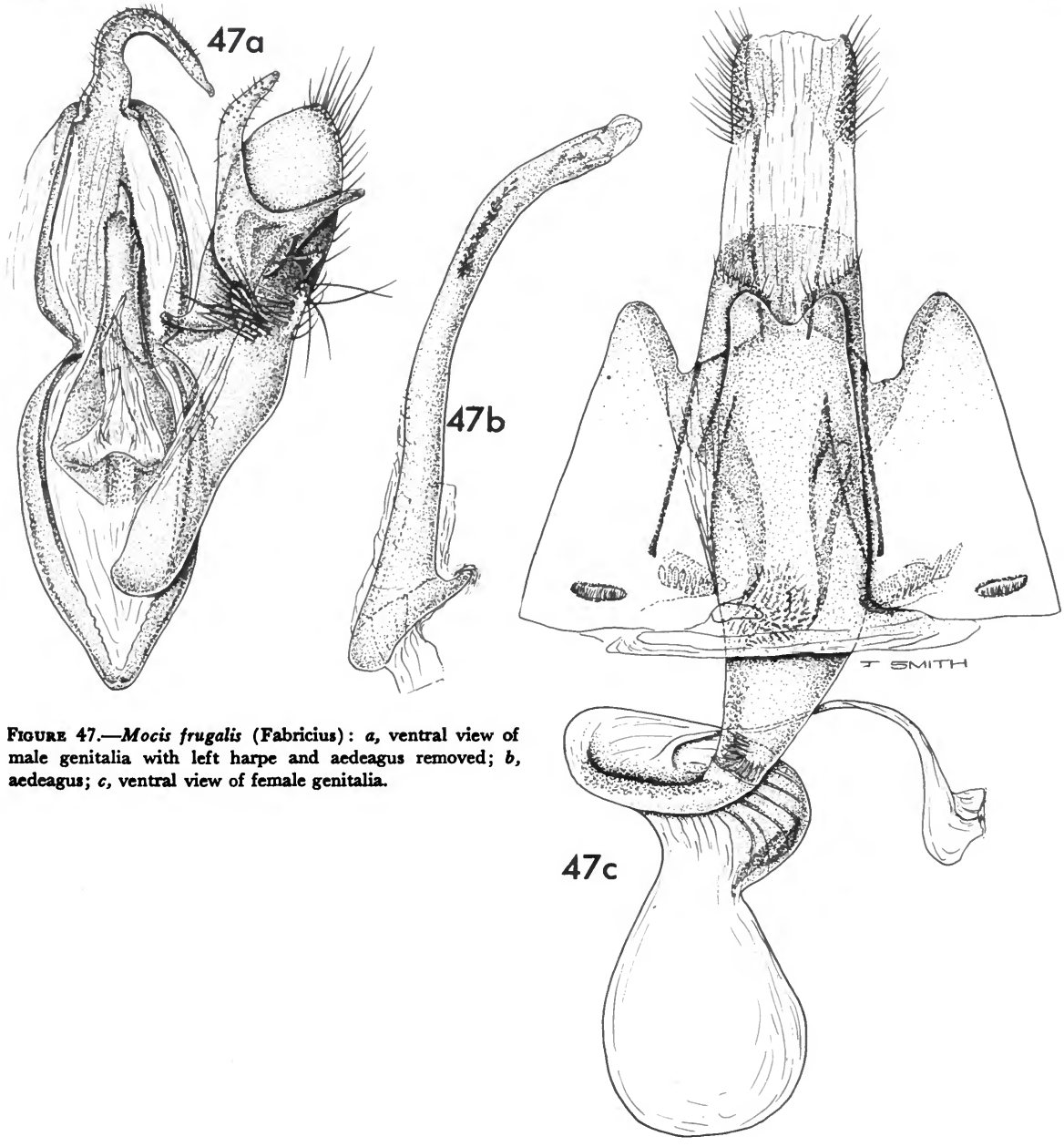
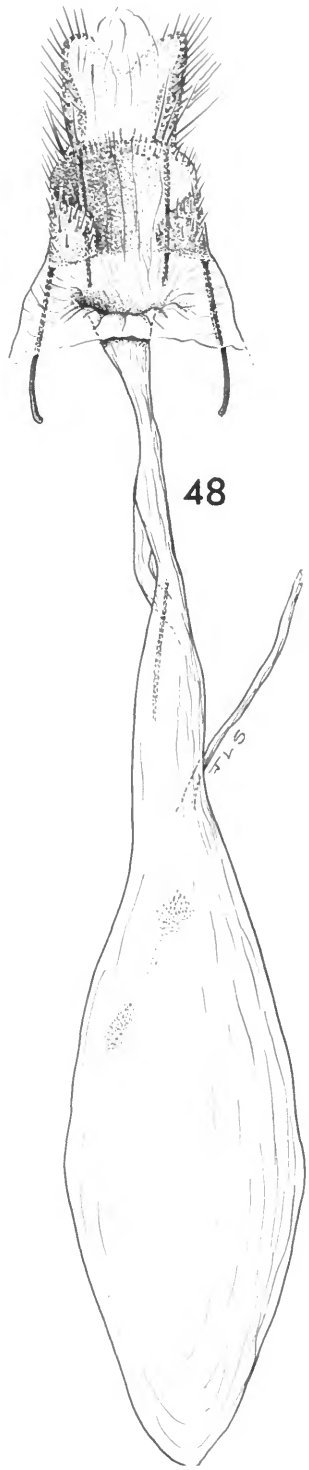


FIGURE 47.—*Mocis frugalis* (Fabricius): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

382-271 O—71——4



Anticarsia *irrorata* (Fabricius)

FIGURE 48

Noctua irrorata Fabricius, 1781, p. 506.
Anticarsia irrorata (Fabricius), Collenette, 1928, p. 481.

A total of only six specimens of *irrorata*, all females, were collected at Haurei (18.IX. to 9.XII.1963).

Subfamily OPHIDERINAE

Genus *Anomis* Hübner

Anomis Hübner, 1821, p. 249. (Type-species: *Anomis erosa* Hübner, 1821, p. 249 [by monotypy].)

Anomis flava flava (Fabricius)

FIGURE 49; PLATE 5*b, g;* PLATE 6*f*

Noctua flava Fabricius, 1775, p. 601.
Anomis flava flava (Fabricius), Collenette, 1928, p. 480.

Five specimens of the variable *flava* were collected from sea level at Haurei to 950′ (292 m) at Maurua and Maugaoa from 25.X to 23.XI.1963.

Anomis vitiensis (Butler)

FIGURE 50; PLATE 5*c*

Genitis vitiensis Butler, 1886b, p. 408.
Anomis vitiensis (Butler), Collenette, 1928, p. 480.

A female of *vitiensis* was reared from *Hibiscus* species, (R9) collected at Haurei. The moth emerged 9.X.1963.

Subfamily EUTELIINAE

Genus *Phlegetonia* Guenée

Phlegetonia Guenée, 1852, p. 301. (Type-species: *Phlegetonia catephioides* Guenée, 1852 [subsequent designation by Hampson, 1912, p. 701.)

Phlegetonia delatrix (Guenée)

FIGURE 51; PLATE 5*f*

Penicillaria delatrix Guenée, 1852, p. 304.
Phlegetonia delatrix (Guenée), Collenette, 1928, p. 476.

Although apparently widely distributed it is not common on Rapa. Collenette (1938, p. 476) only en-

FIGURE 48.—*Anticarsia irrorata* (Fabricius). Ventral view of female genitalia.

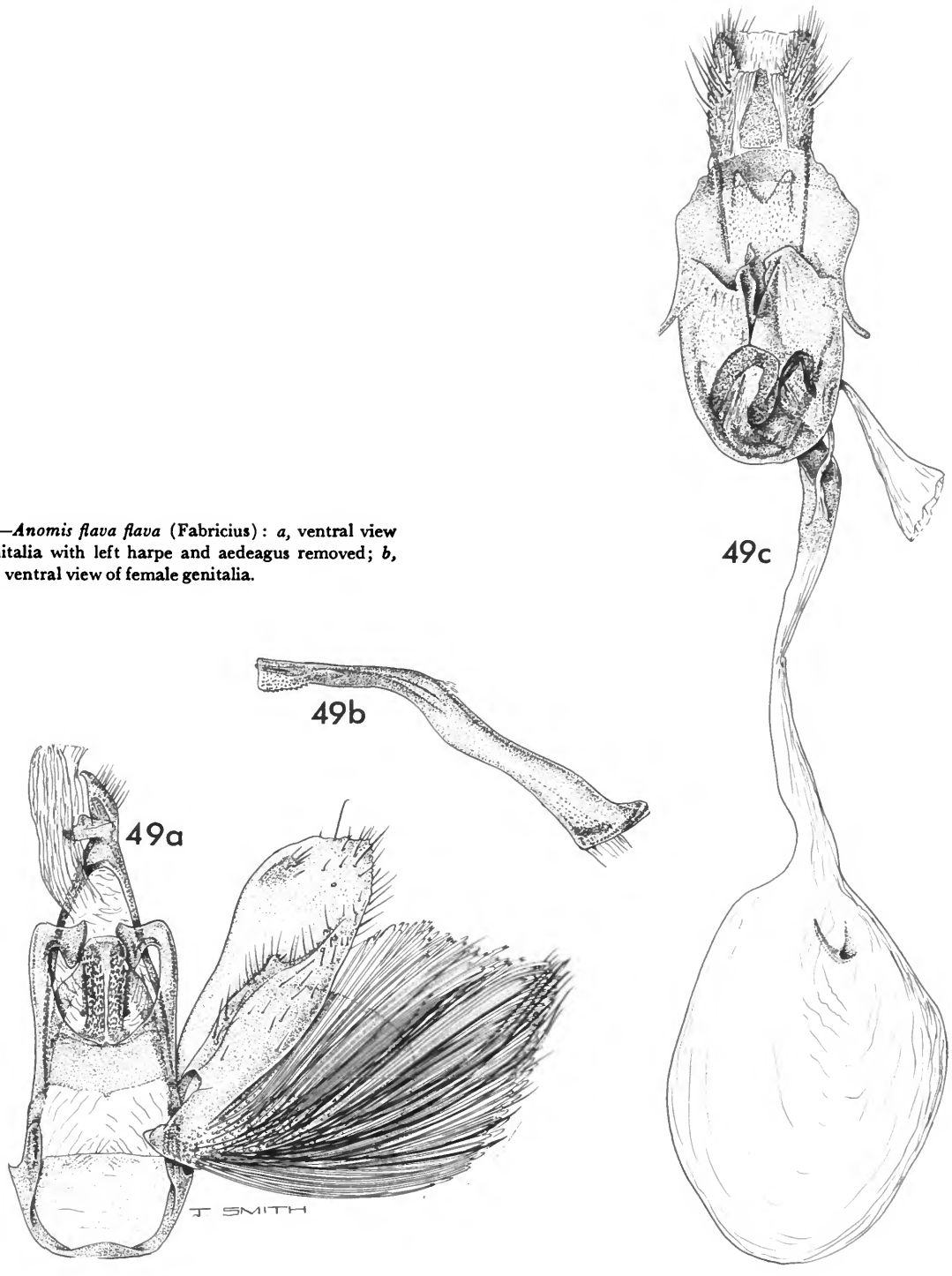


FIGURE 49.—*Anomis flava flava* (Fabricius): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

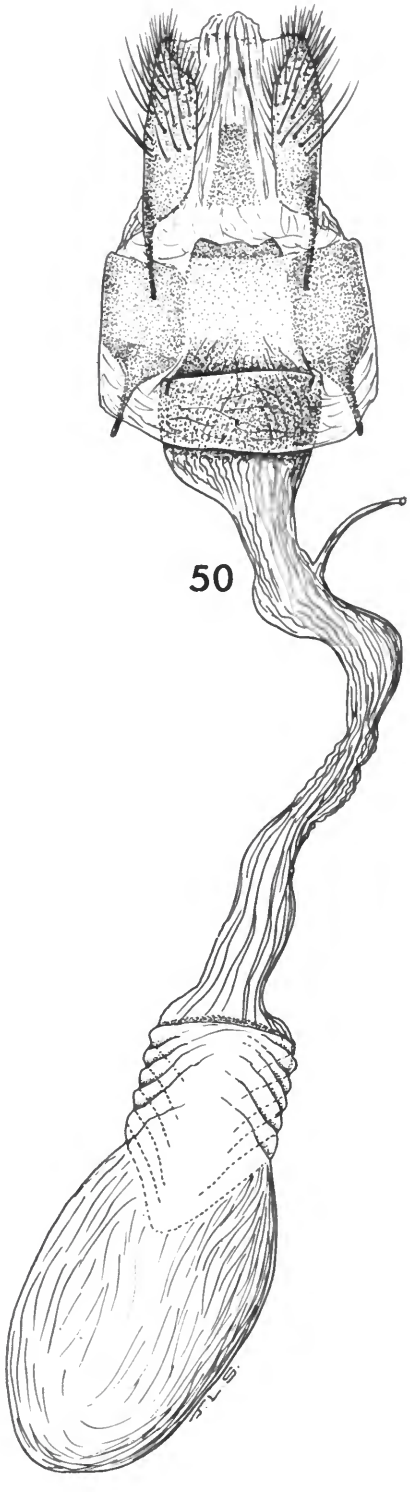


FIGURE 50.—*Anomis vitiensis* (Butler). Ventral view of female genitalia.

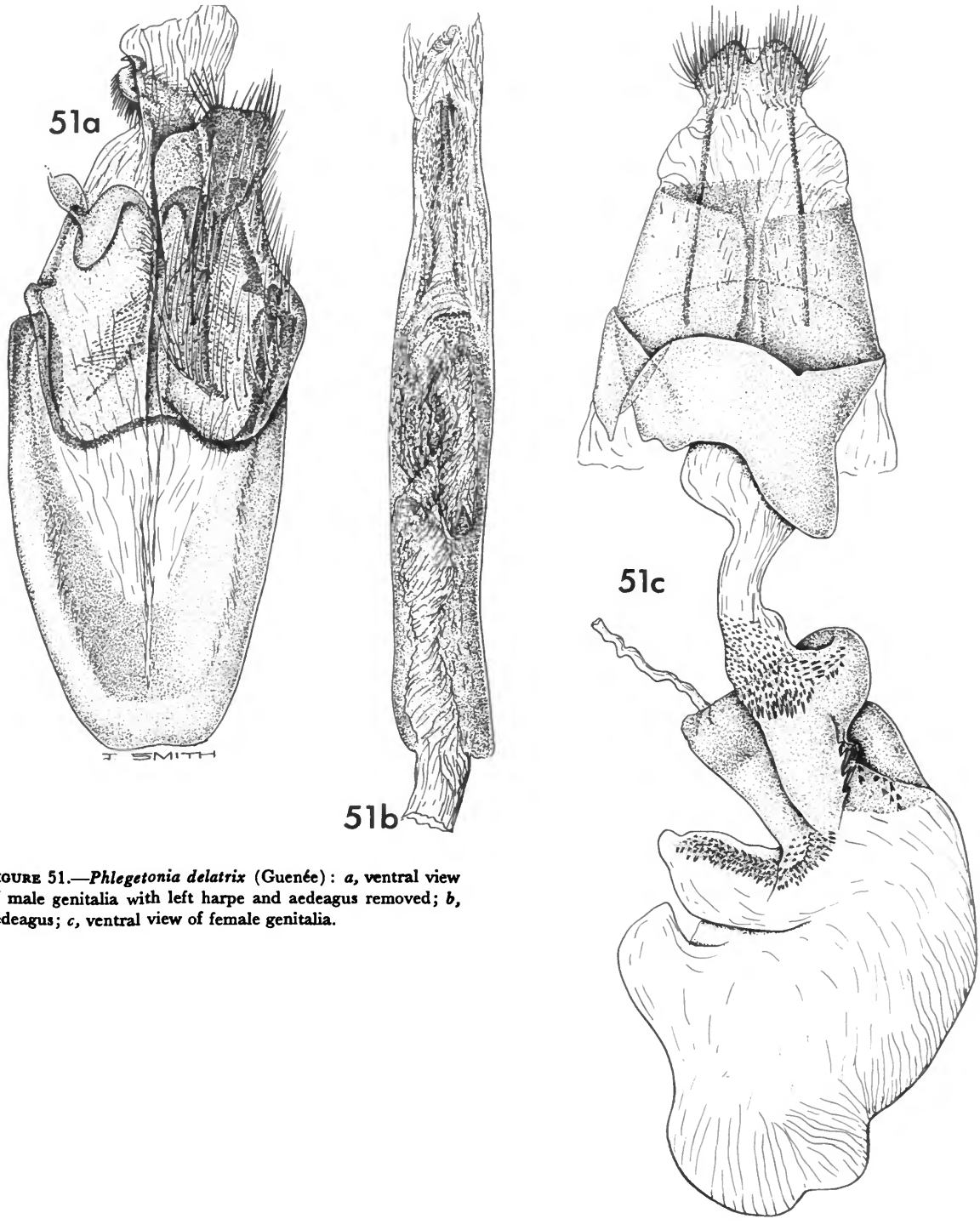


FIGURE 51.—*Phlegetonia delatrix* (Guenée): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

countered one and in more than three months' time we collected only two (12 and 24.X.1963), both at sea level.

Subfamily HYPENINAE

Genus *Simplicia* Guenée

Simplicia Guenée, 1854, p. 51. (Type-species: *Herminia rectalis* Eversmann, 1842, p. 558 [subsequent designation by Desmarest, 1876, p. 217].)

Simplicia caeneusalis (Walker)

FIGURE 52; PLATE 7*d*

Sophronia ? caeneusalis Walker, 1859, p. 94.
Simplicia caeneusalis (Walker), Collenette, 1928, p. 481.

Only four female specimens of *caeneusalis* were encountered and all are from low altitudes. In April 1925, members of the Saint George Expedition collected a ♂ and ♀ of this species.

Genus *Hydrillodes* Guenée

Hydrillodes Guenée, 1854, p. 65. (Type-species: *Hydrillodes lentalis* Guenée, [subsequent designation by Moore, 1885, p. 237].)

Hydrillodes melanozona Collenette

FIGURES 53, 54; PLATE 7*e*

Hydrillodes melanozona Collenette, 1928, p. 481, pl. 21, fig. 6.

Nine specimens of *melanozona* were collected, September to November dates, and all were taken above 500′(153 m).

Genus *Hypena* Schrank

Hypena Schrank, 1802, Fauna Boica, p. 163. (Type-species: *Pyralis proboscidalis* Linnaeus, 1758, p. 533 [subsequent designation by Curtis, 1829, p. 288].)

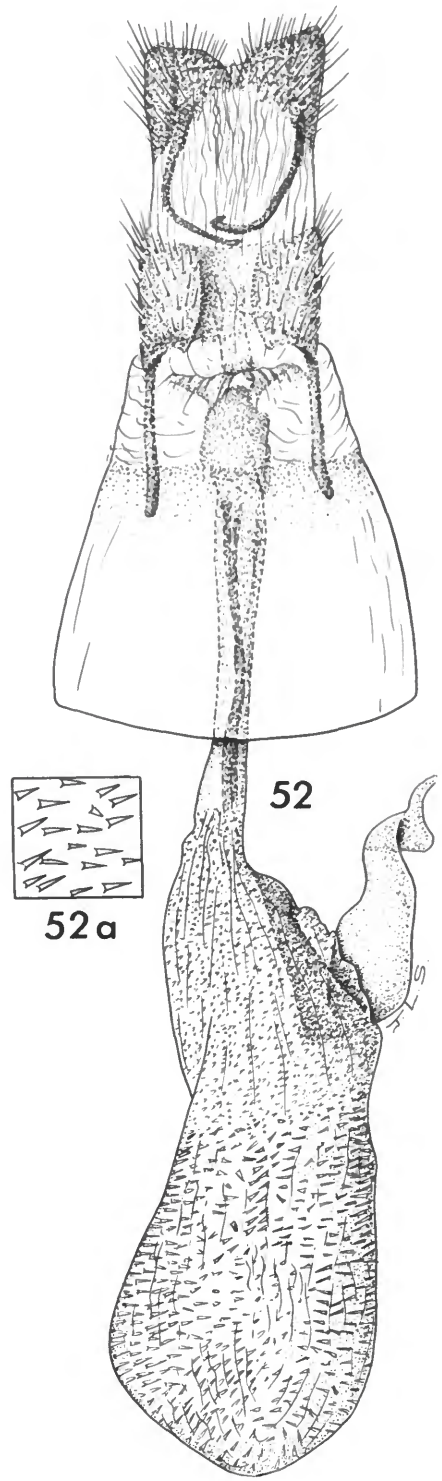


FIGURE 52.—*Simplicia caeneusalis* (Walker). Ventral view of female genitalia: *a*, detail of wall of bursa copulatrix, enlarged.

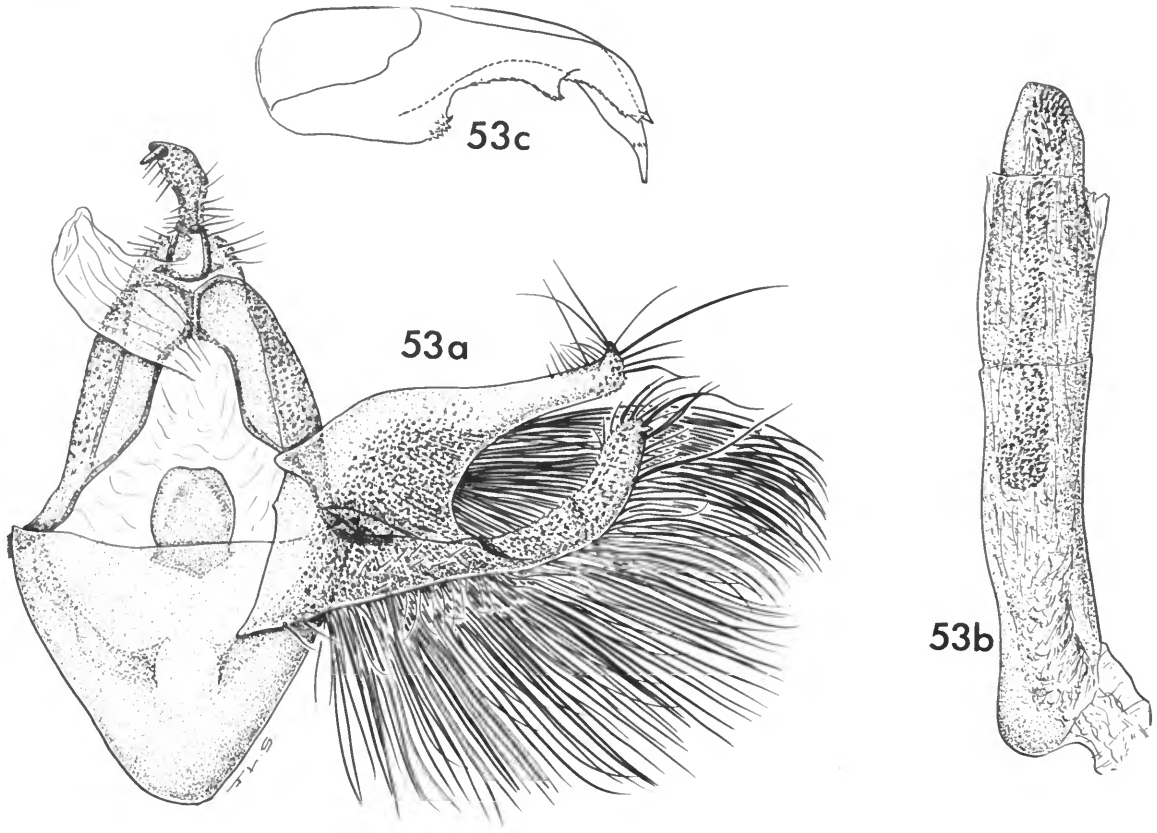


FIGURE 53.—*Hydrillodes melanozona* Collenette: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, outline of harpe from saccular edge.

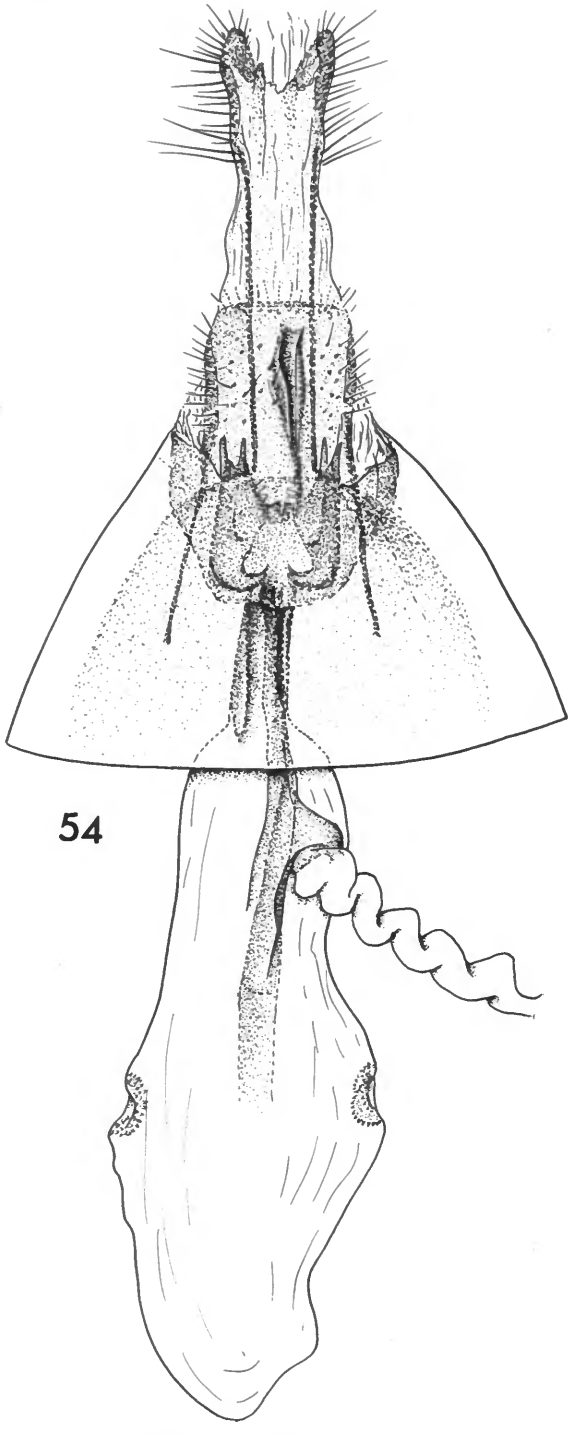


FIGURE 54.—*Hydrillodes melanozona* Collenette. Ventral view of female genitalia.

Hypena longfieldae Collenette

FIGURE 55; PLATE 7*a, b*

Hypena longfieldae Collenette, 1928, p. 483, pl. 21; fig. 11.

This is another high level form, but apparently with a more restricted range than that of *Hydrillodes melanozona*. Our entire series of *longfieldae* was collected between 600′ and 800′ (185–246 m).

This is an extremely variable species. Two common forms are illustrated on Plate 7*a, b*.

Family GEOMETRIDAE

Subfamily GEOMETRINAE

Genus *Cleora* Curtis

Cleora Curtis, 1825, p. 88. (Type-species: *Geometra cinctaria* Denis and Schiffermüller, 1776, p. 101 [by original designation].)

Cleora stenoglypta Prout

FIGURE 56; PLATE 8*c, d, g, h*

Cleora stenoglypta Prout, 1929, p. 272.

This is a common species of which we collected 46 specimens during our visit. It occurred throughout the time we were on the island and was found at all localities. The variation in *stenoglypta* is so great that no two specimens are exactly alike.

Cleora dodonaeae Prout

FIGURE 57; PLATE 8*b, f*

Cleora dodonaeae Prout, 1929, p. 273.

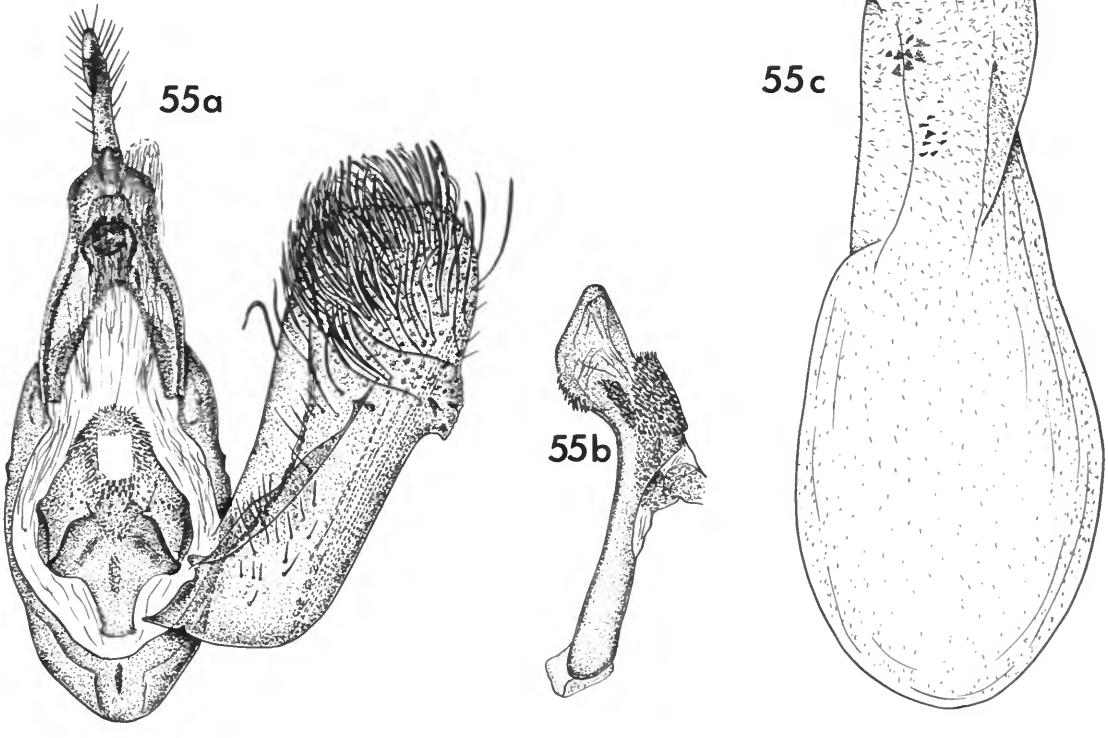
Collenette reared a series of this moth from *Dodonaea viscosa* L., (Prout, 1929, p. 273), but we did not observe any larvae during our expedition. Our series consists of seven collected specimens.

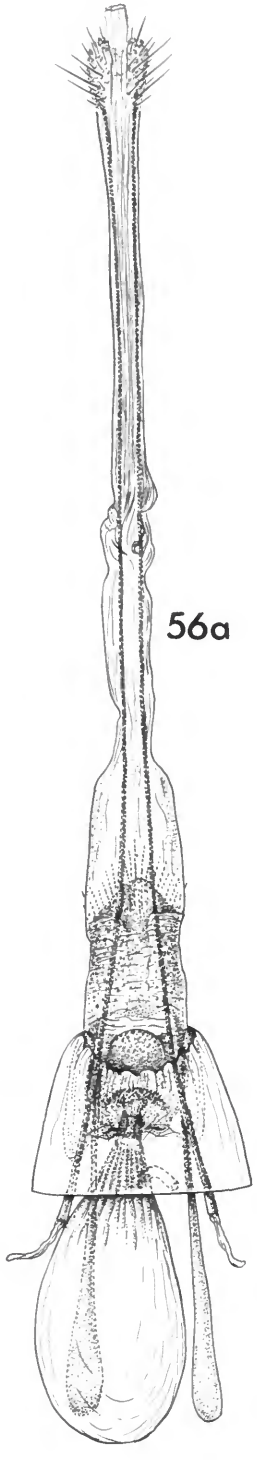
Subfamily STERRHINAE

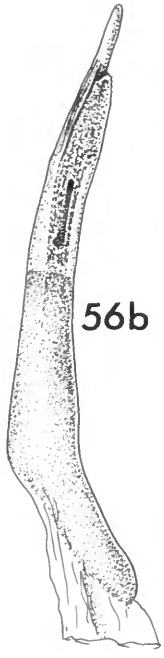
Genus *Gymnoscelis* Mabille

Gymnoscelis Mabille, 1868, p. 656. (Type-species: *Geometra pumilata* Hübner [1809–1813], pl. 75: fig. 389 [by monotypy].)

FIGURE 55.—*Hypena longfieldae* Collenette: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.







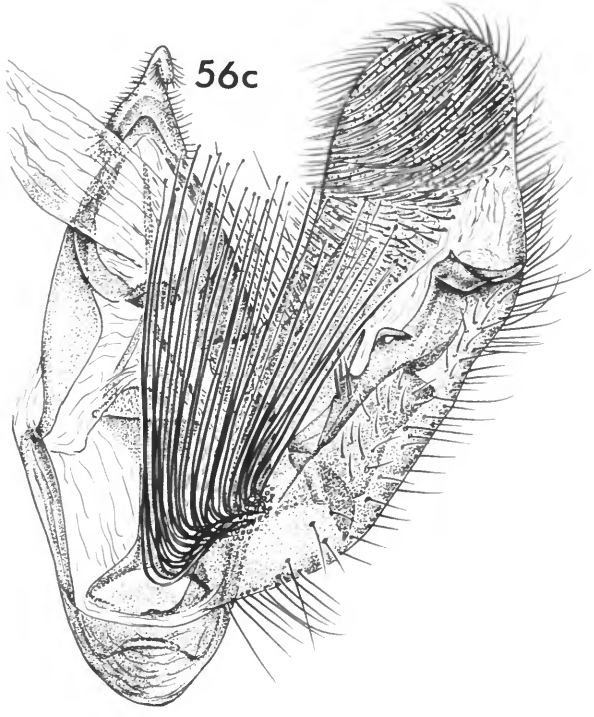
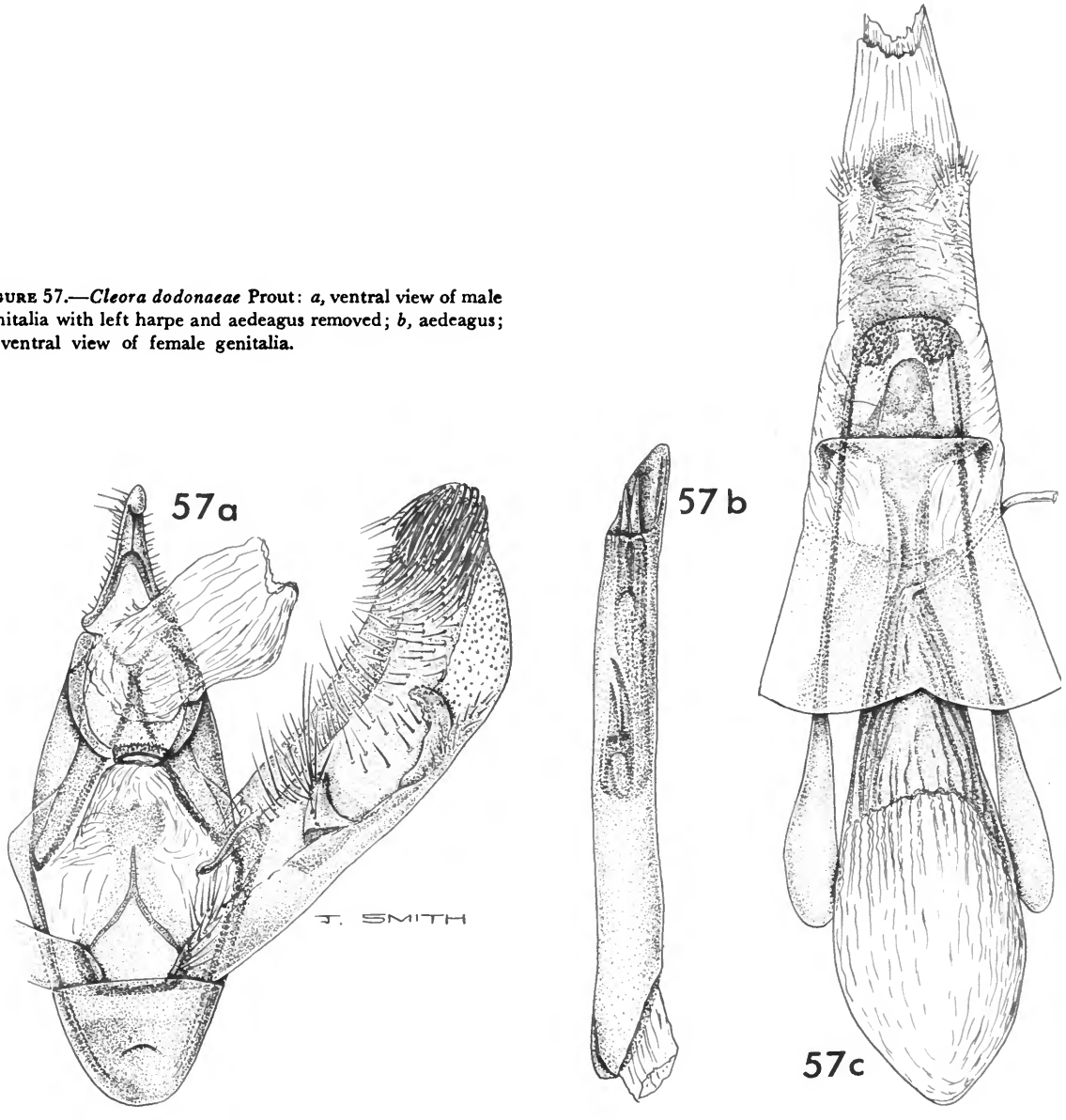


FIGURE 56.—*Cleora stenoglypta* Prout: *a*, ventral view of female genitalia; *b*, aedeagus; *c*, ventral view of male genitalia with left harpe and aedeagus removed.

FIGURE 57.—*Cleora dodonaeae* Prout: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.



Gymnoscelis concinna Swinhoe

FIGURE 58; PLATE 8*e*

Gymnoscelis concinna Swinhoe, 1902, p. 651.
Gymnoscelis erymna Meyrick, Prout, *not* Meyrick, 1929, p. 271.

A check of the types in the British Museum (Natural History) revealed that Prout (1929, p. 271) misidentified the Rapa species and that it is, in fact, *concinna* and not *erymna*.

This moth is not common on Rapa. In three months only 2 ♂♂ and 3 ♀♀ were collected, all above 750' (231 m).

Genus *Chloroclystis* Hübner

Chloroclystis Hübner, 1825, p. 323. (Type-species: *Geometra coronata* Hübner, 1825 [subsequent designation by Hulst, 1896, p. 263].)

Chloroclystis pitoi, new species

FIGURE 59; PLATE 8*a*

Alar expanse 17–22 mm.

Labial palpus ochraceous buff; second segment suffused brownish on outer side with some blackish ir-

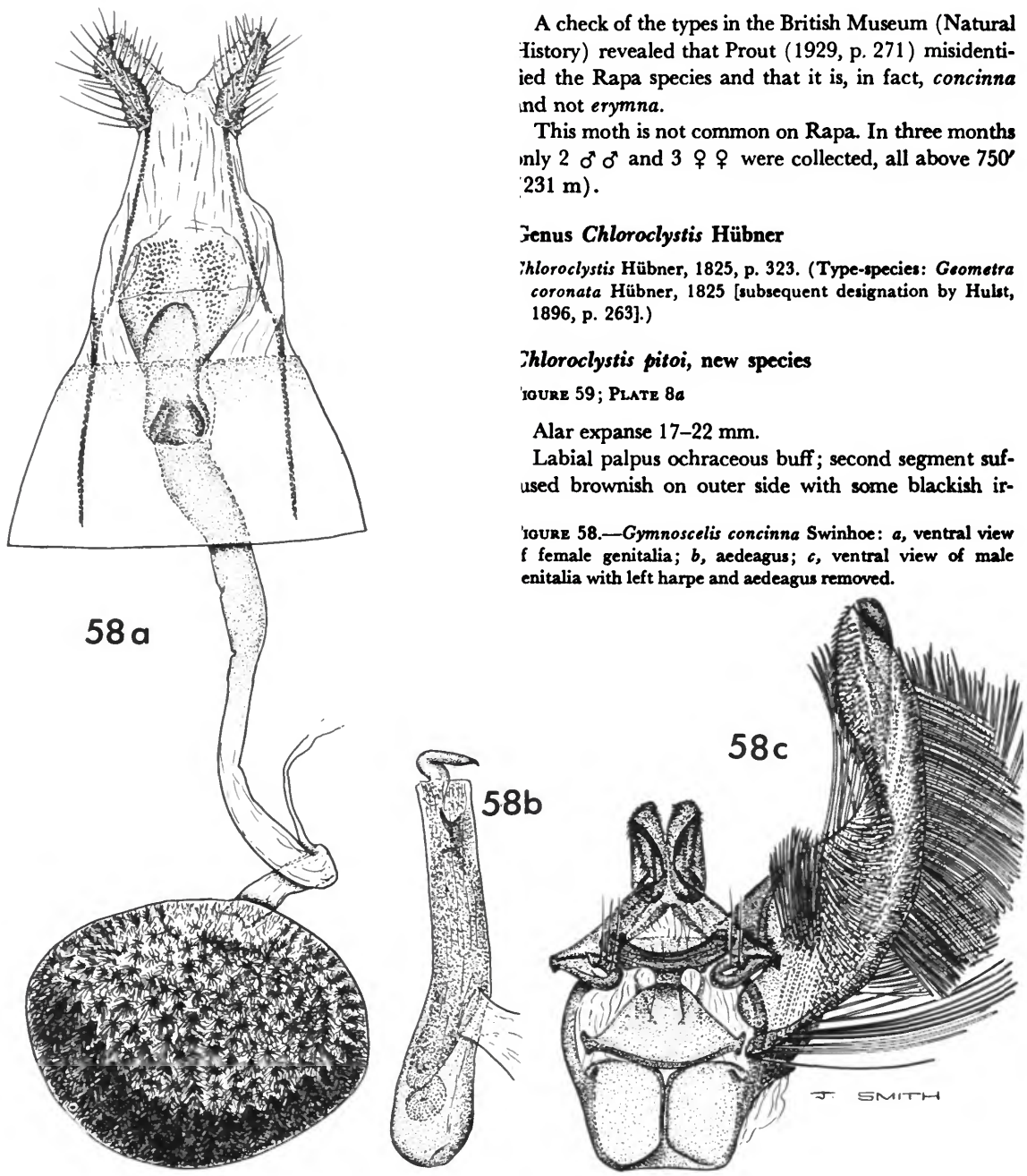


FIGURE 58.—*Gymnoscelis concinna* Swinhoe: *a*, ventral view of female genitalia; *b*, aedeagus; *c*, ventral view of male genitalia with left harpe and aedeagus removed.

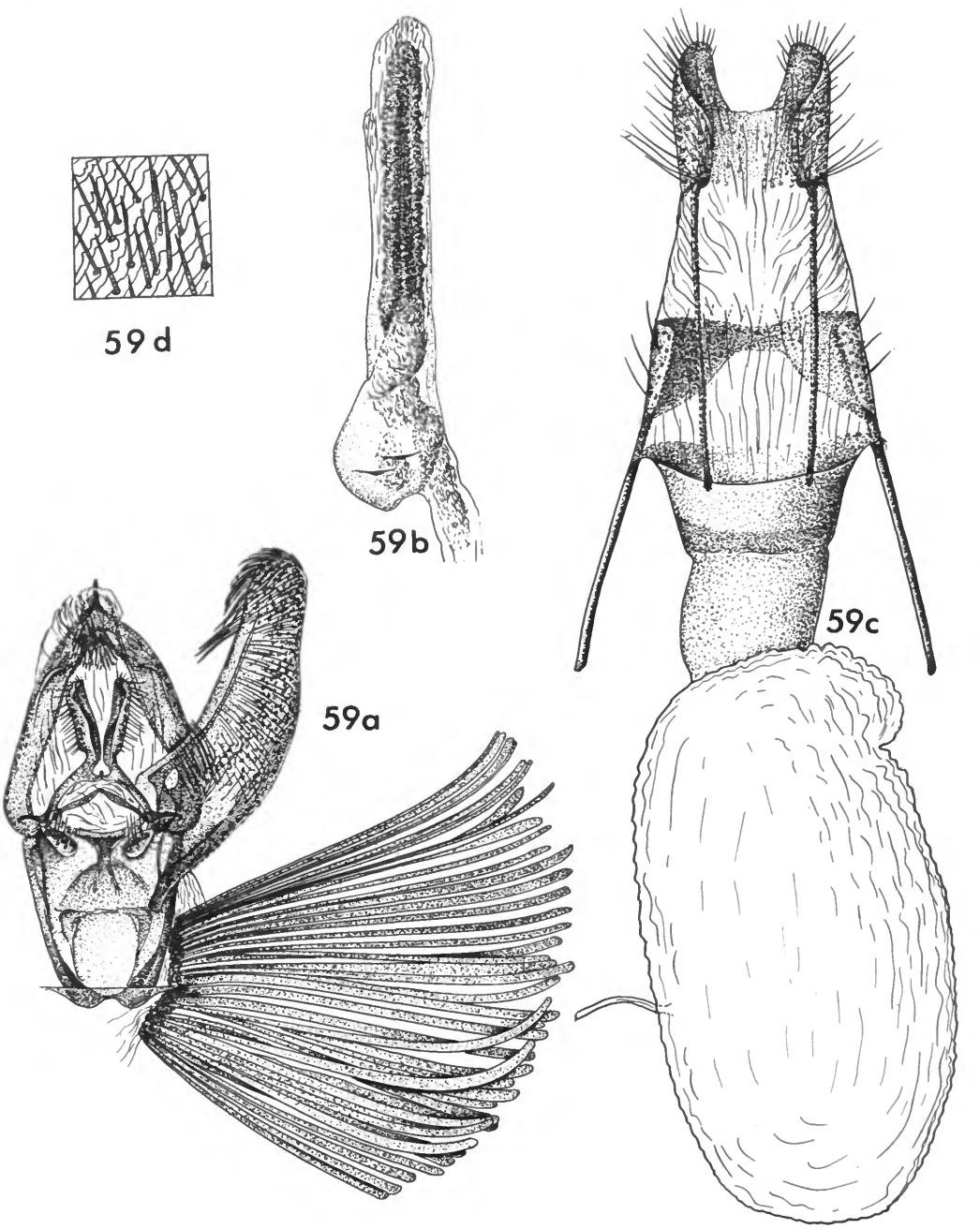


FIGURE 59.—*Chloroclystis pitoi*, new species: *a*, ventral view of male genitalia and corema with left side and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia; *d*, enlarged detail of the wall of bursa copulatrix.

roration. Antenna grayish brown with ill-defined darker annulations. Head ochraceous buff with fuscous band on face and similarly colored median spot posteriorly. Thorax ochraceous buff; anteriorly a broad fuscous band; at middle and posteriorly, fuscous spots; tegula fuscous at base and subapically. Forewing ground color ochraceous buff; on middle four irregular transverse lines the antemedial and postmedial fuscous; median pair grayish; on costa, between base and antemedial line, a pair of fuscous dashes; terminal third of wing with three suffused grayish-fuscous blotches; subterminal band grayish; terminal line narrow, fuscous; cilia ochraceous buff blotched with brown and gray. Hind wing ochraceous buff; median transverse line irregular, fuscous and preceded by three less distinct fuscous lines; in outer half of wing three ill-defined, irregular, transverse fuscous lines broken between veins 3 and 4 by the ground color; terminal line fuscous; cilia ochraceous buff blotched brown and gray. Foreleg buff, suffused fuscous; midleg buff; tarsal segments grayish fuscous on outer side; hind leg buff with ill-defined, small grayish spot on each of first three tarsal segments at base. Abdomen buff, irregularly marked fuscous, and brown dorsally.

Male genitalia slide JFGC 11773. Harpe about as long as tegumen and vinculum combined, broadest at base, somewhat constricted before cucullus; costa strongly, but narrowly, sclerotized. Gnathos with lateral arms somewhat flattened, moderately broad, terminating in a sharp point. Uncus triangular, apex rounded posteriorly. Vinculum rather broad, with anteroventral, transverse bar serving as base for lateral coremata. Tegumen triangular, moderately highly arched. Anellus consisting of a large oval plate with posteromedian U-shaped extension. Transtilla a sclerotized bar with ventral ring, the latter open at middle anteriorly and with median, elongate, paired process posteriorly. Aedeagus as long as remaining part of genitalia, straight, stout, bulbous basally; vesica armed with several long rows of very fine cornuti.

Female genitalia slides JFGC 11774; D.S.F. R5, R6. Ostium very wide, slitlike; ventral edge slightly concave. Inception of ductus seminalis from dorsoanterior end of bursa copulatrix. Ductus bursae broad, flattened, sclerotized in posterior two-thirds. Bursa copulatrix very strongly rugose; inner wall ornamented by numerous small spines.

HOLOTYPE.—USNM 70071.

TYPE LOCALITY.—Rapa, Tevaitau, 800′ (245 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype, 11 ♂♂, and 28 ♀♀ paratypes as follows: Haurei, 3 ♀♀ (11–21.IX.-1963); Maugaoa, 800′ (245 m), 5 ♀♀ (18.IX.1963); Maurua, 600′ (184 m), 2 ♂♂, 5 ♀♀ (16.IX to 22.X.1963); Teumukopuke, 500′ (154 m), 5 ♂♂, ♀ (7.X.1963); Tevaitau, 200′–800′ (61–245 m), 4 ♂♂, 14 ♀♀ (21.IX–1.X.1963).

The figure of *pitoi* on Plate 8 is of an average specimen which reminds one, to some extent, of *Gymnoscelis concinna,* but the markings of *pitoi* are more suffused and there is less of the pale coloring in the basal half of the forewing. The species is variable but where a question of identity occurs the genitalia will suffice for separation.

It gives me great pleasure to name this for Teone, known to us as "Mr. Pito," who adopted us and helped us at every turn.

LATHROTELIDAE, new family

TYPE-GENUS.—*Lathroteles,* new genus, hereby designated.

Forewings and hind wings entire. Forewing with 1st anal absent. Hind wing devoid of special scaling; frenulum a single spine in female. Maxillary palpus well developed. Tongue present, scaled. Tympanum absent.

It appears that this family is derived from, and is closely related to, the Pyralidae. The most important difference between them is the *absence of the tympanum* in the Lathrotelidae which, were we to include this taxon in the Pyralidae, would necessitate a redefinition of the latter family. The antennal socket in the Lathrotelidae is separated from the eye as in the Pyraustinae, Scopariinae, and Nymphulinae of the Pyralidae.

Lathroteles, new genus

TYPE-SPECIES.—*Lathroteles obscura,* new species by monotypy and present designation.

Antenna about two-thirds the length of forewing, heavily scaled; scape without pecten. Labial palpus about twice as long as depth of head, decumbent; second segment nearly twice as long as third, compressed, somewhat roughened beneath; third segment pointed. Maxillary palpus well developed, porrect. Tongue well developed, scaled. Head with appressed scales; ocellus

present and prominent. Thorax smooth. Posterior tibia smooth. Forewing smooth, termen slightly emarginate at middle, costal and dorsal edges straight, divergent, 11 veins; 1b simple; 1c absent; 2 from well before angle of cell; 3 and 4 coincident, stalked with 5; 6 to termen; 7 to apex, out of the stalk of 8 and 9; 10 approximate to stalk of 8 and 9; 11 from outer fifth of cell. Hind wing with 7 veins; 2 from angle of cell; 3 and 4 coincident, out of 5; 6 connate with the stalk of 7 and 8, from angle of cell; 8 anastomosing for short distance at outer end of cell.

FEMALE GENITALIA.—Signum absent.

This strange genus, as pointed out, is related to the pyraloids but has no close relative with which to compare it. The antenna is thickened by rather dense scaling, rather unusual in a female, and it is probable, though highly conjectural, that the antenna is even more conspicuously developed in the male.

Lathroteles obscura, new species

FIGURE 60; PLATE 9*a*

Alar expanse 7 mm.

Labial palpus white; second segment with blackish-fuscous shade on outer side; third segment grayish fuscous apically. Antenna blackish fuscous; scape ocherous white basally. Head blackish fuscous; frons ocherous white. Thorax blackish fuscous anteriorly, white posteriorly. Forewing ground color black; at basal fourth a broad, irregular white transverse fascia followed on costa, slightly before middle, by a round white spot; just beyond middle of costa a quadrate white spot continued as in ill-defined, irregular transverse line; from apical fifth of costa a transverse bar, narrowed inwardly, bent toward base of wing, then continued transversely as a broadened fascia and again narrowed at tornus; the transverse costal bar preceded inwardly by a closely approximated white spot; subterminally two whitish transverse blotches; cilia ocherous white broken by three broad, blackish, transverse bands.

Hind wing very pale cinereous; cilia concolorous. Foreleg ocherous white, suffused grayish fuscous on outer side; midleg similar but shading paler; hind leg sordid white; tarsal segments faintly annulated grayish. Abdomen grayish fuscous dorsally, ocherous white, suffused grayish ventrally.

Female genitalia slides JFGC 11688, 11689. Ostium very small, round. Antrum narrow, sclerotized. Inception of ductus seminalis slightly anterior to antrum. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNIM 70080.

TYPE LOCALITY.—Rapa, Perau, 1900′ (585 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♀ holotype (15.X.1963) and one ♀ paratype with identical data.

Unfortunately, no males of this rare little moth were found, although we watched for the moth at the higher altitudes all during our stay on Rapa. Nothing resembling it was found at the higher elevations in the Marquesas Islands (1968) where one might expect to find a relative, nor is anything like it known from any other locality.

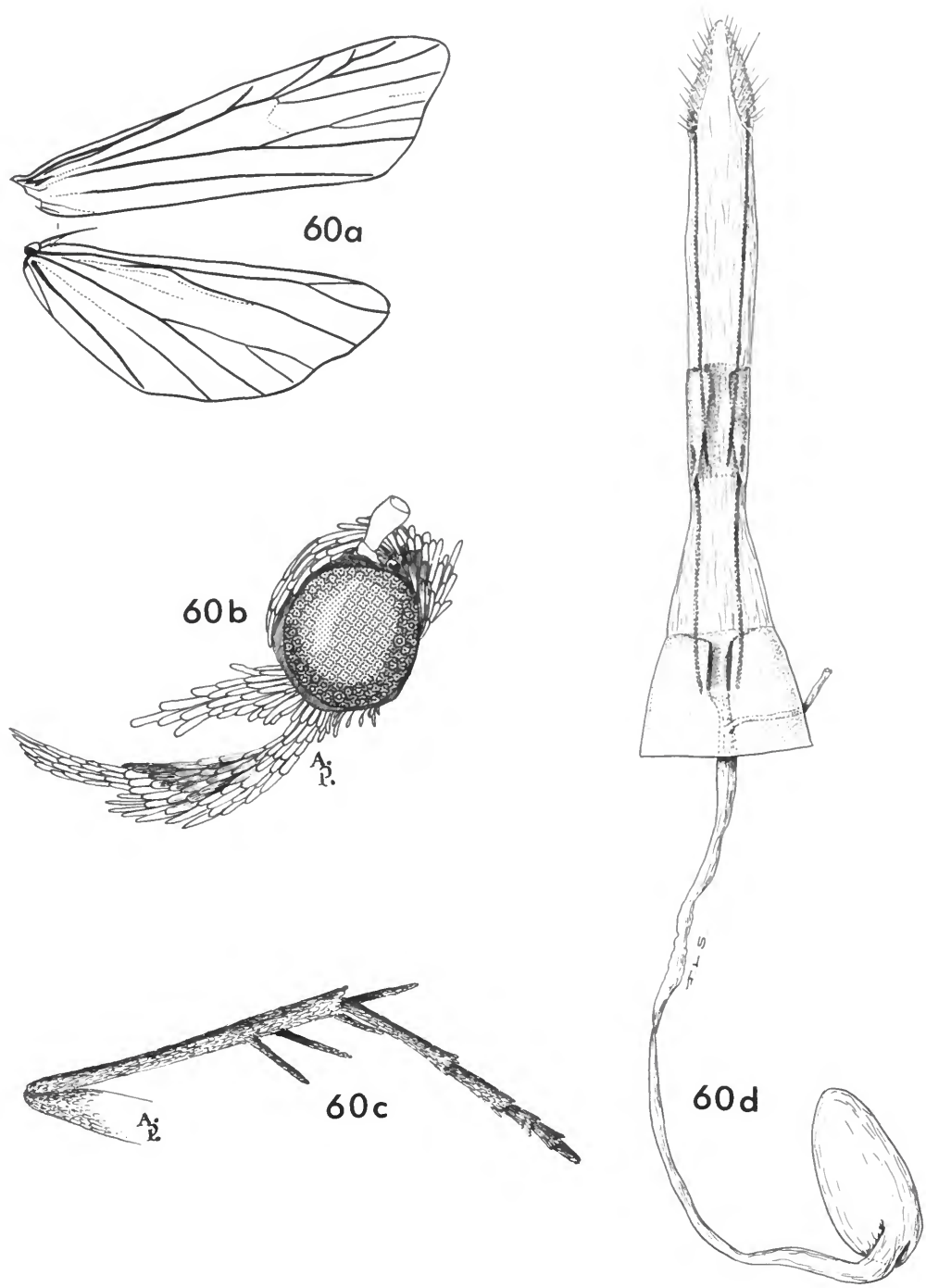


FIGURE 60.—*Lathroteles obscura*, new species: *a*, venation of right wings; *b*, lateral aspect of head; *c*, posterior leg; *d*, ventral view of female genitalia.

Family PYRALIDAE

Key to the Genera of Pyralidae

1. Vein 7 of forewing present 4
   Vein 7 of forewing absent 2
2. Vein 4 of forewing present 3
   Vein 4 of forewing absent ..... *Cadra*
3. Veins 4 and 5 of forewing stalked ..... *Homoeosoma*
   Veins 4 and 5 of forewing connate ..... *Eurhodope*
4. Veins 6 and 7 of forewing approximate at base 5
   Veins 6 and 7 of forewing remote at base ..... *Scoparia*
5. Labial palpus distinctly upturned 6
   Labial palpus otherwise 7
6. Vein 10 of forewing out of stalk of 8 and 9 ..... *Cometura*
   Vein 10 separate but approximate to stalk of 8 and 9 ..... *Spoladea*
7. Labial palpus long, porrect, 3rd segment straight or bent downward 8
   Labial palpus otherwise 13
8. Labial palpus less than twice the length of head 10
   Labial palpus at least twice the length of head 9
9. Veins 2 to 5 of forewing approximate ..... *Pilotocera*
   Vein 2 of forewing remote from 3 ..... *Uresiphita*
10. Hind wing emarginate ..... *Diasemiopsis*
    Hind wing not emarginate 11
11. Vein 10 of forewing free from stalk of 8 and 9 ..... *Hyalobathra*
    Vein 10 of forewing anastomosing with stalk of 8 and 9 12
12. Vein 7 of forewing out of stalk of 8 and 9 ..... *Tirsa*
    Vein 7 of forewing separate from stalk of 8 and 9 ..... *Herpetogramma*
13. Veins 7 and 8 of hind wing anastomosing beyond base of vein 6 14
    Veins 7 and 8 of hind wing not anastomosing beyond base of 6, and 6 out of stalk 7 and 8 ..... *Metasia*
14. Third segment of labial palpus compressed, rounded anteriorly ..... *Glyphodes*
    Third segment of labial palpus reduced, hidden ..... *Marasmia*

Genus *Hyalobathra* Meyrick

Hyalobathra Meyrick, 1885b, p. 445. (Type-species: *Hyalobathra archeleuca* Meyrick, 1885b, p. 445 [by monotypy].)

Hyalobathra variabilis, new species

FIGURE 61; PLATE 10*g*

Isocentris illectalis (Walker) Meyrick, *not* Walker, 1929, p. 166.—Viette, 1949, p. 324.

Alar expanse 22–29 mm.

Labial palpus ocherous white; first segment with spot of pale cinnamon buff on outer side; second segment light cinnamon buff on outer side; third segment almost wholly cinnamon buff. Antenna pale cinnamon buff with some fuscous irroration toward base. Head cinnamon anteriorly, pale cinnamon buff posteriorly. Thorax very light avellaneous. Forewing ground color maize yellow, overlaid with tawny and suffused fuscous; costa, from base to apical third, broadly avellaneous; at basal third, from costa to dorsum a thin, outwardly curved, irregular, transverse fuscous line; from apical third of costa an outwardly curved irregular fuscous line extends to vein 3, then inwardly straight to vein 2, thence to dorsum; before veins 2 and 3 and inside curve of postmedian line, a fuscous shade (in some specimens this shade forms a well-defined blotch); between the postmedian line and termen a short, ill-defined fuscous line extends from costa to veins 2 or 3; on underside two fuscous bars, repeating the outer two lines of upper side, extend as far as vein 4; cilia mixed tawny and yellow. Hind wing sordid white in costal area suffused fuscous toward inner margin, and crossed by two irregular fuscous lines; between the lines in anal angle a yellow blotch irrorate with tawny; cilia white on inner margin, mixed tawny and yellow on outer margin to apex. Foreleg ocherous white with cinnamon buff on outer side; midleg and hind leg similar but with less dark shading; tarsal segments narrowly annulated fuscous. Abdomen avellaneous dorsally, buff ventrally.

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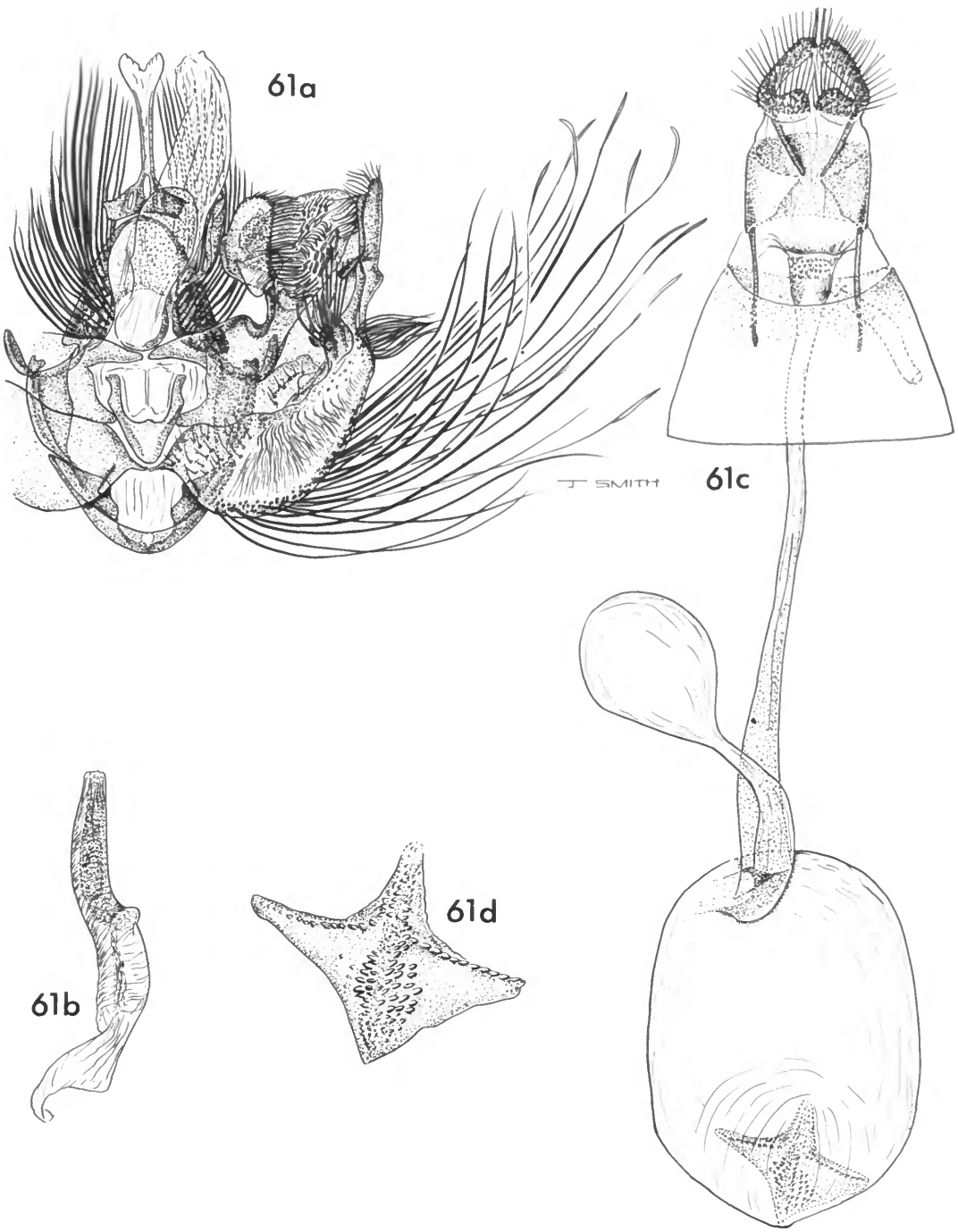


FIGURE 61.—*Hyalobathra variabilis*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia; *d*, signum, enlarged.

Male genitalia slides JFGC 11467, 11469. Harpe very complicated; sacculus mostly membranous, expanded, wrinkled; apical half folded, with a comb of setae on dorsal fold and a large spine inside ventral fold; several clusters of stiff setae. Uncus with broad base, narrow median section and dilated apical portion, the latter deeply cleft posteriorly. Vinculum broadly rounded. Tegumen pyramidal, flattened ventrolaterally, and giving rise to a group of hairlike setae on each side, Anellus V-shaped with deep U-shaped median excavation. Aedeagus weakly sclerotized, curved.

Female genitalia slide JFGC 11468. Ostium funnel shaped, membranous. Antrum narrowly and lightly sclerotized. Inception of ductus seminalis just anterior to antrum. Ductus bursae membranous with very fine granulations on inner surface. Bursa copulatrix membranous, lightly granulated; accessory bursa arising at junction of ductus bursae and bursa copulatrix. Signum a diamond-shaped plate, dentate along median axes. Lamella postvaginalis with two small sclerotized areas.

TYPE.—USNM 70076.

TYPE LOCALITY.—Rapa, Maurua, 600′ (184 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (22.X.1963), 14 ♂♂ and 30 ♀♀ paratypes from the following localities: Maugaoa, 950′ (292 m), 2 ♂♂, 7 ♀♀; Maurua, 600′ (184 m), 8 ♂♂, 7 ♀♀; Morogouta, 750′ (231 m), ♀; Piahu, 750′ (231 m), ♂; Teumukopuke, 500′ (154 m), 3♂♂, ♀; Tevaitau, 750′ (231 m), ♂, 8 ♀♀. Dates of capture range from 16.IX to 23.XI.1963.

This species was not found below 500′ (154 m).

In using the description it must be borne in mind that this species is very variable, the males tending to be darker and blotchy, and the females generally presenting an ochraceous-orange appearance.

Meyrick misidentified Walker's species (*Botys illectalis* Walker, 1859, vol. 18, p. 658), his determination having been based on a single female specimen labeled "Rapa Island, at light, 800 ft., 17.4.25. St. George Expedn. C. L. Collenette," in the British Museum.

The Rapa species is easily distinguished from *illectalis* by its great variability, with yellow to brown ground color, and the absence of the uniformly colored hind wing of *illectalis*. Moreover, the cilia of *variabilis* are not uniformly white as in *illectalis*. The differences in the complicated male genitalia are difficult to describe; the long hairlike scales from the sacculus are much more pronounced in *illectalis* than in *variabilis;* the arms of the anellus are heavier and broader, the slender sclerotized rods from the inner face of cucullus are appreciably longer, and the overall structure is heavier in *illectalis* than in *variabilis*. The most striking difference in the female genitalia lies in the signa. In *illectalis* there are four rather slender arms forming, roughly, a diamond-shaped plate. In *variabilis* the signum is definitely diamond shaped, the anterior and posterior arms being broad.

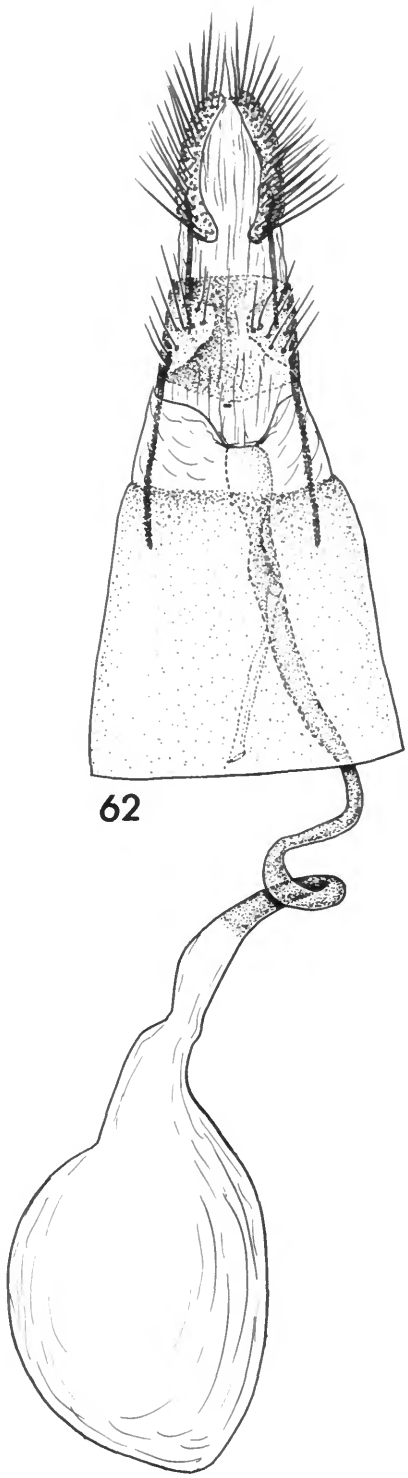
Genus *Glyphodes* Guenée

Glyphodes Guenée, 1854, p. 292. (Type-species *Glyphodes stolalis* Guenée, 1854, p. 354 [designated by Hampson, 1896, p. 345].)

Glyphodes eudoxia, new species

FIGURE 62; PLATE 10*d*

Alar expanse 28–29 mm. Labial palpus basal segment white; second segment buffy olive on outer side, sordid white on inner surface; third segment buffy olive. Maxillary palpus buffy olive, apex sordid white. Antennna brownish olive dorsally, chamois ventrally; scape brownish olive. Head brownish olive; crown paler. Thorax buffy olive mixed with chamois and light drab. Forewing ground color light grayish olive; in basal third two irregular, transverse, chamois fasciae edged narrowly on each side with buffy-olive lines; an irregular, median, transverse, chamois fascia, similarly edged with buffy olive, extended outwardly at middle and before tornus with bars of chamois and with a brownish olive spot at its costal end; on costa, before apex, three, short, transverse brownish-olive fasciae, the inner pair bordering the costal end of an ill-defined, transverse, postmedian, chamois fascia with scattered brownish-olive scales indicating its borders; subterminal area dusted with chamois scales; termen sharply and narrowly defined, brownish olive; cilia buffy olive with darker basal line. Hind wing pale grayish with excurved postmedian and subterminal band pale chamois edged with light brownish olive; apex light brownish olive; terminal line dark brownish olive; cilia grayish olive, except whitish around anal angle, with darker basal line. Foreleg white, over-



laid with light brownish olive on outer side; midleg and hind leg similar but with scant olivaceous suffusion. Abdomen dorsally brownish olive, strongly overlaid with chamois; laterally, segments edged with sordid whitish; ventrally white with slight yellowish tinge; a few indistinct brownish spots; and tuft dull pale yellowish brown.

Female genitalia slide JFGC 11480. Ostium rather small, subconical. Inception of ductus seminalis about posterior one-fourth at a small membranous spot in the otherwise mostly sclerotized ductus bursae, the latter compressed for part of its length and spiraled anteriorly; anterior fifth membranous. Bursa copulatrix membranous except for minute granulations. Signum absent or faintly indicated by thickening of wall of bursa copulatrix; lamella postvaginalis lightly sclerotized.

HOLOTYPE.—USNM 70073.

TYPE LOCALITY.—Rapa, Maurua, 600′ (184 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♀ holotype (16.IX.63) and two female paratypes: Metua nako, 750′ (231 m) (12.XI. 1963); Tevaitau, 750′ (231 m) (18.XI.1963).

Unlike most other species of Glyphodes, *eudoxia* is a somber colored species with rather ill-defined markings. In several respects it is similar to *G. stolalis* Guenée, but does not have a hyaline hind wing of that species. It is probably most nearly related to the Hawaiian *G. cyanomichla* Meyrick, but is a paler species. The male of *eudoxia* is unknown.

Genus *Marasmia* Lederer

Marasmia Lederer, 1863, p. 385. (Type-species: *Marasmia cicatricosa* Lederer, 1863, p. 386 [by monotypy].)

Lederer established this genus for *cicatricosa,* but included under question *Botys ruralis* Walker, 1859 (*ruralis* Walker p. 666, 915?) which, therefore, cannot be the type-species. Hampson, (1896, p. 275) cites as type-species *Asopia venilialis* Walker, 1859, of which *ruralis* and *cicatricosa* are recognized as synonyms, along with *Botys marisalis* Walker and *Lasiacme mimica* Warren.

FIGURE 62.—*Glyphodes eudoxia,* new species. Ventral view of female genitalia.

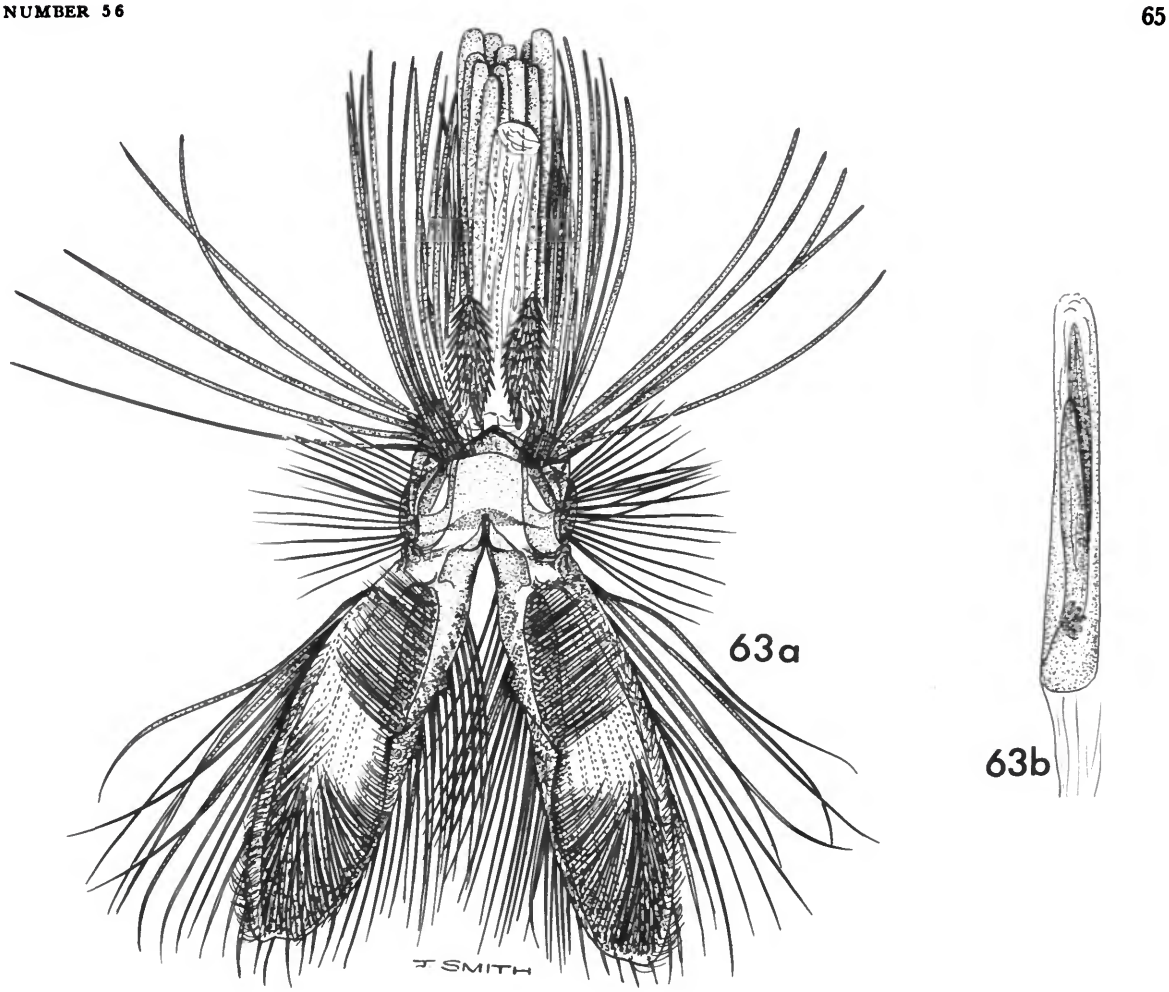
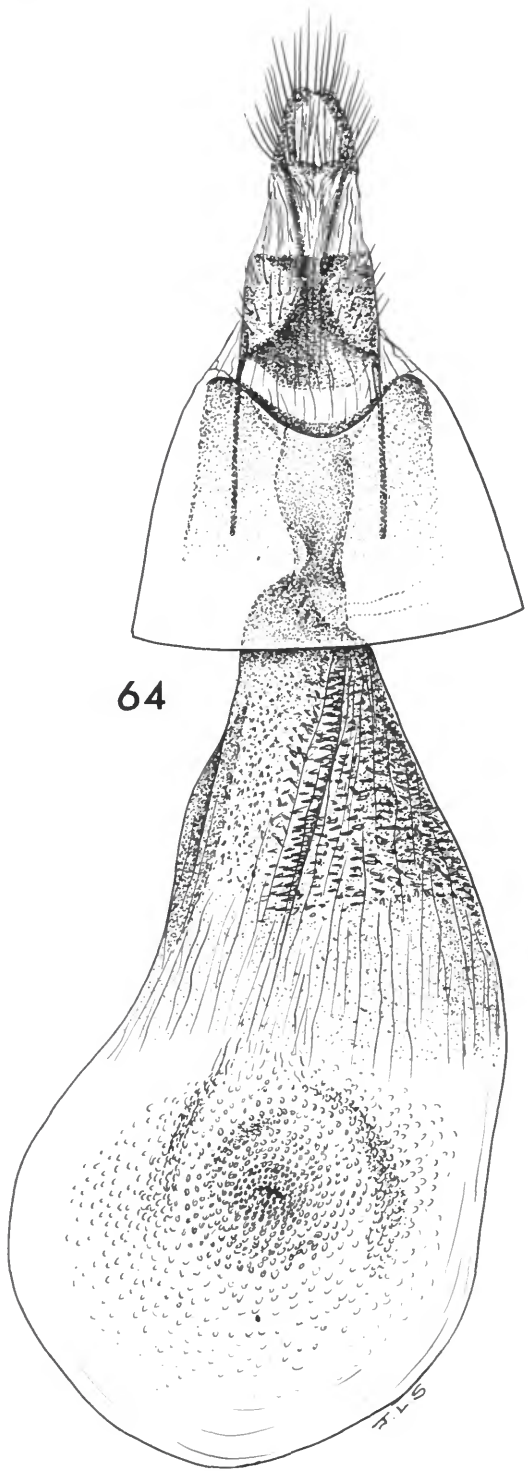


FIGURE 63.—*Marasmia trapezalis* (Guenée): *a*, ventral view of male genitalia with aedeagus removed; *b*, aedeagus.

Marasmia trapezalis (Guenée)

FIGURES 63, 64; PLATE 10*h*

Salbia trapezalis Guenée, 1854, p. 200.
Marasma trapezalis (Guenée), de Nicéville, 1903, p. 141, pl. 14: fig. 3.
Botys creonalis Walker, 1859, p. 579.—Moore, 1885, p. 284, pl. 180, fig. 10.
Botys neoclesalis Walker, 1859, p. 635.
Botys suspicalis Walker, 1859, p. 667.
Botys convectalis Walker, 1865, p. 1411.
Gnaphalocrocis bifurcalis Snellen, 1880, p. 219; 1883, p. 136, pl. 8: figs. 5, 5*a*.—Meyrick, 1886b, p. 237.
Dolichosticha perinephes Meyrick, 1886b, p. 236; 1887, p. 217.
Rovanoa creonalis (Walker), Moore, 1885, p. 284, pl. 180: fig. 10.
Epimima trapezalis (Guenée), Swinhoe, 1900, p. 464.
Dolichosticha trapezalis (Guenée), Meyrick, 1887, p. 217.
Marasmia trapezalis (Guenée), Shibuya, 1928a, p. 192.—Meyrick, 1929, p. 163.—Tams, 1935, p. 276.—Klima, 1939, pp. 65–67.—Ghosh, 1940b, p. 74, pl. 25.—Ghesquiére, 1942, p. 125, fig. 2.—Swezey, 1942, p. 209; 1943, p. 38.—Viette, 1949a, p. 322.—Dick, 1950, p. 390.—Paulian and Viette, 1956, p. 175.—Venkatraman and Chacko, 1961, p. 73, fig. 1.
Marasmia trapizalis Guerin [*sic!*], Sharma, 1964, p. 30.
Marasma [*sic!*] *trapezalis* (Guenée), Green, 1903, p. 141, pl. 14: fig. 3.



Male genitalia slide JFGC 11463. Harpe elongate oval, three times as long as wide; small projection from sacculus at basal third; sacculus narrowly rolled inwardly at middle. Uncus triangular with elongate, setose, lateral elements. Vinculum shield shaped. Tegumen greatly reduced, wider than long; laterally swollen forming a nodule emitting hairlike scales. Anellus membranous. Aedeagus long, straight; vesica armed with two strong, large cornuti.

Female genitalia slides JFGC 11464, 11736. Ostium transverse, membranous. Inception of ductus seminalis from posterior edge of bursa copulatrix. Ductus bursae short, flattened, sclerotized except for very narrow section where it joins bursa copulatrix. Bursa copulatrix membranous, posterior third studded with small spines. Signum a very small, scobinate plate.

TYPES.—British Museum (Natural History) (*creonalis, neoclesalis, suspicalis, convectalis, perinephes, trapezalis*); Rijksmuseum van Natuurlijke, Leiden (*bifurcalis*).

TYPE LOCALITIES.—Celebes (*bifurcalis*); Santo Domingo (*creonalis*); Cape of Good Hope (*neoclesalis*); Ceylon (*suspicalis*); South Hindostan (*convectalis*); Fiji (*perinephes*); Sierra Leone (*trapezalis*).

DISTRIBUTION.—Pantropical: West Indies, Africa, Ceylon, South India, Fiji, Celebes, Marquesas Islands, Society Islands, Tuamotus, Austral Islands (Rapa), Java, Ellice Islands.

In this present collection there are 36 ♂♂ and 33 ♀♀ from the following localities: Haurei, 30 ♂♂, 26 ♀♀; Maugaoa, 1000′ (307 m), ♂; Maurua, 600′ (184 m), ♀; Ororagi, 300′ (92 m), ♂; Piahu, 750′ (231 m), ♂; Point Tepapa, 3 ♂♂, 2 ♀♀; Point Teakauraee, ♂, 2 ♀♀; Tevaitau, ♀. Dates of capture range from 8.IX to 7.XI.1963. One reared specimen, a ♀, emerged 4.X.1963.

FOOD PLANTS.—*Paspalum paniculatum* L. (R17). *P. conjugatum Berg., P. scrobiculatum* L., *Miscanthus floridulus* (Labillardiere) Warburg. Indian corn, millet, sorghum, sugarcane.

The feeding habits of *trapezalis* are the same on Rapa as those for *M. hemicrossa*.

Apparently this species has attained some degree of economic importance in Africa and Asia.

FIGURE 64.—*Marasmia trapezalis* (Guenée). Ventral view of female genitalia.

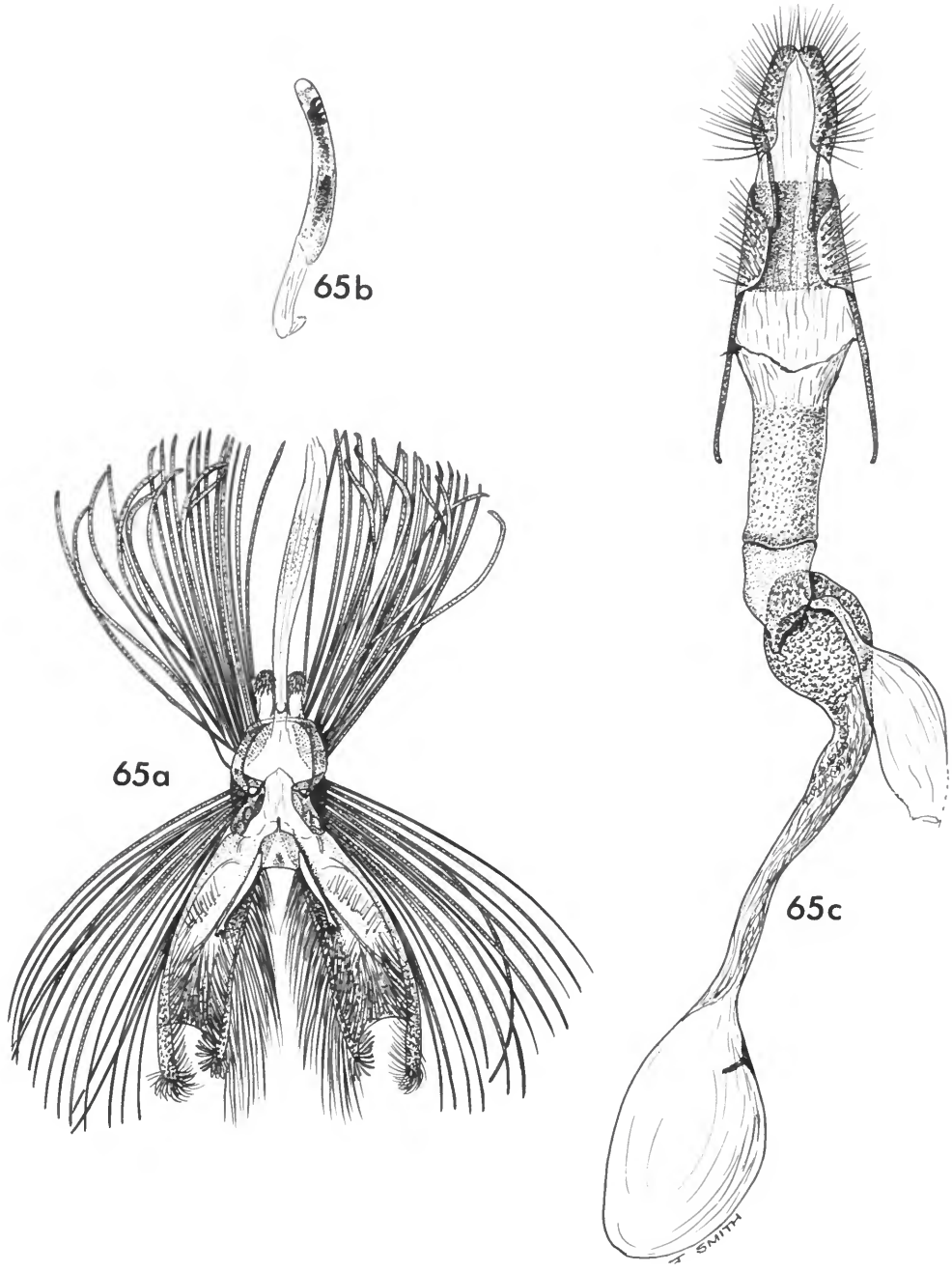


FIGURE 65.—*Marasmia hemicrossa* Meyrick: *a,* ventral view of male genitalia with aedeagus removed; *b,* aedeagus; *c,* ventral view of female genitalia.

Marasmia hemicrossa Meyrick

FIGURE 65; PLATE 9*c*, *d*

Marasmia hemicrossa Meyrick, 1887, p. 217.—Hampson, 1898, p. 639.—Meyrick, 1929, p. 163.—Klima, 1939, p. 67.—Viette, 1949, p. 322.

Male genitalia slides JFGC 11728, 11729. Harpe three times as long as tegumen, narrow basally, broad distally; costa and ventral edge produced forming a deep excavation at cucullus; before middle a small ampulla. Gnathos a narrow, weak band. Uncus divided into two stout elements clothed distally with stout setae directed anteriorly. Vinculum membranous with lateral hairlike scale tufts. Tegumen short, broad, with strong, lateral, hairlike scale tufts. Anellus a quadrate plate. Aedeagus moderately stout, slightly curved; vesica armed with one flattened cornutus and an elongate plate with several stout teeth distally.

Female genitalia slide JFGC 11730. Ostium funnel shaped, membranous. Inception of ductus seminalis at juncture of sclerotized and membranous parts of ductus bursae. Ductus bursae strongly sclerotized in posterior two-fifths, constricted where it joins a swollen, granular part of the anterior membranous section. Bursa copulatrix membranous; inner surface finely granular. Signum a small sclerotized tooth.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Tahiti.

DISTRIBUTION.—Society Islands (Tahiti, Moorea). Austral Islands (Rapa).

From this island we have 47 ♂♂ and 73 ♀♀. All were collected or reared at Haurei (16.X to 6.XI. 1963) except the following: Anatakuri nako, ♂♀ (14.X.1963); Maurua, 600′ (184m), ♀ (16.IX.1963); Metua nako, 750′ (231 m), ♀ (12.XI.1963); Piahu, 750′ (231 m), ♀ (11.X.1963).

FOOD PLANT.—*Paspalum paniculatum* L.

The larva of *hemicrossa* forms a longitudinal tube by rolling the grass-blade lengthwise and feeds on the blade beyond the roll. In the laboratory the larva pupated in the leaf roll but no pupae were found in this situation in the field. Although *Miscanthus floridulus* was common and adjacent to the *Paspalum,* we found no evidence of feeding on it by *hemicrossa.*

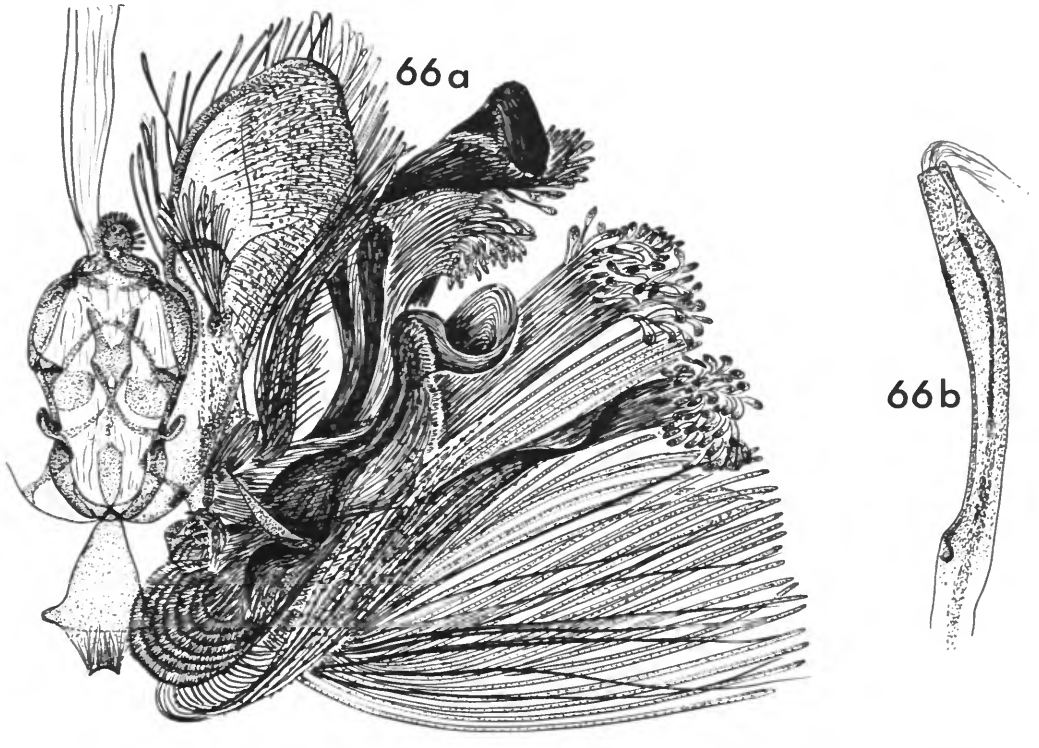


FIGURE 66.—*Spoladea recurvalis* (Fabricius): *a*, ventral view of male genitalia and corema with left side and aedeagus removed; *b*, aedeagus.

Genus *Spoladea* Guenée

Spoladea Guenée, 1854, p. 224.

Spoladea recurvalis (Fabricius)

FIGURES 66, 67; PLATE 9*g*

Phalaena recurvalis Fabricius, 1775, p. 664; 1781, p. 274; 1794, p. 237.—Aurivillius, 1898, p. 169.

Spoladea recurvalis (Fabricius), Guenée, 1854, p. 225, pl. 8; fig. 5.—Hering, 1901, p. 324.

Hymenia recurvalis (Fabricius), Walker, 1859, p. 396.—Moore, 1885, p. 293.—Wallace and Moore, 1886, p. 364.—Swinhoe, 1900, p. 455.—Stebbing, 1903, p. 83.—Swezey, 1915, p. 107; 1926; p. 296.—Ogilvie, 1926, p. 44.—Shibuya, 1928, p. 179, pl. 7; fig. 12; 1929, p. 161.—Illingworth, 1929, pp. 248–254.—Matsumura, 1931, p. 1037.—Tams, 1935, p. 274.—Klima, 1939, p. 31.—Ghesquiére, 1940, p. 119, pl. 4: fig. 7.—Vesey-Fitzgerald, 1941, p. 157.—Swezey, 1942, p. 208.—Viette, 1949a, p. 322.—Cockayne, 1952, p. 71, pl. 3: figs. 12, 13, 14.—Mere, 1952, p. 57.—Marion, 1954, p. 44; 1955, p. 76.—Paulian and Viette, 1955, p. 174, fig. 33.— Inoue, 1955, p. 163.—Batra, 1956, p. 22.—Rungs, 1957, p. 297.—Viette, 1957, p. 178; 1958, p. 8.—Zimmerman, 1958a, p. 8; 1958b, p. 52, figs. 37–40.—Mathur, 1959, p. 190, figs. 22–29.—Singh, 1960, p. 35, figs.—Batra and Bhattacherjee, 1961, p. 128.—Martin, 1961, p. 6, pl. c4.— Bhattacherjee and Menon, 1963, p. 252, pl. 1; figs. 1–14.— Nazmi, 1963, pp. 205, 216, fig. 7 (A–D).—Patel, Patel, Patel, 1964, p. 366.—Pak, 1964, p. 58.—Azuma, 1965, p. 55.—Kimball, 1965, p. 200, pl. 24: fig. 25.—Inoue and Maenami, 1968, p. 532.—Issiki, 1969, p. 76, pl. 37: fig. 148.

Spoladea animalis Guenée, 1854, p. 226.

Zinckenia recurvalis (Fabricius), Zeller, 1852, p. 55—Lederer, 1863, p. 437.—Walker, 1866, p. 1321.—Snellen, 1872, p. 95.—Meyrick, 1884, p. 308.—Pagenstecher, 1884, p. 280.—Meyrick, 1885, p. 105.—Snelleman in Veth, 1892, p. 4, Lepidoptera, 75.—Meyrick, 1886, p. 252.—Pagenstecher, 1888, p. 198.—Meyrick, 1888, p. 217.—Möschler, 1890, p. 312.—Snellen, 1891, p. 629.—Marumo, 1923, pp. 189, 204.

Phalaena Pyralis fascialis Cramer, 1782, p. 236, pl. 398, fig: 0.

Pyralis fascialis Cramer, Stoll, 1791, p. 163, pl. 36: fig. 13 (text fig. 12 err.).

Hymenia fascialis (Cramer), Butler, 1880, p. 683; 1883, p. 117; 1886, p. 384.—Swinhoe, 1884, p. 524; 1886a, p. 867; 1886b p. 457.—Moore, 1889, p. 59.—Dyar, 1903, p. 373.—Marsh, 1911, pp. 1–15; figs. 1, 2; pl. 1.—Chittenden, 1913, p. 2, pl. 4; fig. 2.—Meyrick, 1913b, p. 39.—Zacher, 1916, p. 198, fig. 61.—Watson, 1917, p. 59.—Barnes and McDunnough, 1917, p. 129.—Forbes, 1923, p. 545.—Simmonds, 1924, p. 8.—Hutson, 1926, D15–D17.—Swezey, 1926b, p. 720.—Poos, 1926, p. 491,

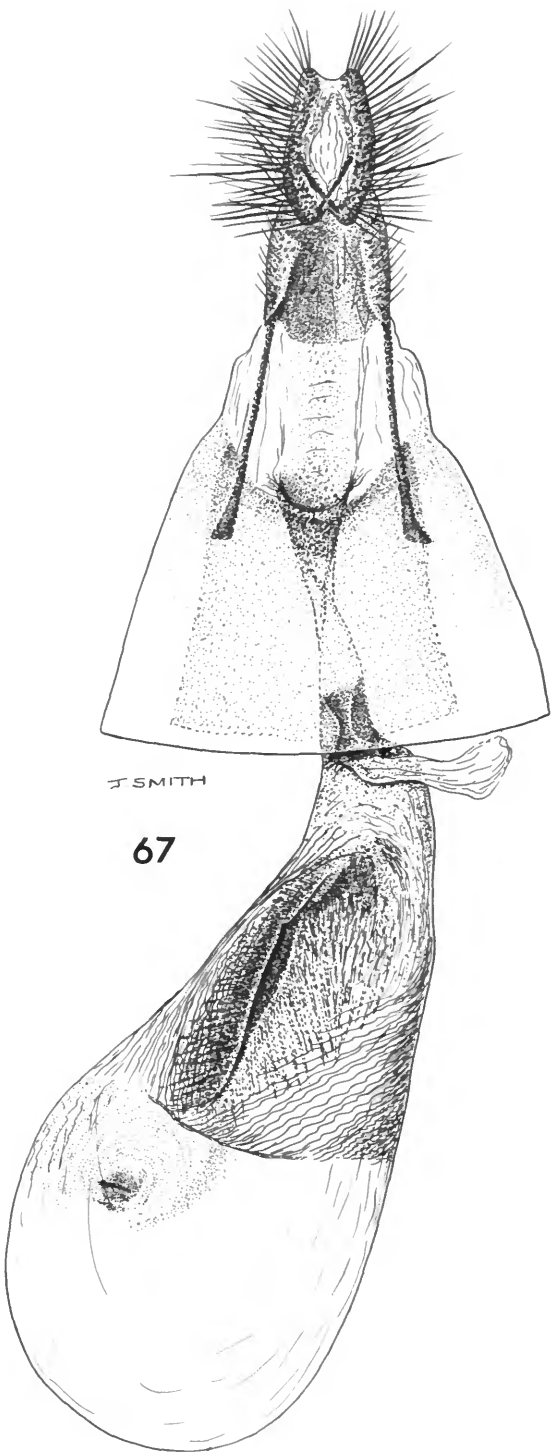


FIGURE 67.—*Spoladea recurvalis* (Fabricius). Ventral view of female genitalia.

fig. 90.—Hudson, 1928, p. 179, pl. 20; fig. 41.—Simmonds, 1932 [*facialis*, sic!], p. 10.—Russell, 1934, p. 31.—McDunnough, 1939, p. 9.—Ghosh, 1940b, p. 151.—Krauss, 1944, p. 89.—Roonwal and Bhasin, 1954, p. 32.—Amsel, 1956, p. 201, pl. 26; fig. 2, pl. 83; fig. 6—Thomas, 1958, p. 223.—Butani, 1958, p. 182.—Agenjo, 1963, p. 24, fig. 1.

Hymeria [*sic!*] *fascialis* (Cramer), Fullaway, 1914.

Zinckenia fascialis (Cramer), Butler, 1883, p. 117.—Swinhoe, 1884, p. 524; 1886, p. 437.—Hampson, 1896, p. 262, fig. 158 (♂); 1898, p. 623, fig. 21 (♂).—Pagenstecher, 1900, p. 188.—Snellen, 1901, p. 259.—Leech, 1901, p. 449.—Holland, 1903, p. 392, pl. 47: fig. 28.—de Joannis, 1913, p. 316.—Shiraki, 1913, p. 365.—Cockerell, 1916, p. 79.—Strand, 1918, p. 37.—Matsumura, 1920, p. 421, pl. 16: fig. 2.—Ogilvie, 1923, p. 7; 1924, p. 30.—Perry, 1924, p. 13.—Matsumura, 1925, p. 188.—Kuwayama, Kuribayashi and Oshima, 1925, p. 36, pl. 2: fig. 3.—Ogilvie, 1925, p. 38.—Kuwayama, 1925, p. 36, pl. 2: fig. 3.—Nakayama, 1929, p. 275.—Lima, 1950, p. 31, fig. 26.—Marion, 1955, p. 76.—Janjua and Haque, 1958, p. 138.

Phalaena angustalis Fabricius, 1787, p. 22.

Phalaena Pyralis fascialis Cramer, 1782, p. 1, pl. 398; fig. 0.

Hymenia diffascialis Hübner, 1825, p. 361, no. 3453.

Phycis recurvella Zincken, 1818, p. 143.

Hydrocampa albifascialis Boisduval, 1833, p. 119, pl. 16: fig. 1.

Hymenia exodias Meyrick, 1904, p. 150.

Odezia hecate var. *formosana* Shiraki, 1910, p. 146, pl. 35: fig. 5.

TYPES.—Lost (*recurvalis*); lost? (*fascialis*); Vienna? (*angustalis*); Museum d'Histoire Naturelle, Paris? (*albifascialis*); British Museum (Natural History) (*exodias, animalis*); Entomological Institute, Taipeh (*formosana*).

TYPE LOCALITIES.— East Indies (*recurvalis*); Japan (*fascialis*); Tranquebar, southeast India (*angustalis*); Madagascar (*albifascialis*); Molokai, Hawaii (*exodias*); Formosa (*formosana*); Pernambuco, Brazil (*animalis*).

DISTRIBUTION.—Cosmopolitan except in very cold climates.

FOOD PLANTS.—Numerous. Among the most important are: beets, cotton, tomato, carrot, spinach, eggplant, purslane, cucumber, corn, sugar beets, chenopodiaceous weeds, *Amaranthus, Helianthus, Celosia,* etc.

In the United States, and elsewhere, this species is known as the "Hawaiian beet webworm." In some areas, particularly India and Ceylon, it is a serious pest of leafy vegetables.

The specimens from Rapa appear to be fairly typical but some show evidence of the striking variations such as are found in Hawaiian examples (Zimmerman, 1958, p. 54, fig. 38). Apparently *recurvalis* is another complex "species," which warrants exhaustive study when sufficient material becomes available.

The name *diffascialis* is a substitute name for *fascialis* and *recurvella* is an emmendation for *recurvalis,* so *diffascialis* and *recurvella* have the same types and type localities as do *fascialis* and *recurvalis,* respectively.

I am greatly indebted to Dr. Eugene G. Munroe of Ottawa, Canada, for nearly all the information on the location of types and for the information on *diffascialis* and *recurvella.*

Genus *Cometura* Meyrick

Cometura Meyrick, 1886, p. 226. (Type species: *Cometura picrogramma* Meyrick, 1886, p. 226 [by monotypy].)

Cometura picrogramma Meyrick

FIGURE 68; PLATE 10*f*

Cometura picrogramma Meyrick, 1886, p. 226.

Tatobotys biannulalis (Walker) Meyrick (*not* Walker), 1929, p. 162.

Male genitalia slides JFGC 11485, 11741. Harpe wide, broadest about middle; three slender sclerotized hooks near base; culcullus narrowly sclerotized. Gnathos a very small transverse plate with membranous lateral elements. Uncus divided into two elongate knobs clothed with stout setae directed dorsad. Vinculum bulbous, ventral edge narrowly sclerotized and with deep median concavity. Tegumen about half as long as harpe, narrowed posteriorly; from each side a conspicuous sclerite giving rise to compact groups of specialized scales, one coalesced group produced into three dorsal teeth. Anellus an elongate plate constricted at middle. Aedeagus slender, slightly curved, base divided forming a Y; on each side a small, dentate plate before apex.

TYPE.—Hope Department of Entomology, University Museum, Oxford, England.

TYPE LOCALITY.—Fiji.

DISTRIBUTION.—Fiji, Austral Islands.

There are two males from Rapa before me as follows: Haurei (8.IX.1963) and Point Tepapa (15.IX.1963).

FOOD PLANT.—Unknown.

Meyrick misidentified Walker's species when he recorded it from Rapa, where it does not occur. Walker's

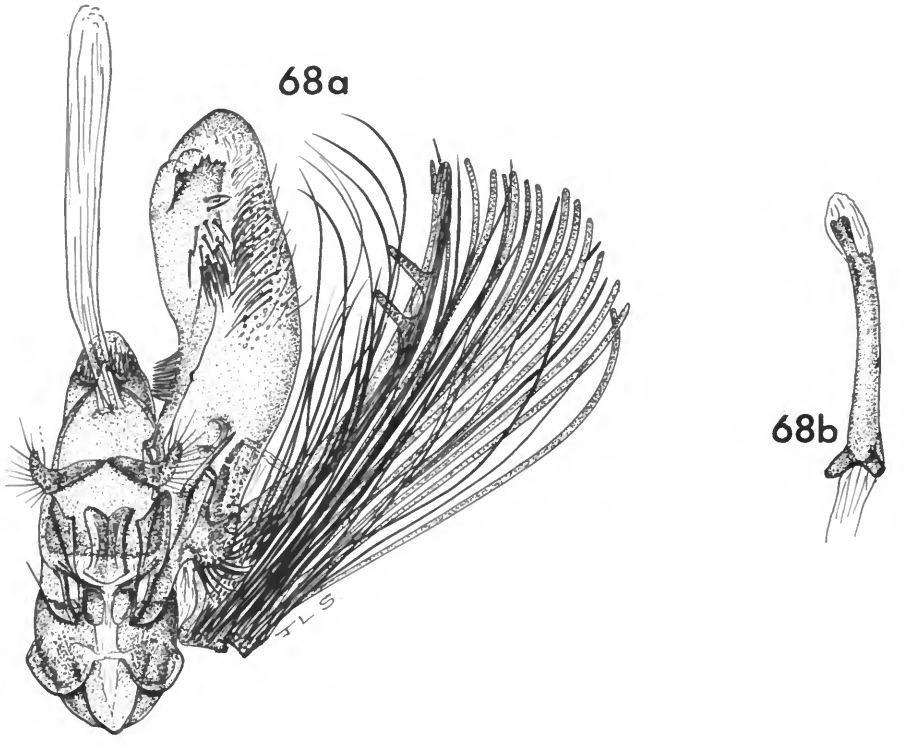


FIGURE 68.—*Cometura picrogramma* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.

type is in the University Museum, Oxford; it is a male without abdomen, and the antennal ciliations, absent in *picrogramma,* are conspicuous. Moreover, *biannulalis* is an orange-yellow, brown-marked species not suffused with gray as is *picrogramma,* and the two subcostal spots of *biannulalis* are oval with pale centers. The subcostal spots of *picrogramma* lack pale centers.

For the above reasons I am removing *picrogramma* from synonymy.

Tirsa, new genus

TYPE-SPECIES.—*Tirsa fiona,* new species, by monotypy and original designation.

Labial palpus nearly twice as long as head, triangular, porrect, pointed; first segment rough-scaled ventrally; second segment short; third segment long, pointed, exposed; maxillary palpus small, closely appressed to dorsal surface of labial palpus. Antenna ciliated in male, simple in female. Frons smooth, slightly convex; ocellus conspicuous. Legs slender, smooth-scaled. Forewing moderately broad, termen gently convex, 12 veins; 2 twice as far from 3 as 3 is from 4; 4 and 5 approximate toward base; 6 approximate to the stalk of 8 and 9; 7 out of the stalk of 8 and 9; 10 anastomosing with 9 for a short distance beyond end of cell; 11 removed from 10. Hind wing with 8 veins; 2 arising well before end of cell; 3 twice as far from 4 as 4 is from 5; 7 and 8 arising free, then coincident for most of their length; outer margin smooth, convex.

Male genitalia with stout uncus, narrowed distally; tegumen short; harpe simple, lacking basal process; vesica armed.

Female genitalia with signum present, elongate, dentate; accessory bursa present.

The venation of *Tirsa* is similar to that of *Uresiphita* Hübner and *Oeobia* Hübner [*Udea*], but differs from both by the origin of vein 7 of forewing from the stalk of 8 and 9, and by the anastomosis of vein 10 with the stalk of 8 and 9. The simple harpe and presence of the accessory bursa also distinguish *Tirsa* from the

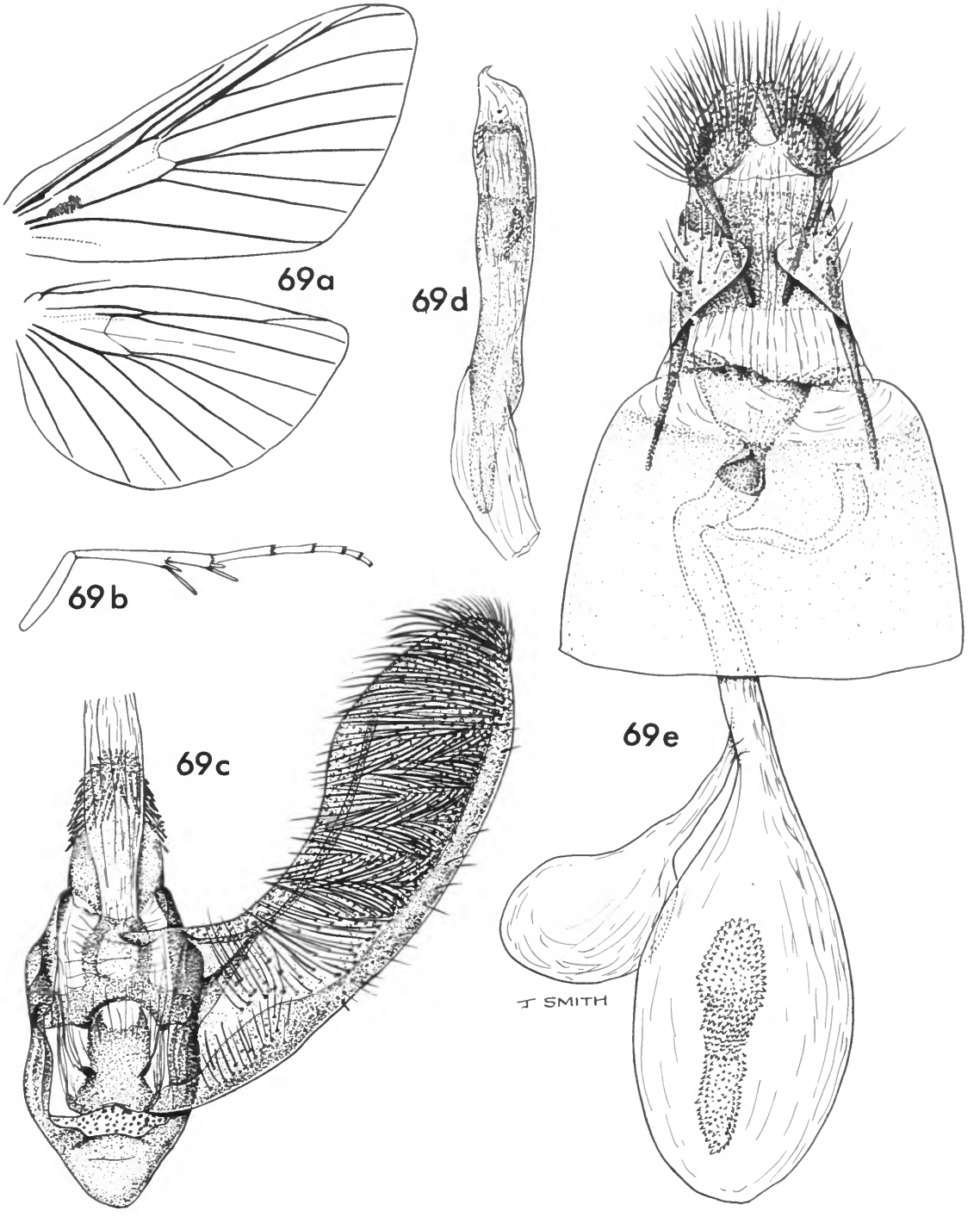


FIGURE 69.—*Tirsa fiona*, new species: *a*, venation of right wings; *b*, posterior leg; *c*, ventral view of male genitalia with left harpe and aedeagus removed; *d*, aedeagus; *e*, ventral view of female genitalia.

other two genera. The signum of *Tirsa* is similar to the Hawaiian species *eucrena* and *leucozonea,* placed by Zimmerman (1958, figs. 159, 160) in *Oeobia.*

Tirsa fiona, new species

FIGURE 69; PLATE 10*e*

Alar expanse 24–28 mm.

Labial palpus white; first segment with a touch of dresden brown anteriorly, second segment almost wholly dresden brown on outer side; third segment dresden brown; maxillary palpus dresden brown, somewhat darker apically. Antenna white dorsally, yellowish ventrally; scape white. Head white; frons narrowly fuscous laterally. Thorax white; tegula dresden brown basally. Forewing ground color white; costa dresden brown to ochraceous buff, usually the latter in females; six ill-defined, scattered spots of brown and six small spots along termen of same color in males; females usually immaculate except for costa; cilia white. Hind wing white with spots along termen and in center of wing of male, brown; female similar, but spots faint or missing; cilia white. Legs white; fore- and midleg shaded dresden brown and ochraceous buff; hind leg immaculate. Abdomen white.

Male genitalia slide JFGC 11479. Harpe elongate, costa and ventral edge nearly parallel; cucullus bluntly pointed. Uncus narrowly triangular; anterior half dorsally clothed with strong setae directed forward. Vinculum U-shaped, saccus well developed. Tegumen short, about as long as broad. Anellus subrectangular, slightly broader basally, concave posteriorly. Aedeagus moderately stout, proximally narrowed; vesica armed with a small dentate plate and a few minute, fine spicules.

Female genitalia slides JFGC 11477, 11478. Ostium membranous, conical. Antrum pear shaped, sclerotized. Inception of ductus seminalis slightly anterior to antrum. Ductus bursae membranous. Bursa copulatrix membranous; accessory bursa membranous. Signum linguiform, dentate.

HOLOTYPE.—USNM 70074.

TYPE LOCALITY.—Rapa, Tevaitau, 800′ (245 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (21.IX.1963), ♂ and 11 ♀ ♀ paratypes as follows: Maurua, 600′ (184 m), 5 ♀ ♀ (16.IX to 22.X.1963); Teumukopuke, 500′ (154 m), 2 ♀ ♀ (7.X and 18.XI.1963); Tevaitau, 800′ (245 m), ♂, 4 ♀ ♀ (21–29.IX.1963).

In pattern, *fiona* is similar to *Palpitia unionalis* (Hübner), but there is no indication of the longitudinal row of spots inside costa of forewing; moreover, the wings of *fiona* are more opaque than those of *unionalis.*

Genus *Uresiphita* Hübner

Uresiphita Hübner, 1825, p. 353. (Type-species: *Pyralis limbalis* Denis and Schiffermüller, 1775, p. 122 [subsequent designation by Pierce and Metcalf, 1938, p. 64].)

Uresiphita polygonalis ochrocrossa, new subspecies

FIGURE 70; PLATE 10*a, b*

Alar expanse 30–40 mm.

Labial palpus buff; second segment buffy brown on outer side; third segment similar except buffy brown ventrally also. Antenna warm buff; somewhat darker toward base; marked with fuscous. Head light buffy brown. Thorax buffy brown with some darker scales mixed; apex of tegula warm buff. Forewing ground color buff suffused grayish; extreme base of costa narrowly blackish fuscous; costa beyond basal third edged ochraceous orange; at outer third a curved line of six blackish-fuscous spots ending on vein 2; on dorsum two suffused fuscous spots; cilia warm buff mixed with vinaceous and gray. Hind wing warm buff; costa and outer margins broadly banded grayish fuscous; cilia warm buff mixed with gray toward apex. Foreleg warm buff suffused brownish on outer side; midleg and hind leg warm buff; tibial spurs grayish fuscous at apices. Abdomen warm buff; dorsally segments grayish fuscous with posterior margins narrowly pale buff.

There is great variation in this subspecies and, as can be seen in Plate 10*b,* the markings are more contrasting and darker in the females.

Male genitalia slide JFGC 11724. Harpe a little more than four times as long as wide; before middle a triangular, sclerotized process, its apex a slightly curved, sharp point; cucullus rounded; sacculus moderately sclerotized. Uncus nearly as long as tegumen, sides nearly parallel; apical half clothed with stout setae directed anteriorly. Vinculum broader at middle than laterally. Tegumen broad basally, narrowed posteriorly; laterally membranous. Anellus an oval sclerotized plate. Aedeagus moderately stout, nearly straight; vesica armed with a single, very long cornutus.

Female genitalia slide JFGC 11725. Ostium crescentic. Antrum broadly, but moderately, sclerotized. Inception of ductus seminalis ventral and only slightly

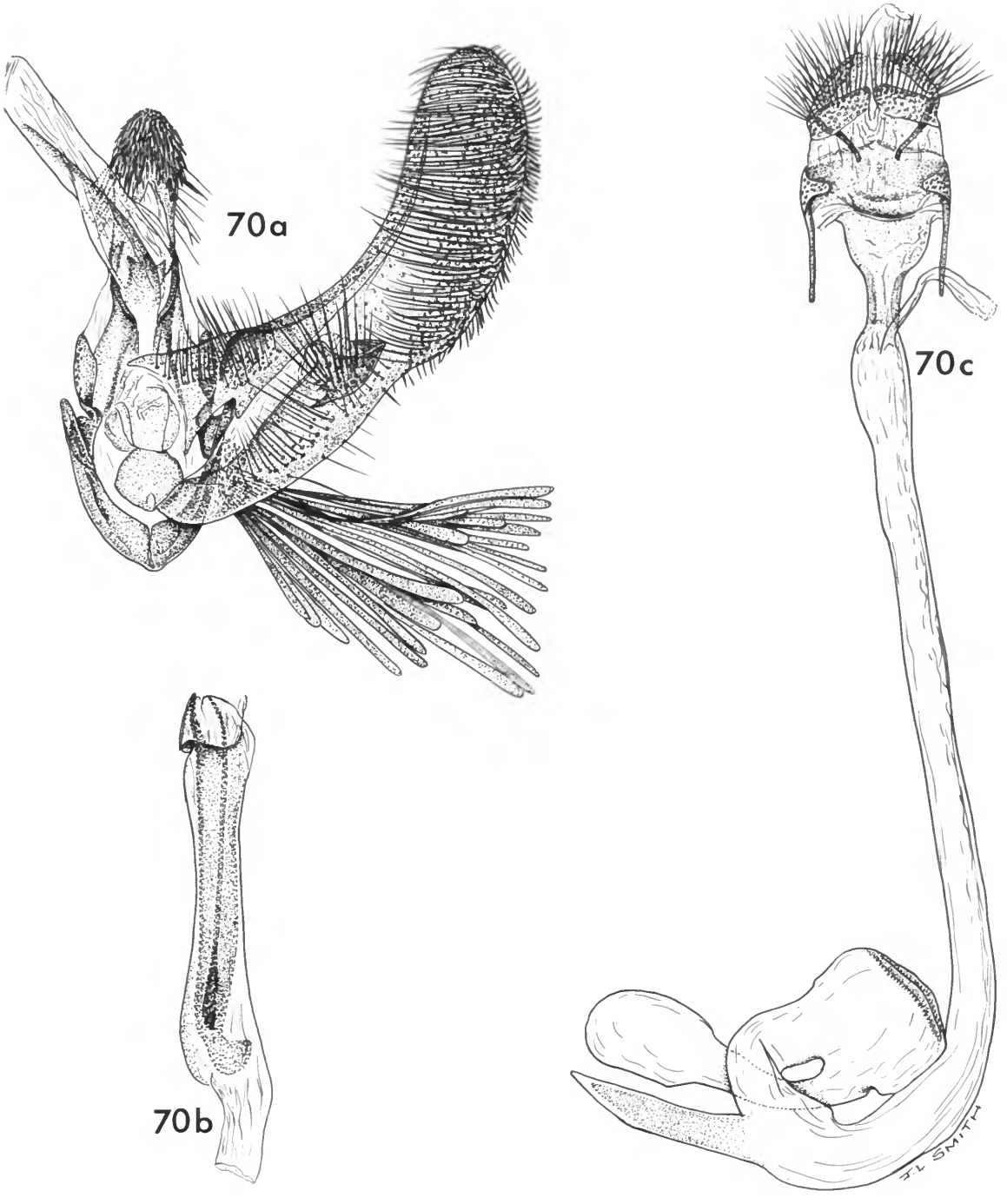


FIGURE 70.—*Uresiphita polygonalis ochrocrossa*, new subspecies: *a*, ventral view of male genitalia and corema with left side and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

anterior to antrum. Ductus bursae long, membranous with lightly sclerotized blind sac before bursa copulatrix. Bursa copulatrix membranous with finely granular inner surface; appendix bursae elongate, membranous. Signum a large elongate-oval, dentate plate.

HOLOTYPE.—USNM 70075.

TYPE LOCALITY.—Rapa, Piahu, 750′(231 m).

DISTRIBUTION.—Rapa.

FOOD PLANTS.—*Genista, Cytisus,* and some other legumes (Europe); *Acacia koa* A. Gray, *Sophora chrysophylla* (Salisbury) Seemann (Hawaiian Islands); *Sophora tetraptera* J. Miller, cape broom, common broom, and clover (New Zealand). Although the moth is quite common we did not find the food plant on Rapa.

Described from the ♂ holotype, 53 ♂♂ and 32 ♀♀ paratypes from the following localities on the island: Anatakuri nako, 2 ♀♀; Haurei, ♀; Maugaoa, 950′(292 m), 6 ♂♂; Maurua, 600′(184 m), 15 ♂♂, 5 ♀♀; Morogouta, 750′(231 m), 2♂♂, 4 ♀♀; Piahu, 750′(231 m), 4 ♂♂, ♀; Teumukopuke, 500′(154 m), 19 ♂♂, 16 ♀♀; Tevaitau, 800′(245 m), 7 ♂♂, 3 ♀♀. Dates of capture range from 10.IX to 23.XI.1963.

I have described this subspecies as new because it is so distinct from the other known subspecies, which I regard as separate, all of them being identifiable on coloration, although there are no substantial structural differences.

This subspecies, *ochrocrossa,* differs from all the other described forms by the broadly infuscated costa of hind wing coupled with a warm buff central area. The Hawaiian subspecies *U. polygonalis virescens* (Butler), *new status,* regarded by Zimmerman (1958, p. 116) as a synonym of *polygonalis,* has a pink underside to forewing and hind wing, and pink fringe on the hind wing compared with the yellow underside and yellowish fringe of *ochrocrossa.* Moreover, the hind wing of *virescens* is almost or wholly infuscated as is that of the New Zealand *maiorialis,* but the latter is an altogether darker subspecies with a dark fringe on the hind wing. European specimens and those from Teneriffe have bright yellow hind wings with contrasting, clearly defined, black terminal bands. Although apparently of one species, all of these segregates are easily identifiable.

It appears that either the species is highly susceptible to rapid change under differing environmental conditions, or the various distinct populations have been separated geographically for a long period of time.

Genus *Herpetogramma* Lederer

Herpetogramma Lederer, 1863, p. 430. (Type-species: *Herpetogramma servalis* Lederer, 1863 [by monotypy].)

Herpetogramma licarsisalis (Walker)

FIGURE 71; PLATE 10*c*

Botys licarsisalis Walker, 1859, p. 686.
Herpetogramma licarsisalis (Walker), Yamanaka, 1960, p. 324.—Inoue, 1963, p. 93.—Nazmi, 1963, pp. 205, 215.
Pachyzancla licarsisalis (Walker) Hampson, 1896, p. 402; 1899, p. 202, fig. 111.—Hering, 1901, p. 102.—Rebel, 1910, p. 431; 1915, p. 146.
Psara licarsisalis (Walker), Shibuya, 1928, p. 263, pl. 9: fig. 6; 1929, p. 204.—Tams, 1935, p. 286, Ghesquiére, 1942, p. 179, pl. 7: fig. 2.—Viette, 1949a, p. 324.—Paulian and Viette, 1955, p. 184.—Viette, 1958, p. 10.—Braithwaite, 1959, p. 588.—Nazmi, 1963, p. 215, figs. 6(A–D).
Botys pharaxalis Walker, 1859, p. 725.
Botys immundalis Walker, 1865, p. 1448.
Entephria? fumidalis Walker, 1865, p. 1486.
Botys serotinalis Joannis 1888, p. 272, pl. 6: fig. 2.

Male genitalia slides JFGC 11471, 11731, 11732. Harpe elongate, widest at middle; costa strongly sclerotized to beyond middle; cucullus narrowly rounded; from inside sacculus a sclerotized bar terminating in a short, free point. Gnathos a triangular plate. Uncus triangular, gradually narrowed posteriorly; apex densely clothed with setae directed anteriorly. Vinculum pointed. Tegumen very short, broad. Anellus subrectangular, narrowed basally. Aedeagus rather stout, nearly straight; vesica armed with one long, lightly sclerotized cornutus, one line of small cornuti and a cluster of small ones near apex.

Female genitalia slide JFGC 11733. Ostium funnel shaped, membranous. Antrum not differentiated. Inception of ductus seminalis from posterior lobe of bursa copulatrix. Ductus bursae short, membranous in posterior half, sclerotized anteriorly. Bursa copulatrix very long, narrow; left side sclerotized posteriorly and posterior half studded with minute spicules. Signum a small plate with median, transverse ridge.

TYPES.—British Museum (Natural History) *licarsisalis, pharaxalis, fumidalis, immundalis*).

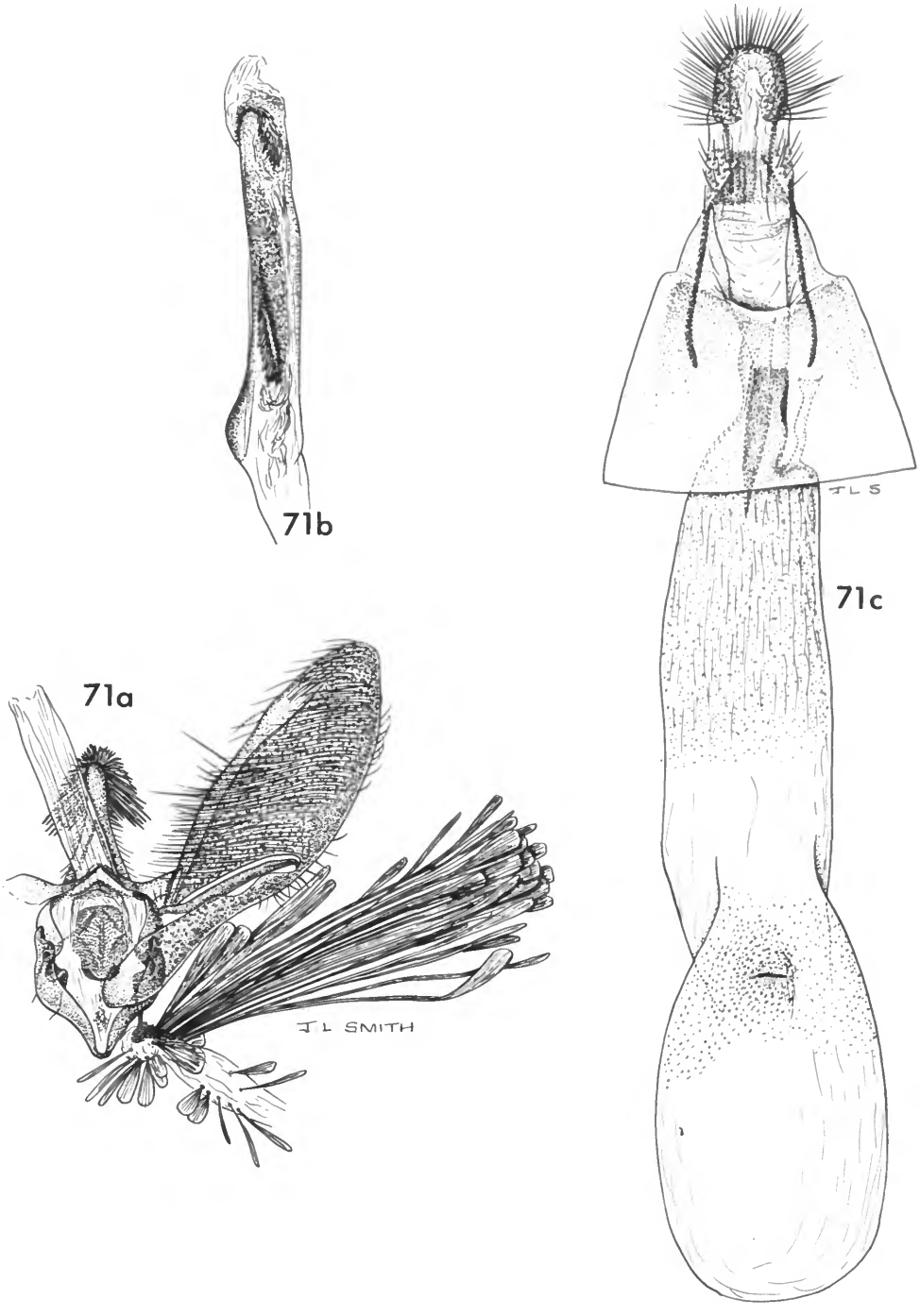


FIGURE 71.—*Herpetogramma licarsisalis* (Walker): *a*, ventral view of male genitalia and corema with left side and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

TYPE LOCALITIES.—Sarawak, Borneo (*licarsisalis*); Sidney, Australia (*pharaxalis*); *New Guinea* (*fumidalis*); Java (*immundalis*).

DISTRIBUTION.—South and East Asia, Malacca, Borneo, Java, Australia, Fiji, Marshall Islands, Syria, Belgian Congo, Madagascar, Egypt, Cape Verde Islands. The six specimens from Rapa (4 ♂♂, 2 ♀♀) were collected at Haurei (8.IX to 3.X.1963).

FOOD PLANTS.—*Cynodon dactylon* Pers. *Hyparrhensis* species, *Beta vulgaris* Linnaeus, rice, other grasses.

It is apparent that *licarsisalis* accepts many grasses as larval food, but we found no evidence of feeding on any of the grasses examined, and the moth was not common during our visit.

Genus *Diasemiopsis* Munroe

Diasemiopsis Munroe, 1957, p. 166, figs. 11, 12. (Type-species: *Hydrocampa ramburialis* Duponchel, 1831, p. 343, pl. 233: fig. 6. [by original designation].)

Diasemiopsis ramburialis (Duponchel)

FIGURE 72; PLATE 9*h*

Hydrocampa ramburialis Duponchel, 1831, p. 343, pl. 233: fig. 6.

Diasemia ramburialis (Duponchel), Guenée, 1854, p. 234.—Heinemann, 1865, p. 99.—Wocke, 1871, p. 213.—Meyrick, 1884, p. 302.—Leech, 1886, p. 45, pl.6: fig. 2.—Meyrick, 1887, p. 219.—Möschler, 1890, p. 306.—Meyrick, 1895, p. 404.—Hampson, 1896, p. 411.—Rebel, 1901, p. 58.—Barnes and McDunnough, 1917, p. 132.—Forbes, 1923, pp. 68, 558.—Shibuya, 1928, p. 270.—Meyrick, 1928, p. 420; 1929, p. 164.—Pierce and Metcalf, 1938, p. 23, pl. 13.—McDunnough, 1939, p. 13.—Ghesquiére, 1942, p. 181.—Viette, 1949a, p. 324.—Beirne, 1952, p. 128, pl. 10: fig. 10.—Inoue, 1955, p. 184.—Paulian and Viette, 1955, p. 185.—Marion, 1957, p. 86—Janmoulle, 1962, p. 5.

Nymphula ramburialis (Duponchel), Fischer von Röslerstam, 1842, p. 381, pl. 92: fig. 3*a*.

Botys ramburialis (Duponchel), Herrich-Schäffer, 1849, p. 26.

Isopteryx melaleucalis Walker, 1859, p. 402.

Diasemia leucophaealis Walker, 1866, p. 1326.

Diasemia reconditalis Walker, 1866, p. 1325.

Diasemiopsis ramburialis (Duponchel), Munroe, 1957, p. 166, figs. 11, 12.—Hannemann, 1964, pp. 304(224) figs. 224–224*d*.

Male genitalia slide JFGC 11734. Harpe elongate, widest about middle; costa and ventral edge evenly sclerotized, meeting at the narrow cucullus. Uncus slender, expanded distally, clothed with strong setae directed anteriorly. Vinculum expanded laterally, centrally, a narrow bar with small median projection. Tegumen short and broad; strong hair pencils from two membranous pockets at base laterally. Anellus broad basally, tonguelike posteriorly. Aedeagus moderately slender; vesica armed with one strong cornutus and a line of smaller ones.

Female genitalia slide JFGC 11735. Ostium membranous, funnel shaped. Inception of ductus seminalis from junction of membranous and sclerotized parts of ductus bursae. Ductus bursae mostly membranous posteriorly; anteriorly heavily sclerotized, broad and flattened. Bursa copulatrix membranous. Signum a long, narrow, curved band with central keel.

TYPES.—British Museum (Natural History) (*melaleucalis*), (*leodocusalis, leucophaealis, reconditalis*); Museum d'Histoire Naturelle, Paris (*ramburialis*).

TYPE LOCALITIES.—Corsica (*ramburialis*); Ceylon (*melaleucalis*); United States (*leodocusalis*); Sydney, Australia (*reconditalis*); Moreton Bay (*leucophaealis*).

DISTRIBUTION.—Cosmopolitan.

From Rapa we have 94 ♂♂ and 27 ♀♀. All were collected in the churchyard at Haurei (September and October dates) except the following: Anatakuri nako, ♀ (14.X.1963); Maurua, 600′ (184 m), ♂, ♀ (25.IX and 22.X.1963); Point Tepapa, ♀ (15.IX.1963); Taga, 575′ (176 m), ♀ (4.X.1963); Tevaitau, 750′ (231 m), ♀ (29.IX.1963).

Of this species Meyrick (1929, p. 164) states, "Ranges from S. Europe to Africa, S. Asia, Australia, N. America; occasionally found in England, and clearly a great wanderer."

FOOD PLANT.—Unknown?

Munroe (1957, p. 166) has illustrated and described what he considers to be the true *ramburialis* and there is no reason to question his findings. The Rapa specimens agree with the European material he describes, but until the types of the presently recognized synonyms are investigated their true relationship to *ramburialis* must remain unknown.

At present, *ramburialis* is considered to be cosmopolitan in distribution but this is now very much in doubt.

We failed to rear this species and it is curious that I am unable to find any reference to its food plant or habits, even in the latest publications on the species.

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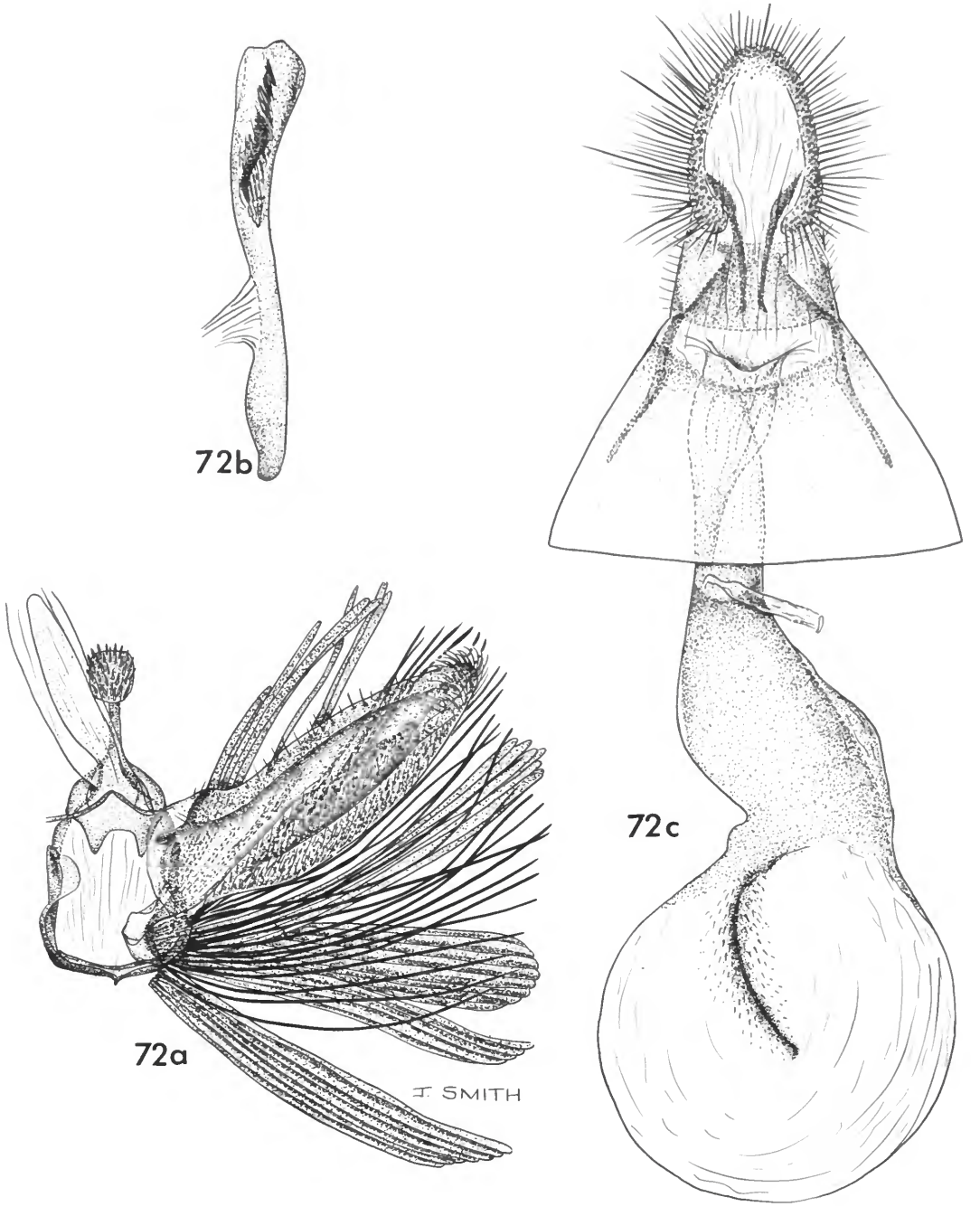


FIGURE 72.—*Diasemiopsis ramburialis* (Duponchel): *a*, ventral view of made genitalia and corema with left side and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

Genus *Metasia* Guenée

Metasia Guenée, 1854, p. 251. (Type-species: *Metasia suppandalis* Guenée, 1854, p. 252 [designated by Hampson, 1899, p. 237].)

Metasia chionostigma, new species

FIGURE 73; PLATE 11*a, b, e, f*

Alar expanse 10–12 mm.

Labial palpus white; second and third segments marked with blackish fuscous on outer side above. Maxillary palpus similarly colored. Antenna black. Head gray; some specimens with white on crown and posteriorly. Thorax white; anteriorly narrowly black or blackish fuscous and posteriorly a large spot of same color; base of tegula black or blackish fuscous. Forewing ground color black or blackish fuscous; extreme base white; on costa a median white spot, large, quadrate (Plate 11*f*) or small, nearly obsolete (Plate 11*a*), from terminal fifth of costa to termen at vein 2, an irregular, white, transverse line; between this line and median white spot, a small white spot (absent in some specimens); at end of cell a small white dot; on dorsum two small white patches; cilia gray with a blackish fuscous basal band.

Hind wing white in basal half, fuscous apically and narrowly around anal angle; cilia gray with a fuscous basal band. Legs white suffused and banded with fuscous. Abdomen blackish fuscous to black dorsally, grayish fuscous ventrally, all segments narrowly edged white.

Male genitalia slides JFGC 11690, 11692. Harpe about three times as long as broad; outer surface with many curved or curled, stiff setae. Uncus broad basally, narrowed at middle, expanded distally; terminal end clothed with stiff setae. Vinculum broad at middle. Tegumen about as long as broad; long, strong setae from dorsal and lateral surfaces. Anellus a broad, lightly sclerotized plate, narrowed posteriorly and with a median, anterior projection. Aedeagus slender proximally, widened distally; vesica armed with an elongate cluster of small cornuti and a series of larger ones.

Female genitalia slides JFGC 11691, 11693. Ostium membranous, cupped; antrum broadly, but lightly, sclerotized. Inception of ductus seminalis ventral and anterior to antrum. Ductus bursae membranous. Bursa copulatrix membranous, with scattered, small spines on inner surface. Signum a small nodule.

HOLOTYPE.—USNM 70079.

TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (7.XI.1963), 2 ♂♂ and 10 ♀♀ paratypes: Maugaoa, 950′ (292 m), 3 ♀♀ (5–7.XI.1963); Perau, 1900′ (585 m), 2 ♂♂, 7 ♀♀ (15.X.1963).

The costal spot, sometimes reduced as in the holotype (Plate 11*a*) and the much darker coloring distinguish *chionostigma* from *empelioptera* immediately. The male and female genitalia are similar but differ as described under *empelioptera.*

Metasia gnorisma, new species

FIGURE 74; PLATE 11*c, g*

Alar expanse 14–17 mm.

Labial palpus light buff; dorsal half of second segment blackish fuscous on outer side; third segment almost wholly blackish fuscous. Maxillary palpus blackish fuscous except for spot of buff on inner surface. Antenna grayish buff, annulated fuscous; scape grayish buff, marked with a few fuscous scales. Head grayish buff. Thorax buff, irrorate with fuscous; tegula fuscous anteriorly. Forewing ground color buff to warm buff; basal two-fifths fuscous, the costal and outer edges of this area blackish fuscous; beyond the dark basal area, in cell, a large blotch of ground color, sometimes extended to form an ill-defined light fascia (Plate 11*c*); at outer, costal side of this light area a fuscous crescentic mark; outer half of wing fuscous with an irregular, transverse line of ground color from outer fifth of costa to vein 3 and some ill-defined buff spots showing through the darker color; on costa, before the transverse line, a large blackish-fuscous spot; underside fuscous except for a buff spot on costa at outer fifth and a buff spot in cell; cilia grayish buff with a series of fuscous spots basally. Hind wing basal two-thirds white, outer third fuscous; cilia white at anal angle, shading to grayish buff around outer margin to apex, the latter with a series of fuscous spots. Foreleg buff; femur and tibia suffused fuscous; tarsal segments broadly annulated blackish fuscous; midleg and hind leg buff; tibial spurs and tarsal segments annulated fuscous. Abdomen buff; dorsally first segment with spot of fuscous; second and sixth segments immaculate;

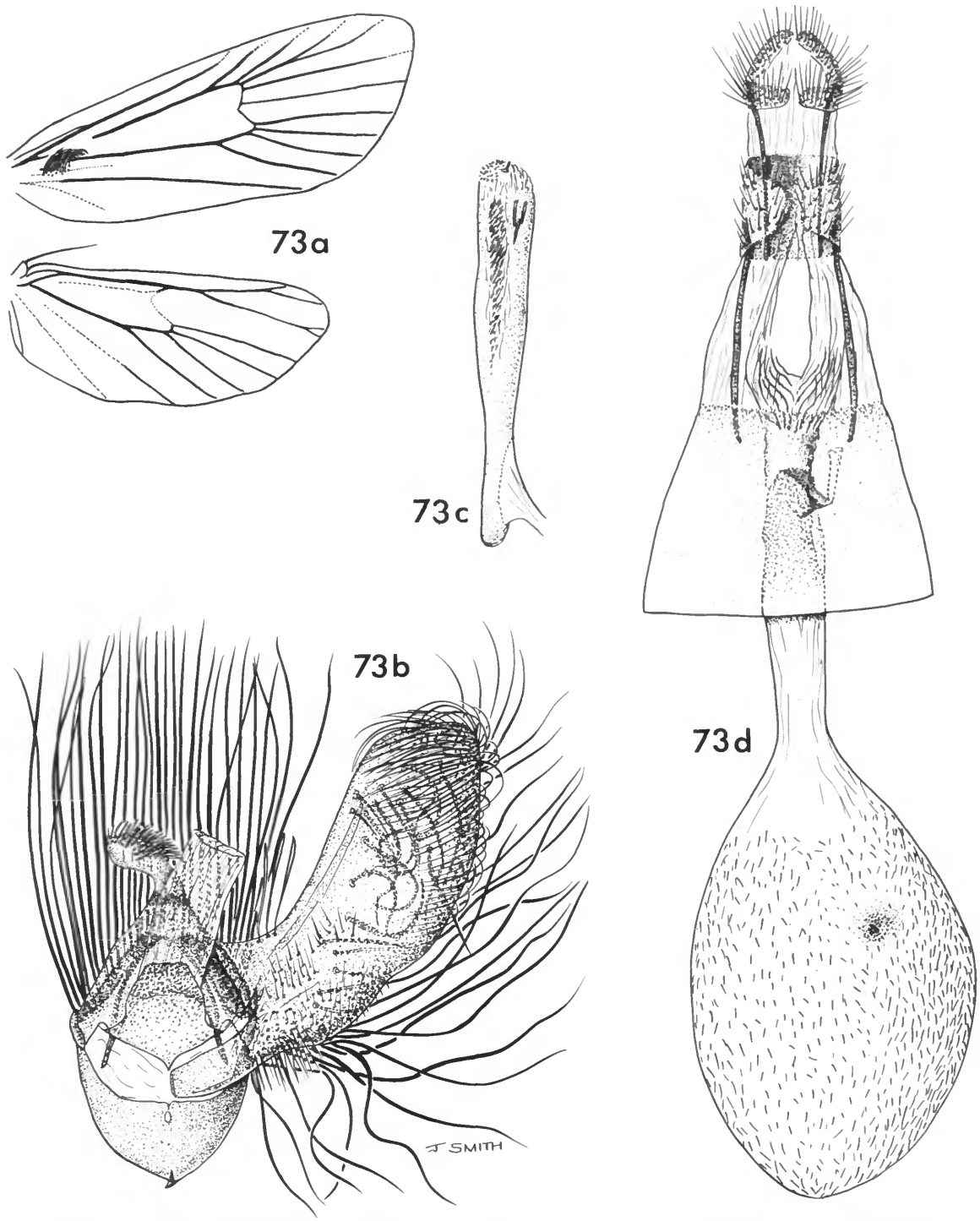


FIGURE 73.—*Metasia chionostigma*, new species: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

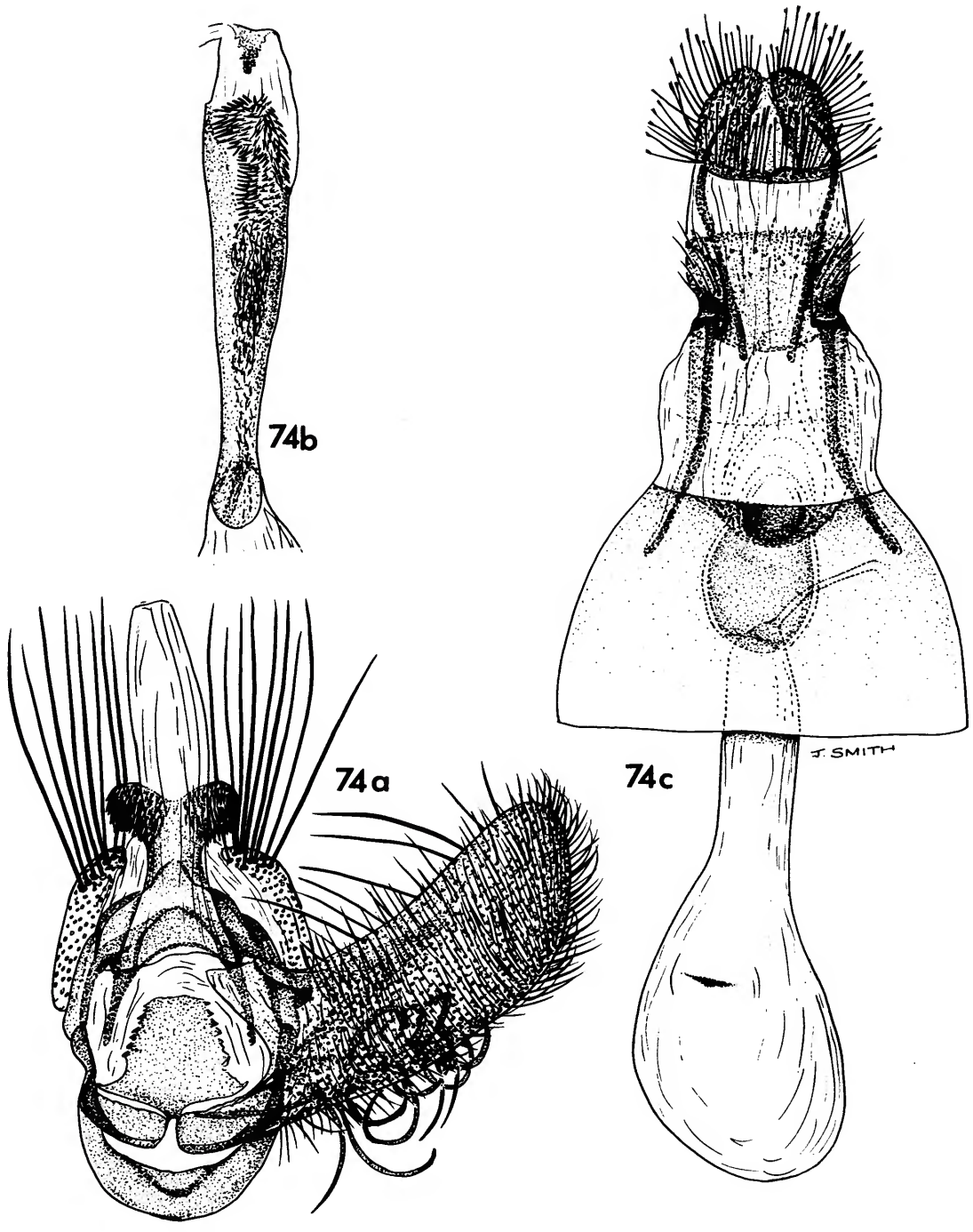


FIGURE 74.—*Metasia gnorisma*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

third to fifth and seventh blackish fuscous except posterior edge; eighth segment with fuscous spot posterolaterally.

Male genitalia slides JFGC 11461, 11894. Harpe simple, broadest beyond middle; basal half of outer surface with strong, flattened, curled setae. Uncus divided posteriorly, each lobe clothed with stiff setae. Vinculum rounded, broadest at middle. Tegumen broader than long. Anellus a lightly sclerotized, linguiform plate, broadly expanded at base. Aedeagus narrow proximally, widest distally; vesica armed with an elongate group of small cornuti.

Female genitalia slide JFGC 11462. Ostium round; anterior lip sclerotized. Antrum sclerotized, oval. Inception of ductus seminalis at junction of antrum and membranous part of ductus bursae. Ductus bursae short; anterior two-thirds membranous. Bursa copulatrix membranous. Signum a slender, lightly sclerotized plate with central keel.

HOLOTYPE.—USNM 70078.

TYPE LOCALITY.—Rapa, Perau, 1900′ (585 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (15.X.1963) 5 ♂♂ and 5 ♀♀ paratypes from: Maugaoa, 950′ (292m), 4 ♂♂ (23.XI.1963); Perau, 1900′ (585 m), ♂, 5 ♀♀ (15.X.1963).

The divided uncus and the shape of the antrum distinguish *gnorisma* from *chionostigma* and *empelioptera*. It may be distinguished, also, from *chionostigma* by the spotted cilia of the wings.

Metasia empelioptera, new species

FIGURE 75; PLATE 11*d*

Alar expanse 10–11 mm.

Labial palpus white; second segment blackish fuscous on outer surface in upper half; third segment almost wholly fuscous. Maxillary palpus white on inner side, blackish fuscous on outer side. Antenna sordid white, shading to gray toward apex. Head ocherous white, frons shaded laterally with fuscous. Thorax ocherous white; tegula anteriorly fuscous. Forewing ground color ocherous white; on base of costa a rectangular fuscous spot; on basal angle a round fuscous spot; basal two-fifths of wing shaded with fuscous, followed by a median fascia of ground color; beyond the fascia, apical half of wing infuscated lightly (darker in female); at apical fifth of costa a fuscous spot preceded by a larger area of the white ground

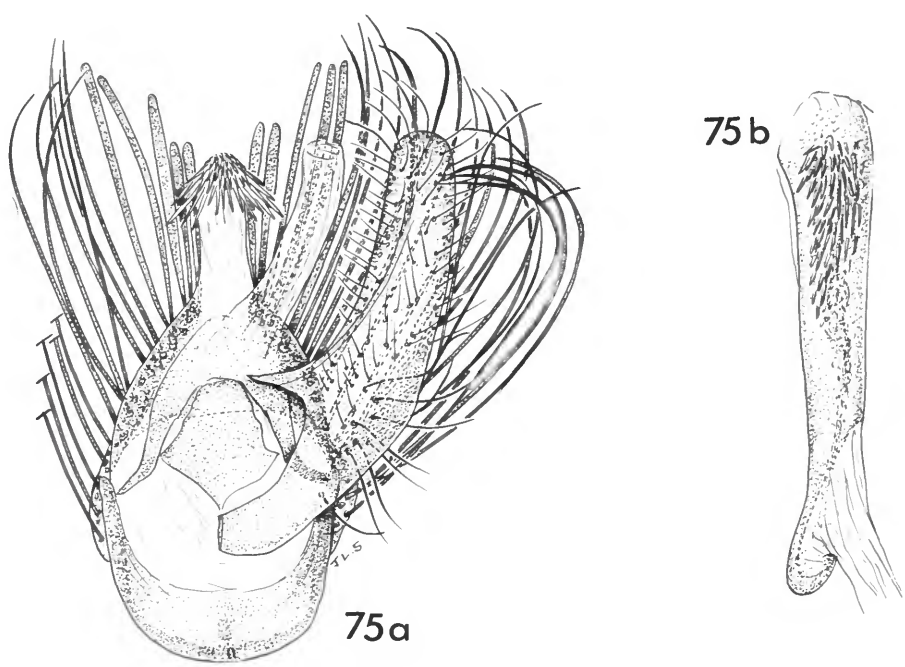


FIGURE 75.—*Metasia empelioptera*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.

color; cilia grayish, with a subbasal row of fuscous spots. The female is more strongly marked than the male.

Hind wing white; apical third grayish fuscous; cilia white around anal angle, shading to grayish at apex, the terminal and apical cilia with a series of subbasal fuscous spots. Foreleg ocherous white; tibia infuscated on outer side; tarsal segments banded blackish fuscous; midleg similar but infuscation of tibia confined to distal end and tibial spurs; hind leg ocherous white; fuscous spot on outer side between tibial spurs; tarsal segments marked with fuscous on outer side. Abdomen ocherous white; anterior segments with fuscous irroration dorsally; sixth segment immaculate; seven and eight fuscous dorsally, eighth with fuscous spot ventroposteriorly.

Male genitalia slide JFGC 11473. Harpe simple, broad basally, narrowed toward cucullus; cucullus rounded; from outer surface long, strong, curved setae. Uncus moderately stout, of nearly even width throughout; apex clothed with strong setae. Vinculum rounded, very broad in median area. Tegumen about as long as broad, with long, strong setae from dorsal and lateral surfaces. Anellus a large, lightly sclerotized plate with median anterior projection. Aedeagus narrow proximally, twice as wide distally; vesica armed with an elongate patch of small cornuti.

Female genitalia slide JFGC 11895. Details of the female genitalia are almost entirely obscured by heavy mold. In the ductus bursae, which broadens abruptly a short distance anterior to the obscured ostium, there appears to be a small, elongate, sclerotized area. The bursa copulatrix is membranous, clothed with scattered spicules as in *chionostigma;* signum a small, sauroform tooth.

HOLOTYPE.—USNM 70077.

TYPE LOCALITY.—Rapa, Piahu, 750′ (231 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (11.X.1963) and one ♀ paratype, Tevaitau, 700′ (215 m) (29.IX. 1963).

This species is nearest to *chionostigma* but differs from it by having a complete white median fascia. Also, the harpe of *empelioptera* is narrower than that of *chionostigma* and the vesica lacks the series of large cornuti of the latter species. In addition, *chionostigma* lacks the spotted cilia of *empelioptera.*

Genus *Piletocera* Lederer

Piletocera Lederer, 1863, p. 431, pl. 16: fig. 15. (Type-species: *Piletocera violalis* Lederer, 1863, p. 431 [by monotypy].)

Piletocera signiferalis isola, new subspecies

FIGURES 76, 77; PLATE 9*e, f*

Alar expanse 17–24 mm.

Labial palpus pale buff, second segment pale olive gray dorsally; third segment grayish drab. Antenna fuscous with a buff dash at basal fourth dorsally and buff dorsally beyond middle; scape grayish drab. Head grayish drab, dorsally mixed with buff; frons with narrow transverse fuscous bar just beneath base of antenna. Thorax grayish fuscous; anteriorly narrowly buff. Forewing ground color grayish drab; orbicular fuscous with well-defined white crescentic mark in center; reniform fuscous, filling outer end of cell; from both orbicular and reniform an outwardly curved fuscous line extends to dorsum; from outer third of costa a fuscous line curves outwardly to vein 3 where it becomes obsolete; middle third of costa and a wedge-shaped mark beyond fuscous transverse line, ocherous buff; transverse lines bordered outwardly with buff; cilia grayish drab with darker basal band. Hind wing grayish drab, shading to ochraceous buff basally and along costa; a broad, fuscous, transverse fascia at basal third and another at outer third, each bordered with buff on outer edge; cilia grayish drab with dark basal line except for buff band at middle of termen and ochraceous buff around anal angle to base; foreleg buff; tibia suffused grayish on outer side and tibial tuft fuscous, mixed with cluster of long, ochraceous buff scales; tarsal segments suffused grayish on outer side; midlegs and hind legs buff; tarsal segments of midleg slightly suffused grayish on outer side. Abdomen fuscous dorsally, ochraceous buff ventrally; laterally broadly shaded orange buff.

In the females the coloring is sharper than in the males, the buff edging of the transverse fasciae broader and more conspicuous; the reniform is edged outwardly with a white spot and there is a similar spot on the middle of the hind wing near costa.

Male genitalia slides JFGC 11674, 11726. Harpe ample, broadest beyond middle; cucullus truncate; clasper C-shaped. Uncus broad basally, narrowed to beyond middle, curved, terminated by a spined, oval knob. Vinculum broad, cup shaped. Tegumen subrectangular, dilated laterally. Anellus a suboval plate,

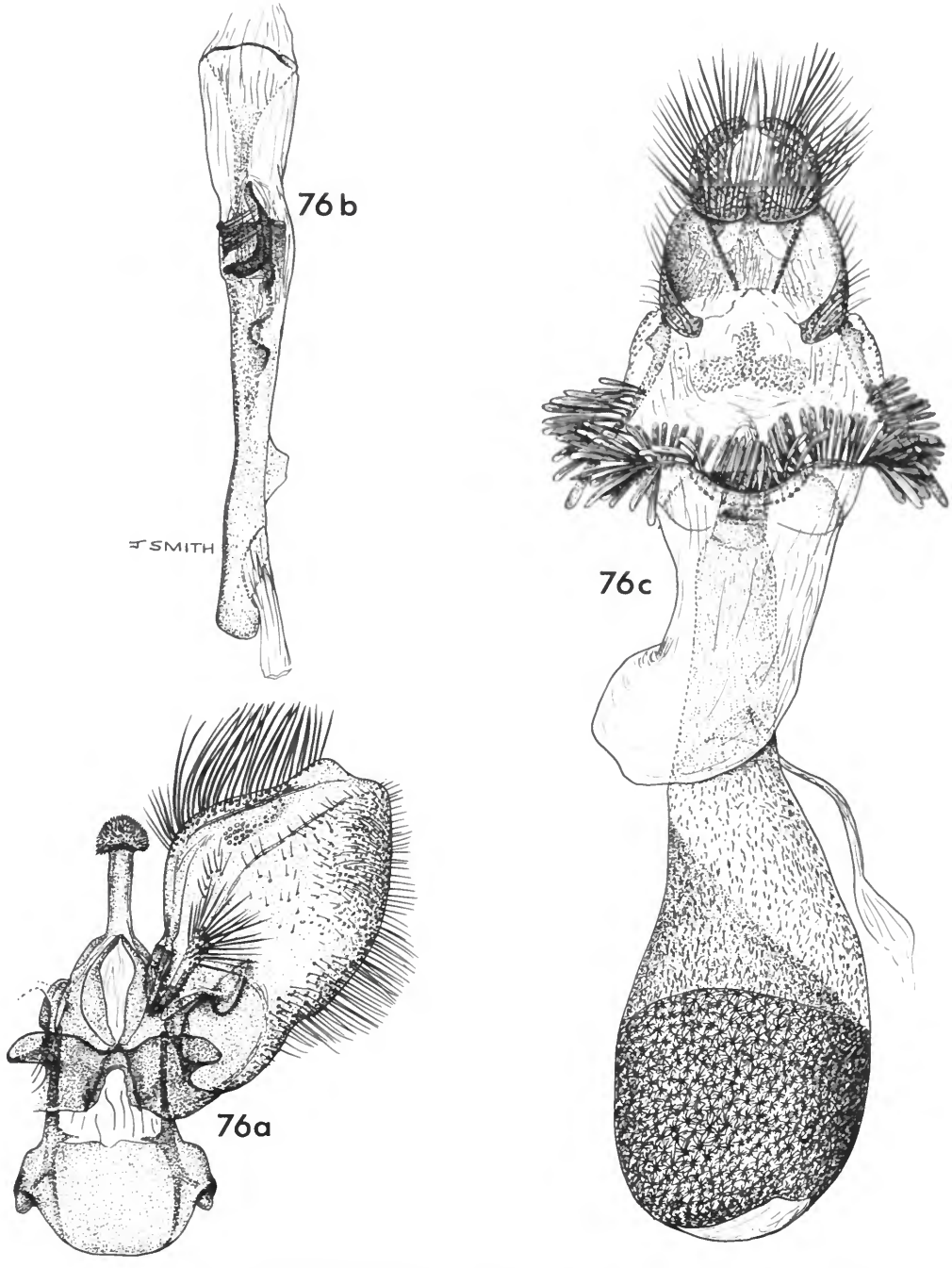


FIGURE 76.—*Piletocera signiferalis isola*, new subspecies: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

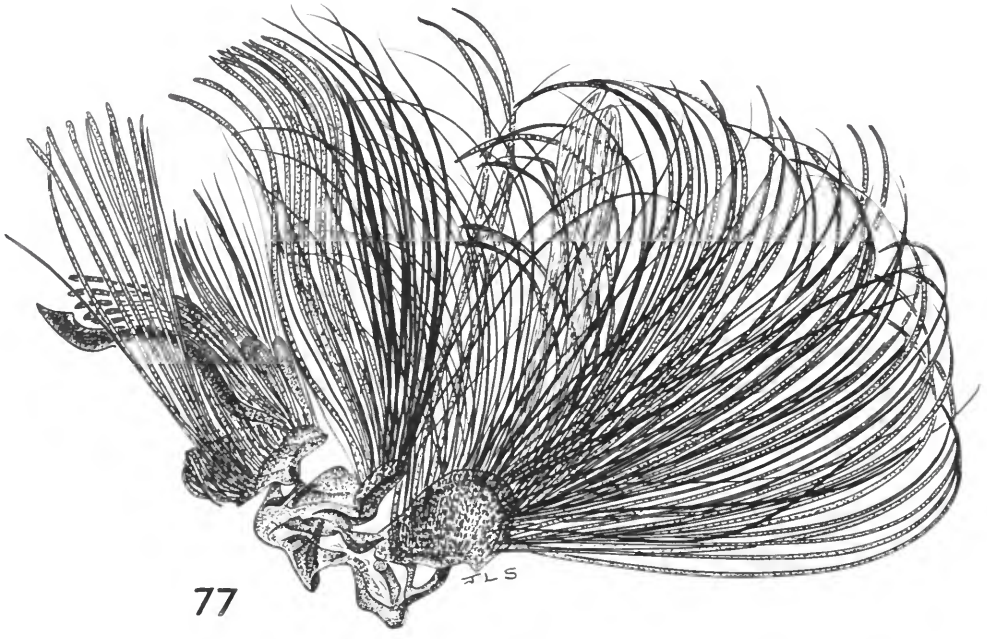


FIGURE 77.—*Piletocera signiferalis isola,* new subspecies. Right corema of male, expanded.

broadest ventrally with a winglike expansion on each side. Aedeagus nearly straight, widest at apex; cornuti consisting of several small rectangular plates and one narrow rod. Corema greatly involved with modified scales and setae.

Female genitalia slides JFGC 11675, 11727. Ostium wide, slitlike. Antrum narrowly sclerotized. Inception of ductus seminalis slightly anterior to antrum. Ductus bursae short, gradually merging with the bursa copulatrix. Bursa copulatrix membranous with broad band of tiny stellate signa. Lamella postvaginalis with slightly sclerotized triangular area.

HOLOTYPE.—USNM 70107.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (24.X.1963), 12 ♂♂ and 38 ♀♀ paratypes as follows: Haurei 12 ♂♂, 34 ♀♀, (28.IX–24.XI.1963); Pariati Bay ♀, (30.X.1963); Point Tepapa ♀, (15.IX.1963); Point Teakauraee ♀, (7.X.1963); Tevaitau, 750′ (231 m), ♀ (29.IX.1963).

Typical *signiferalis* was described from Tahiti, but it is quite evident that the Tahitian and Rapan populations have been isolated for a sufficiently long time to permit development of two distinct races. Of the Rapan population, Dr. Whalley states (in litteris, 8 November 1967)

> . . . I have compared your specimens with ours from Tahiti (the type locality of *signiferalis*). Externally there are differences in pattern but there is very little in the genitalia. There are slight differences but one would have to see a lot more of this species. I have looked at *signiferalis* from the other islands. There certainly is a trend to produce endemic "units" (perhaps species?) in the different islands. As our collection [BMNH] stands at present I cannot match your Rapa specimens with any other species. If (!) my Tahitian *signiferalis* is correct—and as far as one can tell from the original description . . . it is reasonably close to the description, then I am sure your specimens are conspecific. However, I think that they probably represent a good subspecies on Rapa.

Since the above was written my wife and I have acquired a very representative series of *signiferalis* from Tahiti. This series confirms Mr. Whalley's interpretation to the letter and demonstrates clearly the differences between *signiferalis signiferalis* and *signiferalis isola.*

Our specimens of typical *signiferalis* are darker and average smaller that the specimens of *isola.* In the latter the transverse fasciae of the wings exhibit a broader, but suffused, development of the pale edges

and the underside of the abdomen is paler. Moreover, the markings of both forewings and hind wings are more sharply contrasted in the typical race than in *isola*, and the white spots are larger and much more conspicuous.

It is quite probable that the various synonyms associated with *signiferalis* represent valid geographical races.

Genus *Scoparia* Haworth

Scoparia Haworth, 1812, p. 498. (Type-species: *Scoparia cembrae* Haworth, 1812, p. 498 [subsequent designation by Shibuya, 1928a, p. 169].)

All of the Rapa species of *Scoparia* can be distinguished from closely related forms by the dark apices of the hind wings.

Key to the Species of Scoparia

1. Forewing with two well-defined transverse fasciae 2
   Forewing without two well-defined fasciae ..... ***psednopa*** Meyrick
2. Forewing heavily dusted and overlaid with dark gray ..... ***exterminata*** Meyrick
   Forewing with distinct yellowish tinge; not heavily dusted dark gray ..... ***tivira***, new species

Scoparia exterminata Meyrick

FIGURE 78; PLATE 12*a, b*

Scoparia exterminata Meyrick, 1929, p. 169.

Male genitalia slide JFGC 11718. Harpe ample, cucullus broad, rounded, costa sharply convex before cucullus; on ventral edge at outer two-thirds, a setose tubercle. Gnathos U-shaped, with long, slender, median process. Uncus narrow, densely clothed with setae. Vinculum rounded. Tegumen about half as long as harpe, constricted posteriorly. Anellus round basally with long posterior process. Aedeagus moderately stout, bent beyond middle.

Female genitalia slide JFGC 11719. Ostium funnel shaped. Inception of ductus seminalis at juncture of sclerotized and membranous parts of ductus bursae. Ductus bursae sclerotized in posterior half, narrowed and twisted anteriorly; anterior half membranous, spiraled. Bursa copulatrix granular on inner surface; appendix bursae membraneous. Signum indicated by a raised, scobinate area.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa.

In this collection there are 20 ♂♂ and 35 ♀♀ as follows: Haurei, ♂ (17.IX.1963); Maugaoa, 800–950′ (245–292 m), 7 ♂♂, 11 ♀♀ (18.IX–23.XI.1963); Maurua, 600′ (184 m), 5 ♂♂, 9 ♀♀ (16.IX–22.X.1963); Metua nako, ♂ (12.XI.1963); Morogouta, 750′ (231 m), 4 ♀♀ (10.X.1963); Perau, 1900′ (585 m) (15.X.1963); Piahu, 750′ (231 m), ♂ (11.X.1963), ♀; Teumukopuke, 500′ (154 m), 2 ♂♂, 3 ♀♀ (3.XI.1963); Tevaitau, 800′ (245 m), 3 ♂♂, 6 ♀♀ (21.IX–18.XI.1963).

FOOD PLANT.—Unknown.

Although Meyrick had both sexes of this species before him when he described it, he failed to mention the sex-scaling on the hind wing of the male. This scaling is whitish ocherous and gives a rough appearance to all of the wing except apex and costa.

Scoparia psednopa Meyrick

FIGURE 79; PLATE 9*b*

Scoparia psednopa Meyrick, 1929, p. 169.

Male genitalia slide JFGC 11722. Harpe broadest before apex; costa convex; cucullus rounded. Gnathos with long, slender, median projection. Uncus narrow, bluntly pointed, clothed with fine setae. Vinculum rounded. Tegumen half as long as harpe, narrowed posteriorly. Anellus a round, sclerotized plate with long, posterior projection. Aedeagus moderately stout, slightly twisted.

Female genitalia slide JFGC 11723. Ostium wide, funnel shaped. Inception of ductus seminalis at juncture of sclerotized and membranous portions of ductus bursae. Ductus bursae sclerotized in posterior half, membranous and spiraled in anterior half. Bursa copulatrix studded with fine teeth on interior surface; appendix bursae membranous. Signum a small, scobinate plate.

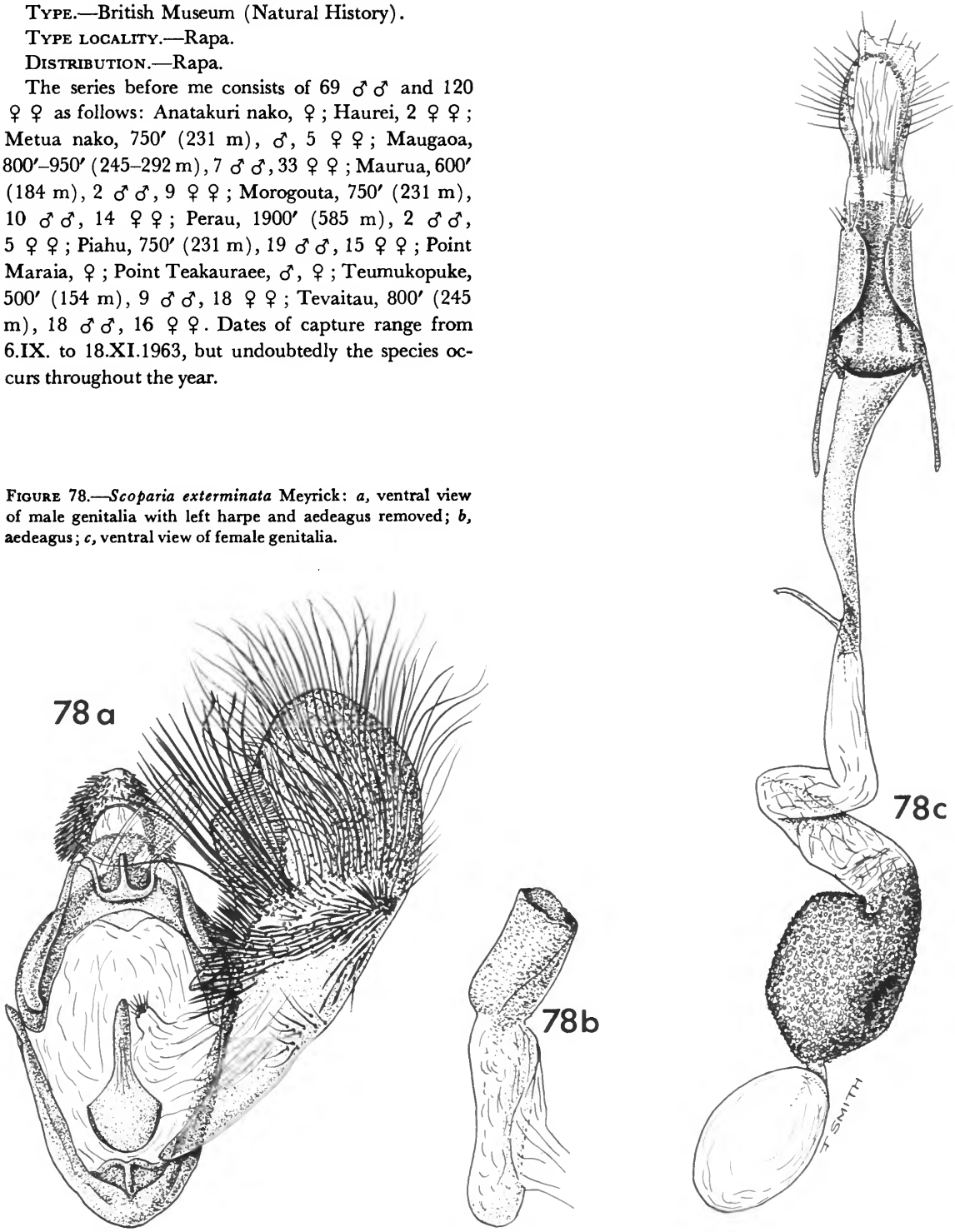
TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa.

The series before me consists of 69 ♂♂ and 120 ♀♀ as follows: Anatakuri nako, ♀; Haurei, 2 ♀♀; Metua nako, 750′ (231 m), ♂, 5 ♀♀; Maugaoa, 800′–950′ (245–292 m), 7 ♂♂, 33 ♀♀; Maurua, 600′ (184 m), 2 ♂♂, 9 ♀♀; Morogouta, 750′ (231 m), 10 ♂♂, 14 ♀♀; Perau, 1900′ (585 m), 2 ♂♂, 5 ♀♀; Piahu, 750′ (231 m), 19 ♂♂, 15 ♀♀; Point Maraia, ♀; Point Teakauraee, ♂, ♀; Teumukopuke, 500′ (154 m), 9 ♂♂, 18 ♀♀; Tevaitau, 800′ (245 m), 18 ♂♂, 16 ♀♀. Dates of capture range from 6.IX. to 18.XI.1963, but undoubtedly the species occurs throughout the year.

FIGURE 78.—*Scoparia exterminata* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.



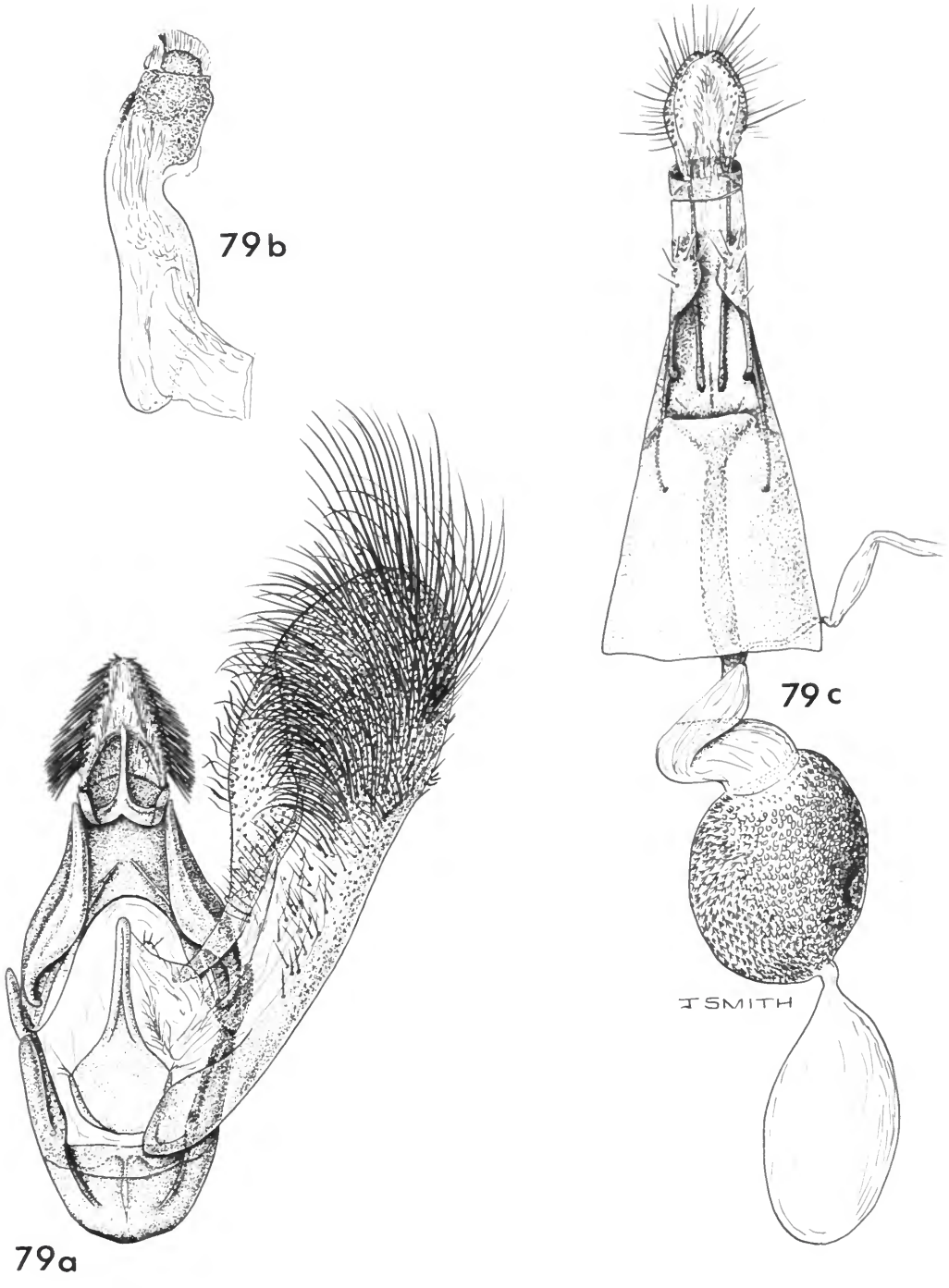


FIGURE 79.—*Scoparia psednopa* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

FOOD PLANT.—Unknown.

Of this species, Meyrick (1929, p. 169) remarked, "This very obsoletely marked form is probably allied to the preceding [*exterminata*], and has been adapted by loss of colouring to the open hill-side."

It appears that its coloring has nothing to do with hillsides because the species is found in the forested areas as abundantly (if not more so) as in the open areas.

Scoparia tivira, new species

FIGURE 80; PLATE 12*e*, *f*

Alar expanse 16–20 mm.

Labial palpus first segment ocherous white; second segment warm buff on inner side, olivaceous gray with buff spot dorsally on outer side; third segment olivaceous gray. Antenna warm buff; olivaceous gray toward base dorsally; scape warm buff. Head warm buff slightly infuscated dorsally. Thorax warm buff, tegula and posterior part of thorax lightly infuscated. Forewing ground color warm buff to Naples yellow; five blackish-fuscous marks as follows: a longitudinal dash at base, a spot at one-third inside costa, an elongate spot on fold, a smaller one in cell obliquely beyond this and a triangular spot at end of cell; at basal third an outwardly curved transverse fascia, a second irregular transverse fascia from outer third of costa to tornus, with a dark spot at each end; subterminally a whitish, crenulate, transverse fascia; at middle of termen a transverse fuscous spot; entire surface of wing with irregular infuscated area; cilia buff with a darker basal line. Hind wing white except grayish-fuscous apex; cilia white, slightly darker at apex. Foreleg ocherous white; tibia suffused grayish on outer side; tarsal segments broadly annulated grayish; midleg similar but less strongly marked than foreleg; hind leg ocherous white; tarsal segments with very slight dark suffusion. Abdomen white, suffused grayish dorsally.

Male genitalia slide JFGC 11720. Harpe ample, costa with deep concavity near base, straight beyond; cucullus broad, rounded; ventral edge with slight diagonal setose ridge. Gnathos with long, slender median process. Uncus narrow, somewhat constricted apically. Vinculum rounded. Tegumen about half as long as harpe, abruptly narrowed posteriorly. Anellus oval basally with elongate posterior process. Aedeagus moderately stout, sharply bent beyond middle.

Female genitalia slide JFGC 11721. Ostium funnel shaped. Inception of ductus seminalis at juncture of sclerotized and membranous portions of ductus bursae. Ductus bursae membranous and spiraled in anterior half, strongly sclerotized in posterior half and broadest before ostium. Bursa copulatrix with granular inner surface; appendix bursae membranous. Signum a raised, granular, round area.

HOLOTYPE.—USNM 70072.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the holotype ♂, 24 ♂♂ and 34 ♀♀ paratypes as follows: Maugaoa, 950′ (292 m), ♂, 4 ♀♀ (18.IX–23.XI.1963); Metua nako, 750′ (231 m), 2 ♀♀ (12.XI.1963); Morogouta, 750′ (231 m), 3 ♂♂, 4 ♀♀ (10.X.1963); Piahu, 750′ (231 m), 5 ♂♂, 3 ♀♀ (11.X.1963); Point Ketunui, 400′ (123 m), ♂ (4.X.1963); Pukutaketake, 1150′ (353 m), ♂ (2.XI.1963); Teumukopuke, 500′(154 m), 5 ♂♂, 13 ♀♀ (7.X.1963); Tevaitau, 200′–800′ (61–245 m), 9 ♂♂, 7 ♀♀ (23.IX.–18.XI.1963).

The three species of *Scoparia* occurring on Rapa are similar in appearance but only *exterminata* exhibits the dark gray coloring of the forewing and it is the only one in which modified sex-scaling is found in the male. The other two are more easily confused, but *tivira* has a stronger yellowish cast to the forewing than that found in *psednopa* and it is more contrastingly marked. Moreover, *psednopa* is smoother and is shiny. The genitalia of the three are similar but in the male of *psednopa* the costa is gently convex, in *exterminata* there is a sharp convexity beyond middle of costa, and in *tivira* the outer two-thirds of costa are nearly straight, with a deep concavity near base. The females are very similar and difficult to distinguish except in the case of *tivira*, in which the appendix bursae arises to one side of the bursa copulatrix. In *psednopa* the sclerotized portion of ductus bursae is somewhat flattened and narrowed posteriorly, in *exterminata* it is not flattened and is broader toward ostium than it is anteriorly.

Genus *Eurhodope* Hübner

Eurhodope Hübner, 1825, p. 371. (Type-species: *Pyralis pudoralis* Denis and Schiffermüller, 1775, p. 124 [subsequent designation by Ragonot, 1885, p. 19].)

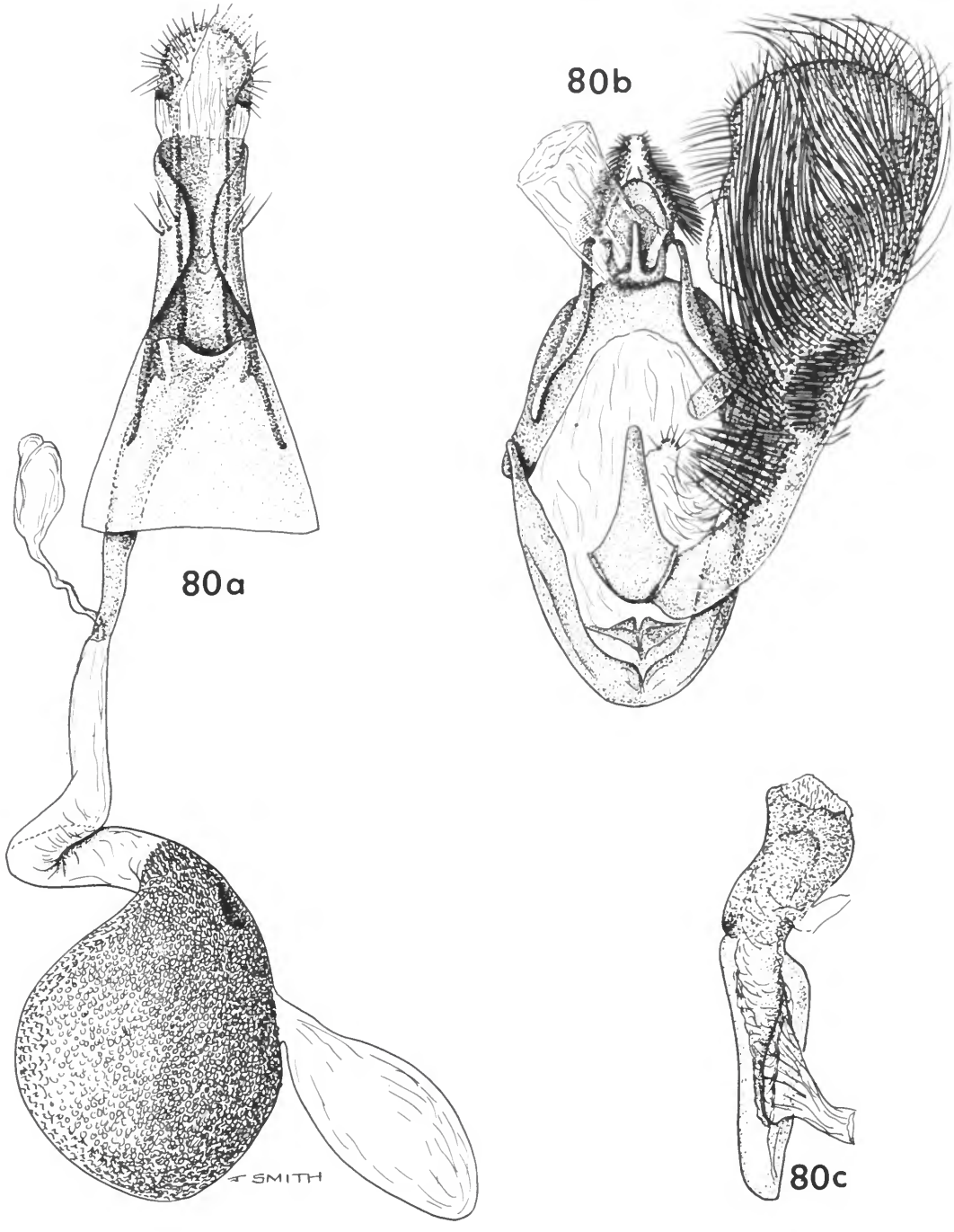


FIGURE 80.—*Scoparia tivira*, new species: *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus.

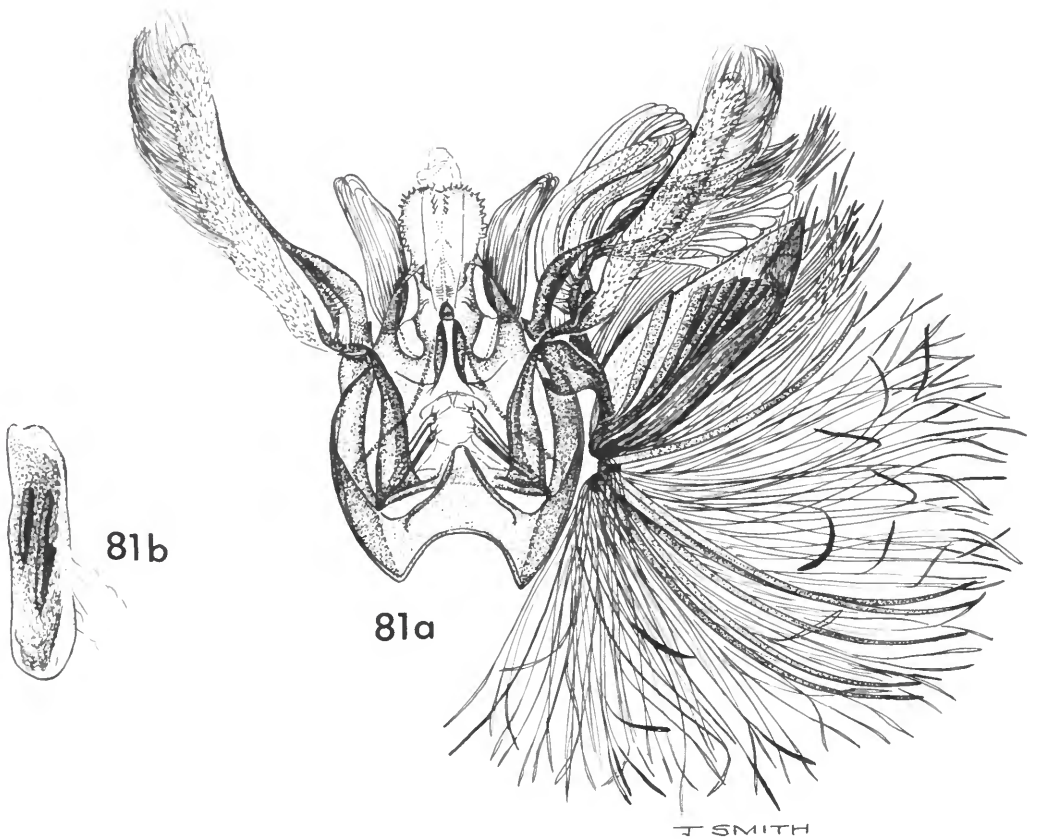


FIGURE 81.—*Eurhodope ardescens* Meyrick: *a*, ventral view of male genitalia with aedeagus removed, and showing expanded right corema; *b*, aedeagus.

Ragonot's type citation is as follows: "*Eurhodope* (Cat. p. 371) formed for *pudoralis* S. V. (*rosella*, Sc.), and *carnealis* (*carnella* L.). The type of the genus is *rosella* Sc., which has since been placed in *Myelois* . . . ."

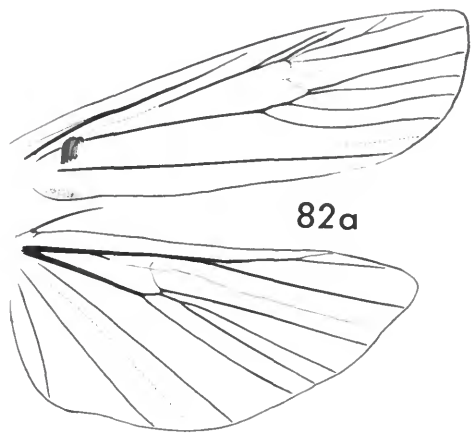
Although *rosella* was not an included species in *Eurhodope*, Ragonot, in the above citation, synonymized *pudoralis* and *rosella*. According to the International Code of Zoological Nomenclature, Article 69 (a) (IV) provides, "If an author designates (or accepts another's designation) as type species a nominal species that was not originally included, and if, but only if, at the same time he synonymizes that species with one of the originally included species, his act constitutes designation of the latter as type-species of the genus."

Eurhodope ardescens Meyrick

FIGURES 81, 82; PLATE 12*c*, *d*

Eurhodope ardescens Meyrick, 1929, p. 160.—Viette, 1949a, p. 321.

Male genitalia slide JFGC 11460. Harpe narrow, costa strongly arched basally, then gently recurved to a very narrow cucullus. Gnathos curved, pointed. Uncus broad, lateral edges dentate; posterior edge indented. Vinculum broad, deeply excavate anteriorly; posterior edge produced. Tegumen weak, short. Anellus a narrow, transverse plate; lateral lobes elongate. Aedeagus shorter than harpe, stout; vesica armed with one large and several small, cornuti. Laterally and dorsally the genitalia are clothed with modified scales and slender setae.



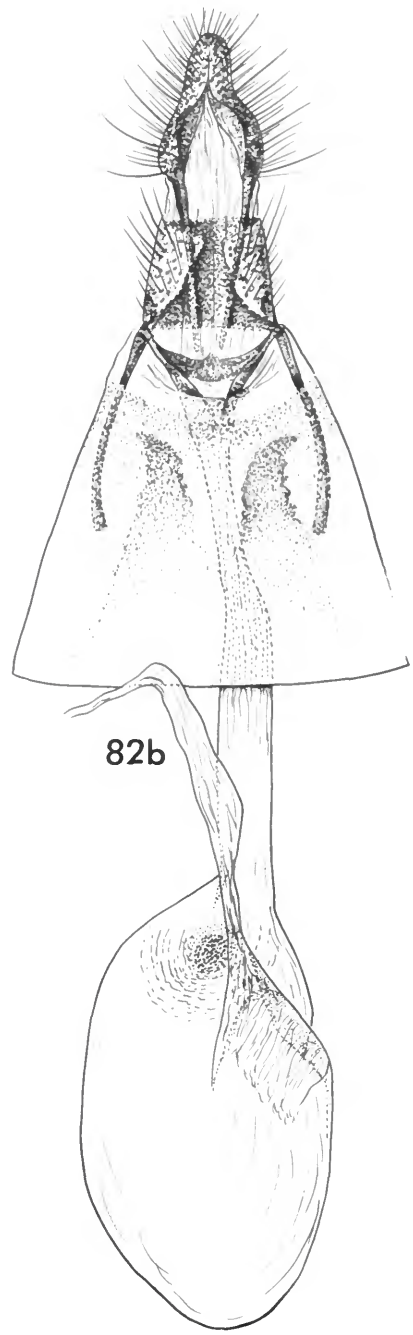


FIGURE 82.—*Eurhodope ardescens* Meyrick: *a*, venation of right wings; *b*, ventral view of female genitalia.

Female genitalia slides JFGC 11739, 11740. Ostium broad, slitlike; membranous. Antrum not differentiated. Inception of ductus seminalis from bursa copulatrix slightly posterior to middle. Ductus bursae membranous. Bursa copulatrix membranous; inner surface clothed with extremely fine spicules. Signum a small granular patch. Lamella antevaginalis membranous. Lamella postvaginalis a narrow, sclerotized transverse plate.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Society Islands, Raiatea.

DISTRIBUTION.—Society Islands (Tahiti, Raiatea); Austral Islands (Rurutu, Rapa).

In this collection there are 129 ♂♂ and 199 ♀♀ as follows: Haurei, 20 ♂♂, 36 ♀♀; Maii Bay, ♂; Maugaoa, 950′ (292 m), 24 ♂♂, 40 ♀♀; Maurua, 600′ (184 m), 23 ♂♂, 46 ♀♀; Metua nako, 750′ (231 m), 13 ♂♂, 12 ♀♀; Morogouta, 750′ (231 m), 10 ♂♂, 16 ♀♀; Ororagi, ♀; Perau, 1900′ (585 m), ♀; Piahu, 750′ (231 m), 12 ♂♂, 12 ♀♀; Teumukopuke, 500′ (154 m), 12 ♂♂, 8 ♀♀; Tevaitau, 750′ (231 m), 14 ♂♂, 26 ♀♀. This species occurred throughout our stay on the island and came to light readily.

FOOD PLANTS.—*Mangifera indica* L. (R13) (inflorescence); *Pandanus tectorius* Solander (fruit stalk); *Oparanthus rapensis* (F. Br.) Sherff (R40).

At Haurei we found larvae in the inflorescence of *Mangifera* where there was much webbing. The larvae appeared to prefer the dead flowers but did not refuse living examples. Pupation occurred in a mass of pollen, flowers, and frass, usually against the flower stalk. The same was true of larvae found on *Oparanthus* at Anatakuri Bay, but in this case the webbing was much more extensive. We did not rear adults from this plant, the determination having been made from larvae. In the case of the moth reared from *Pandanus,* the larva was feeding on the dead tissue of the fruit stalk.

This species is quite variable as can be seen by a comparison of Plate 12*c, d*. The variation is found in both sexes although both examples illustrated are females. The size varies from 12 to 22 mm.

Genus *Homoeosoma* Curtis

Homoeosoma Curtis, 1833, p. 190. (Type-species: *Phycis gemina* Haworth, 1812, p. 497 [by monotypy].)

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Homoeosoma inexplorata Meyrick

FIGURE 83; PLATE 12*g*

Homoeosoma inexplorata Meyrick, 1929, p. 158.—Viette, 1949a, p. 321.

Male genitalia slides JFGC 11456, 11683, 11685. Harpe ample; costa strongly sclerotized; subcostally, at about basal third, a small setose tubercle. Gnathos with strong lateral elements and a pointed median process. Uncus very broad, clothed with strong setae. Vinculum rounded, broad. Tegumen about as long as harpe, moderately sclerotized. Anellus a subrectangular sclerotized plate. Aedeagus moderately stout, slightly broader toward apex than basally; vesica armed with numerous small cornuti.

Female genitalia slides JFGC 11457, 11458, 11686, 11687. Ostium rather wide, funnel shaped, membranous. Antrum not differentiated. Inception of ductus seminalis from posterior end of bursa copulatrix. Ductus bursae membranous. Bursa copulatrix membranous with granular inner surface. Signum absent, or at most indicated by a concentration of granules; lamella antevaginalis and lamella postvaginalis membranous.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Tahiti.

DISTRIBUTION.—Society Islands (Tahiti); Austral Islands, (Rurutu, Rapa, Raivavae).

FOOD PLANT.—*Siegesbeckia orientalis* L. (R39).

On 22 November 1963 a single larva of this species was found at Haurei feeding in the flowers of its host. The following day the larva began spinning a cocoon and a ♂ emerged 5 December 1963.

The collected specimens are as follows: Anatakuri nako, ♀ (14.X.1963); Haurei, 4 ♂♂, 2 ♀♀ (11.IX–20.XI.1963); Pariati Bay, ♂ (30.X.1963); Point Teakauraee, ♀ (29.IX.1963); Tevaitau, 200′ (61 m), ♀ (22.IX.1963).

On our way to Rapa a ♂ of *inexplorata* was collected on Raivavae at Rairua (3.IX.1963).

Genus *Cadra* Walker

Cadra Walker, 1864, p. 961. (Type-species: *Cadra defectella* Walker, 1864, p. 962 [by monotypy].)

Cadra cautella (Walker)

FIGURE 84; PLATE 12*h*

Pempelia cautella Walker, 1863, p. 73.
Cadra defectella Walker, 1864, p. 962.

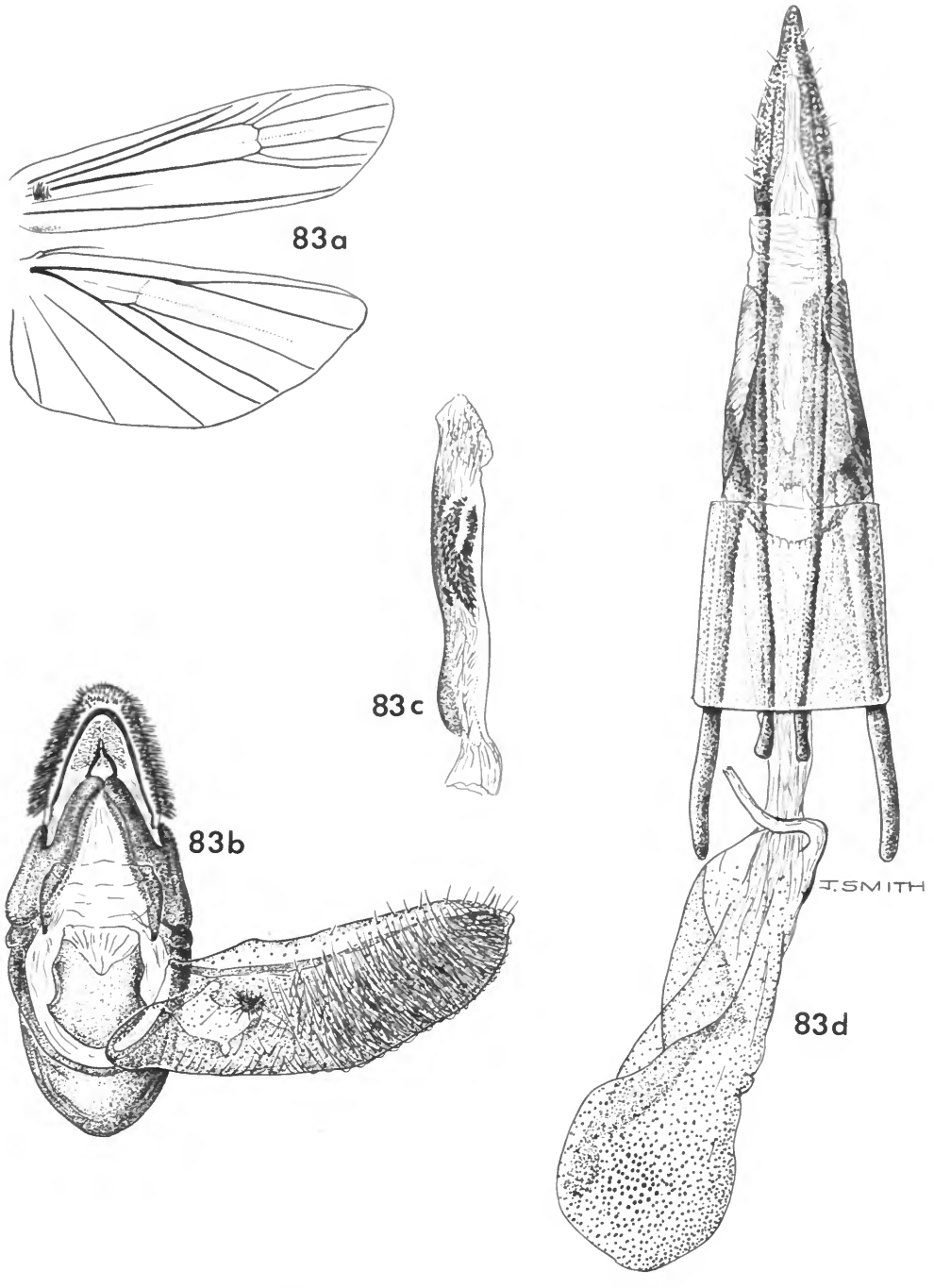


FIGURE 83.—*Homoeosoma inexplorata* Meyrick: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

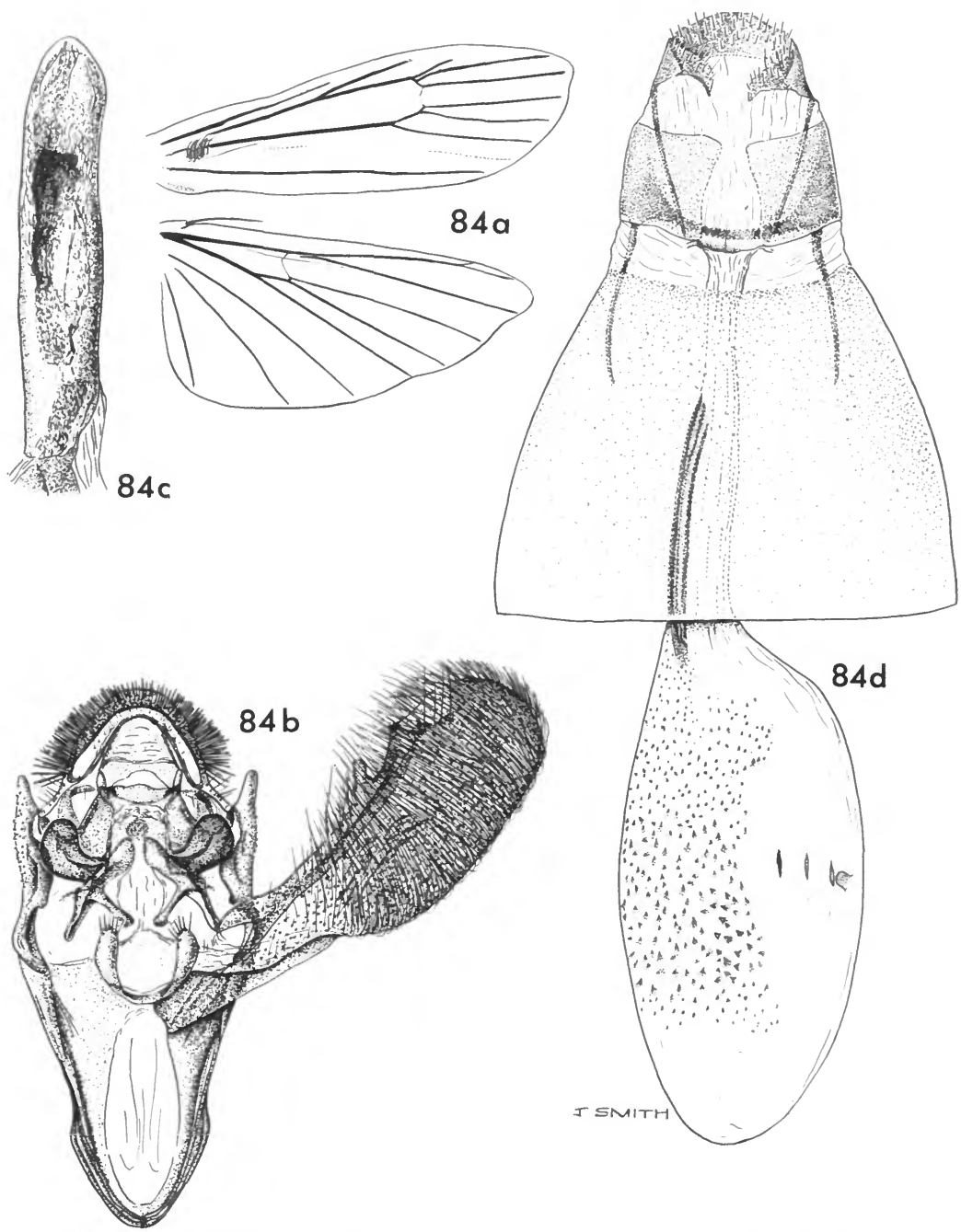


FIGURE 84.—*Cadra cautella* (Walker): *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

Nephopteryx desuetella Walker, 1866, p. 1719.
Ephestia cahiritella Zeller, 1867, p. 384.—South, 1890, p. 304.—Meyrick, 1895, p. 373.—Van Deventer, 1904, p. 80.—Barrett, 1905, p. 56.
Ephestia pasulella Barrett, 1875, p. 271.—Ragonot, 1885, p. 24.
Salebria cautella (Walker) Cotes and Swinhoe, 1889, p. 675.
Ephestia cautella (Walker) Hampson, 1896, p. 66.—Ragonot, 1901, p. 292, pl. 34: fig. 23.—Holland, 1903, p. 414, figs. 234, 235.—Hulst, 1903, p. 434.—Spuler, 1910, p. 202.—Chittenden, 1911, 40 pp.—de Joannis, 1913, p. 317.—Dyar, 1914, p. 345.—Zacher, 1916, p. 199.—Barnes and McDunnough, 1917, p. 149.—Essig, 1920, p. 121.—Forbes, 1923, p. 635.—Essig, 1926, p. 711.—Curran, 1926, p. 386.—Meyrick, 1928, p. 388.—Shibuya, 1928, p. 77.—Richards and Herford, 1930, p. 380.—Noyes, 1930, p. 80.—Simmons, Reed, and McGregor, 1931, p. 36—Keifer, 1931, p. 619.—Richards and Thompson, 1932, p. 197.—Bovingdon, 1933, pp. 1–88.—Norris, 1934, pp. 333–360.—Dickins, 1936, p. 342.—Lehmensick and Liebers, 1937, p. 443.—Pierce and Metcalfe, 1938, p. 7, pl. 4.—McDunnough, 1939, p. 35.—Ghosh, 1940, p. 196.—Hinton, 1942, pp. 21–25, fig. 4, fig. 12, pl. 1: fig. 2; 1943, p. 193.—Corbet and Tams, 1943, p. 64, figs. 56, 62, 110, 147, pl. 3: figs. 8–9.—Hinton and Corbet, 1943, p. 31, figs. 53, 74, 78.—Essig and Hoskins, 1944, p. 65.—DeLucca, 1949, p. 148.—Cotton, 1950, p. 733.—Bierne, 1952, p. 82, pl. 6: fig. 5; figs. 62, 70.—van Deurs, 1952, p. 280.—Rungs, 1953, p. 68.—Kalshoven, 1954, p. 6.—Paulian and Viette, 1955, p. 188.—Wise, 1955, pp. 527, 528.—Burges, 1956, p. 813.—Fujimoto, 1956, p. 20, pl. 6: fig. 5.—Takahashi, 1956, p. 179.—Heinrich, 1956, pp. 298, 302–304, figs. 125, 629, 1121.—Janjua and Haque, 1958, p. 107.—Zimmerman, 1958b, pp. 20, 379; figs. 317, 318, 323.—Abraham, 1958, p. 540.—Sømme, 1959, p. 20, fig. 1.—Jensen, 1959, p. 64, figs. 1(3, 4); 2(3, 4).—Wolff, 1959, p. 124, figs. 5, 8.—Thomas, Bhardwaj, Bhalla, and Sadanand, 1960, p. 114.—Methlein, 1961, p. 36.—Takahashi, 1963, p. 117, figs. 1–4.—Tuli and Mookherjee, 1963, p. 379.—Knoche, 1963, p. 7, figs. 3(2–6); pl. 1, figs. A–E.—Patel, Patel, and Patel, 1964, p. 367.—Zaguliev, 1965, p, 32.
Cryptoblabes formosella Wileman and South, 1918, p. 219.—Shibuya, 1928, pp. 17, 88.
Xenephestia cautella, (Walker), Gozmány, 1958, p. 223, fig. E.
Cadra cautella (Walker), Whalley, 1960, p. 183.—Sweeney, 1963, p. 164.—Aitken, 1963, p. 179, fig. 6.—Takahashi and Muutura, 1964, p. 129, figs. 1–3.—Okumura, 1966, p. 183.

TYPE LOCALITY.—Ceylon.

DISTRIBUTION.—Cosmopolitan.

Two males of this species were taken at Haurei (23.IX.1963).

FOODS.—Dried and stored vegetable products.

This common, cosmopolitan species is carried in commerce throughout the world. In American economic literature it is known as the "almond moth," but in economic literature generally it is referred to as the "fig moth" or "dried currant moth."

I have figured the genitalia for completeness sake but for a comprehensive treatment of this species and allies see Heinrich, Carl, 1956.

Family ALUCITIDAE

Genus *Stangeia* Tutt

Stangeia Tutt, 1906, p. 492. (Type-species: *Pterophorus siceliota* Zeller, 1847, p. 907 [by monotypy].)—Chapman, 1908, p. 53.—Adamczewski, 1951, pp. 309, 382, pl. 12: fig. 62.—Bigot, pp. 284, 285 (figs.), 286.

This remarkable genus was established for the European *siceliota.* Meyrick placed this and many other species in *Trichoptilus* and says of it (1890, p. 485), ". . . a genus of limited extent, but cosmopolitan; more species are known from Australia than any other region." It remained for Tutt to recognize the distinctions between *Trichoptilus* and *Stangeia,* but no figure of the unusual genitalia was published until the appearance of Adamczewski's paper in 1951 where he stated (p. 382): "A very strongly sclerotized and very specialized copulatory apparatus characterizes the genus *Stangeia* Tutt." Bigot (1966) treated this and other related genera and presented simple outline drawings of both male and female genitalia.

Of the described species belonging here I have examined the types of only *siceliota* and *xerodes,* of which the lectotype of the latter is designated below.

In *Trichoptilus,* to which the above and other related species have usually been assigned, the third lobe, or feather, of the hind wing bears a conspicuous tooth of black scales, but this is absent, or only faintly indicated, in *Stangeia.*

Stangeia xerodes (Meyrick)

Trichoptilus xerodes Meyrick, 1886, p. 14.
Stangeia xerodes (Meyrick), Adamcewski, 1951, p. 309.

"♂, ♀, 15–16 mm . . . Toowoomba, Queensland; Bathurst, New South Wales; Adelaide, Wirrabara, and Port Lincoln, South Australia; rather common from September to November."

LECTOTYPE.—♂, 16 mm. "Toowoomba, Queensland. 25.9.79." Slide JFGC 11484. In the British Museum (Natural History), hereby designated.

Meyrick says of *xerodes* (1886, p. 15), "The black scales in the dorsal cilia of the hindwings [third feather] are very slight and inconspicuous, yet always perceptible." I have examined Meyrick's series of 20 specimens under this name, but there is only the slightest suggestion of these scales in only a few of the specimens.

This species does not occur on Rapa but is included here to establish the lectotype.

Stangeia rapae, new species

FIGURE 85; PLATE 11*h*

Alar expanse 13–16 mm.

Labial palpus white; first and second segments shaded with pale clay color; apical tuft of second segment dark gray to black; third segment with black, longitudinal ventrolateral line on each side. Antenna black, each segment semiannulated white; scape black. Head gray with scattered white scales mixed. Thorax gray; posteriorly creamy white with three longitudinal pale, clay-colored lines. Forewing ground color gray, dorsally suffused pale brownish; on apical third of costa a slender white dash; apex black; cilia gray, mixed with white and pale clay color; on dorsum four clusters of black scales preceded and followed by gray and white mixed, the fourth, or outer group of black scales, followed by a conspicuous white patch of cilia. Hind wing grayish fuscous; cilia gray; third feather with coarse white scales along basal half. Legs longitudinally striped creamy white and black or gray; tarsal segments of hind leg gray. Abdomen gray marked creamy white; ventrally three creamy white longitudinal lines; second segment with two blackish-fuscous spots posteriorly between ventral longitudinal lines.

Male genitalia slides JFGC 11481, 11699. Harpe long, slender, crescentic, base dilated, irregular. Gnathos and socii absent. Uncus consisting of paired digitate processes. Vinculum long, narrow with a broad flat flange around periphery. Tegumen short, broad. Anellus a narrow subrectangular plate with a long, ventral arm to which aedeagus is attached. Aedeagus moderately stout, terminating in a ventral beaklike process and a short dorsodistal digitate projection.

Female genitalia slide JFGC 11482. Ostium broad, transverse. Lamella postvaginalis triangular, truncated posteriorly. Antrum conical. Inception of ductus seminalis from posterior edge of bursa copulatrix. Ductus bursae about as long as bursa copulatrix. Bursa copulatrix membranous with minute, fine scobinations. Signum absent. Seventh sternum with a thick longitudinal lobe on each side of ostium.

HOLOTYPE.—USNM 70081.

TYPE LOCALITY.—Rapa, Haurei (Em.30.XI.1963).

DISTRIBUTION.—Rapa.

Described from the ♂ holotype, 30 ♂♂, and 34 ♀♀ paratypes. All of the specimens are from Haurei and were either collected or reared on dates from 25.X to 2.XI.1963.

FOOD PLANT.—*Siegesbeckia orientalis* L. (R39).

The larvae of this species were found feeding in the inflorescence of the host. Pupation takes place on the flower stalks or very small leaves. The infested plants were found on the southern edge of the village of Haurei growing next to mixed bushes in a grassy area at the side of the *taro* beds.

All of the related species that I have examined are rather strongly marked with white on the costal area of the forewing; this marking is absent in *rapae*. The genitalia of all species are similar but the male of *rapae* differs from the lectotype male of *xerodes* by a broader and shorter dilation at base of harpe and a less pronounced swelling in costal third of ventral edge of harpe. In *rapae* the basal processes of the 8th sternum bear a cluster of strong setae, but in *xerodes* there is a strong curved spine at the end of each. The female of *rapae* is compared with the female type of *siceliota*. In the latter species the lateral posterior arms of the 7th sternum are separated by a broad lamella postvaginalis which terminates posteriorly in a sclerotized point. In *rapae* the lamella postvaginalis is much narrower and terminates in a truncated, sclerotized triangle.

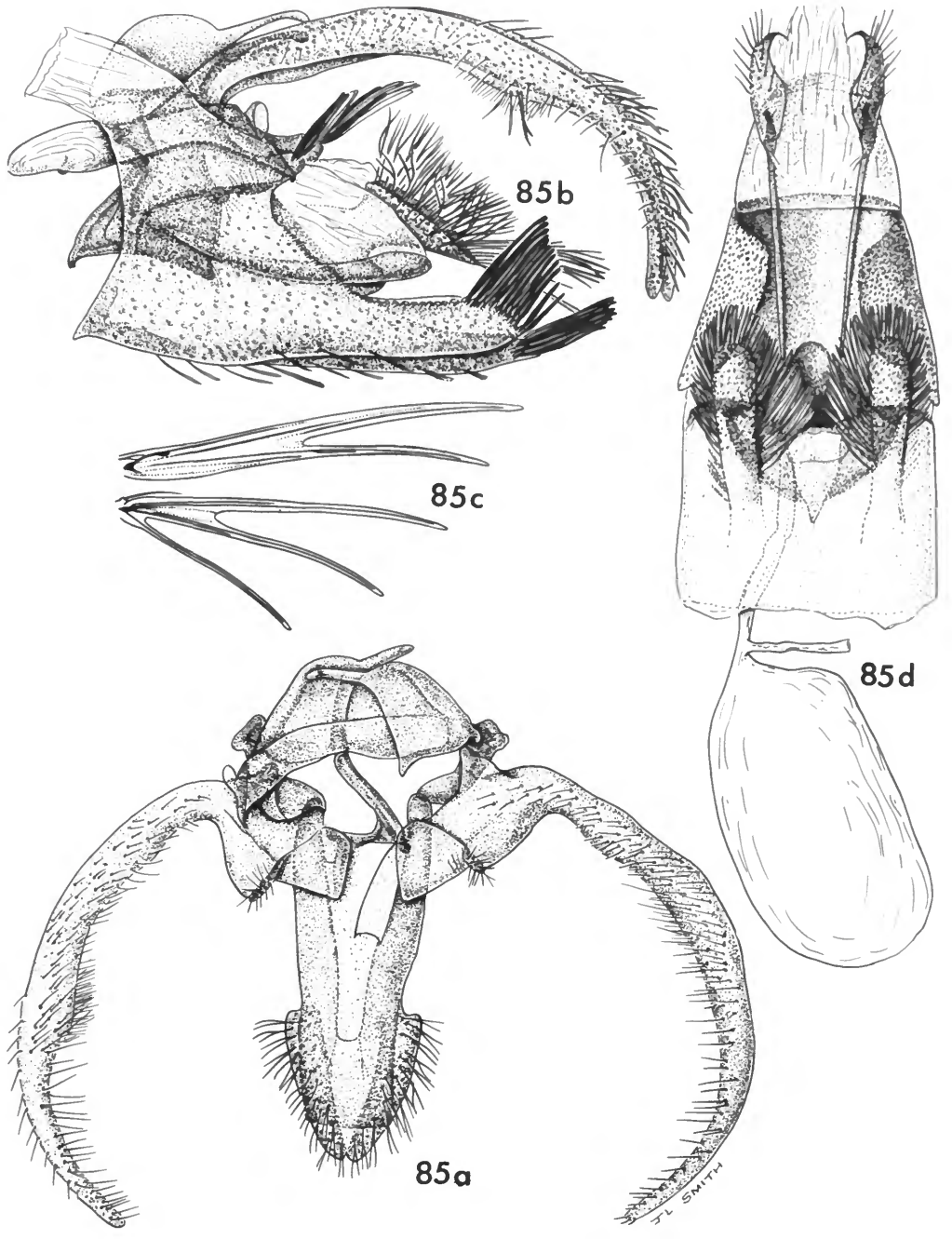


FIGURE 85.—*Stangeia rapae*, new species: *a*, ventral view of male genitalia with aedeagus in situ; *b*, lateral aspects of male genitalia in situ and modified 8th segment; *c*, venation of right wings; *d*, ventral view of female genitalia.

Family TORTRICIDAE

Key to the Genera of Tortricidae

Forewing with vein 7 to costa ..... *Dichelopa*
Forewing with vein 7 to termen ..... *Nesoscopa*

Key to the Species of Dichelopa

1. Hind wing with contrasting dark apex and light base 7
   Hind wing unicolorous or nearly so 2
2. Forewing with conspicuous dark subterminal spot ..... *ceramocausta* Meyrick
   Forewing without such spot 3
3. Hind wing conspicuously mottled ..... *pulcheria*, new species
   Hind wing otherwise 4
4. Forewing with at least one complete yellowish, ochraceous-orange or ochraceous-buff transverse oblique fascia 5
   Forewing otherwise 6
5. Transverse fascia narrow ..... *iochorda* Meyrick
   Transverse fascia broad ..... *messalina*, new species
6. Alar expanse 25 mm, or more ..... *exulcerata* Meyrick
   Alar expanse 18 mm, or less ..... *argyrospiloides*, new species
7. Forewing ground color leaden gray or fuscous 8
   Forewing otherwise 9
8. Forewing with reddish spots ..... *rhodographa*, new species
   Forewing without reddish spots; immaculate or with cinnamon-buff marking ..... *dendrophila*, new species
9. Forewing with large black or blackish triangular area in outer half ..... *anthracodelta*, new species
   Forewing otherwise 10
10. Pale area of hind wing not extending to anal angle 11
    Pale area of hind wing extending to anal angle ..... *sericopis* Meyrick
11. Dark area of anal angle only faintly indicated 13
    Dark area of anal angle strongly indicated 12
12. Forewing with white fasciae edged with black ..... *honoranda* Meyrick
    Forewing without white fasciae ..... *deltozancla* Meyrick
13. Forewing ground color cinereous ..... *vaccinii*, new species
    Forewing otherwise 14
14. Forewing ground color cinnamon buff or clay color ..... *myopori*, new species
    Forewing ground color silvery gray or pale ochraceous buff ..... *lupicinia*, new species

Genus *Dichelopa* Lower

Dichelopa Lower, 1901, p. 76. (Type-species: *Dichelopa dichroa* Lower, 190, p. 76 [by monotypy].)

Previous to the publication of this present paper 27 species have been assigned to this genus; 9 are described as new in the following pages, bringing the total of described forms to 36. The species are now recorded from Australia (6), the Marquesas Islands (13), Tahiti (2), and Rapa (15).

Dichelopa iochorda Meyrick

FIGURE 87; PLATE 1*c*; PLATE 15*b*

Dichelopa iochorda Meyrick, 1926, p. 273; 1928, p. 492.—Viette, 1949a, p. 320.—Clarke, 1958, p. 103, pl. 51: figs. 2–2*b*.

Male genitalia slide JFGC 11744. Harpe broad basally, constricted beyond middle; cucullus narrow, slightly dilated before apex; sacculus smooth. Gnathos a sharply pointed hook. Uncus long, slender, curved ventrad, bifid distally. Vinculum broadly V-shaped.

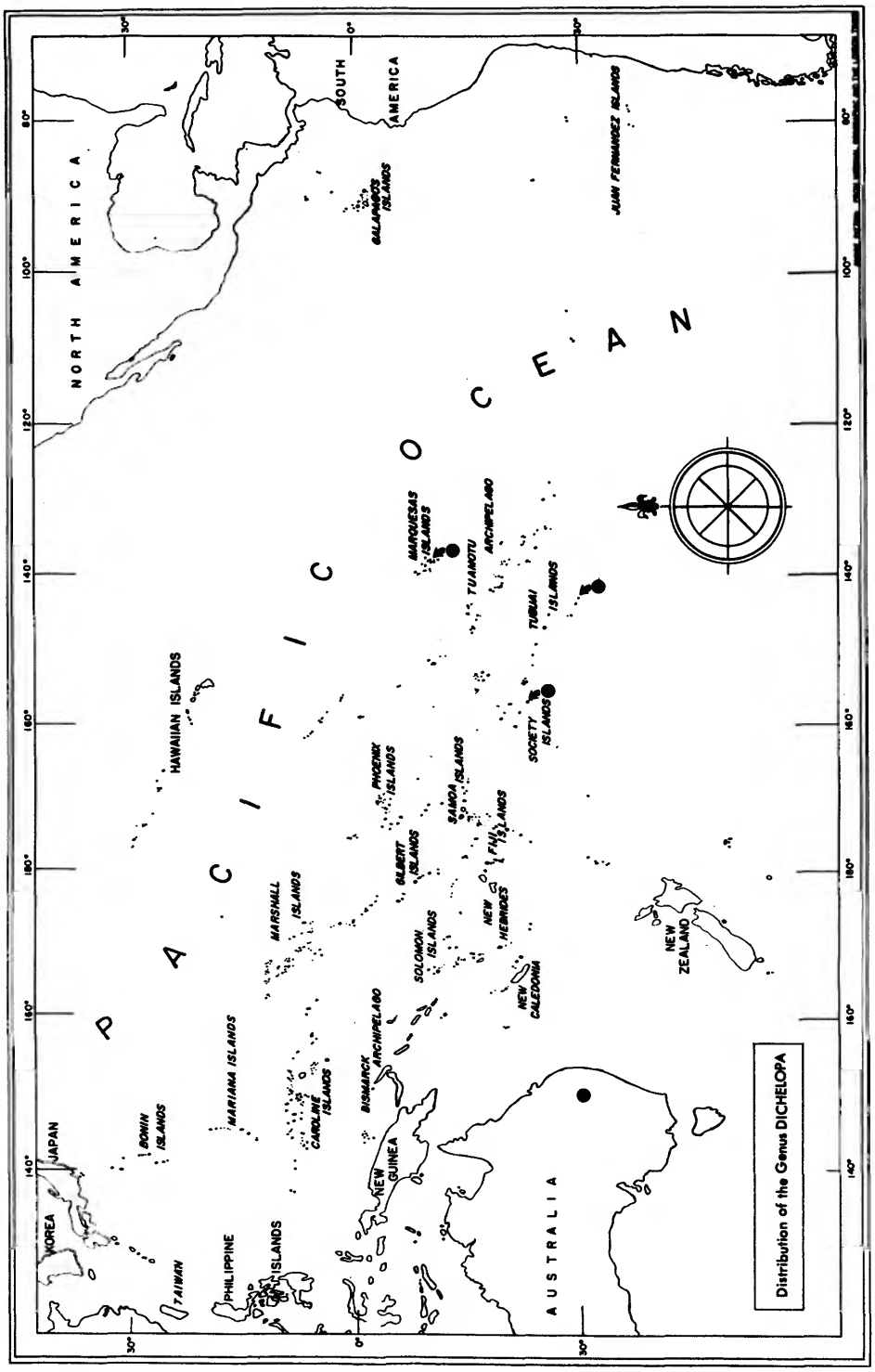


FIGURE 86.—Distribution of the genus *Dichelopa* Lower.

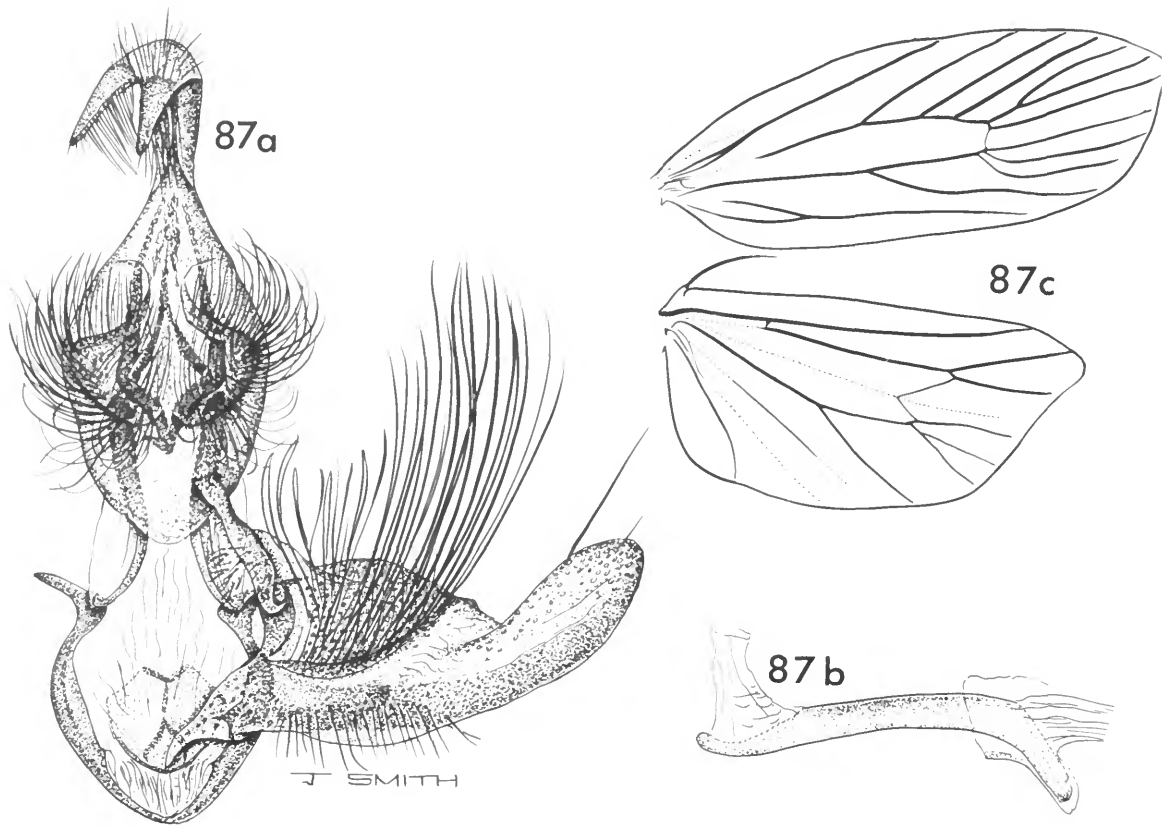


FIGURE 87.—*Dichelopa iochorda* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, venation of right wings.

Tegumen rather narrow, about as long as harpe. Anellus broadly oval, posterior edge indented. Aedeagus long, slender, slightly recurved distally; vesica unarmed.

Female unknown.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa. The 31 ♂♂ before me are from the following localities on the island: Maugaoa, 950′ (292 m), 19 ♂♂; Maurua, 600′ (184 m), 5 ♂♂; Metua nako, 750′ (231 m), ♂; Perau, 1900′ (585 m), ♂; Piahu, 750′ (231 m), ♂; Pukutaketake, 1100′ (338 m), ♂; Teumukopuke, 500′ (154 m), 3 ♂♂. Dates of capture range from 18.IX to 23.XI. 1963.

FOOD PLANT.—*Cyathea rapense* Copeland.

We succeeded in rearing only a single specimen of *iochorda*. The larva was collected along with some of those of *D. dendrophila*, new species. The habits of the two species are indistinguishable, both forming short rolls in the pinnae from which they feed. The larva of *iochorda* feeds on the underside, skeletonizing the pinnae. Pupation presumably takes place in debris on the ground.

It is curious that in the three months we were on Rapa not a single female of *iochorda* came to hand, nor has any other collector found one of that sex. This suggests some peculiarity in the habit of the females.

The deep incision of the apical portion of the uncus, forming two long points (foreshortened in the figure) is atypical for the genus, but in other respects the genitalia place *iochorda* with its congeners. The recurved distal end of the aedeagus suggests a close affinity to *exulcerata*, but the recurved part of aedeagus is not as exaggerated in *iochorda* as it is in that species.

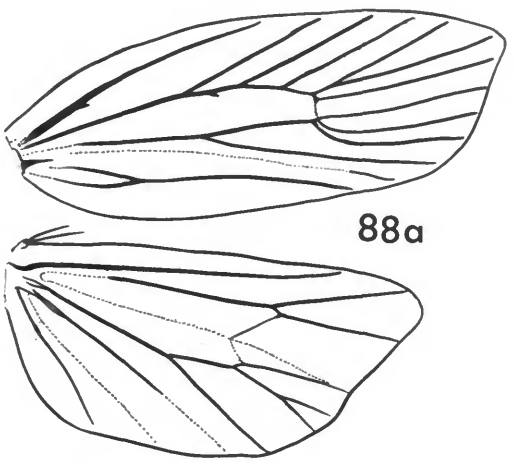


FIGURE 88.—*Dichelopa messalina,* new species: *a,* venation of right wings; *b,* ventral view of female genitalia.

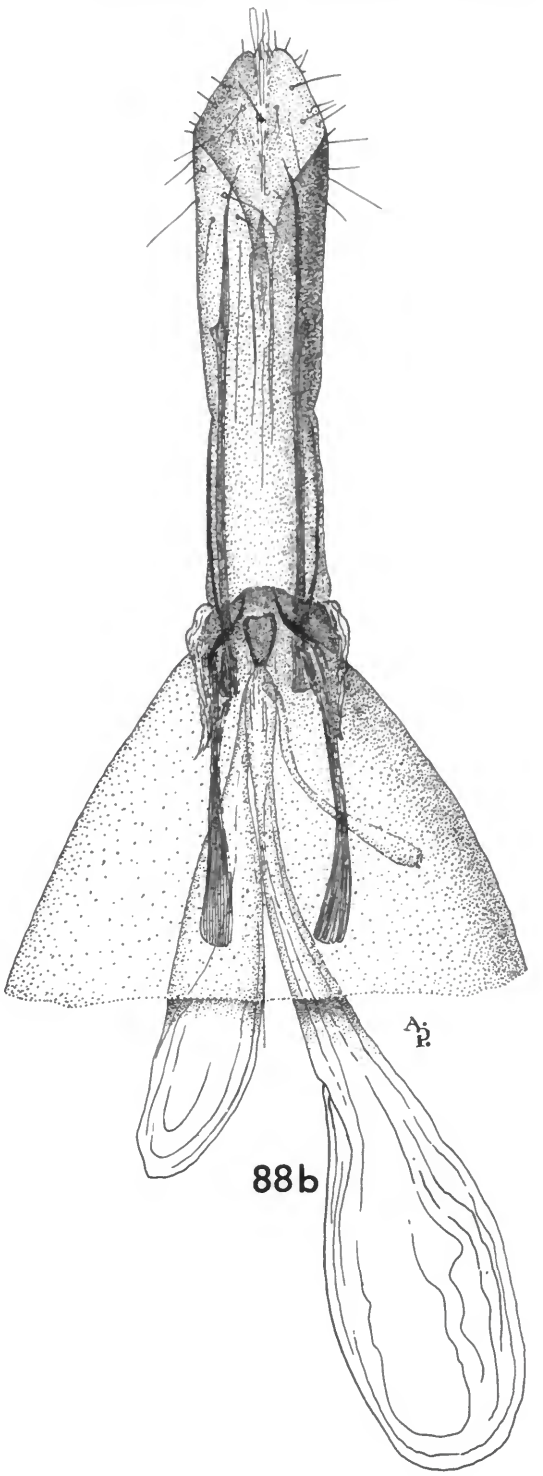
Dichelopa messalina, new species

FIGURE 88; PLATE 14, *e, f*

Alar expanse 16–22 mm.

Labial palpus twice as long as head, cinnamon buff; outer side of second segment snuff brown; third segment fuscous. Antenna fuscous above, ochraceous basally below; scape ochraceous buff. Head ochraceous buff. Thorax ochraceous tawny to sepia variously overlaid with ochraceous-buff and ochraceous-orange scales. Forewing ground color snuff brown to sepia, variously marked and overlaid with ochraceous buff and ochraceous orange; from basal fifth an outwardly oblique ochraceous-orange or ochraceous-buff, transverse fascia; on mid-costa and tornus two spots indicating a similar, but broken, light colored fascia; beyond tornus, on termen, a similarly colored transverse dash; all pale markings somewhat mottled with dark spots, in some cases nearly obscured by them; at end of cell a buff spot, obsolete in some specimens; cilia tawny olive. Hind wing grayish fuscous with a faint tawny hue toward apex; cilia light grayish fuscous with darker basal line. Foreleg pale buff; femur and tibia sepia on outer side; tarsal segments broadly annulated fuscous; midleg similar but with much less dark coloring; hind leg pale buff. Abdomen grayish fuscous posteriorly; anterior half lighter.

Female genitalia slides JFGC 11341, 11342, 11918. Ostium small, round, within a cuplike depression. Genital plate narrow, lightly sclerotized. Antrum scarcely



differentiated. Inception of ductus seminalis from posterior end of accessory bursa. Ductus bursae membranous, slender. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70090.

TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the holotype ♀ (7.XI.1963) and 17 paratypes as follows: Maugaoa, 950′ (292 m), ♀; Maurua, 600′ (184 m). 2 ♀♀; Morogouta, 750′ (231 m), ♀; Perau, 1900′ (585 m), 12 ♀♀; Tevaitau, 750′ (231 m), ♀. The moths occurred from 16.IX.1963 to 18.XI.1963.

Unfortunately, the male of this species is unknown, but in all probability it is quite different from the female. There is great intraspecific variation exhibited by the specimens at hand (plate 14 *e, f*) and almost as many varieties exist as there are specimens.

Dichelopa rhodographa, new species

FIGURE 89; PLATE 15*a*

Alar expanse 9 mm.

Labial palpus grayish fuscous; third segment fuscous. Antenna grayish fuscous, finely and shortly ciliated. Head gray, the scales narrowly tipped cinereous. Thorax grayish fuscous; tegula pale grayish posteriorly. Forewing ground color leaden gray, marked with ten broken, narrow, transverse spots and dashes mixed English red and orange rufous; cilia gray mixed with a few darker scales. Hind wing white basally; fuscous around margins and apically; cilia grayish fuscous with darker basal line. Foreleg grayish fuscous; tarsal segments broadly banded fuscous; midleg similar; hind leg ocherous white; tibia suffused grayish; tarsal segments narrowly annulated light gray. Abdomen grayish fuscous dorsally, pale grayish ventrally; anal tuft mixed grayish fuscous and ocherous white.

Male genitalia slide JFGC 11816. Harpe broad basally, costa strongly arched; cucullus rather stout, bluntly pointed; sacculus sclerotized, ventral edge serrate, terminal part raised. Gnathos sharply pointed. Uncus slender basally, apex broadly expanded, anteriorly clothed with heavy spines. Vinculum narrow, rounded. Tegumen broad, about as long as harpe. Anellus heart shaped, posterior edge deeply cleft. Aedeagus slender, curved, sharply pointed.

HOLOTYPE.—USNM 70083.

TYPE LOCALITY.—Rapa, Perau, 1000′ (307 m).

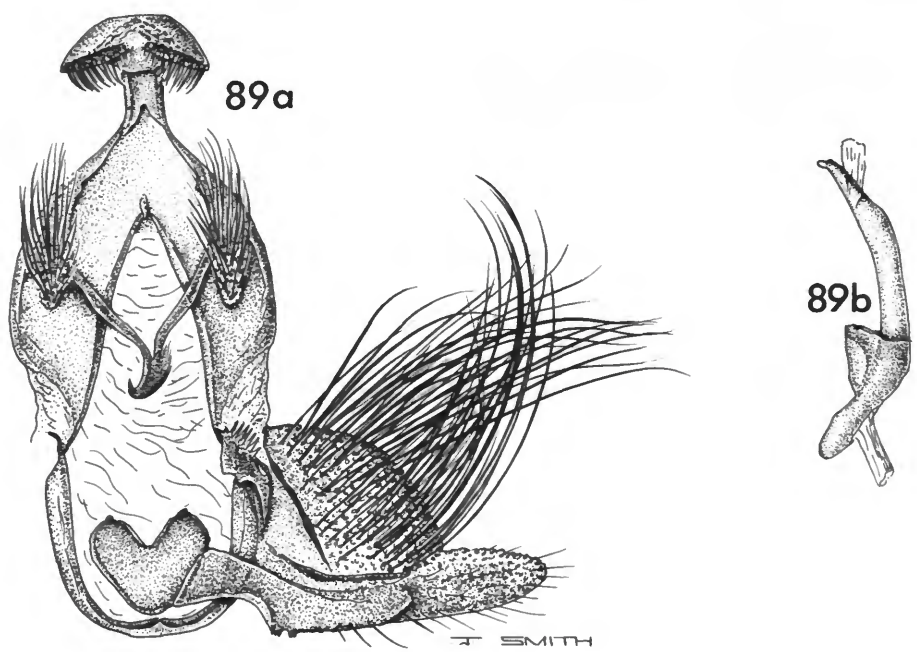


FIGURE 89.—*Dichelopa rhodographa,* new species: *a,* ventral view of male genitalia with left harpe and aedeagus removed; *b,* aedeagus.

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Veronica* (*Hebe*) *rapensis* F. Brown. (R. 22).

Described from the unique holotype male (Em. 18.XI.1963).

The larva of *rhodographa* ties and mines the terminal leaves of its host, and in the laboratory the larva pupated between two tied leaves. Presumably pupation takes place in the same way in nature.

This is the smallest species of the genus known at the present time, and cannot be very common because only a few larvae were found despite the fact that the food plant is abundant. The species was never seen at light.

In the photograph of the wings the red markings show up as a faint mottling.

Dichelopa anthracodelta, new species

FIGURE 90; PLATE 1*b*; PLATE 15*d*

Alar expanse 14 mm.

Labial palpus grayish fuscous; inner surface of second segment pale grayish. Antenna serrulate-ciliated; fuscous with grayish annulations. Head fuscous; crown creamy white. Thorax creamy white mixed with a few yellowish scales; posteriorly a conspicuous fuscous spot; tegula blackish fuscous anteriorly. Forewing ground color white; from basal fourth of costa to basal third of dorsum, blackish fuscous interrupted by a wedge-shaped area of white, yellowish, and orange-brown scales; from slightly before middle of costa to apex a blackish-fuscous triangular patch extends across cell to vein 3; on costa, in the white space between the two dark patches, a blackish-fuscous spot; on dorsum four short, blackish fuscous, transverse bars, the larger of the four on tornus, mixed and overlaid with yellowish scales; in white median area several ill-defined yellowish spots; subterminal area irregularly marked with fuscous, mixed with yellowish scales. Hind wing whitish basally, shading to fuscous apically and around margins. Foreleg sordid ocherous white, strongly suffused fuscous on outside; tarsal segments narrowly annulated whitish; midleg similar; hind leg gray, tibial spurs fuscous

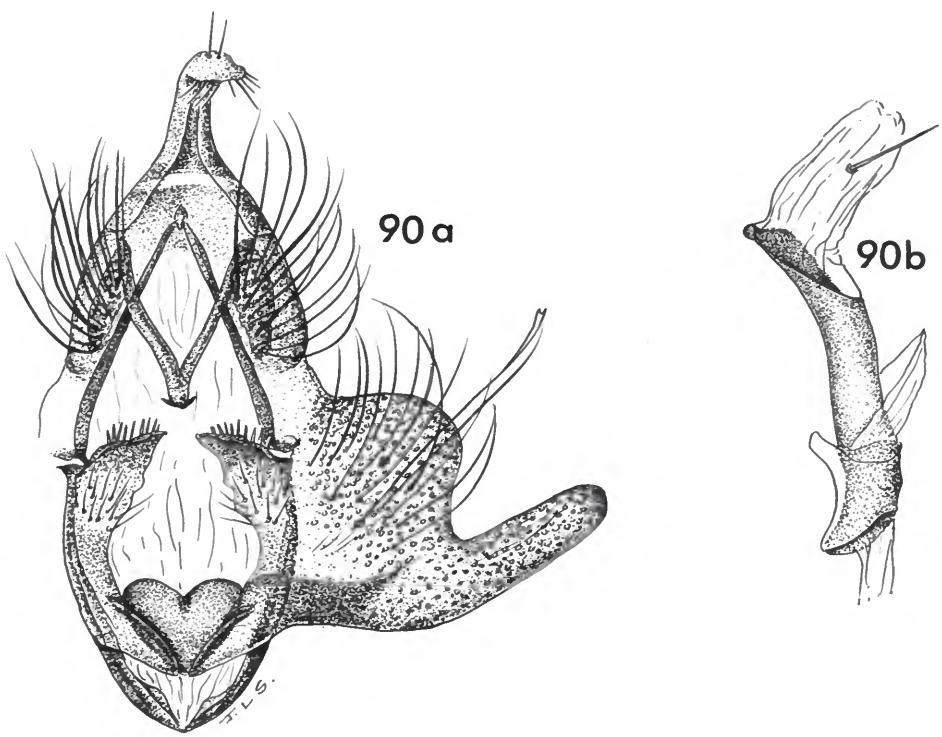


FIGURE 90.—*Dichelopa anthracodelta*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.

basally; tarsal segments marked fuscous. Abdomen grayish fuscous dorsally; grayish ventrally.

Male genitalia slide JFGC 11411. Harpe very broad basally, abruptly narrowed at middle; cucullus produced, narrow. Sacculus smooth on ventral edge. Gnathos terminating in a sharp point. Uncus moderately strong, slightly dilated distally. Vinculum bluntly pointed. Tegumen shorter than harpe, dome shaped. Anellus heart shaped, sclerotized. Aedeagus rather short, about as long as harpe, slightly bent; vesica armed with a single, weak, slender cornutus.

HOLOTYPE.—USNM 70087.

TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (23.XI.1963) and two ♂♂ paratypes from Maurua, 600′ (184 m) (17.X.1963) and Maugaoa, 950′ (292 m) (23.XI.1963).

This striking species cannot be confused with any of its congeners and does not appear very closely related to any of them. It is probably as closely related to *honoranda* as it is to any of the other included species.

Unfortunately, the female is unknown.

Dichelopa dendrophila, new species

FIGURE 91; PLATE 1*e*; PLATE 14*g*

Alar expanse 9–14 mm.

Labial palpus cinnamon buff; third segment fuscous. Antenna of male fasciculate-ciliated, in female simple; fuscous. Head fuscous. Thorax fuscous; tegula occasionally with sparse cinnamon-buff scales. Forewing ground color fuscous with slight purplish tinge; from basal third an ill-defined, outwardly oblique, cinnamon-buff fascia; a similar fascia from slightly beyond middle of costa nearly to tornus; in some specimens the forewing is immaculate, in others strongly marked (Plate 1*e*), the females more strongly marked than the males; cilia fuscous, sometimes tinged cinnamon buff on termen. Hind wing fuscous apically, much paler, and thinly scaled basally; cilia grayish fuscous with wide, fuscous basal band. Legs grayish fuscous; femora somewhat paler. Abdomen fuscous.

Male genitalia slide JFGC 11745. Harpe very broad basally; costa strongly convex; sacculus sclerotized, about half the length of harpe; cucullus digitate. Gnathos terminating in a sharp point. Uncus long, curved, apical portion very broad; terminal edge excavated. Vinculum narrow, rounded. Tegumen about as long as harpe. Anellus a broad, sclerotized plate; posterior edge concave. Aedeagus about as long as harpe, straight over most of its length, bluntly pointed distally.

Female genitalia slides JFGC 11746, 11697. Ostium very small, posteroventral edge V-shaped. Genital plate membranous. Antrum membranous. Inception of ductus seminalis from middle of accessory bursa. Ductus bursae membranous. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70082.

TYPE LOCALITY.—Rapa, Morogouta, 750′ (231 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Cyathea rapense* Copeland. (R. 20).

Described from the ♂ holotype (Em. 3.XI.63), 6 ♂♂ and 12 ♀♀ paratypes as follows: Morogouta, 750′ (231 m), 4 ♂♂, 11 ♀♀ (Em. 28.X to 20.XI.1963); Pukutaketake, 1100′ (338 m), ♂, ♀ (Em. 19–22.XI.1963); Teumukopuke, 500′ (154 m), ♂ (3.XI.1963).

In general coloration *dendrophila* is nearest to *ceramocausta* but can be distinguished easily from it by the absence of the dark subterminal spot of forewing. In the male genitalia of *dendrophila*, the cucullus is produced and the aedeagus is straight; in *ceramocausta* the cucullus is not produced and the aedeagus is slightly curved. In the female the V-shaped ostium immediately separates *dendrophila* from *ceramocausta*. In addition *dendrophila* averages much smaller than *ceramocausta*.

The larva of *dendrophila* feeds externally on the fronds of the tree fern usually skeletonizing the pinnae. Sometimes the larva constructs a tubular retreat by webbing the edges of a pinna together. The larval work is conspicuous, the damaged brown areas contrasting with the undamaged green parts of the fronds. Pupation may take place in the tubular retreat or in debris on the ground. The larvae are very sensitive to sharp knocks administered to the fronds; they leave their retreats, hanging by a thread of silk, thus easily being seen.

Presumably the species is well distributed on the island. In addition to the localities mentioned above, we collected larvae at Maurua, 600′ (184 m) and Maugaoa, 1,000′ (307 m).

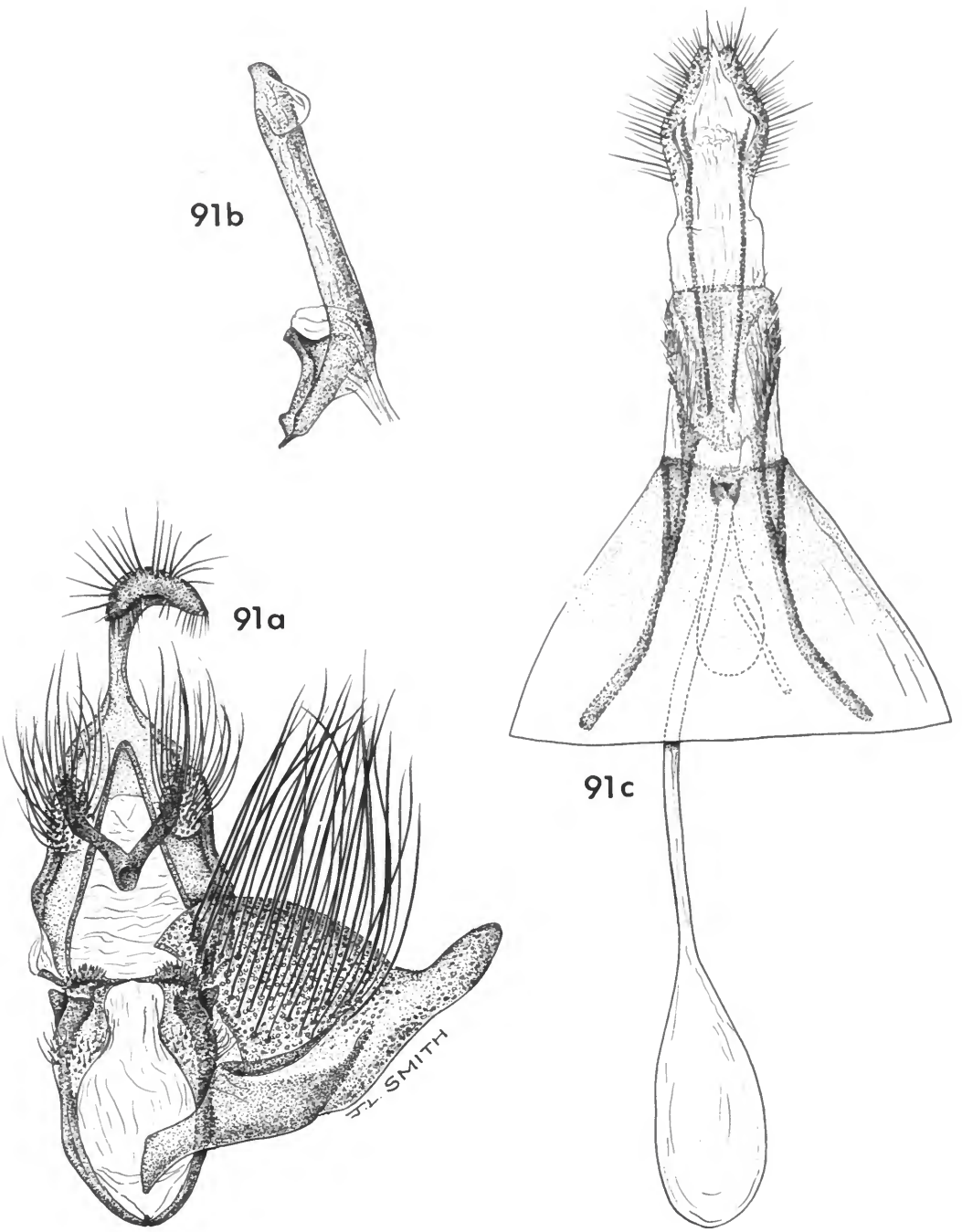


FIGURE 91.—*Dichelopa dendrophila,* new species: *a,* ventral view of male genitalia with left harpe and aedeagus removed; *b,* aedeagus; *c,* ventral view of female genitalia.

Dichelopa honoranda Meyrick

FIGURE 92; PLATE 1*a*; PLATE 15*c*

Dichelopa honoranda Meyrick, 1926, p. 272; 1928, p. 492.—Viette, 1949a, p. 320.—Clarke, 1958, p. 103, pl. 51; figs. 1–1*b*.

Male genitalia slide JFGC 11247. Harpe broad basally, fleshy; sacculus strongly sclerotized, finely dentate ventrally, extending beyond cucullus. Gnathos a short hook. Transtilla narrow, strongly sclerotized, consisting of two curved lateral arms greatly constricted at center; posterior edge armed with strong teeth. Uncus very broadly dilated distally; ventral surface clothed with moderately strong setae. Vinculum narrow, rounded. Tegumen broad, about as long as harpe. Anellus a rectangular, sclerotized plate. Aedeagus stout, slightly curved, simple. Posterior edge of 8th sternum narrowly sclerotized and clothed with moderately long setae.

Female genitalia slide JFGC 11248. Ostium protruding. Genital plate with convex scobinate patch on each side of ostium. Inception of ductus seminalis slightly anterior to ostium. Ductus bursae membranous. Bursa copulatrix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa: Our few specimens were collected only on Maugaoa, 950′(292 m); ♂, 2 ♀♀ (23.XI.1963).

FOOD PLANT.—Unknown.

We were unable to discover the food plant of this beautiful and apparently rare species. Meyrick's type measures 12 mm, ours from 9 mm (♂) to 13 mm (♀).

Dichelopa sericopis Meyrick

FIGURE 93; PLATE 13*a,b,c,d*

Dichelopa sericopis Meyrick, 1926, p. 272; 1928, p. 492.—Clarke, 1958, p. 104, pl. 52: figs. 3–3*b*.

Male genitalia slide JFGC 11245. Harpe very broad basally, bulbous; sacculus strongly sclerotized with sharp spinous process near base and thick digitate process ventrally; cucullus fleshy, produced. Gnathos a long hook, slightly dilated before pointed apex. Uncus rather short, curved, dilated distally. Vinculum rounded. Tegumen somewhat longer than harpe, expanded at middle. Anellus subtriangular; posterior edge excavated. Aedeagus curved, pointed; vesica unarmed.

Female genitalia slide JFGC 11246. Ostium small, conical. Antrum sclerotized ventrally. Inception of ductus seminalis slightly before ostium. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa.

FOOD PLANTS.—*Hibiscus australensis* Fosberg (R9), *Dolichos lablab L.* (R12), *Ipomea gracilis* R. Br. (R8), *Commelina diffusa* Burm. (R10).

This was by far the commonest moth on Rapa during our visit and, indeed, some nights it occurred in such swarms that it was virtually impossible to collect anything else. There is no point in listing the localities on the island for our nearly 900 specimens because *sericopis* was found everywhere.

The species is variable as may be seen in Plate 13*a-d*, but the only species with which it might be confused is *D. lupicinia*, new species (Plate 13*e,f*), which follows. Even so, there are enough points of distinction to separate fresh specimens but rubbed ones can be distinguished only by the genitalia.

The larva of *sericopis*, like many species of Tortricidae, is polyphagus and in the early stages is a leaf miner. Later, the larva folds or rolls the leaf, forming a retreat and skeletonizes the area around it. Pupation occurs in the roll or elsewhere. One pupa was found in the rotten end of a broken *Pandanus* branch.

Dichelopa vaccinii, new species

FIGURE 94; PLATE 15*e, f*; PLATE 29*e*

Alar expanse 10–16 mm.

Labial palpus cinereous; second segment strongly suffused dark gray on outer side; third segment dark gray. Antenna of male short ciliated, of ♀ finely pubescent, dark gray with narrow, paler annulations. Head dark gray, cinereous posteriorly. Thorax dark gray; tegula cinereous posteriorly. Forewing ground color cinereous; at basal fourth an outwardly convex dark gray fascia, somewhat paler on dorsum, edged with fuscous; beyond this fascia, on fold, a dark gray spot; from middle of costa an outwardly oblique, broad, transverse, dark gray fascia to tornus, edged with fuscous; on costa, before apex, a dark gray blotch preceded by a few fuscous dots; between veins 3 and 6 (veins 3 and 4 coincident) a quadrate, dark gray, subterminal spot edged with fuscous; dark markings some-

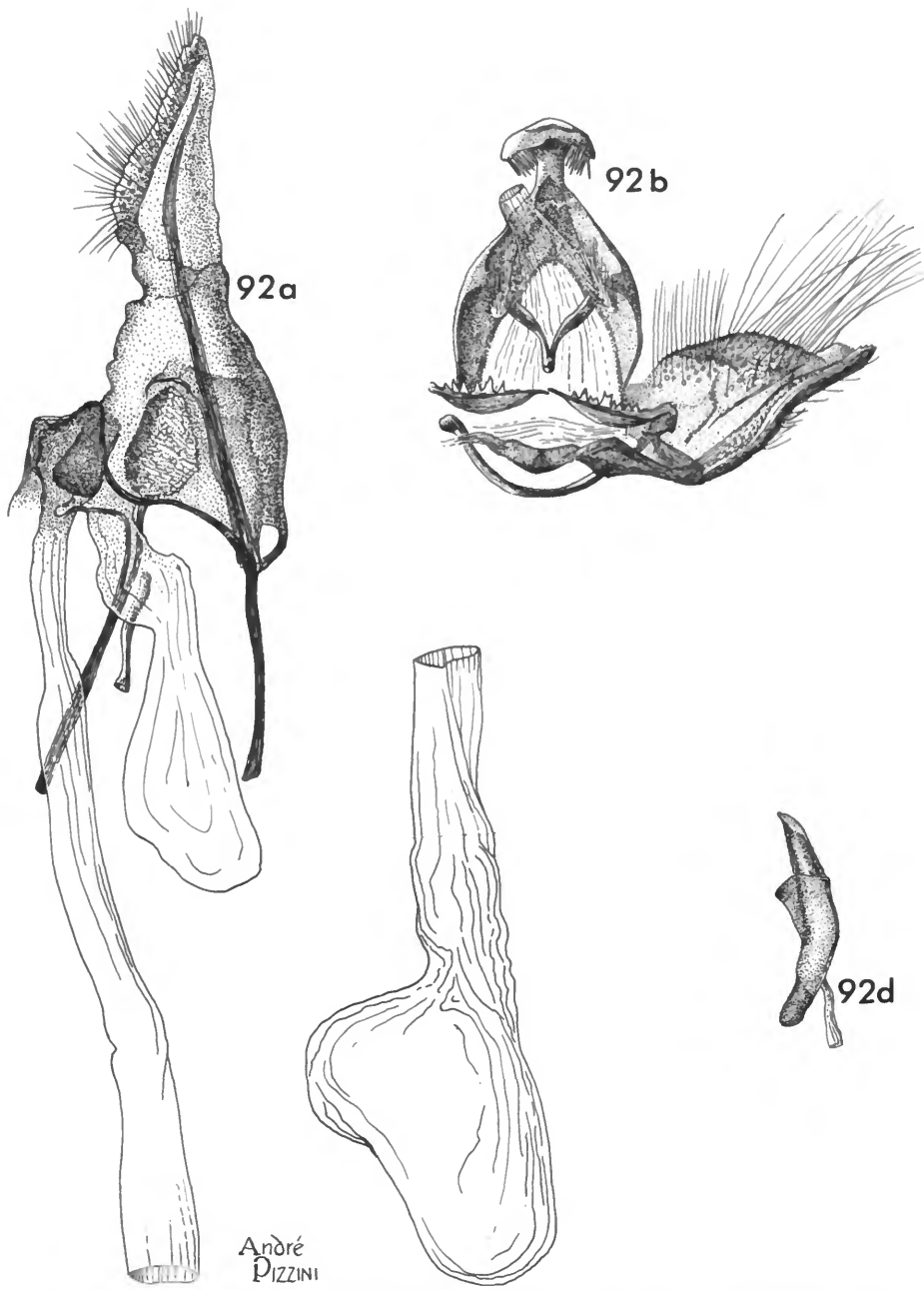


FIGURE 92.—*Dichelopa honoranda* Meyrick: *a,* lateral aspect of female genitalia (bursa copulatrix to right); *b,* ventral view of male genitalia with left harpe and aedeagus removed; *d,* aedeagus.

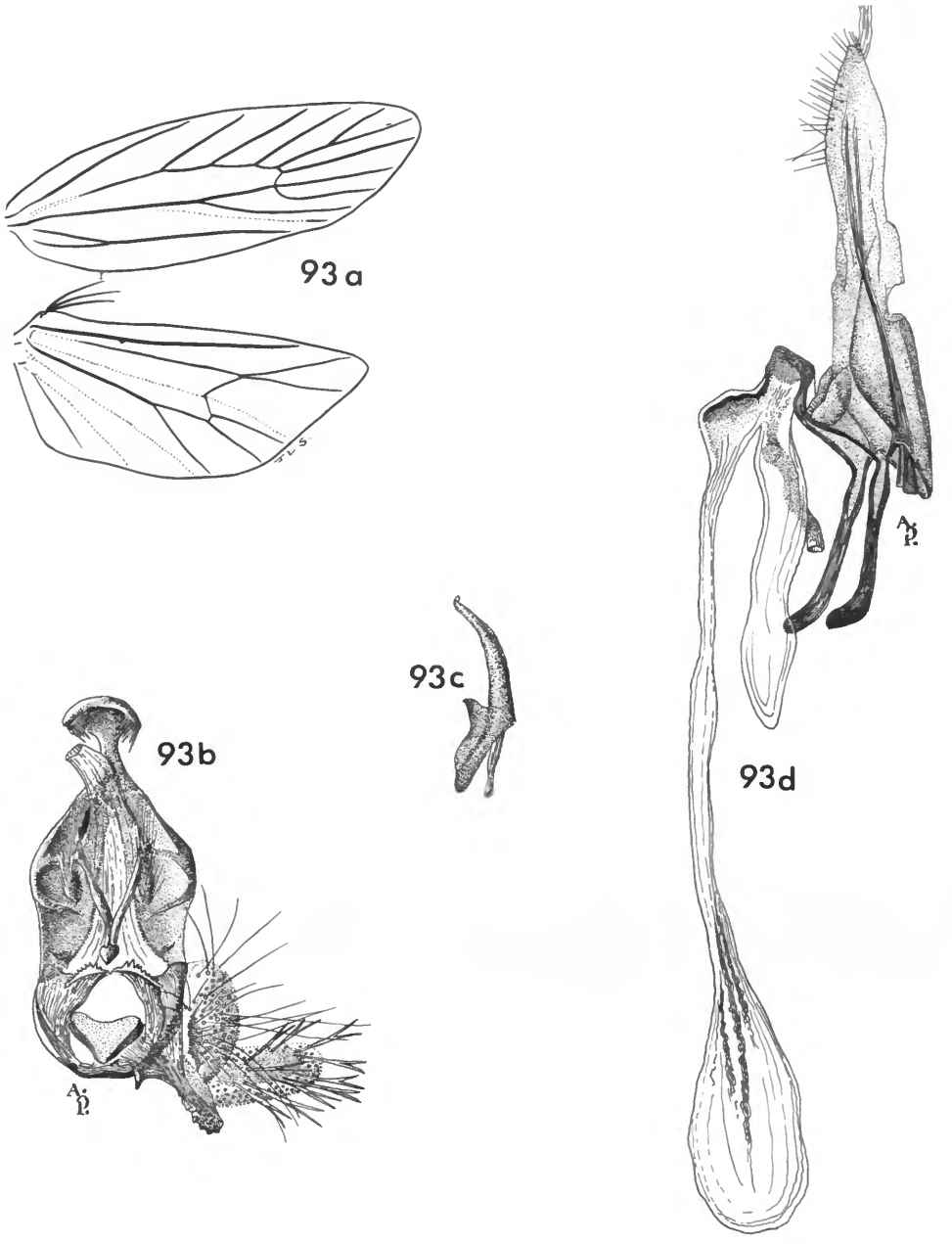


FIGURE 93.—*Dichelopa sericopis* Meyrick: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, lateral aspect of female genitalia.

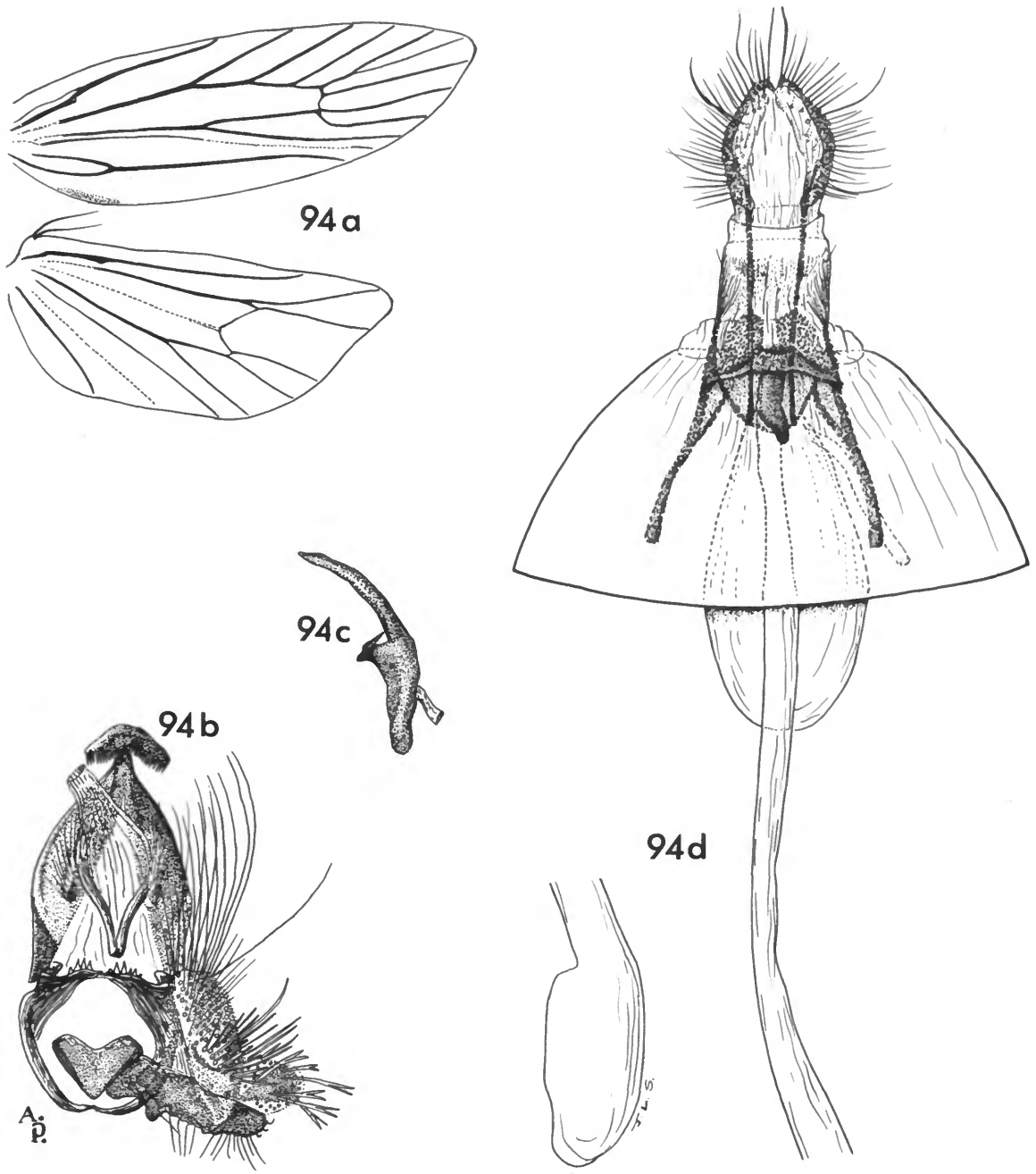


FIGURE 94.—*Dichelopa vaccinii*, new species: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia (bursa copulatrix to left).

times irrorate with ocherous-orange scales; cilia gray. Hind wing whitish basally, grayish fuscous apically; cilia whitish around anal angle, gray around termen and apex with a broad, dark gray basal band. Foreleg cinereous; femur and tibia strongly suffused grayish fuscous on outer side; tarsal segments broadly banded fuscous; midleg similar but with two gray spots on outer side of tibia and tarsal annulations lighter; hind leg pale whitish cinereous. Abdomen grayish fuscous dorsally, whitish cinereous ventrally; anal tuft mixed cinereous and dark gray.

Male genitalia slide JFGC 11253. Harpe broadly arched; cucullus short, broad, rounded; sacculus strongly sclerotized, terminal end free, ventral edge dentate and with one large tooth near base. Uncus slender basally; apex broadly expanded and clothed with heavy spines anteriorly. Vinculum narrowly rounded, constricted at middle. Tegumen longer than harpe; socii long, slender lobes. Anellus heart shaped; posterior edge excavated. Aedeagus slender, curved, sharply pointed.

Female genitalia slides JFGC 11254, 11747. Ostium small, oval, transverse. Genital plate granular. Antrum sclerotized and with anterolateral protuberance. Inception of ductus seminalis lateral, from posterior part of accessory bursa. Ductus bursae long, slender, membranous. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70088.

TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Vaccinium rapae* Skottsberg (R14).

Described from the ♂ holotype (5.XI.1963), 47 ♂♂ and 41 ♀♀ paratypes as follows: Anatakuri Bay, 3 ♂♂; Anatakuri nako, ♀; Maugaoa, 950′ (292 m), 2 ♂♂, 6 ♀♀; Maurua, 600′ (184 m), 2 ♂♂, 3 ♀♀; Morogouta, 600′ (184 m), 6 ♂♂, 7 ♀♀. Ororagi, 400′ (123 m), ♂; Perau, 1900′ (585 m); 2 ♀♀; Piahu, 750′ (231 m), ♂, 3 ♀♀; Point Ketunui, 400′ (123 m), ♂, Point Maraia, 5 ♂♂, ♀; Point Teakauraee, 22 ♂♂, 12 ♀♀; Pukutaketake, 1150′ (353 m), ♂; Teumukopuke, 500′ (154 m), 3 ♂♂, ♀; Tevaitau, 750′ (231 m), 5 ♀♀. Our specimens were reared or collected between 25.IX.1963 and 4.XII.1963.

Although most of the males are strongly marked as in the illustration (Plate 15*e*), there are some in which the forewing is nearly uniform gray, and in which none of the dark markings are contrasting. In this, the immaculate males resemble the females. The figure (Plate 15*f*) of the female is of one of the more contrastingly marked examples. In the black and white illustrations it can be seen how similar this female of *vaccinii* is to that of the female of *sericopis* (Plate 13*c*).

In structure of the genitalia *sericopis* and *vaccinii* are very closely related, although there are good points of difference as can be seen by a comparison of the figures. A point that further emphasizes their close relationship is the coincidence of veins 3 and 4 of the forewing.

The larvae of *vaccinii* were relatively common and were easily detected between the tied leaves and damaged inflorescence of the food plant. Pupation usually takes place between two tied leaves which have been skeletonized by the larva, but judging from the absence of larvae where damage was obvious, I suspect a fairly large proportion of larvae pupate in debris.

Dichelopa deltozancla Meyrick

FIGURE 95; PLATE 14 *c, d, h*

Dichelopa deltozancla Meyrick, 1926, p. 272; 1928, p. 492.—Viette, 1949a, p. 320.—Clarke, 1958, p. 99, pl. 49: figs. 4–4*b*.

Male genitalia slides JFGC 11255, 11696. Harpe broad and fleshy; sacculus strongly sclerotized, with a large, blunt tooth at basal third and a blunt, free terminal point not extending beyond cucullus. Gnathos a slender hook. Socii slender digitate processes, slightly broadly dilated; anterior surface heavily clothed with strong setae. Vinculum narrow, rounded. Tegumen strong setae. Vinculum narrow, rounded. Tegumen slightly longer than harpe. Anellus a broad, sclerotized heart-shaped plate. Aedeagus slender, curved, with a patch of very small teeth distally on ventral surface.

Female genitalia slide JFGC 11256. Ostium small, opening dorsal to a broad sternal fold. Genital plate membranous. Antrum narrowly sclerotized. Inception of ductus seminalis slightly anterior to antrum. Ductus bursae membranous. Bursa copulatrix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa. Our series consists of the following 54 ♂♂ and 56 ♀♀: Anatakuri nako, ♀; Haurei, ♀; Maugaoa, 800′ (245 m) and 950′ (292 m), 4 ♂♂, 6 ♀♀; Maurua, 600′ (184 m), 9 ♂♂, 11 ♀♀; Metua nako, 750′ (231 m), ♂, ♀; Morogouta, 750′ (231 m), 4 ♂♂, ♀; Piahu, 750′ (231 m), 7 ♂♂, 3 ♀♀; Teumukopuke, 500′ (154 m), 18 ♂♂, 23

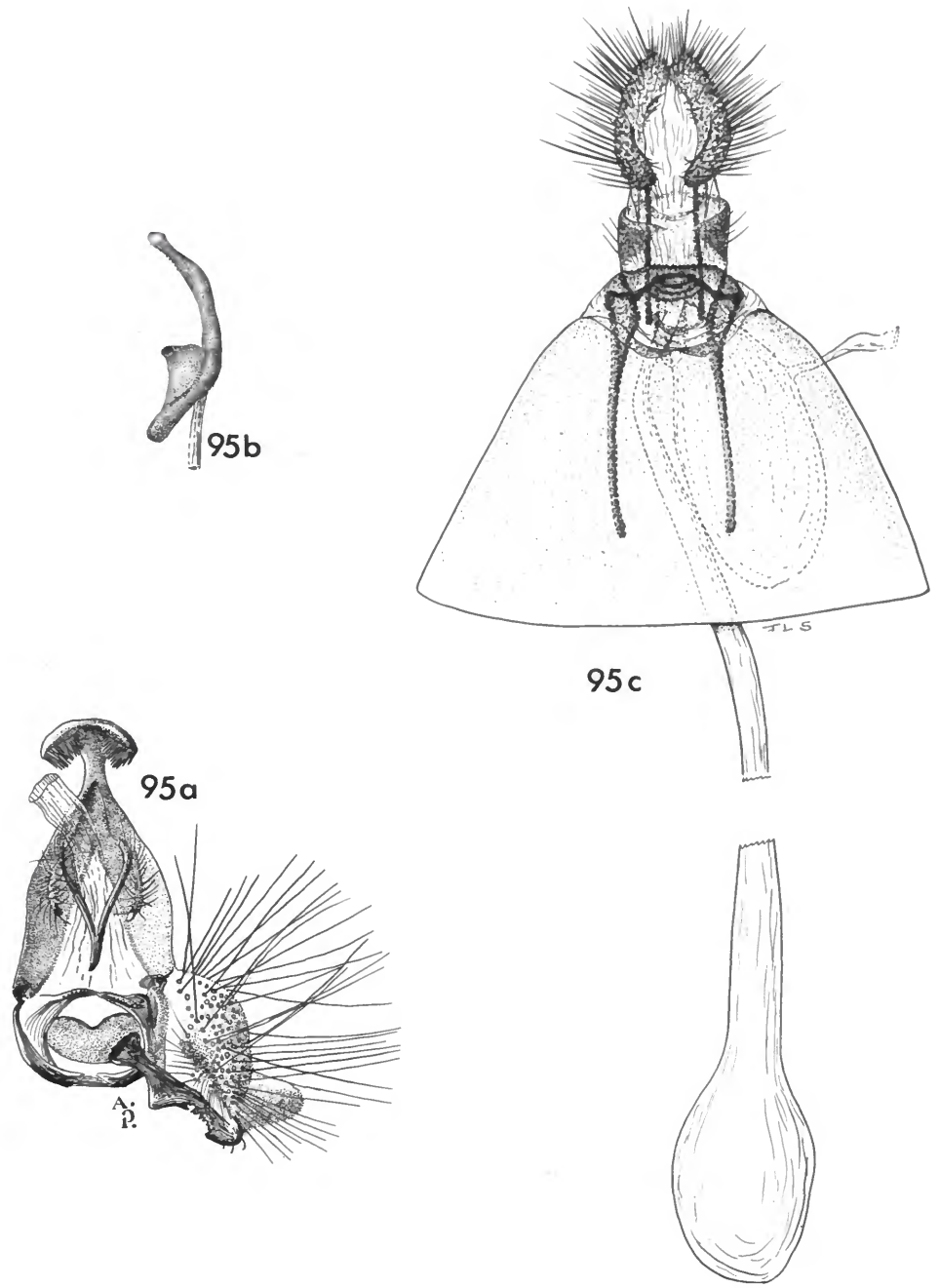


FIGURE 95.—*Dichelopa deltozancla* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

♀ ♀ ; Tevaitau, 750′ (231 m) and 800′ (245 m), 11 ♂ ♂ ; 9 ♀ ♀ . Dates of capture and rearing covered the duration of our visit.

FOOD PLANT.—*Fitchia rapensis* F. Brown.

Although we have one specimen from near sea level, the species is generally found at the higher elevations where its food plant grows among small trees and shrubs, along the ridges in fairly open situations.

The larva feeds in a web on the upper surfaces of leaves, mostly along the edges. The edge along which the larva feeds is drawn slightly toward the midrib, and the feeding area is covered with a sheetlike web.

There is considerable variation in *deltozancla.* The males are usually marked sharply but the markings of the females are generally suffused and subdued. The male (Plate 14*d*) is an unusually strongly marked specimen and demonstrates clearly the great range of variation found in some of the species. The females average slightly larger than the males.

The male, described by Meyrick under *deltozancla,* is the male of *sericopis* as he suspected. He stated (1926, p. 272), ". . . The ♀ is taken as the type, since it is possible that the single ♂ may belong properly to the preceding [*sericopis*] species."

Dichelopa lupicinia, new species

FIGURE 96; PLATE 13*e, f*

Alar expanse 10 to 18 mm.

Labial palpus sordid ocherous white; second segment suffused grayish on outer side; third segment suffused grayish. Antenna serrate in male, simple in female, finely ciliate, grayish fuscous. Head gray. Thorax grayish fuscous; tegula tipped grayish. Forewing ground color pale silvery gray crossed by slender, irregular, antimony yellow transverse strigulae and dashes; female almost uniform light ochraceous buff; on costa some small fuscous spots and surface marked with sparse, very fine fuscous irroration; cilia light ochraceous buff with grayish suffusion. Hind wing whitish basally, grayish fuscous toward margins and apically. Foreleg ocherous white; femur and tibia suffused grayish on outer side; tarsal segments broadly grayish fuscous; midleg ocherous white suffused grayish; hind leg ocherous white. Abdomen grayish fuscous dorsally, ocherous white ventrally; anal tuft light ochraceous buff.

Male genitalia slide JFGC 11249. Harpe nearly as broad as long; costa strongly arched; cucullus triangular, bluntly pointed; sacculus strongly sclerotized; ventral edge roughened; one large curved tooth near base. Gnathos pointed. Socii slender lobes clothed with fine setae. Transtilla consisting of two separated, narrow, pointed, dentate elements. Uncus slender basally, distally broadly expanded; anterior surface clothed with strong setae. Vinculum narrowly rounded, with short, median projection dorsally. Tegumen slightly longer than harpe. Anellus heart shaped. Aedeagus slender, curved, pointed.

Female genitalia slide JFGC 11250. Ostium small, round. Genital plate very narrowly sclerotized. Antrum narrowly and lightly sclerotized. Inception of ductus seminalis from posterior part of accessory bursa. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70089.

TYPE LOCALITY.—Rapa, Point Maraia.

DISTRIBUTION.—Rapa.

FOOD PLANTS.—*Hibiscus australensis* Fosberg (R9); *Sonchus oleraceus* L. (R18); *Rumex crispus* L. (R19); *Metrosideros collina* (Forster) var.? *villosa* A. Gray (R3); *Manihot* sp. (R30); *Pandanus tectorius* Solander (dead wood) (R26).

Although we reared *lupicina* from two endemic plants (*Hibiscus* and *Metrosideros*) the larvae were far more abundant on the two weed species, *Rumex* and *Sonchus,* showing an obvious preference for them. The larvae tie together and skeletonize the leaves and usually pupate in a folded leaf. I have recorded *Pandanus* with the food plants because we reared four examples from dead wood. It seems more likely, however, that the larvae crawled into the wood only to pupate.

Described from the ♂ holotype (Em.26.X.1963), 108 ♂ ♂ and 169 ♀ ♀ paratypes as follows: Anatakuri nako, 3 ♂, 5 ♀; Haurei, 80 ♂ ♂, 86 ♀ ♀; Maugaoa, 950′ (292 m), 5 ♀ ♀ ; Maii Bay, 2 ♂ ♂ ; Metua nako, 750′ (231 m), ♀ ; Morogouta, 750′ (231 m), ♂ ; Pake Bay, ♀ ; Piahu, 750′ (231 m), 12 ♀ ♀ ; Point Maraia, 14 ♂ ♂, 33 ♀ ♀ ; Point Teakauraee, ♀ ; Pukutaketake, 1200′ (369 m), 4 ♂ ♂ ; ♀, Teumukopuke, 500′ (154 m), 2 ♀ ♀. Dates of emergence of reared specimens and dates of capture ranged from September to December.

The males of *lupicinia* are more strongly marked than the females, and the dark margins and apex of the male hind wing are much more extensive and darker than in the female. The females average larger than the males.

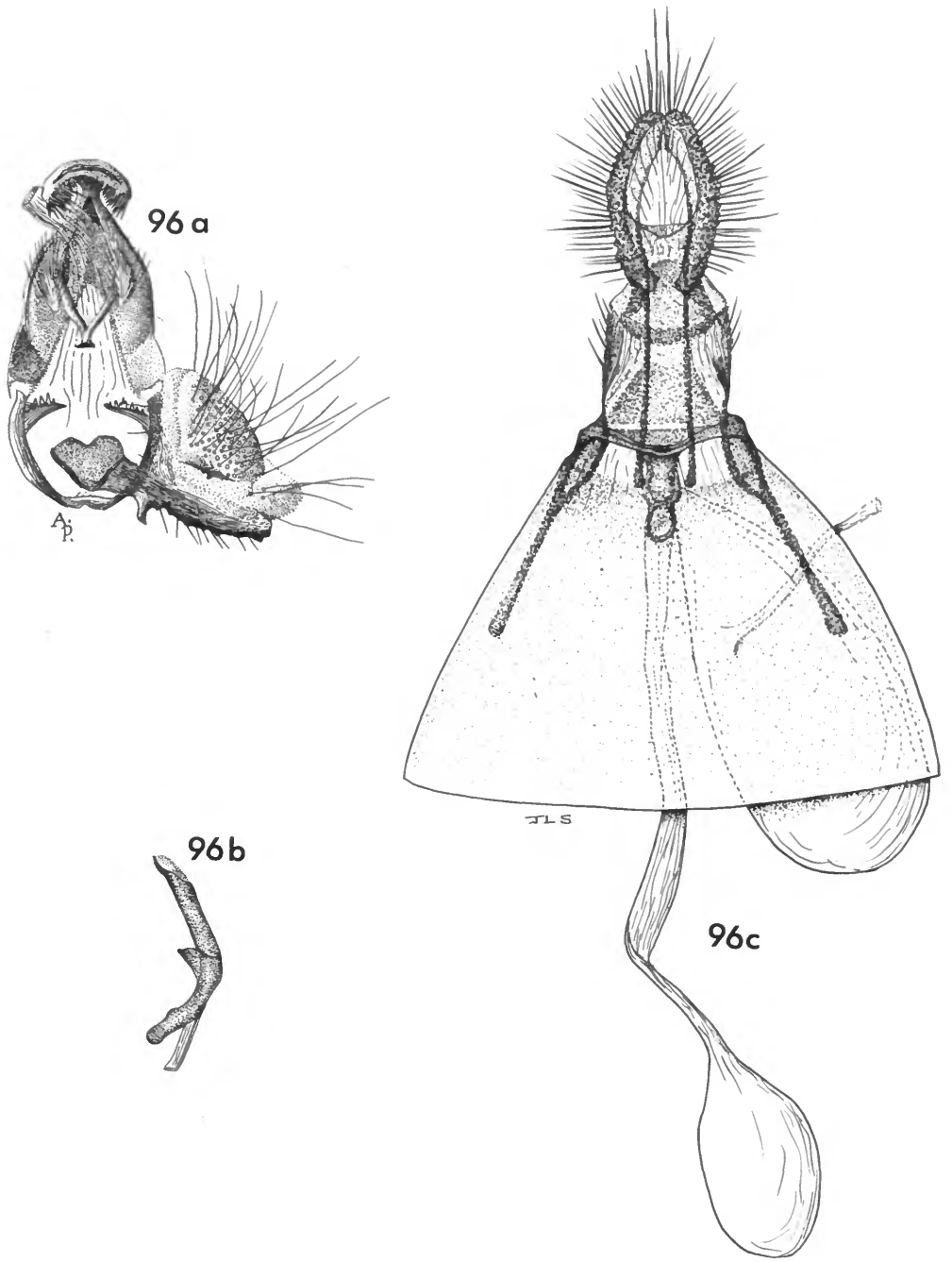


FIGURE 96.—*Dichelopa lupicinia*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

This and the foregoing *sericopis* can be confused easily in the field, especially if the specimens are at all worn. Moreover, the males of *lupicinia* resemble very closely the females of *sericopis*. For a considerable period on the island we found it difficult to associate males with females until copulating pairs were observed. The larvae of both are polyphagus and occur together in many instances, but reared specimens could be associated properly by the presence of a faint silvery luster on the forewing of *lupicinia* which is absent in *sericopis*.

As pointed out under *vaccinii* the halftone plates are of little help in separating some of these species. Because of the variability and similarity of pattern in the various species, the black and white photographs do not bring out the specific differences.

Dichelopa myopori, new species

FIGURE 97; PLATE 13*g*, *h*

Alar expanse 11–17 mm.

Labial palpus ocherous white on inner surface clay color on outer side. Antenna pubescent, fuscous with buff annulations. Head clay color, paler and shiny laterally. Thorax clay color. Forewing ground color of ♂ pale cinnamon buff; from basal fifth of costa to dorsum, slightly before middle an ochraceous-tawny patch followed by a broad outwardly oblique band of ground color; beyond the latter a conspicuous, outwardly oblique ochraceous-tawny band; in the center of the outer dark band abundant leaden metallic scaling; apical third of wing crossed by fine ochraceous-tawny strigulae and scattered leaden scales; at apical third of costa an ill-defined spot of dark suffusion; cilia cinnamon buff; ♀ forewing clay color without strong transverse markings as in ♂; in some specimens a few ill-defined, fine ochraceous-tawny spots or dashes. Hind wing of ♂ white basally, fuscous around margins and apically; cilia white around anal angle, ocherous white apically with dark subbasal line; ♀ hind wing similar but the dark marginal area paler and less extensive. Foreleg ocherous white suffused fuscous on outer side; tarsal segments broadly banded fuscous; midleg similar but with a narrow band of ground color on outer side at middle of tibia; hind leg ocherous white; tarsal segments with tiny spots of fuscous basally on each. Abdomen gray dorsally, ocherous white ventrally; anal tuft ocherous white mixed grayish fuscous.

Male genitalia slide JFGC 11251. Harpe broad basally, costa strongly arched; cucullus short, rounded apically; sacculus strongly sclerotized with rough-edged raised terminal ridge. Gnathos pointed. Uncus slender basally, broadly expanded distally; apical portion densely spined anteroventrally. Vinculum narrow, rounded. Tegumen broad, sightly longer than harpe. Anellus an oval plate, deeply cleft posteriorly. Aedeagus slender, slightly curved, pointed.

Female genitalia slide JFGC 11252. Ostium small, round. Genital plate narrow, sclerotized. Antrum short, strongly sclerotized. Inception of ductus seminalis from posterior surface of accessory bursa. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70086.

TYPE LOCALITY.—Rapa, Pariati Bay.

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Myoporum rapense* F. Brown (R31).

Described from the ♂ holotype (Em. 30.XI.1963), 22 ♂ ♂ and 20 ♀ ♀ paratypes as follows: Anatakuri nako, ♀ (14.X.1963); Metua nako, 750′ (231 m), 2 ♀ ♀ (12.XI.1963); Morogouta, 750′ (231 m), ♀ (10.X.1963); Pariati Bay, 22 ♂ ♂ and 16 ♀ ♀ (30.X to 15.XI.1963).

The larva of *myopori* feeds in the terminal buds and leaves and when full-fed the pupa is formed between spun leaves.

In this species the sexual dimorphism is striking. The males are strongly marked (Plate 13*g*) but the females are, superficially at least, unicolorous and the dark marginal and apical areas are less extensive and lighter than those of the males. The male of *myopori* might be mistaken for the male of *sericopis* except that it is darker and redder. The female of *myopori* resembles the female of *lupicinia* but the former is also redder and darker than the latter. In the photographs (Plate 13*a*, *f*, *g*, *h*) the similarities are obvious. The illustrations of the genitalia show clearly the differences in structure.

Dichelopa ceramocausta Meyrick

FIGURE 98; PLATE 14*a*, *b*

Dichelopa ceramocausta Meyrick, 1926, p. 272; 1928, p. 492.—Viette, 1949a, p. 320.—Clarke, 1958, p. 99, pl. 49: figs. 2–2*b*.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

Male genitalia slide JFGC 11343. Harpe triangular;

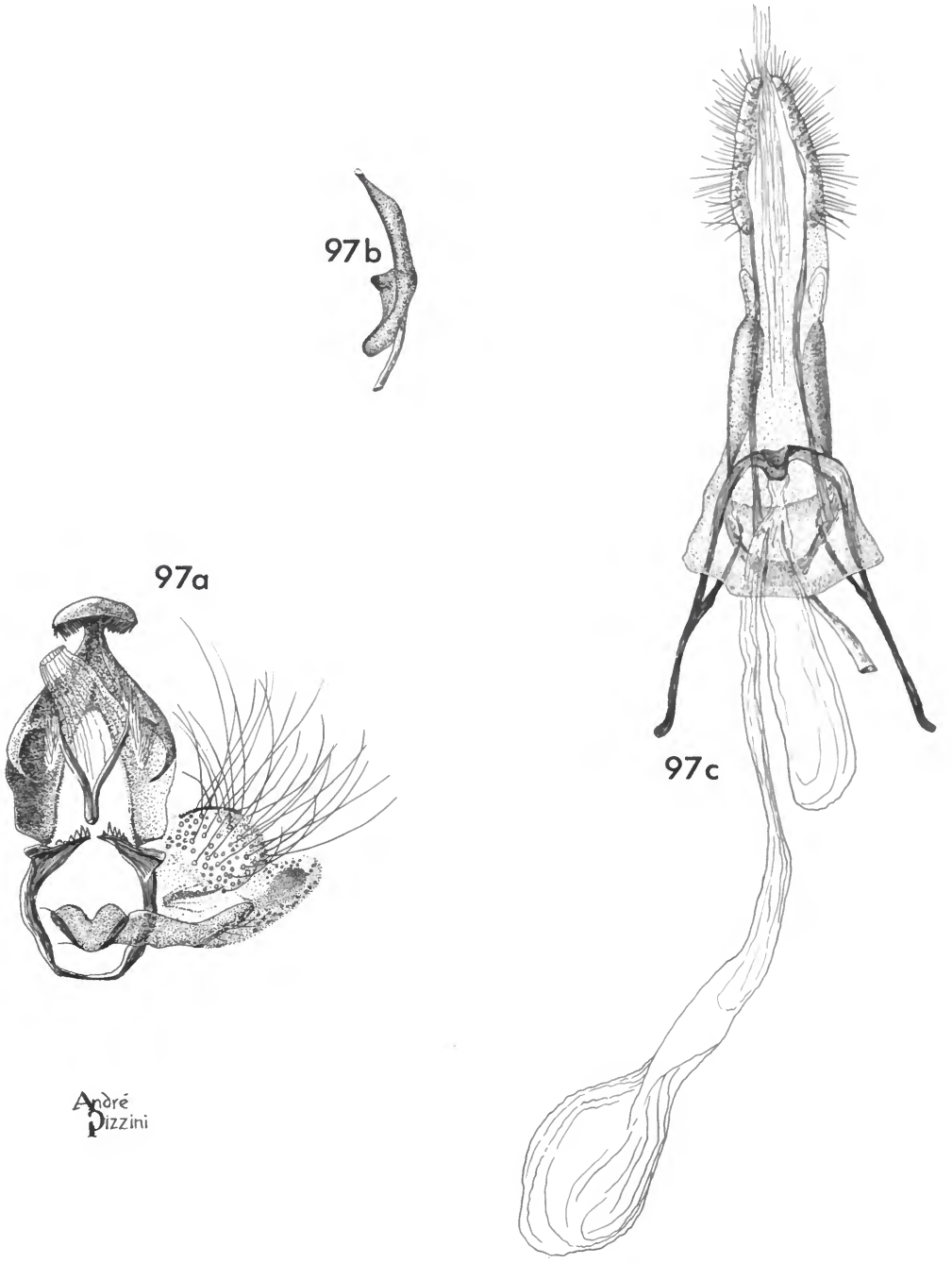


FIGURE 97.—*Dichelopa myopori*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

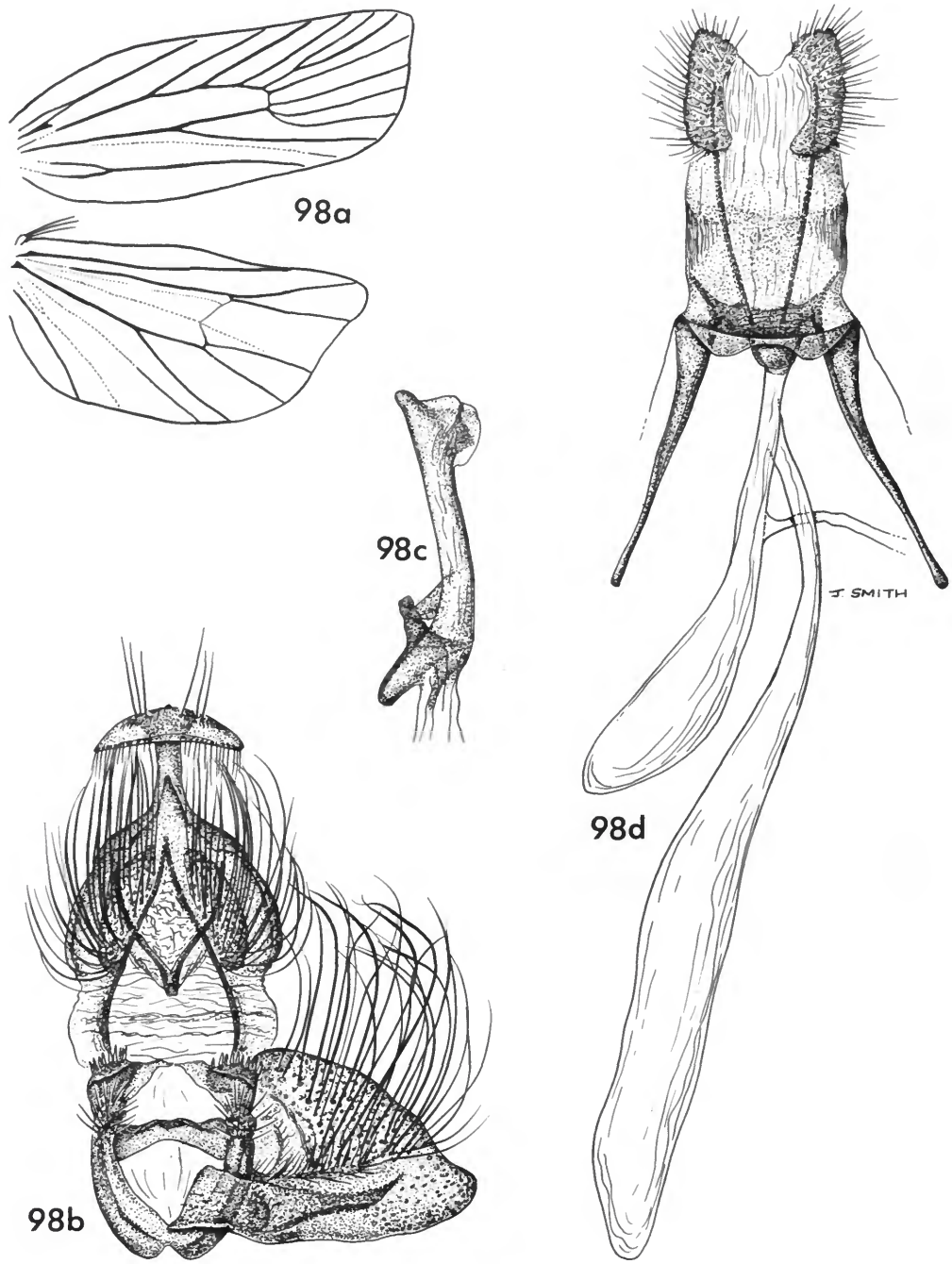


FIGURE 98.—*Dichelopa ceramocausta* Meyrick: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

cucullus scarcely produced, bluntly pointed; sacculus strongly sclerotized with slight projection near base. Uncus slender basally, curved, greatly dilated distally. Vinculum rounded, with median indentation. Tegumen broad, about as long as harpe. Anellus an oval, sclerotized plate with median indentation on posterior edge. Aedeagus slightly curved, moderately stout, terminating in a blunt point distally.

Female genitalia slide JFGC 11344. Ostium small, funnel shaped. Genital plate narrowly sclerotized. Antrum membranous. Inception of ductus seminalis well before ostium. Ductus bursae membranous, slender. Bursa copulatrix membranous, weak. Signum absent.

DISTRIBUTION.—Rapa. The series before me consists of 70 ♂♂ and 113 ♀♀ as follows: Anatakuri nako, ♀; Maii Bay, ♂; Maugaoa, 950′ (292 m), 16 ♂♂, 21 ♀♀; Maurua, 600′ (184 m), 8 ♂♂, 29 ♀♀; Metua nako, 750′ (231 m), 3 ♂♂, 9 ♀♀; Morogouta, 750′ (231 m), 11 ♂♂, 14 ♀♀; Perau, 1900′ (585 m), 3 ♂♂, 3 ♀♀; Piahu, 750′ (231 m), 14 ♂♂, 26 ♀♀; Teumukopuke, 500′ (154 m), 10 ♂♂, 2 ♀♀; Tevaitau 200′–800′ (61–245 m), 3 ♂♂, 8 ♀♀. September to December dates.

Although this was one of the commonest tortricids on the island, we failed to find its food plant. The species is found from sea level to the tops of the mountains but is more frequently encountered at the higher altitudes than at the lower levels.

Dichelopa exulcerata Meyrick

FIGURE 99; PLATE 15*h*

Dichelopa exulcerata Meyrick, 1926, p. 273; 1928, p. 493.—Viette, 1949a, p. 320.—Clarke, 1958, p. 100, pl. 50: figs. 2–2*b*.

Male genitalia slide JFGC 11698. Harpe broadly oval; sacculus not strongly sclerotized; cucullus abruptly narrowed. Socii elongate oval lobes heavily clothed with long setae. Gnathos a narrow hook. Uncus oval; anterior surface moderately clothed with strong setae. Vinculum narrow, rounded. Tegumen rather compressed, about as long as harpe. Anellus a broad U-shaped sclerotized plate. Aedeagus moderately stout, curved, terminating in a distal hook.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa. The 29 specimens before me are from several places on the island as follows: Maugaoa, 800′ (245 m), 2 ♂♂, Morogouta, 750′ (231 m), ♂; Piahu, 750′ (231 m), 5 ♂♂; Teumukopuke, 500′ (154 m), 9 ♂♂; Tevaitau, 750′ (231 m) and 800′ (245 m), 12 ♂♂. Dates of capture are from 18.IX to 3.XI.1963 inclusive.

FOOD PLANT.—Unknown.

Meyrick described *exulcerata* from 3 ♂♂ measuring 26–30 mm. In the series before me there is one specimen measuring 25 mm and one 31 mm. The remainder fall within the dimensions given by Meyrick. This is a variable species ranging from those with a speckled appearance to those with coarse, contrasting spots and blotches. This is one of the few species of this group without the whitish basal part of the hind wing, a character found commonly in species on the island, but with an even grayish fuscous coloring.

The female is unknown.

Dichelopa argyrospiloides, new species

FIGURE 100; PLATE 15*g*

Alar expanse 16 mm.

Labial palpus light cinnamon buff; third segment lightly infuscated. Antenna fuscous with ocherous white annulations; scape light cinnamon buff. Head cinnamon buff; frons ocherous white. Thorax cinnamon buff; tegula paler posteriorly. Forewing ground color ocherous white; from middle of costa to dorsum before tornus a broad, oblique, dark tawny olive fascia confluent at tornus with a broad subterminal area of the same color; a conspicuous triangular spot of ground color, its base on costa, between the transverse fascia and subterminal dark area; on costa, in dark subterminal area, two small spots of ground color; base of dorsum and four ill-defined transverse fasciae from dorsum, fuscous mixed with cinnamon buff; cilia cinnamon buff; pale area with slight silvery luster; underside fuscous except basal third of costa broadly and areas opposite coastal triangle, ocherous white. Hind wing fuscous in apical half, somewhat paler basally; cilia grayish fuscous with darker basal line. Foreleg ocherous white; tarsal segments shaded with fuscous; midleg similar; hind leg ocherous white with very slight grayish suffusion on tibia and tibial spurs. Abdomen grayish fuscous dorsally, light ocherous buff ventrally.

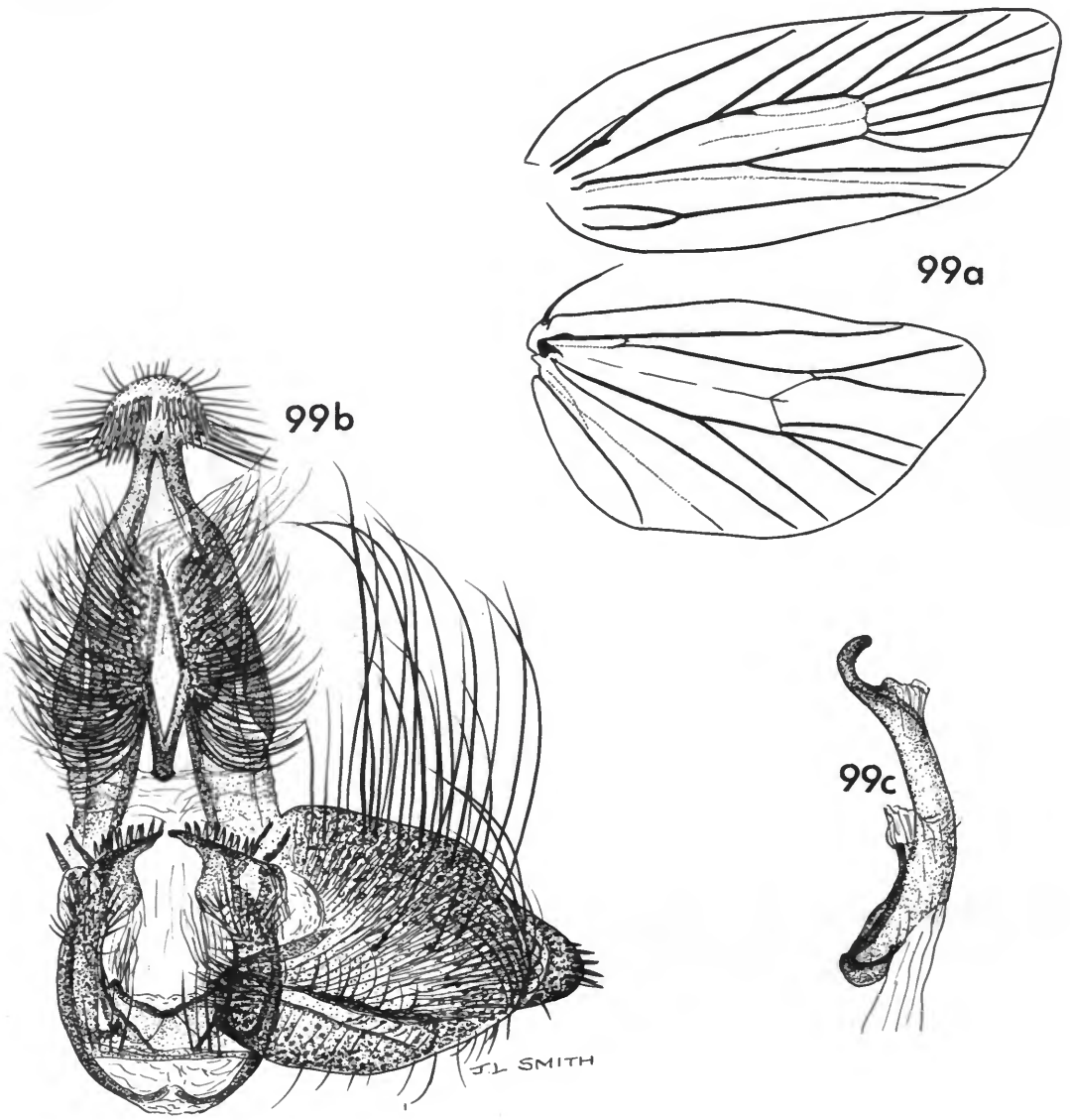


FIGURE 99.—*Dichelopa exulcerata* Meyrick: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus.

Female genitalia slide JFGC 11748. Ostium small, oval, transverse. Genital plate narrowly sclerotized. Antrum narrowly sclerotized. Inception of ductus seminalis from posterior part of accessory bursa. Ductus bursae extremely short, hardly differentiated from bursa copulatrix. Bursa copulatrix long, narrow, membranous. Signum absent.

HOLOTYPE.—USNM 70085.

TYPE LOCALITY.—Rapa, Maurua, 600′ (184 m).

DISTRIBUTION.—Rapa.

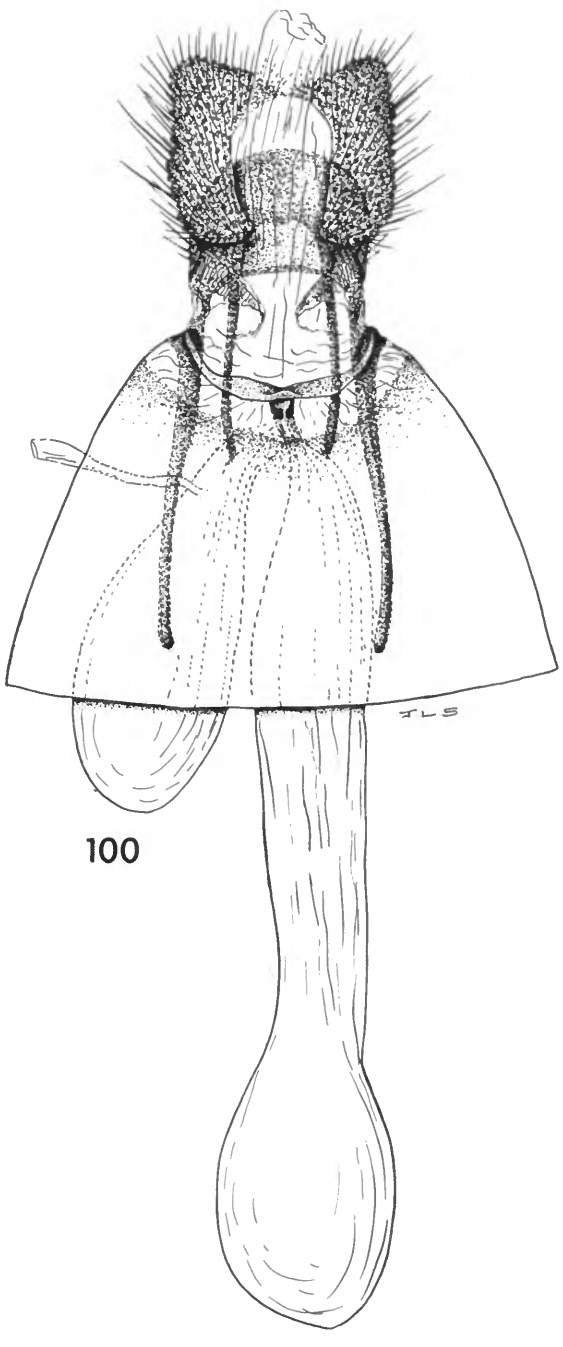


FIGURE 100.—*Dichelopa argyrospiloides*, new species. Ventral view of female genitalia.

FOOD PLANT.—Unknown.

Described from the unique ♀ holotype (25.X.1963).

There is no doubt that *argyrospiloides* and *pulcheria* belong together and constitute a somewhat anomalous species group within *Dichelopa*. The large, thick papillae anales characterize these two species. Unfortunately, the male of *argyrospiloides* is unknown but I suspect that the genitalia will conform to the general pattern that is characteristic of the genus. As in *pulcheria* and *exculcerata* the hind wing is dark and lacks the pale basal portion.

As the name suggests, this species reminds one of the dark form of the North American *Archips argyrospilus* (Walker), but it has a narrower forewing than the latter.

Dichelopa pulcheria, new species

FIGURE 101; PLATE 16*a*

Alar expanse 20–23 mm.

Labial palpus ocherous white; second segment shaded fuscous laterally; third segment fuscous dorsally. Antenna serrulate-fasciculate, pale brownish gray, spotted fuscous in basal half; scape fuscous. Head ocherous white, shaded fuscous anteriorly and posterolaterally. Thorax fuscous with slight brassy hue; tegula ocherous white apically. Forewing ground color ocherous white suffused brownish; basal fifth fuscous; from basal two-fifths of costa to vein 8 before apex a triangular cloud with apex on dorsum before tornus; between veins 8 to 11 three small ocherous-white spots on costa; in pale area between the dark triangular cloud and termen a series of short transverse fuscous dashes; between veins 3 and 6, on termen, an irregular fuscous spot; cilia ocherous white suffused and spotted fuscous. Hind wing dark gray above, ocherous white, wholly mottled dark gray, beneath. Foreleg ocherous white; femur and tibia lightly infuscated; tarsal segments broadly banded fuscous; midleg ocherous white; tibia with two fuscous shaded areas on outer side; hind leg ocherous white. Abdomen grayish fuscous dorsally, ocherous white ventrally; and tuft infuscated ocherous white.

Male genitalia slide JFGC 11410. Harpe broad basally; sacculus strongly sclerotized, produced as a large transverse cone before cucullus; cucullus short,

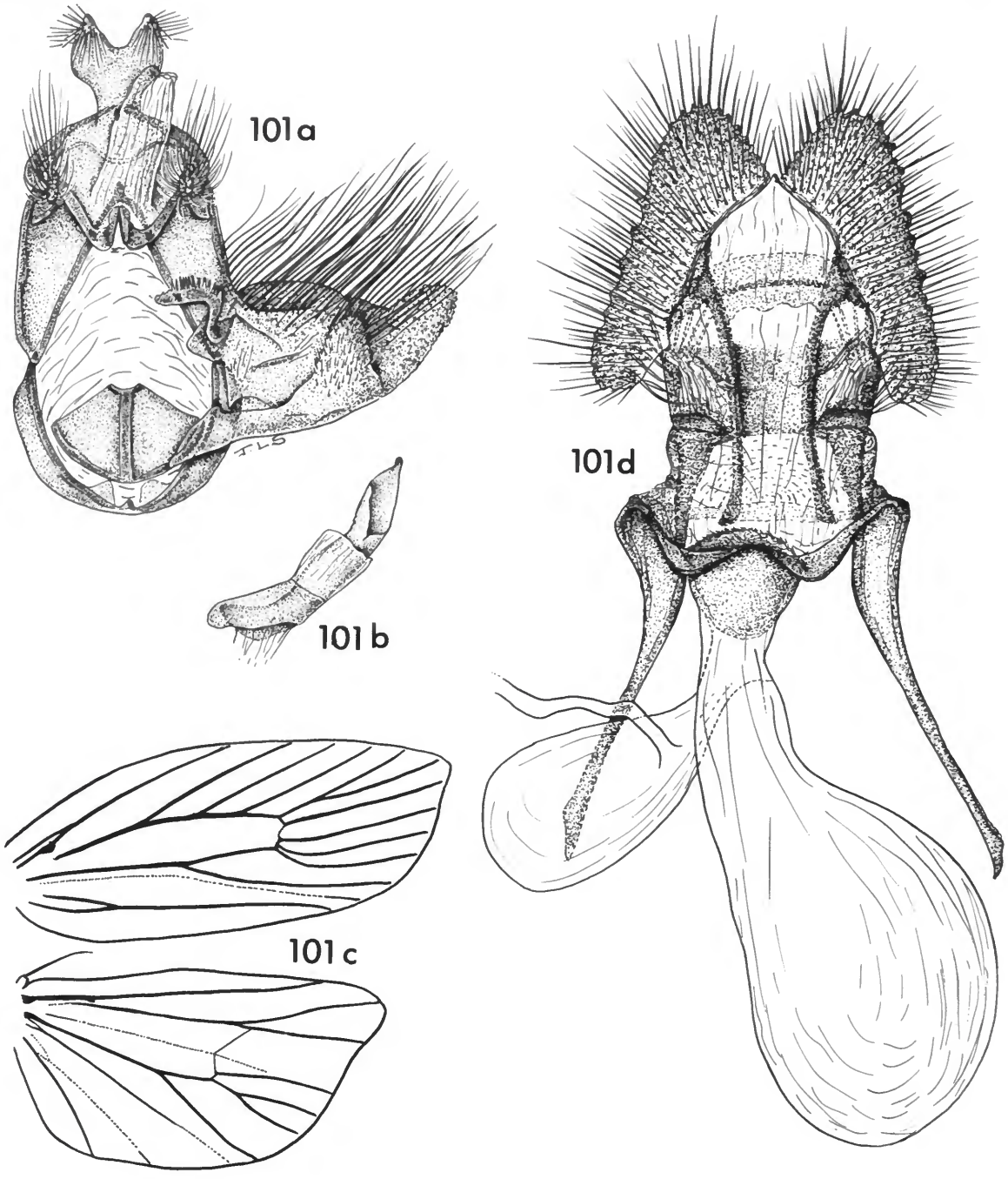


FIGURE 101.—*Dichelopa pulcheria,* new species: *a,* ventral view of male genitalia with left harpe and aedeagus removed; *b,* aedeagus; *c,* venation of right wings; *d,* ventral view of female genitalia.

bluntly pointed. Gnathos terminating in a flat, elongate, very lightly sclerotized plate. Uncus broad basally, widened about middle, narrowed toward distal end and terminating in two widely separated points. Vinculum narrow, rounded. Transtilla with each element C-shaped with long spines from posterior edge. Tegumen about as long as harpe, moderately sclerotized. Anellus a suboval plate, lateral edges produced slightly. Aedeagus short, stout, flattened distally, bluntly pointed apically.

Female genitalia slide JFGC 11749. Ostium broad, slitlike, transverse. Genital plate very narrowly sclerotized. Antrum wide, strongly sclerotized. Inception of ductus seminalis from accessory bursa. Ductus bursae short, wide, scarcely differentiated from the bursa copulatrix. Bursa copulatrix membranous. Signum absent. Papillae anales very broad and strong.

TYPE.—USNM 70098.

TYPE LOCALITY.—Rapa, Perau, 1900′ (585 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype and 2 ♀ ♀ paratypes all with the same data (15.X.1963).

In general appearance *pulcheria* is similar in coloring to *exulcerata* but is a smaller species and can be distinguished easily from the former by the completely mottled underside of the hind wing. Like *exulcerata* it also lacks the pale basal part of the hind wing. In male genitalia *pulcheria* is similar to *iochorda* as seen in the divided apical portion of the uncus. The aedeagi of these two immediately separate them; in *iochorda* the aedeagus is long, slender, slightly curved but in *pulcheria* is short and stout. The females of *iochorda* and *exulcerata* are unknown so no comparison can be made. The female genitalia of *pulcheria* are atypical as can be seen by a comparison with the genitalia of other females of the genus. The venation of *pulcheria,* however, places the species here, as do the male genitalia.

Genus *Nesoscopa* Meyrick

Nesoscopa Meyrick, 1926, p. 271. (Type-species: *Nesoscopa exsors* Meyrick, 1926, p. 271 [by monotypy].)

In his description of the genus Meyrick stated "Forewings . . . 3–5 approximated from near angle . . ." but, in fact, vein 3 is well separated from 4 and veins 4 and 5 are connate. His description of the hind wing is also faulty. He states ". . . 2 from rather near angle, 3–5 rather approximated towards base, 6 and 7 nearly approximated at base." The truth is that vein 2 arises well before angle and 2, 3, and 4 are about equidistant. Moreover, veins 6 and 7 are long stalked.

Nesoscopa exsors Meyrick

FIGURE 102; PLATE 16*b*

Nesoscopa exsors Meyrick, 1926, p. 271; 1928, p. 494.—Viette, 1949a, p. 320.—Clarke, 1958, p. 159, pl. 79: figs. 1–1*d*.

Male genitalia slide JFGC 11742. Harpe very narrow; sacculus lightly sclerotized; cucullus pointed. Socii two elongate, weak lobes. Gnathos nearly as long as harpe, terminating in a sharp point. Uncus short, rounded, armed with a sharp spine on each side. Vinculum broad, rounded. Tegumen rather wide, somewhat longer than harpe. Anellus a small subrectangular, sclerotized plate. Aedeagus moderately stout, curved; vesica armed with a cluster of coalesced cornuti. Transtilla a V-shaped plate with truncated apex.

Female genitalia slide JFGC 11743. Ostium large, broad, anterior lip deeply concave. Genital plate membranous. Antrum conical, sclerotized anteriorly. Inception of ductus seminalis from about middle of ductus bursae. Ductus bursae membranous, slender in posterior half, widened, spiraled and strongly sclerotized in anterior half. Bursa copulatrix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa. There are 24 specimens of this species before me from the following localities on the island: Haurei, ♀; Maugaoa, 950′ (292 m), 2 ♂ ♂, 4 ♀ ♀; Maurua, 600′ (184 m) 2 ♀ ♀; Morogouta, 750′ (231 m), ♂; Teumukopuke, 500′ (154 m), 7 ♂ ♂, 3 ♀ ♀; Tevaitau, 800′ (245 m), 4 ♀ ♀.

FOOD PLANT.—Unknown.

It was not until 1962 that Bradley (1962, p. 251) described a second species of this genus from the New Hebrides. The two species are strikingly similar but can be separated easily by the genitalia.

The three ♂ ♂ specimens from which Meyrick described his genus and species were in indifferent condition so that he missed, and did not mention, the small scale tufts of the forewing.

I know of no other tortricid with structures of the male genitalia such as the uncus, socii, and transtilla of *exsors* and *psarodes*.

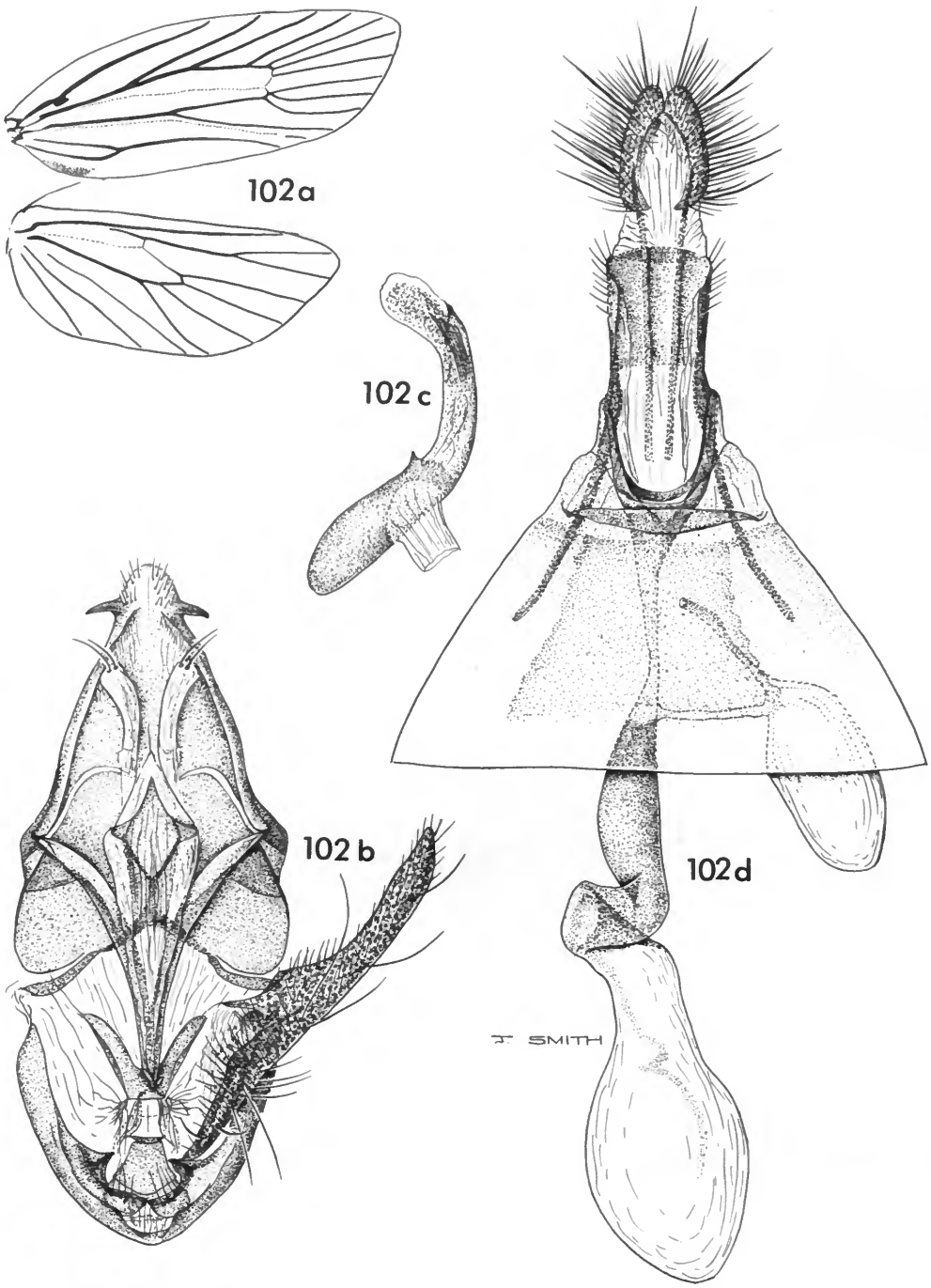


FIGURE 102.—*Nesoscopa exsors* Meyrick: *a*, venation of right wings; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

Family OLETHREUTIDAE

Key to the Genera of Olethreutidae

1. Hind wing with vein 5 straight, parallel to vein 4; veins 3 and 4 stalked ..... *Cryptophlebia*
   Hind wing with 5 bent toward base 2
2. Hind wing with veins 3 and 4 separate or connate 3
   Hind wing with veins 3 and 4 stalked or united 5
3. Forewing with veins 7 and 8 stalked ..... *Tritopterna*
   Forewing with veins 7 and 8 separate 4
4. Hind wing with veins 3 and 4 connate ..... *Platypeplus*
   Hind wing with veins 3 and 4 separate ..... *Bactra*
5. Forewing with veins 3, 4, and 5 approximate at termen ..... *Crocidosema*
   Forewing with veins 3, 4, and 5 well separated at termen ..... *Strepsicrates*

Genus *Tritopterna* Meyrick

Tritopterna Meyrick, 1921, p. 151.
(Type-species: *Tritopterna chionostoma* Meyrick, 1921, p. 152 [by monotypy].)

In Meyrick's description of this genus he states "Forewings. . . . 3 and 4 connate, 8 and 9 out of 7, 7 to termen. Hindwings 3 and 4 connate, 5 approximated at base, 6 and 7 stalked."

Meyrick's description is in error on several points: 3 and 4 of forewing are approximate, 9 is distinctly separate from the stalk of 7 and 8, and 7 goes to apex. In the hind wing 3 and 4 are approximate, 5 is removed from 4, and 6 and 7 are very closely approximate toward base.

It is quite possible that some variation in venation exists, but it appears that creases or folds produced effects that led Meyrick to describe characters that could not be seen clearly without denuding the wings.

Tritopterna anastrepta (Meyrick), new combination

Crusimetra anastrepta Meyrick, 1927, p. 71.

It is surprising that Meyrick described this species in *Crusimetra* when *chionostoma* and *anastrepta* are so similar, except for the snow-white inner surface of the labial palpus of the former. This species has not been found on Rapa but is included here to bring together the two above species and the next one described.

Tritopterna galena, new species

FIGURE 103; PLATE 17*c*, *d*

Alar expanse 12–16 mm.

Labial palpus in ♂, gray; inner surface of second segment blackish fuscous; third segment ocherous white; in female paler with coppery dorsal surface on second segment. Antenna grayish fuscous; scape blackish fuscous. Head grayish fuscous, scales coppery tipped. Thorax blackish fuscous, tegula tipped grayish. Forewing ground color blackish fuscous; beyond basal third overlaid with brown and coppery scales, producing longitudinal streaks of ground color in terminal third; from basal third of costa to apex a series of paired, short ocherous-white striae alternating with fuscous streaks; on tornus two or three leaden gray spots, subterminally a transverse leaden-gray fascia; inside costa, in apical third, an ill-defined series of small leaden-gray spots; cilia fuscous; dorsal tuft of ♂ (absent in ♀) grayish fuscous. Hind wing grayish fuscous with coppery tinge; cilia grayish fuscous with darker basal band. Foreleg grayish fuscous; tarsal segments somewhat paler; midleg similar; hind leg gray; tarsal segments sordid ocherous white. Abdomen fuscous dorsally, grayish ventrally in ♂; in ♀, grayish fuscous dorsally, sordid white ventrally.

Male genitalia slide JFGC 11380. Harpe longer than tegumen; costa concave; cucullus oval, clothed with long setae; ventral edge with six short, stout setae; sacculus moderately sclerotized, with short clasper from beyond middle; a series of long setae from near base. Uncus short, slender, distally expanded laterally into two points; apex truncate. Vinculum narrowly rounded. Tegumen stout, broad, with two long, curved setae posteriorly from each side. Anellus broader than long. Aedeagus short, stout, lightly sclerotized.

Female genitalia slide JFGC 11446. Ostium oval, transverse. Antrum membranous. Inception of ductus seminalis from middle of ductus bursae. Ductus bursae strongly sclerotized, twisted for two-thirds its length. Bursa copulatrix membranous, slightly granular. Signum absent. Lamella antevaginalis lightly

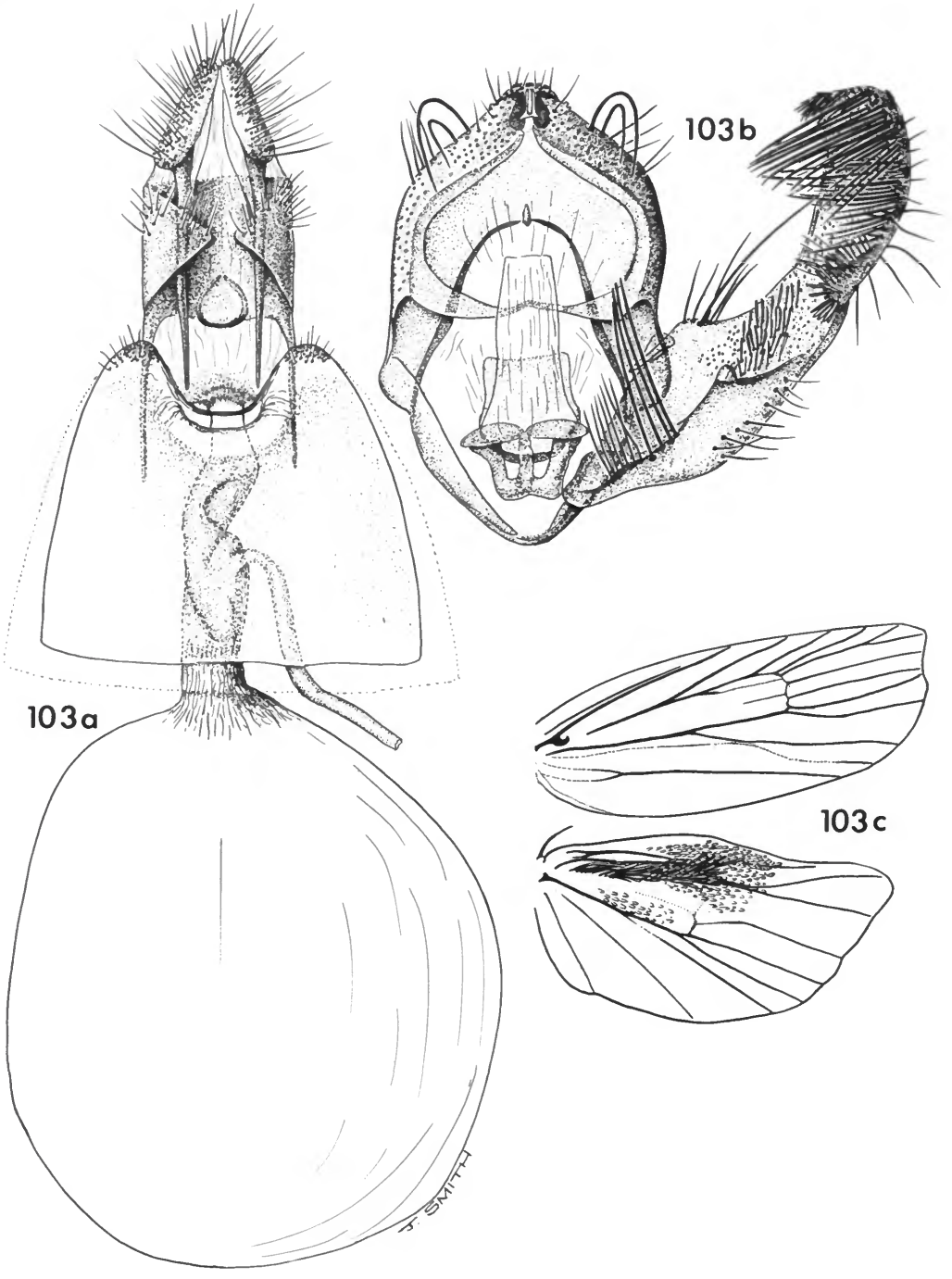


FIGURE 103.—*Tritopterna galena,* new species: *a,* ventral view of female genitalia; *b,* ventral view of male genitalia with aedeagus in situ; *c,* venation of right wings.

sclerotized. Lamella postvaginalis strongly but narrowly sclerotized.

HOLOTYPE.—USNM 70091.

TYPE LOCALITY.—Rapa, Teumukopuke, 500′ (154 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (7.X.1963) and one ♀ paratype with identical data.

It appears that *galena* is related most nearly to *anastrepta* but differs from it by the truncate uncus, the presence of a spined nodule at the base of cucullus, and narrower and longer cucullus. I have not seen the female of *anastrepta*.

Genus *Crocidosema* Zeller

Crocidosema Zeller, 1847, p. 721. (Type species: *Crocidosema plebejana* Zeller, 1847, p. 721 [by monotypy].)

Crocidosema plebejana Zeller

FIGURE 104; PLATE 17*a, b*

Crocidosema plebejana Zeller, 1847, p. 721.—Lederer, 1859, p. 367.—Staudinger and Wocke, 1871, p. 263, no. 1269.—Ragonot, 1894, p. 221, no. 1221.—Staudinger and Rebel, 1901, p. 110, no. 1968.—Amsel, 1936, p. 351.—Rebel, 1940a, pp. 36, 55.—Bradley, 1961, p. 121.—Agenjo, 1963a, p. 5.

Crocidosema plebeiana Zeller, Walsingham, 1892, pp. 506, 544; 1897, p. 127; 1907, p. 675, pl. 10: fig. 15; 1907, p. 1002.—Meyrick, 1908, p. 720.—Spuler, 1910, p. 273, pl. 85: fig. 45.—Fletcher, 1921, p. 52.—Heinrich, 1921, p. 822, pls. 99: fig. A; 102: figs. C, D; 103: fig. E; 105: fig. G; 106: fig. B; 108: figs. A–D.—Heinrich, 1923, p. 190, figs. 10, 29, 29a, 325.—Meyrick, 1924, p. 546.—Gurney, 1925, p. 231.—Ballard, 1925, p. 521.—Willcocks, 1925, pp. 29, 335.—Swezey, 1926c, p. 75.—Meyrick, 1926, p. 273.—Bottimer, 1926, p. 817.—Meyrick, 1927, p. 72.—Hopkins, 1928, p. 47.—Hudson, 1928, p. 248, pl. 49: fig. 10.—Meyrick, 1929, p. 494.—Forbes, 1930, p. 91.—Meyrick, 1930, p. 225.—Heinrich, 1931, p. 11, pl. 7: fig. 23.—Forbes, 1931, p. 350.—Bedford, 1931, p. 391; 1932, p. 622.—Fletcher, 1932, p. 20.—Cowland, 1933, p. 583.—Meyrick, 1934a, p. 109; 1934b, p. 346.—McDunnough, 1939, p. 50.—Swezey, 1942, p. 211.—Wells, 1943, p. 265.—Thompson, 1945, p. 163.—Russo, 1947, p. 420.—El Zoheiry and Asem, 1952, p. 472, pls. 1, 2, 3; 1953, p. 229.—Swezey, 1954, p. 196.—Clarke, 1958, p. 319, pl. 158: figs. 1–1*a*, 2–2*a*.—Kamel and Shazli, 1959, p. 193, figs. 1A–G, 2A–H.—MacKay, 1959, p. 91, fig. 79.—Kimball, 1965, p. 261.—Huggins, 1966, p. 256.

Crocidosema plebiana [*sic!*] Zeller, Willcocks, 1916, pp. vii, 310, figs. 5, 6.—Swezey, 1942, p. 211.—Linsley and Usinger, 1966, p. 163.

Eucosma plebeiana (Zeller), Walsingham, 1914, p. 231.—Philpott, 1923, p. 151.

Crocidosema ptiladelpha Meyrick, 1917b, p. 18.

Crocidosema synneurota Meyrick, 1926, p. 276.

Proteopteryx blackburnii Butler, 1881, pp. 393, 394.

Penthina altheana Mann, 1855, p. 555.

Grapholitha altheana (Mann), Lederer, 1858, p. 343.—Heinemann, 1863, p. 241.

Steganoptycha altheana (Mann); Staudinger and Wocke, 1871, p. 260.

Stechanoptycha [*sic*] *altheana* (Mann), Hartmann, 1879, p. 191, no. 1221.

Steganoptycha signatana Walsingham (not Douglas), 1894, pp. 537, 541.

Grapholitha peregrinana Möschler, 1866, p. 139.

Steganoptycha obscura Wollaston, 1879, p. 341.

Paedisca lavaterana Milliére, 1863, p. 290, pl. 34: figs. 9–13.

TYPES.—British Museum (Natural History), (*ptiladelpha, synneurota, blackburnii, plebejana*); Vienna Museum (?) (*altheana*).

TYPE LOCALITIES.—"Syracuse, 10 May" (*plebejana*); Ecuador (*ptiladelphia*); Albermarle, Galapagos Islands (*synneurota*); Hawaiian Islands (*blackburnii*); Madeira (*signatana*); ? (*altheana*).

The Rapa population clearly demonstrates the present-day activity of evolutionary processes. Although, at present, we cannot justify specific separation from the remaining parts of the world population of *plebejana,* the fact remains that the Rapa specimens exhibit structural differences in the genitalia that set them apart from, for example, New World specimens. In the North American examples there are two large, heavy setae from the outside of the cucullus (Figure 104*c*), but from the cucullus of the Rapa males, three or four rather weak spines emerge (Figure 104*d*). The females show no appreciable differences except the lateral points of lamella antivaginalis are larger. I strongly suspect now that the similarly marked moths from the Juan Fernandez Islands, for which I erected the genus *Parasuleima,* represent no more than an extreme expression of change in the single species, *plebejana.* I have not seen a male of the Juan Fernandez population, and despite the fact that veins 3 and 4 of the hind wing are coincident (except two examples with very short branches on one side in each specimen) the females exhibit unmistakable similarity and demonstrate equally unmistakable close affinity. The signa of the Juan Fernandez females are considerably smaller than those of the Rapa females but this development is one of degree, not structure.

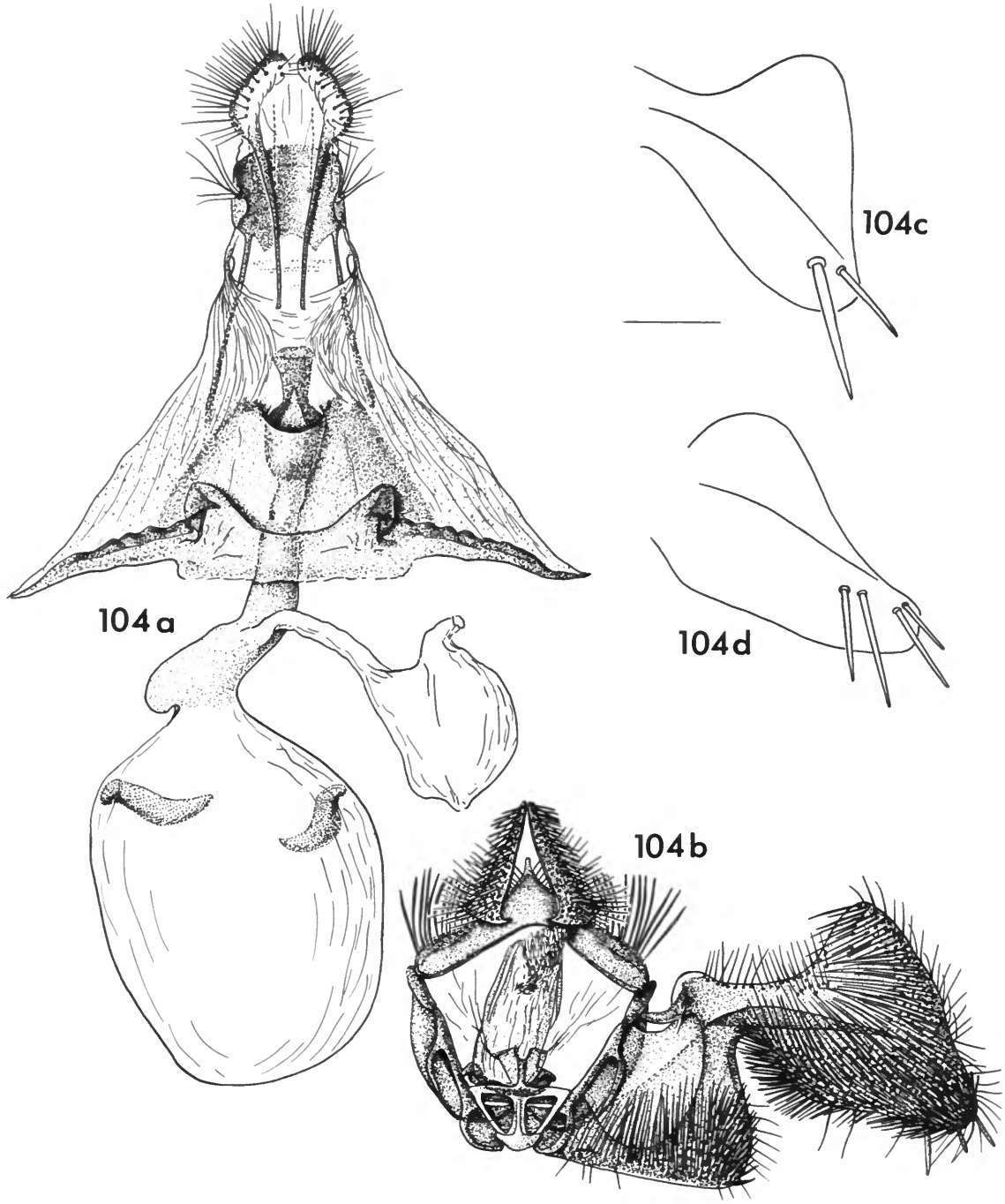


FIGURE 104.—*Crocidosema plebejana* Zeller: *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe removed and aedeagus in situ; *c*, cucullus of North American specimen; *d*, cucullus of specimen from Rapa.

Genus *Strepsicrates* Meyrick

Strepsiceros Meyrick, 1881, p. 678. (Type-species: *Sciaphila ejectana* Walker, 1863, p. 350 [subsequent designation by Fletcher, 1929, p. 211].) (praeocc.).
Strepsicrates Meyrick, 1888, p. 73 (substitute name).

Strepsicrates holotephras (Meyrick)

FIGURE 105; PLATE 16*c*, *d*

Spilonata holotephras Meyrick, 1924, p. 67; 1927, p. 71; 1929, p. 495.—Viette, 1949a, p. 320.—Swezey, 1942, p. 210.
Eucosma eumarodes Meyrick, 1924, p. 68.
Strepsicrates holotephras (Meyrick), Clarke, 1958, p. 596, pl. 292: figs. 1–1*a*; 2–2*b*.

TYPES.—In the British Museum (Natural History).

TYPE LOCALITIES.—Fiji, Lautoka (*holotephras*); Fiji, mountains near Lautoka (*eumarodes*).

FOOD PLANTS.—*Psidium guajava* L. (*tuvava*), *Psidium littorale* Raddi, *Eugenia jambos L.* (*kaika*), *Metrosideros collina* var.? *villosa* A. Gray (*rata*) (all Myrtaceae).

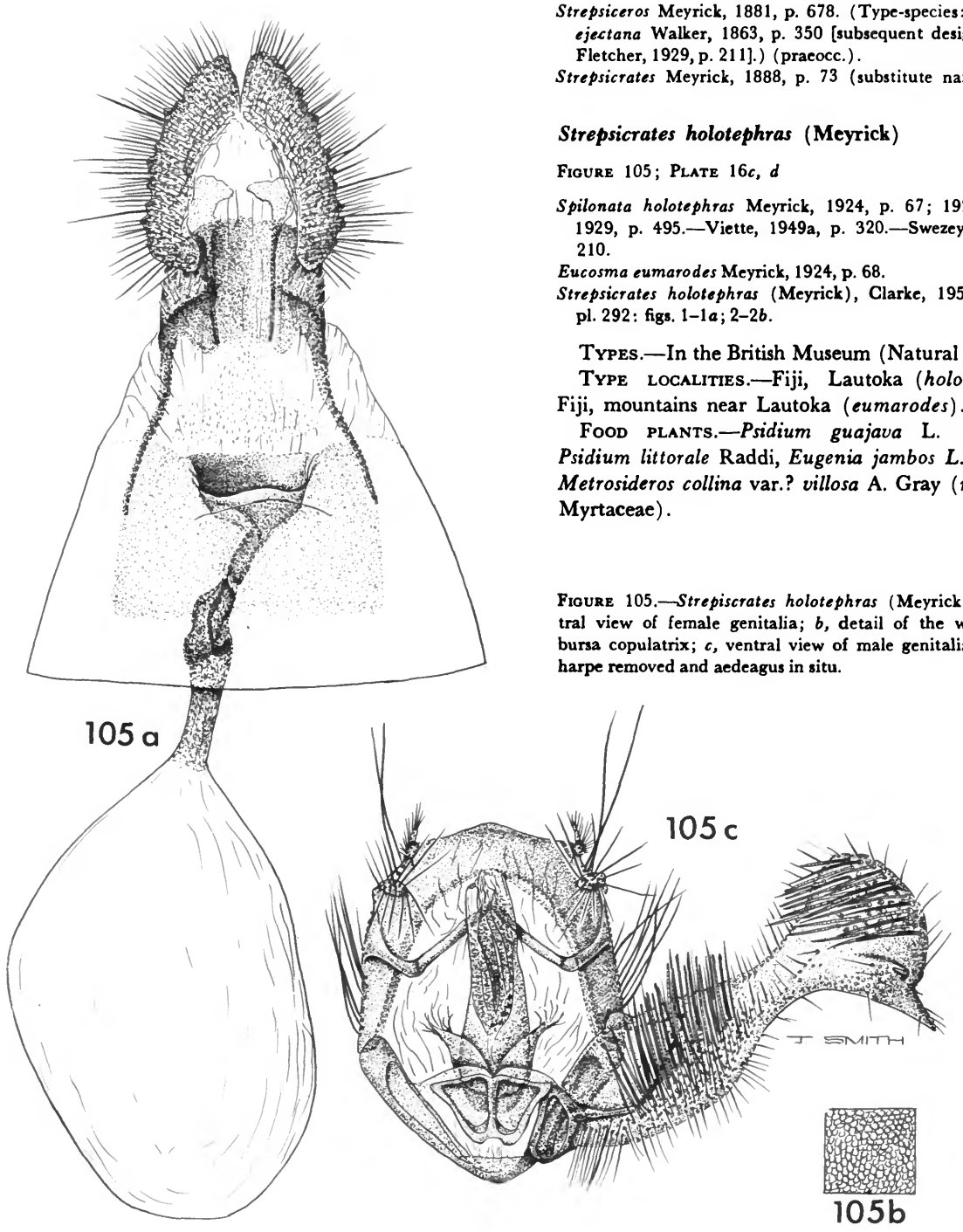


FIGURE 105.—*Strepiscrates holotephras* (Meyrick): *a*, ventral view of female genitalia; *b*, detail of the wall of the bursa copulatrix; *c*, ventral view of male genitalia with left harpe removed and aedeagus in situ.

DISTRIBUTION.—Samoa, Fiji, Marquesas (Nuka Hiva, Hiva Oa, Tahuata), Tahiti, and Rapa. Our series from Rapa consists of 99 specimens (54 ♂♂, 45 ♀♀) as follows: Haurei, 46 ♂♂, 41 ♀♀; Maurua, 600′ (184 m), ♂; Morogouta, 750′ (231 m), ♂; Point Maraia, ♀; Taga, 575′ (169 m), ♂; Point Teakauraee, 2 ♂♂, ♀; Teumukopuke, 500′ (154 m), 3 ♂♂, ♀; Tevaitau, 800′ (245 m), ♀.

Although there is some variation in this species, the specimens are sufficiently similar to be easily placed. It is therefore surprising that Meyrick should describe the species under the two names and in two genera from Fiji specimens collected within a very few miles of each other.

On Rapa, *holotephras* is very common, and although its food plants are myrtaceous we reared the species from pandanus wood and leaves of several other plants where apparently the larvae had crawled to pupate. Pupation generally occurs in a characteristically folded leaf formed by cutting the leaf from one edge and folding the cut piece toward the midrib. Full-fed larvae, given thin plastic (cellophane), performed the same routine cutting and folding. Swezey records this species from the "terminal undeveloped leaves of guava" in Samoa.

The moths come to light readily but were collected frequently in the daytime when they were flushed from grass and fern ground cover.

Strepsicrates thyellopis (Meyrick), new combination

FIGURE 106; PLATE 16*e, f, g, h*

Spilonota thyellopis Meyrick, 1926, p. 273; 1928, p. 495.—Viette, 1949a, p. 320.—Clarke, 1958, p. 588, pl. 293; fig. 4.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa. This common species is found nearly everywhere on the island. We have 223 specimens, reared and collected at light, as follows: Haurei, ♀; Maugaoa, 800′ (245 m) and 950′ (292 m), 25 ♂♂, 21 ♀♀; Maurua, 600′ (184 m), 13 ♂♂, 4 ♀♀; Metua nako, 750′ (231 m), 2 ♂♂, ♀; Morogouta, 750′ (231 m), 4 ♂♂, 2 ♀♀; Perau, 1900′ (585 m), 32 ♂♂, 24 ♀♀; Piahu, 750′ (231 m), 7 ♂♂, 4 ♀♀; Point Maraia, ♀; Point Teakauraee, 25 ♂♂, 11 ♀♀; Pukutaketake, 1000′ (307 m), ♂; Teumukopuke, 500′ (154 m), 20 ♂♂, 4 ♀♀; Tevaitau, 200′ to 800′ (61–245 m), 5 ♂♂, 7 ♀♀.

FOOD PLANTS.—*Metrosideros collina* var. ? *villosa* and *Metrosideros collina* var. ? *glaberrima*. Most of the reared material is from the variety *villosa*, which grows virtually from sea level to the tops of the mountains.

The young larva of *thyellopis* ties the terminal leaves and skeletonizes them on the inner surfaces. The trichomatous covering of the leaves is mixed with frass and ejected in a conspicuous mass at the tip of the tied leaves. In later instars the larva may tie several larger leaves together and eject frass and pubescent material as a rim around the feeding area between the tied leaves.

Strepsicrates dilacerata (Meyrick) is very closely related to *thyellopis* and undoubtedly the larva will be found on some myrtaceous shrub as is that of *thyellopis*. The type of *thyellopis* lacks the abdomen so it was impossible to bring these two species together in their proper relationship until the present time. The differences between the two are slight; the neck of the harpe of *thyellopis* is only about two-thirds the width of that of *dilacerata* and the constriction of the lamella postvaginalis of *thyellopis* is twice the width of that of *dilacerata*.

I have seen only flown specimens of *dilacerata*, but they appear to be consistently paler than specimens of *thyellopis*, and average smaller.

Meyrick described *thyellopis* from flown specimens which are marked as shown in the previously published figure (Clarke, 1958) and in Plate 16*e* of this work. Reared specimens are very dark, as in Plate 16*h*, showing none of the contrasting whitish and dark gray mottling. Instead, the lighter areas are purplish gray and the dark areas are blackish fuscous. Frequently the dark markings are narrowly edged with ochraceous orange, but this and the purplish color are lost in the flown specimens shortly after emergence.

Genus *Platypeplus* Walsingham

Platypeplus Walsingham, 1887, p. 495. (Type-species: *Eccopsis aprobola* Meyrick, 1886b, p. 275 [by monotypy].)

Platypeplus aprobola (Meyrick)

FIGURE 107; PLATE 18 *a, b*; PLATE 29*a*

Eccopsis aprobola Meyrick, 1886b, p. 275.

Argyroploce aprobola (Meyrick), 1910, p. 218; 1911a, p. 275; 1911b, p. 269; 1914a, p. 49.—Fletcher, 1917, pp. 219, 230, 267.—Rao, 1920, p. 282.—Fletcher, 1921, p. 57.—Meyrick, 1926, p. 273; 1927, p. 72; 1928, p. 496.—Joannis, 1930, p. 719.—Fletcher, 1932, p. 27, pl. 18.—

Viette, 1949a, p. 320.—Roonwal and Bhasin, 1954, pp. 51, 73.—Diakonoff, 1960, p. 133.—Liu, 1964, p. 145.

Temnolopha metallota Lower, 1901, p. 73.

Platypeplus aprobola (Meyrick), Walsingham, 1887, p. 495, pl. 208: fig. 2.—Fletcher, 1929, p. 179.—Clarke, 1958, p. 572, pl. 285; figs. 1–1*a*.—Diakonoff, 1961, p. 68, fig. 24.

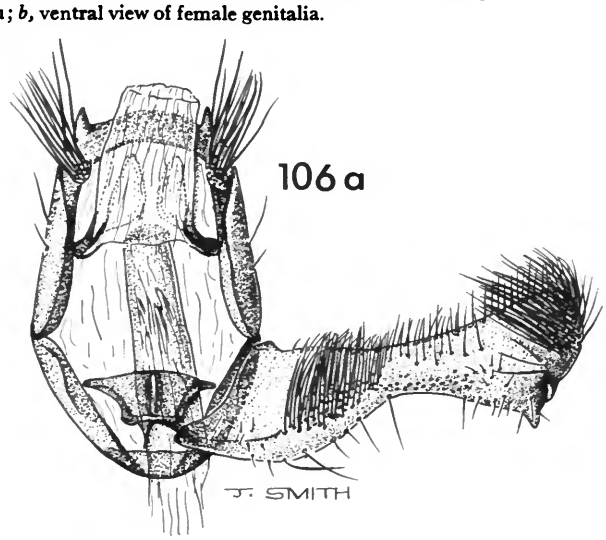
TYPES.—British Museum (Natural History), (*aprobola*); South Australian Museum, Adelaide, (*metallota*) (?).

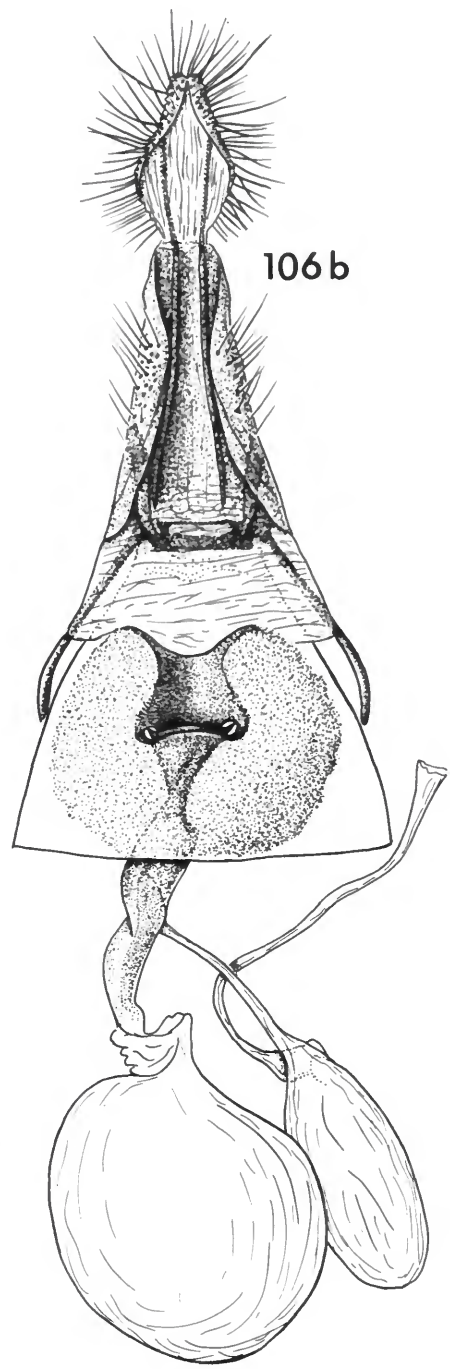
TYPE LOCALITIES.—Tonga (*aprobola*); Cooktown, Queensland (*metallota*).

DISTRIBUTION.—Throughout the Indo-Australian region to the South Pacific islands, including the Society Islands (Tahiti, Raiatea), Austral (Tubuäi) Islands (Rurutu, Raivavae, Rapa), north to Formosa—also Natal. From Rapa we have a series of 141 specimens (70 ♂♂, 71 ♀♀) from the following localities: Haurei, (64 ♂♂, 65 ♀♀); Point Teakauraee (5 ♂♂, 4 ♀♀); Tevaitau (♂, ♀); Maurua (♀).

FOOD PLANTS.—This species has been reared from numerous hosts throughout its range. On Rapa we reared it from the following plants: *Psidium guajava* L., (native name *tuvava*); *Metrosideros collina* (Forster) A. Gray var.? *glaberrima* A. Gray; *M. c.* var.? *villosa* A. Gray (native name *rata*); *Eugenia jambos* L. (all Myrtaceae); *Mangifera indica* L.

FIGURE 106.—*Strepiscrates thyellopis* (Meyrick): *a*, ventral view of male genitalia with left harpe removed and aedeagus in situ; *b*, ventral view of female genitalia.





(native name *vi rapa*) (Anacardiaceae); *Bidens pilosa* L. (Compositae). The *Bidens* record is based on a specimen reared from a pupa found in a folded leaf and appears to have been an accidental use of the leaf for pupation only.

Although *aprobola* rarely comes to light, it is extremely abundant in the daytime, particularly in the late afternoon. It was common from September to December.

Meyrick's specimens measure 19–20 mm in alar expanse, but the Rapa population varies from 12–22 mm, most of them being large. At best, this is a complex species exhibiting considerable variation within any isolated population and more between populations from different islands. Undoubtedly, the careful study of large quantities of material from a wide area in the Pacific will reveal discrete elements, probably of specific rank. In the meantime, it is not possible to delimit the segregates, and since they are obviously nearly related I am retaining the name *aprobola* for the entire complex.

Genus *Bactra* Stephens

Bactra Stephens, 1834, p. 124. (Type-species: *Tortrix lanceolana* Hübner, 1800, fig. 80 [by original designation].)

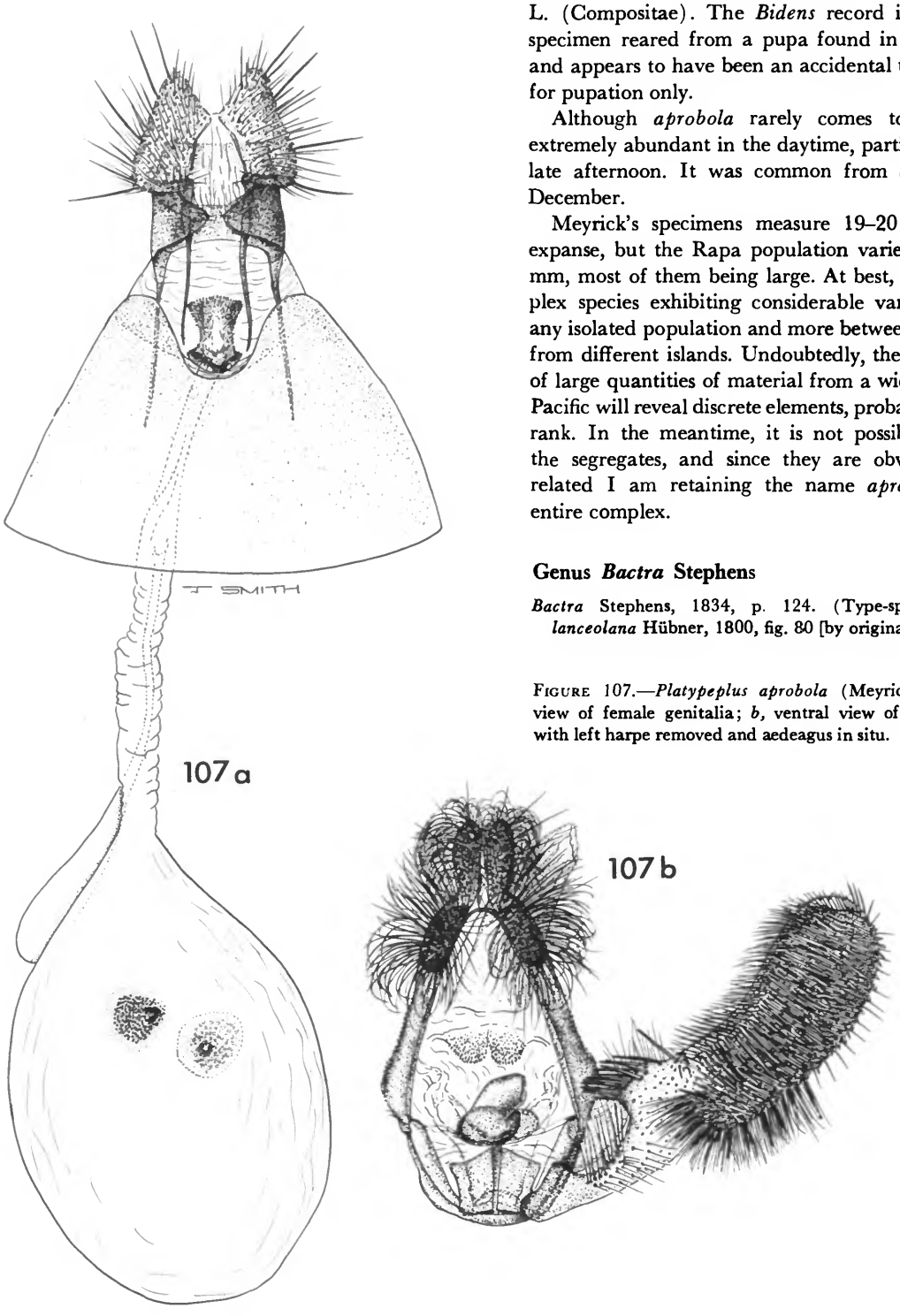


FIGURE 107.—*Platypeplus aprobola* (Meyrick): *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe removed and aedeagus in situ.

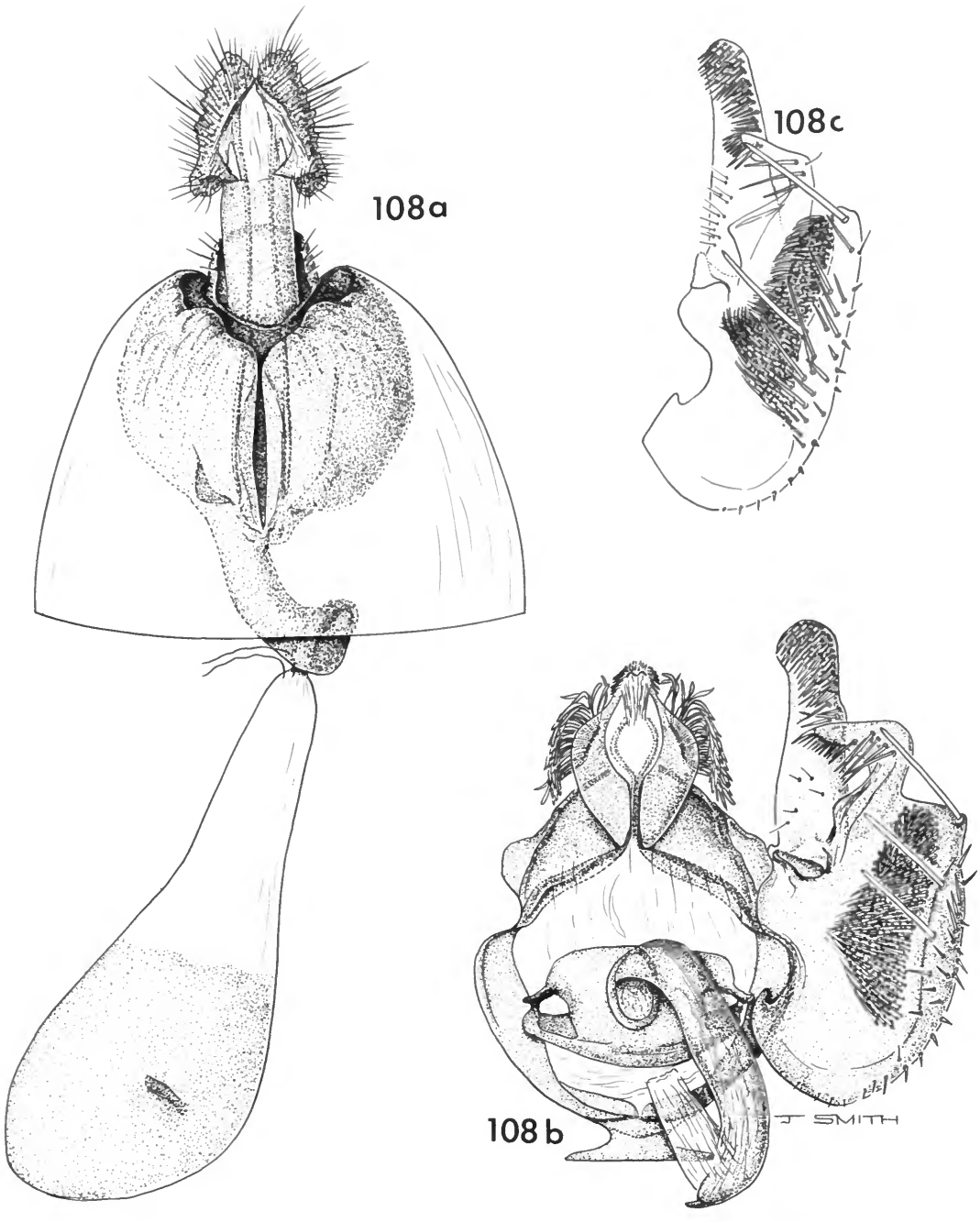


FIGURE 108.—*Bactra litigatrix* Meyrick: *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe removed and aedeagus in situ; *c*, right harpe of another specimen showing variation.

Bactra litigatrix Meyrick

FIGURE 108; PLATE 17*e, f, g, h*

Bactra litigatrix Meyrick, 1929, p. 495.—Viette, 1949, p. 320.—Clarke, 1958, p. 312, pl. 155; figs. 3–3*a*.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Society Islands, Tahiti, Fautaua, 2,500 feet.

FOOD PLANT.—Unknown.

DISTRIBUTION.—Tahiti, Raiatea, and Rapa. From Rapa we have a series of 91 specimens (74 ♂♂, 17 ♀♀) as follows: Anatakuri Bay, ♂; Anatakuri nako, ♂; Haurei, 59 ♂♂, 12 ♀♀; Maii Bay, ♂; Maugaoa, 950′ (292 m), ♂; Maurua, 900′ (276 m), ♂; Morogouta, 700′ (215 m), 2 ♂♂; Pariati Bay, 3 ♂♂, 2 ♀♀; Point Teakauraee, 6 ♂♂, 2 ♀♀; Teumukopuke, 500′ (154 m), ♀. The dates range from 23 September to 28 November. Unquestionably, the species will be found all over the island. Although we did not rear *litigatrix*, the food plants of species of this genus, Cyperaceae, abound from sea level to the tops of the highest peaks. The majority of our specimens came from the taro beds at the southern boundary of the village where Cyperaceae were abundant.

The intraspecific variation of this species can be seen readily in the photographs. Some specimens are contrastingly marked, others are nearly immaculate. Slides examined: JFGC 7327, 11319, 11320, 11321, 11322, 11323.

The wing expanse given by Meyrick is 13–14 mm. Our specimens range in size from 11–18 mm.

Genus *Cryptophlebia* Walsingham

Cryptophlebia Walsingham, 1899, p. 105. (Type-species: *Cryptophlebia carpophaga* Walsingham, 1899, p. 106 [by monotypy and original designation].)

Cryptophlebia nythobia, new species

FIGURE 109; PLATE 18*c*

Alar expanse 22 mm.

Labial palpus wood brown, infuscated, and with faint violaceous reflections on outer side of second segment; third segment fuscous. Antenna grayish fuscous; scape wood brown. Head and thorax wood brown; posterior thoracic crest and anterior part of tegula mixed with fuscous. Forewing ground color wood brown, almost obliterated by gray scales and a faint violaceous hue; on costa a series of many

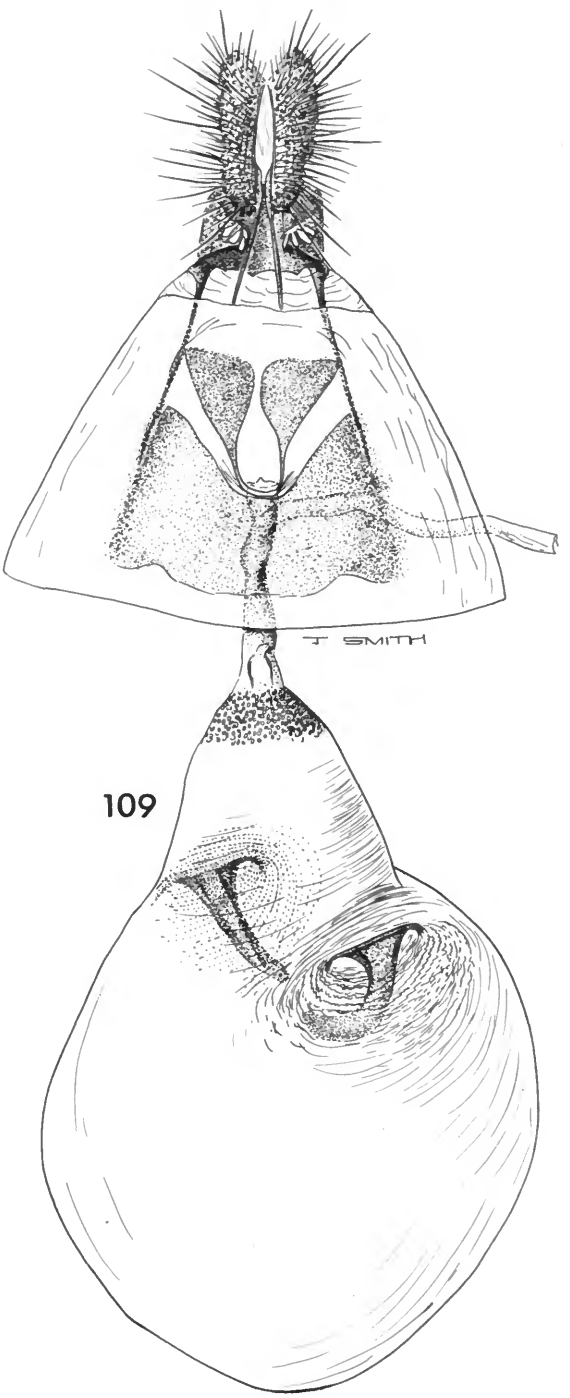


FIGURE 109.—*Cryptophlebia nythobia*, new species. Ventral view of female genitalia.

fuscous strigulae; surface of wing marked with many scattered, short, transverse fuscous dashes; across middle an oblique brown fascia extends from inside middle of dorsum to vein 9, beyond end of cell; black scales irregularly scattered along the fascia; at end of cell a conspicuous white spot; tornal spot indicated by a short oblique black bar and a few black scales on margin; from about apical fourth, on vein 9, an outwardly curved row of black dashes, edged with wood brown, extends to vein 4; cilia tawny with a darker basal line; underside, along costa, olive buff, mottled with fuscous. Hind wing grayish fuscous; underside mostly olive buff mottled with fuscous; cilia grayish fuscous with some olive buff scale mixed. Foreleg wood brown suffused fuscous; tarsi fuscous narrowly annulated with buff; (midleg missing); hind leg light olive buff; terminal four tarsal segments banded with grayish fuscous. Abdomen grayish fuscous dorsally, pale clay color ventrally with fuscous median longitudinal line.

Female genitalia slide JFGC 11376. Ostium U-shaped. Antrum a short, sclerotized band. Inception of ductus seminalis dorsal and immediately anterior to antrum. Ductus bursae short; surface granular. Bursa copulatrix pear shaped; posteriorly granular. Signa two large curved, narrow blades. Lamella antevaginalis more or less rectangular, sclerotized, with a deep concavity posteriorly. Lamella postvaginalis consisting of two elongate triangular, sclerotized patches.

HOLOTYPE.—USNM 70092.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the unique ♀ holotype (19.IX. 1963).

Unfortunately, the male of *nythobia* is unknown, but the female suggests that this species is closely related to *C. ombrodelta* (Lower). The female of *nythobia,* however, lacks the conspicuous tornal spot of *ombrodelta,* this being indicated only by a short, black dash diagonally between veins 1c and 2 and a few black scales on the tornal margin. The lamella postvaginalis of *ombrodelta* also lacks the sclerotized patches of *nythobia.*

Family CARPOSINIDAE

Genus *Carposina* Herrich-Schäffer

Carposina Herrich-Schäffer, 1853, p. 38, pl. 12; figs. 1, 2. (Type-species: *Carposina berberidella* Herrich-Schäffer, 1853 [designated by Fernald, 1908, pp. 34, 59].)

Carposina paracrinifera, new species

FIGURE 110; PLATE 18*e, g*

Alar expanse 13–15 mm.

Labial palpus white; in ♂ second segment shaded and irrorate with blackish fuscous; in ♀ second segment shaded and irrorate with blackish fuscous; third segment with broad blackish fuscous band on outer side. Antenna gray; scape white. Head white with narrow line of blackish fuscous on face laterally. Thorax very pale ochraceous buff with large grayish-fuscous blotch dorsally; tegula tipped gray. Forewing ground color sordid white; extreme base ochraceous buff with costal edge, spot on angle, and a small spot on outer edge grayish fuscous; on costa at one-third, middle, and two-thirds blackish-fuscous spots; subapically on costa two similarly colored small spots; six clusters of raised scales, in pairs at one-third, middle, and two-thirds, blackish fuscous edged white and light ochraceous buff; a grayish suffusion between the middle and outer pair of scale tufts, each scale of which is finely and narrowly edged ochraceous buff; midway between the outer pair of scale tufts and termen a transverse grayish suffusion, scales edged with ochraceous buff, mixed with scattered black scales; along termen a series of small, suffused black spots mixed with ochraceous buff; cilia grayish. Hind wing shining pale grayish fuscous; cilia grayish with darker basal band. Foreleg ocherous white overlaid fuscous on outer side; tarsal segments fuscous annulated; midleg similar; hind leg ocherous white, lightly suffused grayish on outer side. Abdomen ocherous white suffused grayish dorsally.

Male genitalia slide JFGC 11453. Harpe rather narrow, somewhat broader basally than at middle, narrowest slightly before cucullus; cucullus terminating in a sharp hook. Gnathos consisting of two convergent, slender processes, terminating in a cluster of setae. Uncus absent or only weakly indicated. Vinculum elongate, narrowly rounded. Tegumen very broad, short, little more than one-third the length of harpe. Anellus a small sclerotized plate. Aedeagus long, slender, dilated beyond middle; vesica with well-developed cluster of strong cornuti.

Female genitalia slide JFGC 11454. Ostium transverse, oval, large. Antrum strongly sclerotized. Inception of ductus seminalis posterior to middle of ductus bursae. Ductus bursae sclerotized for most of its length. Bursa copulatrix membranous. Signa two pairs of

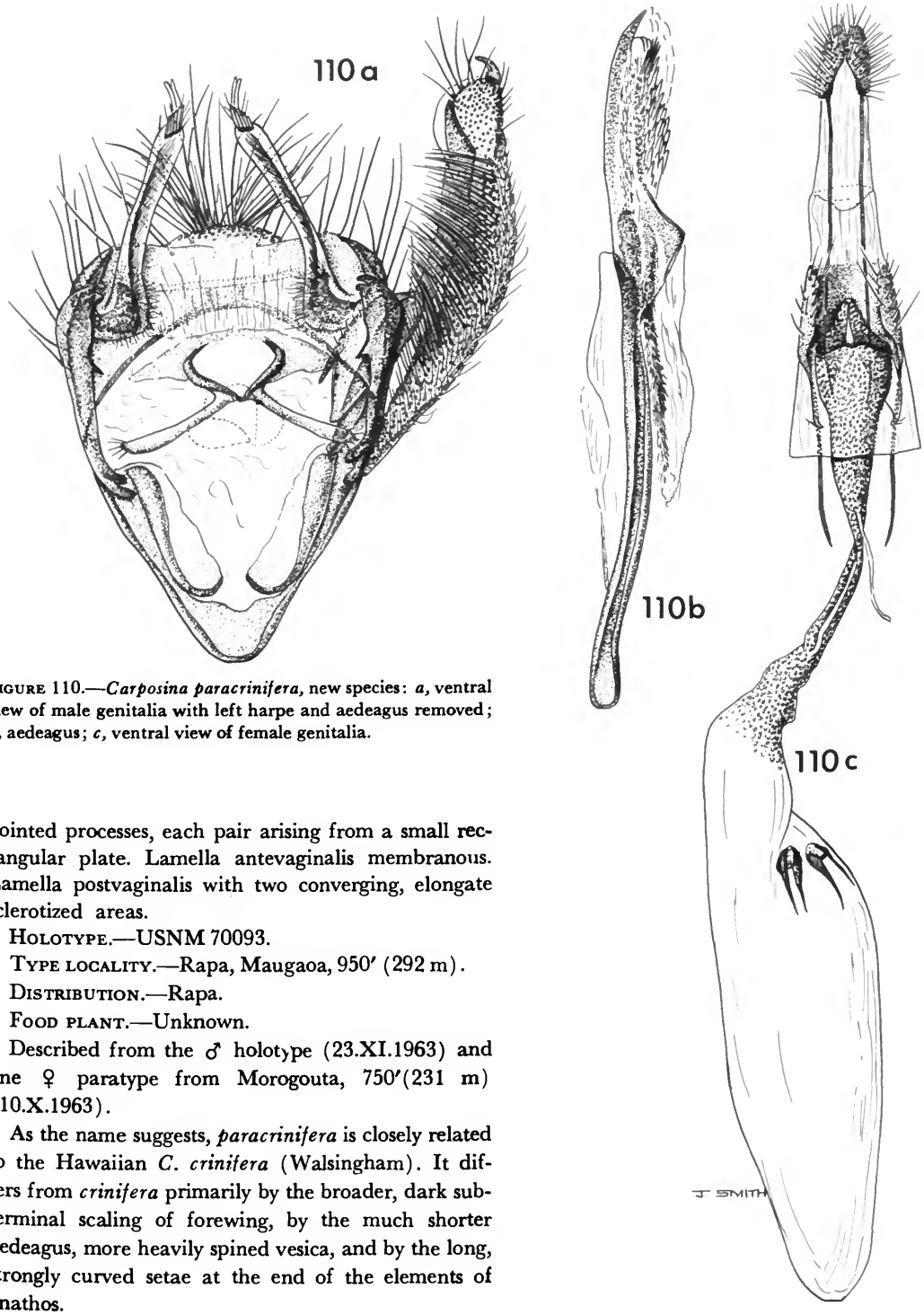


FIGURE 110.—*Carposina paracrinifera*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

pointed processes, each pair arising from a small rectangular plate. Lamella antevaginalis membranous. Lamella postvaginalis with two converging, elongate sclerotized areas.

HOLOTYPE.—USNM 70093.

TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (23.XI.1963) and one ♀ paratype from Morogouta, 750′(231 m) (10.X.1963).

As the name suggests, *paracrinifera* is closely related to the Hawaiian *C. crinifera* (Walsingham). It differs from *crinifera* primarily by the broader, dark subterminal scaling of forewing, by the much shorter aedeagus, more heavily spined vesica, and by the long, strongly curved setae at the end of the elements of gnathos.

***Carposina apousia*, new species**

FIGURE 111; PLATE 18*f*

Alar expanse 16–18 mm.

Labial palpus white; second segment grayish fuscous and ochraceous buff on outer side; third segment with grayish fuscous spot dorsally. Antenna grayish fuscous, basally white; scape white. Head white with grayish fuscous line in front of eye. Thorax white; dorsally a grayish fuscous suffusion; tegula with ill-defined grayish suffusion posteriorly. Forewing ground color white; basal sixth of costa grayish fuscous; at basal third of costa a blackish-fuscous spot followed by four small, similarly colored spots on costa; at basal third of dorsum a cinereous shade; at basal third, on vein 1a, on dorsal edge of cell, and at end of cell blackish fuscous tufts of raised scales, mixed with ochraceous buff and white; scattered over wing several irregular ochraceous buff spots and blotches; apical third shaded with gray; cilia sordid white, shaded gray along termen. Hind wing pale grayish fuscous, lighter toward base; cilia sordid white. Foreleg ocherous white, shaded grayish fuscous on outer side; tarsal segments annulated grayish fuscous; midleg similar but not so heavily shaded; hind leg ocherous white; tibial spurs faintly grayish. Abdomen ocherous white, suffused grayish dorsally.

Female genitalia slides JFGC 11455, 11825. Ostium transverse, wide. Antrum narrowly sclerotized. Inception of ductus seminalis approximately at posterior two-thirds of ductus bursae. Ductus bursae membranous. Bursa copulatrix membranous. Signum absent. Lamella antevaginalis membranous. Lamella postvaginalis membranous immediately posterior to ostium, with a prolonged sclerotized area posteriorly.

HOLOTYPE.—USNM 70094.

TYPE LOCALITY.—Rapa, Maugaoa, 950′(292 m)

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♀ holotype (7.XI.1963) and one ♀ paratype from Maurua, 600′(181 m) (17.X. 1963).

The coloring and pattern of *apousia* and *paracrinifera* are strikingly similar, but the two may be separated by the smaller costal spots and the more rounded

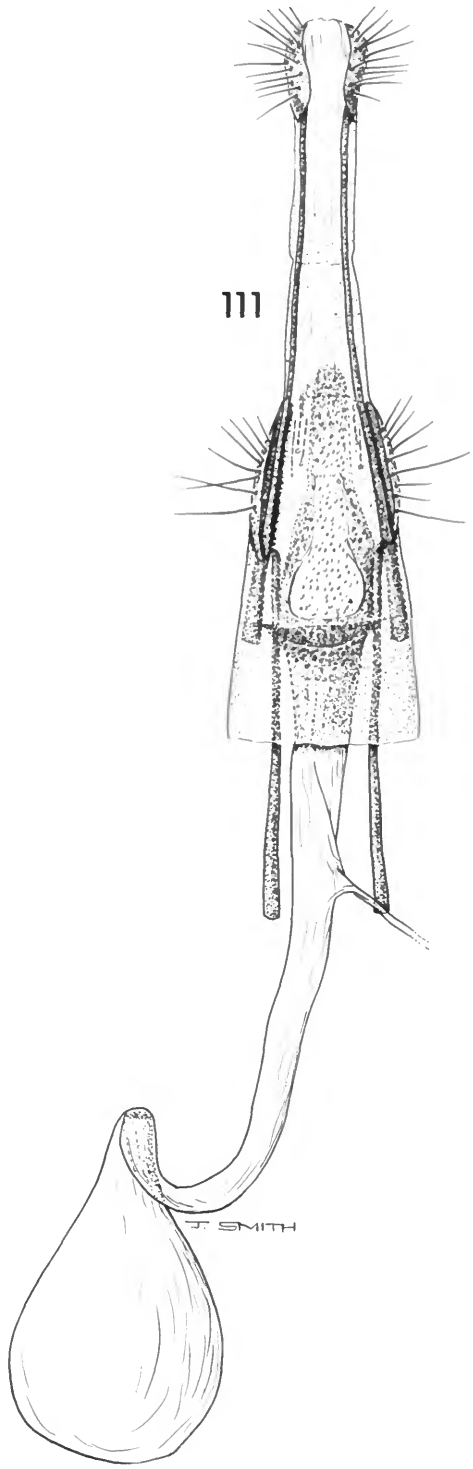


FIGURE 111.—*Carposina apousia, new species.* Ventral view of female genitalia.

tuft of raised scales at the end of cell of *apousia* as seen in the photographs. The absence of signa in *apousia* readily distinguishes it from *paracrinifera*. Unfortunately, the male of *apousia* is unknown.

Despite the absence of signa in *apousia* it agrees with *paracrinifera* in other structural features, is closely similar in appearance, and is obviously very nearly related and derived from the same ancestral form. In the absence of signa this species would appear to belong in the Australian genus *Paramorpha,* but because of the obvious close relationship of the two Rapa species I cannot justify generic separation.

Family GELECHIIDAE

Key to the Genera of Gelechiidae

1. Third segment of labial palpus acute, smooth 3
   Third segment of labial palpus modified 2
2. Third segment plumose (♂ only) ..... ***Stoeberhinus***
   Third segment compressed, and tufted posteriorly ..... ***Palintropa***
3. Forewing with veins 2 and 3 stalked 4
   Forewing with veins 2 and 3 separate ..... ***Phthorimaea***
4. Second segment of labial palpus dilated toward apex ..... ***Autosticha***
   Second segment of labial palpus not dilated toward apex (♀ only) ..... ***Stoeberhinus***

Genus *Phthorimaea* Meyrick

Phthorimaea Meyrick, 1902, p. 103 (Type-species: *Gelechia (? Bryotropha) operculella* Zeller, 1873, p. 262, pl. 13; fig. 17 [by original designation].)

Phthorimaea operculella (Zeller)

FIGURE 112; PLATE 19*e*

Gelechia (?Bryotropha) operculella Zeller, 1873, p. 262, pl. 13; fig. 17.

Because the "potato tuber moth" is so common and widespread and the literature is so extensive, I have not treated this species in the same detail as I have the other Microlepidoptera.

To facilitate identification, however, figures of the adult and the genitalia are included.

Two males were collected at Haurei 23.X and 12.XII.1963.

Genus *Palintropa* Meyrick

Palintropa Meyrick, 1913c, p. 160. (Type-species: *Palintropa hippica* Meyrick, 1913c, p. 160 [by monotypy].)

Meyrick erected this genus for the single species *hippica,* the latter based on two specimens from Ceylon. In his description Meyrick states, "Forewings with 2 from angle, 3 absent, ..." An examination of a wing slide of his type in the British Museum reveals clearly the presence of vein 2, arising well before angle of cell, and what he interpreted as vein 2 is actually vein 3. The fact is that all viens are present in the forewing. Of the hind wing he writes, ". . . 3 absent, 4 and 5 connate, 6 and 7 stalked." Here, again, he missed vein 2 which is present, 3 and 4 are short-stalked (perhaps connate in some specimens, a condition which can easily exist), 5 is well separated from 4, and 6 and 7 are separated by a short, very oblique section of the discocellular vein.

From the discrepancies one might think that Meyrick had some other species before him when he described the genus, but the characters which he did not see could have been missed easily by anyone using only a hand lens as Meyrick did. It is always a source of amazement that Meyrick saw so much as accurately as he did.

That the presence of this genus should be discovered 50 years after its description, nearly 9,000 miles east of its original home, on a very remote island, is in itself interesting and presents some zoogeographical problems to titillate the imagination. There is no question about the generic identity of the Rapa material, and undoubtedly this apparent disjunct distribution of the genus will seem less startling when exhaustive collecting has been accomplished in the vast areas between Rapa and Ceylon.

Meyrick (1930b, p. 723[485]) recorded *hippica* from Tonkin, China, establishing a wide distribution for the species he described from Ceylon.

Had Meyrick known of the presence of this genus on Rapa, would he have accounted for the Ceylon species, as he did for the presence of his *Dichelopa* in Australia, by the invention of "Palaeonesia"?

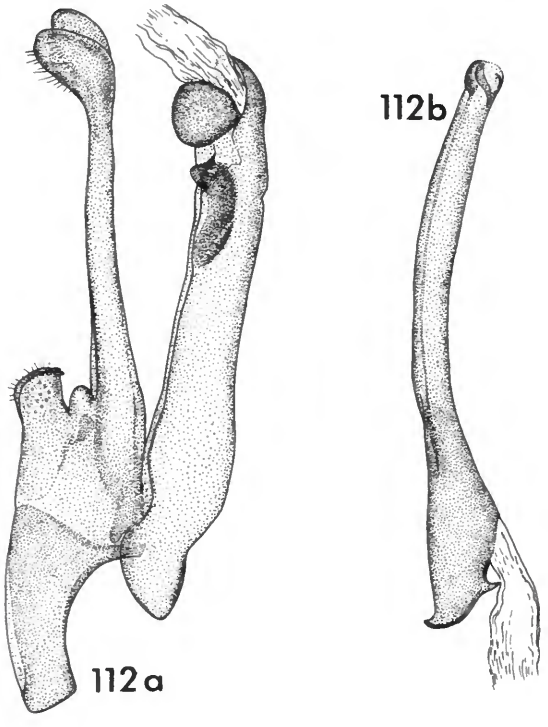
Palintropa peregrina, new species

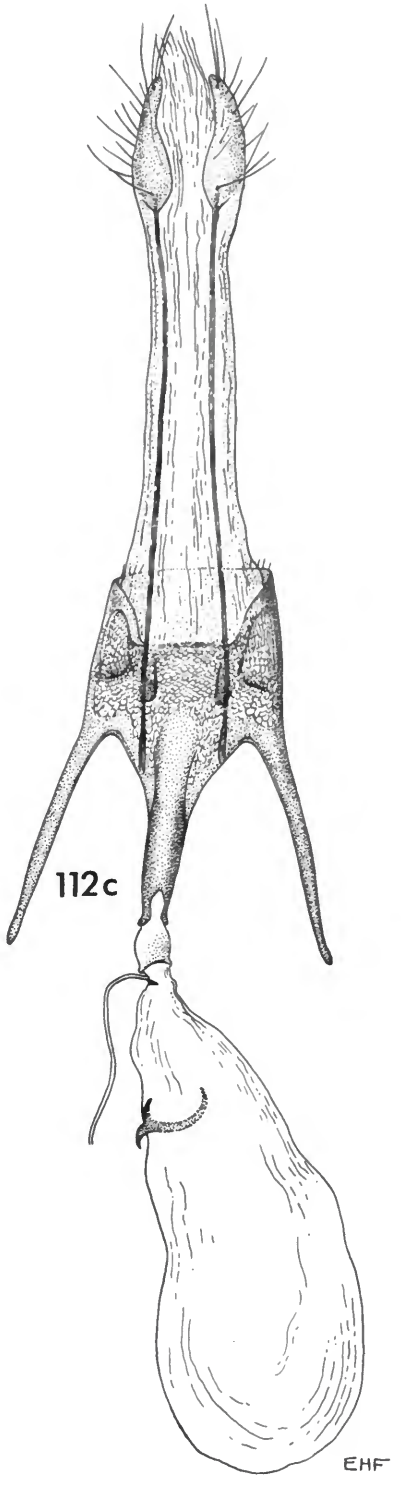
FIGURES 113, 114; PLATE 18*d*, *h*

Alar expanse 13–16 mm.

Labial palpus gray, on inner side the scales cinereous-tipped; second segment strongly overlaid fuscous on outer side; scale tuft of third segment with fuscous spot distally; extreme tip of third segment buff. Antenna alternately annulated blackish fuscous and tawny. Head grayish fuscous, the scales narrowly gray-tipped. Thorax grayish fuscous; posterior tip fuscous. Forewing ground color grayish fuscous; from middle of costa a broad triangular fuscous patch extends to fold; center of triangular area brown, leaving only an edge of the darker color; at apex of triangle a strong scale tuft of fuscous and brown; at apical third a brownish patch confluent with a scale tuft of fuscous, gray, and clay color; subapically a narrow transverse silver line followed by a pair of longitudinal fuscous

FIGURE 112.—*Phthorimaea operculella* (Zeller): *a*, lateral aspect of male genitalia with aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.





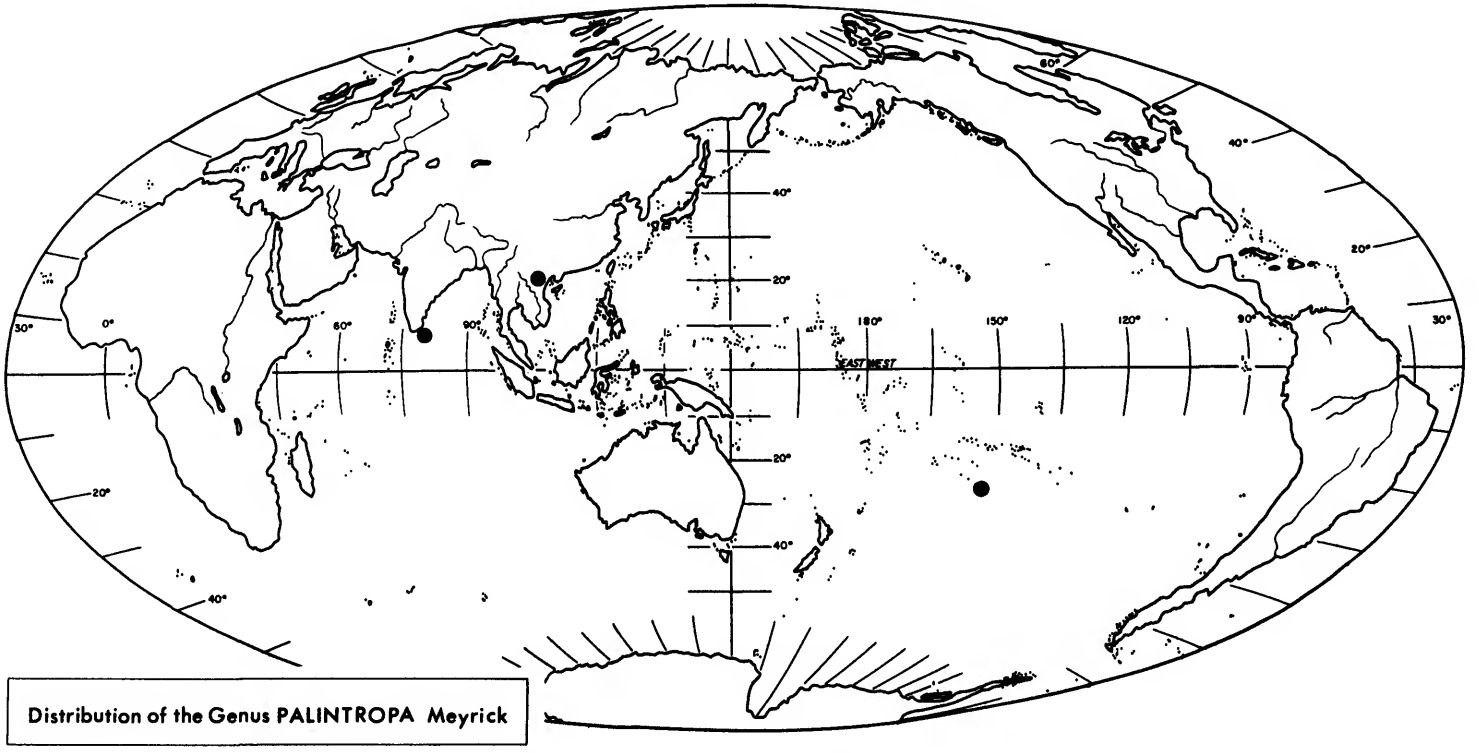


FIGURE 113.—Distribution of the genus *Palintropa* Meyrick.

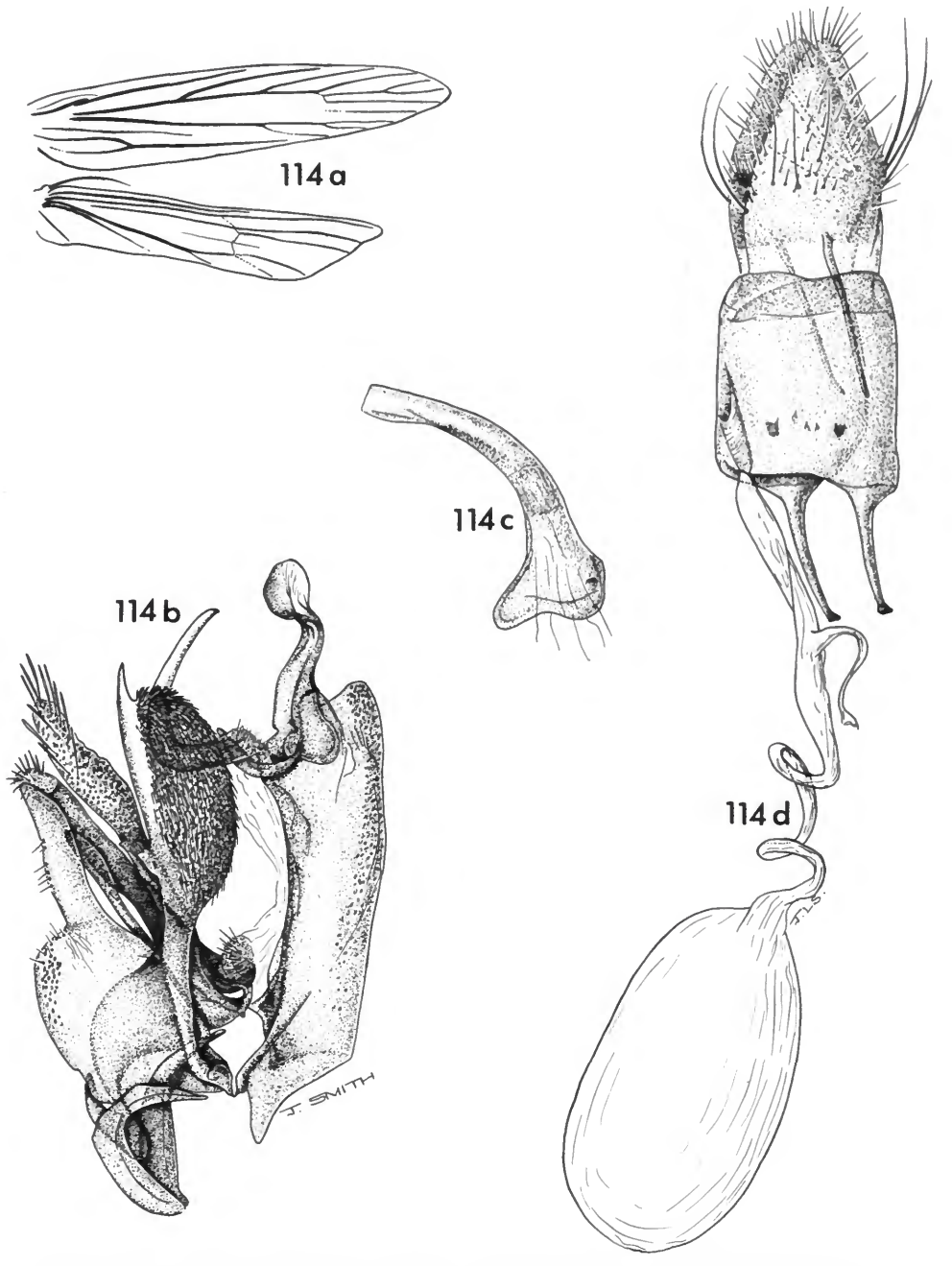


FIGURE 114.—*Palintropa peregrina*, new species: *a*, venation of right wings; *b*, lateral aspect of male genitalia with aedeagus removed; *c*, aedeagus; *d*, lateral aspect of female genitalia.

dashes on a field of brown; around apex and termen a silver line; cilia mixed fuscous, gray and buff. Hind wing grayish fuscous, paler basally; cilia grayish fuscous with a paler basal shade. Foreleg ochraceous buff; femur and tibia strongly overlaid fuscous on outer side; tarsal segments broadly annulated fuscous; midleg similar to foreleg; hind leg light ochraceous buff and not so strongly overlaid fuscous on outer side; tarsal segments broadly annulated fuscous. Abdomen ochraceous buff, suffused fuscous dorsally; ventrally segments edged fuscous.

Male genitalia slide JFGC 11377. Harpes dissimilar; right harpe broad basally; ventral element broadly oval with a long, digitate, distal projection; dorsal element slender basally, broadly dilated distally; from base, on inner side, a long, slender, digitate process; left harpe with two slender elements from a broad base. Gnathos a strongly recurved hook. Uncus sharply bent slightly beyond middle, distal end terminating in a compressed oval plate. Vinculum V-shaped. Tegumen about as long as right harpe. Anellus membranous. Aedeagus simple, curved, dilated proximally, truncated distally, with two small thorns dorsally near apex.

Female genitalia slide JFGC 11671. Ostium small, asymmetrical. Genital plate strongly sclerotized. Papillae anales strongly sclerotized, compressed. Antrum sclerotized. Inception of ductus seminalis at posterior third of ductus bursae. Ductus bursae membranous, spiraled. Bursa copulatrix simple, membranous. Signum absent.

HOLOTYPE.—USNM 70095.

TYPE LOCALITY.—Rapa, Maurua, 600′ (184 m) (16.IX.63).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown. We were never able to locate the host of this species, nor is anything known of the life history of *hippica*, the type of the genus.

Described from the ♂ holotype, 5 ♂♂ and 2 ♀♀ paratypes as follows: 2 ♂♂, 2 ♀♀, Maurua, 600′ (184 m) 16.IX to 17.X.63; ♂, Haurei (13.IX.63); 2 ♂♂, Teumukopuke, 500′ (154 m) 7.X and 3.XI.63.

The two species of this genus, hippica and *peregrina*, are very closely related, the latter differing from the former primarily by the dark scale tuft of second segment of palpus and the absence of the brownish-ocherous spaces preceding and following the transverse silvery line. In the male genitalia the dilation of the dorsal element of the right harpe and stronger and larger gnathos separate *peregrina* from *hippica*. No females of *hippica* are known so no comparison of the genitalia can be made.

After my determination of this species I submitted the matter to my friend and colleague, Dr. John D. Bradley, Commonwealth Institute of Entomology, for his consideration. I quote from his letter of 3 July 1967, as follows:

> Comparison of the genitalia and wing venation of the gelechiid from Rapa with those of *Palintropa hippica* from Ceylon confirms them to be very close and that differences are mainly comparative or quantitative.
>
> The difference in wing development seems rather remarkable: Rapa being an exposed windswept island, the species from there might be expected to exhibit a tendency to brachypterism, but, if anything, the reverse is the case and it is the species from Ceylon which has comparatively narrow and attenuated wings. Otherwise, the venation of both is similar.
>
> The male genitalia are similar in structure and the specific differences are slight and found chiefly in the valvae. In *hippica* the upper (dorsal) margin of the membranous costal arm of the left valva is straight, and the (broad basal part of the valve) sacculus is dilated ventrally and protrudes or bulges caudad and is not evenly rounded as in the Rapa sp. In *hippica* the membranous costal arm of the right valva is slightly narrower, the dorsal margin being nearly straight; the prong-like apical section of the valva is comparatively narrow and not stout throughout as in the Rapa sp.; and the ventrodistal margin of the sacculus is oblique and nearly straight in *hippica*, not rounded as in the Rapa sp. The uncus and gnathos are very similar in both and I can find no describable difference to separate the two spp. The aedeagus is similar in form, but that of *hippica* has a prominent subapical barb on the ventral margin, while that of Rapa sp. has none on the ventral margin but has two small and inconspicuous dentate barbs near the apex on the dorsal margin.
>
> The processes at the bases of the valvae—? LABIDES—are similar in both species, except that in *hippica* the larger left-hand process curves downwards (ventrad), whereas Rapa sp. curves slightly inward; but this difference could be due to mounting, though I am inclined to the opinion that the difference is probably good.
>
> I trust this is of some help even if it does no more than confirm the genus and that you have a separate species from Rapa.

Genus *Stoeberhinus* Butler

Stoeberhinus Butler, 1881, p. 402. (Type-species: *Stoeberhinus testaceus* Butler, 1881, p. 402 [by monotypy].)

Stoeberhinus testaceus Butler

FIGURE 115; PLATE 19*a, b, c, d*

Stoeberhinus testaceus Butler, 1881, pp. 401, 402, fig. 2.—Walsingham, 1887, p. 171; 1907, p. 486, pl. 13: fig. 28.—Swezey, 1926c, p. 75.—Williams, 1931, p. 158.—Bradley, 1961, p. 139.

Stoeberhinus testacea Butler, Meyrick, 1925, p. 255; 1926, p. 274; 1927, p. 84; 1929, p. 497; 1932, p. 206; 1934b, p. 346.—Gaede, 1937, p. 552.—Viette, 1949a, p. 319.

TYPE.—British Museum (Natural History) (*testaceus*).

TYPE LOCALITY.—Honolulu, Hawaii.

DISTRIBUTION.—Apparently found in all the archipelagoes of the Pacific: New Hebrides, Fiji, Samoa, Tutuila, Society Islands, Austral Islands, Marquesas, Tuamotus, Galapagos, Ontong Java. In the National Museum of Natural History collection there are specimens from Raivavae (Tubuäi or Austral Islands) (3 September 1963), J. F. G. and Thelma M. Clarke, and Tahiti (September and October dates, 1961, J. F. G. Clarke).

From Rapa we have the following: Anatakuri Nako, 3 ♀♀ (14 October 1963); Haurei, 5 ♂♂ (13 September to 5 December 1963).

FOOD PLANT.—Dry vegetable matter.

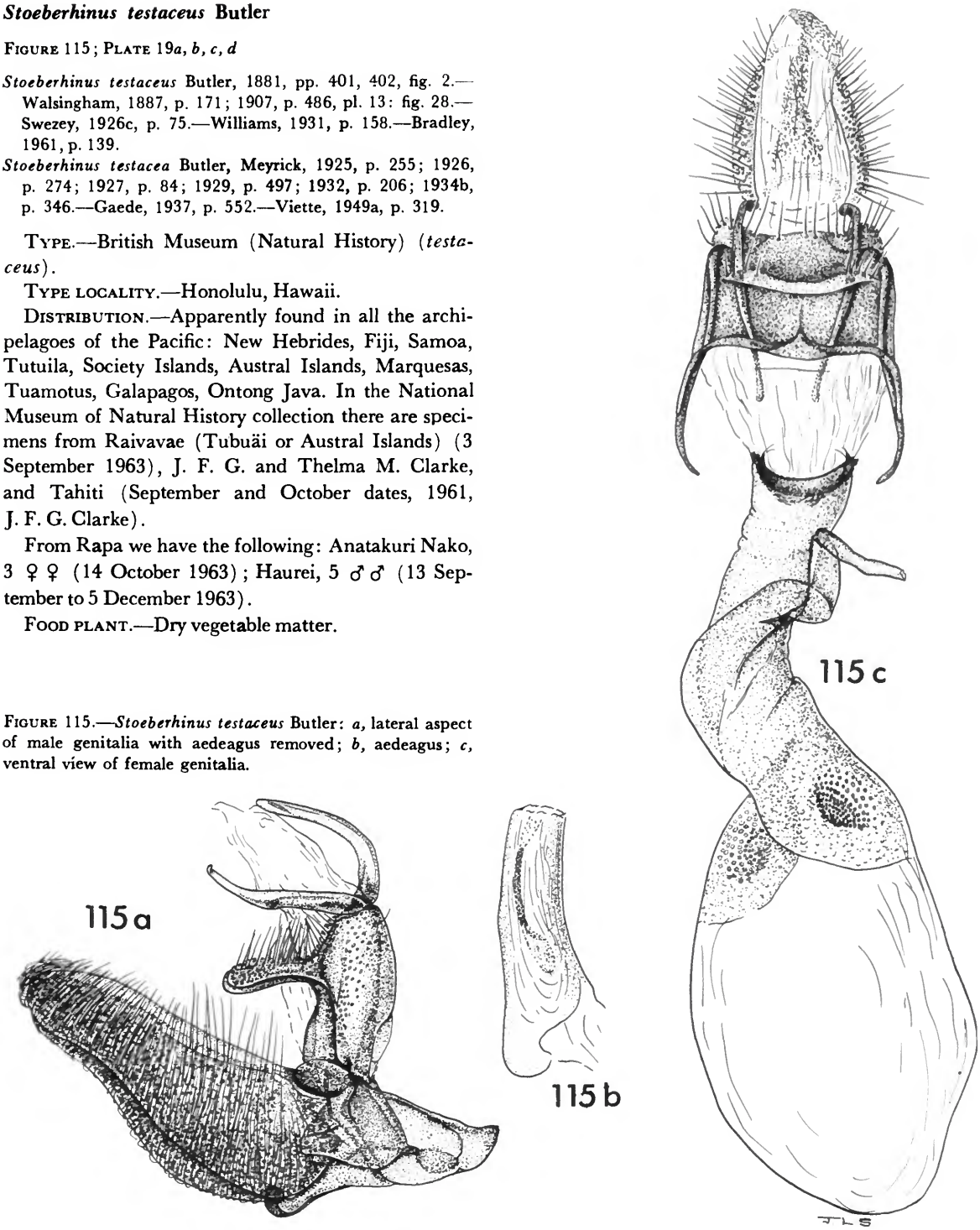
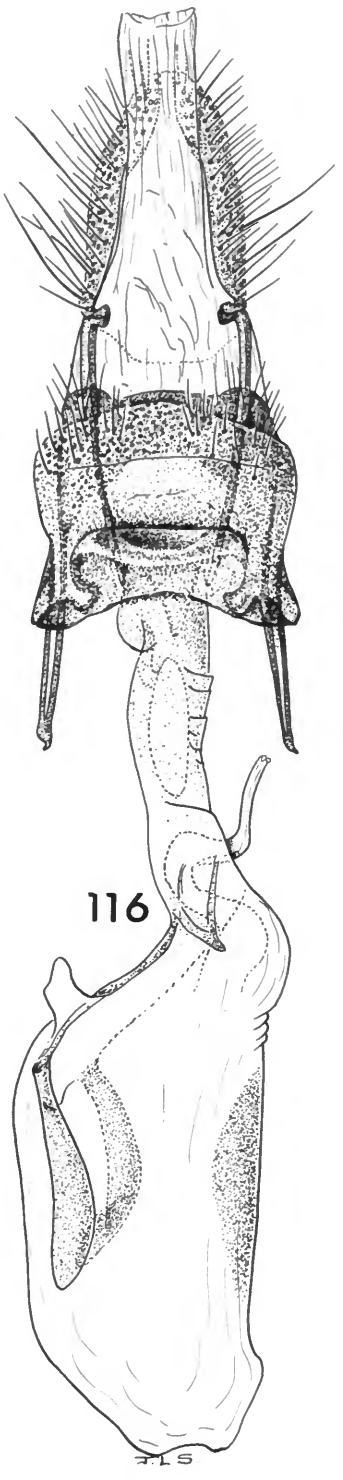


FIGURE 115.—*Stoeberhinus testaceus* Butler: *a*, lateral aspect of male genitalia with aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.



The moths of *testaceus* may be beaten from dry *Pandanus* thatch or from accumulations of dry vegetable matter on the ground. The adults also come readily to light.

In 1925 Meyrick (p. 255) sank his *Autosticha demias* as a synonym of *testaceus* but reversed himself in 1932 (p. 206). I have not seen *demias* and, therefore, cannot verify Meyrick's findings.

Genus *Autosticha* Meyrick

Autosticha Meyrick, 1886b, p. 281. (Type-species: *Automola pelodes* Meyrick, 1883, p. 34 [by monotypy].)

Autosticha merista, new species

FIGURE 116; Plate 19*f, g*

Alar expanse 16 mm.

Labial palpus light buff; second segment suffused and irrorate with fuscous on outer side; third segment with small, but conspicuous, black spot on inner side at middle. Antenna light buff faintly annulated fuscous; scape suffused with fuscous. Head light buff; thorax light buff faintly irrorate with fuscous and with a fuscous spot posteriorly. Forewing ground color light buff suffused and finely irrorate with fuscous, particularly in dorsal two-thirds; at basal third, in cell, a black spot followed at end of cell by a similar spot; on fold, slightly beyond basal third, a black spot; from apex, around termen to tornus, a series of blackish-fuscous spots between the veins; cilia ochraceous buff suffused fuscous. Hind wing sordid whitish, suffused fuscous in outer half and anal angle; cilia light ochraceous buff with grayish terminal and subbasal lines. Legs light buff sparsely irrorate with fuscous; first tarsal segment of foreleg strongly overlaid with fuscous. Abdomen light buff, lightly suffused and sparsely irrorate with fuscous.

Female genitalia slide JFGC 11408. Ostium narrow, slitlike. Genital plate strongly sclerotized. Antrum slightly dilated, sclerotized. Inception of ductus seminalis at junction of ductus bursae and bursa copulatrix. Ductus bursae partly sclerotized, bent. Bursa copulatrix with longitudinal thickening on right side. Signum an elongate plate extending to anterior end of ductus bursae, with a long, curved process from each side

FIGURE 116.—*Autosticha merista,* new species: Ventral view of female genitalia.

laterally; capitulum prominent. Lamella antevaginalis strongly sclerotized forming a broad lip ventral to ostium.

HOLOTYPE.—USNM 70096.

TYPE LOCALITY.—Rapa, Haurei (9.XII.63).

DISTRIBUTION.—Known only from the type locality.

FOOD PLANT.—Unknown (probably dry vegetable matter).

Described from the unique ♀ holotype.

Species of this moderately large genus are distributed widely through the Pacific area. Of the described species *merista* appears to be most nearly related to *siccivora* Meyrick (Java) and *stagmatopis* Meyrick (S. India), but differs from both by the presence of a prominent capitulum. The wing markings are similar but the black spot on fold is basad of the first discal spot in both *siccivora* and *stagmatopis* but the opposite in *merista*.

Family COSMOPTERIGIDAE

Key to the Genera of Cosmopterigidae

1. Forewing vein 1b furcate 3
   Forewing vein 1b simple 2
2. Veins 4 and 5 of hind wing stalked ..... ***Semolina***, new genus
   Veins 4 and 5 of hind wing separate ..... ***Iressa***, new genus
3. Forewing with veins 5 to 8 stalked 4
   Forewing with veins 5 to 8 otherwise 5
4. Hind wing with vein 4 present ..... ***Anatrachyntis***
   Hind wing with vein 4 absent ..... ***Cosmopterix***
5. Hind wing with veins 6 and 7 stalked 6
   Hind wing with veins 6 and 7 separate ..... ***Labdia***
6. Forewing vein 8 out of the stalk of 6 and 7 ..... ***Trissodoris***
   Forewing vein 8 connate with stalk of 6 and 7 ..... ***Echinoscelis***

Genus *Echinoscelis* Meyrick

Echinoscelis Meyrick, 1886b, p. 292. (Type-species: *Echinoscelis hemithia* Meyrick, 1886b, p. 292 [by monotypy].)

In his description of this genus Meyrick states "Forewings . . . 5 and 6 rising out of 7, ..." In my figure of the venation of a Rapa male, vein 5 is distant from the stalk of 6 and 7.

Echinoscelis hemithia Meyrick

FIGURES 21, 117, 118; PLATE 2*d*, *e*; Plate 20*a*, *b*, *c*, *d*

Echinoscelis hemithia Meyrick, 1886b, p. 292.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Tonga.

DISTRIBUTION.—Tonga, Rapa, Fiji (Labasa).

From Rapa we have 135 specimens, all but 8 of which were either reared or beaten from the food plant between 10.IX and 23.X.1963. The eight exceptions are as follows: Maii Bay, ♂ ♀ (23.X); Pariati Bay, ♂ (30.X); Point Tepapa, ♀ (15.IX); Point Teakauraee, ♂, 2 ♀ ♀ (7–15.X); Teumukopuke, 500′ (154 m), ♂ (7.X).

FOOD PLANT.—*Pandanus tectorius* Solander, (*fara*).

Meyrick described this species in the family Elachistidae, but in the collection of the British Museum it was placed in the Heliodinidae. It is, however, referable to the Cosmopterigidae and is hereby transferred to that family.

The unique type (Slide JFGC 11558) is a male although marked "female," and is labeled "Tonga, Polynesia. Mathew. 1887. 1520." Despite the date (one year later than date of publication), there can be no question about the authenticity of the type; it is purely a mistake in dating the specimen.

Echinoscelis is very closely related to *Trissodoris*, and the habits of *hemithia* are quite similar to species of that genus. The larvae of both feed in the dead leaves of *Pandanus* and cut out small cases (Figure 21) in which the larvae pupate, leaving characteristic holes in the dead leaves. In the genus *Trissodoris* the cut out cases usually slip down between the epidermal layers of the leaves or fall to the ground. When the larva of *hemithia* is fully fed and ready to pupate, however, it

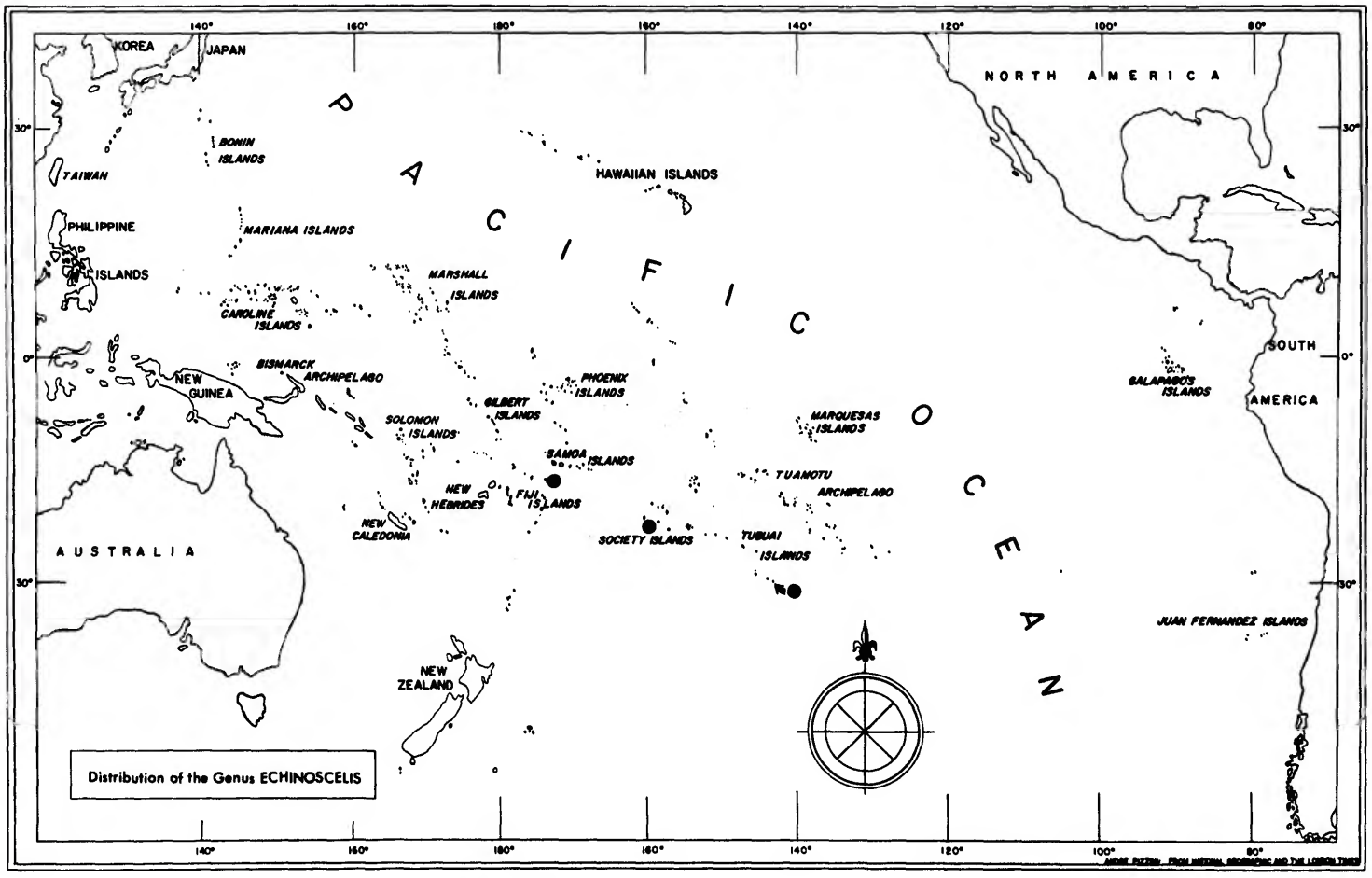


FIGURE 117.—Distribution of the genus *Echinoscelis* Meyrick.

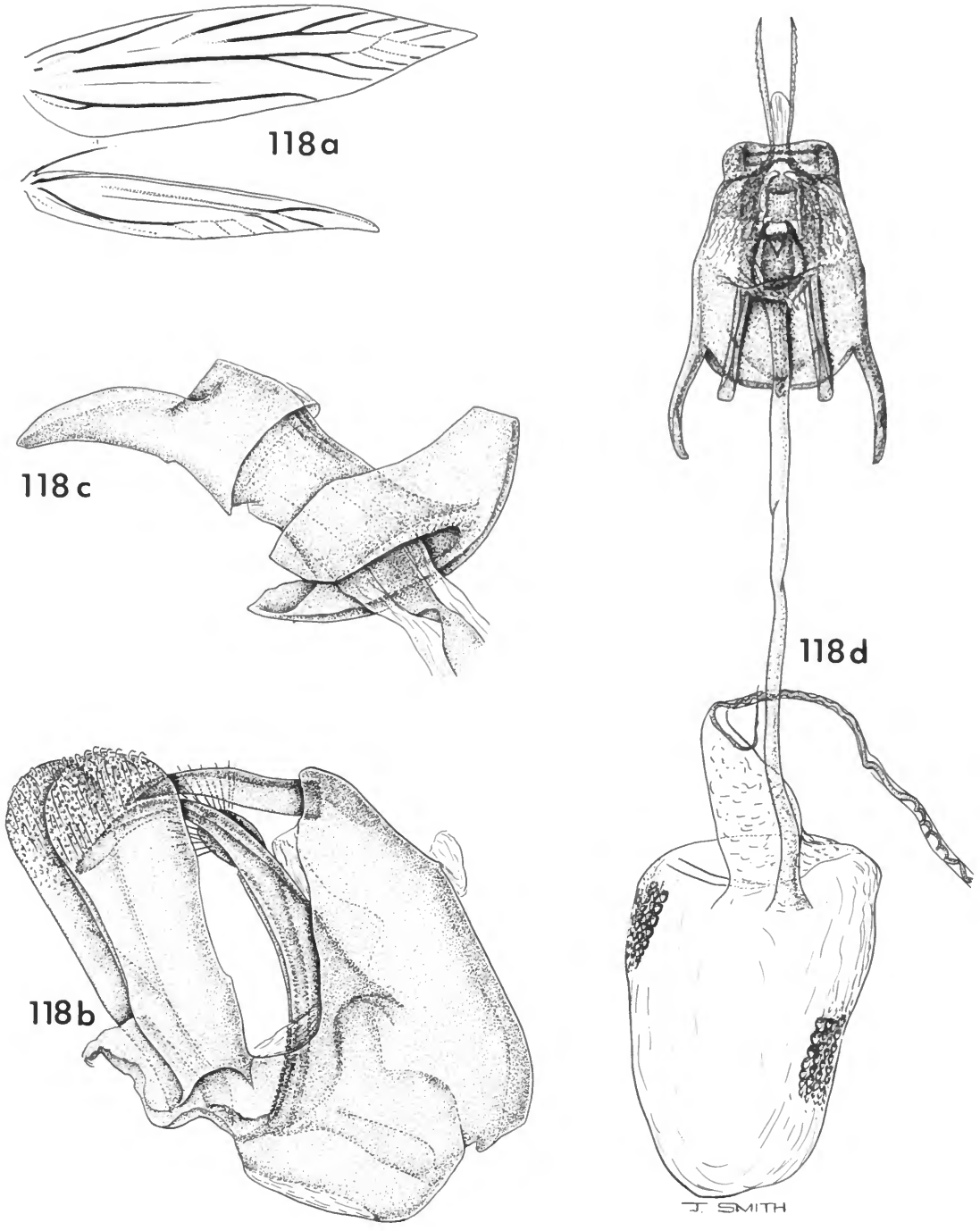


FIGURE 118.—*Echinoscelis hemithia* Meyrick: *a*, venation of right wings; *b*, lateral aspect of male genitalia with aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

crawls to some convenient spot on the green leaves or branches of its host, attaching the case to a suitable surface with silk, and pupates.

There are two forms of *hemithia,* the typical form with the outer two-thirds of the forewing yellow, and the other with a black or blackish-brown apical third of the forewing. It is strange that the type from Tonga and the second specimen in the British Museum, from Fiji, are both the yellow-tipped form which was by far the rarer of the two varieties on Rapa. Of the 135 specimens obtained on Rapa, reared from randomly collected larvae and specimens beaten from *Pandanus* (only one specimen taken at light), approximately 91 percent have black- or brown-tipped forewings and approximately 9 percent are of the yellow-tipped variety.

Unless the composition of the populations on Tonga and Fiji are very different from that on Rapa, it is strange indeed that the only two previously known specimens should be of the type which is rare on this island.

Genus *Trissodoris* Meyrick

Trissodoris Meyrick, 1914a, p. 775. (Type-species: *Stagmatophora honorariella* Walsingham, 1907, p. 515, pl. 15: fig. 21 [by original designation].)—Clarke, 1965, p. 550, pl. 271; figs. 1–1*c*.

Trissodoris honorariella (Walsingham)

FIGURES 21, 119; PLATE 20*e, f*

Stagmatophora honorariella (Walsingham), 1907, p. 515, pl. 15: fig. 21.

Trissodoris honorariella (Walsingham), Meyrick, 1914, p. 775; 1927, p. 92; 1934, p. 348.—Swezey, 1942, p. 212.—Clarke, 1965 p. 550, pl. 271; figs. 1–1*c*.—Bradley, 1957, p. 100.

Trissodoris honorielle [sic!] Viette, 1949a, p. 318.

Stagmatophora quadrifasciata Walsingham, 1907, p. 516, pl. 15: fig. 22.

Trissodoris quadrifasciata (Walsingham) Meyrick, 1914, p. 776; 1927, p. 92.—Swezey, 1954, p. 146.—Bradley, 1957, p. 100.

Male genitalia slide JFGC 11310. Harpe moderately slender, about as long as tegumen; cucullus subtriangular. Gnathos with right element stout, long, sharply bent before apex; apex divided; left element short, pointed. Vinculum undifferentiated. Tegumen slender, weakly sclerotized. Anellus an elongate plate slightly folded longitudinally. Manica long, slender, slightly exceeding gnathos. Prospicuus very slender, long, parallel to manica. Aedeagus slender, somewhat dilated basally.

Female genitalia slides JFCG 11311, 11788. Ostium protruding; posterior lip irregular. Papillae anales very slender, strongly sclerotized, with serrate edge developed for piercing and cutting plant tissue. Inception of ductus seminalis from posterior half of bursa copulatrix. Ductus bursae membranous. Bursa copulatrix membranous. Signum absent.

TYPES.—British Museum (Natural History) (*honorariella, quadrifasciata*).

TYPE LOCALITIES.—Pitcairn Island (*honorariella*); New Guinea (*quadrifasciata*).

DISTRIBUTION.—Hawaii, Pitcairn Island, Fiji, Samoan Islands, New Hebrides, Australia, Buru, Sarawak, Ceylon, Marquesas Islands, Tahiti.

All of the Rapa specimens (5 ♂♂, 8 ♀♀) were reared or beaten from *Pandanus,* one-half mile east of Haurei, between the dates of 28.X to 30.XI.1963.

FOOD PLANT.—*Pandanus* species.

This is another widespread species in the Pacific although other forms of the genus do exist in the area. Undoubtedly *honorariella* will be found to have essentially the same distribution as *Anatrachyntis incertulella* and *A. megacentra.*

Trissodoris thelmae, new species

FIGURE 120; PLATE 20*g, h*

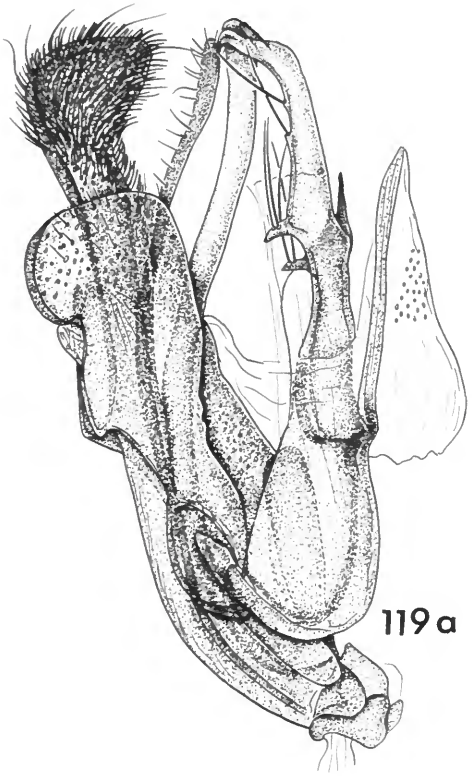
Alar expanse 11–12 mm.

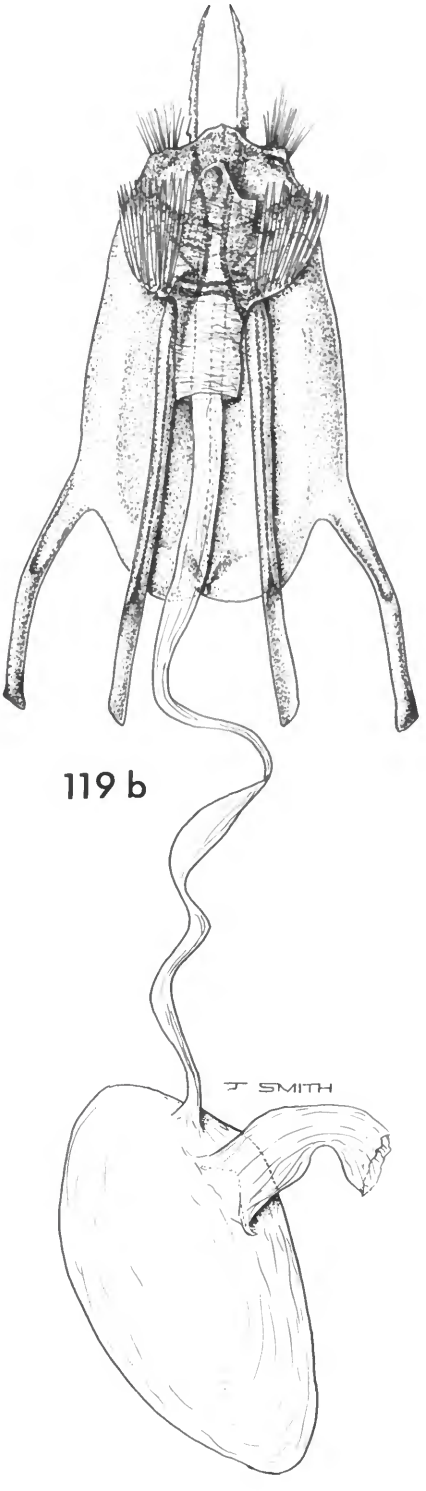
Labial palpus creamy white; third segment with small fuscous spot before apex. Antenna creamy white with pale brownish spot on a few segments near base. Head creamy white with slight iridescence and erect yellowish scales at side. Thorax creamy white; tegula with orange-yellow spot at base and apex; from thorax of male, at base of hind wing, a strong yellowish-buff hair pencil. Forewing ground color creamy white; basal fifth of costa narrowly fuscous; at base, basal fifth, and at middle, transverse orange-yellow bands, the middle band edged outwardly with a few fuscous scales and costal edge fuscous; at apical third a broadly C-shaped orange-yellow mark, the open side toward apex; apex orange-yellow preceded by a lunate fuscous mark; apical cilia pale yellowish, becoming darker around tornus to dorsal edge. Hind wing in male pale grayish basally, becoming grayish fuscous toward apex, in female grayish fuscous; cilia concolorous. Foreleg

creamy white; tibia fuscous on outer side; tarsus with two fuscous bands; midleg similar but tibia marked with two dull, ill-defined orange-yellow spots; tarsus with two fuscous annuli; hind leg creamy white; tibia with an ill-defined, dull orange-yellow spot at middle and a diffused fuscous spot distally; tarsus with two fuscous annuli. Abdomen creamy white overlaid cinnamon buff dorsally, with ill-defined fuscous shading laterally at anterior edges of segments.

Male genitalia slide JFGC 11312. Harpe long, slender; cucullus narrowly rounded. Gnathos divided, right element long, curved; left element short, straight, truncated. Tegumen nearly as long as harpe and with a conspicuous median protuberance. Anellus tubular. Aedeagus long, slender, curved with bulbous base.

FIGURE 119.—*Trissodoris honorariella* (Walsingham): *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, ventral view of female genitalia.





Female genitalia slide JFGC 11313. Ostium tubular, protruding. Inception of ductus seminalis from posterior end of bursa copulatrix. Ductus bursae long, slender, unornamented. Bursa copulatrix membranous. Signa six minute, sclerotized points.

HOLOTYPE.—USNM 70101.

TYPE LOCALITY.—Rapa, one-half mile east of Haurei.

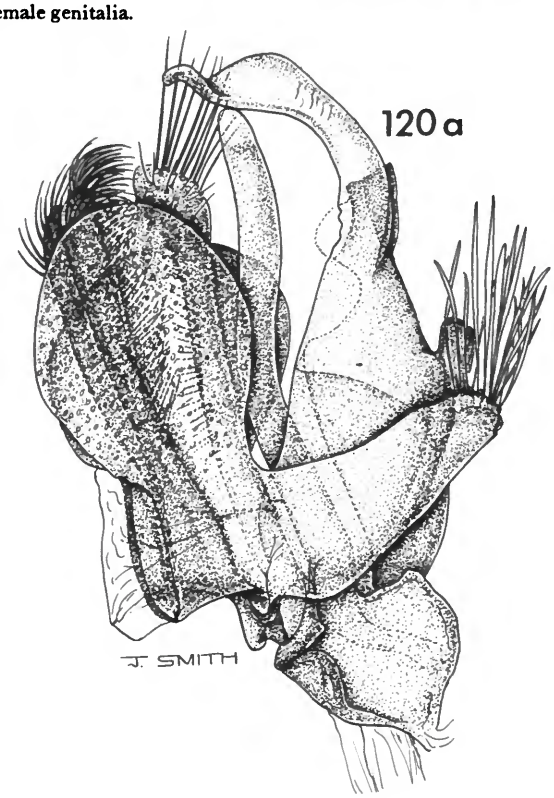
DISTRIBUTION.—Rapa.

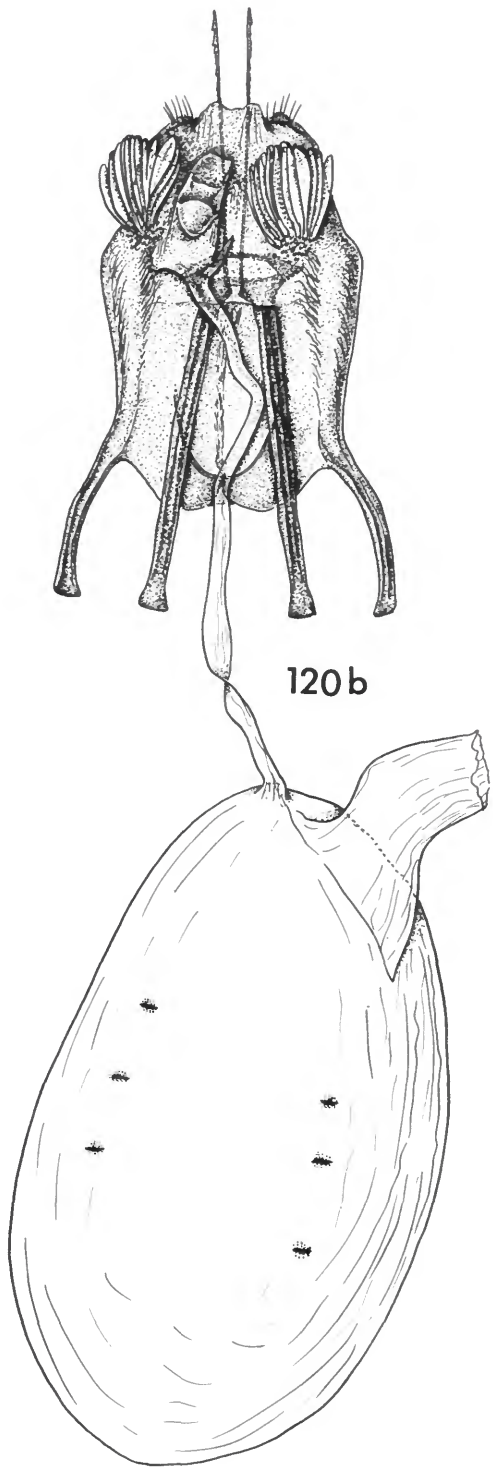
FOOD PLANT.—*Pandanus tectorius* Solander.

Described from the ♂ holotype (27.XI.1963), one ♂ and 2 ♀ ♀ paratypes from the same locality (28–29.X.1963).

On the underside of the forewing of the male of *thelmae* there are two small patches of orange-yellow, bristlelike scales; there is one large patch of similar

FIGURE 120.—*Trissodoris thelmae*, new species: *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, ventral view of female genitalia.





scales in *honorariella*. The transverse fasciae on the forewing of *thelmae* are orange-yellow; those of *honorariella* are brown. In color and pattern *thelmae* is strikingly similar to the Australian *Persicoptila euphedra* Lower (= *larozona* Turner) (a *Pandanus* case maker), but *euphedra* lacks the lunate mark before apex of the forewing of the former.

It gives me much pleasure to name this species for my wife who accompanied and assisted me on the Rapa expedition, and who has extracted more species of Microlepidoptera from *Pandanus* than any other person known to me.

Genus *Anatrachyntis* Meyrick

Anatrachyntis Meyrick, 1915, p. 325. (Type-species: *Gracilaria ? falcatella* Stainton, 1859, p. 121 [by original designation].)

Anatrachyntis similis (Bradley), new combination

FIGURE 121; PLATE 23*a*

Pyroderces similis Bradley, 1953, p. 112, figs. 2, 3.

Male genitalia slide JFGC 11413. Harpe moderately long, narrow, costa and ventral margin nearly parallel. Gnathos right element long, slender, sharply bent at middle, apex beaked; left element short, stout, bluntly pointed, and with median, ventral falciform process. Tegumen about two-thirds the length of harpe, moderately narrow. Manica long, slender, curved, sharply pointed. Prospicuus slightly more than half as long as manica, slender, slightly dilated distally. Aedeagus short, stout.

Female genitalia slides JFGC 11892, 11893. Ostium short, protruding. Antrum not differentiated. Inception of ductus seminalis from posterior end of bursa copulatrix. Ductus bursae slender, slightly sclerotized posteriorly. Bursa copulatrix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Fiji, Viti Levu, Lami, Suva.

DISTRIBUTION.—Fiji, Rapa.

Our series is recorded from: Anatakuri nako, ♂, 2 ♀ ♀; (14.X.1963); Haurei, 28 ♂ ♂, 21 ♀ ♀ (11.IX.–28.X.1963); Pake Bay, 4 ♂ ♂, 3 ♀ ♀ (31.X.1963); Point Maraia, ♂, ♀ (9.X.1963).

FOOD PLANT.—*Pandanus* (ex. male flowers).

Bradley (1953, p. 112) records the larva of *similis* from the male flower of *Pandanus*. We did not rear the species but nearly all our specimens were beaten from the host plant.

Anatrachyntis incertulella (Walker), new combination

FIGURE 122; PLATE 19*h*

Gelechia incertulella Walker, 1864, p. 658.
Pyroderces incertulella (Walker), Meyrick, 1929, p. 497.—Viette, 1949a, p. 318.—Swezey, 1954, p. 146.
Stagmatophora (*Proterocosma*) *incertulella* (Walker), Walsingham, 1907, p. 515, pl. 15: fig. 20.
Aeoloscelis aulacosema Lower, 1904, p. 172.
Stagmatophora (*Proterocosma*) *tridigitella* Walsingham, 1907, p. 515.
Pyroderces subcarnea Meyrick, 1924, p. 553. (New synonymy.)

Male genitalia slides JFGC 11784, 11787. Harpe bent basally, broadened and flattened at cucullus. Gnathos with right element as long as tegumen, sharply bent basally, slightly recurved, dilated distally; left element about half the length of right, moderately stout, truncated. Vinculum undifferentiated. Tegumen strongly arched. Anellus a strongly sclerotized, curved plate. Manica rather stout, strongly curved distally and with prominent point about middorsally. Prospicuus slender, slightly curved, dilated distally, about three-quarters the length of the manica. Aedeagus widely dilated basally and with a broad flange anteriorly.

Female genitalia slide JFGC 11787. Ostium round, with an expanded lip dorsally. Inception of ductus seminalis from posterior part of bursa copulatrix. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent.

TYPES.—In the British Museum (Natural History) (*incertulella, tridigitella, subcarnea*); in the South Australian Museum (*aulacosema*).

TYPE LOCALITIES.—Sandwich Islands (Hawaii) (*incertulella*); Rapa (*tridigitella*); Rodriguez Id. (*subcarnea*); Mackay, Queensland (*aulacosema*).

DISTRIBUTION.—Hawaiian Islands, Australia, Fiji, Pitcairn; Rurutu, and Rapa (Austral Islands), Okinawa, Tahiti; Nuku Hiva, Hiva Oa, and Fatu Hiva (Marquesas Islands).

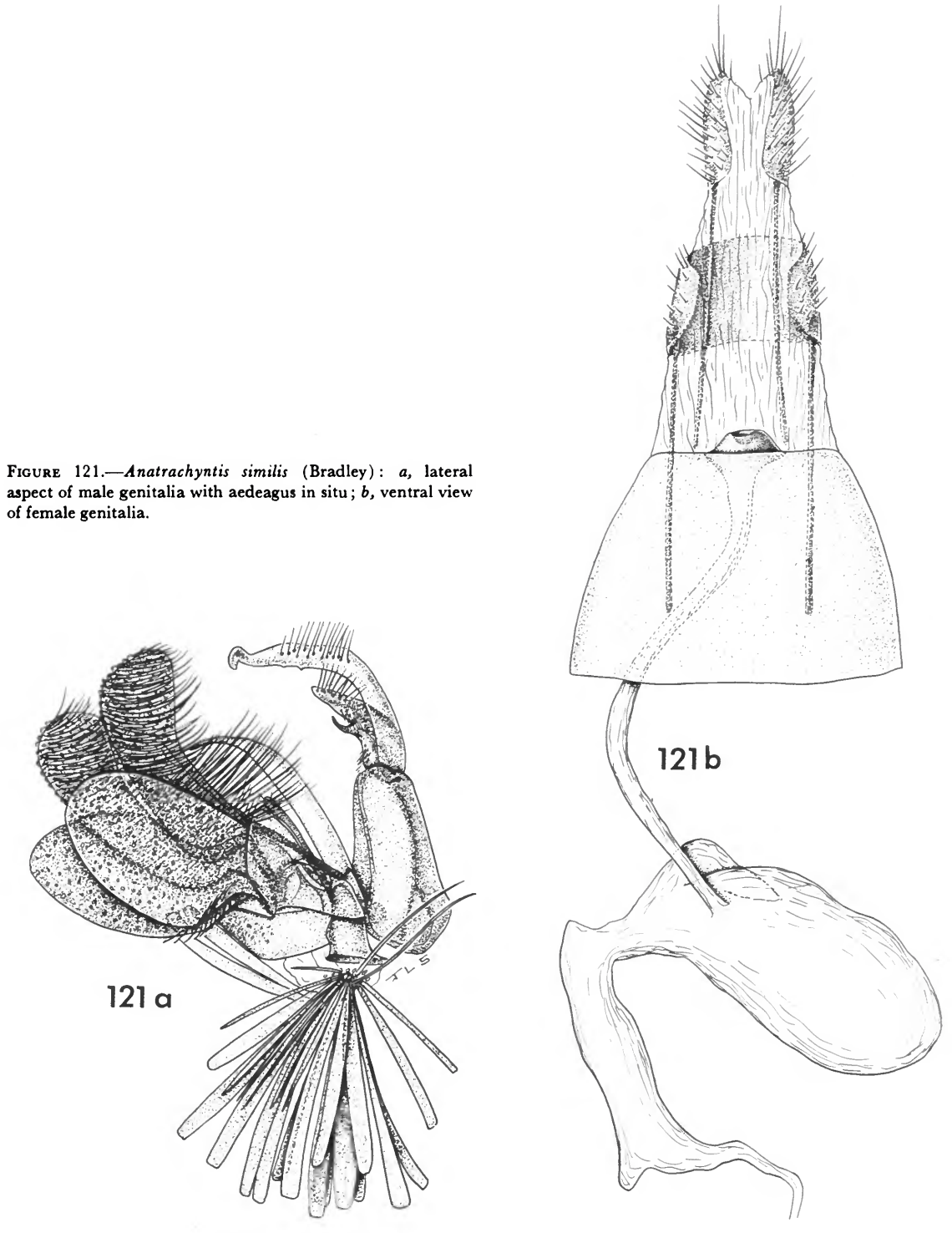
From Rapa we have the following: Anatakuri nako, ♂, ♀ (14.X); Haurei, 4 ♂ ♂, 7 ♀ ♀ (11.IX–23.XI); Maii Bay, ♂ (Em. 21.XI), ♀ (Em. 15.XI); Ororagi, 200′ (61 m), ♀ (4.XI); Pake Bay, 29 ♂ ♂, 17 ♀ ♀ (31.X); Point Maraia, ♀ (31.X).

Probably this species will be found throughout the Pacific region wherever *Pandanus* occurs.

The records from the Marquesas Islands and Tahiti are taken from material recently acquired.

FOOD PLANT.—*Pandanus tectorius* Solander.

FIGURE 121.—*Anatrachyntis similis* (Bradley): *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, ventral view of female genitalia.



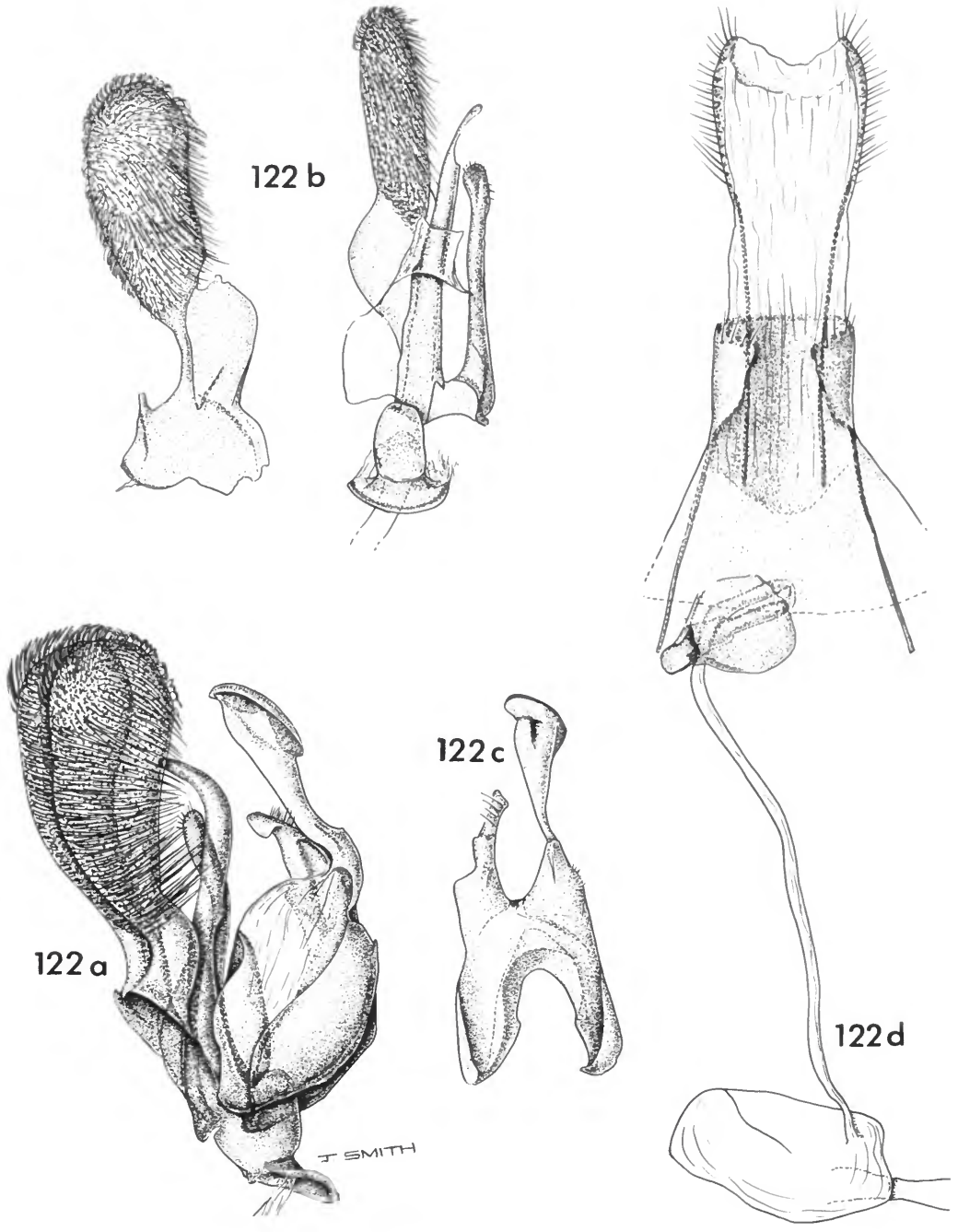


FIGURE 122.—*Anatrachyntis incertulella* (Walker): *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, disarticulated harpes with exposed manica and prospicuus on right; *c*, gnathos and tegumen; *d*, ventral view of female genitalia.

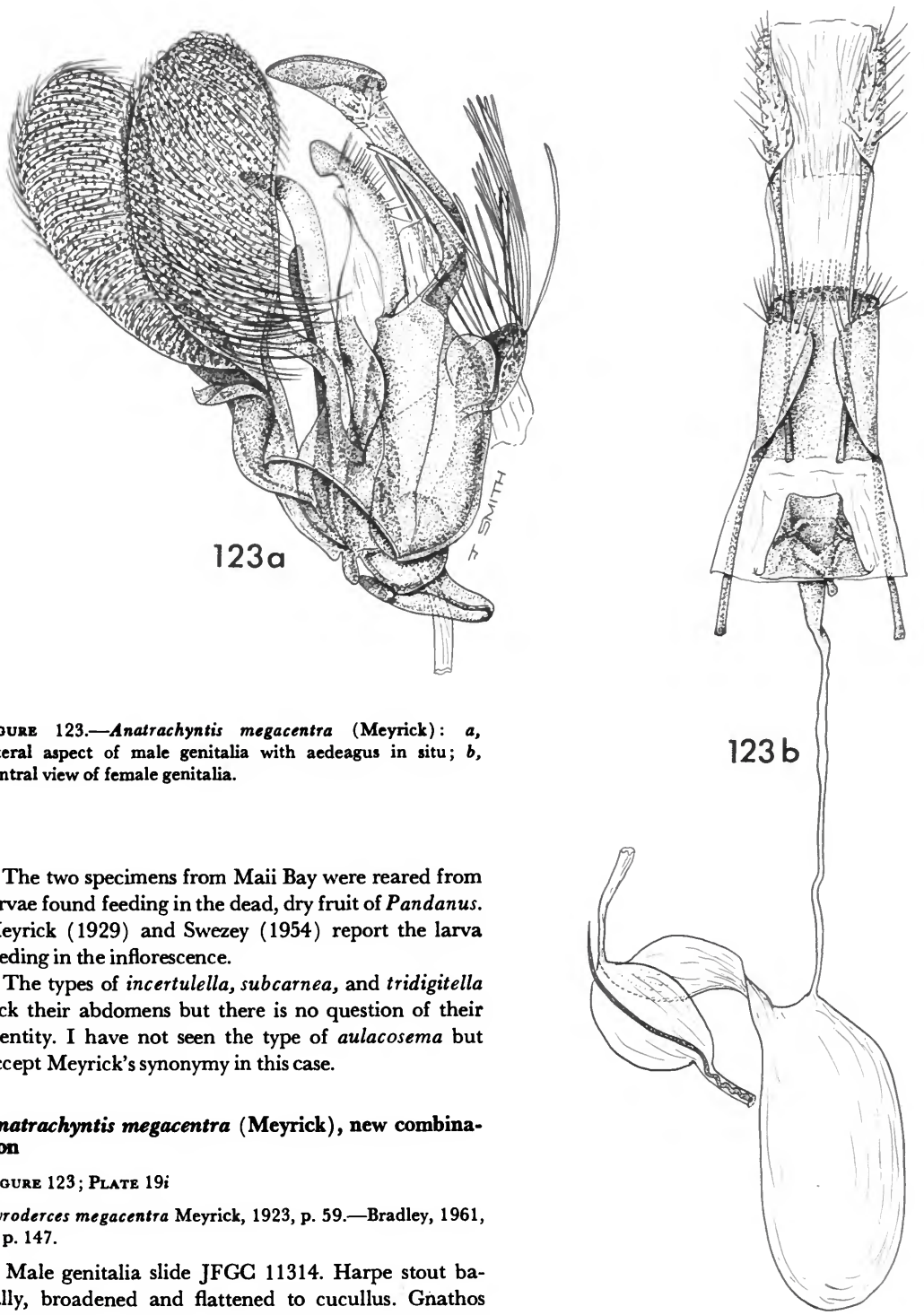


FIGURE 123.—*Anatrachyntis megacentra* (Meyrick): *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, ventral view of female genitalia.

The two specimens from Maii Bay were reared from larvae found feeding in the dead, dry fruit of *Pandanus*. Meyrick (1929) and Swezey (1954) report the larva feeding in the inflorescence.

The types of *incertulella, subcarnea,* and *tridigitella* lack their abdomens but there is no question of their identity. I have not seen the type of *aulacosema* but accept Meyrick's synonymy in this case.

Anatrachyntis megacentra (Meyrick), new combination

FIGURE 123; PLATE 19*i*

Pyroderces megacentra Meyrick, 1923, p. 59.—Bradley, 1961, p. 147.

Male genitalia slide JFGC 11314. Harpe stout basally, broadened and flattened to cucullus. Gnathos with right element longer than tegumen, sharply bent basally, broadly expanded distally; left element two-

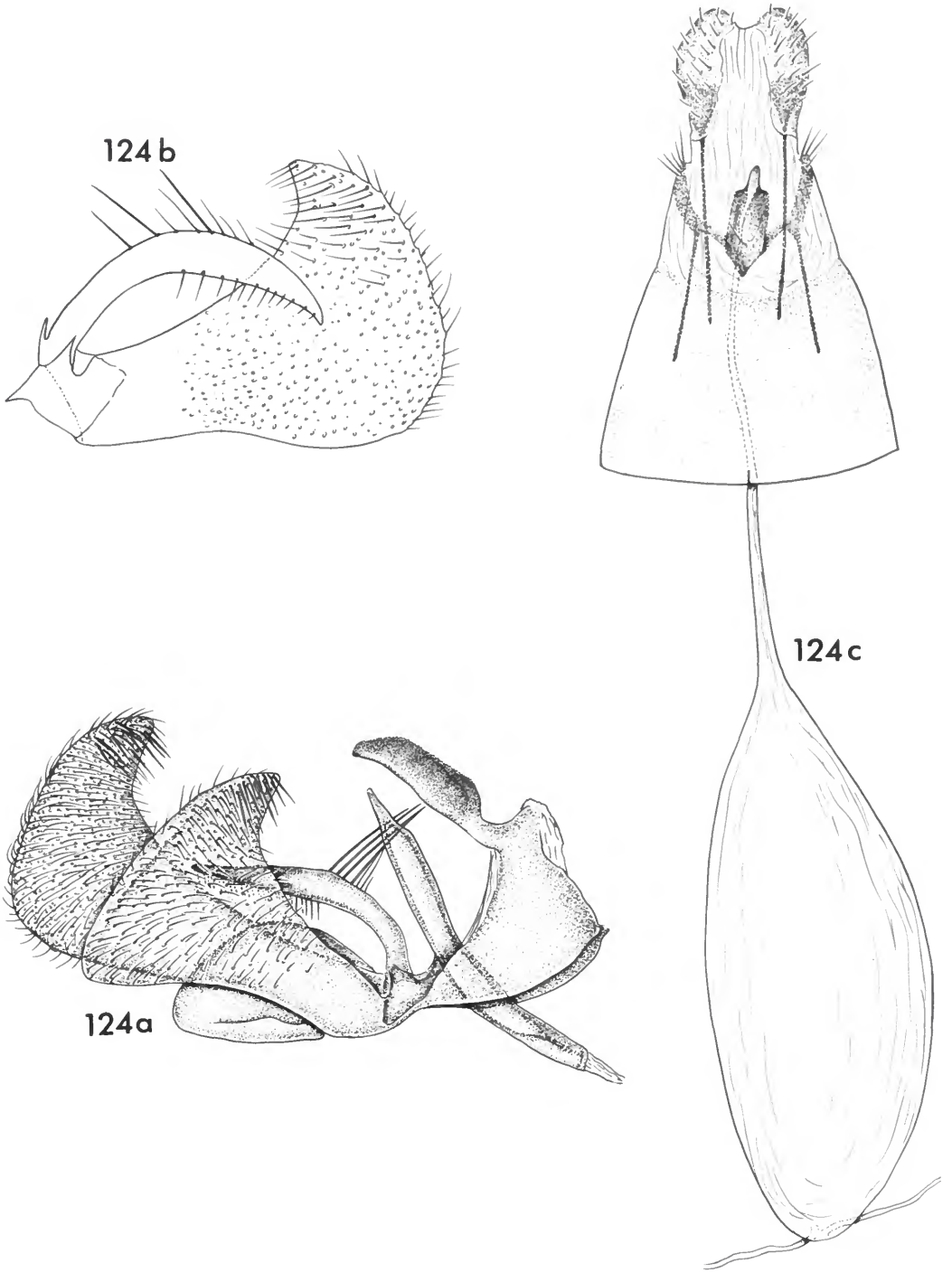


FIGURE 124.—*Cosmopterix melanarches* Meyrick: *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, harpe with prospicuus attached; *c*, ventral view of female genitalia.

thirds the length of right, compressed and slightly widened distally. Vinculum undifferentiated. Tegumen broad, short, about half the length of harpe. Anellus an elongate, curved plate with posterior tonguelike projection. Manica long, curved, sharply bent distally, bluntly pointed. Prospicuus slender, slightly wider in distal third. Aedeagus bulbous basally with broad anterior rim.

Female genitalia slide JFGC 11315. Ostium funnel shaped; ventral lip broad, truncated. Inception of ductus seminalis from posterior surface of bursa copulatrix. Ductus bursae slender, membranous. Bursa copularix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Fiji, Dreketi River.

DISTRIBUTION.—Fiji and Rapa, New Guinea, Java, Solomon Islands (Guadalcanal).

The Rapa specimens are as follows: Haurei, ♂, 2 ♀ ♀; Maii Bay, 4 ♂ ♂, ♀; Point Maraia, 2 ♂ ♂, 4 ♀ ♀; Point Tepapa, 7 ♂ ♂, 8 ♀ ♀. Emergence dates from 16.X to 2.XII. 1963.

FOOD PLANT.—Larva in flowers of *Pandanus* (Java); larvae in dry fruits and fruitstalks.

Like *incertulella, megacentra* is widespread in the Pacific region, and, as in the former, *megacentra* will probably be found wherever *Pandanus* occurs.

Although previously recorded as feeding in the flowers of *Pandanus,* all of ours were reared from the dry, dead tissues of the fruits and fruitstalks.

Genus *Cosmopterix* Hübner

Cosmopterix Hübner, 1825, p. 424. (Type-species: *Tinea zieglerella* Hübner [1805–1810], Tab. Tinea 44, fig. 306. [Opinion 866, 1969, pp. 150–151].)

Cosmopterix melanarches Meyrick

FIGURE 124; PLATE 21*e*

Cosmopteryx melanarches Meyrick, 1929, p. 497.—Viette, 1949a, p. 318.

Male genitalia slides, JFGC 11822, 11824, 11826. Harpe narrow basally, broadly expanded toward cucullus, the latter broadly rounded. Gnathos with right element strongly developed, widened about middle, pointed; left element absent. Vinculum undifferentiated. Tegumen short, broad. Anellus tubular. Aedeagus slender, slightly curved.

Female genitalia slides JFGC 11417, 11772. Ostium very small, round, posteroventral lip produced into a point. Genital plate membranous. Inception of ductus seminalis posteriorly from ductus bursae. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Raiatea (Society Islands).

DISTRIBUTION.—Raiatea (Society Islands); Rapa.

FOOD PLANT.—Unknown.

From Rapa we have the following 37 ♂ ♂ and 22 ♀ ♀: Anatakuri nako, 2 ♂ ♂, ♀ (14.X.1963); Haurei, 22 ♂ ♂, 17 ♀ ♀ (17.IX to 19.XI.1963); Maii Bay, ♂ (23.X.1963); Maugaoa, 950′ (292 m), ♂ (7.XI.1963); Maurua, 600′ (184 m), ♂ (22.X. 1963); Morogouta, 750′ (231 m), ♀ (10.X.1963); Pariati Bay, ♀ (30.X.1963); Point Tepapa, ♀ (15.IX.1963); Point Teakauraee, 3 ♂ ♂ (29.IX. 1963); Teumukopuke, ♂ (7.X.1963); Tevaitau, 200′ (61 m), 6 ♂ ♂, ♀ (23.IX–1.X.1963).

Previously, *melanarches* was known only from the type locality, but unquestionably it will be found in other areas in the Southwest Pacific.

We collected most of our specimens during the daytime while they were hovering over fresh cow dung but some were taken at light. The species frequents grassy areas, and the larva is probably a miner in grass, but we did not succeed in rearing it.

Cosmopterix aphranassa Meyrick

FIGURE 125; PLATE 21*g, h*

Cosmopteryx aphranassa Meyrick, 1926, p. 274; 1929, p. 497.—Viette, 1949a, p. 318.

Male genitalia slide JFGC 11769. Harpe slender, sickle shaped. Gnathos left element absent; right element stout, curved laterally, flattened distally; dorsal edge of distal end serrate. Vinculum not differentiated. Tegumen very short, broad. Manica very stout, strongly sclerotized distally. Prospicuus stout, curved, present on both sides. Aedeagus short, slender.

Female genitalia slides JFGC 11294, 11295, 11770, 11771. Ostium tubular, protruding. Antrum not differentiated. Inception of ductus seminalis from posterior part of bursa copulatrix. Ductus bursae slender, sclerotized. Bursa copulatrix membranous. Signa two sclerotized plates with longitudinal keel. Lamella antevaginalis sclerotized, with protruding median process. On each side of the ostial region there are three groups of dense scales.

TYPE.—British Museum (Natural History).

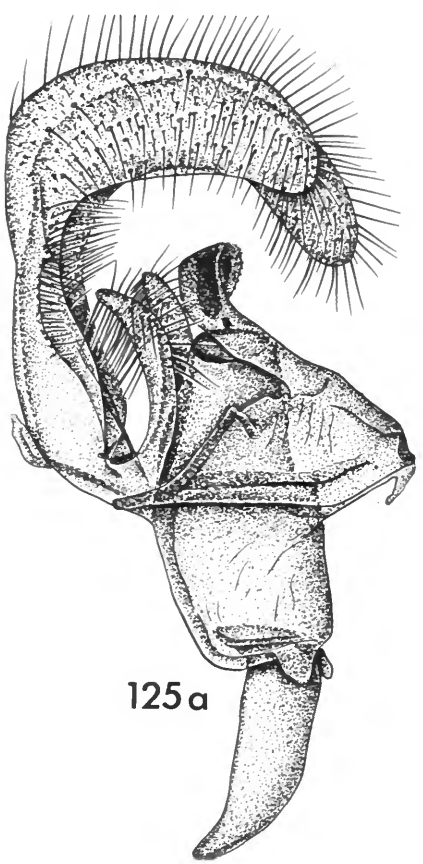
TYPE LOCALITY.—Rapa.

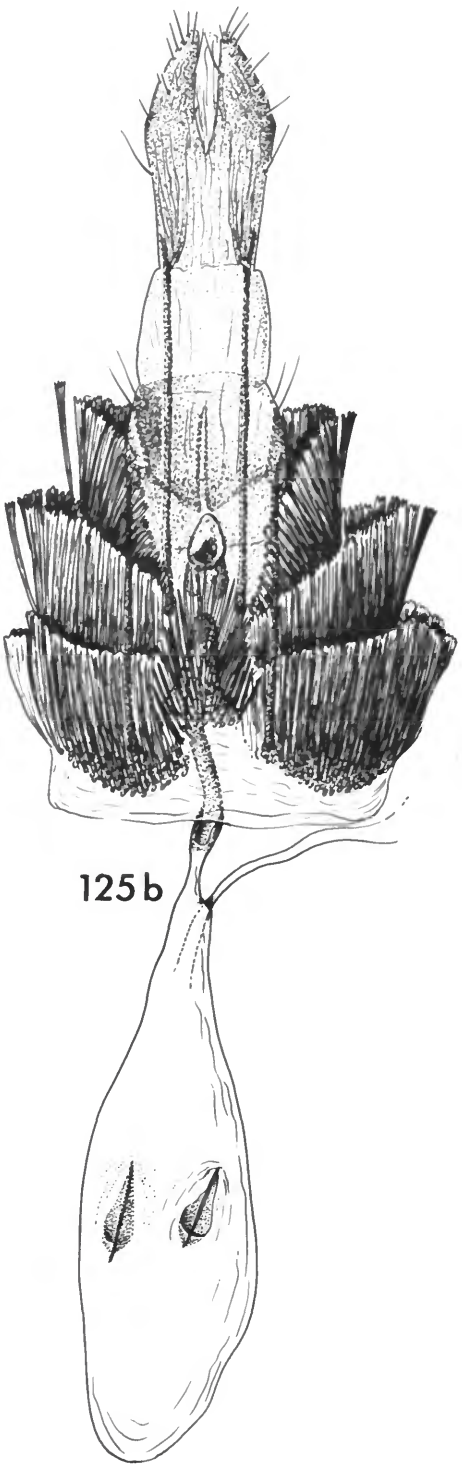
DISTRIBUTION.—Rapa.

We have 93 ♂♂ and 66 ♀♀ from Rapa as follows: Anatakuri nako, ♂; Haurei, 80 ♂♂, 52 ♀♀; Maii Bay, ♂; Maugaoa, 950′ (292 m), 2 ♂♂; Maurua, 600′ (184 m), 4 ♂♂, 7 ♀♀; Morogouta, 750′ (231 m), ♂, ♀; Piahu, 750′ (231 m), ♂, 4 ♀♀; Teumukopuke, 500′ (154 m), 2 ♂♂; Tevaitau 200′ and 800′ (61 m, and 245 m), ♂, 2 ♀♀.

FOOD PLANT.—*Miscanthus floridulus* (Labill) Warberg. (R16).

FIGURE 125.—*Cosmopterix aphranassa* Meyrick: *a*, lateral aspect of male genitalia with aedeagus in situ; *b*, ventral view of female genitalia.





In all open areas where *Miscanthus* flourishes, *aphranassa* is abundant. It was the first species collected after our arrival and was plentiful throughout our visit; indeed, on occasion it was so abundant at the collecting sheet that nothing else could be collected.

There are two forms of this species as shown in the figures on Plate 21. The form in which the dark costal marks are absent, beyond the postmedian band, as shown in Plate 21*h* is uncommon, the normal form being that shown in Plate 21*g*.

Meyrick described this species from two males and states of them, "Peculiarly characterized by the white hind-wings." The specimens he had were worn and the normal hind-wing color of the male is gray; the female hind wing is usually so much darker that the sex can be recognized by that alone.

The larva of *aphranassa* is a miner in the grass blades. The miner works lengthwise in the blade and when the larva encounter dead tissue, or an area too narrow to be mined, it leaves the old mine and cuts into the blade starting a new mine. The new opening is covered with a light web, apparently to prevent the entrance of predators or parasites. We found no pupae in the many mines examined, so assume pupation takes place on the ground. In the laboratory the larvae pupated in the mine.

Genus *Labdia* Walker

Labdia Walker, 1864, p. 823. (Type-species: *Labdia deliciosella* Walker, 1864, p. 823 [by monotypy].)

Labdia dicyanitis Meyrick

FIGURE 126; PLATE 21*f*

Labdia dicyanitis Meyrick, 1934, p. 347.

Male genitalia slide JFGC 11423. Harpe long, slender, longer than gnathos and tegumen combined; cucullus dilated. Gnathos with long, curved right element terminating in a hook; left element a small nodule. Vinculum not differentiated. Tegumen broad, strongly sclerotized, with slender digitate process from ventral edge on left side. Anellus funnel shaped. Manica long, slender, curved, lightly sclerotized. Prospicuus slender, curved, about two-thirds the length of the manica. Aedeagus short, dilated basally, the latter surrounded by a narrow rim.

Female genitalia slide JFGC 11424. Ostium a short double tube. Genital plate membranous. Inception of ductus seminalis from posterior end of bursa copulatrix at junction with ductus bursae. Ductus bursae threadlike. Bursa copulatrix membranous. Signum absent.

TYPE.—Bishop Museum, Honolulu, Hawaii.

TYPE LOCALITY.—Uahuka, Hane Valley, 30 feet.

DISTRIBUTION.—Marquesas Islands, Rapa.

In addition to the type locality, Meyrick records the species from two other islands, Uapou and Hiva Oa, in the Marquesas. From Rapa we have 23 ♂♂ and 15 ♀♀ from the following localities: Anatakuri Bay, ♂; Haurei, 19 ♂♂, 14 ♀♀; Ororagi, 300′ (92 m), ♂; Pake Bay, ♀; Tevaitau, 200′ (61 m), 2 ♂♂. Dates of capture range from 11–IX to 28.XI.1953.

FOOD PLANT.—Unknown.

Although Meyrick did not designate a "type" in his description of *dicyanitis*, he states (1934, p. 333), "the type specimens of these [species] are placed in the Bernice P. Bishop Museum in Honolulu." Moreover, the specimen before me is labeled "*Labdia dicyanitis* Meyr., type" in Meyrick's handwriting.

The discovery of *dicyanitis* on Rapa, more than 1,000 miles to the southwest, although somewhat of a surprise, points once again to the apparent close relationship between Rapa and the Marquesas Islands, demonstrated so strikingly by the development of *Dichelopa* in both areas.

Semolina, new genus

TYPE-SPECIES.—*Semolina leucotricha*, new species, by monotypy and present designation.

Labial palpus about three times as long as head, recurved, ascending; second segment slightly roughened beneath; third segment slender, acute. Maxillary palpus minute, appressed to base of tongue. Head smooth, lateral tufts slightly spreading. Antenna serrulate in male, simple in female; scape with pecten. Forewing narrow, apex pointed, 12 veins; 1b simple; 2 to 5 nearly parallel; 2 from outer three-fifths of cell; 3 nearer to 4 than to 2; 6 and 7 out of 8 (bases of veins obsolescent); 9 connate with 8; 10 well removed from 9; 11 from slightly beyond middle of cell. Hind wing with 8 veins; 2 and 3 parallel; 4 and 5 stalked; 6 and 7 preserved at margins only, 7 to costa; 8 very short, bent inwardly toward cell and enclosing between it and costa a swollen pad giving rise to an expansible hair tuft (Plate 29*k*); costa of male folded over dorsal surface of wing forming pocket to receive hair tuft.

Male genitalia typically cosmopterigid without greatly modified abdominal segments associated.

Female genitalia without signum; posterior abdominal segments normal.

Semolina is most nearly related to the Marquesan *Asymphorodes* but differs from it by the presence of veins 3 of forewing in both male and female and the stalking of veins 4 and 5 of hind wing (4 and 5 remote in hind wing of *Asymphorodes*); veins 6 and 7 of forewing are out of 8 in *Semolina,* but 6 is connate with the stalk of 7 and 8 in *Asymphorodes.*

Semolina, Iressa, and *Asymphorodes* all have in common simple vein 1b of forewing.

In Meyrick's description of *Asymphorodes* there appear to be several discrepancies: He states ". . . ocelli posterior," but I am unable to find ocelli. Further, ". . . 1b furcate," appears to be in error.

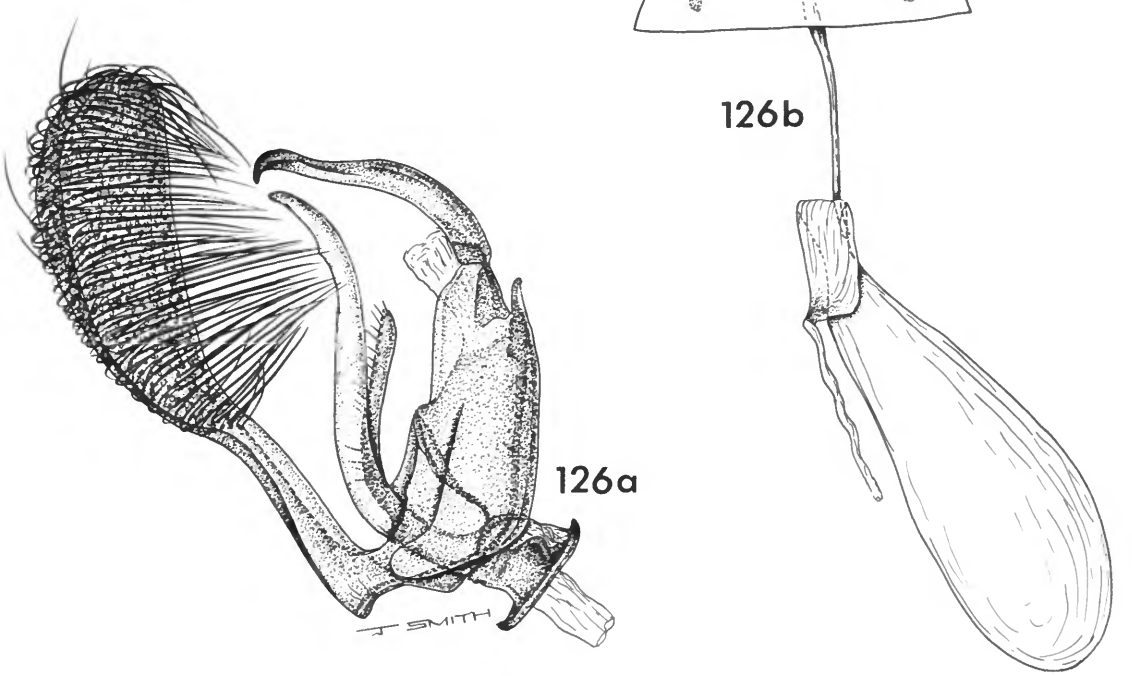


FIGURE 126.—*Labdia dicyanitis* Meyrick: *a,* lateral aspect of male genitalia with aedeagus in situ; *b,* ventral view of female genitalia.

Semolina leucotricha, new species

FIGURE 127, PLATE 21*c*, *d*

Alar expanse 8–10 mm.

Labial palpus pale cinereous; second segment suffused gray on outer side; third segment with a very dark gray longitudinal line anteriorly. Antenna black with longitudinal white line dorsally, the latter broken into dashes distally. Head brownish gray. Thorax light brownish olive. Forewing ground color light brownish olive; at middle of costa a buff shade; before apex and on tornus outwardly oblique buff streaks; at end of cell a fuscous spot (obsolete in some specimens); cilia gray with light brownish suffusion. Hind wing very light brownish olive, somewhat paler toward base; cilia gray with brownish suffusion. Foreleg pale cinereous; femur and tibia suffused dark gray on outer side; tarsal segments broadly annulated blackish; midleg similar; hind leg suffused gray on outer side. Abdomen brownish olive dorsally, buff ventrally.

Male genitalia slides JFGC 11420, 11897. Harpe rather broad basally, constricted beyond middle; cucullus rounded. Gnathos left brachium very stout, flattened, pointed. Right brachium long, slender, sharply pointed. Tegumen about as broad as long, narrowed dorsally. Manica long, slender, curved, tapered to a sharp point. Prospicuus broad, spatulate. Aedeagus short, slender, bulbous basally.

Female genitalia slide JFGC 11421. Ostium very small, opening from a heavily sclerotized, protruding tube; at base of tube a stalked pit giving rise to four long setae. Ductus bursae partly sclerotized; very slender. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70099.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (29.X.1963), 2 ♂♂ and 3 ♀♀ paratypes all from the same locality with dates from 28.IX to 11.XI. 1963.

This species was collected, along with *Iressa neoleuca*, by beating the trunks of small trees.

Iressa, new genus

TYPE-SPECIES.—*Iressa neoleuca*, new species, by monotypy and present designation.

Labial palpus three times as long as head, slender, ascending; second segment smooth scaled, nearly as long as third; third segment acute. Head smooth except for rough scales above eye; ocellus absent. Antenna serrulate in male, simple in female; scape with pecten. Forewing narrow, 12 veins; 1b not furcate; 2 and 3 distant, both from before angle of cell; 3, 4, and 5 about equidistant; 6 out of the stalk of 7 and 8; 7 to costa; 9 removed from 8; 9, 10, and 11 about equidistant. Hind wing lanceolate; 2, 3, 4, 5, and 6 about equidistant from each other; 6 and 7 stalked. Conspicuous hair pencil laterally from metathorax of male. Hind tibia rough scaled dorsally.

Male genitalia typically cosmopterigid but with closely associated, greatly modified, and thickened abdominal flaps. Seventh sternum of male strongly sclerotized, hemicylindrical.

Female genitalia with signum absent; sixth and seventh sterna strongly sclerotized.

This genus is nearly related to *Labdia* but differs from it in significant characters. In the forewing of *deliciosella*, vein 1b is forked but in *Iressa* it is simple; vein 5 is approximate to the stalk of 6 and 7 and vein 8 arises from the stalk of 6 and 7; in *Iressa* vein 5 is distant from the stalk of 7 and 8 and 6 arises from the stalk. In the hind wing of *deliciosella* veins 6 and 7 are separate, in *Iressa* veins 6 and 7 are stalked. *Labdia* does not have the enormous, modified abdominal flaps of *Iressa*.

Iressa neoleuca, new species

FIGURE 128; PLATE 21*a*, *b*

Alar expanse 9–12 mm.

Labial palpus ocherous white; second segment grayish fuscous on outer side; third segment grayish fuscous anteriorly. Antenna gray with paler annulations; scape ocherous white, grayish fuscous ventrally and posteriorly. Head ocherous white. Thorax ocherous white; tegula grayish fuscous. Thoracic hair pencils vary from ocherous white to avellaneous and extend to near posterior end of abdomen. Forewing ground color grayish fuscous; from base of costa to near middle a light buff streak; at three-fifths of costa an elongate light buff spot, and preapically a similarly colored, short, transverse streak; dorsum ocherous white, the light streak bent toward apex beyond tornus; on termen three, sometimes confluent, ocherous white spots; cilia grayish, mixed ocherous white opposite terminal spots. Hind wing gray; cilia light gray. Fore-

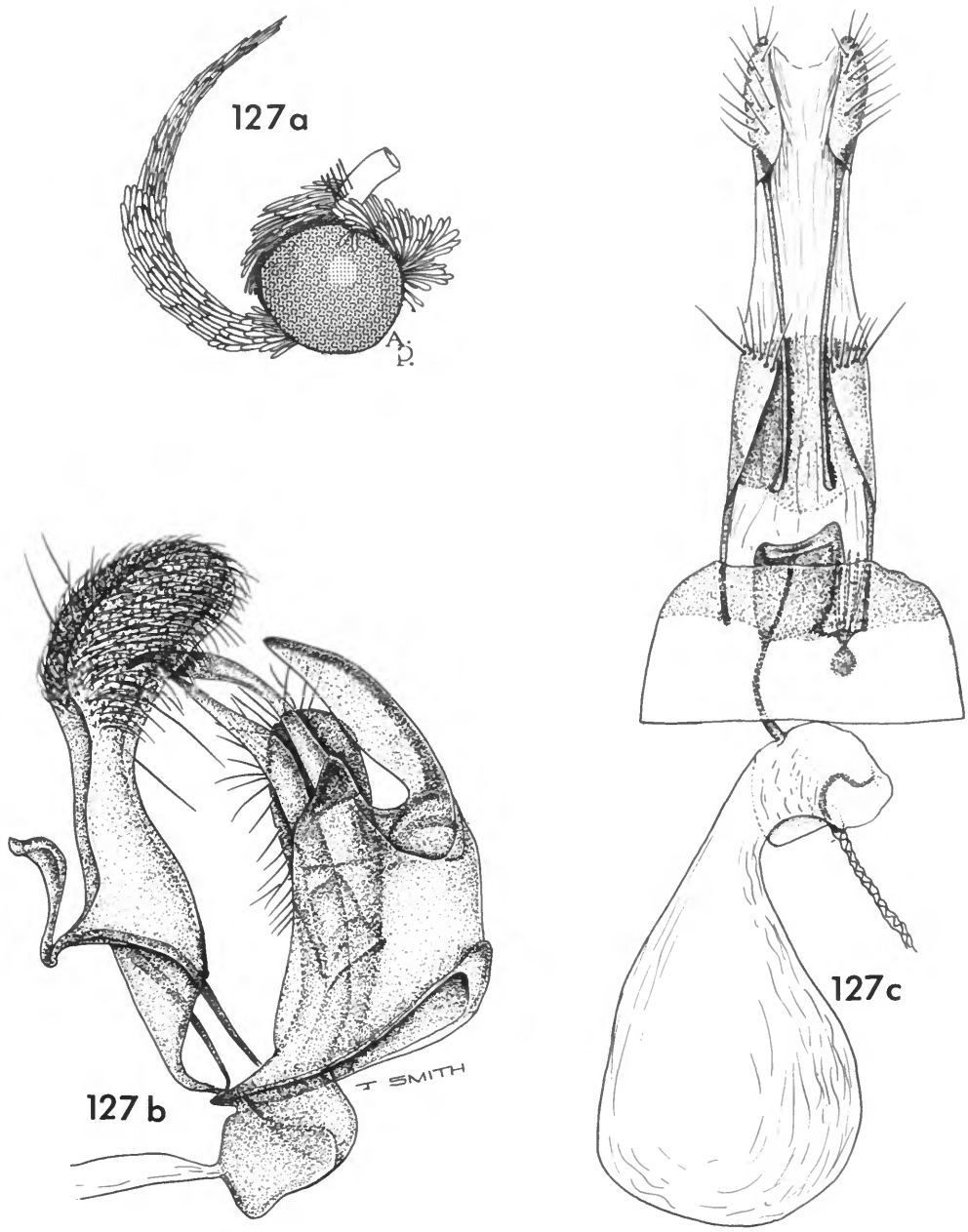


FIGURE 127.—*Semolina leucotricha*, new species: *a*, lateral aspect of head showing palpus; *b*, lateral aspect of male genitalia with aedeagus in situ; *c*, ventral view of female genitalia.

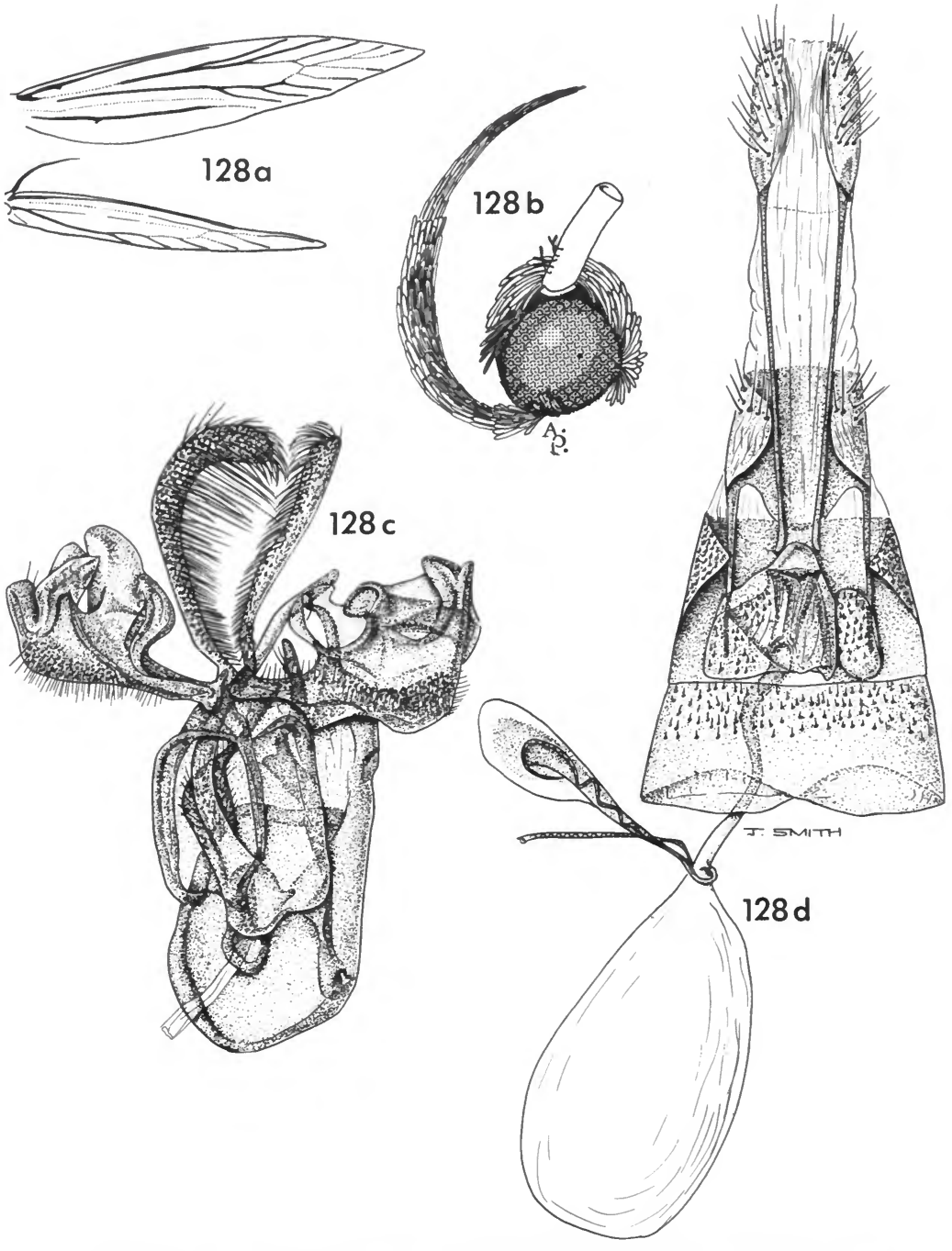


FIGURE 128.—*Iressa neoleuca*, new species: *a*, venation of right wings; *b*, lateral aspect of head showing palpus; *c*, ventral view of male genitalia with aedeagus in situ; *d*, ventral view of female genitalia.

leg and midleg ocherous white, shaded gray on outer side; hind leg ocherous white; distal end of tibia with gray spot; tarsal segments with two or three grayish dashes. Abdomen buff ventrally, grayish fuscous dorsally.

Male genitalia slide JFGC 11418. Harpe very long, slender, widest beyond middle, sickle shaped. Gnathos right brachium slender, curved, pointed; left brachium digitate. Tegumen strongly sclerotized, robust, distorted. Aedeagus minute, slender, bulbous basally. Manica very long, slender, curved basally, dilated; prospicuus a large, flattened process which becomes narrow and attenuated beyond middle.

Female genitalia slide JFGC 11419. Ostium small, oval, opening dorsal, and attached to a strongly modified 7th sternum. Antrum sclerotized. Inception of ductus seminalis at junction of ductus bursae and bursa copulatrix. Ductus bursae sclerotized most of its length, membranous anteriorly. Bursa copulatrix membranous. Signum absent.

HOLOTYPE.—USNM 70100.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown (probably decaying vegetable matter).

Described from the ♂ holotype (23.XI.1963), 14 ♂♂ and 22 ♀♀ paratypes as follows: Haurei, 14 ♂♂, 18 ♀♀ (30.IX to 27.XI.1963); Maii Bay, ♀ (23.X.1963); Point Maraia, 3 ♀♀ (31.X.1963).

This species and the following species, *triformis,* are similar and closely allied, but the ocherous white head and thorax of *neoleuca* immediately distinguish it from the former in which the head and thorax are white. The genitalia are also strikingly similar and difficult to separate. The 7th sternum of *neoleuca,* however, is densely sclerotized and fused with a much reduced 8th sternum forming an inflexible half-cylinder around the genitalia; that of *triformis* is normal and has a strongly sclerotized, narrow 8th sternum. Sternum 6 of *neoleuca* terminates in a median projection. The 6th sternum of *triformis* terminates in a solidly attached median patch of modified scales.

The male genitalia, and associated abdominal segments, are the most involved structures I have encountered and defy accurate description.

Most of our specimens were collected by beating the trunks of trees in a coffee grove, a short distance east of Haurei.

Iressa triformis (Meyrick), new combination

Labdia triformis Meyrick, 1927, p. 89.

As indicated above, *triformis* is closely related to *neoleuca* and is hereby transferred to the new genus *Iressa.*

In placing this species in *Labdia,* Meyrick either overlooked or misinterpreted the characters. As can be seen from the drawing of the wing venation, there are several obvious differences between *Labdia* and *Iressa.* Moreover, the very unusual development of the posterior lateral abdominal flaps of *triformis* and *neoleuca* immediately distinguish them from *Labdia deliciosella* Walker, the type-species of *Labdia.*

This species (*triformis*) does not occur on Rapa but is included to provide proper placement.

Family MOMPHIDAE

Genus *Batrachedra* Herrich-Schäffer

Batrachedra Herrich-Schäffer, 1853, p. 54; pl. 9: figs. 18–21. (Type-species: *Ornix turdipennella* Kollar, 1832 [= *Gracillaria praengusta* Haworth, 1828] [by monotypy].)

Batrachedra monophthalma, new species

FIGURE 129; PLATE 23*b, c*

Alar expanse 9–14 mm.

Labial palpus maize yellow; second segment with dark gray or blackish shade on outer side; third segment with a black spot at base and one at apex on outer side. Antenna ochraceous buff, paler distally with small blackish spots dorsally; before apex a black band, followed by a black spot and two more black bands. Head maize yellow suffused ochraceous buff. Thorax maize yellow suffused ochraceous buff and with a small fuscous streak posteriorly. Forewing ground color maize yellow overlaid ochraceous buff; base of costa fuscous, remainder of costa and tornal area speckled with fuscous; on fold a conspicuous blackish spot at basal third; in basal angle a pale avellaneous shade; cilia pale grayish buff. Hind wing very light avellaneous, darker toward apex; cilia slightly lighter. Foreleg ocherous white, suffused grayish fuscous on outer side; midleg ocherous white suffused ochraceous buff; tibia with three oblique grayish-fuscous bands on outer side; tarsal segments with grayish-fuscous spot basally on outer side; hind leg ocherous white; tibia suffused and irrorate grayish

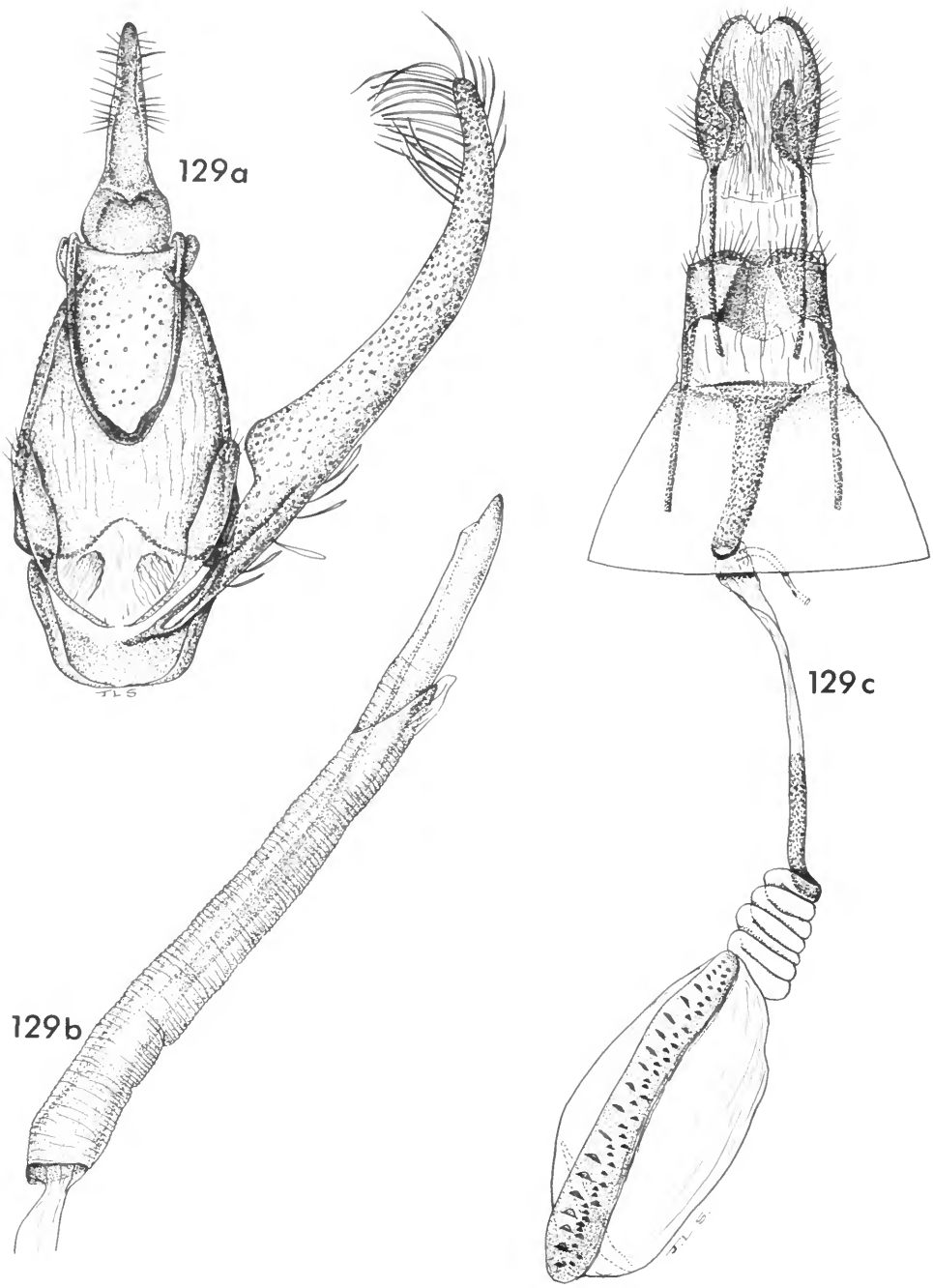


FIGURE 129.—*Batrachedra monophthalma*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

fuscous on outer side; tibial spurs grayish fuscous; tarsal segments grayish basally. Abdomen ochraceous buff; ventrolaterally grayish fuscous.

The moth appears darker than the ground color indicates because of the grayish speckling and ochraceous buff suffusion.

Male genitalia slide JFGC 11430. Harpe long, slender, widest at base, tapering to a narrow cucullus. Gnathos narrow, U-shaped. Uncus long, curved, pointed, dilated basally. Vinculum narrow, rounded. Tegumen two-thirds as long as harpe, narrowed distally. Anellus mostly membranous with long, lateral lobes. Aedeagus longer than harpe, slender, slightly curved; vesica unarmed.

Female genitalia slide JFGC 11431. Ostium funnel shaped, membranous. Antrum sclerotized anteriorly, scobinate posteriorly. Inception of ductus seminalis at anterior edge of antrum. Ductus bursae membranous anterior to antrum, inner surface very finely dentate about middle, spiraled anteriorly. Signum a large, narrow, sclerotized, dentate plate.

HOLOTYPE.—USNM 70097.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANTS.—*Cyperus javanicus* Houtt (*C. pennatus* L.) (R21); *Scirpus* sp., *lacustris* L. ? (tule).

Described from the ♂ holotype (Em. 27.XI.1963), 29 ♂♂ and 41 ♀♀ paratypes as follows: Anatakuri nako, 3 ♀♀ (14.X.1963); Haurei, 6 ♂♂, 15 ♀♀ (9.IX.–4.XII.1963); Maugaoa, 800′–950′ (245–292 m), 3 ♂♂, 5 ♀♀ (18.IX.–7.XI.1963); Maurua, 600′ (184 m), 3 ♂♂, 4 ♀♀ (17–25.X.1963); Metua nako, 750′ (231 m), ♂ (12.XI.1963); Morogouta, 750′ (231 m), ♂ (10.X.1963); Ororagi, 300′ (92 m), ♀ (10.XI.1963); Point Maraia, 5 ♂♂, 5 ♀♀ (21–29.XI.1963); Pukutaketake, 1150′ (353 m), ♂ (27.XI.1963); Teumukopuke, 500′ (154 m), 3 ♂♂, 2 ♀♀ (7.X.–3.XI.1963); Tevaitau, 200′–800′ (61–245 m), 6 ♂♂, 6 ♀♀ (23.IX.–18.XI.1963).

This species and *B. arenosella* (Walker) are closely related, but the conspicuous dark spot at basal third, in fold of forewing, at once distinguishes *monophthalma* from *arenosella*. The signum of *monophthalma* is an elongate, sclerotized, dentate plate extending the length of the bursa copulatrix, but that of *arenosella* is a much shorter, oval plate.

The larva of *monophthalma* webs the flowers and immature fruits on which it feeds. A tough cocoon is formed in the inflorescence.

When at rest the adult stands with the same attitude as that of *Gracillaria* species but uses only the mesothoracic legs. The prothoracic legs are tucked neatly under the thorax.

Family GLYPHIPTERIGIDAE

Genus *Anthophila* Haworth

Anthophila Haworth, 1810, p. 471. (Type-species: *Phalaena Tortrix Fabriciana* Linnaeus, 1767, p. 880 [subsequent designation by Fletcher, 1829, p. 16].)

Anthophila chalcotoxa (Meyrick), new combination

FIGURE 130; PLATE 22*c*

Simaethis chalcotoxa Meyrick, 1886, p. 287; 1929, p. 504.—Viette, 1949a, p. 317.

Male genitalia slide JFGC 11371. Harpe about twice as long as broad, somewhat dilated at cucullus; sacculus thickened; from base a sclerotized ridge reaching to about middle of harpe. Uncus and gnathos absent. Vinculum broad, rounded. Tegumen very narrow, U-shaped. Anellus an elongate plate, dilated about middle, then continued posteriorly as two curved plates more or less forming a tube. Aedeagus moderately stout, slightly twisted.

Female genitalia slides JFGC 11701, 11756. Ostium small, round, within a sclerotized ring. Antrum sclerotized and cylindrical. Inception of ductus seminalis at anterior edge of antrum. Ductus bursae membranous. Bursa copulatrix membranous. Signum a finely dentate plate. Lamella antevaginalis moderately sclerotized. Lamella postvaginalis membranous.

Lectotype: ♂ "Tonga, Polynesia. Mathew 1887. 4360." A second label reads "Walsingham Collection, 1910–427." A third label bears the name "*Simaethis chalcotoxa* Meyr. Tr. Ent. Soc. London, 1886, 287. cotype." Slide JFGC 11370, hereby designated.

TYPE LOCALITY.—Tonga, Polynesia.

DISTRIBUTION.—Society Islands: Moorea, Eimeo, 7–9.IV.1883, Walker; Bora Bora, Vanilla Plantn. 20.VI.1925, L. E. Cheesman; Fiji, Natora 5 Jan. 1919 R. Veitch; Ellice Ids. Nui, 21.IX.1924, P. A. Buxton and G. A. Hopkins; Rapa.

FOOD PLANT.—*Ficus* species.

Although the lectotype is dated 1887, the year following the date of publication, we must attribute this discrepancy purely to error in recording because only one collection was made in the area by G. F. Mathew, from which the species was described.

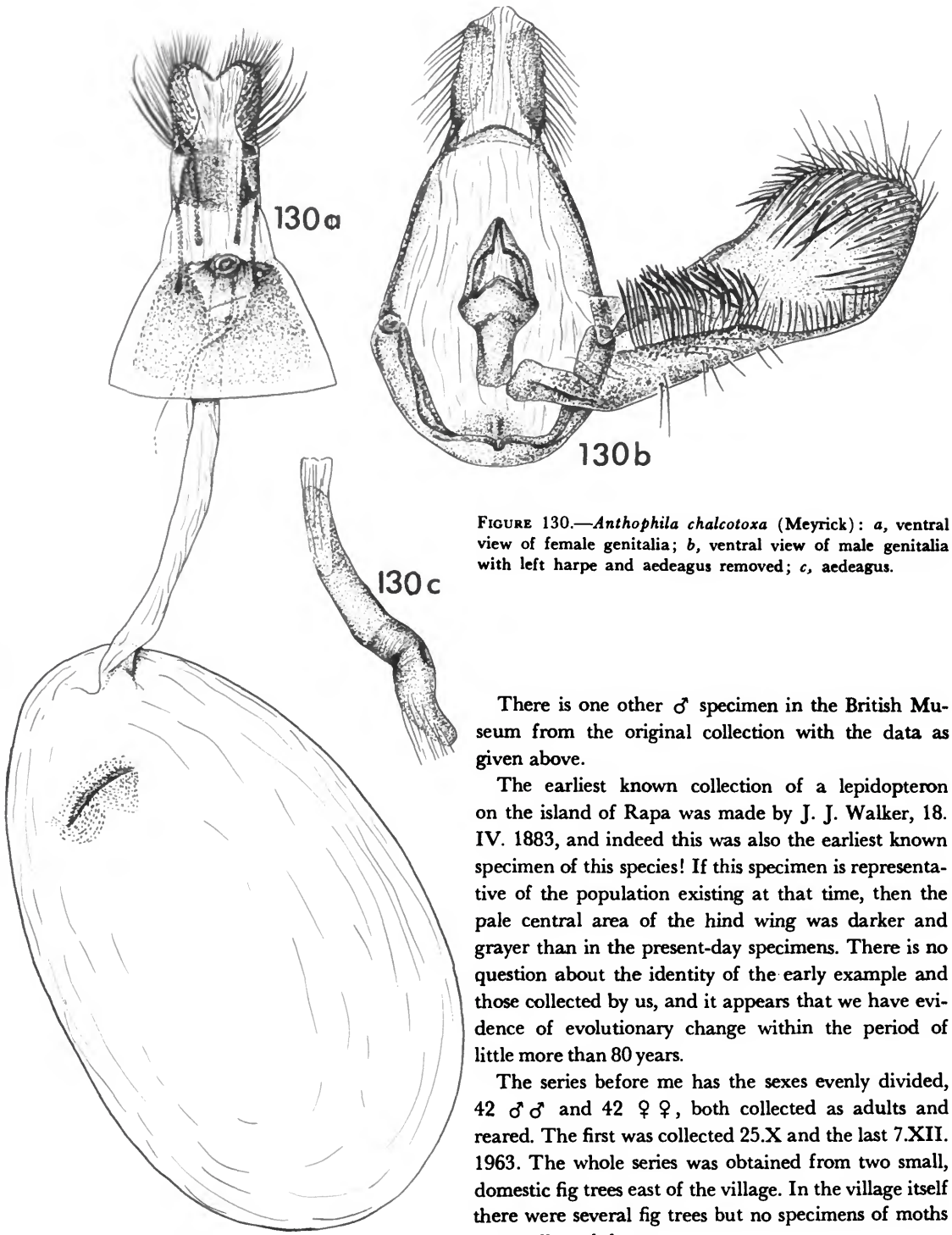
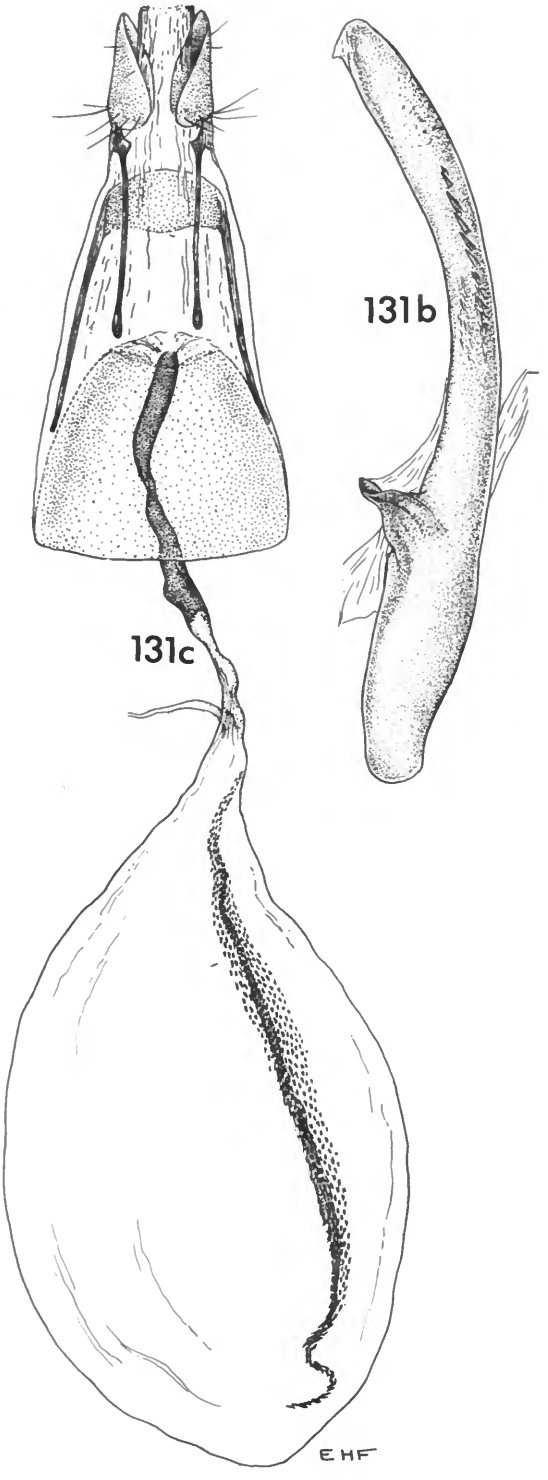


FIGURE 130.—*Anthophila chalcotoxa* (Meyrick): *a*, ventral view of female genitalia; *b*, ventral view of male genitalia with left harpe and aedeagus removed; *c*, aedeagus.

There is one other ♂ specimen in the British Museum from the original collection with the data as given above.

The earliest known collection of a lepidopteron on the island of Rapa was made by J. J. Walker, 18. IV. 1883, and indeed this was also the earliest known specimen of this species! If this specimen is representative of the population existing at that time, then the pale central area of the hind wing was darker and grayer than in the present-day specimens. There is no question about the identity of the early example and those collected by us, and it appears that we have evidence of evolutionary change within the period of little more than 80 years.

The series before me has the sexes evenly divided, 42 ♂♂ and 42 ♀♀, both collected as adults and reared. The first was collected 25.X and the last 7.XII. 1963. The whole series was obtained from two small, domestic fig trees east of the village. In the village itself there were several fig trees but no specimens of moths were collected there.



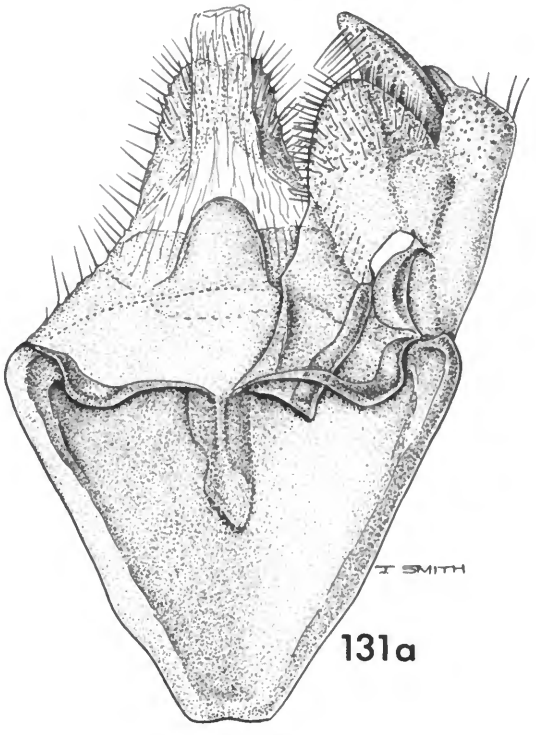


FIGURE 131.—*Tebenna bradleyi*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

Genus *Tebenna* Billberg

Tebenna Billberg, 1820, p. 90. (Type-species: *Tinea bjerkandrella* Thunburg, 1784, p. 79 [subsequent designation by Bradley, 1966, p. 220].)

Tebenna bradleyi, new species

FIGURE 131; PLATE 22*d*

Alar expanse 9–11 mm.

Labial palpus basal segment white; second segment dark gray and white mixed, and with large yellow-brown spot on outer side in basal half; third segment speckled gray and white. Antenna black with narrow white annulations. Head gray and white mixed. Thorax grayish fuscous with very fine median white line; tegula white on inner edge and apex, and with scattered ochraceous-orange scales. Forewing ground color grayish fuscous; basal fourth leaden metallic with two longitudinal, broad ochraceous-orange dashes; antemedian

fascia outwardly curved, widest on dorsum, indicated by closely packed (but not solid) white scales; postmedian fascia similar, beginning at costal third, extending outwardly to vein 6, then inwardly to tornus; subterminal line consisting of scattered whitish scales; on middle of costa a black spot mixed with leaden metallic scales; astride outer end of cell a large black spot with leaden metallic scales in center; on middorsum a similar but smaller spot; on tornal half of termen a transverse black dash edged outwardly with leaden metallic scales; subapically an outwardly curved line of leaden metallic scales; some scattered ochraceous-orange scales in median area; cilia dark gray with a fuscous basal band and whitish median band; apical cilia white tipped. Hind wing grayish fuscous, somewhat darker toward margins; in outer third a white dash astride veins 3 to 5; cilia similar to those of forewing but nearly all white tipped. Legs white, banded with blackish fuscous. Abdomen blackish fuscous dorsally, white ventrally.

Male genitalia slides JFGC 11425, 11429, 11927. Harpe very broad, short; ventral margin strongly convex, setose; cucullus truncate with conspicuous, triangular ventral projection. Vinculum very broad basally, triangular. Tegumen a narrow band widened at middle. Anellus tubular, semimembranous. Aedeagus twice as long as vinculum, curved, thickest in basal third; vesica armed with elongate series of dentate cornuti.

Female genitalia slides JFGC 11427, 12038. Ostium very small, round. Inception of ductus seminalis from near junction of ductus bursae and bursa copulatrix. Ductus bursae strongly sclerotized in posterior three-fifths. Bursa copulatrix membranous. Signum a long, narrow band of small teeth.

HOLOTYPE.—USNM 70102.

TYPE LOCALITY.—New Zealand, Haumoana, Hawkes Bay.

DISTRIBUTION.—Australia, New Zealand, Rapa, India.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (13.XI.1965, T. H. Davies) and 63 paratypes as follows: 40 ♂♂, 10 ♀♀ with identical data same as holotype; 6 ♂♂, 5 ♀♀, Australia, New South Wales, Parramatta (22.X.1879, Raynor) (Walsingham collection); ♀, India, Bihar, Pusa (23.II.1928, E. Hassan); ♂, Rapa, Anatakuri nako (14.X.63).

This species has been confused in collections with *T. bjerkandrella* (Thunburg), but differs from it by having a much shorter harpe, without the extension of the sacculus of that species (Pierce and Metcalfe, 1935, pl. 23), and a much narrower signum than in *bjerkandrella*.

Family YPONOMEUTIDAE

Genus *Tanaoctena* Turner

Tanaoctena Turner, 1913, p. 204. (Type-species: *Tanaoctena ooptila* Turner, 1913, p. 205 [by monotypy].)

Tanaoctenota Meyrick, 1918, p. 188. (Type-species: *Tanaoctena ooptila* Turner, 1913, p. 205 [by original designation].)

Cylicophora Turner, 1927, p. 156. (Type-species: *Cylicophora collina* Turner, 1918 [by monotypy].) (New synonymy.)

For the above new synonymy I am indebted to my good friend and colleague, Dr. Ian F. B. Common of C.S.I.R.O., Canberra, Australia. Having had experience with the Tasmanian and Australian species as well as *T. dubia* Philpott (1931, p. 34) from New Zealand, he recognized immediately the generic position of the species from Rapa, which is described next.

Tanaoctena indubitata, new species

FIGURES 132, 133; PLATE 22*g*, *h*

Alar expanse 16–22 mm.

Labial palpus ocherous white; outer side shaded with pearl gray. Antenna pale gray; scape suffused fuscous dorsally, much paler anteroventrally. Head drab; face ocherous white. Thorax gray, suffused fuscous. Forewing ground color drab; basal fourth fuscous in ♂ except on dorsum; in ♀, basal patch indicated primarily by ill-defined, transverse fuscous bars; on costa, slightly before middle a more or less well-defined fuscous quadrate patch extending nearly to cell; in cell, at one-third, a fuscous spot and a similarly colored but smaller spot at end of cell; middle of dorsum white mottled fuscous; terminal fifth of wing with ill-defined fuscous spots; cilia gray. Hind wing light pearl gray, nearly white basally; cilia light gray. Foreleg ocherous white; femur and tibia lightly suffused fuscous on outer side; 1st tarsal segment blackish fuscous, remaining tarsal segment grayish fuscous; midleg ocherous white with slight fuscous suffusion on outer side; hind leg ocherous white. Abdomen gray dorsally, ocherous white ventrally.

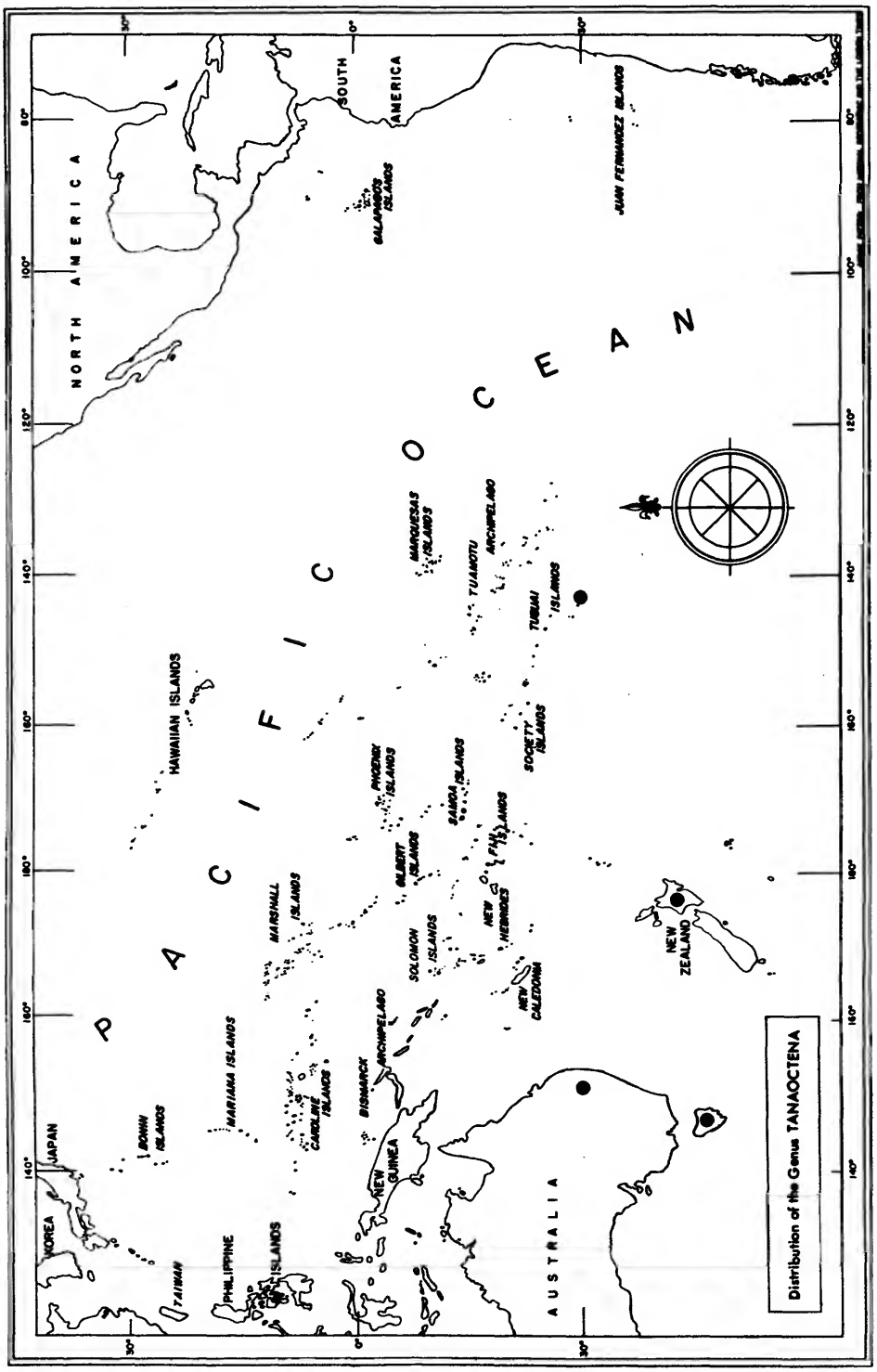


FIGURE 132.—Distribution of the genus *Tanaoctena* Turner.

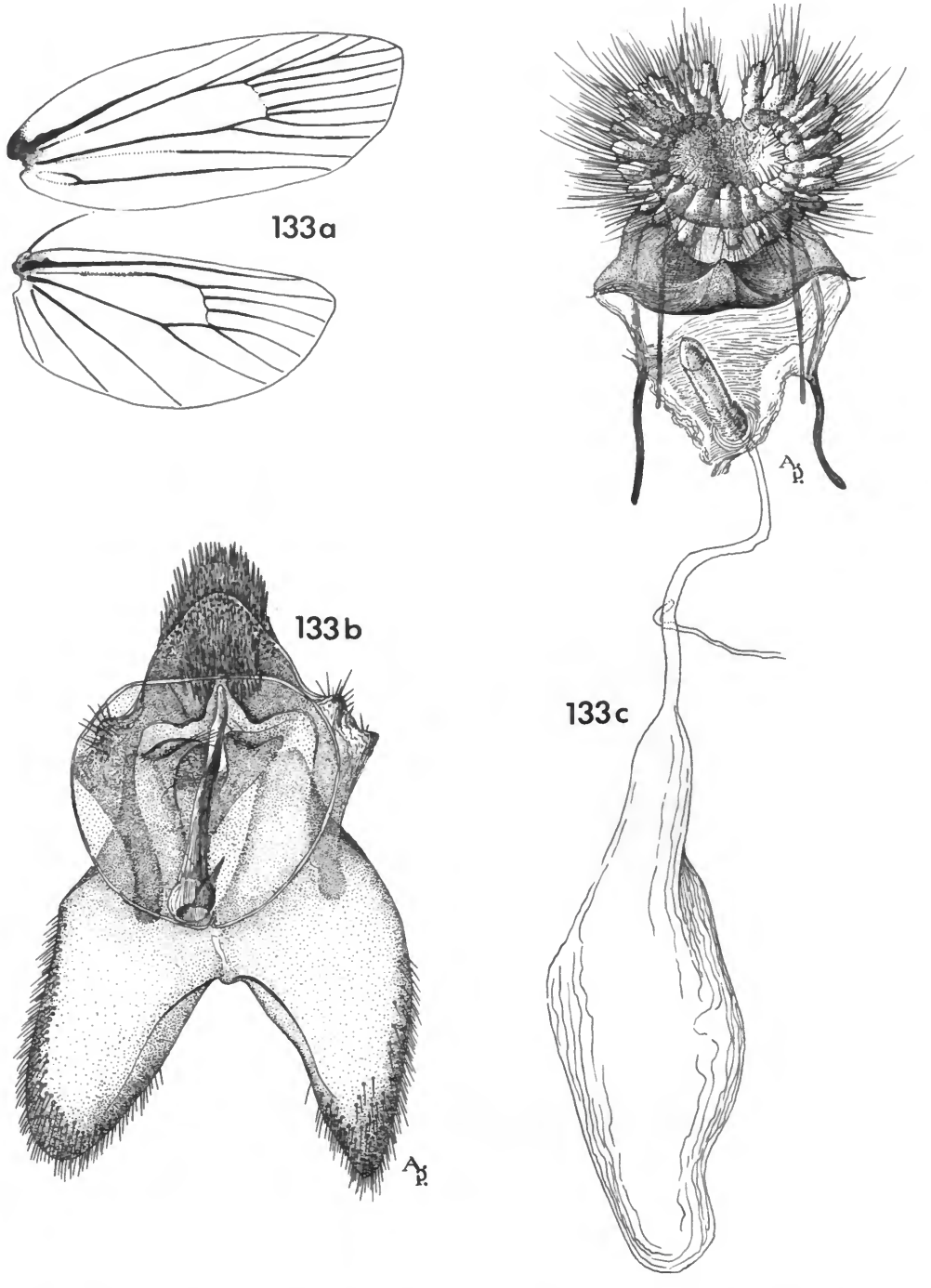


FIGURE 133.—*Tanaoctena indubitata,* new species: *a,* venation of right wings; *b,* ventral view of male genitalia with aedeagus in situ; *c,* ventral view of female genitalia.

Male genitalia slide JFGC 11243. Harpe elongate, triangular, costa convex, armed with short, stiff setae beyond middle to cucullus; cucullus narrowly rounded. Gnathos broad, robust, apex rounded. Uncus thick, bluntly pointed. Vinculum absent? Tegumen broad, produced laterally as two thick arms expanded posteriorly. Anellus tubular but much involved, with a large ventral membranous pad surrounded by a sclerotized ring. Aedeagus very slender, dilated basally.

Female genitalia slide JFGC 11244. Ostium tubular, protruding, strongly sclerotized. Papillae anales forming a rosette. Inception of ductus seminalis anterior to middle of ductus bursae. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum absent. Lamella antevaginalis membranous; lamella postvaginalis sclerotized, granular.

HOLOTYPE.—USNM 70104.

TYPE LOCALITY.—Rapa, Tevaitau, 750′(231 m).

DISTRIBUTION.—Rapa.

Described from the ♂ holotype (18.XI.1963), 6 ♂♂ and 15 ♀♀ paratypes as follows: Maugaoa, 800′(245 m), 3 ♂♂ (18.IX.63), 950′(292 m), 8 ♀♀ (7–23.XI.63); Maurua, 600′(184 m), ♂, ♀ (25.IX.63, 17.X.63); Metua nako, 750′ (231 m), ♀ (12.XI.63); Morogouta, 750′ (231 m), ♂, 2 ♀♀ (10.X.63); Piahu, 750′ (231 m), ♀ (11.X.63); Tevaitau, 750′–800′(231–245 m), ♂, 2 ♀♀ (18.XI.63).

FOOD PLANT.—Unknown.

The New Zealand *dubia* has been reared from *Coprosma robusta* Raoul, and in all probability the larva of *indubitata* will be found on *Coprosma cookei* Fosb., or *C. rapensis* F. Br., both of which occur on Rapa.

This species is nearest to the New Zealand *dubia* but has a more rectangular forewing and a paler hind wing.

The genitalia are unusual, and in the case of the male it is difficult to identify certain of the structures. In the anellus, the sides of which appear to be much folded, there is a large ventral membranous pad enclosed by a large sclerotized ring. The membranous pad, through which the aedeagus passes, is associated with the tubular part of the anellus, but what is the ring? If it is part of the anellus, it is a strange development indeed. Posterolaterally on the tegumen, there are two raised points clothed with setae, which appear to be socii. There is no evidence of a vinculum in the usual sense, but in this species it is represented only by a very thin membrane. The papillae anales of the female are very unusual, forming a nearly complete circle.

Pseudorinympha, new genus

TYPE-SPECIES.—*Pseudorinympha laeta*, new species, by monotypy and present designation.

Antenna about three-fifths the length of forewing, rather stout, finely ciliated; scape with small eye cap. Labial palpus as long as head is deep, cylindrical, drooping; third segment slightly longer than second, slightly swollen distad. Maxillary palpus rudimentary. Tongue well developed, naked. Head with appressed scales; ocellus absent. Thorax smooth. Posterior tibia smooth. Forewing smooth, termen oblique, costal and dorsal edges nearly parallel, 12 veins; 1b furcate; 1c strongly preserved at margin; 2 from well before angle of cell; 4 and 5 connate; 7 to termen; 8 and 9 connate; 11 from about middle of cell, sinuate below stigma. Hind wing with 7 veins by coincidence of 3 and 4; 2 from well before angle of cell; 2 to 7 nearly parallel; 3 plus 4, 5, and 6 nearly equidistant.

FEMALE GENITALIA.—Signum absent.

Pseudorinympha is extremely close to the North American *Orinympha*, and indeed, differs only by the absence of ocelli, which may or may not be significant. In the absence of a male of *Pseudorinympha* from Rapa, and a female of *Orinympha*, I am describing *Pseudorinympha* as new, albeit with considerable misgiving. In Meyrick's description of *Orinympha* he states "4 absent" from the forewing. This is not so as can be seen from my figure of his type (1965, p. 5, pl. 176: fig. 1*a*), in which the venation is identical to that of *Pseudorinympha*.

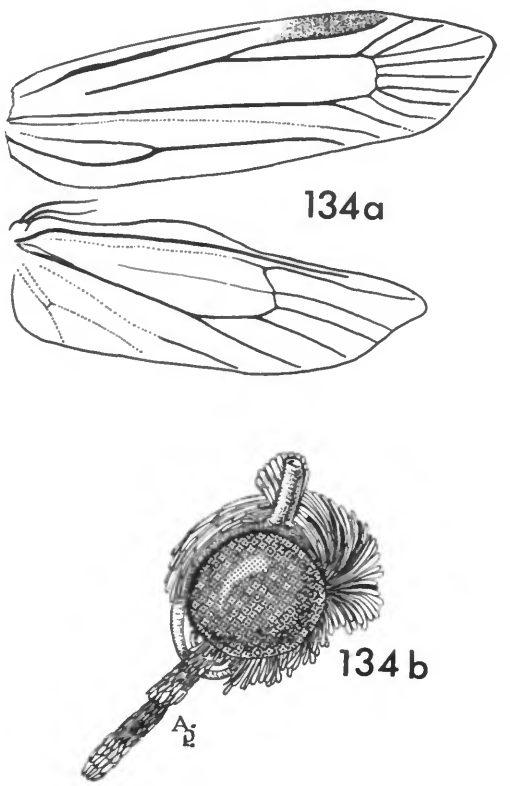
With the discovery of a male it will be possible to determine whether or not the genera are synonymous, but until such time it is appropriate to consider such geographically distant relatives as separate.

Pseudorinympha laeta, new species

FIGURE 134; PLATE 22*e*

Alar expanse 12–13 mm.

Labial palpus ocherous white; second and third segments with longitudinal fuscous blotch on outer side. Antenna grayish fuscous; scape ocherous white, suffused pale fuscous. Head ocherous white, suffused fuscous anteriorly. Thorax ocherous white suffused fuscous anteriorly and with a pair of small fuscous



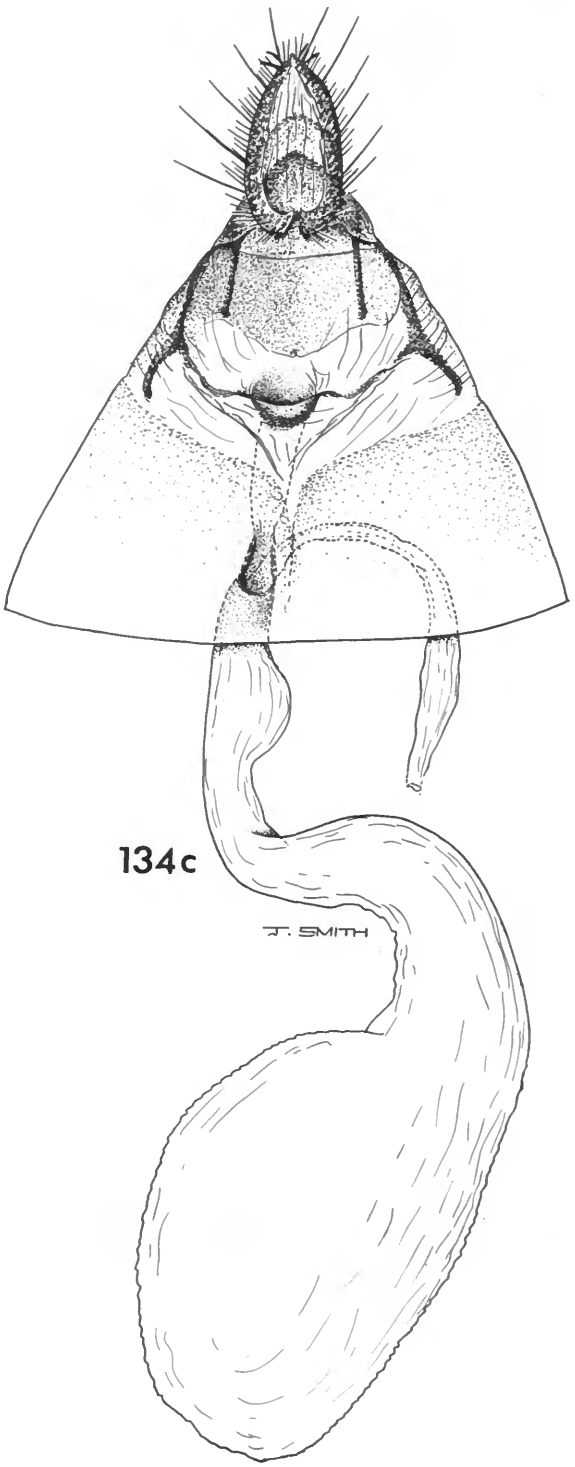


FIGURE 134.—*Pseudorinympha laeta*, new species: *a*, venation of right wings; *b*, lateral aspect of head showing palpus; *c*, ventral view of female genitalia.

dots posteriorly; tegula overlaid with fuscous. Forewing ground color sordid white variously spotted and marked with fuscous; at base of costa a fuscous spot followed to middle of costa by a series of similarly colored indistinct spots; from middle to apical third, along costa, a series of four fuscous spots, and subapically on costa a large spot of the same color; subterminally a series of four small fuscous dots; on middle of dorsum a large fuscous blotch extends across fold and is preceded on dorsal edge by three small fuscous spots; cilia grayish fuscous. Hind wing fuscous from cell outwardly; paler basally and semihyaline in cell. Foreleg ocherous white; tarsal segments spotted with fuscous; midleg ocherous white; tibia with a conspicuous fuscous spot distally on outer side; tarsal segments suffused fuscous; hind leg ocherous white;

tarsal segments with very slight infuscation. Abdomen ocherous white, suffused grayish fuscous dorsally except last two segments.

Female genitalia slide JFGC 11702. Ostium small, round; anterior edge produced ventrally as a scoop-shaped projection. Genital plate membranous. Anterodorsally to papillae anales, a median sclerotized knob. Antrum narrow, sclerotized. Inception of ductus seminalis at junction of sclerotized portion of antrum and remaining membranous part of ductus bursae. Bursa copulatrix membranous; interior surface finely granular. Signum absent.

HOLOTYPE.—USNM 70103.

TYPE LOCALITY.—Rapa, Teumukopuke, 500′(154 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♀ holotype (7.X.1963) and one ♀ paratype, Haurei (29.X.1963).

The relationship between *laeta* and the North America (Texas) *Orinympha aetherias* Meyrick appears unmistakable. Had it not been for the paucity of material, the relation between the two species could have been judged with more certainty. Moreover, it is not possible to compare the two more favorably because *aetherias* is represented by a male and *laeta* by a pair of females.

Terthroptera, new genus

TYPE-SPECIES.—*Terthroptera eremosesia*, new species, by monotypy and present designation.

Antenna about three-fifths the length of forewing, serrulate and very finely and short ciliated; scape with a few elongate, stout scales lying closely appressed ventrally. Labial palpus about twice as long as head, drooping; third segment slightly longer than second, acutely pointed. Maxillary palpus well developed, swollen distally. Tongue well developed, naked. Head with appressed scales; ocellus present, Thorax smooth. Posterior tibia smooth. Forewing smooth, termen oblique, costal and dorsal edges nearly parallel, 12 veins, all separate; 1b furcate; 1c strongly developed; 2 from well before angle; 3 from angle; 4 and 5 approximate at base; 7 to termen; 11 from basal third of cell. Hind wing with 8 veins, all separate; 2 from well before cell; 3, 4, 5 about equidistant; 6 and 7 parallel.

Terthroptera is closely related to *Pseudorinympha* but differs from it by the presence of an ocellus; 4 and 5 and 8 and 9 of forewing are separate, and 11 arises much nearer the base of cell. In the hind wing *Terthroptera* has 8 veins, in *Pseudorinympha* there are 7.

Despite the loss of the genitalia, I do not hesitate to erect this genus to accommodate the single species on Rapa which, when recovered, will be easily recognized.

Terthroptera eremosesia, new species

PLATE 22*f*

Alar expanse 13 mm.

Labial palpus sordid white, overlaid grayish fuscous on outer side. Antenna gray, faintly annulated whitish toward base; scape sordid white suffused grayish dorsally. Head sordid white suffused grayish fuscous laterally. Thorax sordid white suffused grayish fuscous anteriorly; tegula grayish fuscous basally. Forewing ground color sordid white; basal fourth grayish fuscous, this color continued in dorsal two-thirds of wing to beyond end of cell, forming an undulating boundary with costal lighter third; along costa about a dozen short, well-defined, fuscous bars; a similar, but less well-defined, series of short bars on dorsum; apical fourth of wing mottled; cilia pale gray and grayish fuscous mixed. Hing wing gray; cilia pale gray. Foreleg sordid white; femur and tibia suffused grayish; tarsal segments grayish fuscous; midleg similar but tibia with well-defined, broad, grayish-fuscous band distally, and tarsal segments not so dark; hind leg sordid white; femur overlaid grayish fuscous on outer-side; tibial spurs and tarsal segments lightly suffused grayish. Abdomen gray dorsally, sordid white ventrally.

HOLOTYPE.—USNM 70105.

TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION—Rapa.

FOOD PLANT.—Unknown.

Described from the unique ♂ holotype (23.XI.1963).

Unfortunately the abdomen of this specimen was lost, but despite this loss the species is distinct and readily recognized and its presence in the fauna of the island should be made known.

Although *eremosesia* is generically related to *Pseudorinympha laeta*, they are widely different in pattern as can be seen by comparison of the figures.

Genus *Plutella* Schrank

Plutella Schrank, 1802, p. 169. (Type-species: *Phalaena Tinea xylostella* Linnaeus, 1758, p. 538 [=*Cerostoma maculipennis* Curtis, 1832] [by monotypy].)

Plutella xylostella (Linnaeus)

FIGURE 135, PLATE 22*b*

Phalaena Tinea xylostella Linnaeus, 1758, p. 538.—Hübner, 1796, p. 119.

Alucita xylostella (Linnaeus), Duponchel, 1838, p. 11, pl. 293: fig. 10.

Plutella xylostella (Linnaeus), Schrank, 1802, p. 169.—Guenée, 1846, p. 101.—Herrich-Schäffer, 1854, p. 106.—Wocke, 1871, p. 281.—Möschler, 1890, p. 341.—Viette, 1952, p. 3.—Paulian and Viette, 1955, p. 153.—Bradley and Pelham-Clinton, 1967, p. 127.—Bradley, 1967a, p. 510, fig 7.

Cerostoma maculipennis Curtis, Westwood, 1854, p. 223, pl. 49: fig. 1548.—Walsingham and Durrant, 1897, pp. 173–175.

Plutella maculipennis (Curtis), Berg, 1880, pp. 85–91, 99–109.—Rebel, 1901, p. 137.—Dyar, 1903, p. 492, no. 5503.—Walsingham, 1907, p. 652.—Spuler, 1910, p. 452, pl. 47: fig. 44.—Meyrick, 1914, p. 59.—Walsingham, 1914, p. 343.—Fullaway, 1914, pp. 43, 46.—Barnes and McDunnough, 1917, p. 183, no. 7683.—Marsh, 1917, pp. 1–10, pls. 1, 2.—Britton, 1920, p. 96.—Brethes, 1923, pp. 162–163, figs. 1, 2.—Forbes, 1923, p. 341.—Miles, 1924, pp. 45–48.—Perry, 1924, p. 13.—Essig, 1926, p. 742.—Hopkins, 1927, pp. 23–32, pl. 2.—Meyrick, 1928, p. 802.—Bondar, 1928, pp. 259–260.—King, 1929, pp. 373–390, pl. 1.—Thorpe, 1929, pp. 621–634.—Romanova, 1930, p. 564.—Forbes, 1930, p. 100.—Muggeridge, 1930, pp. 253–264, figs. 1–9.—Meyrick, 1931, p. 283.—Amsel, 1936, p. 354.—Walker and Anderson, pp. 343–348.—List, 1937, p 676.—Hardy, 1938, pp. 343–372, figs. 1–10, pl. 9.—Robertson, 1939, pp. 330A–339A, figs. 1–4; pp. 341A–364A, figs. 5–10.—McDunnough, 1939, p. 89, no. 8878.—Bourquin, 1939, pp. 409–413, figs. 1–3.—Brooks and Allen, 1940, p. 56.—Ghosh, 1940, pp. 129–130, pl. 62: figs. 1–4.—Lloyd, 1940, pp. 451–484, pls. 18–19.—Ghesquière 1940, pl. 7: fig. 1 [39], fig. 3.—Rebel, 1940, pp. 38, 55.—Ghesquière, 1941, p. 763.—Reid, 1941, pp. 1–35, figs. 1–7; 1942, p. 1, fig. 1*c*.—Walker and Anderson, 1943, pp. 343–344.—Jones, 1943, p. 182.—Lima, 1945, pp. 317–319, figs. 201–203.—Kanervo, 1946, pp. 143–153, fig. 1.—Ahmad, 1949, p. 205.—Ullyett, 1947, pp. 77–202, figs. 1–30.—MacNay, 1948, p. 77.—Paulian, 1949, p. 351, fig. 4.—Lamont and Callan, 1950, p. 206.—Ford, 1951, pp. 90, 91, pl. 12: fig. 17.—Skala, 1951, p. 182, pl. 18.—Hill, 1952, p. 59.—Agenjo, 1952, p. 69.—MacNay, 1953, pp. 66–94.—Paramonow, 1954, p. 78.—Inoue, 1954, p. 34.—Harcourt, 1955, p. 900, no. 9751; 1956, pp. 155–160, figs. 1–7.—Tanada, 1956, pp. 320–329, figs. 1–4.—MacNay, 1957, p. 92.—Harcourt, 1957, p. 554, figs. 1, 2.—Hassanein, 1958, p. 326, figs. 1–3.—Wakely, 1958, p. 139.—Janjua, Ahmad and Haque, 1958, pp. 148, 157.—MacNay, 1959, p. 76; pp. 32–43.—Friese, 1960, p. 20.—Simonds and Rao, 1960, p. 278.—Harcourt, 1960, p. 419, figs. 1, 2; p. 517, fig. 1.—Gupta and Thorsteinson, 1960, pp. 241–250.—MacNay, 1961, p. 251.—Beri, 1961, pp. 69–70.—Harcourt, 1961, p. 280, figs. 1, 2.—Pastokhov, 1964, p. 42.—Wolff, 1964, p. 51.—Benander, 1965, p. 22.—Kimball, 1965, p. 291.—Azuma, 1965, p. 56.—Hua, 1965, pp. 1–4, pl. 1A–5B.—Merivee, 1966, p. 497.—Johansson and Svensson, 1968, p. 127.—Abraham and Padmanaban, 1968, pp. 513–519.—Kawabe, 1968, p. 539.

Plutella cruciferarum Zeller, 1843, p. 283.—Stainton, 1854, p. 68; 1869, p. 328.—Heinemann, 1870, p. 117.—Fry, 1880, p. 347.—Snellen, 1882, p. 542.—Meyrick, 1886, p. 177; 1895, p. 702.—Veitch, 1929, p. 68.

Cerostoma annulatellus Wood, 1839, p. 223, pl. 49: fig. 1547.

Plutella annulatella Wood, Herrich-Schäffer, 1851, fig. 350.

Plutella limbipennella Clemens, 1860, p. 6; 1872, p. 90.

Plutella mollipedella Clemens, 1860, p. 6; 1872, p. 91.

Cerostoma brassicella Fitch, 1856, p. 170.

Cerostoma dubiosella Beutenmuller, 1889, p. 27.

Gelechia cicerella Rondani, 1876, p. 20, pl. 1: figs. 3–5.

Male genitalia slide JFGC 11790. Harpe ample, widest beyond middle; ventral margin armed with strong setae; sacculus with cluster of long, stiff setae. Gnathos rather involved, with sclerotized plates on each side. Uncus absent. Vinculum twice as long as wide, terminating in a point. Tegumen a rather narrow band. Anellus a V-shaped plate. Aedeagus trifid; middle arm long and very slender; lateral arms short, stout. Corema well developed.

Female genitalia slide JFGC 11791. Ostium oval, moderately broad. Antrum very slender, sclerotized. Inception of ductus seminalis approximately at junction of ductus bursae and bursa copulatrix. Ductus bursae slender membranous. Bursa copulatrix membranous. Signum absent.

TYPES.—Linnean Society, London (*xylostella*); Melbourne Museum Australia ? (*maculipennis*); *annulatella* (?); Philadelphia Academy of Sciences, Philadelphia (*limbipennella, mollipedella*); lost (*brassicella, dubiosella*); ? (*cicerella*).

TYPE LOCALITIES.—Europe (*xylostella, maculipennis*); England (*annulatella*); North America (*limbipennella, mollipedella, brassicella, dubiosella*); Italy (*cicerella*).

DISTRIBUTION.—Cosmopolitan.

For the complete known distribution of this widespread, economic species, consult Series A (Agricultural), Map 32 (revised), published by the

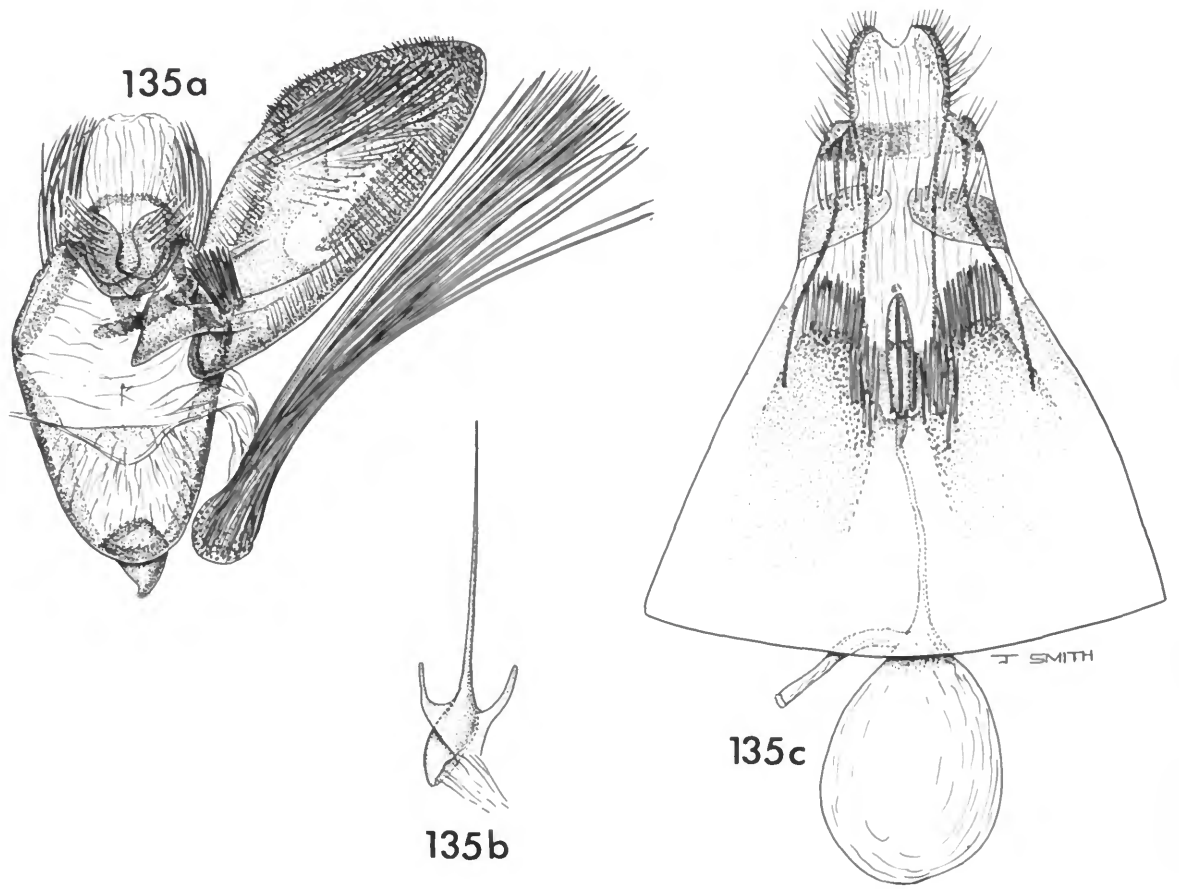


FIGURE 135.—*Plutella xylostella* (Linnaeus): *a*, ventral view of male genitalia, showing corema, with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

Commonwealth Institute of Entomology, London, 1967.

FOOD PLANTS.—Cultivated and wild Cruciferae.

Our small series from Rapa consists of 7 ♂♂ and a ♀, collected in the village of Haurei, 8.IX.–19.IX. 1963, and a ♂, Tevaitau, 800′(245 m), 29.IX.63.

The species was very common in gardens where cabbage was grown and where the larvae riddled the plants. No controls were exercised, but a partial control was effected by the predaceus odonaton *Ischnura aurora aurora* Braur.

This species is so well known that even the description of the genitalia appears to be superfluous. The trifid aedeagus alone will identify the male.

Family EPERMENIIDAE

Genus *Ochromolopis* Hübner

Ochromolopis Hübner, 1825, p. 408. (Type-species: *Tinea ictella* Hübner [1810–1813], pl. 53: fig. 261 [subsequent designation by Fletcher, 1929, p. 150].)

According to Gaedike (1966, p. 630), neither the location of the type nor the type locality of the type-species of *Ochromolopis* are known. This "European" genus, then, might have been described from any one of numerous places. There are, however, two European species, *ictella* Hübner and *staintonella* (Stainton), assigned to this genus, and Diakonoff (1955, pp. 98, 100) described *oculigera* and *dentata* from New

Guinea. It is probably not surprising, therefore, to find a species in such an isolated spot as Rapa, and unquestionably others will appear in the Pacific region.

Ochromolopis is very closely related to the North American *Acanthedra* Meyrick, differing in venation only by the stalking of veins 7 and 8 of the forewing.

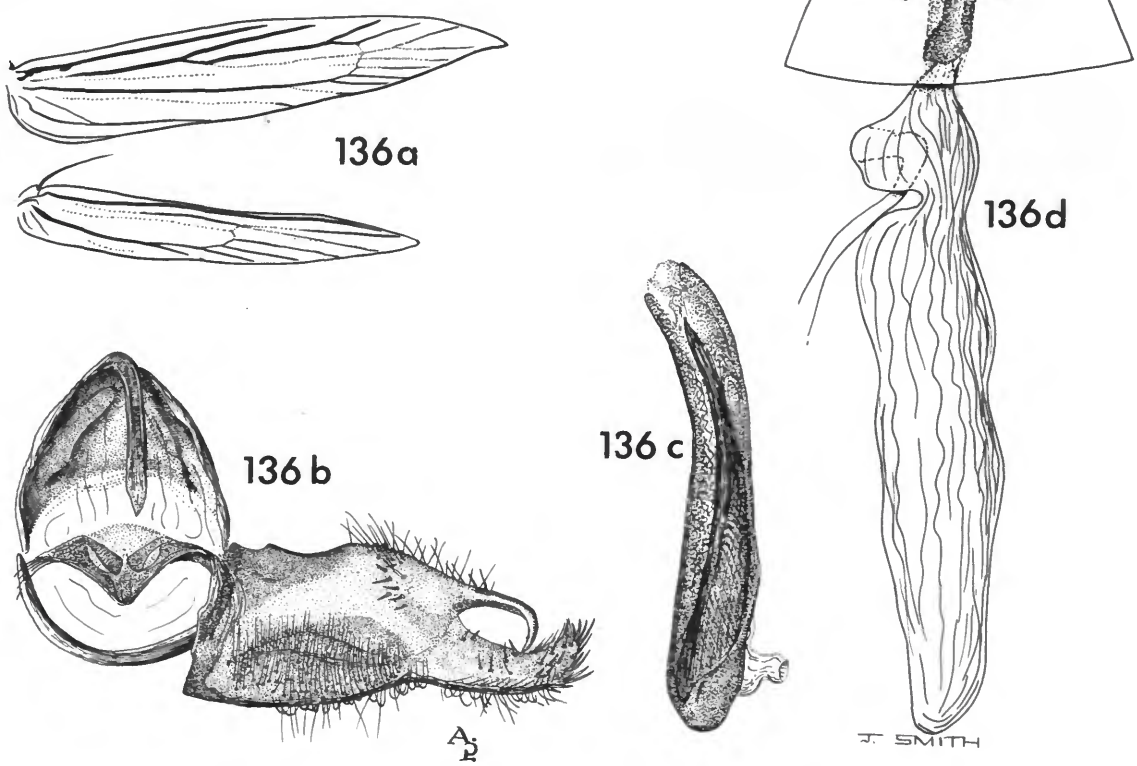
Ochromolopis incrassa, new species

FIGURE 136; PLATE 23*d*

Alar expanse 12–14 mm.

Labial palpus pale gray; second segment blackish fuscous on outer side with scattered, minute, white irroration; third segment similarly colored, extreme apex tawny olive. Antenna scape and basal five segments of shaft blackish fuscous, remainder grayish dotted blackish fuscous; apex of scape gray. Head blackish fuscous; frons grayish. Thorax blackish

FIGURE 136.—*Ochromolopis incrassa*, new species: *a*, venation of right wings; *b*, ventral view of male genitalia with aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.



fuscous with narrow, transverse, tawny-olive band posterior of middle; apex of tegula clay color. Forewing ground color blackish fuscous, the dark areas marked by numerous, fine transverse tawny-olive strigulae; at one third a tawny olive fascia with two narrow, blackish-fuscous strigulae; a similar, narrower band at apical third; in middle of cell a black dot followed outwardly by white scales; at end of cell a black dot preceded by white scales and a cinnamon-buff longitudinal streak and followed outwardly by a spot of gray and then a cinnamon-buff patch; apical third of costa marked with two or three small, clay-colored spots; on dorsum four blackish-fuscous tufts of scales; cilia gray to clay color, the apical cilia barred blackish fuscous; extreme apex blackish fuscous. Hind wing gray, paler basally; cilia light gray, darker toward apex. Legs light clay color variously barred and annulated blackish fuscous. Abdomen gray dorsally, light clay color ventrally.

Male genitalia slide JFGC 11381. Harpe broad basally; costa greatly expanded, terminating in a long, curved, pointed hook; sacculus sclerotized to beyond middle; cucullus narrow, bluntly pointed. Uncus twice as long as tegumen, curved, pointed. Vinculum a narrow band. Tegumen very short, twice as wide as long. Anellus a heavily sclerotized curved tube. Aedeagus stout, curved, as long as harpe; vesica armed with one long cornutus.

Female genitalia slide JFGC 11382. Ostium wide, transverse; ventral lip sclerotized. Antrum broadly sclerotized. Inception of ductus seminalis from posterior end of bursa copulatrix. Ductus bursae very short. Bursa copulatrix membranous, sculptured with fine, longitudinal ridges. Signum absent.

HOLOTYPE.—USNM 70106.

TYPE LOCALITY.—Rapa, Maurua, 600′ (184 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (22.X.1963), one ♂ and two ♀♀ paratypes as follows: ♂, ♀, Maugaoa, 950′ (292 m) (7.XI.1963); ♀, Tevaitau, 750′ (231 m) (18.XI.1963).

According to the figure in Gaedike (1966 p. 681, pl. 4: fig. 3*b*) of *O. ictella,* veins 6 and 7 of the hind wing are very closely approximate or connate, but in the Rapa species these veins are short stalked; on the other hand, Diakonoff (1955 p. 98) states that these veins are long stalked and draws attention to the fact that this is the essential difference between the New Guinean and European species. It seems likely, as Diakonoff contends, that these differences are not significant, but the fact remains that, with regard to the condition of veins 6 and 7 of the hind wing, the Rapa species is nearer *ictella* than are the New Guinean species. Spuler's figure (1910, p. 435, fig. 185) shows the condition of veins 6 and 7 of the hind wing of *ictella* to be almost identical to that of *incrassa.*

The forewing presents some interesting points. In *incrassa* vein 1c is weakly preserved at margin and vein 2, although nearly obsolete, is discernible. In neither of the figures cited above (Spuler, 1910; Gaedike, 1966) is there any indication of the presence of these veins, and Diakonoff (1955 p. 98) states that vein 5 is absent and that vein 2 arises slightly before angle. In my opinion it is vein 2 that is absent (if any vein is actually absent) and not vein 5. The obsolescence of vein 2 in *incrassa* would indicate that vein 2 is disappearing and that the reduction had not progressed as far as in the European and New Guinean species.

Family HELIODINIDAE

Genus *Stathmopoda* Herrich-Schäffer

Stathmopoda Herrich-Schaffer, 1853, p. 54, 283, pl. 9: figs. 17, 22. (Type-species: ***Phalaena Tinea pedella*** Linnaeus, 1761, p. 367 [subsequent designation by Fletcher, 1929, p. 208].)

On Plate 9 Herrich-Schaffer figured two species, *pedella* and *pinicolella,* referred to on page 54. On page 283, however, only one species, *pedella,* is included in the genus. Stainton (1854 p. 227) states, "Only one species is at present known in this genus." Although the above two authors used *Stathmopoda* in the same sense with one species included, the type-species was not clearly fixed until Fletcher cited *pedella* (1929, p. 208).

Stathmopoda perfuga (Meyrick), new combination

FIGURE 137; PLATE 24*e*

Ulochora perfuga Meyrick, 1926, p. 274.

Asymphorodes perfuga (Meyrick), 1929, p. 501.—Viette, 1949a, p. 318.

"♂ ♀. 12–13 mm. . . . At low level; 3 ex., in poor condition."

LECTOTYPE.—♀, 12 mm. "Rapa Island. At light, 11.4.25. St. George Expedn. C. L. Collenette," hereby

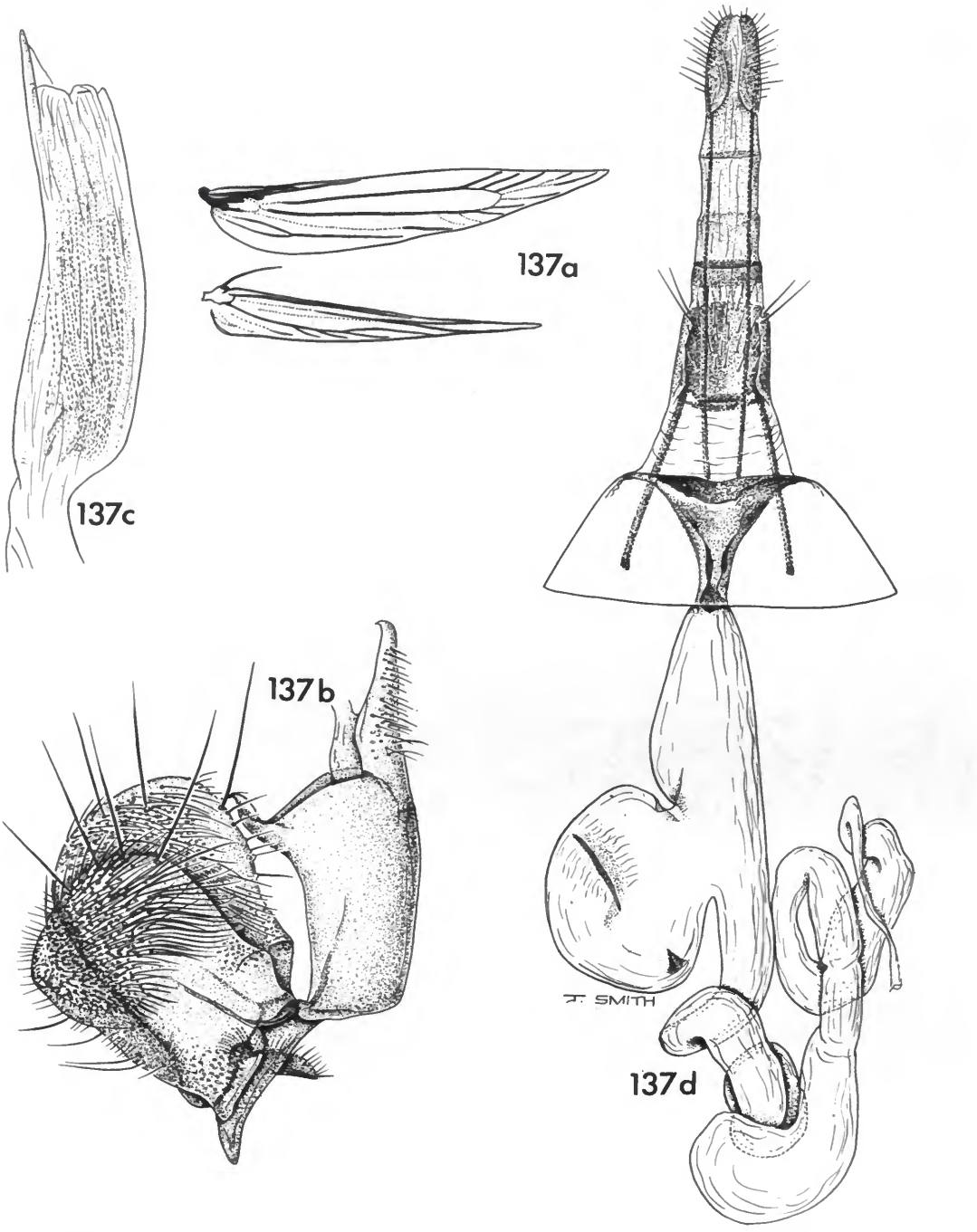


FIGURE 137.—*Stathmopoda perfuga* (Meyrick): *a*, venation of right wings; *b*, lateral aspect of male genitalia with aedeagus removed; *c*, aedeagus; *d*, ventral view of female genitalia.

designated. The specimen is in very poor condition, without abdomen and marked "TYPE ♂" in the British Museum (Natural History).

Male genitalia slide JFGC 11389. Harpe rectangular; sacculus broadly sclerotized basally; cucullus wide, rounded. Gnathos short, broad basally, apex falciform. Uncus nearly as long as tegumen, stout, pointed. Vinculum with saccus somewhat produced. Tegumen shorter than harpe, stout. Anellus a lightly sclerotized U-shaped plate. Aedeagus stout, pointed ventrally at distal end; vesica sculptured with lightly sclerotized ridges.

Female genitalia slides JFGC 11669, 11670, 11768. Ostium very wide, funnel shaped. Antrum sclerotized. Inception of ductus seminalis from posterior side of bursa copulatrix. Ductus bursae short, thick, membranous anterior to antrum. Bursa copulatrix membranous with slight sculpturing around signa. Signa two elongate, sclerotized plates with central keel.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa.

In our series there are 131 specimens as follows: Anatakuri Bay (♂); Anatakuri nako, 3 ♂♂; Haurei, 54 ♂♂, 26 ♀♀; Maugaoa, 950′(292 m), ♂, 6 ♀♀; Maurua, 600′(184 m), ♂, 9 ♀♀; Metua nako, 750′(231 m), 2 ♂♂, 3 ♀♀; Morogouta, 750′(231 m), ♂, 2 ♀♀; Ororagi, 750′(231 m), ♂; Piahu, 750′(231 m), ♂; Point Tepapa, 3 ♂♂, ♀; Point Teakauraee, 200′(61 m), ♂, ♀; Teumukopuke, 500′(154 m), 3 ♂♂, 5 ♀♀; Tevaitau, 800′(245 m), ♂, 5 ♀♀. The above were collected from 11.IX to 9.XII.1963. The specimens from which the species was described were collected in April, so it is probably fair to assume that *perfuga* occurs throughout the year.

FOOD PLANT.—*Corokia collenettei* Riley (R25) (dried fruit); *Mangifera indica* L. (R13) (inflorescence); *Fitchia rapensis* F. Brown (R32) (dead dry fruits).

Although we reared this species from three readily identifiable plants, there is no doubt that the larvae of species of this genus will feed on almost any dry or dead plant material. The fruit of the *Corokia,* from which one specimen was reared, was old and dry but still attached to the living plant. The larva on *Mangifera* was unquestionably feeding in the dead inflorescence and was obtained in conjunction with rearing a series of *Eurhodope ardescens* Meyrick.

Most of the specimens of our series were obtained by beating brush and trees from which the moths were easily obtained. Generally, the moths were found in clusters of dead leaves hanging on the plants.

Meyrick described *perfuga* in the genus *Ulochora* and later (1929) transferred it to *Asymphorodes.* He was wrong in both cases. In the first place, his *Ulochora* was incorrectly described and was based on a single female in poor condition. In the forewing *all* veins are present and *not* with vein 4 absent as stated, and 9 is out of the stalk of 7 and 8. In placing *perfuga* in *Asymphorodes* he was again mistaken, *Asymphorodes* being clearly referable to the family Cosmopterigidae, while *perfuga* is referable to the genus *Stathmopoda* in the family Heliodinidae.

At this time it is not possible to assign the genus *Ulochora* properly, although Meyrick placed it in the Cosmopterigidae, because the type lacks the abdomen and other essential characters. In any case, *perfuga* and *streptosema* (type-species of *Ulochora*) are generically distinct; veins 6 and 9 of the forewing of *perfuga* are separate from 7, but in *streptosema* vein 9 is out of the stalk of 7 and 8.

Stathmopoda percnophthalma, new species

FIGURES 138, 139; PLATE 24*a, b*

Alar expanse 7–10 mm.

Labial palpus ocherous white; second segment suffused gray subapically on outer side; third segment grayish on outer side. Antenna gray; scape ocherous white. Head shining light silvery gray anteriorly; posteriorly very pale vinaceous buff. Thorax gray; tegula shining silvery gray. Forewing ground color grayish olive; basal angle buff; on dorsum a short buff streak; (in many specimens, especially the males, the two buff markings are obsolete or absent); cilia gray. Hind wing and cilia gray. Foreleg ocherous white; tarsal segments dark gray on outer side; midleg ocherous white with no appreciable dark suffusion; hind leg ocherous white; tibia with apical fourth and apical spur dark gray; tarsal segments gray on outer side. Abdomen gray dorsally, ocherous white ventrally.

Male genitalia slide JFGC 11827. Harpe broad and lightly sclerotized basally, constricted at middle, curved to cucullus; cucullus rounded; sacculus produced at middle, apically rounded. Gnathos a digitate process. Uncus narrowly triangular; laterally a row of stiff

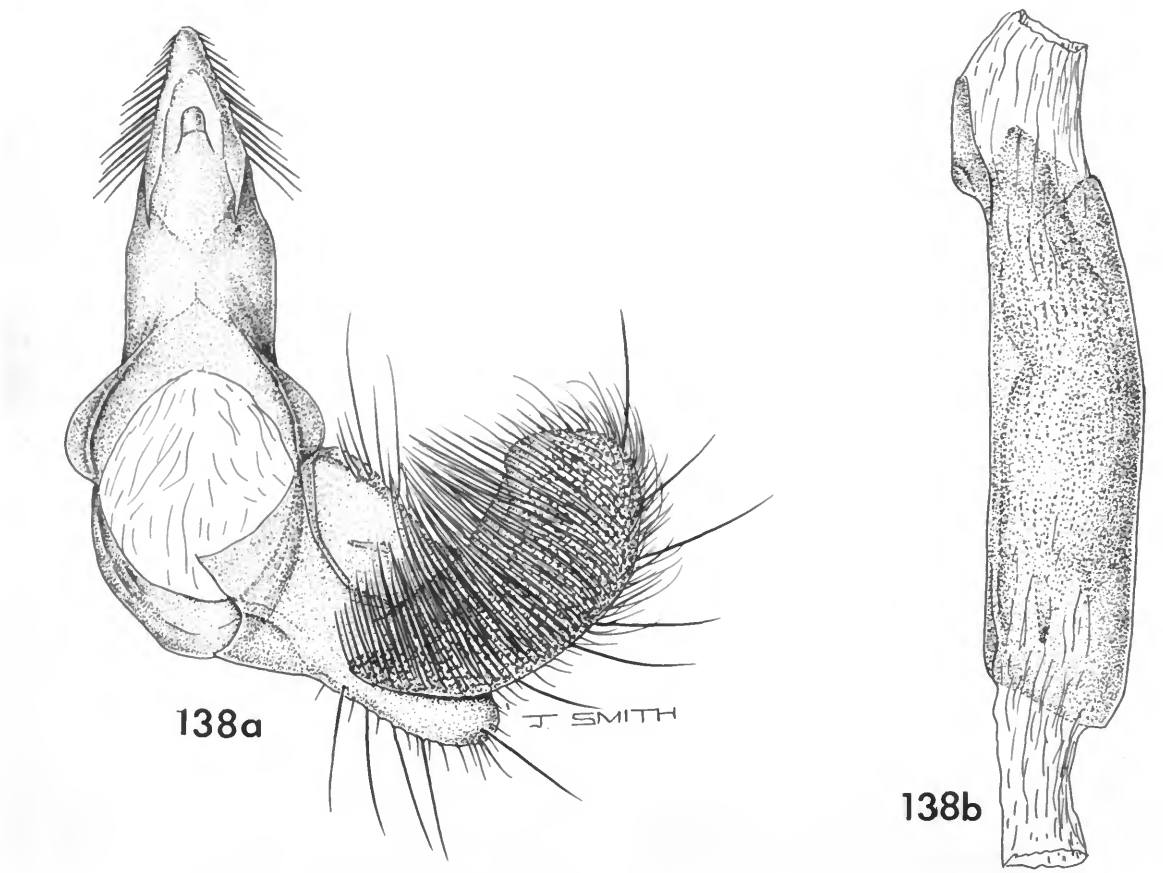


FIGURE 138.—*Stathmopoda percnophthalma,* new species: *a,* ventral view of male genitalia with left harpe and aedeagus removed; *b,* aedeagus.

setae directed ventrad. Vinculum a broad band produced dorsally. Tegumen broad basally, abruptly narrowed before middle. Anellus membranous. Aedeagus stout, apically terminating in a ventral point.

Female genitalia slide JFGC 11828. Ostium very broad, funnel shaped. Antrum not differentiated. Inception of ductus seminalis from junction of ductus bursae and bursa copulatrix. Ductus brusae short, membranous. Bursa copulatrix membranous, ornamented posteriorly with very fine, weak ridges. Signum pyramidal.

HOLOTYPE.—USNM 70117.

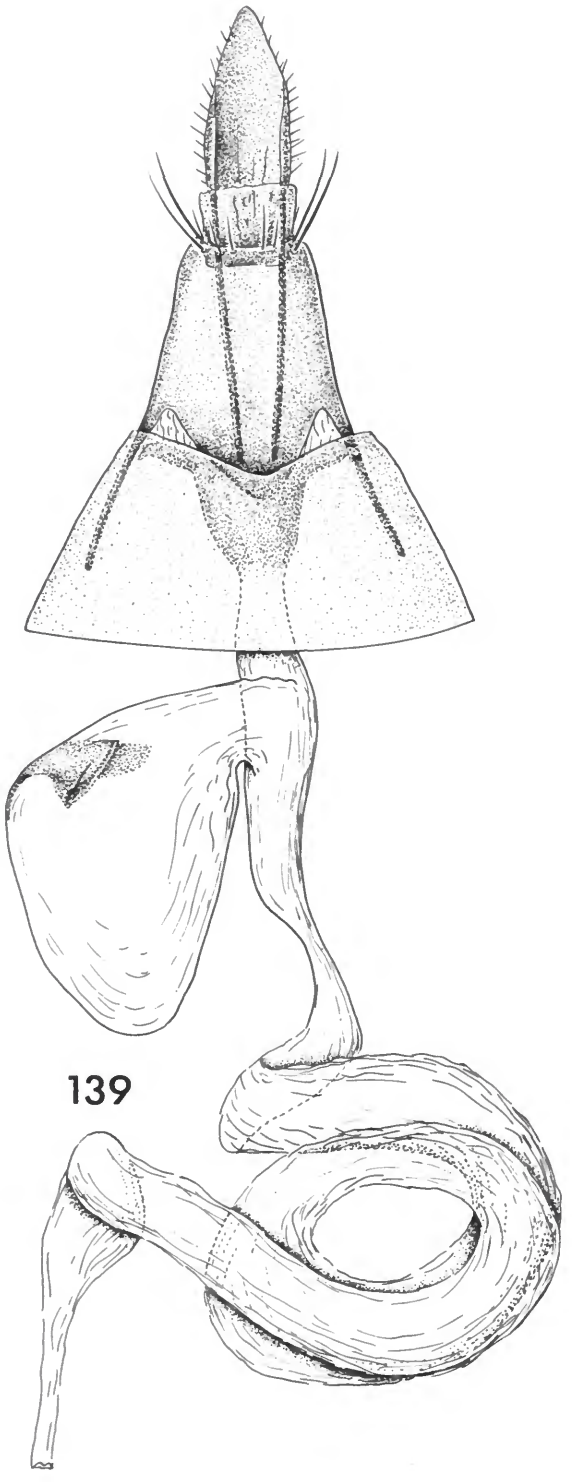
TYPE LOCALITY.—Rapa, Maugaoa, 950′ (292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (23.X.1963), 53 ♂♂ and 32 ♀♀ paratypes from the following localities: Anatakuri Bay, ♂ (28.XI.1963); Haurei, 3 ♂♂ (8.X–18.XI.1963); Maii Bay, ♀ (23.X.1963); Maugaoa, 950′ (292 m), 13 ♂♂, 7 ♀♀ (2.XI.–11.XII. 1963); Maurua, 600′ (184 m), 11 ♂♂, 5 ♀♀ (16.IX–22.X.1963); Morogouta, 750′ (231 m), ♂, 2 ♀♀ (10.X.1963); Point Tepapa, ♀ (26.XI.1963); Teumukopuke, 500′ (154 m), 9 ♂♂, 4 ♀♀ (7.X–3.XI.1963); Tevaitau, 200′–800′ (61–245 m), 15 ♂♂, 12 ♀♀ (29.IX.–1.X.1963).

In color this approaches *perfuga,* but it is grayer and is a smaller species. Moreover, *perfuga* never exhibits a pale basal angle of the forewing as does *percnophthalma.*



***Stathmopoda argyrosticha*, new species**

FIGURE 140; PLATE 24*c*, *d*

Alar expanse 8–10 mm.

Labial palpus ocherous white with slight ochraceous buff suffusion on outer side. Antenna very pale ochraceous buff; scape ocherous white. Head ocherous white, sometimes suffused ochraceous orange. Thorax ocherous white, posteriorly ochraceous orange; tegula ocherous white. Forewing ground color ocherous white; extreme edge of basal third of costa black; from base of wing to two-fifths a silver gray streak; from basal angle an outwardly oblique ochraceous-orange or ochraceous-tawny shade; on dorsum a similarly colored crescentic mark and at end of cell a large, similarly colored spot (in some specimens the ochraceous markings are suffused); apical third of wing frequently wholly suffused ochraceous orange or ochraceous tawny; cilia gray. Hind wing light gray, darker apically; cilia gray. Foreleg ocherous white; tibia and tarsal segments marked black; midleg ocherous white; hind leg ocherous white; tibia with small, black apical spot on outer side. Abdomen pale gray dorsally, ocherous white ventrally.

Male genitalia slide JFGC 11829. Harpe broad basally, weakly sclerotized; costa deeply excavated; cucullus narrow; sacculus produced into a point. Gnathos slender, pointed. Uncus broadly hoodshaped; lateral row of stiff setae directed ventrad. Vinculum a broad band, median part produced dorsally. Tegumen broad basally, constricted at middle. Anellus membranous. Aedeagus stout; ventrally apex bluntly pointed.

Female genitalia slide JFGC 11830. Ostium broad, transverse. Antrum slightly sclerotized. Inception of ductus seminalis at junction of bursa copulatrix and ductus bursae. Ductus bursae short, membranous. Bursa copulatrix membranous, ornamented posteriorly with very fine, weak ridges. Signum a sclerotized plate with high, curved keel.

HOLOTYPE.—USNM 70084.

TYPE LOCALITY.—Rapa, Maugaoa, 950′(292 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (23.XI.1963), 14 ♂♂ and 30 ♀♀ paratypes as follows: Anatakuri Bay, ♂ (28.XI.1963); Haurei, 2 ♀♀ (22 and 24.XI.

FIGURE 139.—*Stathmopoda percnophthalma*, new species. Ventral view of female genitalia.

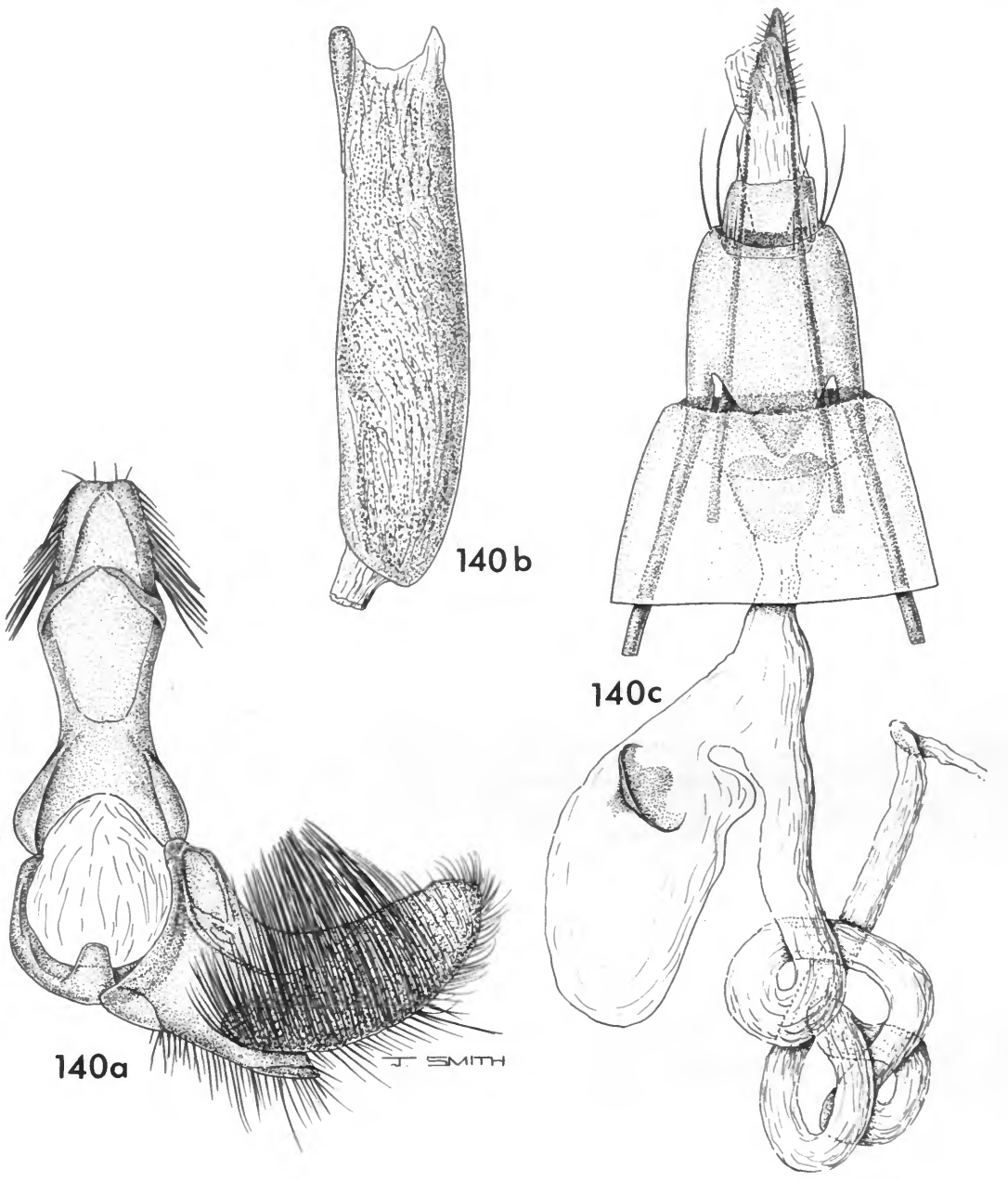


FIGURE 140.—*Stathmopoda argyrosticha*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

1963); Maugaoa, 800′–950′(245–292 m), 4 ♂♂, 4 ♀♀ (18.IX.–23.XI.1963); Maurua, 600′(184 m), 6 ♂♂, 9 ♀♀ (16.IX.–22.X.1963); Perau, 1900′(585 m), 3 ♀♀ (15.X.1963); Piahu, 750′(231 m), 3 ♀♀ (11.X.1963); Point Tepapa, ♀ (26.XI.1963); Teumukopuke, 500′(154 m), 2 ♂♂, 3 ♀♀ (7.X.–3.XI. 1963); Tevaitau, 200′–800′(61–245 m), ♂, 5 ♀♀ (23–29.IX.1963).

The two species, *argyrosticha* and *percnophthalma,* are very closely related but can be distinguished easily by the silver streak and bright coloring of *argyrosticha,* which are absent in *percnophthalma.* The broad uncus and elongate signum with high keel also distinguish *percnophthalma* from *argyrosticha.*

In general appearance *argyrosticha* is nearest the New Zealand *caminora,* but may be distinguished from it by the lighter costal two-thirds of forewing.

Genus *Lissocnemitis* Meyrick

Lissocnemitis Meyrick, 1934, p. 352. (Type-species: *Lissocnemitis argolyca* Meyrick, 1934 [by monotypy].)

Meyrick's description of this genus was incomplete, the venation being completely omitted: forewing with 12 veins; 1a and 1b free, simple; 2 from well before angle of cell; 3 from angle; 3, 4, 5, and 7 nearly equidistant; 6 and 8 out of the stalk of 7; 7 to costa; 9 approximate to the base of 7; 10 and 11 from near outer end of cell. Hind wing with cell open, 6 veins; 2 and 3 from common stalk; 4 and 5 absent; 6 and 7 stalked.

In Meyrick's type the hind tibia have a few bristle-like hairs, not smooth as described. In this respect *Lissocnemitis* resembles closely the Australian *Pachyrhabda* and may, in fact, be synonymous. I have not been able to compare the two genera.

Lissocnemitis argolyca Meyrick

PLATE 24*f*

Lissocnemitis argolyca Meyrick, 1934, p. 352.

TYPE.—Bernice P. Bishop Museum, Honolulu, Hawaii.

TYPE LOCALITY.—Marquesas Islands, Hiva Oa, Atuona Valley, 300 feet.

DISTRIBUTION.—Marquesas Islands, Rapa. One specimen from Haurei (17.IX.1963).

FOOD PLANT.—Unknown.

Unfortunately, the abdomen of the single female from Rapa is missing. The type is a male but there appears to be no doubt about the identity of the Rapa specimen.

Family GRACILLARIIDAE

Genus *Parectopa* Clemens

Parectopa Clemens, 1861, p. 209. (Type-species: *Parectopa lespedezaefoliella* Clemens, 1861, p. 210 [by monotypy].)

Parectopa pontificalis Meyrick

FIGURES 141, 142; PLATE 23*e*; PLATE 29*f*

Parectopa pontificalis Meyrick, 1929, p. 505.
Parectopa pontificalus [sic!] Viette, 1949a, p. 316.

"♀. 10–11 mm. . . . Austral Is., Rurutu, up to 650 feet, March; 3 ex. This approaches still nearer than the Samoan *pyrelictis* to the New Zealand *miniella.*"

LECTOTYPE.—♀, 10 mm. "Rurutu, Austral Islands. at light, 650 ft. 23.3.25. St. George Expedn. C. L. Collenette." Slide JFGC 11474. A large label with name and reference to original description and "Type ♀" is attached to pin. A small, white label bears the inscription "P263." Lectotype hereby designated.

Male genitalia slide JFGC 11786. Harpe simple, narrow basally, widened toward cucullus; cucullus rounded. Vinculum with very slender, greatly lengthened saccus, dilated distally. Tegumen very weakly sclerotized. Anellus tubular, clothed with fine setae on outer surface. Aedeagus twice as long as harpe, nearly straight; vesica armed with about a dozen very small, weak cornuti.

Female genitalia slides JFGC 11475, 11789. Ostium small, round. Antrum a narrow sclerotized band. Inception of ductus seminalis well removed anteriorly from antrum. Ductus bursae long, slender. Bursa copulatrix membranous. Signa two slightly curved blades.

LECTOTYPE.—British Museum (Natural History).

TYPE LOCALITY.—Austral Islands, Rurutu.

DISTRIBUTION.—Rurutu, Rapa.

We have 17 ♂♂ and 31 ♀♀ from the following localities on the island: Maugaoa, 950′(292 m), 2 ♂♂, 2 ♀♀; Maurua, 600′(184 m), ♂, ♀; Perau, 1900′(585 m), 2 ♀♀; Point Maraia, 4 ♂♂, 4 ♀♀; Pukutaketake, 1000′(307 m), 3 ♀♀; Point Teakauraee, 200′(61 m), 9 ♂♂, 12 ♀♀; Tevaitau, 200′ (61 m), ♂, 7 ♀♀. Emergence and collecting dates ranged from 12.X.–11.XII.1963.

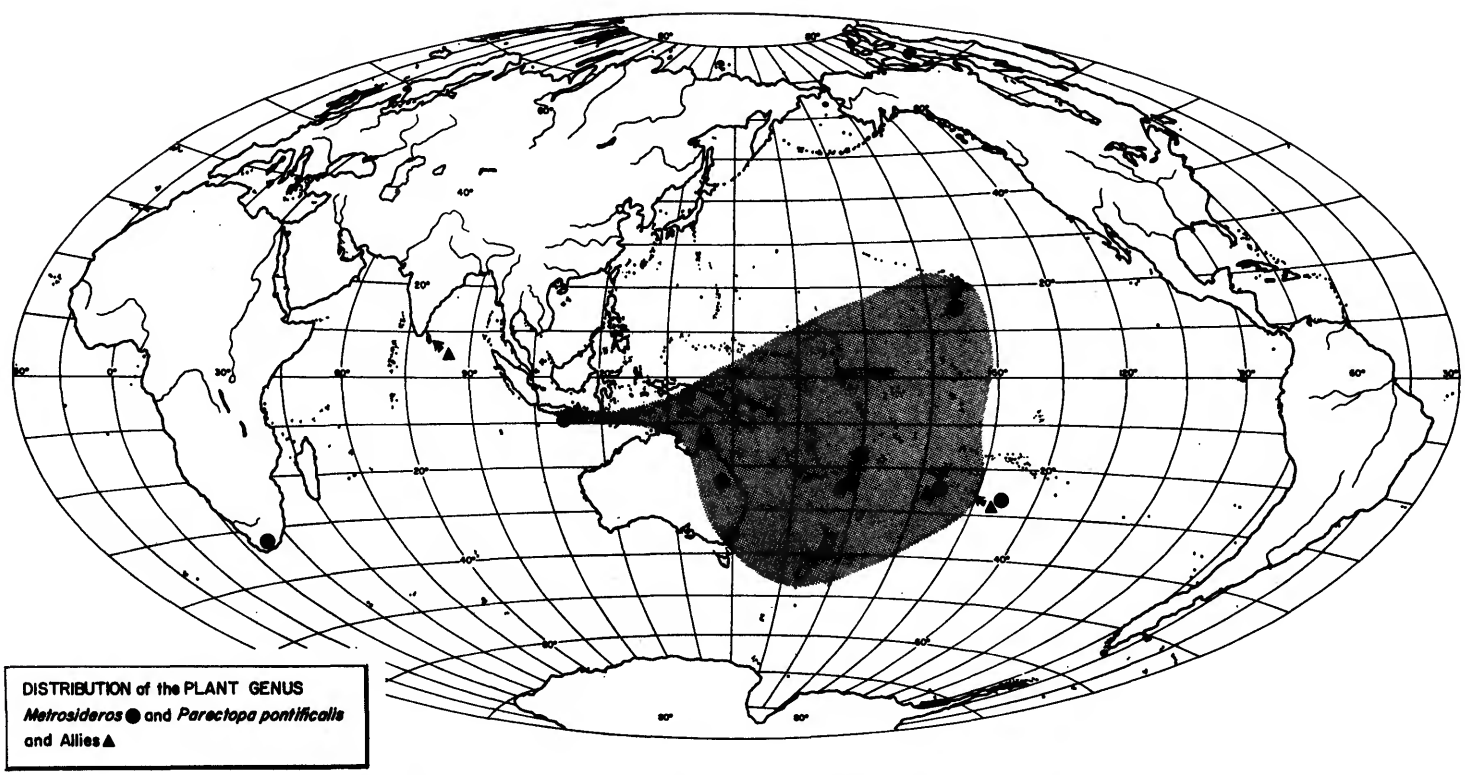


FIGURE 141.—Distribution of *Parectopa pontificalis* Meyrick, its relatives, and the plant genus *Metrosideros*.

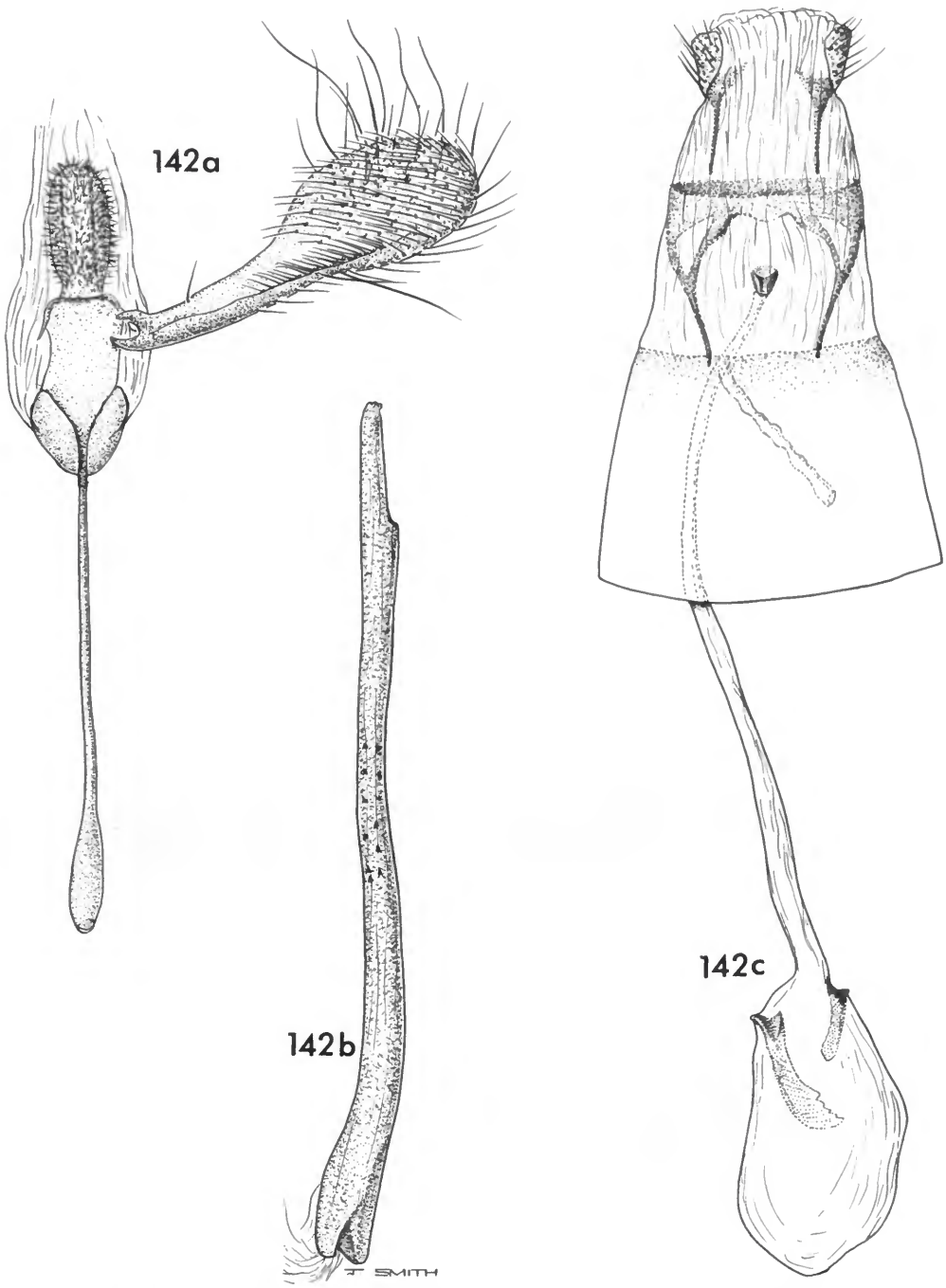


FIGURE 142.—*Parectopa pontificalis* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

FOOD PLANT.—*Metrosideros collina* (Forster) A. Gray [varieties *glaberrima* A. Gray (R2) and *villosa* A. Gray (R3)].

The larval habits of *pontificalis* are rather involved. First, the larva makes a tortuous serpentine mine, ending in a blotch mine at one edge of the leaf, and filled with frass. When about half grown, the larva leaves the blotch mine and migrates to a second leaf, which it cuts from the edge toward the midrib. The cut edge is rolled to form a cone (Figure 23) on the underside of the leaf, with the apex of the cone pointing downward. The larva continues to feed inside the cone until nothing but the thin upper epidermis remains to preserve the shape. The cone becomes filled with frass at the small end, or bottom. When the larva is fully fed it cuts an exit hole, either in the base (upper end) or in the side of the cone near the base. The larva then goes to a third leaf, which it folds longitudinally at one edge and pupates within the fold.

In the laboratory larvae preferred cellophane in which to pupate and ignored fresh leaves.

The group to which *pontificalis* belongs contains *miniella* (New Zealand), *pyrelictis* (Samoa), *hieranthes, paradisia,* and *thriambica* (Ceylon), *gamelia* (Java), *coccinea, zehntneri,* and *haemataula* (India), and *collischema* and *tegulata* (Assam).

It will be seen on the distribution map that the distribution of the group to which *pontificalis* belongs follows very closely the distribution of the plant genus *Metrosideros.* This is not to say, however, that all the species indicated above feed on plants of this genus, but the correlation is interesting.

Genus *Gracillaria* Haworth

Gracillaria Haworth, 1828, Lepidoptera Britannica, p. 527. (Type-species: *Gracillaria anastomosis* Haworth, 1828, p. 530 [synonym of *Tinea syringella* Fabricius, 1794, p. 328] [subsequent designation by Curtis, 1883, p. 10, pl. 479].)

Gracillaria hilaropis Meyrick

FIGURE 143; PLATE 23*g, h*

Gracillaria hilaropis Meyrick, 1926, p. 274.—Viette, 1949a, p. 316.

Gracillaria crypsidelta Meyrick, 1926, p. 275; 1929, p. 505.—Viette, 1949a, p. 316.—Clarke, 1955, p. 106. (New synonymy.)

[*hilaropis*]

"♂ ♀. 12–13 mm., At 800′; 3 ex."

LECTOTYPE.—♀, 13 mm. "Rapa Island, at light. 800 ft., 17.4.24, St. George Expedn. C. L. Collenette," hereby designated. Slide JFGC 11383. This specimen is marked "Type ♂" in the British Museum (Natural History).

Male genitalia slide JFGC 11384. Harpe simple, widest beyond middle; cucullus truncate. Uncus scarcely differentiated, rounded. Vinculum with saccus broad, produced, nearly as long as harpe. Tegumen moderately narrow. Anellus a narrow sclerotized plate; posterior edge truncate. Aedeagus long, slender, gently tapering to a blunt point.

Female genitalia slide JFGC 11385. Ostium small, transverse; lamella postvaginalis broadly sclerotized. Antrum a narrow sclerotized band. Inception of ductus seminalis at anterior edge of antrum. Ductus bursae very slender, membranous. Bursa copulatrix membranous with very fine sculpturing. Signa two long, slender, pointed rods.

TYPES.—British Museum (Natural History).

TYPE LOCALITIES.—Rapa (*hilaropis, crypsidelta*).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Of this species we have 9 ♂♂ and 9 ♀♀ from the following localities: Anatakuri nako, ♂, 3 ♀♀ (14.X.1963); Maugaoa, 950′ (292 m), 4 ♂♂, 2 ♀♀ (18.IX.–23.XI.1963); Maurua, 600′ (184 m), ♂ (17.X.1963; Piahu, 750′ (231 m), (11.X.1963); Teumukopuke, 500′ (154 m), 2 ♂♂, 3 ♀♀ (7.X.–3.XI.1963); Tevaitau, 200′ (61 m), ♀ (23.IX.1963).

This is a variable species, some of the females lacking almost all of the fuscous purple coloring.

The type of *crypsidelta* is in very poor condition, without head or abdomen, and is no more than a badly stained specimen of *hilaropis.* I am, therefore, placing *crypsidelta* in synonymy.

Gracillaria verina, new species

FIGURE 144; PLATE 23*f*

Alar expanse 10 mm.

Labial palpus buff; second segment shaded ochraceous buff toward apex; third segment ochraceous buff. Antenna buff, narrowly annulated grayish fuscous. Head buff suffused gray on crown. Thorax buff suffused grayish; tegula grayish fuscous anteriorly. Forewing ground color buff, speckled grayish fuscous and with brassy hue; base of costa grayish fuscous; slightly beyond middle of costa a grayish-fuscous spot,

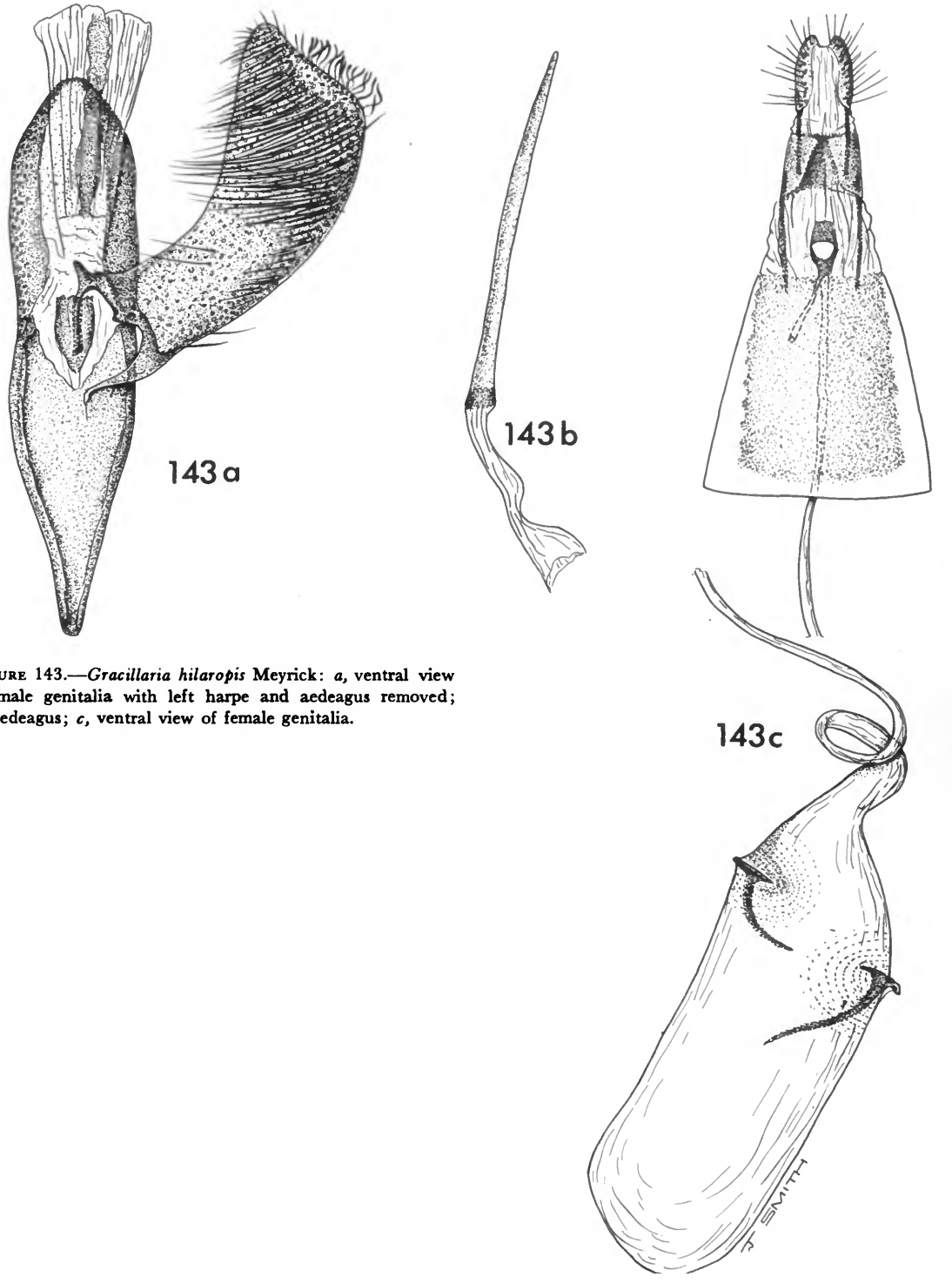


FIGURE 143.—*Gracillaria hilaropis* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

two ill-defined similarly colored spots in fold and a small, round, grayish-fuscous spot at end of cell; cilia light gray. Hind wing grayish fuscous, somewhat paler basally; cilia light gray. Foreleg buff; femur with grayish-fuscous blotch distally on outer side; tibia grayish fuscous on outer side; first tarsal segment grayish fuscous, remaining segments with grayish-fuscous spot distally; midleg similar; hind leg buff with spot of grayish fuscous on middle of femur; tibia suffused grayish; tarsal segments with ill-defined gray spots distally. Abdomen grayish fuscous dorsally, buff ventrally; segments 2, 3, and 4 each with black spot laterally.

Female genitalia slide JFGC 11898. Ostium narrow, transverse, slitlike. Antrum narrowly sclerotized. Inception of ductus seminalis slightly anterior to antrum. Ductus bursae membranous, slender. Bursa copulatrix membranous, finely scobinate. Signa two curved, short blades, the posterior one arising from a crescentic plate.

HOLOTYPE.—USNM 70109.

TYPE LOCALITY.—Rapa, Maugaoa, 800′(245 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the unique ♀ holotype (18.IX.-1963).

The obvious difference between *verina* and *hilaropis* is the complete absence of any sign of the large, yellow costal triangle of forewing in the former. The much shorter signa of *verina* immediately distinguish it from *hilaropis*. Unfortunately, the male of *verina* is unknown.

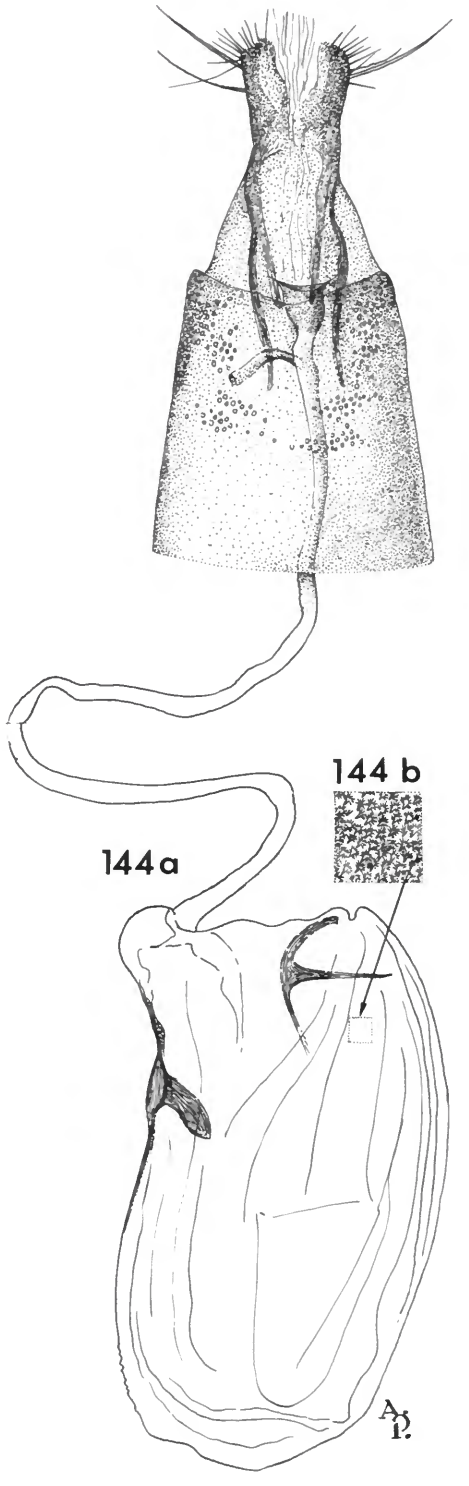


FIGURE 144.—*Gracillaria verina*, new species: *a*, ventral view of female genitalia; *b*, detail of wall of bursa copulatrix.

Family TINEIDAE

Key to the Genera of Tineidae

1. Apex of forewing upturned ..... *Decadarchis*
   Apex of forewing not upturned 2
2. Vein 2 of hind wing swollen at base and from middle of cell ..... *Choropleca*
   Vein 2 of hind wing not as above 3
3. Forewing with 12 veins, all separate 4
   Forewing otherwise 5
4. Hind wing with 8 veins, all separate ..... *Petula*
   Hind wing with 7 veins; 5 and 6 coincident ..... *Praeacedes*
5. Forewing with fovea ..... *Monopis*
   Forewing without fovea 6
6. Forewing with 11 veins, all separate 8
   Forewing with 12 veins 7
7. Forewing with 7 and 8 connate or stalked ..... *Nesoxena*
   Forewing with 7, 8, and 9 stalked ..... *Setomorpha*
8. Cell of forewing broadest near outer end; veins 2–9 bunched from end ..... *Biastolemma*
   Cell of forewing narrowed outwardly, veins 2 and 9 distant from others ..... *Erechthias*

Genus *Setomorpha* Zeller

Setomorpha Zeller, 1852, p. 95. (Type-species: *Setomorpha rutella* Zeller, 1852, p. 96 [by monotypy].)

Setomorpha rutella Zeller

FIGURE 145; PLATE 25*e*

Setomorpha rutella Zeller, 1852, p. 96.—Diakonoff, 1938, pp. 399–414, figs. 1–10.—Ghesquière, 1940, p. 11, pl. 3: fig. 4; 1941, p. 763.—Corbet and Tams, 1943, pp. 111, 119, figs. 200, 235, 262, pl. 5: figs. 9, 10.—Hinton, 1956, p. 261.—Viette, 1956, p. 533.—Gozmány, 1967, pp. 1–100, figs. 1–98.

Male genitalia slides JFGC 11272, 11757. Harpe broadest toward base, fleshy; cucullus terminating in a strong, sharply pointed hook. Gnathos absent. Uncus absent. Vinculum narrow, produced into a long, dilated median process. Tegumen subrectangular. Anellus strongly developed, narrow, fused with base of harpe. Aedeagus slightly longer than tegumen, slender, tapering to a point apically.

Female genitalia slides JFGC 11273, 11758. Ostium wide, transverse, somewhat protruding. Antrum not differentiated. Inception of ductus seminalis at about anterior fourth of ductus bursae. Ductus bursae membranous. Signum absent.

TYPE.—Stockholm Museum (*rutella*).

TYPE LOCALITY.—Africa (*rutella*).

DISTRIBUTION.—General in the tropical and subtropical regions.

From Rapa we have 4 ♂♂ and 2 ♀♀ (10.IX.–28.X.63), all collected in our dwelling at Haurei.

FOODS.—A wide variety of stored vegetable and animal materials.

Diakonoff (1938) has given a full and excellent account of this species, including synonymy, distribution, and habits, and it would belabor the point to repeat it here. Hinton (1956) has presented a discussion of the species and excellent figures of the larval characters. I have added recent references to this species.

Genus *Monopis* Hübner

Monopis Hübner, 1825, p. 401. (Type-species: *Tinea rusticella* Hübner, 1796, pl. 3: fig. 17; [1810] 1813, pl. 49: fig. 339 [by monotypy].)

Monopis crocicapitella (Clemens)

FIGURE 146, 147; PLATE 25*f*

Tinea crocicapitella Clemens, 1860, p. 258; 1872, pp. 49, 51.—Chambers, 1878, p. 163.—Walsingham, 1882, p. 170.—Busck, 1903, p. 184.

Monopis crocicapitella (Clemens), Dyar, 1903, p. 570.—Dietz, 1905, p. 33.—Walsingham, 1907, p. 728.—Barnes and McDunnough, 1917, p. 193.—Meyrick, 1922, p. 269.—McDunnough, 1939, p. 105.—Rebel, 1940, p. 45.—Ghesquière, 1940, pp. 1, 5.—Hinton and Corbet, 1943, p. 33, fig. 63.—Woodroffe and Southgate, 1952, p. 288.—Janmoulle, 1955, p. 4.—Petersen, 1957, p. 168, figs. 139, 140.—Schaffner, 1959, p. 47.—Petersen, 1960, p. 231.—Capuşe and Georgeşcu, 1963, p. [829], figs. 1–9.—Petersen, 1964, p. 405.—Kimball, 1965, p. 300, no. 9635.—Clarke, 1965, p. 103.—Gozmány, 1967, p. 19.

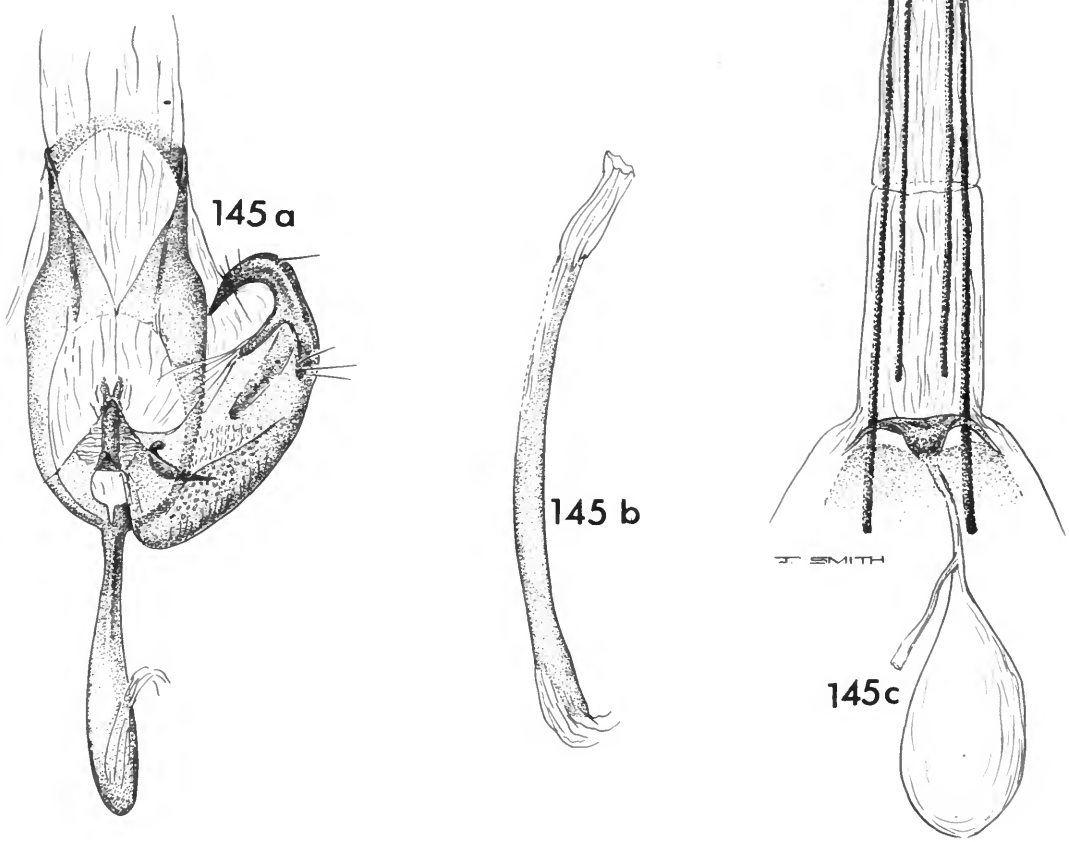
Tinea hyalinella Staudinger, 1871, p. 229.

Blabophanes lombardica Hering, 1889, p. 295.
Blabophanes heringi Richardson, 1893, p. 14.

Male genitalia slides JFGC 11404, 11405. Harpe more than twice as long as wide, costal and ventral edges nearly parallel; cucullus bluntly pointed. Gnathos stout; lateral elements separate, pointed distally. Uncus as long as gnathos; divided. Vinculum a narrow ring; saccus longer than harpe, slender. Tegumen narrow. Anellus membranous, tubular. Aedeagus slightly longer than saccus; sharply pointed distally.

Female genitalia slide JFGC 11762. Ostium transverse, wide, ventral lip produced, sclerotized, posterior edge concave. Antrum broadly sclerotized. Inception of ductus seminalis at junction of antrum and membranous portion of ductus bursae. Ductus bursae

FIGURE 145.—*Setomorpha rutella* Zeller: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.



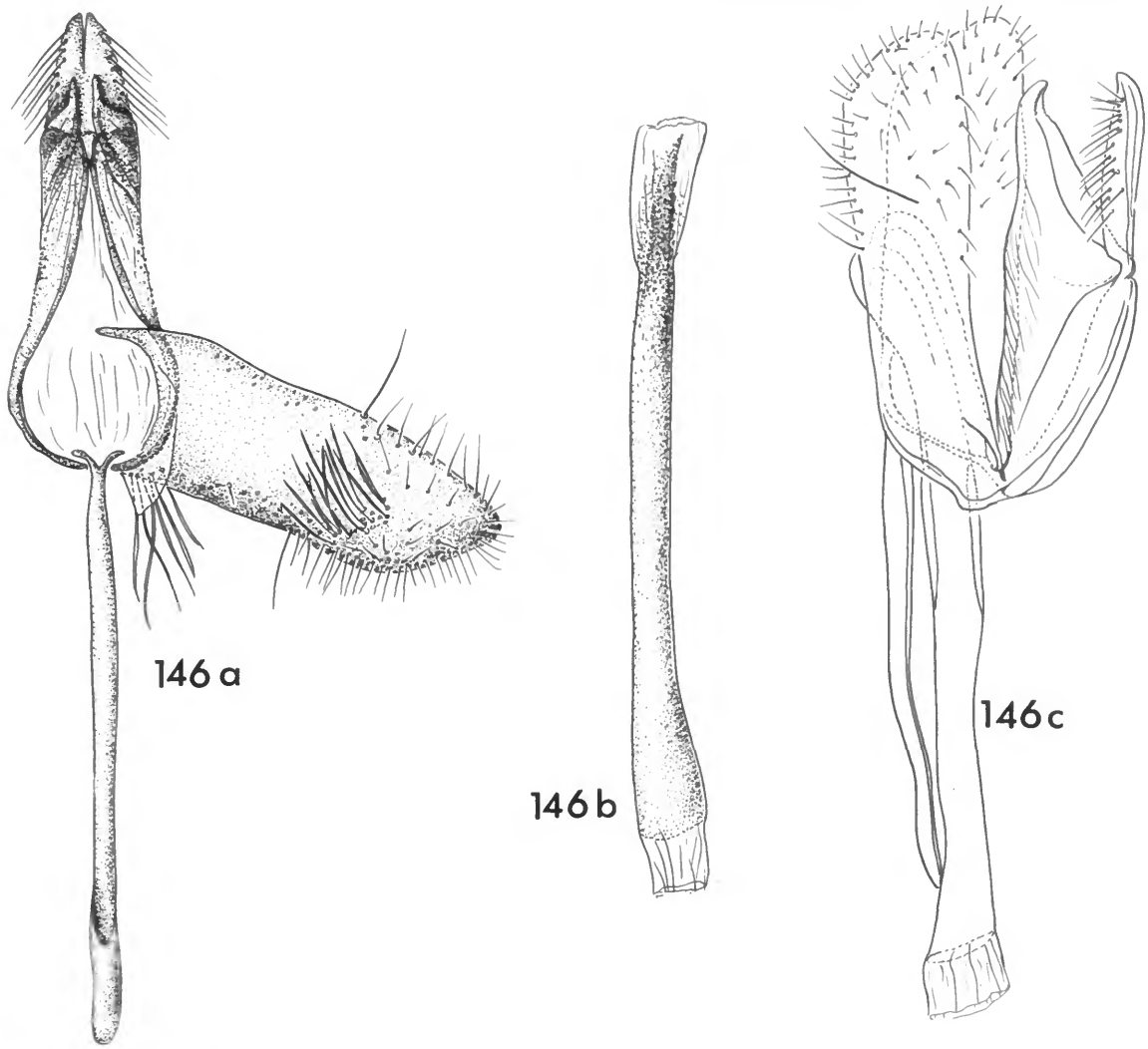


FIGURE 146.—*Monopis crocicapitella* (Clemens): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, lateral aspect, outline of male genitalia to show uncus and gnathos, and aedeagus in situ.

membranous, not sharply differentiated from bursa copulatrix. Bursa copulatrix membranous. Signa about 30 sharp, dentate processes forming a ring.

TYPES.—Academy of Natural Sciences, Philadelphia (*crocicapitella*); ? (*hyalinella*), Museum Stettin; (*lombardica*), British Museum (Natural History) ? (*heringi*).

TYPE LOCALITIES. "North America" (*crocicapitella*); Greece (*hyalinella*); Europe (*lombardica*); England (*heringi*).

DISTRIBUTION.—Australia, New Zealand, Hawaii, South America, Africa, Saint Helena, North America, French Polynesia.

Our Rapa specimens are distributed as follows: Anatakuri nako, ♂ (14.X.1963); Maurua, 600′ (184 m), 7 ♂♂, ♀ (16.IX.–25.X.1963); Tevaitau, 200′–700′ (61–215 m), 4 ♂♂ (21.IX.–1.X.1963).

FOODS.—Textiles, furs, and refuse.

Undoubtedly *crocicapitella* is carried in commerce and is much more widely distributed than present

records indicate. Because of its habits it occurs in habitations as well as out-of-doors.

Genus *Praeacedes* Amsel

Praeacedes Amsel, 1954, p. 55 (Type-species: *Praeacedes deluccae* Amsel, 1954, p. 55 [by monotypy].)

Praeacedes thecophora (Walsingham)

FIGURES 148, 149; PLATE 25*c, d*

Tinea thecophora Walsingham, 1908, p. 1024.—Rebel, 1940b, p. 45.
Titaenoses thecophora (Walsingham), Peterson, 1958, p. 417.
Praeacedes deluccae Amsel, 1954, p. 55, fig. 7; 1955, p. 29.
Tinea despecta Meyrick, 1919, p. 274.—Viette, 1949a, p. 316. (New synonymy.)

Male genitalia slides JFGC 10768, 11270, 11302, 11303, 11304, 11906. Harpe nearly four times as long as wide; cucullus rounded. Gnathos a broad band with posterior, median point. Uncus wide basally with long median point. Vinculum a narrow ring, saccus extremely slender, slightly longer than harpe. Tegumen broad, short, strongly arched. Anellus tubular; dorsoposterior edge deeply concave; ventral side flattened, subrectangular in outline. Aedeagus with two long, slender elements.

Female genitalia slides JFGC 11271, 11305, 11306, 11307, 11440, 11907. Ostium small, irregular, pro-

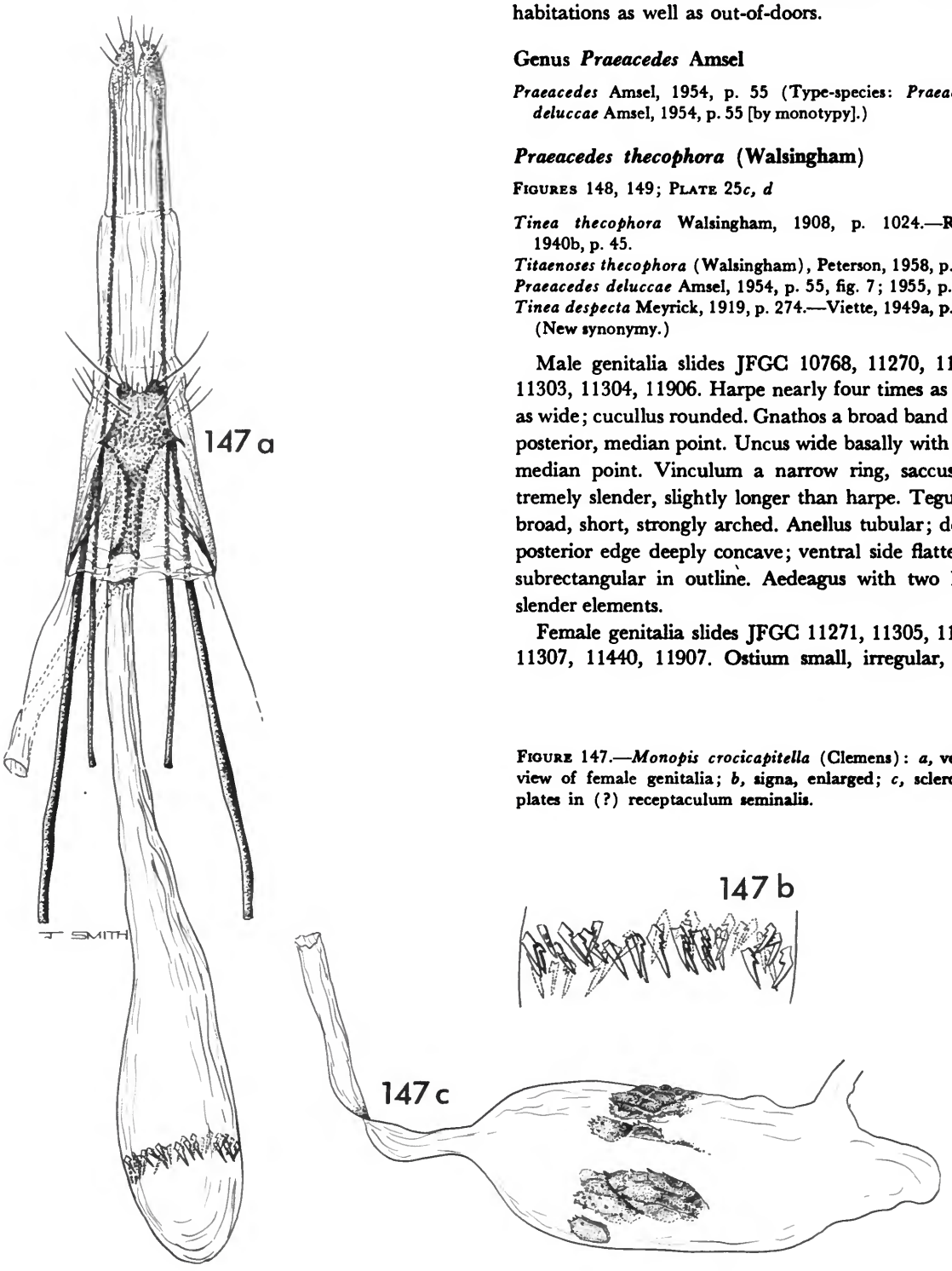


FIGURE 147.—*Monopis crocicapitella* (Clemens): *a*, ventral view of female genitalia; *b*, signa, enlarged; *c*, sclerotized plates in (?) receptaculum seminalis.

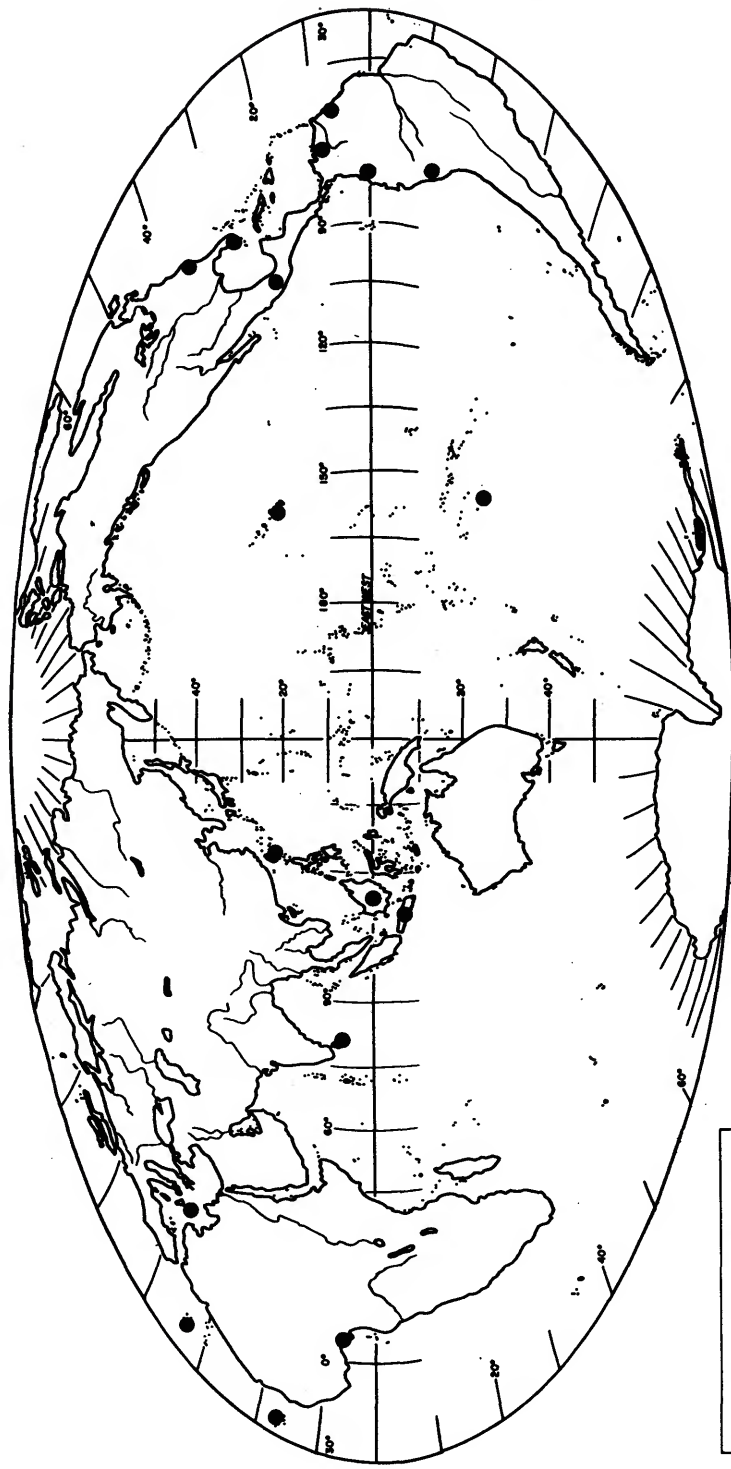


FIGURE 148.—Distribution of *Praeacedes thecophora* (Walsingham).

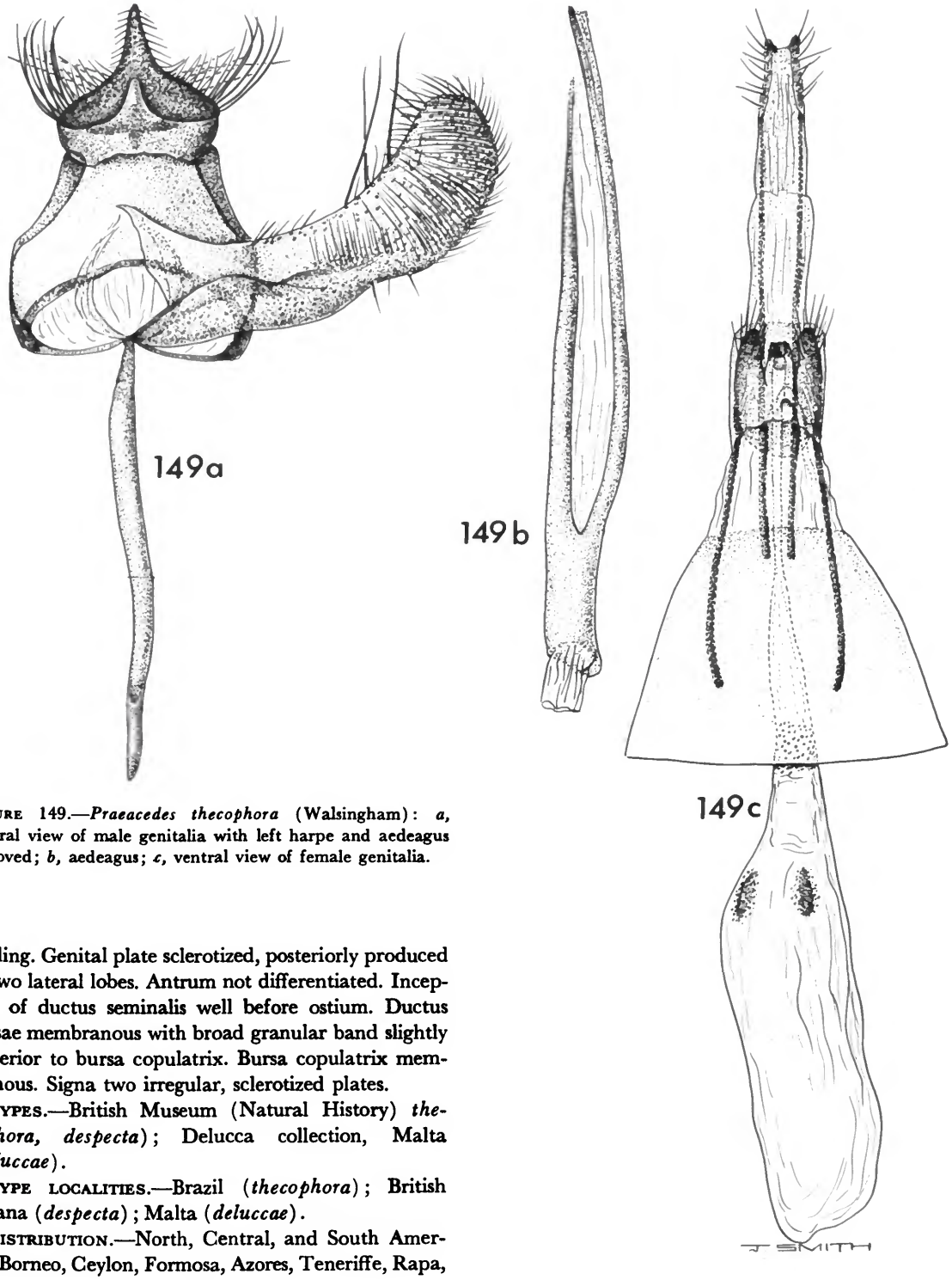


FIGURE 149.—*Praeacedes thecophora* (Walsingham): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

truding. Genital plate sclerotized, posteriorly produced in two lateral lobes. Antrum not differentiated. Inception of ductus seminalis well before ostium. Ductus bursae membranous with broad granular band slightly posterior to bursa copulatrix. Bursa copulatrix membranous. Signa two irregular, sclerotized plates.

TYPES.—British Museum (Natural History) (*thecophora, despecta*); Delucca collection, Malta (*deluccae*).

TYPE LOCALITIES.—Brazil (*thecophora*); British Guiana (*despecta*); Malta (*deluccae*).

DISTRIBUTION.—North, Central, and South America, Borneo, Ceylon, Formosa, Azores, Teneriffe, Rapa,

Hawaii.

In the National Museum of Natural History collection we have specimens from Caracas, Venezuela (14. VII.1939, C. H. Ballou 1064, Rf. wool), Cordoba, Mexico (Knab collection reared together with *Tineola uterella* Walsingham?), and two North American localities: Merritt Island, Florida (12.III.56. Howden and Howells. Rf. horned owl nest); Charleston, South Carolina (November 1951, M. Leland).

From Rapa we have 16 ♂♂ and 22 ♀♀ from Haurei. The dates range from 12.IX. to 3.XII.1963.

Foods.—Refuse, etc.

Obviously, the presence of *thecophora* on Rapa can be explained by its having been introduced in commerce. We can account for its wide distribution, mostly in tropical areas, in the same manner.

The usual behavior of *thecophora* is similar to that of *Pheroeca walsinghami* (Busck), both commonly being found when their case-making larvae crawl up the walls of houses, inside or out. The name "plaster moth" is frequently applied to these species because of this habit.

We found *thecophora* commonly in our small dwelling on Rapa where the case-carrying larvae were crawling up the plaster walls or the adults were flying about the house along with *Setomorpha rutella* Zeller.

The males of *thecophora* are easily distinguished from other tineids by the peculiar, divided aedeagus. Meyrick (1919, p. 274) said of this species, "The only species known to me in which 5 and 6 of hindwings are normally coincident . . . ." This character is constant in all the Rapa specimens except a male in which an additional vein is lost in the hind wing and a female with 5 and 6 connate, not coincident, as found by Meyrick.

Petula, new genus

Type-species.—*Petula phalarata*, new species by monotypy and present designation.

Antenna about as long as forewing in male, fasciculate, long ciliated; in ♀ about three-fifths length of forewing, serrulate, finely ciliated. Labial palpus upturned, slender; third segment fourth-fifths the length of second. Maxillary palpus minute, four-segmented; apical segment pointed, penultimate segment with spreading scales. Tongue rudimentary, maxillae separate. Head rough; ocelli absent. Thorax smooth. Posterior tibia clothed with hairlike scales. Forewing smooth, termen oblique, costa slightly arched, dorsal edge nearly straight, 12 veins, all separate; 2 from outer three-fourths of cell; 3 from angle; 4 twice as far from 5 as it is from 3; 7 to costa; 10 twice as far from 9 as 9 is from 8; 11 from basal fourth of cell. Hind wing with 8 veins, all separate; 2 from outer fourth; 5, 6, and 7 nearly equidistant.

Male genitalia.—Gnathos absent. Uncus absent or rudimentary.

Female genitalia.—Signum absent.

Petula is closely related to the Australian-Tasmanian genus *Chrysoryctis*, but differs from it primarily by the long, slender labial palpus and fasciculate, long-ciliated antenna of the male.

Petula phalarata, new species

Figures 150, 151; Plates 24*g*, 25*g*, *h*

Alar expanse 9–16 mm.

Labial palpus fuscous black; inner side gray. Antenna gray, annulated fuscous black. Head cream buff; face suffused grayish. Thorax fuscous black. Forewing ground color fuscous black; on middle of dorsum a cream buff spot (in female the spot suffused, larger, and not sharply defined as in male), sometimes extended as a narrow cream buff line on dorsal edge; at end of cell an ill-defined black spot. Hind wing gray, paler basally, with brassy hue. Forelegs and midlegs buff, overlaid dark gray on outer sides; tarsal segments narrowly annulated buff; hind leg dark gray; tarsal segments annulated buff. Abdomen gray.

Male genitalia slide JFGC 11436. Harpe broad, short; cucullus narrow, recurved, bluntly pointed; sacculus strongly convex; costa concave. Vinculum unusually broad and heavy; saccus a short, broad pocket. Tegumen narrowed posteriorly. Socii fingerlike. Anellus a strongly sclerotized plate, semitubular posteriorly. Aedeagus slender, straight, narrowed distally.

Female genitalia slide JFGC 11449. Ostium very small, semicircular. Genital plate moderately sclerotized. Antrum narrowly sclerotized. Inception of ductus seminalis slightly anterior to antrum. Ductus bursae membranous. Bursa copulatrix membranous. Signum absent.

Holotype.—USNM 70111.

Type locality.—Rapa, Haurei.

Distribution.—Rapa.

Food plant.—Unknown.

Described from the ♂ holotype (29.X.1963), 10

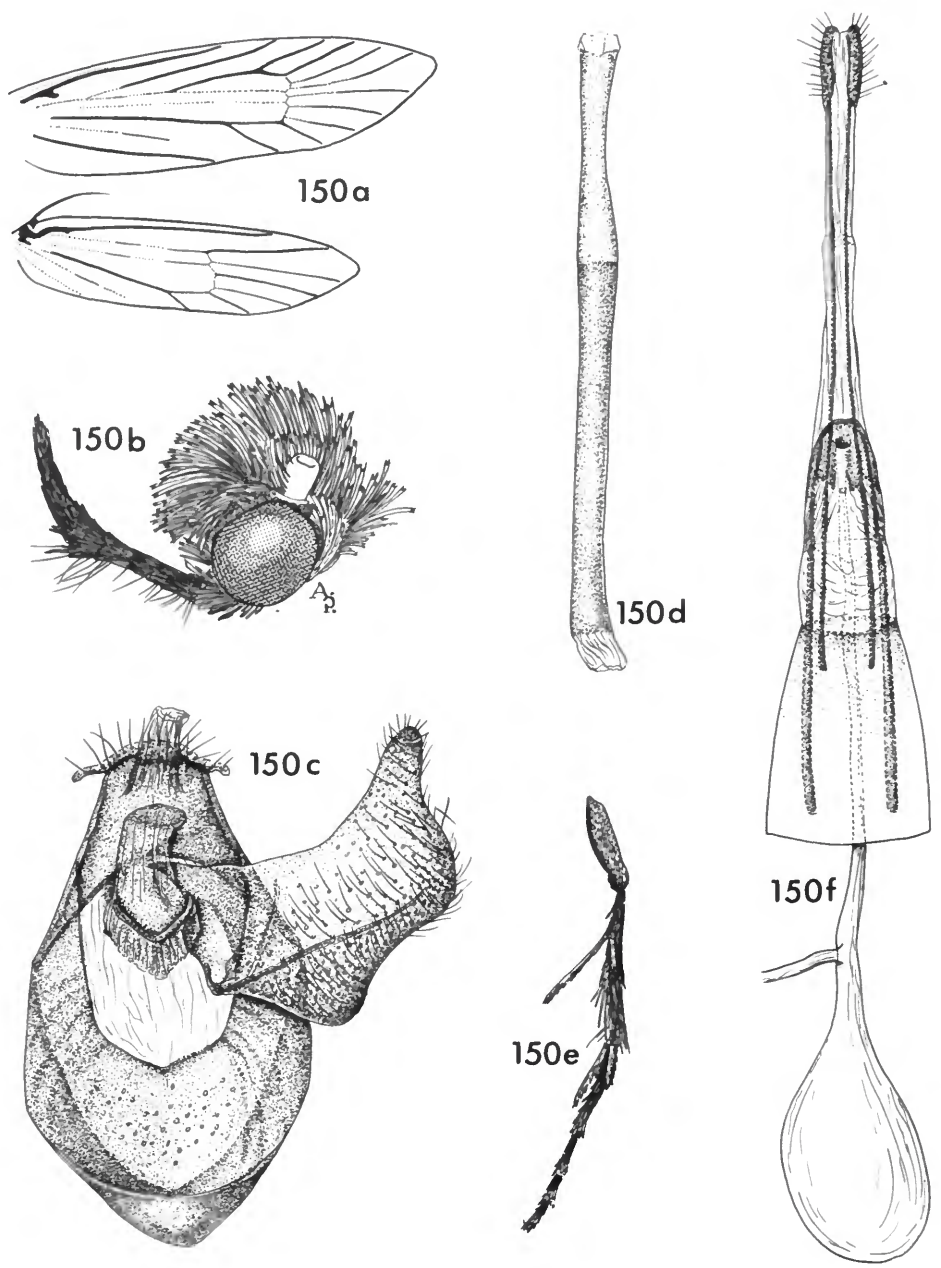


FIGURE 150.—*Petula phalarata,* new species: *a,* venation of right wings; *b,* lateral aspect of head showing palpus; *c,* ventral view of male genitalia with left harpe and aedeagus removed; *d,* aedeagus; *e,* posterior leg; *f,* ventral view of female genitalia.

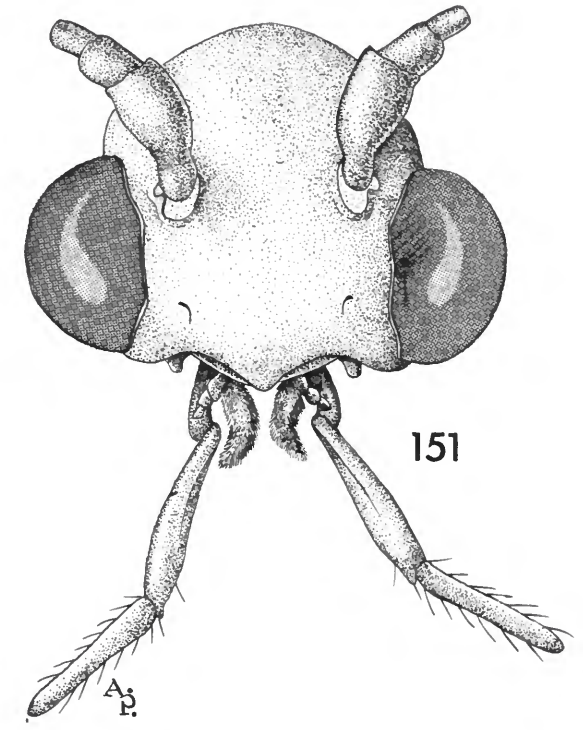


FIGURE 151.—*Petula phalarata,* new species. Anterior view of denuded head showing mouthparts.

♂♂ and 2 ♀♀ paratypes as follows: Haurei, 7 ♂♂, 2 ♀♀ (28.X.–23.XI.1963); Pake Bay, ♂ (31.X. 1963); Point Teakauraee, 2 ♂♂ (2.XI.1963).

Several of our specimens were beaten from *Pandanus,* where the larva is probably a refuse-feeder, and from tree trunks.

The females average much larger than the males and the ground color tends to be a little lighter. The black spot at end of cell is thus more clearly defined in the females (Plate 25*h*).

Genus *Erechthias* Meyrick

Erechthias Meyrick, 1880, p. 261. (Type-species: *Erechthias charadrota* Meyrick, 1880, p. 268 [designated by Fletcher, 1929, p. 83].)

Erechthias zebrina (Butler)

FIGURES 152, 153; PLATE 27*h*

Argyresthia zebrina Butler, 1881, p. 403.
Ereunetis zebrina (Butler), Walsingham, 1907, p. 715, pl. 25: fig. 16.
Ereunetis lanceolata Walsingham, 1897, p. 158.—Forbes, 1930, p. 148; 1931, p. 382.
Ereunetis xenica Meyrick, 1911, p. 301.
Comodica lanceolata (Walsingham), Walsingham, 1914, p. 346.
Erechthias zebrina (Butler), Meyrick, 1915, p. 253; 1930, p. 322.—Viette, 1949a, p. 316.
Erechtias [*sic!*] *zebrina* (Butler), Gresquière, 1940, p. 86.

Male genitalia slides JFGC 11759, JDB. 1965. Harpe broadest at base, tapered evenly to the bluntly pointed cucullus. Uncus rather broad, divided posteriorly, lightly sclerotized laterally. Vinculum a broad band; saccus elongate, narrow. Tegumen a narrow band. Anellus semitubular. Aedeagus long, very slender, curved; vesica armed with an elongate cluster of spiculate cornuti.

Female genitalia slide JFGC 11760. Ostium oval, small, ventral lip strongly sclerotized. Inception of ductus seminalis at posterior fourth of ductus bursae. Ductus bursae membranous except for lightly sclerotized posterior fourth; anteriorly ornamented with fine transverse ridges. Signum a moderately narrow crescentic plate; capitulum prominent, narrowly pyramidal.

TYPES.—British Museum (Natural History).

TYPE LOCALITIES.—Honolulu, Hawaii (*zebrina*); Saint Thomas, Danish, West Indies (*lanceolata*); Seychelles, Cascade Estate, Mahé (*xenica*).

DISTRIBUTION.—Pantropical: Brazil, Saint Thomas, Porto Rico, Mexico, Panama Canal Zone, Cuba, Jamaica, Seychelles, Mauritius, Ceylon, India, Java, Summatra, Assam, Belgian Congo, Cameroun, Madagascar, Hawaii, Rapa. From Rapa we have the following: Haurei, 5 ♂♂, ♀ (21.IX.–22.XI.1963).

FOOD PLANTS.—Fruits of *Cola acuminata* Schott and Endl., and of false cotton; galls of *Lophira alata* Banks; also abandoned cocoons (Ghesquière, 1940, p. 87).

Two or our specimens were beaten from *Pandanus* where, undoubtedly, the larvae had fed on dry or decaying vegetable matter.

The genitalia of *zebrina* indicate a very close affinity to species of *Decadarchis.*

Genus *Nesoxena* Meyrick

Nesoxena Meyrick, 1929, p. 506. (Type-species: *Nesoxena strangulata* Meyrick, 1929, p. 507 [by monotypy].)
Caryolestis Meyrick, 1934, p. 109. (Type-species: *Caryolestis praedatrix* Meyrick, 1934, p. 110 [by monotypy].) (New synonymy.)

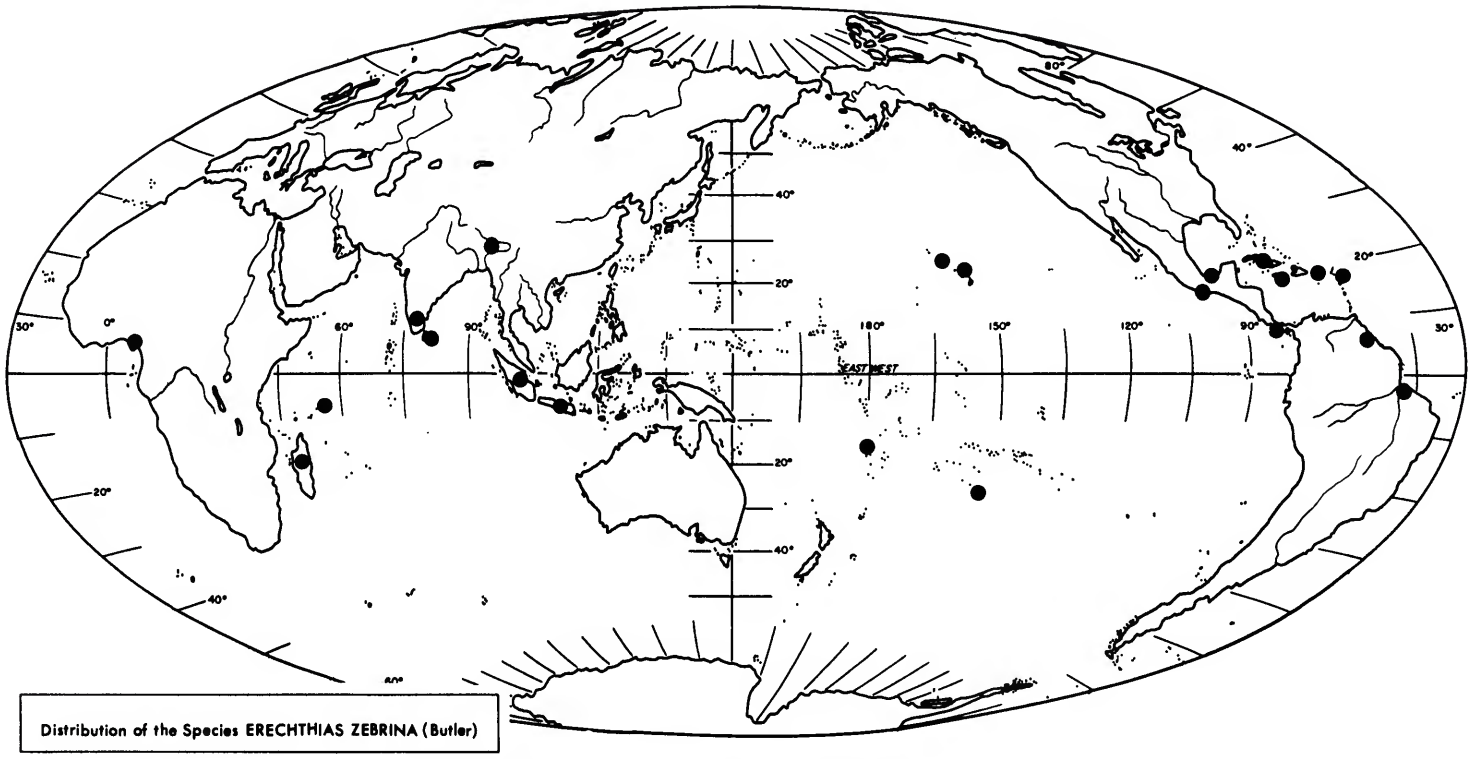


FIGURE 152.—Distribution of *Erechthias zebrina* (Butler).

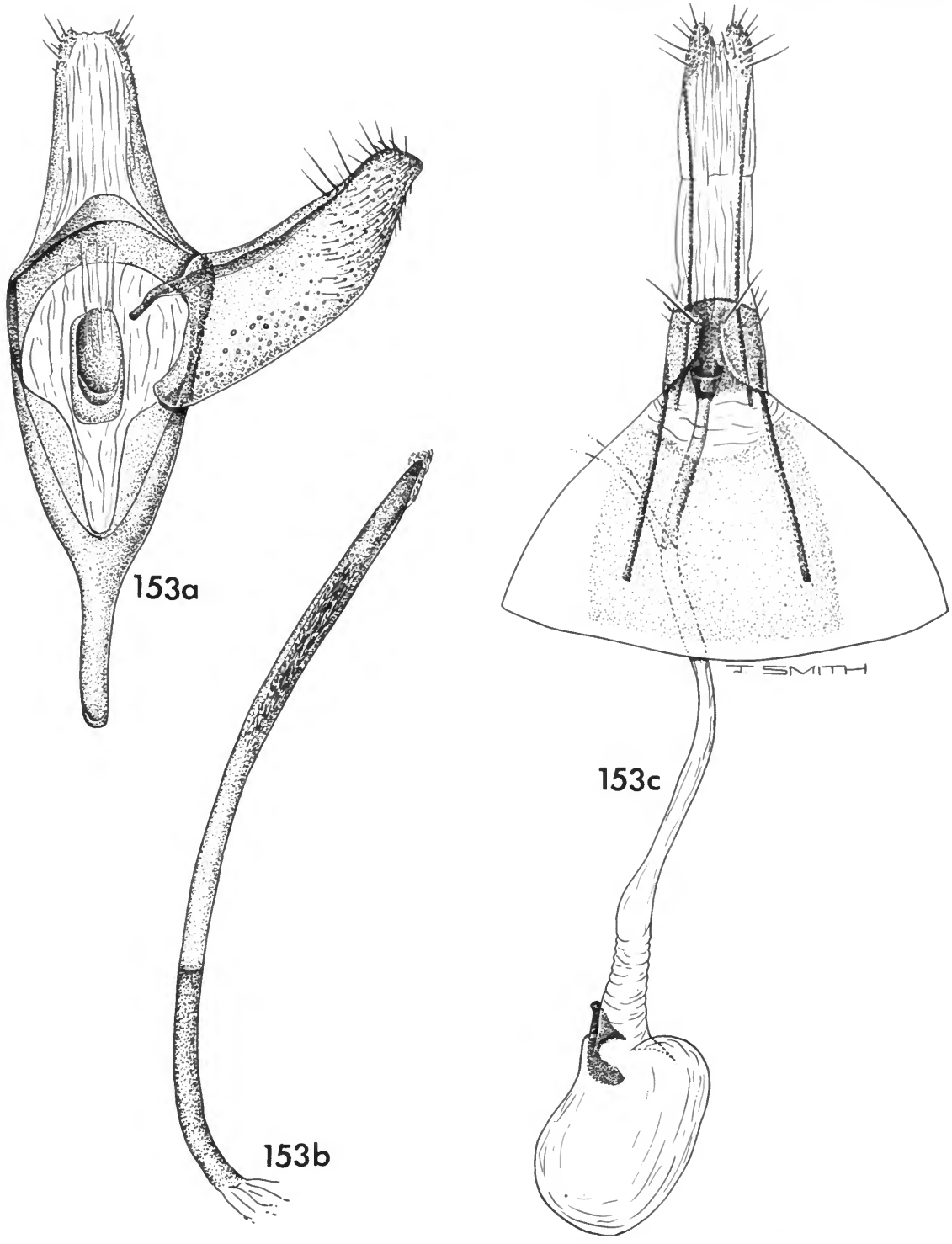


FIGURE 153.—*Erechthias zebrina* (Butler): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

The type of *strangulata* is practically denuded and any reference to color, except the yellowish sex scaling on the hind wing, is purely imaginary. Moreover, the abdomen is missing, the thorax is a mere skeleton, and the wings are damaged. The only possible excuse Meyrick could have had for describing this moth was his fascination for the venation of the hind wing—a secondary sexual character! The same venation as seen in *pandani,* described below, is absent in the male of *praedatrix,* though the latter is obviously congeneric. Unquestionably *strangulata* is closely related to *pandani* from Rapa, if not conspecific, but the latter point cannot be determined until more material is obtained from the Tuamotus.

In Meyrick's description of *Caryolestis* he states:

> Forewing 1b simple, 2 from angle 2b [3?] equidistant, 7 to costa, 7 and 8 in male short-stalked, in female parallel, 8–10 from near end of cell, 11 from towards base. Hindwings . . . in male 2 from near angle, 2 and 3 closely approximated towards base, in female 2 from 5/6, 3 from angle not approximated, 4 absent in both sexes; 5 and 6 in male short-stalked, in female nearly parallel, 5–7 more crowded together in male than in female.

An examination of the denuded type ♂ wing reveals some quite different characters: 1b is furcate, not simple; 2 and 3 are stalked from angle. In the hind wing 2 actually arises well before 3+4 but runs parallel and therefore gives the superficial appearance of approximation to them; 7 also is absent, but a very strong vein 8 arises at base and runs to costa before apex.

Nesoxena praedatrix (Meyrick), new combination

FIGURES 154, 155

Caryolestis praedatrix Meyrick, 1934, p. 110.—Viette, 1949a, p. 316.

TYPE.—Bernice P. Bishop Museum, Honolulu, Hawaii.

TYPE LOCALITY.—Tahiti, Tetiaroa.

DISTRIBUTION.—Tahiti.

To date *praedatrix* is known only from Tahiti but the species described below is similar and nearly related to it.

FOOD PLANT.—*Cocos nucifera* L.

Nesoxena pandani, new species

FIGURES 156, 157; PLATE 25*a, b*; PLATE 29*c*

Alar expanse 16–23 mm.

Labial palpus ocherous white; second segment mostly overlaid fuscous on outer side with a few pure white scales mixed: third segment sparsely irrorate with fuscous. Antenna ocherous white, irregularly marked with short grayish streaks; scape ocherous white, notched distally. Head ocherous white, slightly darker on crown. Thorax olive brown. Forewing ground color deep olive buff; base olive brown, this shade fading toward tornus and costal half of wing; extreme dorsal edge of dark shade, brown; dorsum narrowly ocherous white to tornus; a slender, longitudinal, black streak on tornal edge; entire surface of wing with sparse, scattered grayish or brownish scales; cilia deep olive buff. Hind wing olive buff; modified costal scales of male ocherous white to yellowish; cilia very pale olive buff. Foreleg ocherous white heavily overlaid fuscous; midleg similar, but fuscous marking reduced to streaks and spots; hind leg ocherous white; tibial vestiture more ochraceous buff.

Male genitalia slide JFGC 11391. Harpe broadest about middle; costa abruptly notched at outer third, then concave; cucullus rounded. Uncus divided distally; narrowly sclerotized laterally with lateral row of setae. Vinculum a narrow band; saccus broad, half as long as harpe. Tegumen a moderately wide band. Anellus cup shaped basally, constricted beyond middle, posteriorly crescentic. Aedeagus about as long as harpe, slender, pointed; vesica unarmed.

Female genitalia slides JFGC 11435, 11695. Ostium small, cup shaped. Inception of ductus seminalis slightly anterior to ostium. Ductus bursae long, slender, membranous, gradually widening where it joins bursa copulatrix. Bursa copulatrix membranous. Signum a crescentic plate; capitulum short, stout.

HOLOTYPE.—USNM 70110.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Pandanus tectorius* Solander (R26) (*fara*).

Described from the ♂ holotype (Em. 27.IX.1963), 30 ♂♂ and 33 ♀♀ paratypes all from Haurei (12.IX–28.XI.1963) except: Anatakuri nako, ♀ (14.X.1963); Point Maraia, ♂ (31.X.1963); Point Tepapa, ♀ (26.XI.1963). All dates include emergence of the reared specimens as well as those beaten from *Pandanus.*

The larva of *pandani* feeds on the dead tissue of the dry, hanging leaves within the rolled edges. The prepupal larva constructs a long, spindle-shaped cocoon

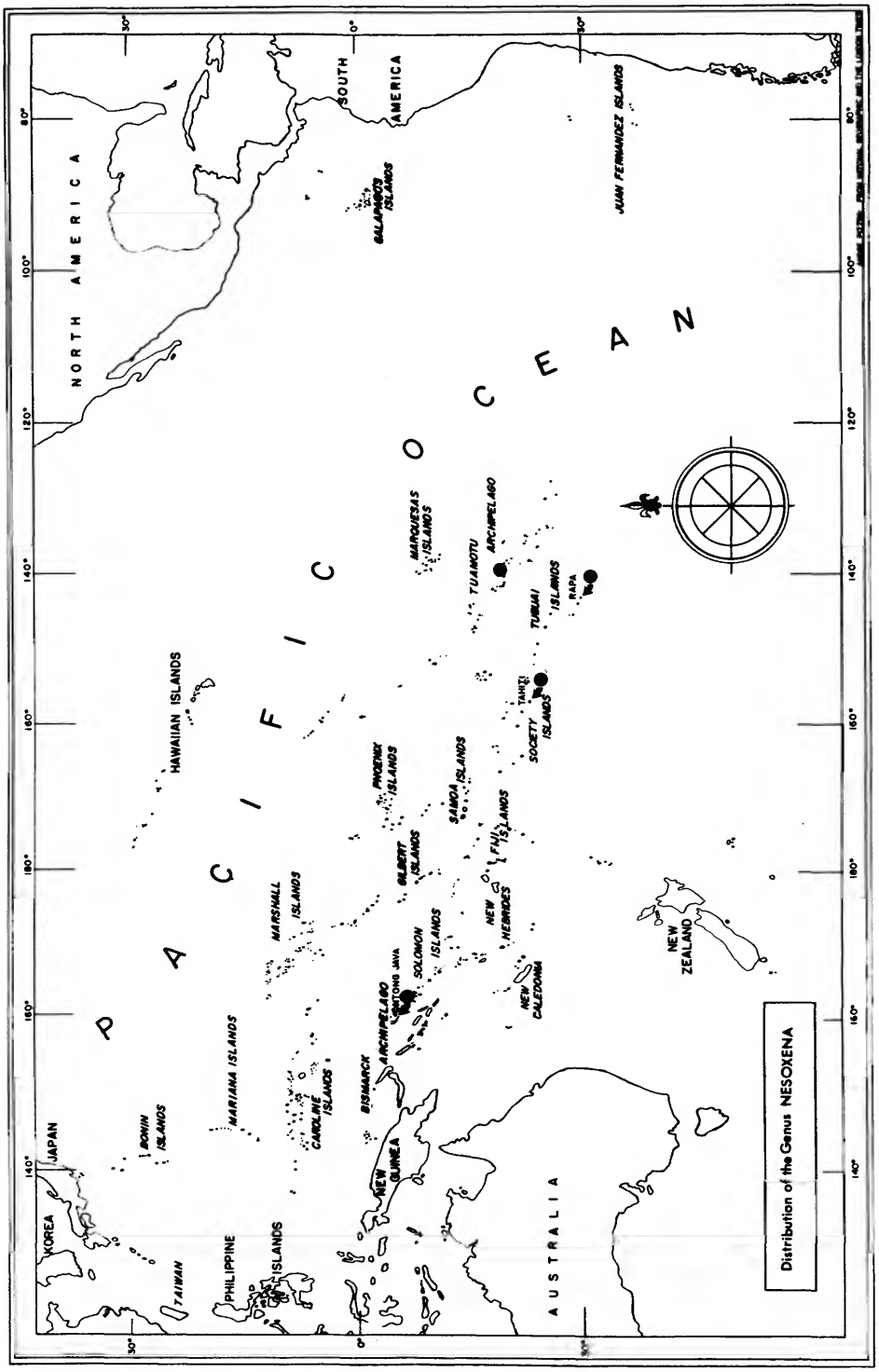
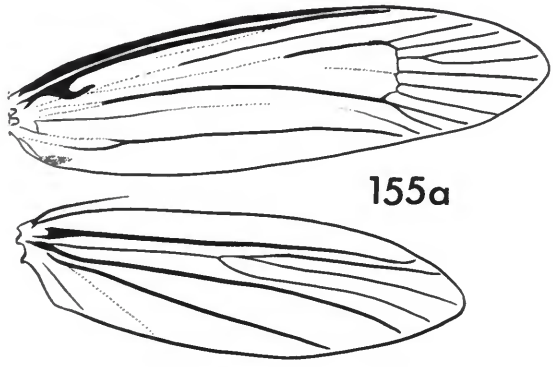


FIGURE 154.—Distribution of the genus *Nesoxena* Meyrick.



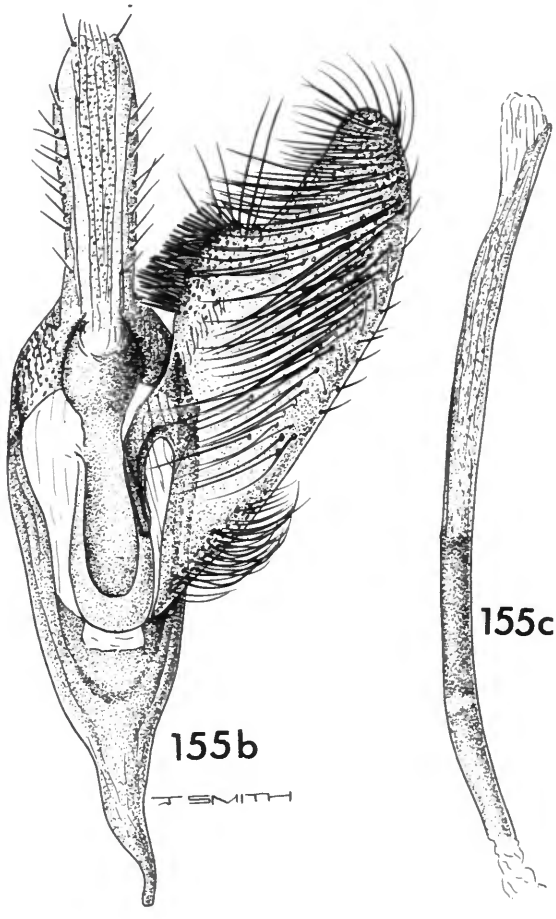
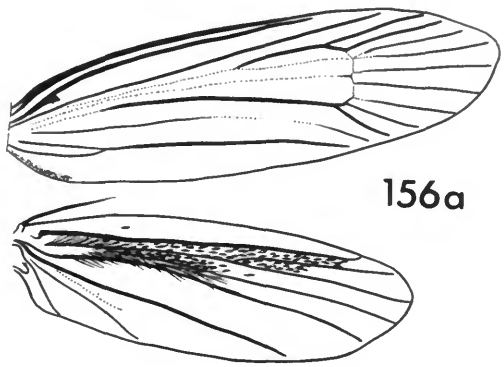


FIGURE 155.—*Nesoxena praedatrix* (Meyrick): *a*, venati
of right wings; *b*, ventral view of male genitalia with l
harpe and aedeagus removed; *c*, aedeagus.



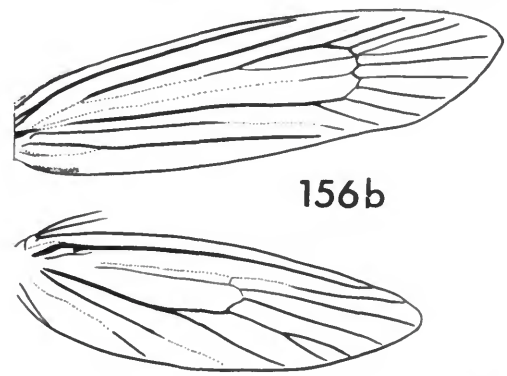
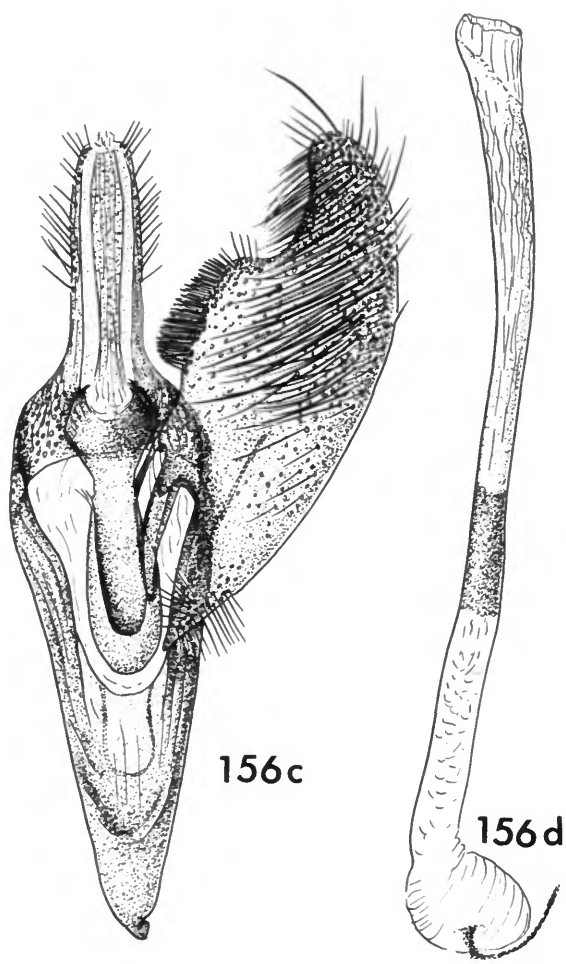


FIGURE 156.—*Nesoxena pandani*, new species: *a*, venation of male right wings; *b*, venation of female right wings; *c*, ventral view of male genitalia with left harpe and aedeagus removed; *d*, aedeagus.



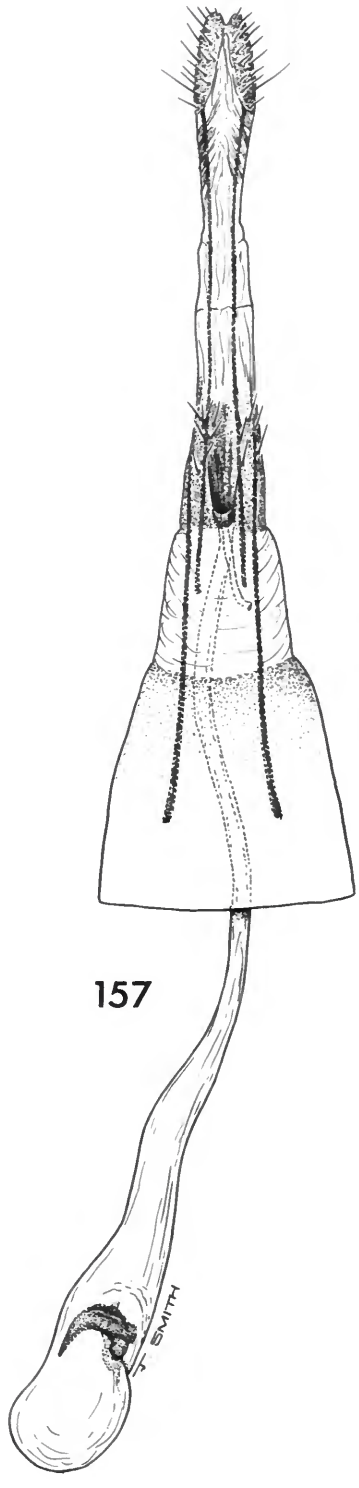


FIGURE 157.—*Nesoxena pandani*, new species. Ventral view of female genitalia.

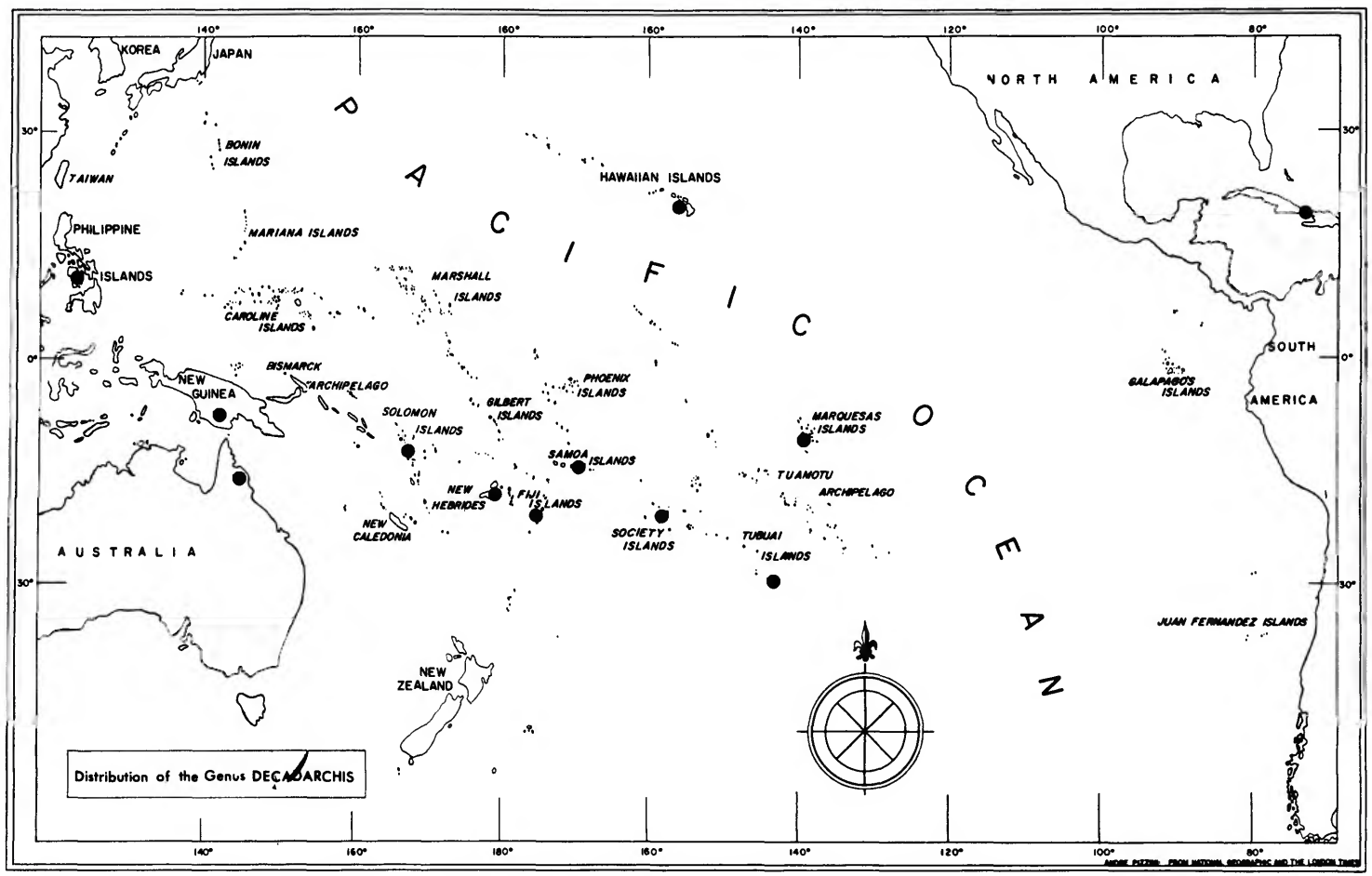


FIGURE 158.—Distribution of the genus *Decadarchis* Meyrick.

of fibers (Plate 29*c*) and silk, sometimes as long as 45 mm. The pupa is extruded at the time of emergence.

The Tahitian *praedatrix* and *pandani* are similar in appearance, but the male of *pandani* has an elongate patch of modified scales on the upper side of the hind wing, as in *strangulata,* which is absent in *praedatrix.* As can be seen from the figures of the genitalia, the two species are very close structurally as well as in superficial appearance. The chief points of difference in the male genitalia lie in the costa and base of the harpe, the latter having a double extension (articulation) of the costa in *pandani* and a single extension in *praedatrix.*

Nesoxena semifusca (Bradley), new combination

Decadarchis semifusca Bradley, 1961, p. 165, pl. 7: fig. 14, pl. 19: figs. 13, 14.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Ontong Java, Leuaniua.

DISTRIBUTION.—Ontong Java.

FOOD PLANT.—Unknown.

C. semifusca is similar to *praedatrix* but costa of harpe is not deeply notched as in that species.

I have included *semifusca* here to bring together the four known, strikingly similar species of this genus, but *semifusca, strangulata,* and *praedatrix* do not occur on Rapa.

Genus *Decadarchis* Meyrick

Decadarchis Meyrick, 1886, p. 290. (Type-species: *Decadarchis melanastra* Meyrick, 1886, p. 291 [by monotypy].)

Decadarchis pelotricha Meyrick

FIGURES 159, 160; PLATE 27*c, d;* PLATE 29*g, h, i, j*

Decadarchis pelotricha Meyrick, 1926, pp. 275, 506.—Viette, 1949a, p. 316.

"♂, 15–16 mm. . . . At 800 feet; 3 ex."

LECTOTYPE.—The male in the British Museum (Natural History) labeled "TYPE ♂" hereby designated. It is labeled "Rapa Island. At light, 11.4.25. St. George Expedn. C. L. Collenette." A small, white label bears the inscription "M96." In addition there is the large label with the name and reference to the original description. Slide JFGC 11392.

Male genitalia slide JFGC 11396. Harpe broadest beyond middle; costa sharply convex; cucullus deeply excavated. Uncus divided distally, weakly sclerotized laterally. Vinculum broad; saccus produced. Tegumen a narrow band. Anellus cup shaped proximally, concave distally. Aedeagus long, slender, slightly bent; vesica armed with one short, strong cornutus.

Female genitalia slides JFGC 11393, 11694. Ostium narrow, longitudinal. Inception of ductus seminalis well before ostium. Ductus bursae slender, membranous. Bursa copulatrix ornamented with a reticulum of fine ridges. Signum a large, broadly C-shaped plate; capitulum elongate, rectangular.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Rapa.

DISTRIBUTION.—Rapa.

We have 18 ♂♂ and 4 ♀♀ from the following localities: Anatakuri nako, ♂ (14.X.1963); Haurei, 5 ♂♂, 3 ♀♀ (13.IX.10.XII.1963); Maurua, 600′ (184 m), ♂, ♀, (16.IX and 17.X.1963); Morogouta, 750′(231 m), ♂ (7.X.1963); Point Maraia, (2.XI. 1963); Teumukopuke, 500′(154 m), 8 ♂♂ (7.X.–3. XI.1963); Tevaitau, 800′(245 m), ♂ (29.IX.1963).

FOOD PLANT.—*Pandanus tectorius* Solander (R26).

Our reared specimens were obtained from the dead wood of *Pandanus.* Pupation occurs within the burrow and the cocoon is constructed of frass, bits of wood, and silk. The pupa is extruded at the time of emergence.

The majority of our specimens was collected by beating the dead leaves in which the adults hide during the daytime.

Decadarchis cirrhogramma, new species

FIGURE 161; PLATE 26*b*

Alar expanse 14–18 mm.

Labial palpus light ochraceous buff; second segment with olive brown line on outer side dorsally; basal half of third segment olive brown on outer side. Antenna light ochraceous buff; scape olive brown dorsally and with conspicuous, dorsal, subterminal notch in male; female with irregular olive brown spotting on shaft. Head ochraceous buff suffused brownish. Thorax olive brown. Forewing ground color olive brown; from base to tornus, along fold, an irregular ochraceous-buff line, distinct in male, almost obliterated by ground color in female; cilia olive brown except some ochraceous buff at tornal edge. Hind wing brownish gray; cilia con-

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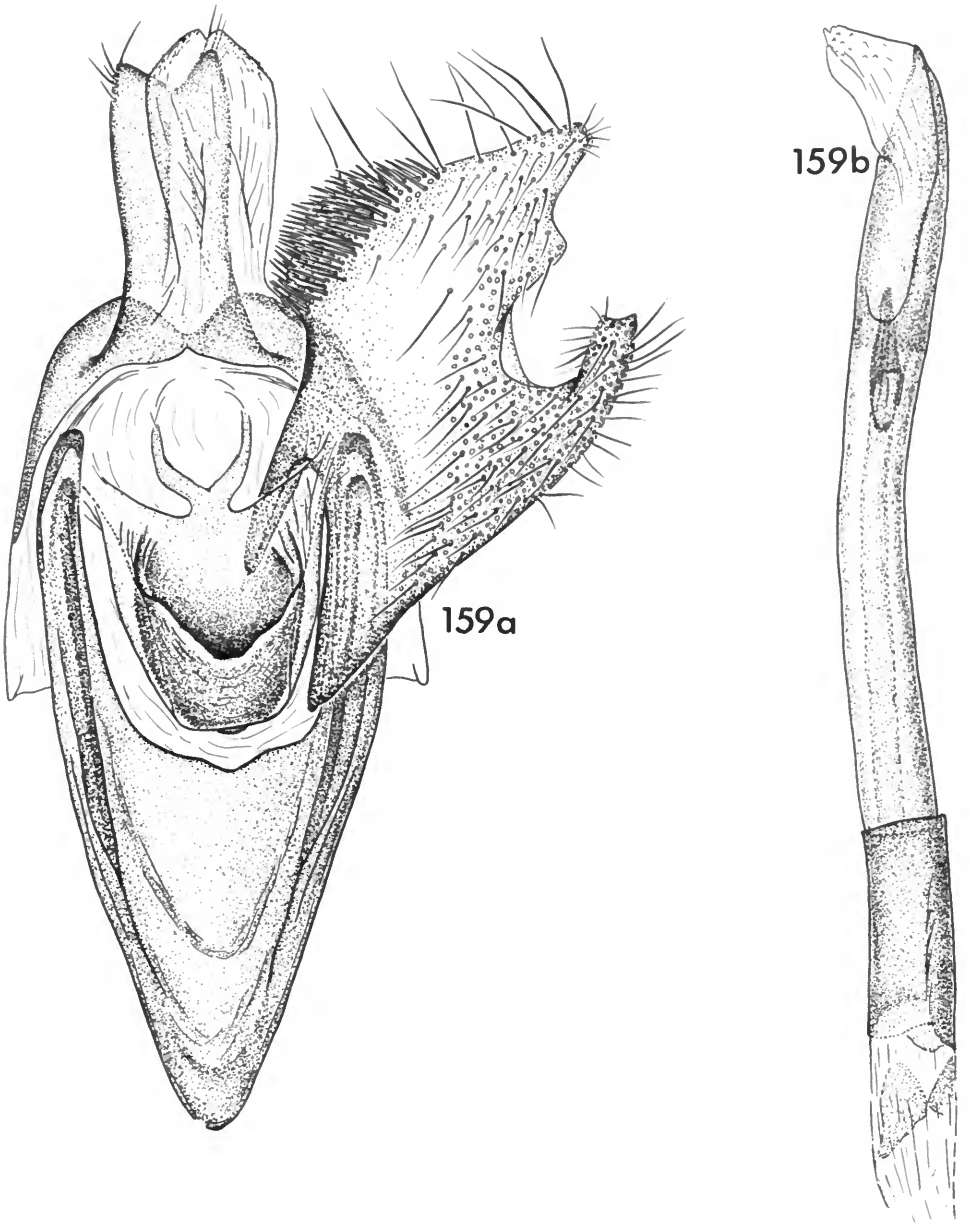
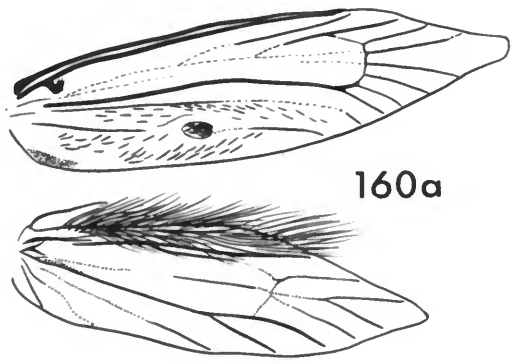
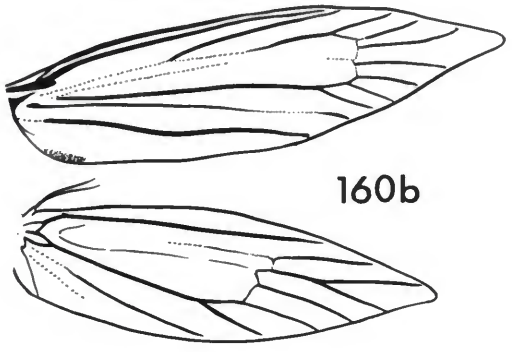


FIGURE 159.—*Decadarchis pelotricha* Meyrick: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.





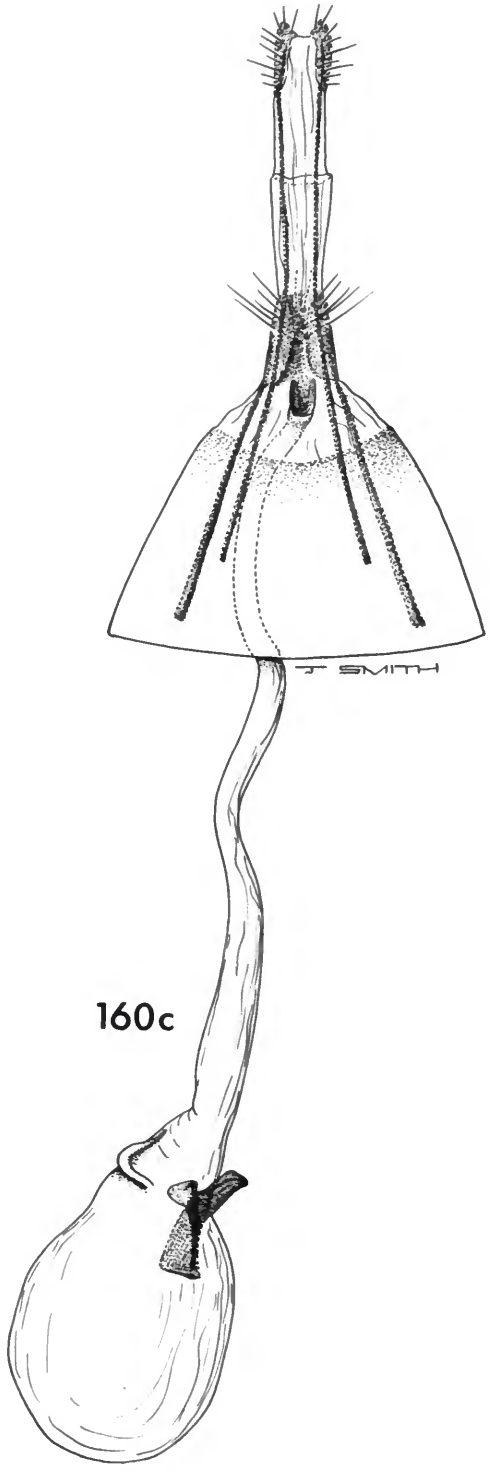
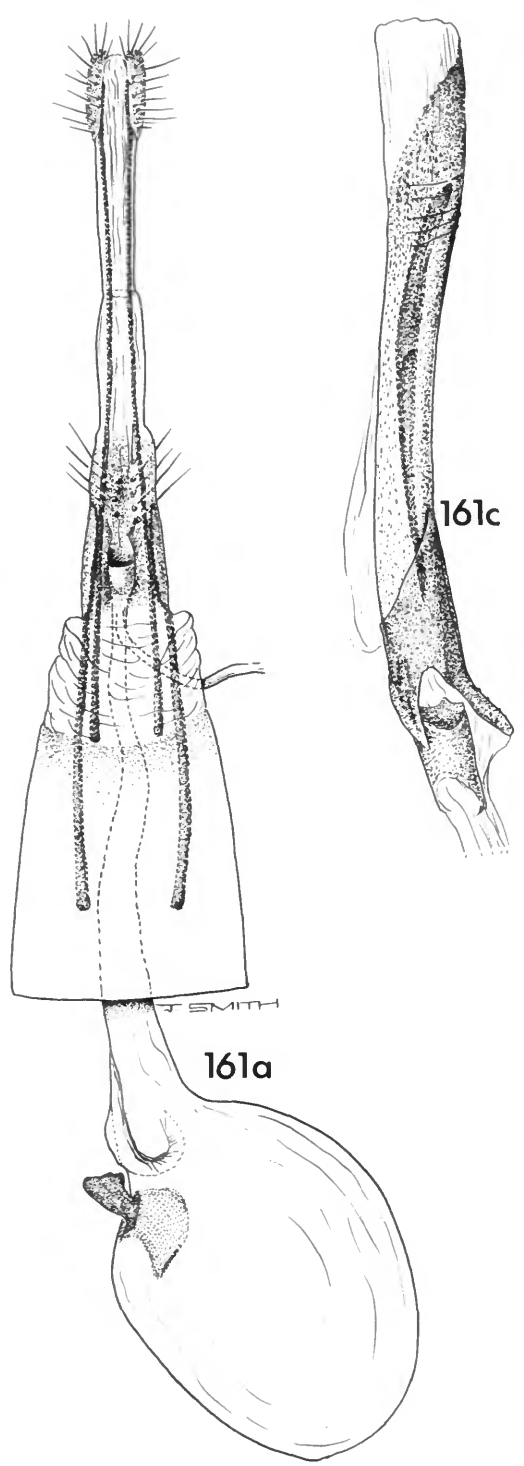


FIGURE 160.—*Decadarchis pelotricha* Meyrick: *a*, venation of male right wings; *b*, venation of female right wings; *c*, ventral view of female genitalia.



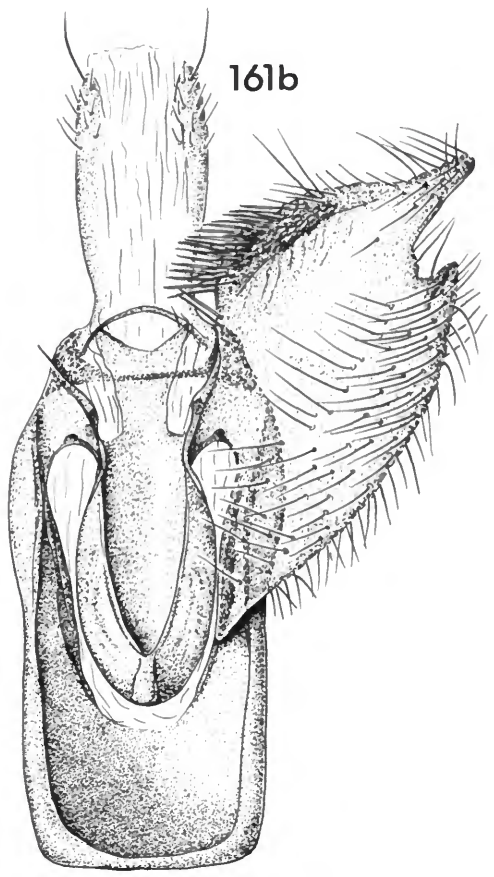


FIGURE 161.—*Decadarchis cirrhogramma,* new species: *a,* ventral view of female genitalia; *b,* ventral view of male genitalia with left harpe and aedeagus removed; *c,* aedeagus.

colorous. Foreleg and midleg dull, pale ochraceous buff overlaid brownish on outer sides; hind leg similarly colored except tibia clothed with light gray scales and hairlike scales; tarsal segments faintly annulated gray. Abdomen shining brownish gray, rough scaled along pleura; in male 6th segment with long hairlike scales posterodorsally; eversible glandular sacs posterolaterally on second segment.

Male genitalia slide JFGC 11443. Harpe broad; costa strongly convex with strong setal patch about middle; ventral margin gently convex, with deep excavation before the pointed cucullus. Uncus broad, divided apically. Vinculum very broad, truncated anteriorly. Tegumen a very narrow ring. Anellus deeply cup shaped, anteriorly, broadly Y-shaped posteriorly. Aedeagus long, stout; vesica armed with one long, strongly sclerotized cornutus.

Female genitalia slide JFGC 11444. Ostium small, round. Antrum not differentiated. Inception of ductus seminalis slightly anterior to ostium. Ductus bursae membranous with small pocket at junction with bursa copulatrix. Bursa copulatrix membranous with very weak reticulum of small ridges. Signum a broad, curved plate; capitulum prominent, dilated distally.

HOLOTYPE.—USNM 70115.

TYPE LOCALITY.—Rapa, Perau, 1900′(575 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (15.X.1963) and 4 ♀ ♀ paratypes as follows: 3 ♀ ♀, Perau, 1900′(585 m) (15.X.1963); ♀, Maugaoa, 950(292 m) (23.XI. 1963).

The male genitalia place *cirrhogramma* in the *pelotricha-pagophila* group, but the extremely long cornutus of *cirrhogramma* immediately distinguishes it from both. In coloring, this species resembles *phaeoptera,* but *cirrhogramma* is a much smaller insect and the former lacks any suggestion of the ochraceous-buff, longitudinal line.

Decadarchis pagophila, new species

FIGURE 162; PLATE 26*a*

Alar expanse 13–14 mm.

Labial palpus white, slightly suffused pale buff; second segment fuscous ventrally. Antenna warm buff; scape deeply notched subapically. Head white, suffused pale buff; some fuscous below scape. Thorax white; posteriorly a small, median fuscous spot; tegula fuscous basally. Forewing ground color white, suffused buff; base of costa broadly fuscous, this shade continued to apex as a strong, longitudinal, median line; from midcosta a slender, outwardly oblique, fuscous streak; beyond this a very slender fuscous line meets a similar terminal line at apex; well inside dorsal edge a slender, longitudinal fuscous streak; cilia white with subterminal and terminal fuscous bands. Hind wing very pale grayish; cilia white suffused pale buff. Foreleg femur buff overlaid fuscous on outer side; tibia and tarsus fuscous; midleg similar except tarsal segments buff, spotted fuscous dorsally; hind leg buff; 3rd and 4th tarsal segments with small fuscous spot basally. Abdomen buff.

Male genitalia slide JFGC 11451. Harpe broad; costa strongly convex; cucullus pointed; sacculus produced apically as a blunt point. Uncus divided posteriorly. Vinculum broad U-shaped. Tegumen very short, broad, dorsoposteriorly a narrow band only. Anellus a broad, deep cup anteriorly, straplike posteriorly. Aedeagus slender, slightly curved; vesica armed with one strong, curved cornutus.

HOLOTYPE.—USNM 70112.

TYPE LOCALITY.—Rapa, Tevaitau, 800′(245 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype (29.IX.1963) and 2 ♂ ♂ paratypes with identical data.

In superficial appearance *pagophila* resembles *sphenacma,* but the median longitudinal line of *pagophila* is much stronger than that of *sphenacma,* the costa is straighter than that of the latter, and *pagophila* is a smaller insect. They can be distinguished easily by the genitalia as will be seen by a comparison of the figures.

Decadarchis sphenacma Meyrick

FIGURE 163; PLATE 27 *a, b*; PLATE 29*b*

Decadarchis sphenacma Meyrick, 1926, pp. 275, 506.
Decadarchis citrogramma Meyrick, 1931b, p. 165. (New synonymy.)

[*sphenacma*]

"♂ ♀. 15–26 mm. . . . At low level; 4 ex."

LECTOTYPE.—♀, 26 mm. "Rapa Island. At light, 14.4.25 St. George Expedn. C. L. Collenette," hereby

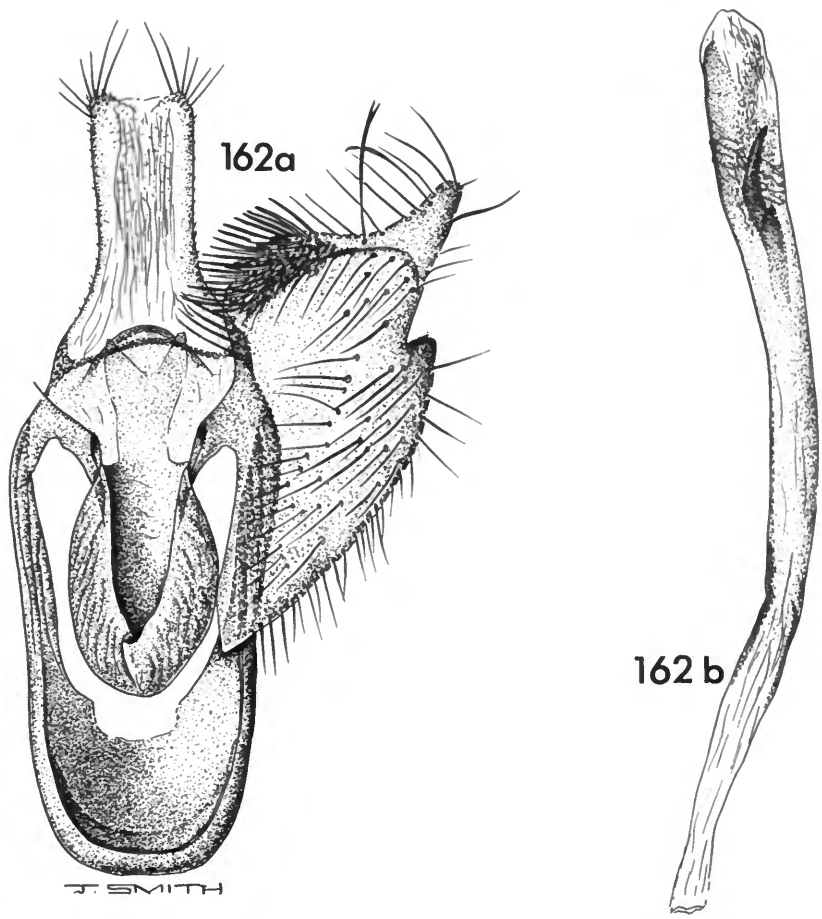


FIGURE 162.—*Decadarchis pagophila*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus.

designated. Slide JFGC 11394. A small, white label bears the inscription "M93." A third label gives the name and reference to the original description and is marked "TYPE" at lower left.

Male genitalia slide JFGC 11763. Harpe broadest beyond middle, costa convex, ventral edge gently rounded, cucullus pointed. Uncus half as long as harpe, divided, weakly sclerotized laterally. Vinculum narrow, elongate, saccus produced. Tegumen bandlike, very narrow mediodorsally. Anellus elongate, deeply cupped proximally; distal edge concave. Aedeagus long, slender, gently curved; vesica armed with one strong cornutus.

Female genitalia slide JFGC 11395. Ostium small, longitudinal, V-shaped. Inception of ductus seminalis near anterior third of ductus bursae. Ductus bursae membranous, broadened before bursa copulatrix. Bursa copulatrix lined with network of small, irregular ridges. Signum a large, broadly crescentic plate; capitulum prominent, subrectangular.

TYPES.—British Museum (Natural History).

TYPE LOCALITIES.—Rapa (*sphenacma*); Fiji, Lautoka (*citrogramma*).

DISTRIBUTION.—Fiji and Rapa.

The specimens before me are from the following localities on the island: Haurei, 2 ♂♂, 2 ♀♀ (18.X.–11.XII.1963); Morogouta, 750′ (231 m), ♂ (10.X.1963); Point Tepapa, ♀ (26.XI.1963).

FOOD PLANT.—*Pandanus tectorius* Solander (fruitstalk).

Five of our six specimens were either reared or beaten from *Pandanus,* but it seems likely that any dead or dry vegetable refuse would provide suitable food.

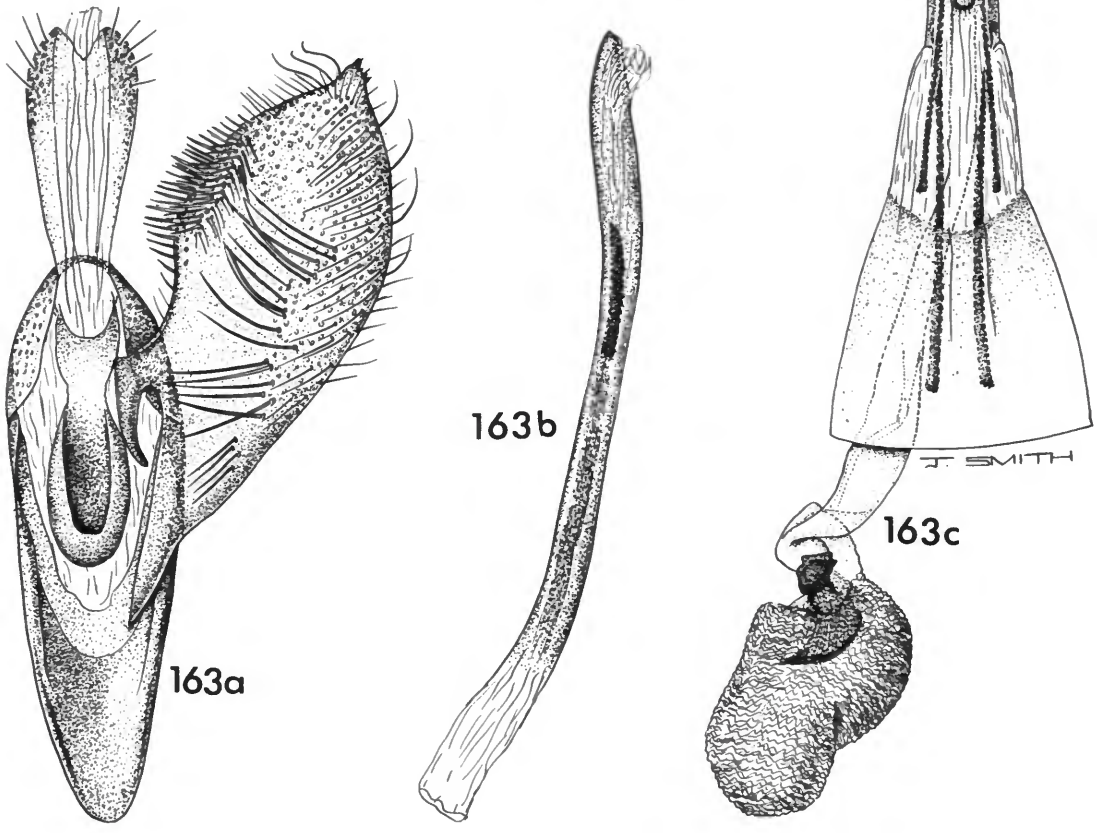
I have compared the types of *sphenacma* and *citrogramma,* and our Rapa material, and am convinced of the synonymy.

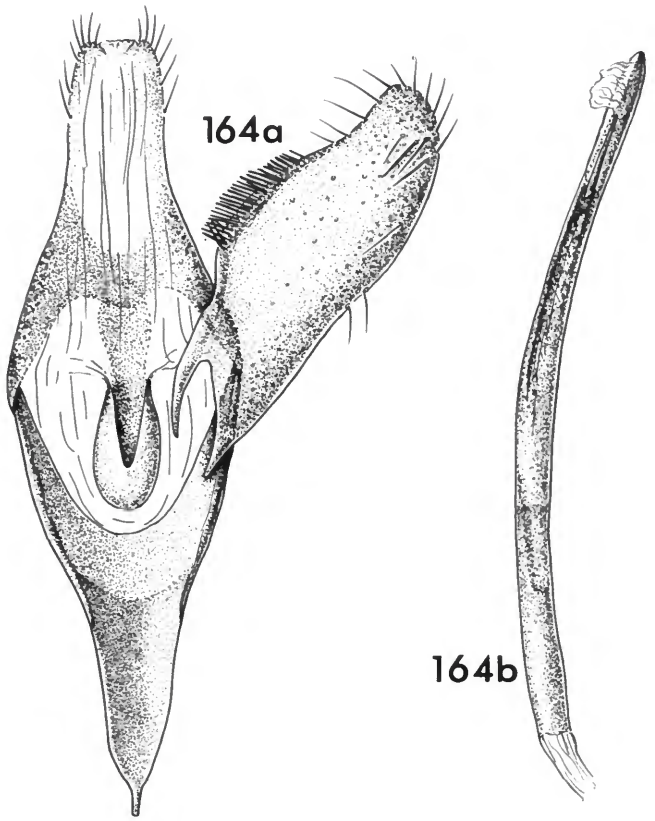
Decadarchis minuscula (Walsingham)

FIGURE 164; PLATE 26*e, f*

Ereunetis minuscula Walsingham, 1897, p. 155; 1907, p. 716. —Swezey, 1909, p. 12, pl. 2: figs. 7–9.—Busck, 1911, p. 80.—Walsingham, 1914, p. 347.—Forbes, 1930, p. 147. —Williams, 1931, p. 156, pl. 26: figs. 7–9.

FIGURE 163.—*Decadarchis sphenacma* Meyrick: *a,* ventral view of male genitalia with left harpe and aedeagus removed; *b,* aedeagus; *c,* ventral view of female genitalia.





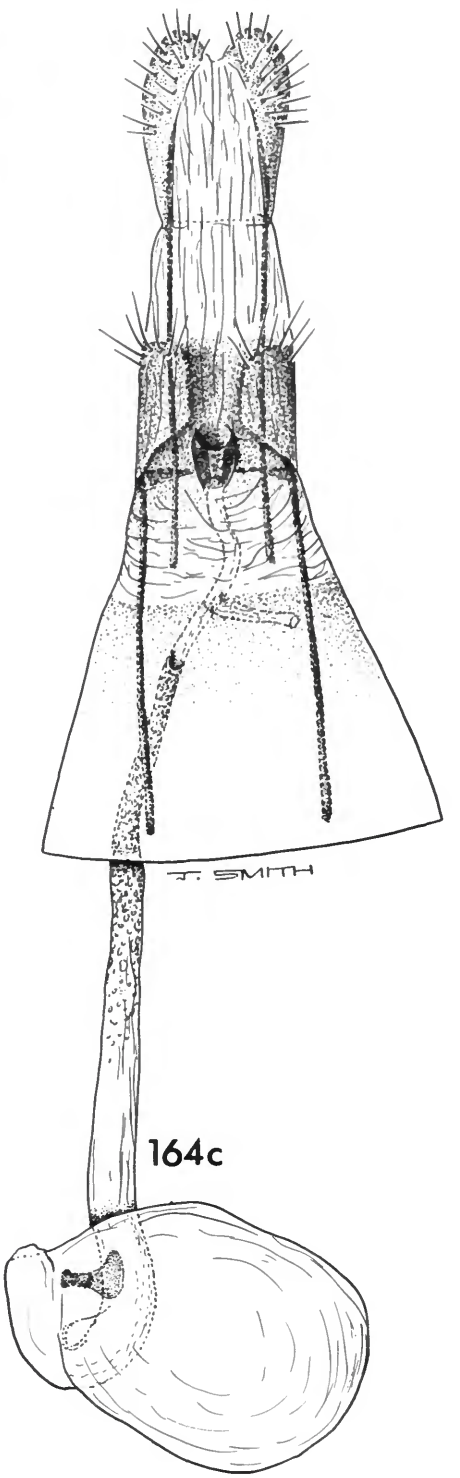


FIGURE 164.—*Decadarchis minuscula* (Walsingham): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

Decadarchis minuscula (Walsingham), Meyrick, 1929, p. 505.—Ghesquière, 1940, p. 86.—Vesey-FitzGerald, 1941, p. 158.—Swezey, 1942, p. 215.—Viette, 1949a, p. 316.—Davis, 1953, p. 85.—Swezey, 1954, pp. 21, 147, 160, 187.—Diakonoff, 1967, p. 265, fig. 762.

Male genitalia slides JFGC 11407, 11792. Harpe widest at middle; costa slightly concave before middle; cucullus rounded. Uncus divided posteriorly, lightly sclerotized laterally. Vinculum elongate; saccus nearly as long as harpe, terminating in a point. Tegumen a moderately broad band. Anellus narrow, cup shaped proximally. Aedeagus long, slender, curved; vesica armed with one conspicuous, sharply pointed cornutus.

Female genitalia slide JFGC 11761. Ostium small, elongate, ventral lip concave. Antrum not differentiated. Inception of ductus seminalis well before

ostium. Ductus bursae membranous. Bursa copulatrix membranous. Signum a short, wide, spatulate plate; capitulum columnar, slightly longer than signum.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—West Indies.

DISTRIBUTION.—Pantropical. West Indies, Virgin Islands, Florida, Hawaii, Marquesas Islands, Rapa, Tahiti, Fiji, Solomon Islands, Seychelles, Samoa, Nigeria, Belgian Congo, Java, Guyana (from gall on mango). The Rapa specimens are from: Haurei, ♀ (13.IX.1963); Tevaitau, 200′(61 m), 2 ♂♂ (22.-IX.1963).

FOOD PLANTS.—The dead or decaying tissue of many hosts such as coconut, *Pandanus,* acacia, cacao, and *Thespesia.*

As our few records indicate, the species was not common on Rapa while we were there. Busck provides an interesting item concerning *minuscula* in his report recorded in the *Proceedings of the Entomological Society of Washington,* 1911, p. 81:

> Mr. Busck said that he looked under the floor of the warehouse at Baracoa [Cuba], which was elevated about 4 feet above the ground, and thought he saw merely rough boards until a flying moth apparently disappeared through a crack; he then looked closer and realized that the rough appearance of the boards was effected by thousands of these moths resting close together under the floor, and he then found the cracks of the floor filled with the galleries of the larvae.

This species does not appear in our North American lists although Busck clearly records it from Florida in the aforementioned article.

Decadarchis flavistriata (Walsingham)

FIGURE 165; PLATES 27*e*, 29*d*

Ereunetis flavistriata Walsingham, 1907, p. 716, pl. 25: fig. 18.—Swezey, 1909, p. 9, pl. 2: figs. 1–6.—Williams, 1931, p. 152, pl. 25: figs. 1–2, pl. 26: figs. 1–6.—Viette, 1951, p. 14.—Shiroma, 1963, p. 209.

Erechthias flavistriata (Walsingham), Meyrick, 1929, p. 505.—Viette, 1949a, p. 316.

Decadarchis flavistriata (Walsingham), Veitch, 1923, p. 9, pl. 2: fig. 2.—Bradley, 1961, p. 163; 1962, p. 270.

Male genitalia slide JFGC 11406. Harpe with long, outwardly curved process from middle of costa; cuculus truncate. Uncus divided, lightly sclerotized laterally. Vinculum rounded, somewhat flattened ventrally. Tegumen a narrow band. Anellus short, cup shaped proximally. Aedeagus rather slender, slightly curved, distally flattened; vesica armed with minute, spiculate cornuti.

Female genitalia slide JFGC 11401. Ostium small, round, ventral lip concave. Antrum very narrowly sclerotized. Inception of ductus seminalis well before ostium. Ductus bursae slender, membranous. Bursa copulatrix membranous. Signum a broad blade with long, curved, ventral bar; capitulum irregular, as long as ventral bar.

TYPE.—British Museum (Natural History).

TYPE LOCALITY.—Lanai, Hawaii.

DISTRIBUTION.—Hawaii, New Zealand, Solomon Islands, Polynesia, Java, Malaya, New Hebrides, Fiji.

The Rapa specimens were reared or collected from the following localities: Anatakuri nako, 2 ♀♀ (14.X.1963); Haurei, 4 ♂♂, 3 ♀♀ (15.IX–29.XI.1963); Maii Bay, 5 ♂♂ (12.XI.–7.XII.1963); Pake Bay, ♂ (31.X.1963); Point Maraia, 3 ♂♂ (31.X.1963); Point Tepapa, 2 ♀♀ (15.IX.–9.XII.1963); Teumukopuke, 600′(154 m), ♂ (7.X.1963). Dates of emergence of reared specimens and dates of capture are combined.

FOOD PLANTS.—Sugarcane (Viette and others); *Cocos nucifera* L. (flowers; Meyrick); *Pandanus tectorius* Solander (R26) (dry, dead fruits, leaves).

In Fiji *flavistriata* is known as the "budmoth of sugarcane."

The three species, *flavistriata, lampadacma,* and *euophthalma* are similar in appearance and all have similar habits, but the female genitalia of *flavistriata* immediately distinguish it from the other two. The signum of *flavistriata* consists of a capitulum attached to a strongly sclerotized bar. From the latter a strong, curved, broad blade projects anteriorly and transversely across the bursa copulatrix. The signum of *euophthalma* consists of a capitulum with a strong hook anteriorly. Because of these differences I am removing *euophthalma* from synonymy of *flavistriata.*

Erechthias lampadacma belongs in *Decadarchis* and I present what I consider the correct synonymy in the text that follows.

Decadarchis lampadacma (Meyrick), new combination

Erechthias lampadacma Meyrick, 1921, p. 458.

Decadarchis euophthalma Meyrick, 1924, p. 83.

(New synonymy.)

Bradley (1961) placed *euophthalma* in the synonymy of *flavistriata,* but he had not examined the gen-

italia of *euophthalma*. The type of the latter is a female, not a male as recorded (slide JFGC 11400), and a comparison of the genitalia with those of the type of *lampadacma*, also a female, confirms their identity. Both were reared from coconut.

This species does not occur on Rapa.

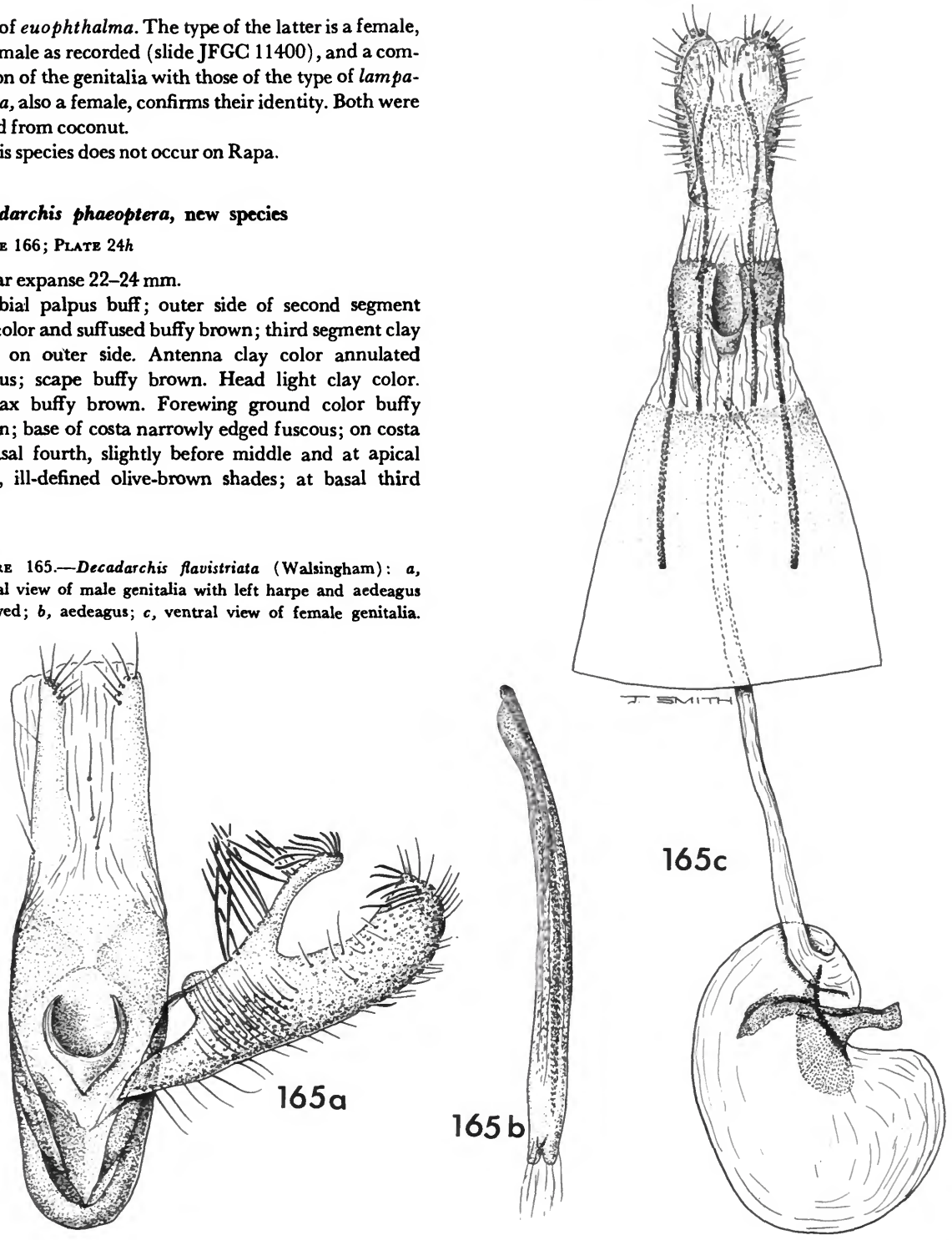
Decadarchis phaeoptera, new species

FIGURE 166; PLATE 24*h*

Alar expanse 22–24 mm.

Labial palpus buff; outer side of second segment clay color and suffused buffy brown; third segment clay color on outer side. Antenna clay color annulated fuscous; scape buffy brown. Head light clay color. Thorax buffy brown. Forewing ground color buffy brown; base of costa narrowly edged fuscous; on costa at basal fourth, slightly before middle and at apical third, ill-defined olive-brown shades; at basal third

FIGURE 165.—*Decadarchis flavistriata* (Walsingham): *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.



of wing, astride cell, an olive-brown spot; at end of cell a similarly colored spot; termen and apex narrowly olive brown; cilia clay color. Hind wing light grayish olive; cilia olive buff. Foreleg clay color; femur, tibia, and tarsal segments buffy brown on outer side; midleg light clay color; tibia and tarsal segments marked with buffy brown on outer side; hind leg clay color; tarsal segments faintly marked with buffy brown. Abdomen clay color.

Female genitalia slide JFGC 11445. Ostium oval; laterally and anteriorly the edges sclerotized. Antrum not differentiated. Inception of ductus seminalis well before ostium. Ductus bursae membranous. Bursa copulatrix membranous, sculptured with a reticulum of fine ridges; posteriorly, at junction with ductus bursae, a sclerotized bulge. Signum a curved, sclerotized blade, broad basally, tapering to a blunt point; capitulum prominent.

HOLOTYPE.—USNM 70114.

TYPE LOCALITY.—Rapa, Maurua, 600′(184 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♀ holotype (16.IX.1963) and one ♀ paratype with identical data.

Unfortunately the male of *phaeoptera* is unknown, but the genitalia of the female place it close to *sphenacma*. The bursa of the latter, however, lacks the sclerotized bulge at the junction with the ductus bursae, and the capitulum is curved and irregular. The forewing of *phaeoptera* is much darker than that of *sphenacma* and lacks the longitudinal streaking of that species.

Decadarchis melanospila, new species

FIGURE 167; PLATE 26*g*, *h*

Alar expanse 8–11 mm.

Labial palpus black; second segment shining white dorsally; third segment with spot of white dorsally. Antenna pale ochraceous buff; basal four segments of shaft and scape black; some grayish shading on segments before apex, gray annulated. Head black, frons grayish. Thorax black; apical half of tegula white. Forewing ground color pale ochraceous buff, slightly darker dorsally; extreme base of costa black; from near base to apical third, costal area pearl white, the area

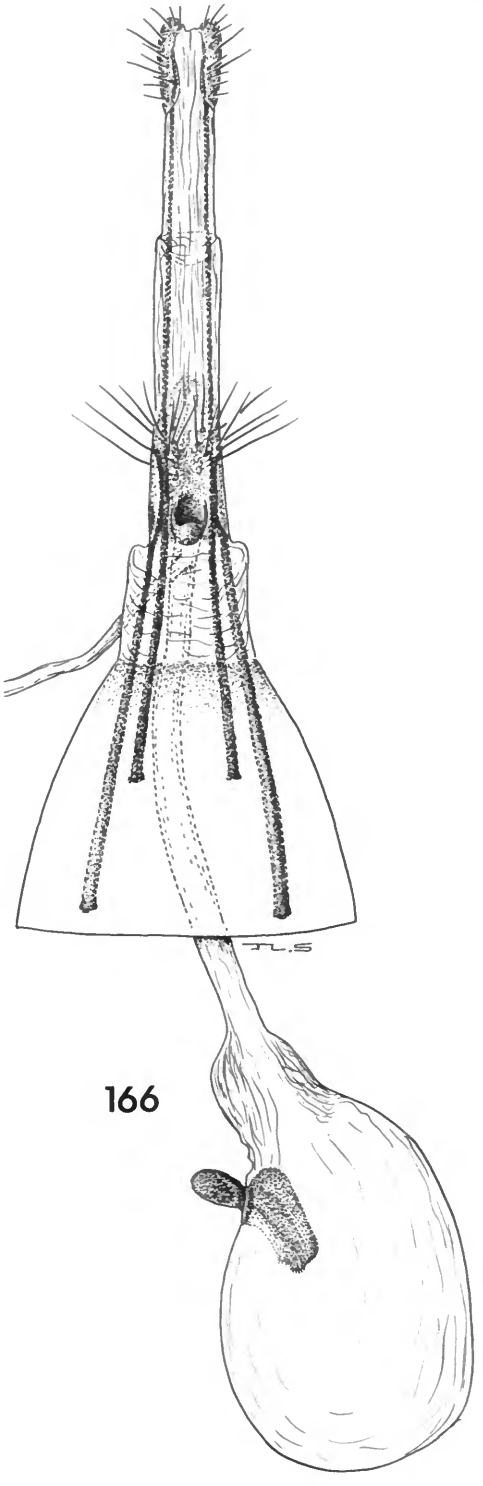


FIGURE 166.—*Decadarchis phaeoptera*, new species. Ventral view of female genitalia.

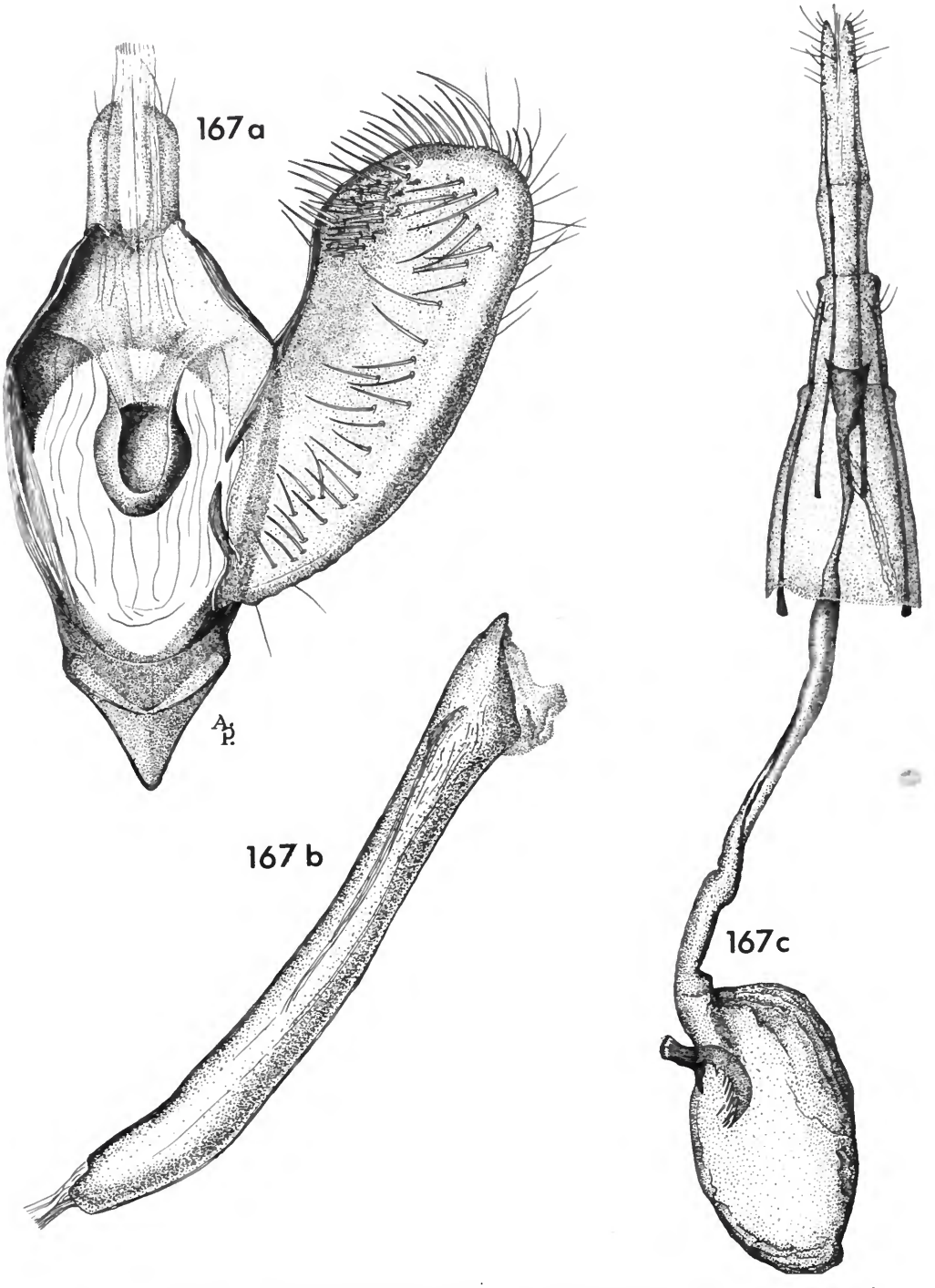


FIGURE 167.—*Decadarchis melanospila*, new species: *a*, ventral view of male genitalia with left harpe and aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

narrowed outwardly; on middle of costa a blackish spot; an oval black dot at apex; from apical fourth of costa to termen a slender, outwardly oblique brown line; beyond, and parallel to this, a slender white line followed by a light brown triangle; the latter bordered outwardly by a narrow white triangle; cilia pale buff, shading to white before apex, then gray. Hind wing pearl white with faint pinkish tinge, cilia ocherous white except brownish at apex. Foreleg ocherous white; tibia blackish on outer side; tarsal segments black; midleg ocherous white; basal and terminal tarsal segments spotted black; hind leg ocherous white. Abdomen ochraceous buff.

Male genitalia slides JFGC 11908, 11910. Harpe slightly more than twice as long as broad, broadest before cucullus; on outer costa a cluster of strong setae; cucullus with two long setae from apex. Uncus moderately short, broad, divided apically. Vinculum a narrow ring; saccus short, broad basally; pointed distally. Tegumen a moderately broad band. Anellus a deep cup basally; apically lightly sclerotized, expanded laterally. Aedeagus about one and one-half times the length of harpe, nearly straight, moderately slender; vesica armed with one long, lightly sclerotized, rodlike cornutus.

Female genitalia slides JFGC 11909, 11911. Ostium funnel shaped. Antrum not differentiated. Inception of ductus seminalis well before ostium. Ductus bursae membranous. Bursa copulatrix membranous, partly sculptured with fine wrinkles. Signum sickle shaped with one strongly dentate edge; capitulum slender, digitate.

HOLOTYPE.—USNM 70113.

TYPE LOCALITY.—Rapa, Point Tepapa.

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Pandanus tectorius* Solander (?).

Described from the ♂ holotoype (15.IX.1963); 26 ♂♂ and 21 ♀♀ paratypes as follows: Anatakuri Bay, ♀ (28.XI.1963); Anatakuri nako, 2 ♀♀ (14.X. 1963); Haurei, 19 ♂♂, 16 ♀♀ (11.IX.–3.XII. 1963); Maii Bay, 2 ♂♂, ♀ (23.X.1963); Ororagi, 300′(92 m), ♂ (14.XI.1963); Pake Bay, 2 ♂♂ (31. X.1963); Point Tepapa 2 ♂♂, ♀ (26.XI.1963).

The adults were found most commonly by beating the dry leaves of *Pandanus,* and it is very likely that the larva feeds on the dead tissue of this plant. It is probable that the larvae feed on dead tissues of other plants also.

This small, handsome species appears to be most nearly related to *D. pagophila,* new species, but differs markedly in color and pattern as will be seen by a comparison of the figures.

Decadarchis coprosoma, new species

FIGURE 168; PLATE 26*c, d*

Alar expanse 13–18 mm.

Labial palpus pale ochraceous buff with slight violaceous iridescence on inner side; outer side with three or four dense clumps of brown scales. Antenna ochraceous buff, annulated brown; scape fuscous; scape with deep dorsal notch in male. Head grayish fuscous mixed ochraceous buff. Thorax grayish fuscous; tegula tipped light ochraceous buff. Forewing ground color light ochraceous buff suffused brownish with irregular fuscous spots, streaks, and fine irrorations; about middle, between dorsal edge and fold, an oval fuscous spot; in some specimens a slender, longitudinal, fuscous streak from base to termen below apex; cilia light ochraceous buff, suffused brownish and with scattered fuscous scales. Hind wing light gray; in male, pale clay color sex scaling along costal edge of cell. Foreleg light ochraceous buff, all segments overlaid fuscous on outer sides; midleg similar except femur suffused fuscous apically, tibia with two fuscous bars; tarsal segments barred with fuscous on outer side; hind leg light ochraceous buff. Abdomen light ochraceous buff, suffused brownish dorsally.

Male genitalia slides JFGC 11439, 11452, 11913, 11914, 11916, 11917. Harpe broadest beyond middle; costa strongly convex with cluster of strong setae at middle. Uncus mostly membranous, divided distally. Vinculum produced into an elongate, triangular saccus. Tegumen a weak, narrow band. Anellus cup shaped anteriorly; weakly sclerotized and flattened posteriorly. Aedeagus moderately stout; only slightly bent; vesica armed with one long cornutus, dilated distally, apex with one to four points. Eighth intersegmental membrane with dorsolateral coremata.

Female genitalia slides JFGC 11437, 11441, 11450. Ostium small, round, cup shaped. Antrum not differentiated. Ductus seminalis slightly anterior to ostium. Ductus bursae slender, membranous, with narrow, fleshy, bent protuberance anteriorly. Bursa copulatrix membranous. Signum a curved, subtriangular plate; capitulum short, stout, produced at one side.

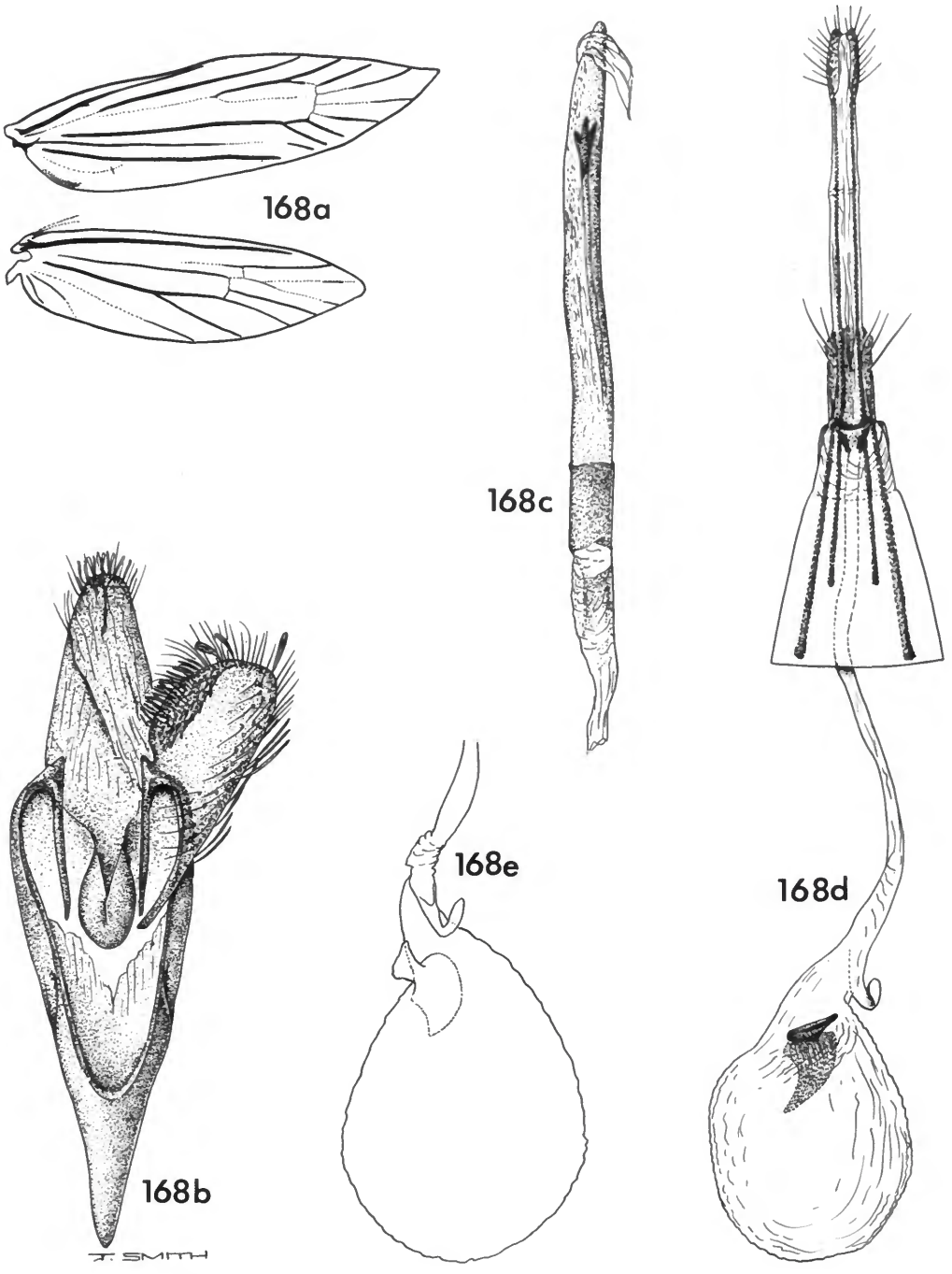


FIGURE 168.—*Decadarchis coprosoma,* new species: *a,* venation of right wings; *b,* ventral view of male genitalia with left harpe and aedeagus removed; *c,* aedeagus; *d,* ventral view of female genitalia; *e,* outline to show variation in detail of female characters.

HOLOTYPE.—USNM 70116.

TYPE LOCALITY.—Rapa, Tevaitau, 800′(245 m).

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown.

Described from the ♂ holotype, 10 ♂♂ and 5 ♀♀ paratypes as follows: Haurei, ♂ (20.IX.1963); Maurua, 600′(184 m), ♀ (25.IX.1963); Morogouta, 750′(231 m), ♂ (10.X.1963); Pariati Bay, ♀ (30.X 1963); Piahu, 750′(231 m), ♀ (11.X.1963); Teumukopuke, 500′(154 m), 6 ♂♂, 2 ♀♀ (7.X.–3.XI. 1963); Tevaitau, 800′(245 m), 2 ♂♂ (29.IX.1963).

D. coprosoma looks like a small *phaeoptera* but has a less pointed forewing and can be distinguished from *phaeoptera* and other related species by the peculiar, bent protuberance at the anterior end of the ductus bursae.

Biastolemma, new genus

TYPE-SPECIES.—*Biastolemma coarctata*, new species, by monotypy and present designation.

Antenna about two-thirds the length of forewing, slightly thicker in male than in female, sparsely and finely short ciliated; scape with pecten. Labial palpus spreading, third segment compressed. Maxillary palpus slender, folded, 5 segmented. Tongue rudimentary, maxillae moderately long. Head rough; ocellus absent. Thorax smooth. Posterior tibia clothed with long, hairlike scales. Forewing with termen emarginate, apex pointed, costa and dorsal edge nearly straight, parallel, 11 veins; 1b simple; 1c strong, nearly anastomosing with 1b at outer fifth, forming pocket containing, in male, modified scales; 2 from slightly before angle of cell; 3 and 4 coincident; 5 and 6 connate; 7 to costa; 10 very short; 11 arising near base of cell. Hind wing lanceolate, 8 veins; 2 from outer fourth of cell; 3 from angle; 4 connate with stalk of 5 and 6 or 4 stalked with 5 and out of 6; 6 to apex; 7 separate. First sternum of male with paired coremata.

MALE GENITALIA.—Gnathos absent; uncus membranous.

FEMALE GENITALIA.—Signum present.

I know of no genus in the Tineidae with which *Biastolemma* can be properly compared. The compact male genitalia cannot be opened to show the inner faces of the harpes and the character of the anellus cannot be determined; presumably it is membranous. The uncus is membranous, chiefly indicated by a pair of setaceous papillae. The labial palpi are very similar to those of the genus *Opogona*, divergent with third segment of each compressed, but the head of *Biastolemma* is not flattened and smooth as in that genus.

Biastolemma coarctata, new species

FIGURES 169, 170; PLATE 27*f,g*

Alar expanse 8–10 mm.

Labial palpus ocherous white; second segment fuscous on outer side; third segment fuscous in basal half on outer side. Antenna buff with ill-defined grayish annulations; second segment of shaft of male with conspicuous digitate process; scape with slight infuscation. Head ocherous white. Thorax ocherous white; posteriorly a median fuscous spot; tegula tawny olive basally. Forewing ground color ocherous white; extreme costal edge fuscous basally; from middle of costa a short fuscous streak confluent with an elongate, outwardly oblique, tawny olive patch; from apical third of costa a short fuscous streak confluent with a narrow, outwardly oblique, tawny olive streak; beyond this a conspicuous, outwardly oblique, fuscous bar extends from costa to apex; from middle of fold a longitudinal tawny olive streak edged on coastal side by a very slender fuscous line; in some specimens (Plate 27 *g*) the longitudinal line extends from base to termen beyond tornus; from base, along dorsum, scattered fuscous and tawny olive scales; cilia ocherous white mixed with tawny olive. Hind wing gray, apex narrowly edged by short fuscous line; cilia ocherous white. Foreleg ocherous white overlaid dark gray on outer side; midleg ocherous white; tarsus with two dark gray dashes on outer side; hind leg ocherous white; tibial hairlike scales light gray. Abdomen ocherous white, suffused gray dorsally.

Male genitalia slides JFGC 11415, 11764, 11912, 11915. In general, the male genitalia are very compact, the base of harpe, anellus, and gnathos (if present) ankylosed. Harpe bulbous basally, narrowed distally, and divided at cucullus. Uncus membranous at most. Vinculum robust, long, produced into a pointed saccus. Tegumen a narrow, weakly sclerotized band. Aedeagus very stout, almost as long as remainder of genitalia; vesica spiculate.

Female genitalia slide JFGC 11765. Ostium transverse, oval. Genital plate strongly sclerotized. Antrum sclerotized. Inception of ductus seminalis at junction of antrum and membranous part of ductus bursae. Ductus bursae swollen, membranous posteriorly, then granular and broadening at junction with bursa

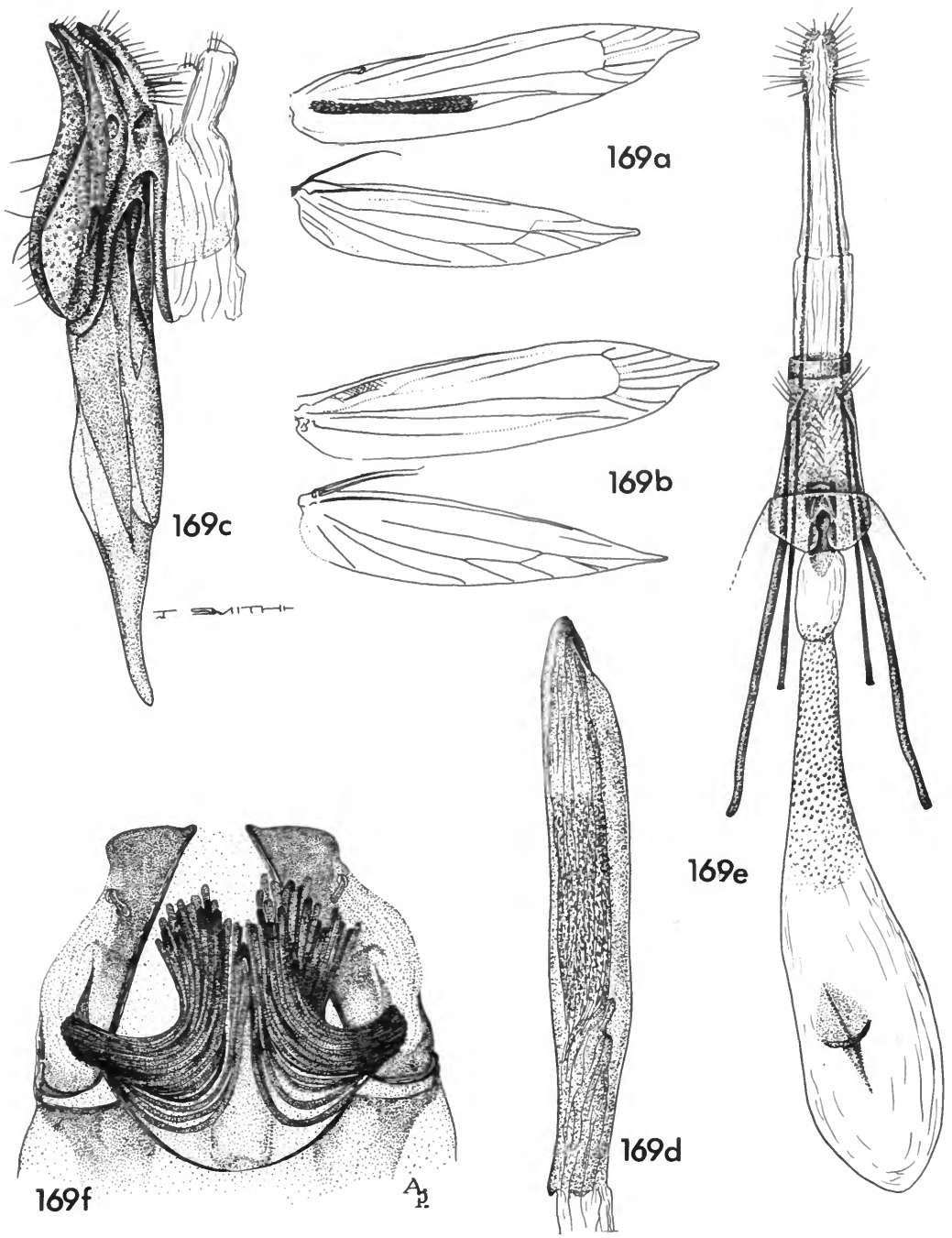


FIGURE 169.—*Biastolemma coarctata,* new species: *a,* venation of male right wings; *b,* venation of female right wings; *c,* lateral aspect of male genitalia with aedeagus removed; *d,* aedeagus; *e,* ventral view of female genitalia; *f,* coremata of 1st sternum.

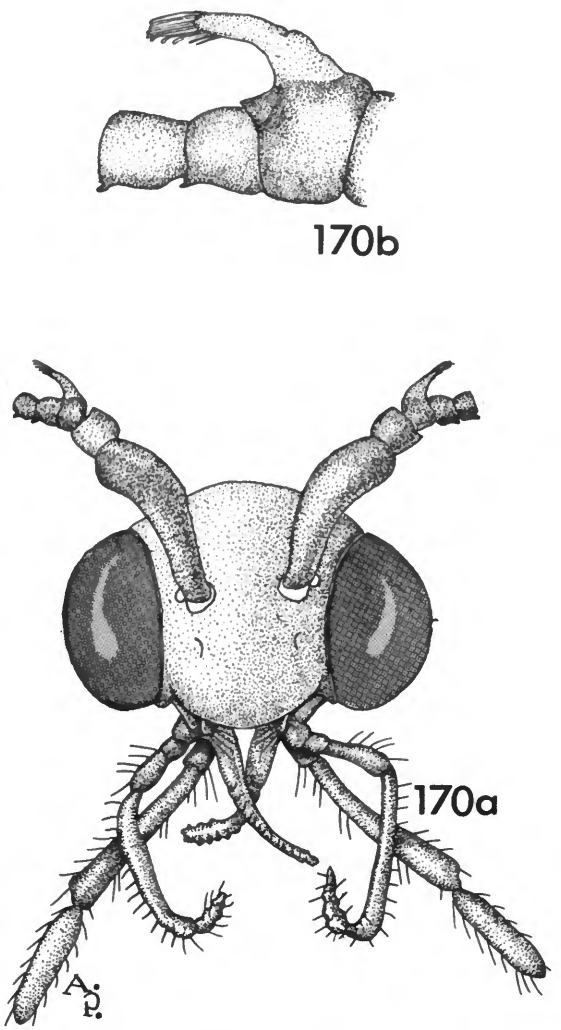


FIGURE 170.—*Biastolemma coarctata,* new species: *a,* anterior view of denuded head to show mouthparts; *b,* modification of antennal segments, enlarged.

copulatrix. Bursae copulatrix membranous. Signum a triangular plate with a single, long, sclerotized spine projecting forward.

HOLOTYPE.—USNM 70118.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—*Pandanus tectorius* Solander.

Described from the ♂ holotype (Em. 24.XI.1963) 16 ♂♂ and 11 ♀♀ paratypes as follows: Anatakuri nako, ♂ (14.X.1963); Haurei, 14 ♂♂, 9 ♀♀ (15.IX.–2.XII.1963); Maii Bay ♀ (Em. 20.IX.1963); Point Maraia, ♂ (9.X.1963); Point Tepapa, ♀ (26.XI.1963). Both emergence and ordinary collecting dates are included.

Only one specimen, the male from Anatakuri nako, was collected at light, and this in a *Pandanus* grove. All of the others were collected by beating *Pandanus* or were reared from the dead, dry fruit or dry leaves of that plant. The cocoon is constructed of tightly cemented silk, plant fiber, and frass. The area, one-half mile east of Haurei, where most of the material was collected, is shown in Figure 6.

This species exhibits several interesting characters, particularly in the male. The male genitalia are so compact that it is impossible to examine all the structures without dismembering the whole. Even then it is difficult to be sure of the various parts. In both male and female 1b is simple and 1c is strongly developed. Near the outer end these two veins nearly anastomose, and in the males in the area between the two veins, there is an elongate patch of dense, modified, short scales. This patch is covered by an umbrella of long, spatulate scales, which arise in the dorsal area, curve outwardly and obliquely toward the center of forewing, covering the elongate patch of dense scales between 1b and 1c. Moreover, in the male the second segment of the antennal shaft (not the scape) is enlarged and has a long, digitate, terminal process. The next two segments are modified so that they, combined with the second segment, form a conspicuous notch.

Genus *Choropleca* Durrant

Choropleca Durrant, 1914, p. 366. (Type-species: *Cyane visaliella* Chambers, 1873, p. 112 [by original designation].)

Diachalastis Meyrick, 1920, p. 363 (*Diachalastis tetraglossa* Meyrick, 1920, p. 363 [by monotypy].) (New synonymy.)

The genus *Diachalastis* was based on a unique male specimen, without abdomen, from Lautoka, Fiji. The characters of the genus are essentially as given, but in the forewing veins 4 and 5 are connate, not equidistant. In the hind wing the cell is closed, not open as described by Meyrick, and 5 and 6 are approximate or separate, not short stalked.

Diachalastis is closely related to *Dryadaula* Meyrick, as indicated by the highly specialized and anomalous genitalia.

For the genus *Dryadaula,* Bradley (1966, p. 218) proposed the subfamily *Dryadaulinae* in the family

382-271 O—71——15

Lyonetiidae. Because of the anomalous genitalia, this proposal seems highly justified but I would place the genus in the Tineidae.

The type-species of *Dryadaula* is the Australian *D. glycinopa* Meyrick. The genus contains other Australian species and the New Zealand *D. pactolia* Meyrick.

Choropleca terpsichorella (Busck)

FIGURES 171, 172, 173; PLATE 28*a, b*

Cyane terpsichorella Busck, 1910, p. 134.—Williams, 1931, p. 157, pl. 27: figs. 5, 6, 8.
Choropleca terpsichorella (Busck), Durrant, 1914, p. 367.
Diachalastis tetraglossa Meyrick, 1920, p. 363. (New synonymy.)

Male genitalia slides JFGC 11399, 11750. Harpes asymmetrical; right harpe slender, with digitum from near base; sacculus flattened and expanded into a blunt median projection; cucullus clothed with long, dense setae; left harpe distorted, constricted at middle; cucullus a large, flattened plate with a basal, inner, irregular process attached to middle of harpe; a large, elongate, irregular projection from base of harpe. Vinculum asymmetrical, distorted, widest on right side. Tegumen sides narrow. Anellus an irregular plate, elongated on left side. Aedeagus short, widest at base, tapered to blunt point.

Female genitalia slide JFGC 11751. Ostium asymmetrical, opening on left side. Genital plate strongly sclerotized, asymmetrical. Inception of ductus seminalis from side of bursa copulatrix. Ductus bursae threadlike, membranous. Bursa copulatrix membranous. Signum absent. Papillae anales small, widely separated, rounded lobes.

The genitalia are remarkably asymmetrical and defy accurate description. The male genitalia are involved and closely associated with the asymmetrical eighth sternum. Dorsally on the abdomen of the male, between the second and third segments, is a large pit with paired, large scale tufts (Figure 172*b*).

TYPES.—National Museum of Natural History (*terpsichorella*); British Museum (Natural History) (*tetraglossa*).

TYPE LOCALITIES.—Honolulu, Hawaii (*terpsichorella*); Fiji, Lautoka (*tetraglossa*).

DISTRIBUTION.—Hawaii, Fiji, Rapa.

The 33 ♂♂ and 38 ♀♀ Rapa specimens are from the following localities: Haurei, 31 ♂♂, 36 ♀♀ (23.IX.–23.XI.1963); Maugaoa, 950′(292 m), ♀ (5.XI.1963); Point Maraia, ♂ (31.X.1963); Teumukopuke, 500′(154 m), ♂ (1.XI.1963); Tevaitau, 200′ (61 m), ♂ (23.IX.1963).

FOOD PLANTS.—Dead tissue of *Pandanus,* banana, and sugarcane.

This is the "Dancing moth," so-called because of its habit of gyrating rapidly on any surface upon which it alights. Swezey (1909, p. 20) has given an account of the habits of this species and has figured the imago, larva, and pupa.

Both Swezey (op. cit.) and Busck (1910, p. 135) have speculated that the species is introduced from America. Apparently this speculation was based on the presumed generic identity with *Cyane* Chambers, and Busck stated, "Though I have as yet not seen the present species, *Cyane terpsichorella,* from Central America, there is no doubt that it has been introduced into Hawaii from there and that it will eventually turn up in collections from the continent." Since the above was written, nearly 60 years have elapsed and much collecting has been done in the neotropics, yet the species still remains a Pacific insect, where I believe its origin lies.

I have compared carefully the Rapa specimens with the types of *terpsichorella* and *tetraglossa* and there is no doubt about their identity.

Occasionally *terpsichorella* was seen flying in the afternoon but most of our specimens were collected by beating *Pandanus* and *Hibiscus.*

Family LYONETIIDAE

Genus *Opogona* Zeller

Opogona Zeller, 1853, p. 507. (Type-species: *Opogona dimidiatella* Zeller, 1853, p. 508 [by monotypy].)

Opogona aurisquamosa (Butler)

FIGURE 174; PLATE 28 *c, d*

Argyresthia? aurisquamosa Butler, 1881, p. 403.
Opogona aurisquamosa (Butler), Walsingham, 1907, pp. 713, 737, pl. 25: fig. 14.—Swezey, 1909, p. 16, pl. 3: figs. 1–3.—Meyrick, 1929, p. 505.—Williams, 1931, p. 156, pl. 27: figs. 1–3.—Meyrick, 1934, p. 354.—Swezey, 1940, p. 366; 1942, p. 133.—Holdaway and Look, 1942, p. 259.—Viette, 1949a, p. 316.—Swezey, 1954, pp. 116, 160.

Male genitalia slides JFGC 11358, 11766. Harpe very thick, heavily sclerotized basally; sacculus terminating in a blunt point; cucullus narrow, curved. Socii greatly enlarged, subrectangular, armed with coarse,

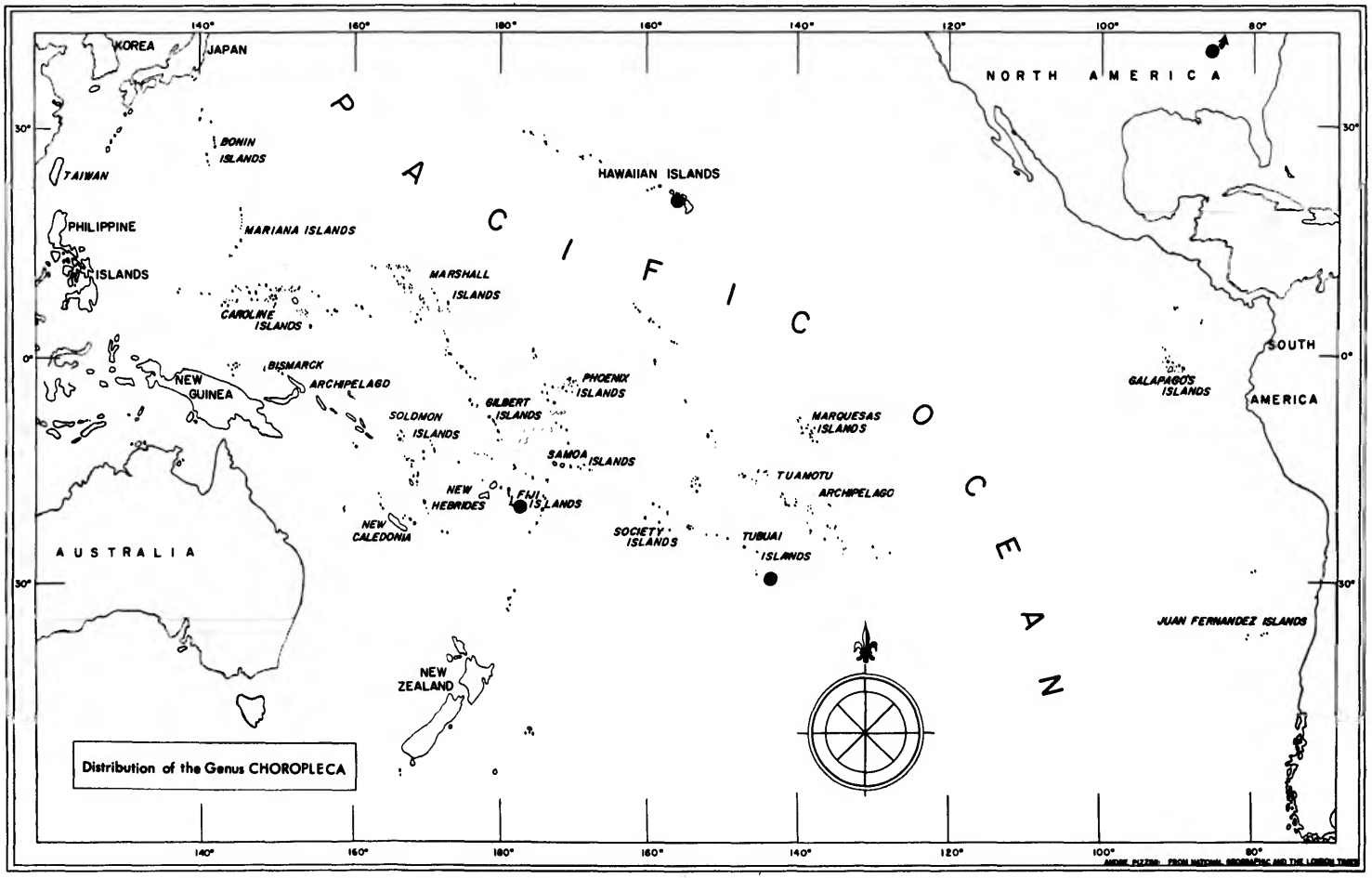


FIGURE 171.—Distribution of the genus *Choropleca* Durrant.

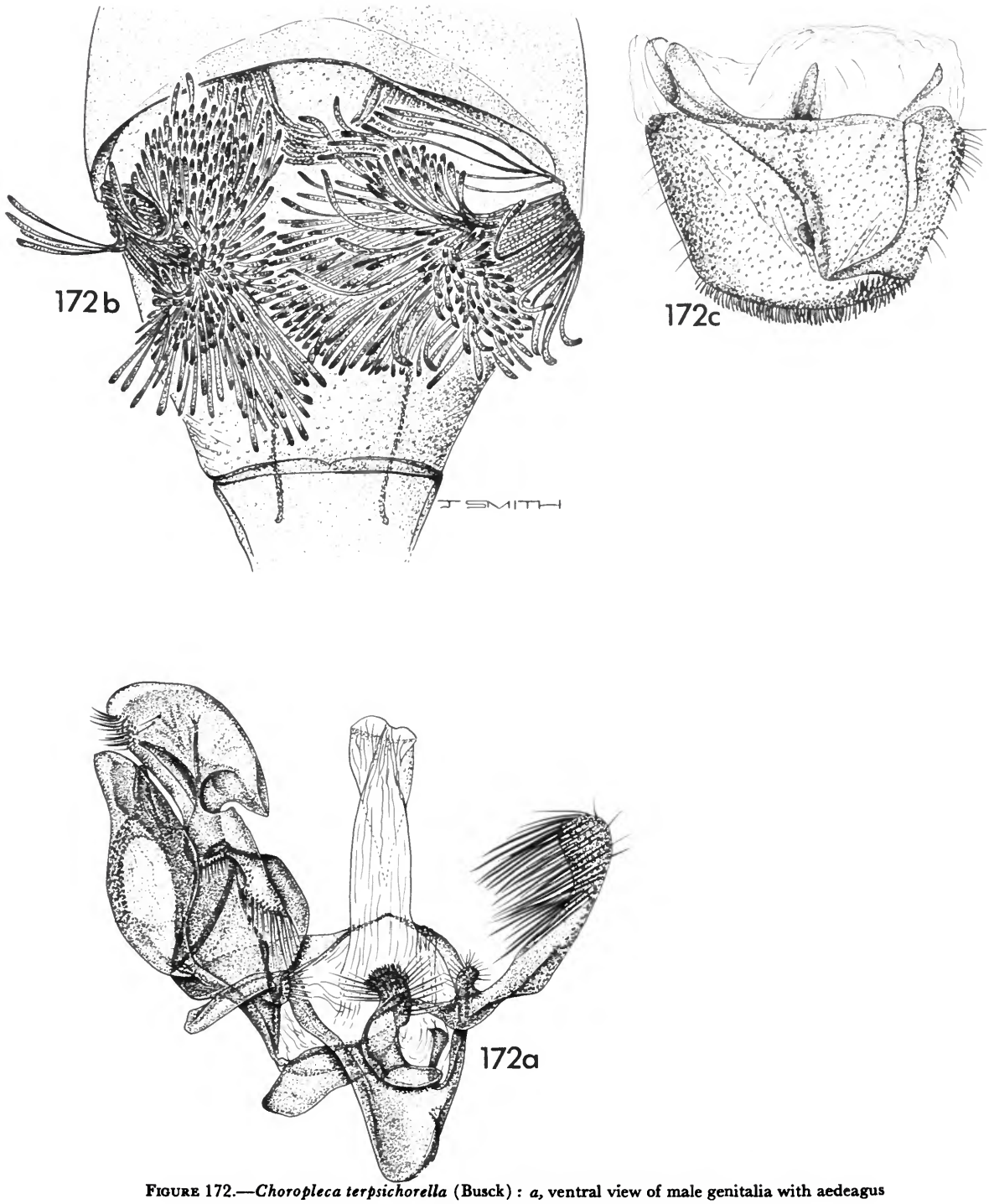


FIGURE 172.—*Choropleca terpsichorella* (Busck): *a*, ventral view of male genitalia with aedeagus in situ; *b*, expanded coremata; *c*, modified 8th segment.

stout setae. Vinculum broad; saccus very slender, about three times the length of harpe. Tegumen short and broad. Anellus membranous or only lightly sclerotized at most. Aedeagus very long, slender, sharply pointed distally; basally divided into two divergent points forming a Y.

In describing the two large posterolateral pads of the male genitalia as socii, I do so with some misgiving. They do not appear to be widely separated parts of the uncus, the latter is apparently absent, but they are so grossly exaggerated it seems doubtful that such a development of the socii would take place. The anal tube is ventroanterior to these pads so they cannot be elements of the gnathos.

Female genitalia slides JFGC 11359, 11767. Ostium small, protruding. Antrum sclerotized. Inception of ductus seminalis at junction of membranous and sclerotized portions of ductus bursae. Ductus bursae long, slender, sclerotized posteriorly. Bursa copulatrix thick walled, ornamented with transparent pits. Signum a curved plate with divergent points on each side anteriorly.

TYPE.—British Museum (Natural History).

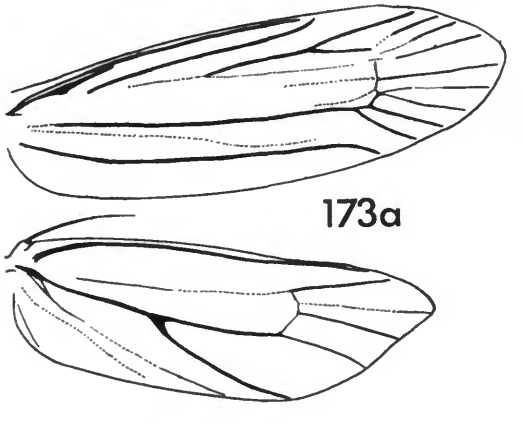
TYPE LOCALITY.—Hawaii, Honolulu.

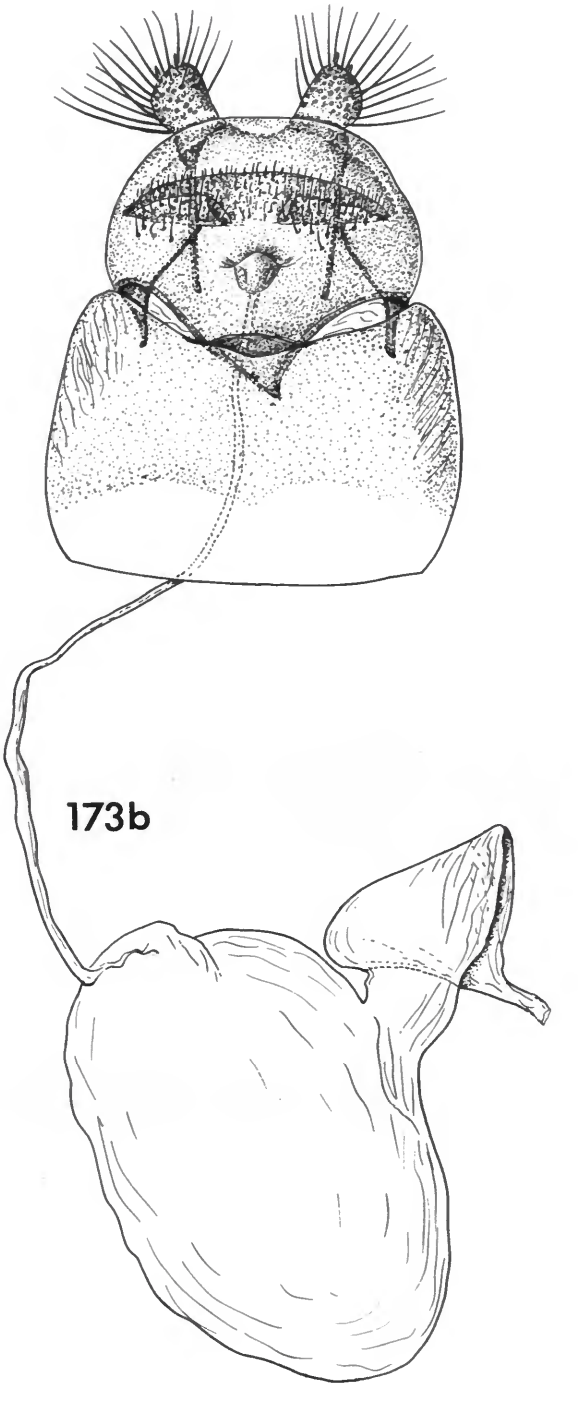
DISTRIBUTION.—Tahiti, Easter Island, Marquesas Islands, Fiji, Kermadec Islands, Rapa.

FOOD PLANT.—*Pandanus tectorius* Solander (R26), etc.

Our Rapa series consists of 10 ♂♂ and 23 ♀♀ as follows: Haurei, 10 ♂♂, 20 ♀♀ (15.IX–7.XII.

FIGURE 173.—*Choropleca terpsichorella* (Busck): *a*, venation of right wings; *b*, ventral view of female genitalia.





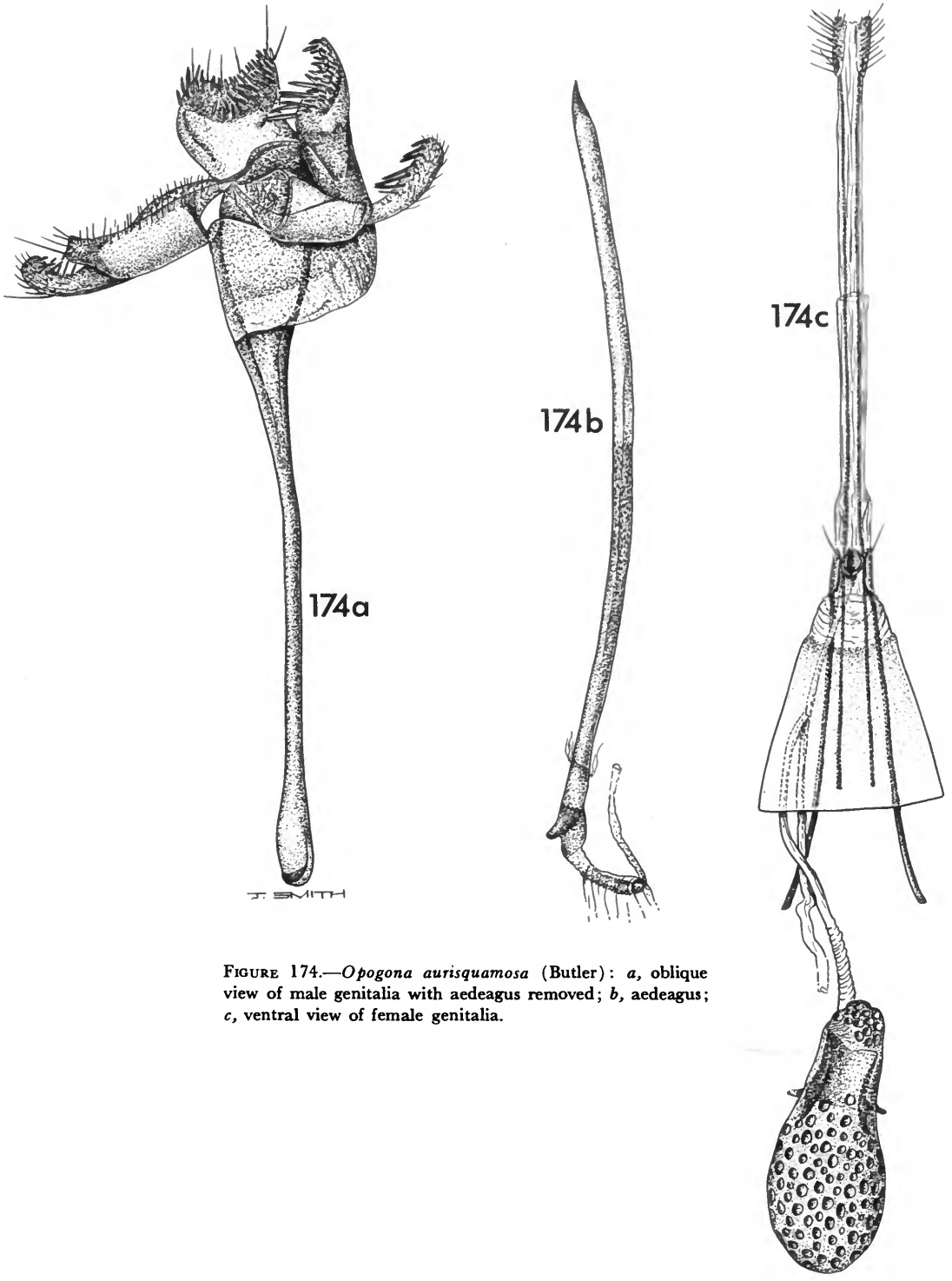


FIGURE 174.—*Opogona aurisquamosa* (Butler): *a*, oblique view of male genitalia with aedeagus removed; *b*, aedeagus; *c*, ventral view of female genitalia.

1963); Maii Bay, ♀ (Em. 18.XI.1963); Morogouta, 750′(231 m), ♀ (10.X.1963); Teumukopuke, 500′ (154 m), ♀ (7.X.1963).

The female from Maii Bay was reared from the dry fruits of *Pandanus*. The species is recorded from a multitude of dead and decaying plants, and the larva will undoubtedly accept almost any decaying vegetable matter.

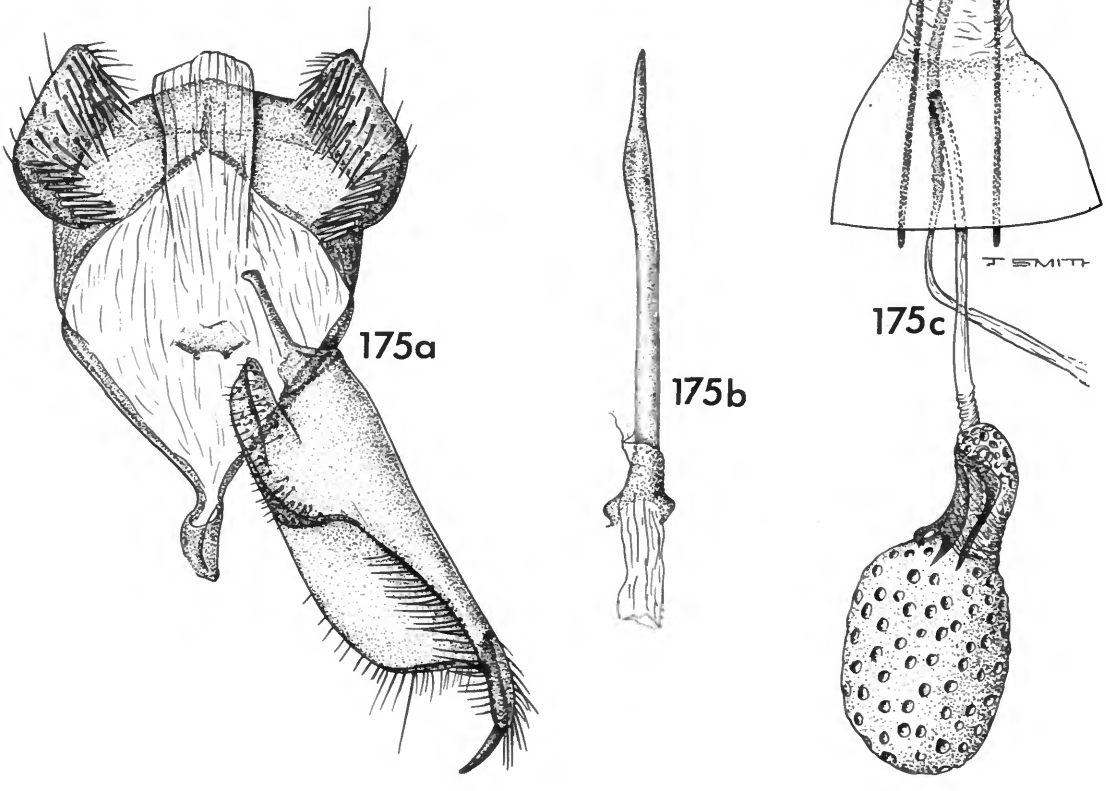
Opogona allaini, new species

FIGURE 175; PLATE 28 *e, f, g, h*

Alar expanse 10–14 mm.

Labial palpus light buff. Antenna light buff, gradually darkening to drab apically. Head drab; frons light buff. Thorax drab with slight violaceous iridescence;

FIGURE 175.—*Opogona allaini*, new species: *a*, ventral view of male genitalia with aedeagus and left harpe removed; *b*, aedeagus; *c*, ventral view of female genitalia.



posteriorly a small median buff spot. Forewing ground color drab with green and violaceous iridescence basally; on dorsum, from near base and extending to fold, a pale cinereous area which widens at middle of dorsum and extends across fold as a short triangle; on basal third of costa a pale cinereous triangular spot; from middle of costa to near apex a pale cinereous area extended transversely at apical third as a point to near termen; cilia drab with olivaceous hue. Hind wing drab, paler toward base; cilia olivaceous buff at anal angle, shading to olivaceous drab apically. Legs buff; posterior tibia and tarsal segments infuscated. Abdomen buff ventrally; dorsally drab with violaceous iridescence.

Male genitalia slides JFGC 11357, 11901, 11902, 11903. Harpe three times as long as broad, terminating in a stout, long, sharp curved point; costa with fleshy digitate process arising slightly beyond middle. Socii two quadrate lobes clothed with short, stout setae. Vinculum narrow, produced into a long saccus. Tegumen a short, broad band. Anellus a tiny sclerotized plate. Aedeagus slender, slightly curved, terminating in an acute point; base divided into two short arms.

Female genitalia slides JFGC 11361, 11904. Ostium a small, longitudinal slit with lateral longitudinal ridge on each side. Antrum narrow, elongate, sclerotized. Inception of ductus seminalis from posterior part of ductus bursae. Ductus bursae membranous for most of its length. Bursa copulatrix thick-walled, studded with small, round, transparent pits. Signum a strongly sclerotized half-cylinder with spinous process from each of two anterior points. Lamella antevaginalis moderately sclerotized with U-shaped anterior margin.

HOLOTYPE.—USNM 70119.

TYPE LOCALITY.—Rapa, Haurei.

DISTRIBUTION.—Rapa.

FOOD PLANT.—Unknown, but "beaten from *Pandanus tectorius* Solander."

Described from the ♂ holotype (25.IX.1963), 10 ♂♂ and 4 ♀♀ paratypes as follows: Anatakuri nako, 2 ♂♂, (14.X.1963); Haurei, 6 ♂♂, 3 ♀♀ (17.IX.–3.XII.1963); Maii Bay, ♂ (23.X.1963); Maugaoa, 950′(292 m), ♂ (5.XI.1963); Maurua, 600′(184 m), ♀ (25.IX.1963).

This is easily distinguished from *aurisquamosa* by the very dark ground color or the pale markings on dorsum and costa of forewing.

The illustrations on Plate 28 show the extent and prominence of the pale markings of the forewing. In some specimens the markings are clearly defined (Plate 28*h*) but in others they are obsolete (Plate 28*e*).

It gives me much pleasure to name this species in honor of Mr. Gaston Allain, Administrator of the Tubuäi Islands, who was of such great help while we were in French Polynesia.

Bibliography

Abraham, E. V.

1958. Pests of Cashew (*Anacardium occidentale*) in South India. *Indian Journal of Agricultural Science,* 28(4): 531–543, figures 1–4.

Abraham, E. V., and M. D. Padmanaban.

1968. Bionomics and Control of the Diamond-back Moth, *Plutella maculipennis* Curtis. *Indian Journal of Agricultural Science,* 33(3): 513–519.

Adamczewski, S.

1951. On the Systematics and Origin of the Generic Group *Oxyptilus* Zeller (Lep. Alucitidae). *Bulletin of the British Museum (Natural History).* Entomology, 1(5): 303–387, plates 9–20.

Agenjo, Ramon

1952. *Faunula lepidopterológica aolmeriense.* Premio "Alonso de Herrera 1950," del Consejo Superior de Investigationes Científicas. Pages 1–370, plates 1–24. Madrid.

1963a. Algunos lepidópteros de Punta Umbría, provincia de Huelva. La canaria *Eilema albicosta* (Rghfr., 1894) nueva para España y Europa. (Lepidoptera). *Graellsia. Revista de Entomólogos Españoles,* 20(1–3): 1–20, plate 1.

1963b. El microlepidóptero etiópico *Daraba laisalis* (Wlk., 1859) plaga del pimiento y la berenjena en Somalia, hallado en Punta Umbría, provincia de Huelva, nuevo para la fauna Paleárctica. *Graellsia. Revista de Entomólogos Españoles,* 20(1–3): 23–28, figures 1–3.

Ahmad, Taskhir

1949. Insect Fauna of Afghanistan IV: Lepidoptera. *The Indian Journal of Entomology,* 8(2): 202–223.

Aitken, Audrey D.

1963. A Key to the Larvae of Some Species of Phycitinae (Lepidoptera, Pyralidae) Associated with Stored Products, and Some Related Species. *Bulletin of Entomological Research,* 54(2): 175–188, figures 1–24.

Allen, T. C.

1940. See Brooks, J. W., and T. C. Allen.

Amsel, H. G.

1936. Zur kenntnis der Kleinschmetterlings-fauna Sardiniens. *Veröffentlichungen aus dem Deutschen Kolonial-und Uebersee-Museum in Bremen,* 1(3): 344–368, figures 1–4, plate 15.

1954. Neu Pterophoriden, Gelechiiden und Tineiden aus Palästina und Malta. *Bulletin de la Société Fouad*

Ier d'Entomologie, 38: 51–57, figures 1–8. Le Caire.

1955. Über Mediterrane Microlepidopteren und einige Transcaspische Arten. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique,* 31(83): 1–64, figures 1–5, plates 1–6.

1956. Microlepidoptera Venezolana I. *Boletín de Entomologia Venezolana* [1954], 10 (1, 2): 1–336; II, 10 (3, 4), plates 1–110.

Anderson, Lauren D.

1937. See Walker, Harry G., and Lauren D. Anderson.

Aurivillius, C.

1898. Zu den von J. Chr. Fabricius aus Dänischen Sammlungen Beschriebenen Lepidopteren. *Entomologisk Tidskrift,* 1897, 18(3–4): 139–174.

Asem, M. A.

1952. See El Zoheiry, H. E. M. S., and M. A. Asem.

Azuma, Seiji

1965. Heterocera from the Yonaguni Island, Southern Ryukyus (Lepidoptera). Okinawa Seibutsugakka, Okinawa Seibutsugakkai Shi. *Biological Magazine of Okinawa,* 2(4): 52–57, figures 1–4.

Ballard, E.

1925. Some of the Causes of Low-grade Cotton. *The Review of Applied Entomology,* 13(Series A, part 10): 520–521.

Bare, C. O.

1942. See Reid, W. J., C. E. Smith, L. B. Reed, and C. O. Bare.

Barnes, Wm., and J. McDunnough

1917. *Check List of the Lepidoptera of Boreal America.* Pages i–viii, 1–392. Herald Press, Decatur, Illinois.

Barrett, C. G.

1875. On the Species of *Ephestia* Occurring in Britain. *The Entomologist's Monthly Magazine,* 11: 269–273.

1905. *The Lepidoptera of the British Islands,* 10: 1–381, plates 425–469. Lovell Reeve and Co., Ltd., London.

Batra, H. N.

1956. Some Insects of Economic Importance in Kulu Valley, Punjab. *Plant Protection Bulletin* [New Delhi], 8(3–4): 18–23.

Batra, H. N., and N. S. Bhattacherjee

1961. Short Notes. Occurrence of *Hymenia recurvalis* (Fabricius) (Lepidoptera: Pyralidae) as a Bad Pest of Some Leafy Vegetables. *Indian Journal of Entomology,* 22(3): 128–130.

Bedford, H. W.

1931. A Report on the Work Carried Out at the Khartoum Laboratory during 1929. *The Review of Applied Entomology,* 19 (Series A, part 6): 391–392.

Beirne, Bryan P.

1952. *British Pyralid and Plume Moths.* Pages 1–208, plates 1–16, figures 1–189. Frederick Warne & Co., London.

Benander, Per

1965. Notes on Larvae of Swedish Micro-Lepidoptera. II. *Opuscula Entomologica,* 30(1–2): 1–23.

Berg, Cárlos

1880. Observaciones acerca de la Familia Hyponomeutidae. *Anales de la Sociedad Científica Argentina,* 10: 85–91; 99–109.

Beri, Y. P.

1961. Studies on the Application of Dyar's Law to the Larval Stages of *Plutella maculipennis* Curtis. *The Indian Journal of Entomology,* 23(1): 69–70 [published March 1962].

Beutenmuller, Wm.

1889. Two New Species of Tineidae from the Aleutian Islands. *The Canadian Entomologist,* 21: 27.

Bhasin, G. D.

1954. See Roonwall, M. L., and G. D. Bhasin.

Bhattacherjee, N. S., and M. G. Ramadas Menon

1963. External Structure of the Various Stages of *Hymenia recurvalis* (Fabricius) (Pyralidae: Lepidoptera). *Indian Journal of Entomology,* 24(4): 252–264, plate 1: figures 1–14.

Bigot, L.

1966. Les *Oxyptilus* et *Trichoptilus* de la faune française. *Alexanor,* 4(6): 272–286, illustrated.

Billberg, G. J.

1820. *Enumeratio Insectorum in Museo Gustàv Johàn Billbærg.* Pages 1–38. Stockholm.

Boisduval, Jean A.

1833. *Faune entomologique de Madagascar, Bourton et Maurice. Lépidoptères.* Pages 1–122, plates 1–15. Paris. Ala Libraire Encyclopédique de Roret.

Bondar, Gregorio

1928. Séria praga do repolho na Bahía-*Plutella maculipennis* Curtis. *Correio Agricola* 6(11–12): 259–260. Publica também, em 1929, *Boletin Laboratorio Patologia Vegetal,* 8: 35–38 e em *Chacaras Quintaes,* 38(6): 602, 1 figure.

Bottimer, L. J.

1926. Notes on Some Lepidoptera from Eastern Texas. *Journal of Agricultural Research,* 33(9): 797–819, figures 1–3.

Bourquin, Fernando

1939. Metamorphosis de *Plutella maculipennis* (Lep. Plutellidae). *Physis* (Buenos Aires), 17: 409–413, figures 1–3.

Bovingdon, H. H. S.

1933. Report on the Infestation of Cured Tobacco in London by the Cacao Moth *Ephestia elutella* Hb. *Empire Marketing Board,* 67: 1–88, figures 1–4, plates 3, 4. London.

Bradley, J. D.

1952. Some Important Species of the Genus *Cryptophlebia* Walsingham, 1899, with Descriptions of Three New Species (Lepidoptera: Olethreutidae). *Bulletin Entomological Research,* 43(4): 679–689, figures 1–8, plates 14, 15.

1953. New Microlepidoptera from Fiji. *Proceedings of the Hawaiian Entomological Society,* 15(1): 109–114, figures 1–9.

1956. See Hinton, H. E., and J. D. Bradley

1957. *The Natural History of Rennell Island, British Solomon Islands.* Volumes 2, 19. Microlepidoptera from Rennell and Bellona Islands. Pages 87–112, plates 1–12.

1961. Microlepidoptera from the Solomon Islands. Additional Records and Descriptions of Microlepidoptera Collected in the Solomon Islands by the Rennell Island Expedition 1953–54. *Bulletin of the British Museum (Natural History).* Entomology, 10(4): 113–168, plates 5–19.

1962. Microlepidoptera from the New Hebrides. *Bulletin of the British Museum (Natural History).* Entomology, 12(5): 249–271, plates 14–27.

1966. Some Changes in the Nomenclature of British Lepidoptera, Part 4. *Entomologist's Gazette,* 17(4): 213–235.

1967a. Some Lepidoptera of Economic Importance in Commonwealth Countries. *Acta Universitatis Agriculturae,* 15: 501–519, figures 1–12.

1967b. Some Changes in Nomenclature of British Lepidoptera, Part 7. *Entomologist's Gazette,* 18: 153–154.

Bradley, J. D., and E. C. Pelham-Clinton

1967. The Lepidoptera of the Burren, Co. Clare, W. Ireland. *Entomologist's Gazette,* 18: 115–153.

Braithwaite, B. M.

1959. Insect Pests of Pastures on the North Coast of New South Wales. *The Agricultural Gazette of New South Wales.* 70(11): 586–590, illustrated.

Bremer, Otto, and William Grey

1853. *Beiträge zur Schmetterlings-Fauna des Noerdlichen China's,* 1–23, mit 50 [30?] colorirten Abbildungen neuer Species.

Bréthes, Juan

1923. La Polilla del Repollo (*Plutella maculipennis* Curt.). *Anales de la Sociedad Rural Argentina,* 57(4): 162–166, figures 1–3.

Britton, Wilton Everett

1920. Check-list of the Insects of Connecticut. State of Connecticut Public Document No. 47. *State Geological and Natural History Survey, Bulletin* 31: 1–397. Hartford.

Brooks, J. W., and T. C. Allen

1940. What's New in Farm Science. Derris-nicotine Dust Controls Two Cabbage Insects. *Annual Report of the Director, Agricultural Experiment Station, University of Wisconsin, Madison.* Bulletin 449(2): 56.

Burges, H. D.

1956. Some Effects of the British Climate and Constant Temperatures on the Life-cycle of *Ephestia cautella* (Walker). *Bulletin of Entomological Research,* 46(4): 813–835, figures 1–5.

Busck, August

1903. Notes on Brackenridge Clemens' Types of Tineina. *Proceedings of the Entomological Society of Washington,* 5(3): 181–220.

1910. New Central-American Microlepidoptera Introduced into the Hawaiian Islands. *Proceedings of the Entomological Society of Washington,* 12: 132–135.

1911. [Note] *Proceedings of the Entomological Society of Washington,* 13(2): 80–81.

Butani, Dhamo K.

1958. Note on *Hymenia fascialis* C., a Pest of Sugar Beet. *Current Science (India),* 27(5): 182–183.

Butler, Arthur G.

1880. On a Second Collection of Lepidoptera Made in Formosa by H. E. Hobson, Esq. *Proceedings of the Zoological Society of London,* 1880: 666–691.

1881. On a Collection of Nocturnal Lepidoptera from the Hawaiian Islands. *Annals and Magazine of Natural History,* Series 5, 7: 392–408, figures 1, 2.

1883. On Lepidoptera from Manchuria and the Corea. *Annals and Magazine of Natural History,* Series 5, 11: 109–117.

1886a. On Lepidoptera Collected by Major Yerbury in Western India. *Proceedings of the Zoological Society of London,* 1886: 355–394, plate 35.

1886b. XV. Descriptions of 21 New Genera and 103 New Species of Lepidoptera-Heterocera from the Australian Region. *Transactions of the Entomological Society of London,* 1886: 381–441, plates 9, 10.

Callan, E. McC.

1950. See Lamont, Norman, and E. McC. Callan.

Capuşe, I., and M. Georgeşcu

1963. Contribution to the Study of the Early Stages of *Monopis crocicapitella* Clem. (Lepidoptera. Tineidae). *Academici Republicii Populare Romîne Comunicările,* 13(9): [829–834], figures 1–9.

Chacko, M. J.

1961. See Venkatraman, T. V., and M. J. Chacko.

Chambers, V. T.

1873. Micro-Lepidoptera. *The Canadian Entomologist,* 5: 110–115.

1878. Art. V. Index to the Described Tineina of the United States and Canada. *Bulletin United States Geological Survey,* 125–167.

Chapman, T. A.

1908. Notes from the Pyrenees. *The Entomologist's Record and Journal of Variation,* 20: 50–53, plates 6–8.

Chittenden, F. H.

1904. The Fig Moth. *United States Department of Agriculture, Bureau of Entomology, Bulletin* 104:1–40, figures 1–4, plates 1–4.

1913. Papers on Insects Affecting Vegetable and Truck Crops. The Spotted Beet Webworm. *United States Department of Agriculture, Bureau of Entomology, Bulletin* 127(1): 1–11, figures 1–2, plates 1–4.

Clarke, J. F. Gates

1955–

1965. *Catalogue of the Type Specimens of Microlepidoptera in the British Museum (Natural History) Described by Edward Meyrick,* 1:i–viii, 1–332, plates 1–4 (1955); 3: 1–600, plates 1–298 (1958); 4: 1–521, plates 1–252 (1963); 5: 1–581, plates 1–283 (1965a).

1965b. Microlepidoptera of the Juan Fernandez Islands. *Proceedings of the United States National Museum,* 117(3508): 1–106, figures 1–111, plate 1.

Clemens, Brackenridge

1859–

1860. Contributions to American Lepidopterology. III. *Proceedings of the Academy of Natural Sciences of Philadelphia,* 1859: 256–328; 1860: 4–15.

1861. Contributions to American Lepidopterology. IV. *Proceedings of the Academy of Natural Sciences of Philadelphia,* 12: 203–221.

1872. In H. T. Stainton, *The Tineina of North America.* Pages IV–XV, 1–282, illustrated. London.

Cockayne, E. A.

1952. A Note on *Hymenia recurvalis* Fabricius. *The Entomologist's Record and Journal of Variation,* 64(3): 71–72.

Cockerell, T. D. A.

1916. Sunflower Insects in California and South Africa. *Canadian Entomologist,* 48(3): 76–79.

Collenette, C. L.

1925. *Sea-girt Jungles. The Experiences of a Naturalist with the "St. George" Expedition.* Pages 1–275, plates 1–36. London, Hutchinson.

1928. The Arctiidae, Noctuidae and Sphingidae of the "St. George" Expedition, from French Oceania. *Transactions of the Entomological Society of London,* 76: 469–486, figures 1–2, plate 1.

Corbet, A. Stephen

1943. See Hinton, H. E., and A. Stephen Corbet.

Corbet, A. Stephen, and W. H. T. Tams

1943. Keys for the Indentification of the Lepidoptera Infesting Stored Food Products. *Proceedings of the Zoological Society of London,* Series B, 113: 55–148, figures 1–287, plates 1–5.

Cotes, E. C., and C. Swinhoe

1889. *A Catalogue of the Moths of India,* 6: 671–777.

Cowland, J. W.

1933. Gezira Entomological Section, G.A.R.S. Final Report on Experimental Work, 1931–32. *The Review of Applied Entomology,* 21 (Series A, part 11): 582–583.

Cramer, Pieter

1777–

1779. *Papilons exotiques des trois parties du Monde, L'Asie, L'Afrique et L'Amerique,* 2: 1–151, plates 97–192. 1780–1782, 4: 1–252, plates 289–400 (text 33–253, and plates after 253 evidently by Stoll). S. J. Baalde, Amsterdam. [With regard to the proper authorship in Cramer, 1777–1779, E. L. Todd, 1959 (U.S. Department of Agriculture, Technical Bulletin No. 1201, p. 23), has indicated the following: "In the *Catalogue of the Books, Manuscripts, Maps and Drawings in the British Museum (Natural History),* 1903, volume 1, p. 398, there is a statement that the pages of volume 4 beyond page 32 of Cramer's *De Uitlandsche Kapellen Voorkomende in de Drie Waereld-Deelen Asia, Africa en America* should be credited to Caspar Stoll. Except for the signed footnotes and the 29 page Proeve, which were written by Stoll, I consider Cramer to be the author of the entire volume. In the bibliographic citations in the supplementary work, Aanhangsel van het Werk, *de Uitlandsche Kapellen Voorkomende in de Drie Waereld-Deelen Asia, Africa en America,* Stoll credits the species described in volume 4 to Cramer."]

Cranwell, Lucy M.

1964. *Rapa Island Coal and Its Microfossils: A Preliminary Report.* Ancient Pacific Floras. Pages 43–47, figures 1–4, plate 1. (University of Hawaii Press.)

Curran, C. H.

1926. The Identification and Control of Adult Lepidopterous Insetcs Attacking Stored Products. *Scientific Agriculture, Ottawa,* 1926: 383–388, figures 1–6.

Curtis, John

1824–

1839. *British Entomology: Being Illustrations and Descriptions of the Genera of Insects Found in Great Britain and Ireland Containing Coloured Figures from Nature . . .* 5, 6 (1832). Pages unnumbered; 94 plates with associated text, plates irregularly numbered. (Complete work contains 769 colored plates in 16 parts for arrangement in 8 volumes.) London.

1833. Art. XIX. Characters of Some Undescribed Genera and Species, Indicated in the "Guide to an Arrangement of British Insects." *The Entomological Magazine,* 1: 186–199.

Davis, C. J.

1953. New Host and Insect Records from the Island of Hawaii. *Proceedings of the Hawaiian Entomological Society for the Year 1952,* 15(1): 85–86.

DeLucca, C.

1949. Microlepidoptera New to the Maltese Islands. *The Entomologist,* 32(1034): 148–149.

Desmarest, M. E.

1876. In Chenu Encyclopédie d'Histoire Naturelle ou traité complet de cette science. *Papillons Nocturnes,* 1–312, plates 1–39, 199 text figures. Firmin-Didot et Cie., Paris.

Denis, M., and I. Schiffermüller

1776. *Systematisches Verzeichniss der Schmitterlinge der Wienergegend,* 1–322, plates 1a, 1b. Augustin Bernardi, Wien.

Diakonoff, A.

1938. Indo-Malayan and Papuan Microlepidoptera. 1: Notes on the Tropical Tobacco Moth, *Setomorpha rutella* Zeller (Tineidae). *Treubia,* 16(3): 399–414, figures 1–10.

1952–

1955. Microlepidoptera of New Guinea. *Verhandelingen der Koninklijke Nederlandsche Akademie van Wetenschappen,* AFG. *Natuurkunde,* 1952, part 1, 49 (1): 1–168; 1953, part 2, 49(3): 1–166; 1954, part 3, 49(4): 1–164; 1954, part 4, 50(1): 1–192; 1955, part 5, 50(3): 1–212.

1960. A Second Note on Microlepidoptera from South China (Lepidoptera: Tortricidae). *Beiträge zur Entomologie,* 10(1/2): 132–133.

1961. Records and Descriptions of Exotic Tortricoidea. *Annales of the Entomological Society of France,* 130: 49–76, plate 7.

1967. Microlepidoptera of the Philippine Islands. *United States National Museum Bulletin* 257: i–v, 1–484, figures 1–846. Washington.

Dick, J.

1951. Sugar-cane Entomology in Natal, South Africa. Pages 377–394. *Proceedings of the International Society of Sugar Cane Technologists. Seventh Congress, Brisbane,* 1950: i–xxxi, 1–795, illustrated. Brisbane.

Dickins, G. R.

1936. The Scent Glands of Certain Phycitidae (Lepidoptera). *Transactions of the Royal Entomological Society of London,* 85(14): 331–362, figures 1–27.

Dietz, William G.

1905. Revision of the Genera and Species of the Tineid Subfamilies Amydriinae and Tineinae Inhabiting North America. *Transactions of the American Entomological Society,* 31(1): 1–95, plates 1–6.

Dosse, Von Gudo

1959. Ein bisher unbekanntes Schadbild von *Plutella maculipennis* Curt. an Winterraps und senf mit Ergänzungen zur Morphologie der Larven. *Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie und Pflanzenschutz),* 66(3): 150–156, figures 1–7.

Doubleday, Edward, and John O. Westwood

[1846–

1850]. *The Genera of Diurnal Lepidoptera: Comprising Their Generic Characters.* 2: Notes of Their Habits and Transformations, and a Catalogue of the Species of Each Genus. Pages 1: i–xi, 1–250, plates 1–40. Longman, Brown, Green, and Longmans. London.

Drury, D.

1770

[1773]. *Illustrations of Natural History. Wherein Are Exhibited Upwards of Two Hundred and Forty Figures of Exotic Insects* . . . . 1: i–xxvii, 1–130, plates 1–50. B. White. London. [There is a note in the copy of the British Museum (Natural History) as follows: ". . . names of the Insects according to the System of Linnaeus" was issued with volume 2. These names should therefore be dated 1773 (vide volume 2, page vi).]

Duponchel, P. A. J.

1827. In Goddart and Duponchel, *Histoire naturelle des Lépidotères ou papillons de France,* 7(1): 1–528, plates 1–132; 1831, *Nocturnes,* 5(2): 1–402, plates 211–236; 1838: 11, plate 293; figure 10. Mequignon-Marvis, Paris.

Duport, L.

1912. Notes sur quelques maladies et ennemis des plantes cultivées en Extréme-Orient. Gouvernement général de l'Indochine. *Bulletin Économique de l'Indochine.* New Series, 99: 781–803.

Durrant, J. Hartley

1909–

1915. In Godman and Salvin, *Biologia Centrali-Americana,* 42 (*Lepidoptera-Heterocera,* 4): i–xii, 1–24 (1909); 25–40 (1910); 41–112 (1911); 113–168 (1912); 169–224 (1913); 225–392 (1914); 393–482 (1915); figures 1–30, plates 1–10. London.

Dyar, Harrison G.

1903 A List of North American Lepidoptera and Key to the Literature of the Order of Insects. *United States National Museum Bulletin* 52: i–viii, 1–723.

1914. Report on the Lepidoptera of the Smithsonian Biological Survey of the Panama Canal Zone. *Proceedings of the United States National Museum,* 47(2050): 139–350.

El Zoheiry, H. E. M. S., and M. A. Asem

1952. The Chinese Jute or Hollyhock Moth *Crocidosema plebiana* Zell. as an Anticipated Cotton Pest. *Transactions of the 9th International Congress of Entomology,* 472–477. Amsterdam. See also: *The Review of Applied Entomology,* 1953, 41 (Series A, part 8): 229.

Esper, E. V. C.

1796–

1805. *Der europäischen Schmetterlinge,* 4(1:1): 373–698, 111 plates.

Essig, E. O.

1920. Important Dried Fruit Insects in California. *The Monthly Bulletin. California State Department of Agriculture,* 9(3) supplement: 119–125, figures 33–37.

1926. *Insects of Western North America.* Pages i–xi, 1–1035, figures 1–766. Macmillan, New York.

Essig, E. O., and W. M. Hoskins

1944. Insects and Other Pests Attacking Agricultural Crops. *California Agricultural Extension Service, Circular* 87: 1–155, figures 1–108.

Eversmann, D. E.

1842. Quaedam Lepidopterorum. Species novae, in Rossia Orientali observatae, nunc descriptae et depictae. *Bulletin de la Société Impériale des Naturalistes de Moscow,* 15(3): 543–565.

1844. *Fauna Lepitopterologica Volgo-Uralensis.* Pages i–xvii, 1–633. Casani Typis Universitatis.

Fabricius, J. C.

1781. *Species Insectorum,* 2: 1–517. E. Hohn, Hamburg.

1787. *Mantissa Insectorum,* 2: 1–382. C. G. Proft. Hafniae.

1793– *Entomologia systematica emendata et aucta* . . . 3

1794. (Glossata) (1) 1–487, 1793; (2): 1–349, 1794. C. G. Proft Hafniae.

1798. *Supplementum, Entomologiae Systematicae,* 1–510. Proft et Storch, Hafniae.

Fernald, C. H.

1908. *The Genera of the Tortricidae and Their Types.* Pages 1–67.

Fitch, A.
1856. [*Insects*] *Infesting Garden Vegetables. First and Second Report on the Noxious, Beneficial and Other Insects of the State of New York,* 1: 170–176.

Fletcher, T. Bainbrigge
1917. *Report of the Proceedings of the Second Entomological Meeting, Pusa,* 1–340, illustrated. Calcutta, India.
1921. Life-histories of Indian Insects. Microlepidoptera. *Memoirs of the Department of Agriculture in India.* Entomological Series, 6(2): 33–64, plates 9–11.
1928. *Catalogue of Indian Insects.* Part 16: Cosmopterygidae. Pages iii, 1–33. Calcutta: Government of India.
1929. A List of the Generic Names Used for Microlepidoptera. *Memoirs of the Department of Agriculture in India.* Entomological Series, 11: i–ix, 1–244.
1932. Life-histories of Indian Microlepidoptera (Second Series). Alucitidae (Pterophoridae), Tortricina and Gelechiadae. *The Imperial Council of Agricultural Research. Scientific Monograph* 2: 1–58, plates 1–35. Calcutta: Government of India.
1933. Life-histories of Indian Microlepidoptera (Second Series). Cosmopterygidae to Neopseustidae. *The Imperial Council of Agricultural Research. Scientific Monograph* 4: 1–85, plates 1–77. Delhi, India.

Forbes, W. T. M.
1923. The Lepidoptera of New York and Neighboring States. *Cornell University Agricultural Experiment Station, Memoir* 68: 1–729, illustrated.
1930. Scientific Survey of Porto Rico and the Virgin Islands. *New York Academy of Sciences,* 12(1): 1–171, plate 1.
1931. Supplementary Report on the Heterocera or Moths of Porto Rico. *Journal of the Department of Agriculture,* 15(4): 339–394, plates 1–6.

Ford, L. T.
1951. The Plutellidae. *Proceedings and Transactions of the South London Entomological and Natural History Society for 1949–1950:* 85–93, plate XII.

Franclemont, John G.
1951. The Species of the *Leucania unipuncta* Group, with a Discussion of the Generic Names for the Various Segregates of *Leucania* in North America. *Proceedings of the Entomological Society of Washington,* 53: 57–85, illustrated.

Fry, Heinrich
1856. *Die Tineen und Pterophoren der Schweiz,* i–xii, 1–430. Meyer und Zeller. Zürich.
1880. *Die Lepidopteren der Schweiz,* i–xxvi, 1–454. Wilhelm Engelmann. Leipzig.

Friese, Gerrit
1960. Revision der paläarktischen Yponomeutidae unter besonderer Berücksichtigung der Genitalien (Lepidoptera). *Beiträge zur Entomologie,* 10(1/2): 1–131, figures 1–91, plates 1–3.

Fujimoto, Shigehiro
1956. Lepidopterous Larvae on Stored Grain in Japan. *University of Osaka Prefecture, College of Agriculture, Entomological Laboratory, Publication* 2: 19–23, plate 6.

Fullaway, D. T.
1914. *Report of the Entomologist, Hawaii Agricultural Experiment Station Report,* 1914: 43–50.

Gaede, M.
1937. In Bryk, *Lepidopterorum Catalogus. Gelechiidae,* 79: 1–630. W. Junk, 's-Gravenhage.

Gaedike, Reinhard
1966. Die Genitalien der europäischen Epermeniidae (Lepidoptera: Epermeniidae). *Beiträge zur Entomologie,* 16(5/6): 633–692, figures 1–90.

Georgeşcu, M.
1963. See Capuşe, I., and M. Georgeşcu.

Ghesquiére, J.
1940. Catalogues raisonnés de la Fauna entomologique du Congo Belge, Lépidoptères, Microlépidoptères (première partie). *Annales du Musée du Congo Belge.* C. Zoologie. Série III(II), VII (1): 1–120, plates I–V. Tervueren, (Belgique).
1941. Microlepidopteres de l'Afrique tropicale nuisikles aux plantes cultivees ou a des matieres vegetales ou animales. *Revue de Botanique Appliquee et d'Agriculture Tropicale,* 21 (Bulletin 235, 236): 762–770.
1942. Catalogues raisonnés de la Fauna entomologique du Congo Belge, Lépidoptères, Microlépidoptères (deuxième partie). *Annales du Musée du Congo Belge.* C. Zoologie. Série III(II), VII, (2): 121–240, plate VI. Tervueren, (Belgique).

Ghosh, C. C.
1940a. The Diamond Back Moth (*Plutella maculipennis* Curt.). *Insect Pests of Burma,* 129–130, plate 62, figures 1–4. Rangoon.
1940b. Sorghum Leaf Rolling Caterpillar (*Marasmia trapezalis* Gn.). *Insect Pests of Burma,* 74, plate 25, figures 1–5. Rangoon.
1940c. On Amaranthus. *Insect Pests of Burma,* 151. Rangoon.

Glick, P. A.
1939. The Distribution of Insects, Spiders, and Mites in the Air. *United States Department of Agriculture, Technical Bulletin* 673: 1–151, figures 1–13, plates 1–5.

Godart, M.
1819. In Latreille, *Encyclopédie Méthodique,* 9: i–ii, 3–803; Supplément, 804–828.

Gozmány, L.
1958. Notes on Hungarian Phycitidae (Lepidoptera). *Annales Historico-Naturales Musei Nationalis Hungarici* (New Series 9), 50: 223–225, figure 1.
1967. The Tineid Moths of the Royal Museum of Central Africa, Tervueren, Belgium (Lepidoptera Tineidae). *Annales du Musée Royale de l'Afrique Centrale, Série in 8° Sciences Zoologiques* 157: 1–100, figures 1–98. Tervueren, Belgique.

Green, E. Ernest
1903. Notes on Insect Pests from the Entomological Section, Indian Museum. *Indian Museum Notes,* 5(3): 103–194, plates 1–20 [edited by Lionel de Niceville].

Gregory, Herbert E., et al.
1935. Report of the Director for 1934, Mangarevan Expedition. *Bulletin of the Bernice P. Bishop Museum,* 133: 33–71, illustrated.

Gressitt, J. Linsley
1954. *Insects of Micronesia,* 1: i–viii, 1–257, illustrated.

Grey, William. See Bremer and Grey.

Grote, A. R.
1874. List of the Noctuidae of North America. *Bulletin of the Buffalo Society of Natural Science,* 2(1): 1–77, plate 1.
1874. On the Noctuidae of North America. *Report of the Peabody Academy of Science,* 1873: 21–38.
1895. List of the North American Eupterotidae, Ptilodontidae, Thyatiridae, Apatelidae and Agrotidae. *Abhandlungen des Naturwissenschaftlichen Vereins zu Bremen* 14(1): 43–128 [1–87].

Guenée, A.
1846. (Title page dated 1845; actual publication date May 1846). *Europaeorum Microlepidopterorum Index Methodicus, sive Pyrales, Tortrices, Tineae et Alucitae Linnaei. . . .* Pages i–vi, 1–106. Roret, Paris.
1852. In Boisduval, M. M. and M. A. Guenée, *Histoire naturelle des insectes species général des Lépidoptères.* 5: Noctuelites, 1: i–xcvi, 1–407; 6: Noctuelites, 2: 1–444. Librairie Encyclopédique de Roret. Paris.
1854. In Boisduval, M. M. and M. A. Guenée, *Deltoides et Pyralites,* 8: 1–448, plates 1–10. Libraire Encyclopédique de Roret. Paris.

Gunn, D.
1917. The Small Cabbage Moth (*Plutella maculipennis* Curtis). *Union South Africa Department of Agriculture Bulletin,* 8: 1–10, illustrated.

Gupta, P. D., and A. J. Thorsteinson
1960. Food Plant Relationships of the Diamond-back Moth (*Plutella maculipennis (Curt.)*). I: Gustation and Alfaction in Relation to Botanical Specificity of the Larva. *Entomologia Experimentalis et Applicata,* 3(3): 241–250.

Gurney, W. B.
1925. Insect Pests of Cotton in New South Wales. *The Review of Applied Entomology,* 13 (Series A, part 5): 230–231.

Hampson, G. F.
1894–1896. In Blanford, *The Fauna of British India, Including Ceylon and Burma. Moths.* 1894, 2: i–xxii, 1–609, figures 1–325; 1896, 4: i–xxviii, 1–594, figures 1–297. Taylor and Francis, London.
1898. A Revision of the Moths of the Subfamily *Pyraustinae* and the Family *Pyralidae.* Part 1. *Proceedings of the Zoological Society of London,* 1898: 590–761, figures 1–87, plates 49, 50.
1899. A Revision of the Moths of the Subfamily *Pyraustinae* and the Family *Pyralidae.* Part 2. *Proceedings of the Zoological Society of London,* 1899: 172–291, figures 88–161, plates 16–19.
1901. *Catalogue of the Lepidoptera Phalaenae in the British Museum,* 3: i-xix, 1–690, figures 1–294, plates 1–53.
1907. Descriptions of New Genera and Species of Syntomidae, Arctiadae, Agaristidae, and Noctuidae. *Annals and Magazine of Natural History,* Series 7, 19(III): 221–257.
1910–1913. *Catalogue of the Lepidoptera Phalaenae in the British Museum,* 1910, 9: i–xv, 1–552, figures 1–247, plates 137–147; 1912, 11: i–xvii, 1–689, figures 1–275, plates 176–191; 1913, 13: i–xiv, 1–609, figures 1–130, plates 222–239.
1912–1918. Descriptions of New Species of Pyralidae of the Subfamily Pyraustinae. *Annals and Magazine of Natural History,* Series 8, 1912, 9: 149–174; 242–269; 321–336; 433–444; 625–633; 10: 1–20; 557–573; 1913, 11: 322–342; 509–530; 12: 1–38; 299–319; 1917, 20: 369–384; Series 9, 1918, 1: 125–136; 252–262; 265–280; 2: 181–196; 393–407.

Hannemann, Hans-Joachim
1964. In Dahl, *Die Tierwelt Deutschlands, Kleinschmetterlinge oder Microlepidoptera* II, 50: i–viii, 1–401, figures 2–296. Sena.

Haque, Heshamul
1958. See Janjua, Nazeer Ahmad, and Heshmul Haque.

Harcourt, D. G.
1955. The Biology and Ecology of the Diamondback Moth, *Plutella maculipennis* Curtis, in Eastern Ontario. *Dissertation Abstracts,* 15(5): 900. Publication 9751. Michigan University Microfilms.
1957. Biology of the Diamondback Moth, *Plutella maculipennis* (Curt.) (Lepidoptera: Plutellidae), in Eastern Ontario. II: Life-history, Behaviour, and Host Relationships. *The Canadian Entomologist,* 89(12): 554–564, figures 1–2.
1960a. Biology of the Diamondback Moth, *Plutella maculipennis* (Curt.) (Lepidoptera: Plutellidae), in Eastern Ontario. III: Natural Enemies. *The Canadian Entomologist,* 92(6): 419–428, figures 1–2.
1960b. Distribution of the Immature Stages of the Diamondback Moth, *Plutella maculipennis* (Curt.) (Lepidoptera: Plutellidae), on Cabbage. *The Canadian Entomologist,* 92(7): 517–521.
1961. Design for a Sampling Plan for Studies on the Population Dynamics of the Diamondback Moth, *Plutella maculipennis* (Curt.) (Lepidoptera: Plutellidae). *The Canadian Entomologist,* 93(9): 820–831, figures 1–2.

Hardy, J. Eliot
1938. *Plutella maculipennis* Curt., Its Natural and Biological Control in England. *Bulletin of Entomological Research,* 29(4): 343–372, figures 1–10, plate 9.

Hartmann, August
1879. Die Kleinschmetterlinge des europäischen Faunengebietes. Erscheinungszeit der Raupen und Falter, Nahrung und biologische Notizen. *Mittheilungen des Münchener Entomologischen Vereins,* 1877: 143–200.

Hassanein, M. H.
1958. Biological Studies on the Diamond-back Moth, *Plutella maculipennis* Curtis [Lepidoptera: Plutellidae]. *Bulletin de la Société Entomologique d'Egypte,* 42: 325–337, figures 1–3.

Haworth, A. H.
1810–1812. *Lepidoptera Britannica* (1810), 2: 137–376; (1812) 3: 377–512.
1828. *Lepidoptera Britannica,* 4: 512–609. J. Murray, London.

Heinemann, H. von
1863–1870. *Die Schmetterlinge Deutschlands und der Schweiz,* Part 2, 1(1): 1–248; 1865, 1(2): i–iv, 1–214, key; 1870, 2(1): 1–388. C. A. Schwetschke und Sohn, Braunschweig.

Heinrich, Carl
1921. Some Lepidoptera Likely To Be Confused with the Pink Bollworm. *Journal of Agricultural Research,* 29(11): 807–836, plates 93–109.
1923. Revision of the North American Moths of the Subfamily Eucosminae of the Family Olethreutidae. *United States National Museum Bulletin* 123: i–iv, 1–298, plates 1–59.
1931. Notes on and Descriptions of Some American Moths. *Proceedings of the United States National Museum* 79(2879): article 13,1–16, plates 1–7.
1956. American Moths of the Subfamily Phycitinae. *United States National Museum Bulletin* 207: i–viii, 1–581, figures 1–1135.

Hemming, Francis
1937. *Hübner, A Bibliographical and Systematic Account of the Entomological Works of Jacob Hübner and of the Supplements Thereto by Carl Geyer, Gottfried Franz von Frölich and Gottlieb August Wilhelm Herrich-Schaeffer.* 1. Pages i–xxxiv, 1–605; 2. Pages i–ix, 1–274. Royal Entomological Society of London.

Hering, E.
1889. Beiträge zur Mitteleuropäischen Microlepidopteren Fauna. *Entomologische Zeitung,* 50(7–9): 290–320. Stettin.
1901. Uebersicht der Sumatra-Pyralidae. *Entomologische Zeitung herausgegeben von dem entomologischen Vereine zu Stettin,* 62: 319–348.

Herrich-Shäffer, G. A. W.
1843–1856. *Systematisches Bearbeitung der Schmetterlinge von Europa, Zugleich als Text, Revision und Supplement zu Jacob Hübner's Sammlung Europäischer Schmetterlinge.* Published in irregular installments in 69 parts. Band I: Die Tagfalter (Papilionides-Hesperides). Band II: Die Schwärmer, Spinnen und Eulen (Hepialides-Cossides-Zygaenides - Sesiides - Sphingides - Bombycides - Noctuides-Nycteolides). Band III: Die Spanner (Geometrides). Band IV: Die Zünsler und Wickler (Pyralides-Tortricides). Band V: Die Schaben und Fadermotten (Tineides-Micropteryges-Pterophorides). Band VI: Schusswort. Umrisstafeln Macrolepidopteren. Erklarung. Umrisstafeln Microlepidoptera. Erläuterung. Nachträge. Systema Lepidopterorum Europae. Index Universalis. For dates of publication of parts figures, see Catalogue of Books, Manuscripts, Maps, and Drawings in the British Museum (Natural History), 1922, 6: 457. G. L. Manz. Regensburg.

Hill, Alex R.
1952. A Survey of Insects Associated with Cultivated Raspberries in the East of Scotland. *Entomologist's Monthly Magazine,* 88(1054): 51–61.

Hinton, H. E.
1942. Notes on the Larvae of Three Common Injurious Species of *Ephestia* (Lepidoptera, Phycitidae). *Bulletin of Entomological Research,* 33(1): 21–25, figures 1–15, plate 1.
1943. The Larvae of the Lepidoptera Associated with Stored Products. *Bulletin of Entomological Research,* 34(3): 163–212, figures 1–128.
1956. The Larvae of the Species of Tineidae of Economic Importance. *Bulletin of Entomological Research,* 47(2): 251–346, figures 1–216.

Hinton, H. E., and J. D. Bradley
1956. Observations on Species of Lepidoptera Infesting Stored Products. XXI: Two New Genera of Clothes Moths (Tineidae). *The Entomologist,* 89 (1113): 42–47, figures 1–4.

Hinton, H. E., and A. Stephen Corbet
1943. Common Insect Pests of Stored Food Products. A Guide to Their Identification. *British Museum (Natural History) Economic Series* 15: 1–44, figures 1–87.

Hodges, Ronald W.
1962. A Revision of the Cosmopterigidae of America North of Mexico, with a Definition of the Momphidae and Walshiidae (Lepidoptera: Gelechioidea). *Entomologica Americana,* 42(New Series): 1–171, figures 1–199.
1964. A Review of the North American Moths of the Family Walshiidae (Lepidoptera: Gelechioidea). *Proceedings of the United States National Museum,* 115(3485): 289–330, figures 1–66.
1966. Review of the New World Species of Batrachedra with Description of Three New Genera (Lepidoptera: Gelechiioidea). *Transactions of the American Entomological Society,* 92: 585–651, plates 29–53.

Holdaway, F. G., and William C. Look
1942. Insects of the Garden Bean in Hawaii. *Proceedings of the Hawaiian Entomological Society for the Year 1941,* 11(2): 249–260.

Holland, W. J.
1903. *The Moth Book.* Pages i–xxiv, 1–479, figures 1–263, plates 1–48. Doubleday, Page and Company, New York.

Hopkins, G. H. E.
1927. Pests of Economic Plants in Samoa and Other Island Groups. *Bulletin of Entomological Research,* 18(1): 23–32, plate 2.

Hoskins, W. M.
1944. See Essig, E. O., and W. M. Hoskins.

Hua, Ho Thian
1965. The Life History and Control of the Diamond-back Moth in Malaya. Ministry of Agriculture and Co-operatives Malaysia. *Division of Agriculture Bulletin,* 118: 1–26, figures 1–5, plates 1A–5B.

Hübner, Jacob
1796–1838. *Sammlung Europäischer Schmetterlinge* (one volume of text and eight volumes of plates). Augsburg. For dates of publication see Hemming, 1937.
1816–1826. *Verzeichnisz bekannter Schmettlinge* [*sic!*]. Pages 1–431.
1818–1837. *Zuträge zur Sammlung Exotischer Schmettlinge Bestehend in Bekundigung Einzelner Fleigmuster neuer oder rare Nichteuropäischer Gattungen.* Erstes Hundert: 1–40, figures 1–200, 1818; Zwentes Hundert: 1–40, figures 201–400, 1823; Drittes Hundert: 1–48, figures 401–600, 1831; Viertes Hundert: 1–48, figures 601–800, 1832; Fünftes Hundert: 1–52, figures 801–1000, 1837. Augsburg. See Hemming, 1937: 438–487.
1819–1832. *Sammlung exotischer Schmetterlinge,* 2: 1–4, plates 1–225 (color). Augsburg.

Hudson, G. V.
1928. *The Butterflies and Moths of New Zealand.* Pages i–xi, 1–388, plates 1–52.

Huggins, H. C.
1966. Notes on the Microlepidoptera. *The Entomologist's Record and Journal of Variation,* 78(11): 256.

Hulst, Geo. D.
1896. A Classification of the Geometrina of North America, with Descriptions of New Genera and Species. *Transactions of the American Entomological Society,* 32: 245–386, plates 10, 11.
1903. In Dyar, A List of North American Lepidoptera and Key to the Literature of This Order of Insects. *United States National Museum Bulletin* 52: 417–448.

Hutson, J. C.
1926. Report on the Work of the Entomological Division. *Ceylon Administration Reports for 1925.* Department of Agriculture. D15–D17.

Illingworth, J. F.
1929. Preliminary Notes on Pests of Agricultural Crops of Kona, March 15, 1928. *Proceedings of the Hawaiian Entomological Society for the Year 1928,* 7(2): 248–254.

Inoue, Hiroshi
1954–1958. *Check List of the Lepidoptera of Japan.* Part 1: Micropterygidae-Phaloniidae. Pages i–xii, 1–112. Rikusuisha, Tokyo.
1955. *Check List of the Lepidoptera of Japan.* Part 2: Alucitidae-Epicopeidae. Pages 113–217. Corrigenda to Part 1.
1956. *Check List of the Lepidoptera of Japan.* Part 3: Geometridae. Pages 219–364. Corrigenda to Parts 1 and 2. Part 4: Drepanidae-Notodontidae. Pages 365–429. Corrigenda to Parts 1, 2, 3.
1958. *Check List of the Lepidoptera of Japan.* Part 5: Noctuidae. Pages 431–619.
1963. Some Moths from the Island of Amami-Oshima. *TYO TO GA (Transactions of the Lepidoptera Society of Japan),* 13(4): 93–97.

Inoue, Hiroshi, and T. Maenami
1968. The Moth-fauna of Izu Schichito or Izu Islands. *The Japan Heterocerists' Journal,* 50: 519–534, figures 1–10.

Issiki, Syûti, et al.
1969. *Early States of Japanese Moths in Color.* Pages i–vi, 1–237, plate 1–67. Hoikusha Publishing Co. Inc., Osaka.

Janjua, Nazeer Ahmad, and Heshamul Haque
1958. Moths of Karachi. *Agriculture Pakistan,* 9(2): 120–159.

Janmoulle, E.
1955. Espèces nouvelles pour la faune belge. *Lambillionea,* 55(1–2): 3–4.
1962. *Diasemia ramburialis* Dup. (Pyralidae, Pyraustinae) en Belgique. *Lambillionea,* 62(1–2): 5.

Jensen, H. K.
1959. En Klaekning of *Ephestia cautella* Wlk. *Flora og Fauna,* 65(2): 64–65, figures 1–4.

Joannis, L. de
1888. Descriptions genres nouveau et espèces nouvelles de Lépidoptères. *Annales de la Société Entomologique de France* (Series 6) 8: 271–274, plate 6.

Joannis, M. J. de
1913. In Duport, Liste des espèces de Lépidoptères citées par les travaux les plus récents comme nuisibles a diverses cultures dans l'Inde et à Java. *Bulletin Économique de l'Indochine.* New Series, 102: 309–375. Gouvernement Général de l'Indochine (Hanoi-Haiphong).
1930. Lépidoptères Hétérocères du Tonkin. *Annals de la Société Entomologique de France.* Supplément aux Annales de 1929, 99: 559–834.

Johansson, Roland, and Ingvar Svensson
1968. Pältsa-expedition 1964 (Lepidoptera). *Opuscula Entomologica,* 33(1–2): 119–128, figures 1–5.

Jones, Frank Morton, and Charles P. Kimball
1943. *The Lepidoptera of Nantucket and Marthas Vinyard Islands, Massachusetts.* Pages 1–217. Nantucket Maria Mitchell Association, IV. Nantucket, Massachusetts.

Jordan, Karl. See Rothschild and Jordan.

Kalshoven, L. G. E.
1950. *Dr. Plagen van de Cultuurgewassen in Indonesië Microlepidoptera.* 1: 365–398, figures 194–224.
1954. Twee soorten cacaomot in Nederland. *Berichten van de Afdeling Tropische Production van het*

Koninklijk Institut voor de Tropen, 246: 1–14, figures 1–4.

Kamel, Esmat, and Ahmed Shazli
1959. Life-history and Morphology of *Crocidosema plebeiana* Z., in Egypt. *Bulletin de la Société Entomologique d'Égypte,* 43: 193–201, figures 1A–G, 2A–H.

Kanervo, V.
1946. Sporadic Observations Concerning Diseases in Certain Species of Insects. 3: Diseases Attacking *Plutella maculipennis* Curt. [in Finnish, with summary in English]. Suomen Hyönteistieteellinen Aikakauskirja. *Annales Entomologici Fennici,* 12(4): 143–153, figure 1.

Kawabe, A.
1968. The Micro-moths Fauna of Izu Islands (I). *The Japan Heterocerists' Journal,* 50: 535–540.

Keifer, H. H.
1931. Notes on Some California Lepidoptera of Economic Interest. *Monthly Bulletin of the Department of Agriculture State of California,* 20(10–11): 613–626, figures 1–13.

Kimball, Charles P.
1943. See Jones, Frank Morton, and Charles P. Kimball.
1965. *Arthropods of Florida and Neighboring Land Areas. Lepidoptera of Florida.* An Annotated Check List. Pages i–v, 1–363, plates 1–26. Gainsville, Florida.

King, Kenneth M.
1929. Insects Affecting Field Crops and Gardens in Saskatchewan, 1922–1927. *Scientific Agriculture,* 9(6): 373–390, plate 1.

Kirby, W. F.
1892. *A Synonymic Catalogue of Lepidoptera Heterocera (Moths).* I: Sphinges and Bombyces. Pages i–xii, 1–951. London: Gurney and Jackson.

Klima, A.
1939. In Bryk, Pyralidae: Subfamily Pyraustinae I. *Lepidopterorum Catalogus,* 89: 1–224. W. Junk, 's-Gravenhage.

Knocke, Christel.
1963. Formenbildung bei Ephestia cautella (Walker) an Kakao aus verschiedenen Herkunftsländern. *Entomologische Mitteilungen aus dem Zoologischen Staatsinstitut und Zoologischen Museum Hamburg,* 2(42): 1–14, figures 1–3, plate 1.

Krauss, N. L. H.
1944. Notes on Insects and Other Arthropods from the Islands of Molokai and Maui, Hawaii. *Proceedings of the Hawaiian Entomological Society for the Year 1943,* 12 (1):81–94.

Kuribayashi, Kazue
1925. See Kuwayama, Satoru, Kazue Kuribayashi, and Kishiro Oshima.

Kuwayama, Satoru, Kazue Kuribayashi, and Kishiro Oshima.
1925. Insect Pests and Fungus Diseases of Sugar Beet, with Special Reference to Their Controlling Methods. *Bulletin. Hokkaido Agricultural Experiment Station,* 36: 1–138, plates 1–3. Kotoni, Sapporo, Japan.

382–271 O—71——16

Ladd, Harry S.
1958. Fossil Land Shells from Western Pacific Atolls. *Journal of Paleontology,* 32(1): 183–198, plate 30.
1960. Origin of the Pacific Island Molluscan Fauna. *American Journal of Science* (Bradley Volume), 258A: 137–150, illustrated.

Lamont, Norman, and E. McC. Callan
1950. Moths New to Trinidad, B.W.I. *Zoologica. Scientific Contributions of the New York Zoological Society,* 35, 3(17): 197–207.

Lederer, Julius
1859. Classification der europäischen Tortricinen. *Wiener Entomologische Monatschrift,* 3(1): 366–389.
1863. Beitrag zur Kenntniss der Pyralidinen. Die Gattungen der Pyralidinen mit irhen Arten. *Wiener Entomologische Monatschrift,* 7(10): 331–501, plates 2–18.

Leech, John Henry
1886. *British Pyralides, including the Pterophoridae.* Pages i–viii, 1–121, plates 1–18. R. H. Porter, London.
1901. XV. Lepidoptera Heterocera from China, Japan, and Korea. . . . Part V: With Descriptions of New Species, by Richard South, F.E.S. *Transactions of the Entomological Society of London,* 1901: 385–513, plates 14, 15.

Lehmensick, Rudolf, and Rudolf Liebers
1937. Die Oberflächenstruktur von Motteneiern als Bestimmungsmerkmel. *Zeitschrift für Angewandte Entomologie,* 24: 436–447, figures 1–8, plates 1–2.

Liebers, Rudolf
1937. See Lehmensick, Rudolf, and Rudolf Liebers

Lieftinck, M. A.
1966. Some Odonata of Rapa Island, with Descriptions of Three Polynesian Species of Ischnura Charpentier. *Tidschrift voor Entomologie,* 109(4): 89–102, figures 1–3.

Lima, A. da Costa
1945. *Insetos do Brasil.* Tomo 5: *Lepidópteros* 1.ª parte. Pages 1–379, figures 1–235. Escola Nacional de Agronomia. Rio de Janeiro.
1950. *Insetos do Brasil.* Tomo 6: *Lepidópteros* 2.ª parte. Pages 1–420, figures 1–331.

Linnaeus, Carolus
1758. *Systema Naturae.* . . . 10th edition, pages 1–824. Laurentii Salvii, Holmiae.
1761. *Fauna Suecica.* Pages 1–560. Laurentii Salvii, Stockholmiae.
1767. *Systema Naturae.* . . . 12th edition, 1(2): 533–1327, index, and addenda. Laurentii Salvii, Holmiae.

Linsley, E. G., and R. L. Usinger
1966. Insects of the Galapagos Islands. *Proceedings of the California Academy of Sciences,* Series 4, 33 (7): 113–196.

List, George M.
1937. Possible Migration of Diamondback Moth. *Journal of Economic Entomology,* 30(4): 676.

Liu, Siu-king
1964. Note on Nine Litchi Flower and Fruit Borers in Kwangtung Province. *Acta Entomologica Sinica,* 13(2): 147–158, figures 1–25.

Lloyd, D. C.
1940. Host Selection by Hymenopterous Parasites of the Moth *Plutella maculipennis* Curtis. *Proceedings of Royal Society of London,* 138(B): 451–484, plates 18–19.

Look, William C.
1942. See Holdaway, F. G., and William C. Look.

Lower, Oswald B.
1901. Descriptions of New Genera and Species of Australian Lepidoptera. *Transactions and Proceedings and Report of the Royal Society of South Australia,* 1901, 25(2): 63–98.
1904. Descriptions of New Species of Australian Elachistidae, etc. *Transactions and Proceedings and Report of the Royal Society of South Australia,* 28: 168–180.

Mabille, M. P.
1868. Notices sur les Lépidoptères de la Corse avec une énumération monographique des Eupithécies de la Corse. *Annales de la Societé Entomologique de France,* Series 4, 7(4): 635–658.

MacKay, Margaret Rae
1959. Larvae of the North American Olethreutidae (Lepidoptera). *The Canadian Entomologist,* 91 (Supplement 10): 1–338, figures 1–161.

MacNay, C. Graham
1948. A Summary of the More Important Insect Infestations and Occurrences in Canada in 1947. *Seventy-eighth Annual Report of the Entomological Society of Ontario,* 78: 71–89.
1953. Summary of Important Insect Infestations, Occurrences and Damage in Canada in 1952. *Eighty-third Annual Report of the Entomological Society of Ontario,* 1952, 83: 66–94.
1957. Summary of Important Insect Infestations, Occurrences and Damage in Canada in 1956. *Annual Report of the Entomological Society of Ontario,* 87: 86–102.
1959. Saskatchewan. Insects of the Season 1958 in Saskatchewan. *The Canadian Insect Pest Review,* 37 (1): 32–43.
1959. Summary of Important Insect Infestations, Occurrences and Damage in Agricultural Areas of Canada in 1958. *Annual Report of the Entomological Society of Canada,* 89: 73–87.
1961. Summary of Important Insect Infestations, Occurrences, and Damage in Agricultural Areas of Canada in 1960. *Proceedings of the Entomological Society of Ontario,* 91: 247-263.

McDunnough, J.
1917. See Barnes, Wm., and J. McDunnough.
1939. Check List of the Lepidoptera of Canada and the United States of America. Part II: Microlepidoptera. *Memoirs of the Southern California Academy of Sciences,* 2(1): 1–171.

Maenami, T.
1968. See Inoue, Hiroshi, and T. Maenami.

Mann, Josef
1855. Die Lepidopteren, gesammelt auf einer entomologischen Reise in Corsika im Jahre 1855. *Verhandlungen des zoologischbotanischen Vereins in Wien,* 5: 529–572.

Marion, H.
1954. Contribution a l'étude des Pyralidae de Madagascar. *Mémoires de l'Institut Scientifique de Madagascar,* Series E, Entomology, 5(3): 39–62, figures 1–14, plate 1.
1955. Synonymie de quelques pyrales decrites de Madagascar [Lépidoptères]. *Naturaliste Malagache,* 6 (1/2): 76–78.
1957. Classification et nomenclature des Pyraustidae d'Europe. *L'Entomologiste,* 13(4, 5): 75–87.

Marsh, H. O.
1911. Papers on Insects Affecting Vegetables. The Hawaiian Beet Webworm. *United States Department of Agriculture, Bureau of Entomology, Bulletin* 109(1): 1–15, figures, 1–2, plate 1.
1917. Life History of *Plutella maculipennis,* the Diamond-back Moth. *Journal of Agricultural Research,* 10(1): 1–10.

Martin, Edward L.
1961. British Pyralid and Plume Moths: A supplement. *Coridon,* Series B(2): 5–8, plate C4.

Marumo, Nobukatsu
1923. List of the Lepidoptera of the Islands Tanegashima and Yakushima. *Journal of the College of Agriculture, Imperial University of Tokyo,* 8(2): 135–206, plate 3.

Mathlein, Rolf
1961. Studies on Some Major Storage Pests in Sweden, with Special Reference to Their Cold Resistance. *Statens Växtskyddsanstalt Meddelanden* [National Institute for Plant Protection Contributions], 12 (83): 1–49, figures 1–6.

Mathur, R. N.
1959. Immature Stages of Indian Lepidoptera Pyralidae, Sub-family Pyraustinae. *Indian Forest Records.* New Series, Entomology, 9(10): 183–210, figures 1–85.

Matsumura, S.
1920. *Conspectus of Japanese Injurious Insects.* Pages 1–971+116, plates 1–61, text figures.
1925. An Enumeration of the Butterflies and Moths from Saghalien, with Descriptions of New Species and Subspecies. *Journal of the College of Agriculture, Hokkaido Imperial University,* 15(3): 83–196, plates 8–11. Sapporo, Japan.
1931. 6000 Illustrated Insects of Japan-Empire. Pages i–xxiii, 1–1497+1–191, many text-figures; 10 plates (color).

Menon, M. G. Ramdas
1963. See Bhattacherjee, N. S., and M. G. Ramdas Menon.

Mere, R. M.
1952. A Pyrale New to Britain. *Entomologist's Gazette,* 3(2): 57, figure.

Merivee, E.
1966. Kapsakoi (*Plutella maculipennis* Curt.) Fotoperioodiline reaktsioon. *Akadeemia Nauk Estonskoi SSR.* Isv. Bioloogiline Seeria, 15(4): 497–567.

Metcalf, J. W.
1938. See Pierce, F. N., and J. W. Metcalf.

Meyrick, E.
1880. Descriptions of Australian Micro-Lepidoptera. IV: Tineina. *Proceedings of the Linnean Society of New South Wales,* 5: 204–271.
1881. Descriptions of Australian Micro-Lepidoptera. *Proceedings of the Linnean Society of New South Wales,* 6: 629–706.
1883. Notes on Hawaiian Micro-Lepidoptera. *Entomologist's Monthly Magazine,* 20: 31–36.
1884. XV. On the Classification of the Australian Pyralidina. *Transactions of the Entomological Society of London,* 1884: 277–350.
1885a. On Lepidoptera from St. Vincent. *The Entomologist's Monthly Magazine,* 22: 105–106.
1885b. X. On the Classification of the Australian Pyralidina. *Transactions of the Entomological Society of London,* 1885: 421–456.
1886a. On the Classification of the Pterophoridae. *Transactions of the Entomological Society of London,* 1886: 1–21.
1886b. VIII. Descriptions of Lepidoptera from the South Pacific. *Transactions of the Entomological Society of London,* 1886: 189–296.
1886c. Notes on Synonymy of Australian Lepidoptera Described by Mr. Rosenstock. *Annals and Magazine of Natural History,* 5(17): 528–530.
1886d. Description of New Zealand Micro-Lepidoptera. *Transactions and Proceedings of the New Zealand Institute,* 1885, 18 (New Series): 162–183.
1887. XII. On Pyralidina from Australia and the South Pacific. *Transactions of the Entomological Society of London,* 1887: 185–268.
1888. Notes on New Zealand Tortricina. *Transactions and Proceedings of the New Zealand Institute,* 1887, 20 (New Series 3): 73–76.
1888a. IX. On the Pyralidina of the Hawaiian Islands. *Transactions of the Entomological Society of London,* 1888: 209–246.
1890. On the Classification of the Pyralidina of the European Fauna. *Transactions of the Entomological Society of London,* 1890: 429–492, plate XV.
1895. *A Handbook of British Lepidoptera.* Pages i–vi, 1–843, illustrated. London.
1897. Descriptions of Australian Microlepidoptera XVII. Elachistidae. *Proceedings of the Linnean Society of New South Wales,* 1897, 2: 297–435.
1902. A New Genus of Gelechiadae. *Entomologist's Monthly Magazine,* 38: 103–104.
1907. Descriptions of Indian Microlepidoptera. III. *Journal of the Bombay Natural History Society,* 17(3): 730–754.
1908a. Descriptions of African Micro-Lepidoptera. *Proceedings of the Zoological Society of London,* 1908: 716–756.
1908b. Descriptions of Indian Microlepidoptera. VIII. *Journal of the Bombay Natural History Society,* 18(4): 806–832.
1910. XXII. Notes and Descriptions of Indian Micro-Lepidoptera. *Records of the Indian Museum,* 5 (part 4) (22): 217–232.
1911a. Revision of Australian Tortricina. *Proceedings of the Linnean Society of New South Wales,* 36(2): 224–303.
1911b. The Percy Sladen Trust Expedition to the Indian Ocean in 1905. No. XII: Tortricina and Tineina. *The Transactions of the Linnean Society of London,* Series 2, Zoology, 14(2): 263–307.
1912. Lepidoptera. Heterocera. Family Gracilariadae. In Wytsman, M. P., *Genera Insectorum,* 128: 1–35, 1 plate (color). Tervueren, Belgium.
1913a. In Wagner, H. *Lepidopterorum Catalogus. Carposinidae, Heliodinidae, Glyphipterygidae,* 13: 1–53. W. Junk, Berlin.
1913b. Article V: A Revision of New Zealand Pyralidina. *Transactions of the New Zealand Institute,* 1912, 45: 30–51.
1913c. Descriptions of Indian Micro-Lepidoptera. *Journal of the Bombay Natural History Society,* 22(1): 160–182.
1914a. H. Sauter's Formosa-Ausbeute. *Supplementa Entomologica,* 3: 45–62.
1914b. In Wagner, H. *Lepidopterorum Catalogus.* Yponomeutidae, Plutellidae, Amphitheridae, 19: 1–63. W. Junk, Berlin.
1915a. Article 27: Revision of New Zealand Tineina. *Transactions of the New Zealand Institute,* 47: 205–244.
1915b. Descriptions of South American Micro-Lepidoptera. *Transactions of the Entomological Society of London,* 1915: 201–256.
1915c. *Exotic Microlepidoptera,* 1: 321–336.
1917. Description of South American Micro-Lepidoptera. *Transactions of the Entomological Society of London,* 1917: 1–52.
1918. *Exotic Microlepidoptera,* 2: 177–192.
1919. *Exotic Microlepidoptera,* 2: 273–288.
1920. *Exotic Microlepidoptera,* 2: 353–368.
1921a. *Exotic Microlepidoptera,* 2: 449–464.
1921b. XIV: New Micro-Lepidoptera. *Zooligische Mededeelingen uitgegeven vanweg 's Rijks-Museum van Natuurlijke Historie te Leiden,* 6(2–3): 145–202.
1922. In Skottsberg, *The Natural History of Juan Fernandez and Easter Island,* 3(2): 129–287, plates 6–10.
1923. *Exotic Microlepidoptera,* 3: 49–64.
1924a. *Exotic Microlepidoptera,* 3: 65–80.
1924b. *Exotic Microlepidoptera,* 3: 81–96.

1924c. XXVI: Micro-Lepidoptera of Rodriguez. *Transactions of the Entomological Society of London,* 1924: 544–557.
1925. In Wytsman, *Genera Insectorum.* Lepidoptera-Heterocera. Family Gelechiadae, 184: 1–290, 5 plates (color).
1926. On Microlepidoptera from the Galapagos Islands and Rapa. *Transactions of the Entomological Society of London,* 74: 269–278.
1927. *Insects of Samoa and Other Samoan Terrestrial Arthropoda. Part III: Lepidoptera,* 2: 65–110. British Museum (Natural History), London.
1928. *A Revised Handbook of British Lepidoptera.* Pages i-vi, 1–914, illustrated. London.
1929a. The Micro-Lepidoptera of the "St. George" Expedition. *Transactions of the Entomological Society of London,* 76: 489–521.
1929b. Pacific Pyrales of the "St. George" Expedition. *Transactions of the Entomological Society of London,* 77: 155–169.
1930. Microlepidoptera of Mauritius. *Transactions of the Entomological Society of London,* 78: 309–323.
1931a. *Reports of an Expedition to Brazil and Paraguay in 1926–1927, Supported by the Trustees of the Percy Sladen Memorial Fund and the Executive Committee of the Carnegie Trust for Scotland.*
1931b. *Exotic Microlepidoptera,* 4: 161–176.
1932. *Exotic Microlepidoptera,* 4: 193–208.
1934a. Pyrales and Microlepidoptera of the Society Islands. *Pacific Entomological Survey Publication* 6(A22): 109–110. [Also issued as *Bernice P. Bishop Museum Bulletin* 113 with same pagination.]
1934b. Pyrales and Microlepidoptera of the Marquesas Islands. *Pacific Entomological Survey Publication* 7 (A28): 333–355. [Also issued as *Bernice P. Bishop Museum Bulletin* 114 with same pagination, but (teste Zoological Record) issued in 1935.]

M'Gregor, E. A.
1931. See Simmons, Perez, W. D. Reed, and E. A. M'Gregor.

Miles, Herbert W.
1924. The Diamond-back Moth, *Plutella maculipennis. The Annual Report of the Kirton Agricultural Institute,* 1923: 45–48.

Milliere, P.
1863. I: Iconographie et description de Chenilles et Lépidoptères. Pages 1–290, plate 34, figures 9–13. [Extrait des *Annales de la Société Linnéenne de Lyon,* New Series, 9: 281–312, plates 1–4.]

Mookherjee, P. B.
1963. See Tuli, S., and P. B. Mookherjee.

Moore, Frederick
1877. The Lepidopterous Fauna of the Andaman and Nicobar Islands. *Proceedings of the Zoological Society of London,* 1877: 580–632, plate 58–60.
1881. Descriptions of New Genera and Species of Asiatic Nocturnal Lepidoptera. *Proceedings of the Zoological Society of London,* 1881: 326–380, plates 37–38.
1884– *The Lepidoptera of Ceylon,* 3(1): i.–. . . , 1–88
1887. (1884); 89–304(1885); 305–392(1886); 393–578(1887). L. Reeve & Co., London.
1889. List of the Lepidoptera of Mergui and Its Archipelago Collected for the Trustees of the Indian Museum, Calcutta, by Mr. John Anderson, F.R.S., Superintendent of the Museum. *The Journal of the Linnean Society,* 21: 29–60, plates 3, 4.

Moriuti, Sigeru
1956. Preliminary Notes on the Life History of the Diamondback Moth. *Entomological Laboratory, College of Agriculture, University of Osaka Prefecture, Publication* 2: 25–38, figures 1–8.

Möschler, H. B.
1866. Aufzählung der in Andalusien 1865 von Herrn Graf v. Hoffmannsegg gesammelten Schmetterlinge. *Berliner Entomologische Zeitschrift,* 1866: 135–146.
1890. Die Lepidoptern-Fauna der Insel Portorico. *Abhandlungen der Senckenbergischen naturforschenden Gesellschaft,* 16: 77–360, 1 plate.

Muggeridge, J.
1930. The Diamond-back Moth. Its occurrence and Control in New Zealand. *The New Zealand Journal of Agriculture,* 41(4): 253–264, figures 1–9.

Munroe, Eugene
1957. North American Components of the Genus *Diasemia* of Authors. *The Canadian Entomologist,* 89: 164–170, illustrated.
1965. Zoogeography of Insects and Allied Groups. *Annual Review of Entomology,* 10: 325–344.

Mutuura, Akira
1964. See Takahashi, Fumiki, and Akira Mutuura.

Nakayama, Shonosuke
1929. A List of More Important Injurious Insects in Chosen. *Annals of the Agricultural Experiment Station, Suigen, Korea,* 4(3): 261–301.

Nazmi, N. H.
1963. A Redescription of the Pyraustinae of Egypt (U.A.R.) [Lepidoptera]. *Bulletin de la Société Entomologique d'Égypte,* 47: 201–250, figures 1–26.

Nićeville, Lionel de
1903. *Notes on Insect Pests from the Entomological Section, Indian Museum,* 5(3): 1–216, plate 1–20. V: Insect Pests of Cereals and Crops, 133–134.

Norris, M. J.
1934. Contributions to the Study of Insect Fertility. III: Adult Nutrition, Fecundity and Longevity in the Genus *Ephestia* (Lepidoptera, Phycitidae). *Proceedings of the Zoological Society of London,* 1934: 333–360.

Noyes, Winefred M.
1930. Moth Pests in Cocoa and Confetcionery. *Bulletin of Entomological Research* 21(1): 77–121.

Ogilvie, Lawrence
1923. Notes on Plant Diseases and Pests. *Agricultural Bulletin of the Bermuda Department of Agriculture,* 2(12): 7–8.

1924. Preliminary Report of the Plant Pathologist for the Period September 27th to December 31st, 1923. *Reports of the Board and Department of Agriculture for the Year 1923:* 28–34. Bermuda.

1925. Report of the Plant Pathologist for the Year 1924. In *Bermuda Reports of the Board and Department of Agriculture for the Year 1924:* 32–43.

1926. Report of the Plant Pathologist for the Year 1925. In *Bermuda Report of the Department of Agriculture for the Year 1925:* 36–63.

Okumura, George T.

1966. The Dried-fruit Moth. *California Department of Agriculture Bulletin,* 55(4): 180–186, figures 1–6.

Oshima, Kishiro

1925. See Kuwayama, Satoru, Kazue Kuribayashi, and Kishiro Oshima.

Padmanaban, M. D.

1968. See Abraham, E. V., and M. D. Padmanaban.

Pagenstecher, Arnold

1884. Beiträge zur Lepidopteren-Fauna von Amboina. *Jahrbücher des Nassauischen Vereins für Naturkunde,* 37: 150–326.

1888. Beiträge zur Lepidopteren fauna des Malayischen Archipels. V: Verzeichniss der Schmetterlinge von Amboina. *Jahrbücher des Nassauischen Vereins für Naturkunde,* 41: 87–217.

1900. Die Lepidopteren-fauna des Bismarck-Archipels. Mit. Berücksichtigung der thiergeographischen und biologischen Verhältnisse systematisch dargestellt. In Chun, *Zoologica,* 12(29): 1–268, plates 1–2.

Pak, Sea-Wook

1964. Some Moths from Dagelet Island. *Korean Journal of Zoology,* 7(2): 58.

Paramonow, S.

1954. Hauptschädlinge der Ökulturen der Ukraine. *Zeitschrift für Angewandte Entomologie,* 35(1): 63–81.

Patel, H. K., R. C. Patel, and V. C. Patel

1964. Short Notes. Record of Some New Insect-pests of Different Crops, Ornamental Plants, Weeds and Stored Products in Gujarat State. *Indian Journal of Entomology,* 26(3): 366.

Patel, R. C.

1964. See Patel, H. K., R. C. Patel, and V. C. Patel.

Patel, V. C.

1964. See Patel, H. K., R. C. Patel, and V. C. Patel.

Paulian, Renaud

1949. Recherches sur les insectes d'importance biologique de Madagascar (1). Les chenilles du chou a Madagascar. *Mémoires de l'Institut Scientifique de Madagascar.* Série A, 3(3): 347–352, figures 1–5.

Paulian, R., and P. Viette

1955. Essai d'un catalogue biologogique des Lépidoptères Hétérocères de Tananarive. *Mémoires de l'Institut Scientifique de Madagascar.* Série E, Entomologia, VI: 141–281, figures 1–114, plates V–XII.

Pelham-Clinton, E. C.

1967. See Bradley, J. D., and E. C. Pelham-Clinton.

Perry, W. M.

1924. Report of the Horticulturist. In Thompson, *Report of the Virgin Islands Agricultural Experiment Station,* 1923: 7–13, figures 1, 2.

Petersen, Von Günther

1957–

1958. Die Genitalien der paläarktischen Tineiden (Lepidoptera: Tineidae). *Beiträge zur Entomologie 1957,* 7(1/2): 55–176, figures 1–149, plates 1–4; 7(3/4): 338–379, figures 150–203, plate 6; 1957, 7(5/6): 557–598, figures 204–247, plates 11, 12; 1958, 8(1/2): 111–118, figures 248–252; 8(3/4): 398–430, figures 253–267, plates 2–3.

1960. Contribución al conocimiento de la distribución geográfica de los Tineidos de la Peninsula Ibérica (Lep. Tineidae). *Eos,* 36(2): 205–236, figures 1–8.

1964. Zweiter Beitrag zur Kenntnis der geographischen Verbreitung der Tineiden auf der Iberischen Halbinsel (Lepidoptera: Tineidae). *Beiträge zur Entomologie,* 14(3/4): 395–420, figures 1–10.

Philpott, Alfred

1912. Descriptions of Three New Species of Lepidoptera. *Transactions of the New Zealand Institute,* 1911, 44: 115–116.

1923. Article 14: Notes and Descriptions of New Zealand Lepidoptera. *Transactions and Proceedings of the New Zealand Institute,* 54: 148–154.

1931. Notes and Descriptions of New Zealand Lepidoptera. *Transactions of the New Zealand Institute,* 62: 26–36, illustrated.

Pierce, F. N., and J. W. Metcalfe

1935. *The Genitalia of the Tineid Families of the Lepidoptera of the British Islands. An Account of the Morphology of the Male Clasping Organs and the Corresponding Organs of the Female.* Pages i–xxii, 1–116, plates 1–68. F. N. Pierce. Warmington, England.

1938. *The Genitalia of the British Pyrales with the Deltoids and Plumes.* An *Account of the Morphology of the Male Clasping Organs and the Corresponding Organs of the Female.* Pages i–xiii, 1–69, plates 1–29. F. N. Pierce, Warmington, England.

Poos, Fred

1926. A New Pest of Spinach in Virginia. *Virginia Truck Experiment Station Bulletin* 56: 491–497, figure 90.

Poulton, E. B., and N. D. Riley

1928. The Rhopalocera of the "St. George" Expedition, from French Oceania. *Transactions of the Entomological Society of London,* 76: 453–468, plate 1: figures 1–2.

Prout, Louis B.

1929. The Geometridae of the "St. George" Expedition from French Polynesia. *Transactions of the Entomological Society of London,* 77: 265–277.

Ragonot, E. L.

1885. Revision of the British Species of Phycitidae and Galleridae, *Entomologist's Monthly Magazine,* 22: 17–32.

1894. Notes synonymiques sur les Microlépidoptères et descriptions d'espèces pau commues ou inédites. *Annales de la Société Entomologique de France,* 63: 161–226, plate 1.

1901. Monographie des Phycitinae et des Galleriinae. In N. M. Romanoff, *Mémoires sur les Lépidoptères,* 8: 1–xli, 1–602, plates 24–27. Imprimerie General Lahure, Paris.

Rao, Y. Ramachandra

1920. Lantana Insects in India. *Mémoirs of the Department of Agriculture in India.* Entomological Series, 5(6): i–iii, 239–314, plates 24–37.

Rao, V. P.

1960. See Simmonds, F. J., and V. P. Rao.

Rebel, H.

1901. In Staudinger, O., and H. Rebel, *Catalog der Lepidopteren des palaearctischen Faunengebietes.* II: Famil. Pyralidae-Micropterygidae. Pages 1–282; 335–368. Berlin. R. Friedlander and Sohn.

1910. In Rechinger, Karl, Botanische und zoologische ergebnisse einer wissenschaftlichen forschungsreise nach den Samoainseln, dem Neuguinea-Archipel und den Salomonsinseln von März bis Dezember 1905. *Denkschriffen der Kaiserlichen Akademie der Wissenschaften Mathematisch-Naturwissenschaftliche Klasse. Lepidoptera von den Samoainseln,* 85: 412–432, figures 31–35.

1915. Neuer Beitrag zur Lepidopteren Fauna der Samoa-Inseln. 2. Beiheft zum Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten. *Mitteilungen aus dem Naturhistorischen (Zoologischen) Museum in Hamburg,* 32: 121–158, plate 1.

1940a. Die Lepidopterenfauna des Azorischen Archipels. Societas Scientarum Fennica. *Commentationes Biologicae* 8(1): 1–49, 1 map.

1940b. Eine Lepidopteren-Ausbeute von Madeira. Societas Scientarum Fennica. *Commentationes Biologicae* 8(1): 50–59, 2 plates.

Reed, L. B.

1941. See Reid, W. J. Jr., Chas. E. Smith, L. B. Reed, and W. A. Thomas.

1942. See Reid, W. J., C. E. Smith, L. B. Reed, and C. O. Bare.

Reed, W. D.

1931. See Simmons, Perez, W. D. Reed, and E. A. M'Gregor.

Reid, W. J., Jr., Chas. E. Smith, L. B. Reed, and W. A. Thomas.

1941. Field Studies of Insecticides Used To Control Cabbage Caterpillars in the South. *United States Department of Agriculture Technical Bulletin,* 782: 1–35, figures 1–7, Washington, D.C.

Reid, W. J., C. E. Smith, L. B. Reed, and C. O. Bare.

1942. Studies in the Control of Cabbage Caterpillars with Derris in the South. *United States Department of Agriculture Circular* 615: 1–26, figures 1–9.

1964. *Résume des observations en surface et en altitude.* Ministère des travaux publics et des transports service de la meteorologique, annee 1963. Papeete-Tahiti.

Richards, O. W., and G. V. B. Herford

1930. Insects Found Associated with Cacao, Spices and Dried Fruits in London Warehouses. *The Annals of Applied Biology,* 17(2): 367–395, plates 23–32.

Richards, O. W., and W. S. Thomson

1932. A Contribution to the Study of the Genera *Ephestia,* Gn. (including *Strymax,* Dyar), and *Plodia,* Gn. (Lepidoptera, Phycitidae), with Notes on Parasites of the Larvae. *Transactions of the Entomological Society of London,* 80: 169–250, plates 5–12.

Richardson, N. M.

1893. *Blabophanes heringi* at Portland: Distinct from *B. ferruginella? The Entomologist's Monthly Magazine,* 29: 14–15.

Riley, L. A. M.

1926. Notes on the Flora of Rapa. *Bulletin of Miscellaneous Information. Royal Botanical Garden, Kew,* 51–56.

Riley, N. D.

1928. See Poulton, E. B., and N. D. Riley.

1966. See Zimmerman, Elwood C., and N. D. Riley.

1967. See Zimmerman, Elwood C., and N. D. Riley.

Robertson, Phyllis L.

1939. Diamond-back Moth Investigation in New Zealand. *New Zealand Journal of Science and Technology,* 20(5A): 330A–339A, figures 1–4; (6A): 341A–364A, figures 5–10.

Romanova, V. P.

1930. On Pests of Mustard in the Northern Caucasus [in Russian]. *Bulletin of Northern Caucasus Plant Protection Station,* 133–138. (*Review of Applied Entomology,* A 1930, 19: 563–564.)

Rondani, Camillo

1876. Papilionaria aliqua microsoma. *Bulletino della Società Entomologica Italiana,* 8(1): 19–24, plate 1.

Roonwall, M. L., and G. D. Bhasin

1954. A List of Insect Pests of Forest Plants in India and the Adjacent Countries. *Indian Forest Bulletin,* 171(1) (New Series): 5–93.

Röslerstamm, J. E. Fischer Edlen von

1834–1842. *Abbildungen zur Berichtigung und Ergänzung der Schmetterlingskunde, besonders der Microlepidopterologie als Supplement zu Treitschke's und Hübner's Europaeischen Schmetterlingen, mit Erläuterndem text.* Pages i–ii, 1–304, plates 1–100.

Rothschild, Walter, and Karl Jordan

1903. A Revision of the Lepidopterous Family Sphingidae. *Novitates Zoologicae* 9(III, Supplement): 475–972.

Rungs, C.

1953. Contribution a la connaissance des enemies de l'arganier *Argania spinosa* (L.) *Bulletin de la Société des Sciences Naturelles du Maroc,* 32 (1, 1952): 61–76.

1957. Notes de Lépidoptérologie Marocaine (XXII). *Bulletin de la Société de Sciences Naturelles et Physiques du Maroc,* 36 (3): 277–298, figures 1–6.

Russell, T. A.
1934. Report of the Plant Pathologist, 1933. *Report of the Department of Agriculture for the Year 1933:* 28–36. Bermuda.

Russo, G.
1947. Cotton Pests. Research and Observations Made in Italy during 1941. *The Review of Applied Entomology,* 35 (Series A, part 12): 419.

St. John, Harold
1935. See Gregory, Herbert E., et al.

Samouelle, George
1819. The Entomologist's Useful Compendium; or an Introduction to the Knowledge of British Insects . . . . Pages 1–496, plates 1–12. Thomas Boys, London.

Schaffner, J. V., Jr.
1959. Microlepidoptera and Their Parasites Reared from Field Collections in the Northeastern United States. *United States Department of Agriculture Miscellaneous Publication* 767: i–iv, 1–97.

Schiffermüller, I.
1776. See Denis and Schiffermüller

Schonken, D. B.
1940. See Ullyett, G. C., and D. B. Schonken.

Schrank, Franz von Pavla
1802. *Fauna Boica,* 2(2): 1–412. J. W. Kruell, Ingonstadt..

Seitz, Adalbert
1908–1928. *Die Gross-Schmetterlinge der Erde. Eine Systematische Bearbeitung der bis jetzt bekannten Gross-Schmetterlinge. 9: Die Indo-Australischen Tagfalter.* Pages i–viii, 1–1197, plates 1–175. (This edition published in parts.) Alfred Kernen, Stuttgart.

Sharma, R. C.
1964. Observations on Some Insect Pests of Jowar (*Sorghum vulgare*) at Ajmer (Rajasthan). *Bulletin of Entomology* [Madras], 5: 28–30.

Shazli, Ahmed
1959. See Kamel, Esmat, and Ahmed Shazli.

Shibuya, Jinschichi
1928a. The Systematic Study on the Formosan Pyralidae. *Journal of the Faculty of Agriculture, Hokkaido Imperial University,* 22(1): 1–300, plates 1–9. Sapporo.
1928b. The Systematic Study on the Japanese Pyralinae (Lepid.). *Journal of the Faculty of Agriculture, Hokkaido Imperial University,* 21(4): 150–176, plates 3, 4. Sapporo.
1929. On the Known and Unrecorded Species of the Japanese Pyraustinae (Lepid.). *Journal of the Faculty of Agriculture, Hokkaido Imperial University,* 25(3): 151–242. Sapporo, Japan.

Shiraki, Tokuichi
1910. *Bulletin of the Agricultural Experiment Station, Formosa,* 1: 146, plate 35; figure 5.
1913. Special Report No. 8. Investigations on Injurious Insects. *Formosa Agricultural Experiment Station Bulletin,* 8: 1–670.

Shiroma, E. S.
1963. Christmas Island Insects. *Proceedings of the Hawaiian Entomological Society for the Year 1962,* 18(2): 208–209.

Simmonds, F. J., and V. P. Rao
1960. Record of *Plutella maculipennis* Curt. and Some of Its Parasites in Kashmir, India. *The Canadian Entomologist,* 92(4): 278.
1932. Annual Report of the Government Entomologist, 1931. *Annual Bulletin of Divisional Reports of the Department of Agriculture, Fiji,* 1931: 9–12.

Simmonds, Hubert W.
1924. *Fiji Department of Agriculture* (Annual Report for the Year 1923). (Council Paper 53): 1–15.
1932. Annual Report of the Government Entomologist. *Annual Bulletin of Divisional Reports of the Department of Agriculture, Fiji,* 1931: 9–12. Suva.

Simmons, Perez, W. D. Reed, and E. A. M'Gregor
1931. Fig Insects in California. *United States Department of Agriculture Circular* 157: 1–71, figures 1–38.

Singh, S. R.
1960. The Hawaiian Beet Web-worm (*Hymenia recurvalis* F.), a Serious Pest of Indian Spinach (*Amaranthus viridus* Linn.). *Fiji Department of Agriculture Agricultural Journal,* 30(1): 35–38, illustrated.

Skala, Von Hugo, Haid
1951. Einige Blattminen aus verschiedenen Kleinfalterfamilien. *Zeitschrift der Wiener Entomologischen Gesellschaft,* 62(10/12): 182, plate 18.

Smith, Chas. E.
1941. See Reid, W. J., Jr., Chas. E. Smith, L. B. Reed, and W. A. Thomas.
1942. See Reid, W. J., C. E. Smith, L. B. Reed, and C. O. Bare.

Snelleman, J. F.
1892. In Veth, Pietier Johannes, *Bijdragen tot de Kennis der Fauna van Midden-Sumatra . . .* 1877–1879. . . . (1891–1892): 1–92, plates 1–5. E. J. Beill. Leiden.

Snellen, P. C. T.
1872. Bijdrage tot de Vlinder-fauna van Neder-Guinea, Zuidwestlijke gedeelte van Afrika. *Tijdschrift voor Entomologie,* 15: 1–110, plates 1–8.
1880. Nieuwe Pyraliden op het Eiland Celebes gevonden door Mr. M. C. Piepers. *Tijdschrift voor Entomologie,* 23: 198–250.
1882. *De Vlinders van Nederland.* Microlepidoptera, 2: 537–1196, plates I–XIV.
1891. A Catalogue of the Pyralidina of Sikkim Collected by Henry J. Elwes and the Late Otto Möller. *Transactions of the Entomological Society of London for 1890:* 557–647, plates 19, 20.
1901. Bockaankondiging. *Tijdschrift voor Entomologie, jaargang 1900,* 43: 247–261.

Sømme, Lauritz
1959. *Ephestia cautella* (Wlkr.) (Lep. Pyralidae), New to Norway. *Norsk Entomologisk Tidsskrift,* 11(1–2): 20–21, figure 1.

South, Richard
1890. Additions to the British List of Deltoids, Pyralides, and Crambi, Since 1859. *The Entomologist,* 23 (329): 297–305.
1918. See Wileman, A. E., and Richard South.

Southgate, B. J.
1952. See Woodroffe, G. E., and B. J. Southgate.

Spuler, Arnold
1908. *Die Schmetterlinge Europas,* 1: i–cxxviii, 1–384, figures 1–114. Stuttgart. E. Nägele; 1910, 2: 1–523, figures 1–239. 3: plates 1–91. Stuttgart. Nägele and Dr. Sproesser.

Stainton, H. T.
1854. *Insecta Britannica. Lepidoptera: Tineina,* 3: i–viii, 1–313, plates 1–10.
1859. Descriptions of Twenty-five Species of Indian Micro-Lepidoptera. *Transactions of the Entomological Society of London,* 1859. New Series, 5: 111–126.
1869. *The Tineina of Southern Europe.* Pages i–vii, 1–370, illustrated. John van Voorst, London.

Staudinger, O.
1871. Beitrag zur Lepidopterenfauna Greichenlands. *Horae Societatis Entomologicae Rossicae,* 7: 1–304, plates 1–3.
1901. See Rebel, H., In Staudinger, O., and H. Rebel.

Staudinger, O., and M. Wocke
1871. *Catalog der Lepidopteren des Europaeischen Faunengebiets.* I: Macrolepidoptera by Staudinger. II: Microlepidoptera by Wocke. Pages i–xxxviii, 1–426.

Staudinger, O., and H. Rebel
1901. *Catalog der Lepidopteren des palaearctischen Faunengebiets.* I: Famil. Papilionidae-Hepialidae (by Staudinger and Rebel). Pages i–xxx, 1–411. II: Famil. Pyralidae-Micropterygidae (by Rebel). Pages 1–368. R. Friedlander and Sohn. Berlin.

Stebbing, E. P.
1903. Notes on Insect Pests from the Entomological Section, Indian Museum. *Indian Museum Notes,* 6(1): 63–89.

Stephens, James Francis
1829. *The Nomenclature of British Insects; Being a Compendious List of Such Species as Are Contained in the Systematic Catalogue of British Insects and Forming a Guide to Their Classification,* etc. Pages 1–68.
1834. *Illustrations of British Entomology; or, a Synopsis of Indigenous Insects: Containing Their Generic and Specific Distinctions; with an Account of Their Metamorphoses, Times of Appearance, Localities, Food, and Economy as Far as Is Practicable. Haustellata,* 4: 1–433. Baldwin and Cradock, London.

Stoll, Caspar
1791. In Cramer, *Supplément à l'ouvrage, intitulé les Papillons exotiques, des trois parties du monde, l'Asie, l'Afrique et l'Amérique; par Mr. Pierre Cramer, contenant les figures exactes des Chenilles et des Chrysalides de Suriname . . . Papillons et Phalènes,* 5: i–viii, 1–384, plates 1–42. A Amsterdam, chez Nic. Th. Gravius.

Stoll, N. R., et al.
1961. *International Code of Zoological Nomenclature Adopted by the XV International Congress of Zoology,* i–xix, 1–176. Richard Clay and Company, Great Britain.

Strand, Embrik
1918. H. Sauter's Formosa-Ausbeute: Pyralididae Subfam. Pyraustinae. *Deutsche Enomologische Zeitschrift, Iris,* 32(1/2): 33–91, plate 1. Dresden.

Svensson, Ingvar. See Johansson, Roland, and Ingvar Svensson.

Sweeney, R. C. H.
1963. Entomology. *Nyasaland Protectorate Annual Report of the Department of Agriculture for the Year 1961–62,* 2: 160–166.

Swezey, Otto H.
1909. The Hawaiian Sugar Cane Beet Moth (*Ereunetis flavistriata*) with an Account of Some Allied Species and Natural Enemies. *Hawaiian Sugar Planters' Association Experiment Station Division of Entomology, Bulletin* 6: 1–41, plates 1–4.
1915. A Preliminary List of the Hymenopterous Parasites of Lepidoptera in Hawaii. *Proceedings of the Hawaiian Entomological Society,* January 1914–April 1915, 3(2): 99–109.
1926a. *Casinaria infesta* (Cress.) in Hawaii (Hym.). *Proceedings of the Hawaiian Entomological Society for the Year* 1925, 6(2): 296–297.
1926b. Recent Introduction of Beneficial Insects in Hawaii. *Journal of Economic Entomology,* 19(5): 714–720.
1926c. Lepidoptera. *Bulletin of the Bernice P. Bishop Museum,* 31: 73–79.
1942. Notes on Food Habits of Lepidoptera in Samoa. *Proceedings of the Hawaiian Entomological Society for the Year 1941,* 11(2): 202–216.
1954. Forest Entomology in Hawaii. An Annotated Check-list of the Insect Faunas of the Various Components of the Hawaiian Forests. *Bernice P. Bishop Museum Special Publication* 44: i–ix, 1–266, figures 1–32.

Swinhoe, C.
1884. On Lepidoptera Collected at Kurrachee. *Proceedings of the Zoological Society of London,* 1884: 503–529, plates 47, 48.
1886a. On the Lepidoptera of Bombay and the Deccan. *Proceedings of the Zoological Society of London for 1885:* 852–886, plates, 56, 57.
1886b. On the Lepidoptera of Mhow, in Central India. *Proceedings of the Zoological Society of London for 1886:* 421–465, plates 40, 41.

1889. See Cotes, E. C., and C. Swinhoe.
1900. *Catalogue of Eastern and Australian Lepidoptera Heterocera in the Collection of the Oxford University Museum.* Part II: Noctuina, Geometrina and Pyralidina. Pages 1–540, plates 1–8.
1902. New and Little Known Species of Drepanulidae, Epiplemidae, Microniidae and Geometridae in the National Collection. *Transactions of the Entomological Society of London, 1902:* 585–677.

Takahashi, Fumiki
1956. On the Effect of Population Density on the Power of Increase of the Almond Moth, *Ephestia cautella.* II: On the Relations between the Larval Density and the Duration of Postembryonic Period, Percentage of Survival and the Size of the Moth. *Japan Journal of Applied Zoology,* 21 (4): 179.
1963. Changes in Some Ecological Characters of the Almond Moth Caused by the Selective Action of an Ichneumon Wasp in Their Interacting System. *Researches on Population Ecology,* 5(2): 117–129. Kyoto University.
1964. The Influences of Low Temperature on Preimaginal Development of the Almond Moth, *Cadra cautella* (Walker), and on the Occurrence of Abnormal Male Capulatory Organs. *Japanese Journal of Applied Entomology and Zoology,* 8(2): 129–135, figures 1–3.

Tams, W. H. T.
1935. *Insects of Samoa and Other Samoan Terrestrial Arthropoda. Part III: Lepidoptera,* 4: 169–289, figures 1–12, plates VI–XVIII. British Museum (Natural History).
1943. See Corbet, A. Stephen, and W. H. T. Tams.

Tanada, Yoshinori
1956. Microbial Control of Some Lepidopterous Pests of Crucifers. *Journal Economic Entomology,* 49(3): 320–329, figures 1–4.

Taylor, Richard
1855. *Te Ika a Maui, or New Zealand and Its Inhabitants, Illustrating the Origin, Manners, Customs, Mythology, Religion, Rites, Songs, Proverbs, Fables and Language of the Natives.* Pages i–xiv, 1–490, map, text figures, plates 1–8. Appendix. Wertheim and Macintosh, London.

Thomas, P. M., et al.
1960. Flour Moth. *Allahabad Farmer,* 34(2): 114–122.

Thomas, R. T. Simon
1958. Insects Bred from Cultivated Ornamental Plants in Netherlands New Guinea. *Tijdschrift voor Entomologie,* 101(3–4): 223–228.

Thomas, W. A.
1941. See Reid, W. J., Jr., Chas. E. Smith, L. B. Reed, and W. A. Thomas.

Thompson, W. R.
1945. *A Catalogue of the Parasites and Predators of Insect Pests.* Section 1, Parasite Host Catalogue, Part 6, Parasites of the Lepidoptera, 131–258. The Imperial Parasite Service. Belleville, Ontario, Canada.

Thorpe, W. H.
1929. Biological Races in *Hyponomenta padella* L. *Journal of the Linnean Society of London. Zoology,* 36: 621–634.

Thorsteinson, A. J.
1960. See Gupta, P. D., and A. J. Thorsteinson.

Todd, E. L.
1962. In Beardsley, Notes and Exhibitions [of specimens]. *Proceedings of the Hawaiian Entomological Society,* 18(1): 5.

Tuli, S., and P. B. Mookherjee
1963. Ecological Studies on *Cadra* (*Ephestia*) *cautella* (Walker). *The Indian Journal of Entomology,* 25 (4): 379–380.

Turner, A. Jeffries
1913. Studies in Australian Microlepidoptera. *The Proceedings of the Linnean Society of New South Wales for the Year 1913,* 38(1) (149): 174–228.

Tutt, J. W.
1892. *The British Noctuae and Their Varieties,* 2: i–xviii, 1–180. Swan, Sonnenschein and Co., London.
1906. *A Natural History of the British Lepidoptera, a Text-book for Students and Collectors.* Pages i–xiii, 1–558, plate 1. Swan Sonnenschein and Co., London.

Ullyett, G. C.
1947. Mortality Factors in Populations of *Plutella maculipennis* Curtis (Tineidae: Lep.), and Their Relation to the Problem of Control. *South Africa Department of Agriculture and Forestry. Entomology Memoirs* 2(6): 7–202, figures 1–30.

Ullyett, G. C., and D. B. Schonkin
1940. A Fungus Disease of *Plutella maculipennis* Curt. in South Africa, with Notes on the Use of Entomogenous Fungi in Insect Control. *Union of South Africa, Department of Agriculture and Forestry, Science Bulletin 218,* 1–24, figures 1–8.

Usinger, R. L.
1966. See Linsley, E. G., and R. L. Usinger.

Van Deventer, W.
1904. Over de ontwikkelingstoestanden van eenige Microlepidoptera van Java. *Tijdschrift voor Entomologie,* 46: 79–90, plates 9–10.

Veitch, Robert
1923. The Minor Pests on Sugar Cane in Fiji. *Agricultural Report* 7: 9, plate 2: figure 2. Sydney.
1929. Report of the Chief Entomologist. In *Annual Report of the Department of Agriculture and Stock,* 1928–1929: 67–71. Queensland.

Venkatraman, T. V., and M. J. Chacko
1961. The Natural Enemies of *Marasmia trapezalis* (Guen.), a Pest of Maize and Jowar. *Current Science,* 30(2): 73–75, figures 1–3.

Vesey-Fitzgerald, Desmond
1941. Some Insects of Economic Importance in Seychelles. *Bulletin of Entomological Research,* 32 (2): 153–160.

Viette, Pierre E. L.
1949a. Catalogue of the Heterocerous Lepidoptera from French Oceania. *Pacific Science,* 3: 315–337.
1949b. Les Lépidoptères Gelechiidae du Pacifique sud. *Bulletin du Muséum National d'Histoire Naturelle* (2e Série) 21(1): 98–104.
1951. Supplément au catalogue des Lépidoptères Hétérocères de l'Océanie française. *Bulletin de la Societé Entomologique de France,* 56(1): 14–16.
1952. *Results of the Norwegian Scientific Expedition to Tristan da Cunha, 1937–1938.* 23: *Lepidoptera.* Pages 1–19, figures 1–19, plates 1–3, map. Jacob Dybwad, Oslo.
1955. See Paulian, R., and P. Viette.
1956. Les types de Tinéides (s.l.) de Zeller d'Afrique de sud. Arkiv för Zoologi utgivet av Kungl. *Svenska Vetenskaps-Akademien,* Series 2, 8(6): 531–539, figures 1–12.
1957. La faune entomologique de l'ile de la Reunion. *Mémoires de l'Institute Scientifique de Madagascar.* Série E, Entomologie, 8: 138–226, illustrated.
1958. Lépidoptères Tinéides (s.l.) et Pyrales. Societas Scientiarum Fennica. *Commentationes Biologicae,* 17(8): 1–12, figures 1–3.

Vos, H. C. C. A. A.
1953. Introduction in Indonesia of Angitia cerophaga Grav., a Parasite of *Plutella maculipennis* Curt. *General Agricultural Research Station,* 134: 1–32, figures 1–13. Bogor (Java).

Wakely, S.
1958. Notes on the Tineina. *The Entomologist's Record and Journal of Variation,* 70(5): 137–139.

Walker, Francis
1856–
1866. *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* 1856, 9: 146–252; 1857, 11: 493–764; 1858, 15: 1521–1888; 1859, 17: 255–508; 18: 509–798; 19: 799–1036; 1863, 28: 287–561; 1864, 29: 563–835; 30: 837–1096; 1865, 32 (Supplement 2): 323–706; 34 (Supplement 4); 1121–1533; 1866, 35: 1536–2040.
1864. Catalogue of the Heterocerous Lepidopterous Insects Collected at Sarawak, in Borneo, by Mr. A. R. Wallace, with Descriptions of New Species. *Journal of the Proceedings of the Linnean Society. Zoology,* 7: 160–198.

Walker, Harry G., and Lauren D. Anderson
1937. Control of Larvae of Diamond-back Moth, *Plutella maculipennis* Curtis. *Journal of Economic Entomology,* 39(3): 443–448.
1943. Control of Aphids and Diamond-back Moth Larvae on Collards with Rotenone-nicotine Dusts. *Journal of Economic Entomology* 36(2): 343–344.

Wallace, Alfred R., and Frederic Moore
1866. List of Lepidopterous Insects Collected at Takow, Formosa, by Mr. Robert Swinhoe. *Proceedings of the Zoological Society of London,* 1866: 355–365.

Walsingham, Lord (Thomas de Grey)
1882. Notes on Tineidae of North America. *Transactions of the American Entomological Society,* 10: 165–204.
1887a. A Revision of the Genera Acrolophus, Poey, and Anaphora, Clem. *Transactions of the Entomological Society of London,* 1887: 137–173, plates 7, 8.
1887b. In Moore, *The Lepidoptera of Ceylon* [1884–1887], 3: i–xv, 1–578, plates 151–215.
1892. On the Microlepidoptera of the West Indies. *Proceedings of the Zoological Society of London,* 491–549, 1 plate.
1894. XXII: Catalogue of the Pterophoridae, Tortricidae, and Tineidae of the Madeira Islands, with Notes and Descriptions of New Species. *Transactions of the Entomological Society of London,* 1894: 535–555.
1897. Revision of the West-Indian Microlepidoptera, with Descriptions of New Species. *Proceedings of the Zoological Society of London,* 53–183.
1899. Description of Two New Species of Tineina from Bengal. *Indian Museum Notes,* 4(3): 105–107, plate 7.
1907. *Fauna Hawaiiensis or the Zoology of the Sandwich (Hawaiian) Isles,* edited by David Sharp. 1(5): Microlepidoptera. Pages 469–759, plates 10–25. University Press, Cambridge.
1908. Microlepidoptera of Tenerife. *Proceedings of the Zoological Society of London,* 1907: 911–1034, figures 241–243, plates 51–53.
1909–
1915. In Godman and Salvin, *Biologia Centrali-Americana,* 42 (*Lepidopera-Heterocera,* 4): i–xii, 1–24 (1909); 25–40 (1910); 41–112 (1911); 113–168 (1912); 169–224 (1913); 225–392 (1914); 393–482 (1915); figures 1–30, plates 1–10. London.

Walsingham, Lord, and John Hartly Durrant
1897. The Diamond-back Moth: *Plutella cruciferarum, Z.* (1843), a Synonym of *Cerostoma maculipennis,* Crt. (1832). *The Entomologist's Monthly Magazine,* Series 2, 8(33): 173–175.

Watson, J. R.
1917. Florida Truck and Garden Insects. *University of Florida Agricultural Experiment Station, Bulletin* 134: 35–127.

Wells, W. G.
1942. *Annual Report of the Department of Agriculture and Stock,* 1941–42: 1–27. Queensland.
1943. *Review of Applied Entomology,* 31 (Series A, part 6): 265.

Westwood, J. O.
[1846–
1850]. See Doubleday, Edward, and John W. Westwood.
1854. *Index Entomologicus; or, a Complete Illustrated Catalogue, Consisting of Upwards of Two Thousand Accurately Coloured Figures of the Lepidopterous Insects of Great Britain, by W. Wood.* A new and revised edition, with supplement. Pages i–vii, 1–298, plates 1–59.

Whalley, Paul E. S.
1960. The Genus *Ephestia* Guenée (Lep., Phycitinae). *Entomologist's Gazette,* 11(4): 183–184.
Wileman, A. E., and Richard South
1918. New Species of Pyralidae from Formosa. *The Entomologist,* 51(665): 217–219.
Willcocks, F. C.
1916. The Insect and Related Pests of Egypt. The Insect and Related Pests Injurious to the Cotton Plant. *Sultanic Agricultural Society,* 1(1): i–xvii, 1–339, plates 4–10.
1922. A Survey of the More Important Economic Insects and Mites of Egypt. *Sultanic Agricultural Society* (Technical Section), 1: i–v, 1–482. Cairo.
Williams, F. X.
1931. *Handbook of Insects and Other Invertebrates of Hawaiian Sugar Cane Fields.* Pages 1–400, figures 1–190. Hawaiian Sugar Planter's Association Experiment Station, Honolulu.
Wise, K. A. J.
1955. Pests of Stored Products in New Zealand. I: Family Phycitidae (Lepidoptera). *New Zealand Journal of Science and Technology,* 36(5): 523–530.
Wocke, M. F.
1871. In Staudinger and Wocke, *Catalog der Lepidopteren des Europaischen Faunengebiets. II: Microlepidoptera.* Pages 201–426. Hermann Burdach, Dresden.
Wolff, Niels L.
1959. Bemaerkninger om nogle danske Pyralider (Lepidoptera) (notes on some Danish Pyralid Moths). *Flora og Fauna,* 65(4): 113–133, figures 1–9.
1964. The Lepidoptera of Greenland. *Meddelelser om Grønland,* 159(11): 1–74, figures 1–55, plates 1–21.
Wollaston, T. Vernon
1879. XXXVIII: Notes on the Lepidoptera of St. Helena, with Descriptions of New Species. *The Annals and Magazine of Natural History.* Series 5, 3: 329–343.
Wood, W.
1839. *Index Entomologicus; or, a Complete Illustrated Catalogue Consisting of 1944 Figures of the Lepidopterous Insects of Great Britain.* Pages i–xii, 1–226, plates 1–54.
Woodroffe, G. E., and B. J. Southgate
1952. *Monopis crocicapitella* (Clem.) (*Lep. Tineidae*) Infesting Felt-lagging on a Water Pipe at Harrow, Middlesex. *The Entomologist's Monthly Magazine,* 88(1063): 288.
Yamanaka, H.
1960. On the Known and Unknown Species of the Japanese *Herpetogramma* (Lepidoptera, Pyralididae). *Tinea,* 5(2): 321–327, figures 1–14. Tokyo.
Zacher, Freidrich
1916. Die afrikanischen Baumwollschädlinge, unter besonderer Berücksichtigung der von Busse und Kersting in Togo gesammelten Arten. *Arbeiten aus Kaiserlichen Biologischen Anstalt für Land- und Forstwirtschaft,* 9(1): 121–230, figures 1–83.
Zaguliaev, A.
1965. Moli i ognevki-vrediteli zapasov. *Zashchita rasteniu ot vrediteleĭ i bolizneĭ,* 10(1): 31–32, figures 1–4.
Zeller, P. C.
1843. Ueber *Phalaena Tin. xylostella* Lin. (*Plut. xylost.* auctor.) *Stetteiner Entomologische Zeitung herausgegeben von dem entomologischen Vereine zu Stettin,* 4: 281–283.
1847. Bemerkungen über die auf einer Reise nach Italien und Sicilien beobachteten Schmetterlinge. *Isis von Oken,* 40(12): 882–914.
1852. Lepidoptera Microptera, quae J. A. Wahlberg in Caffrorum Terra Collegit. Kongl. *Vetenskaps-Akademiens Handlingar för Är 1852:* 1–120.
1853. Drei Javanische Nachfalter. *Bulletin de la Société Impériale des Naturalistes de Moscow,* 26(2): 502–516, 1 plate.
1867. Einige von Herrn Pickard Cambridge, besonders in Aegypten und Palästina, gesammelte Microlepidoptera. *Entomologische Zeitung hereausgegeben von dem entomologischen Vereine zu Stettin,* 28 (10–12): 365–415, plate 2.
1873. Beiträge zur Kenntniss der nordamerikanischen Nachfalter, besonders der Microlepidopteren. *Gesellschaft in Wien,* 1873: 201–334, plates 3–4.
Zimmerman, Elwood C.
1938. Cryptorhynchinae of Rapa. *Bernice P. Bishop Museum Bulletin* 151: 1–75, figures 1–6, plates 1–4.
1958a. *Insects of Hawaii.* 7: Macrolepidoptera, i–ix, 1–542, 423 figures, bibliography. University of Hawaii Press, Honolulu.
1958b. *Insects of Hawaii.* 8: Lepidoptera: Pyraloidea, i–ix, 1–456, figures 1–347. University of Hawaii Press, Honolulu.
Zimmerman, Elwood C., and N. D. Riley
1966. *Gracilaria* Haworth, 1828 (Insecta, Lepidoptera): Proposed Addition to the Official List of Generic Names. Z.N.(S.), 1757. *Bulletin of Zoological Nomenclature,* 23(4): 186–187.
1967. Further Comment on the Case of *Gracilaria* versus *Gracillaria* (Insecta, Lepidoptera). Z.N.(S), 1757. *Bulletin of Zoological Nomenclature,* 24(5): 267–268.
Zincken, Johann
1818. Die Linneischen Tineen in irhe natürlichen Gattungen autgelöst und beschreiben. *Germar Magazin Entomologie,* 1818, 3: 113–176.

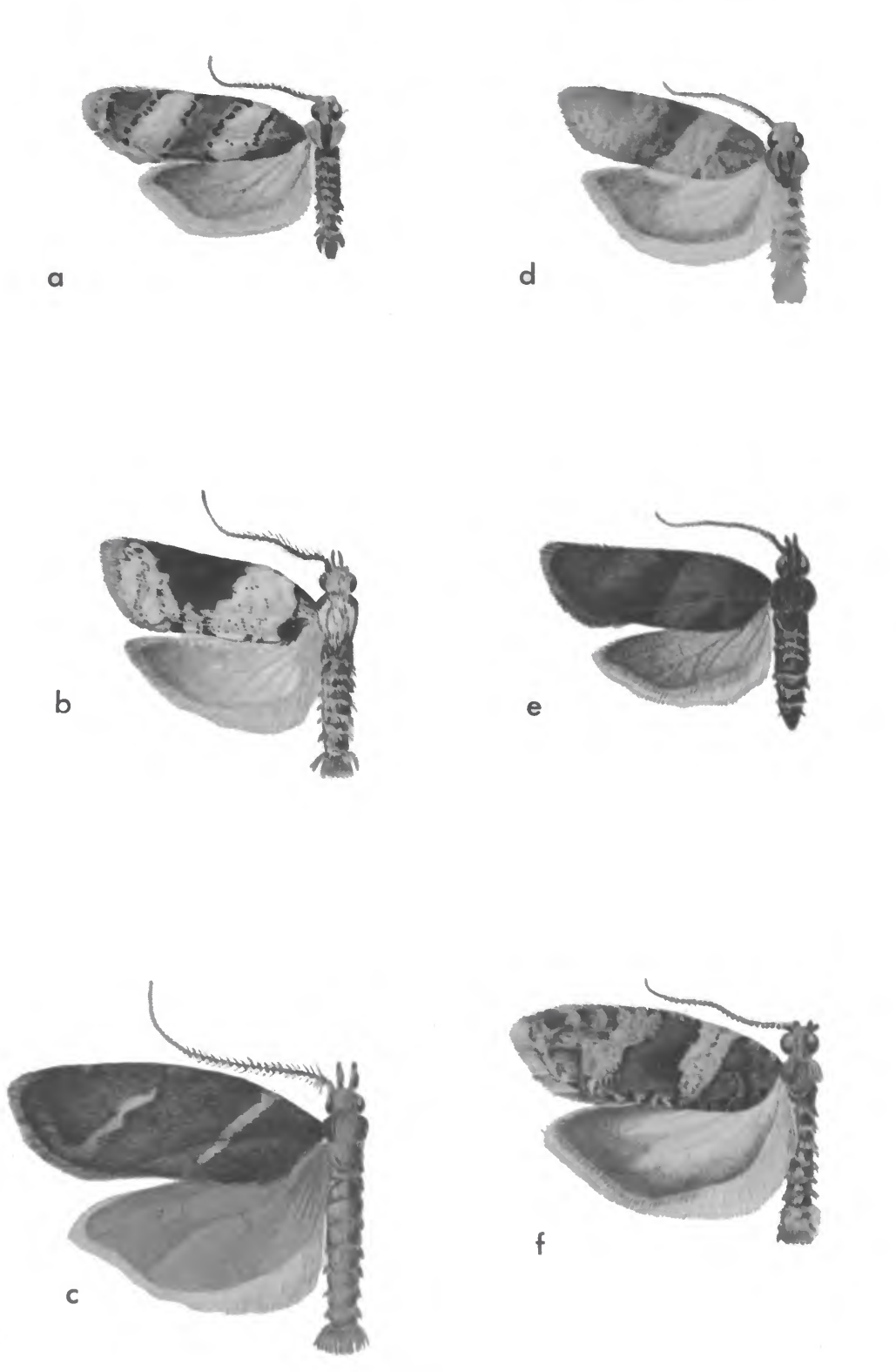
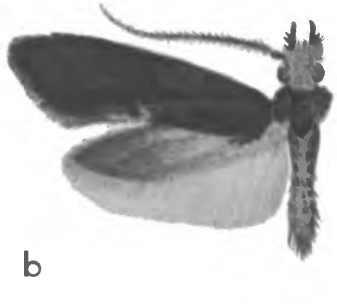


PLATE 1.—*a, Dichelopa honoranda* Meyrick; *b, D. anthracodelta,* new species; *c, D. iochorda* Meyrick; *d, D.* myopori, new species; *e, D. dendrophila,* new species; *f, D. deltozancla,* Meyrick.

PLATES



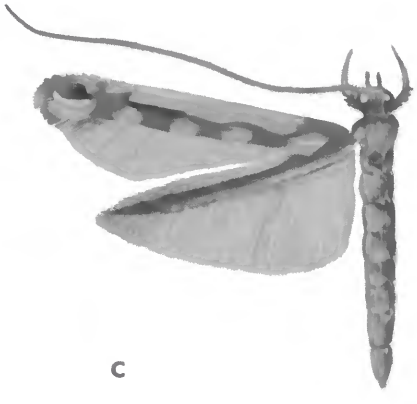


PLATE 2.—*a, Decadarchis melanospila,* new species; *b, Petula phalarata,* new species; *c, Parectopa pontificalis* Meyrick; *d, Echinoscelis hemithia* Meyrick, dark form; *e, E. hemithia* Meyrick, typical; *f, Gracillaria hilaropis* Meyrick.

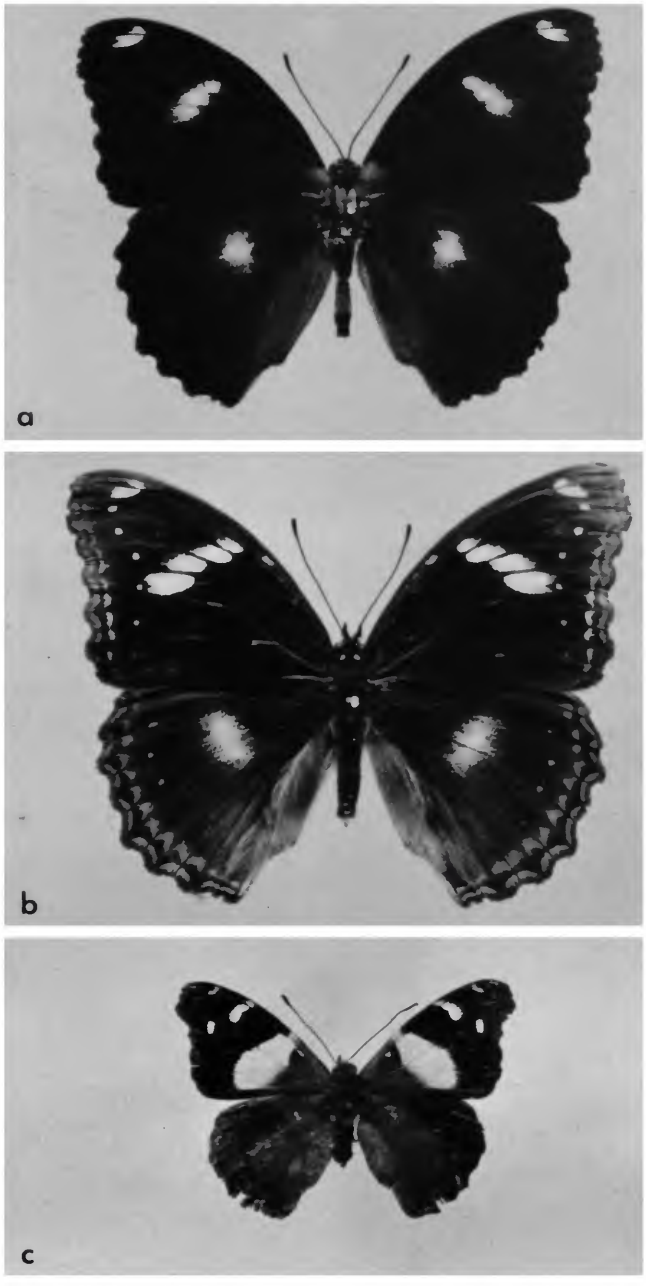


PLATE 3.—*a, Hypolimnas bolina* (Linnaeus), ♂; *b, H. bolina* (Linnaeus), ♀; *c, Vanessa* (*Bassaris*) *itea* (Fabricius), ♀.

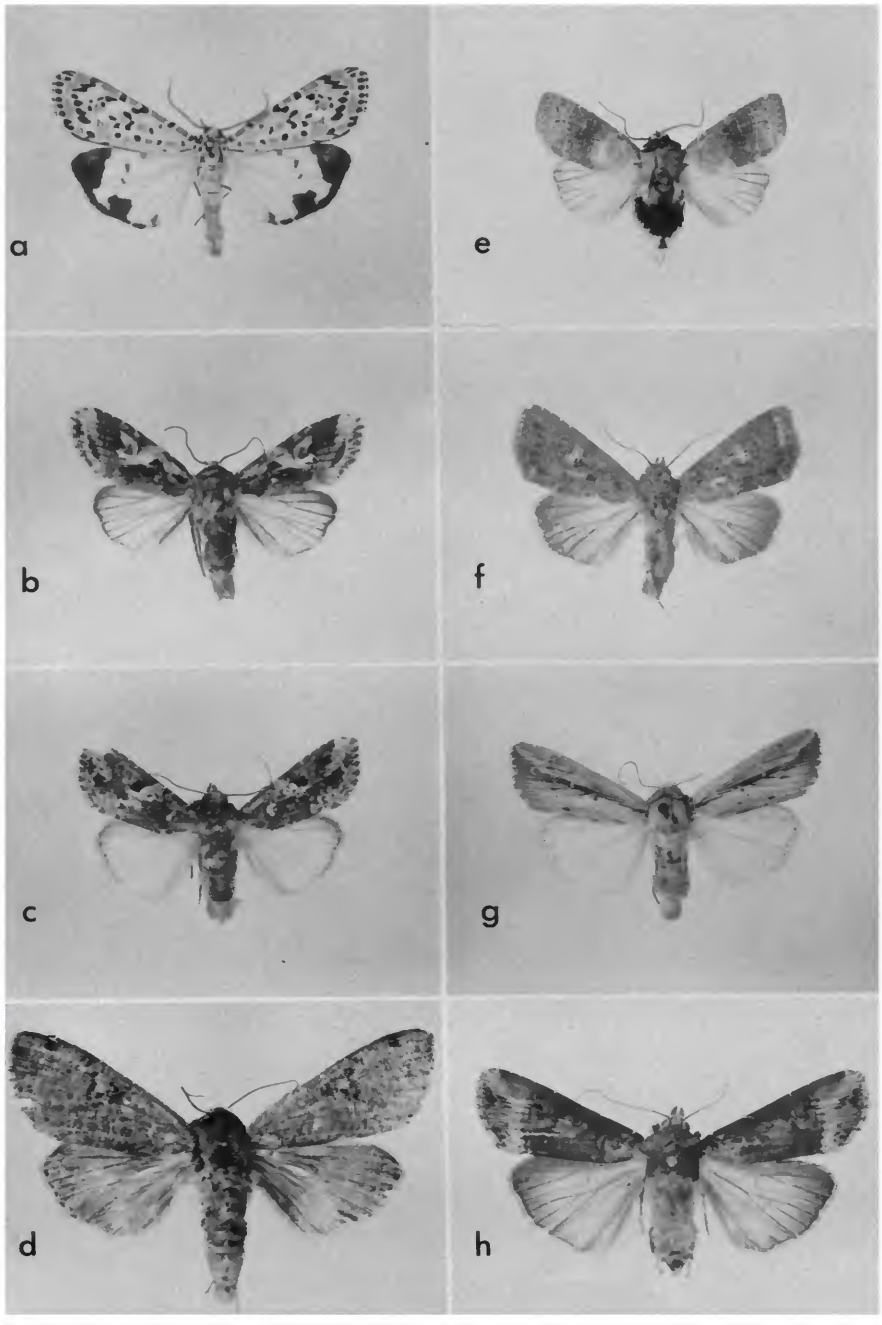


PLATE 4.—*a, Utetheisa pulchelloides* Hampson, ♂; *b, Prodenia litura* (Fabricius), ♂; *c, Spodoptera mauritia* (Boisduval), ♂; *d, Tiracola plagiata* (Walker), ♂; *e, Elydna nonagrica* (Walker), ♂; *f, Platysenta illecta* (Walker), ♂; *g, Mythimna loreyi* (Duponchel), ♂; *h, Peridroma saucia* (Hübner), ♀.

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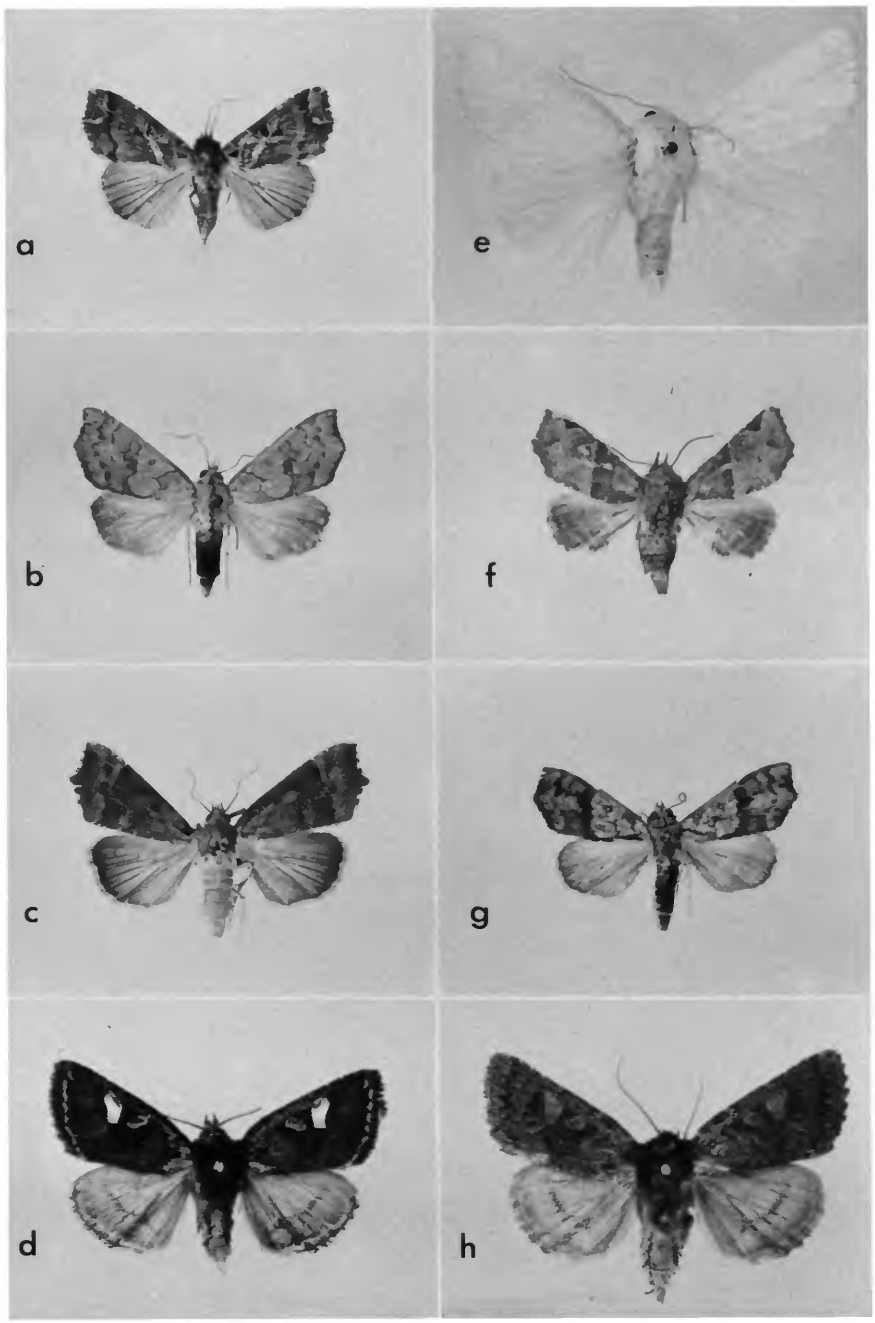

PLATE 5.—*a, Callopistria meridionalis* Collenette, ♀; *b, Anomis flava flava* (Fabricius), ♀; *c, A. vitiensis* (Butler), ♀; *d, Euplexia vetula,* new species, ♀ paratype; *e, Chasmina tibialis* (Fabricius), ♂; *f, Phlegetonia delatrix* (Guenée), ♂; *g, Anomis flava flava* (Fabricius), ♂, dark form; *h, Euplexia vetula,* new species, ♀ holotype.

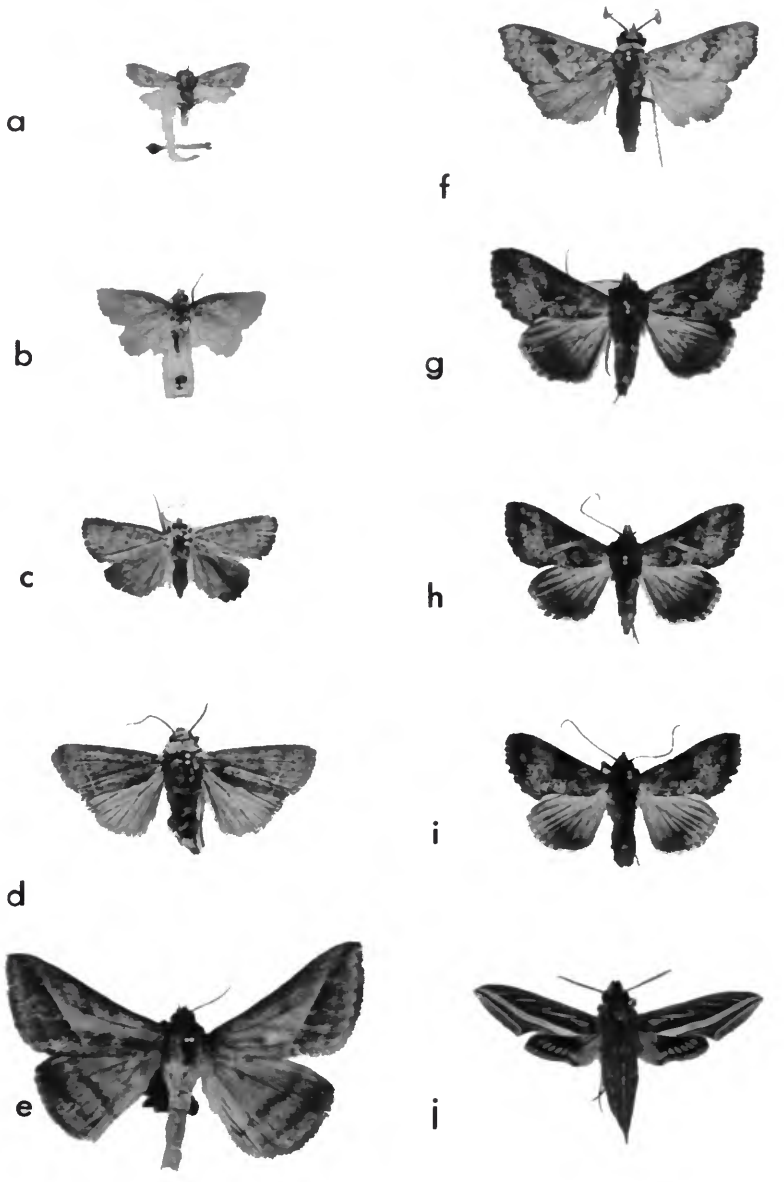

PLATE 6.—*a, Celama insularum* Collenette, (holotype); *b, Amyna natalis* Walker, ♂; *c, A. natalis* Walker, ♀; *d, Elydna nonagrica* Walker, ♀; *e, Mocis frugalis* (Fabricius), ♂; *f, Anomis flava flava* (Fabricius), ♂; *g, Chrysodeixis albostriata* (Bremer and Gray), ♀; *h, C. albostriata* (Bremer and Gray), ♀; *i, C. albostriata* (Bremer and Gray), ♂; *j, Tippotion celerio* (Linnaeus), ♂.

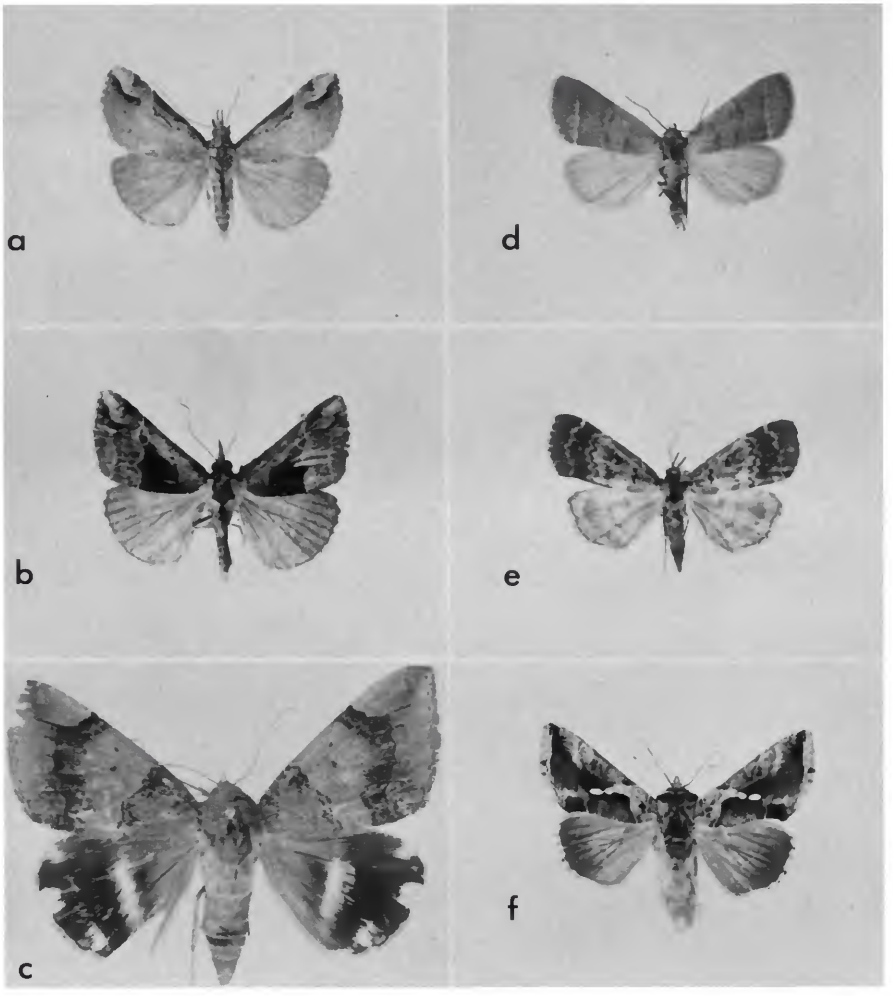

PLATE 7.—*a, Hypena longfieldae* Collenette, ♂ : *b, H. longfieldae Collenette,* ♂, dark form; *c, Achaea janata* (Linnaeus) ♀ ; *d, Simplicia caeneusalis* (Walker), ♀ ; *e, Hydrillodes melanozona* Collenette, ♀ ; *f, Chrysodeixis chalcites* (Esper), ♂ .

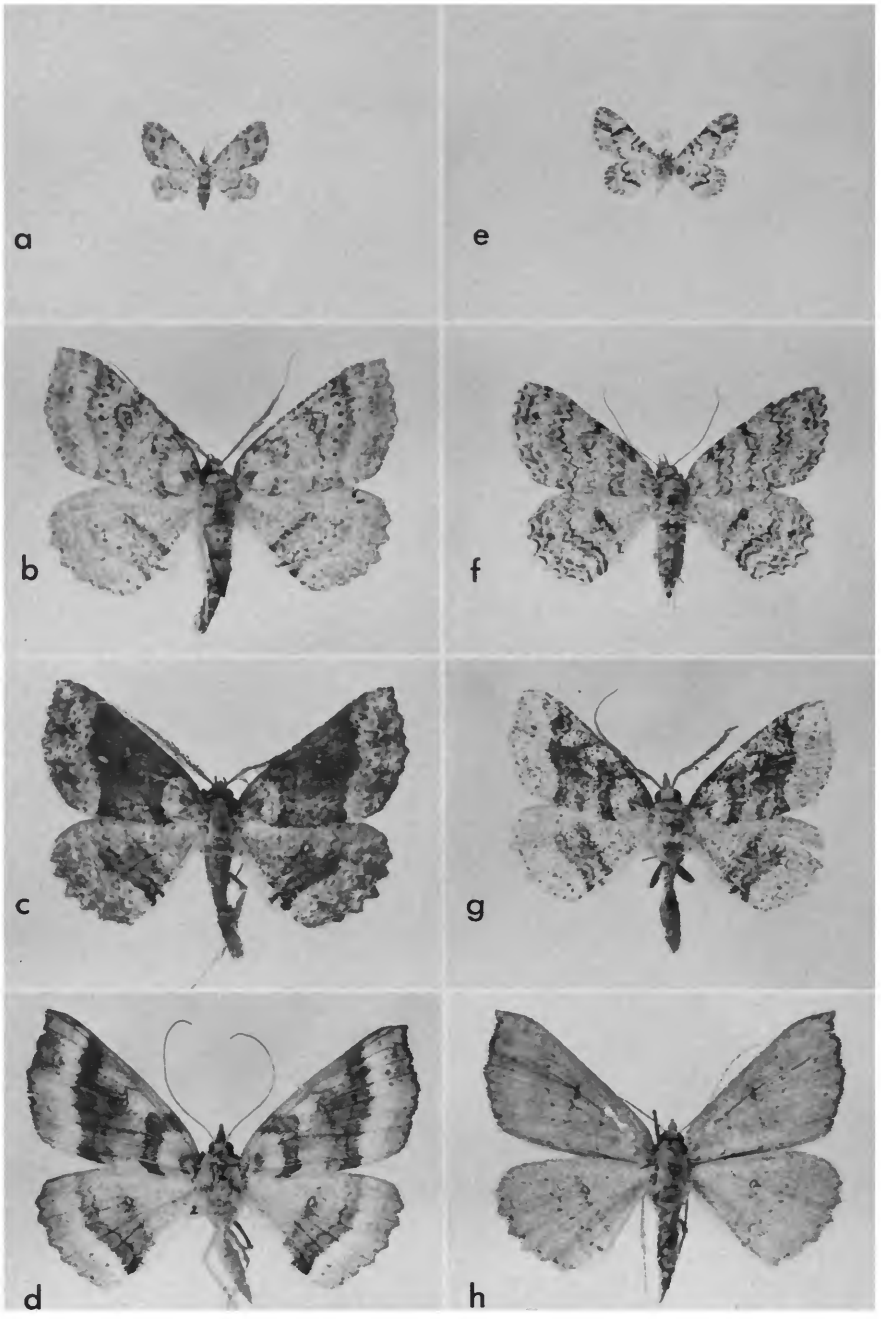

PLATE 8.—*a, Chloroclystis pitoi,* new species, ♀ paratype; *b, Cleora dodonaeae* Prout, ♂; *c, C. stenoglypta* Prout, ♂; *d, C. stenoglypta* Prout, ♀; *e, Gymnoscelis concinna* Swinhoe, ♀; *f, Cleora dodonaeae* Prout, ♀; *g, C. stenoglypta* Prout, ♂; *h, C. stenoglypta* Prout, ♀.

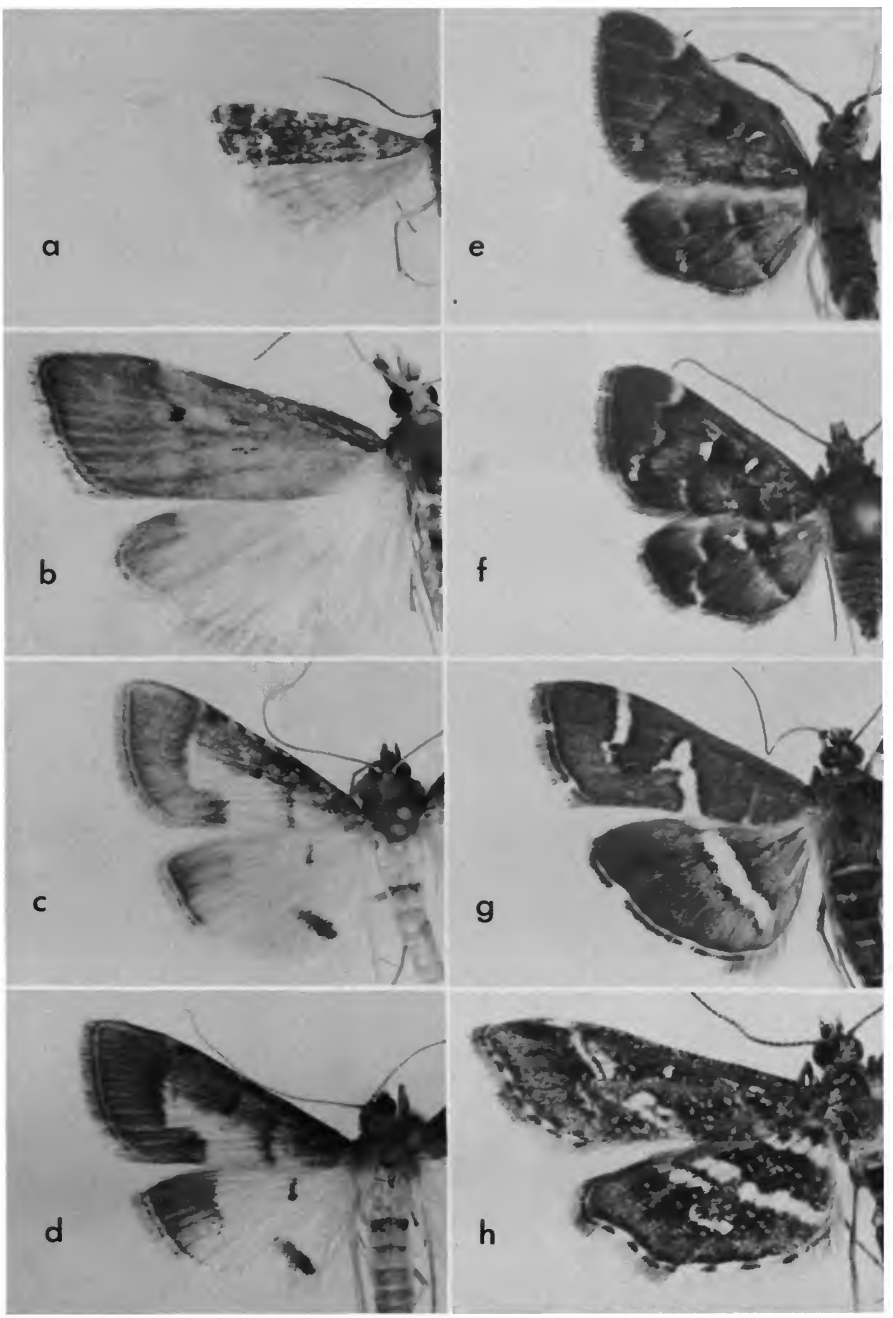

PLATE 9.—*a, Lathroteles obscura,* new species, ♀ paratype; *b, Scoparia psednopa* Meyrick, ♀; *c, Marasmia hemicrossa* Meyrick, ♂; *d, M. hemicrossa* Meyrick, ♀; *e, Piletocera signiferalis isola,* new subspecies, ♂ holotype; *f, P. signiferalis isola,* new subspecies, ♀ paratype; *g, Spoladea recurvalis* (Fabricius), ♀; *h, Diasemiopsis ramburialis* (Duponchel), ♀.

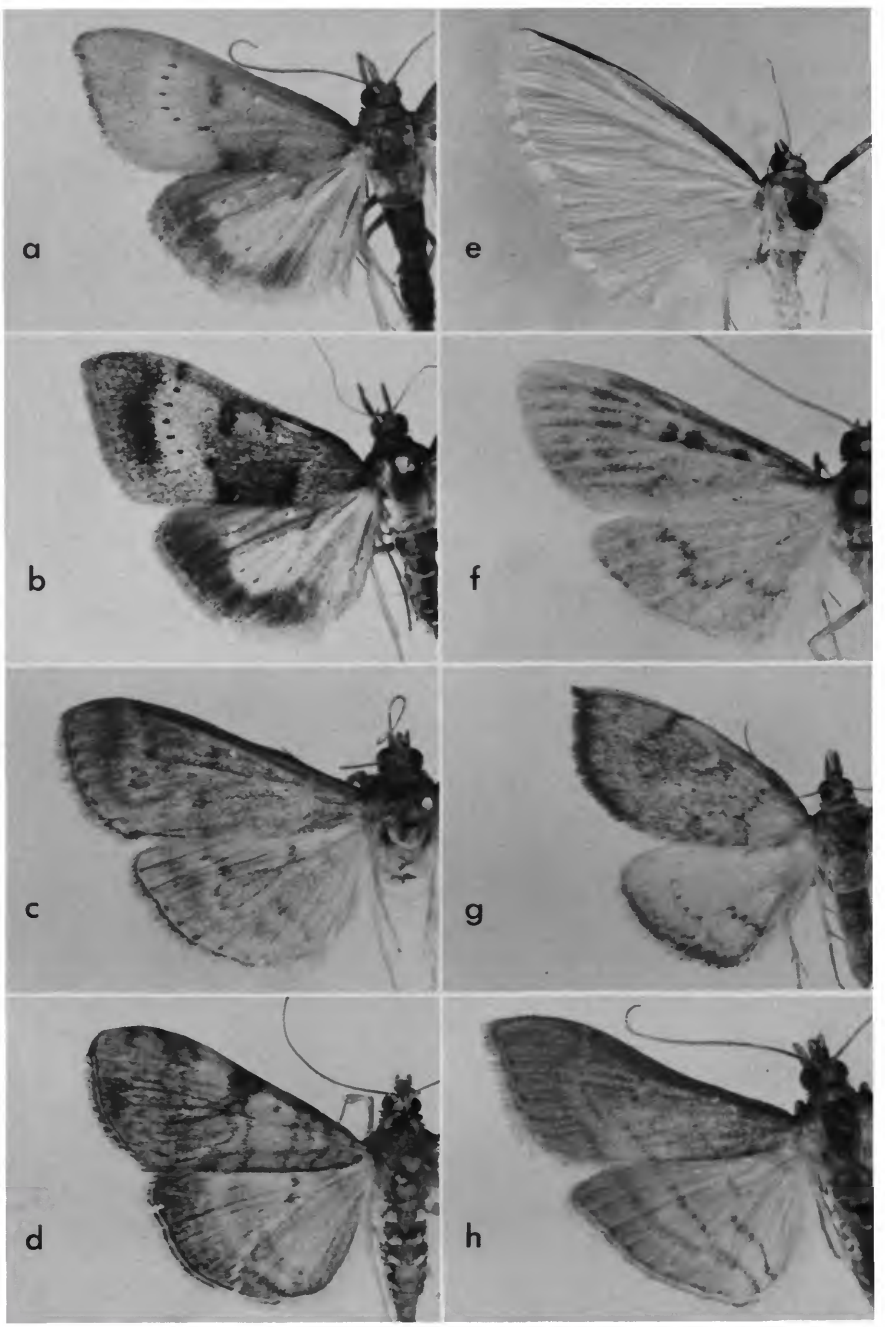

PLATE 10.—*a, Uresiphita polygonalis ochrocrossa,* new subspecies, ♂ holotype; *b, U. polygonalis ochrocrossa,* new subspecies; ♀ paratype; *c, Herpetogramma licarsisalis* (Walker), ♀; *d, Glyphodes eudoxia,* new species, ♀ paratype; *e, Tirsa fiona,* new species, ♀ paratype; *f, Cometura picrogramma* Meyrick, ♂; *g, Hyalobathra variabilis,* new species, ♀ paratype; *h, Marasmia trapezalis* Guenée, ♀.

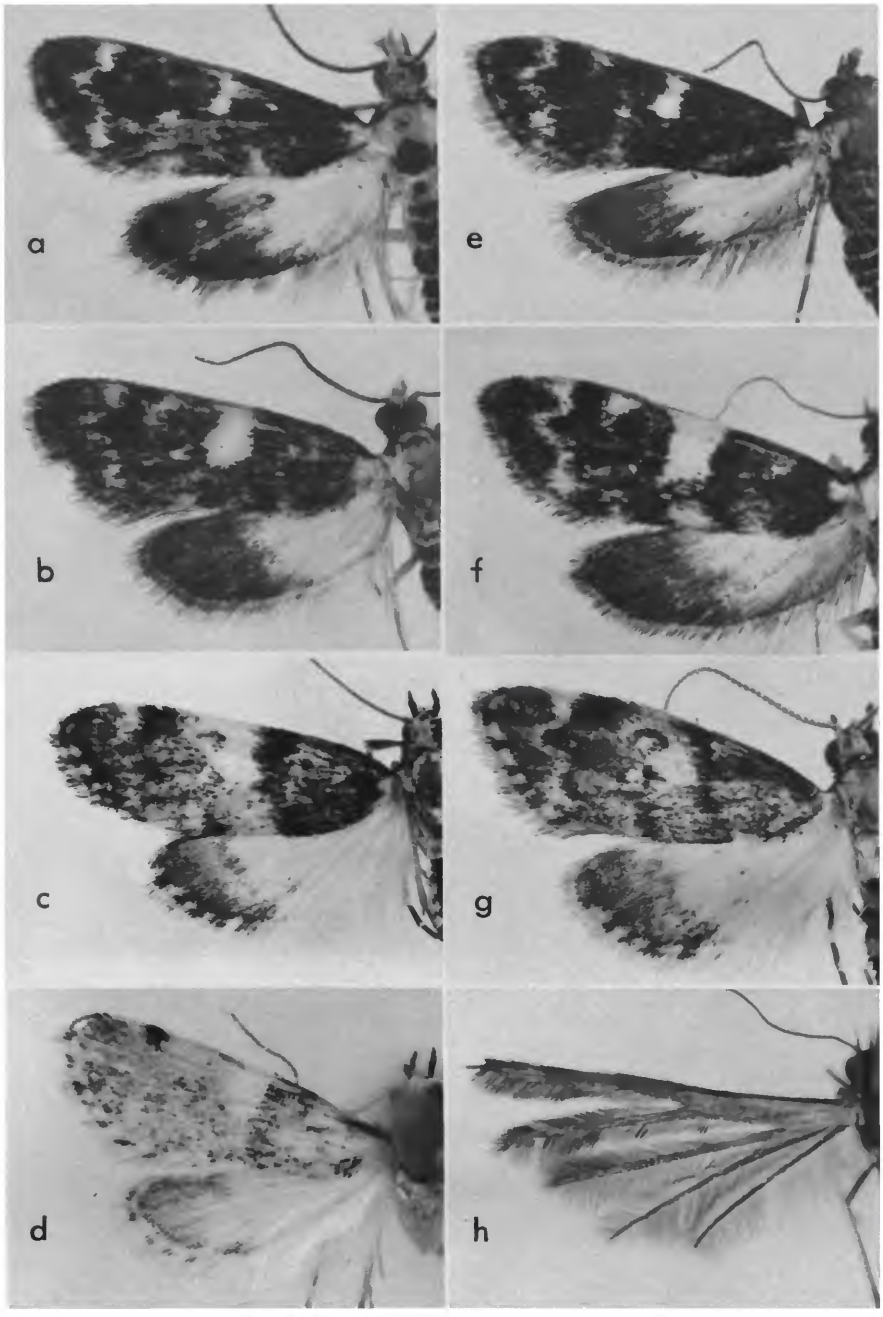

PLATE 11.—*a, Metasia chionostigma,* new species, ♂ holotype; *b, M. chionostigma,* new species, ♂ paratype; *c, M. gnorisma,* new species, ♀ paratype; *d, M. empelioptera,* new species, ♂ holotype; *e, M. chionostigma,* new species, ♀ paratype; *f, M. chionostigma,* new species, ♀ paratype; *g, M. gnorisma,* new species, ♂ holotype; *h, Stangeia rapae,* new species, ♀ paratype.

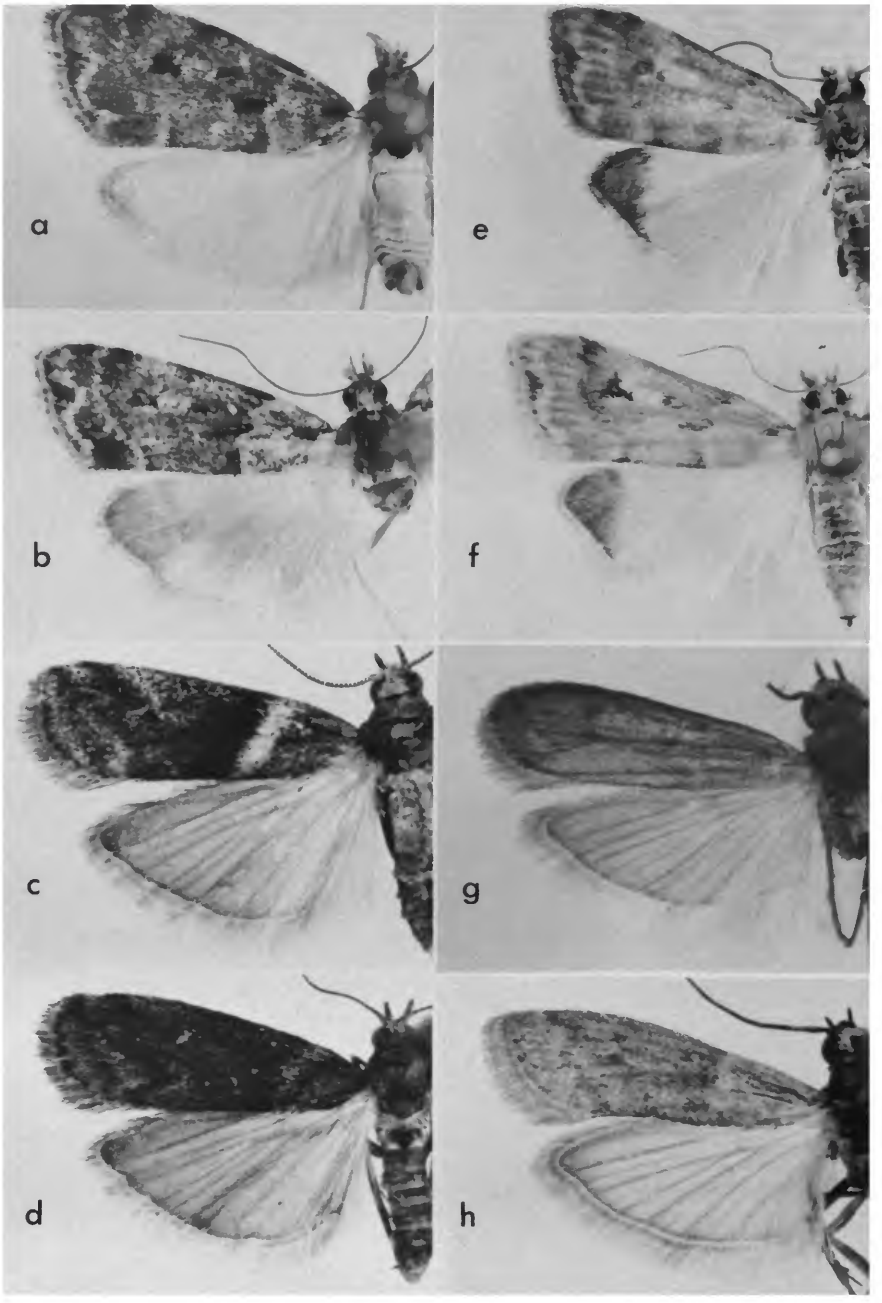

PLATE 12.—*a, Scoparia exterminata* Meyrick, ♂ ; *b, S. exterminata* Meyrick, ♀ ; *c, Eurhodope ardescens* Meyrick, ♂ ; *d, E. ardescens* Meyrick, ♀ ; *e, Scoparia tivira,* new species, ♂ paratype; *f, S. tivira,* new species, ♀ paratype; *g, Homoeosoma inexplorata* Meyrick, ♂ ; *h, Cadra cautella* (Walker), ♂ .

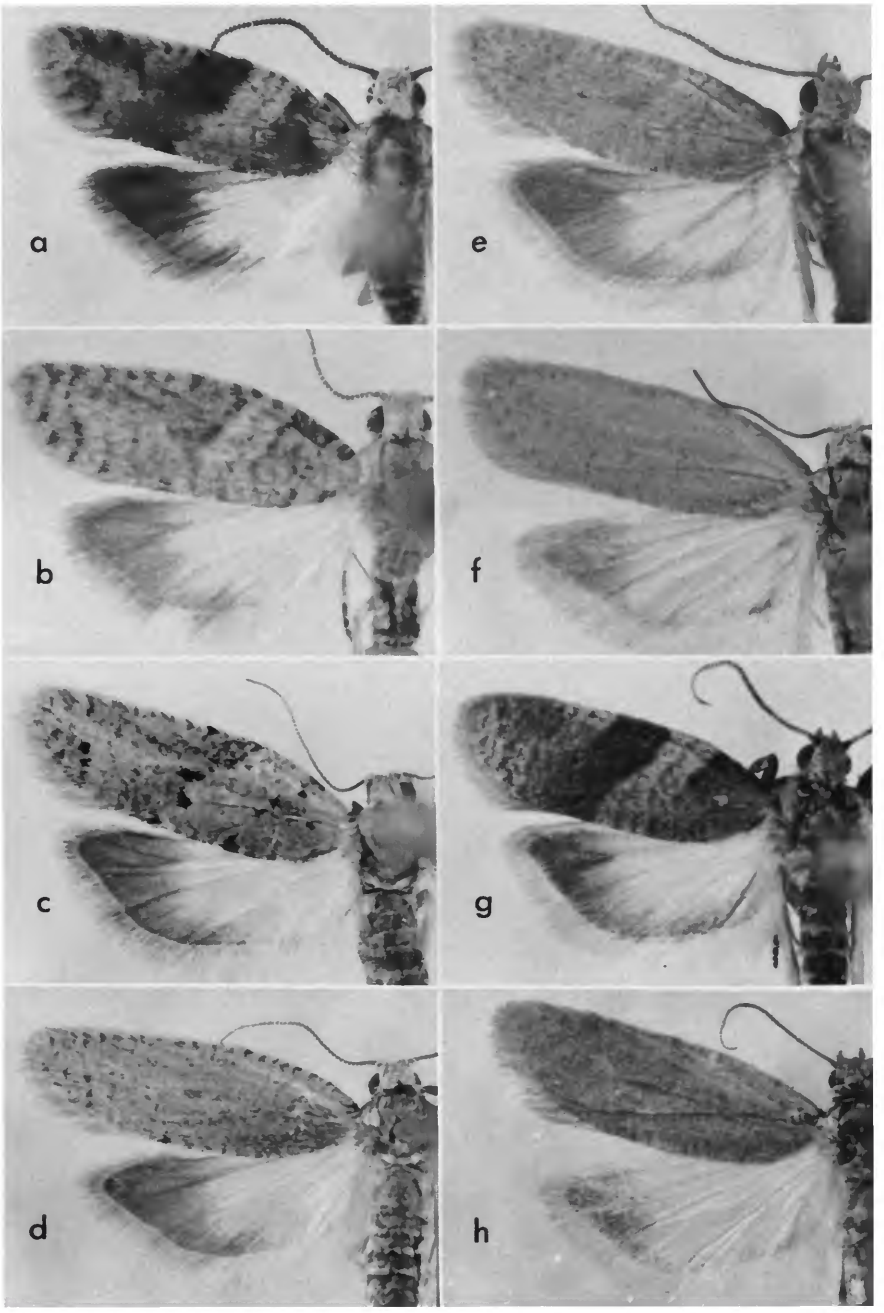

PLATE 13.—*a, Dichelopa sericopis* Meyrick, ♂; *b, D. sericopis* Meyrick, ♂; *c, D. sericopis* Meyrick, ♀; *d, D. sericopis* Meyrick, ♀; *e, D. lupicinia,* new species, ♂ holotype; *f, D. lupicinia,* new species, ♀ paratype; *g, D. myopori,* new species, ♂ paratype; *h, D. myopori,* new species, ♀ paratype.

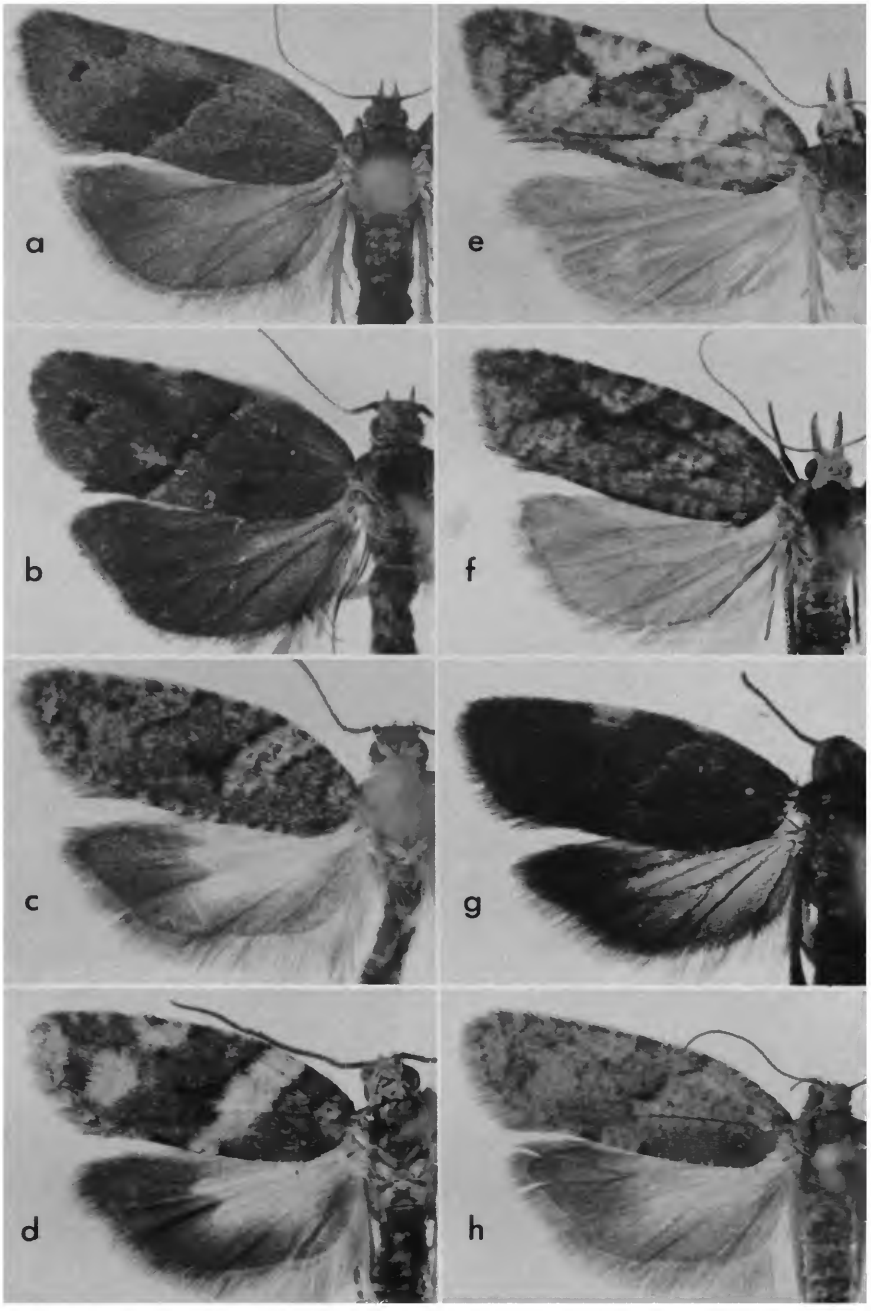

PLATE 14.—*a, Dichelopa ceramocausta* Meyrick, ♂; *b, D. ceramocausta* Meyrick, ♀; *c, D. deltozancla* Meyrick, ♂; *d, D. deltozancla* Meyrick, ♂ (extreme form); *e, D. messalina,* new species, ♀ paratype; *f, D. messalina,* new species, ♀ holotype; *g, D. dendrophila,* new species, ♂ holotype; *h, D. deltozancla* Meyrick, ♀.

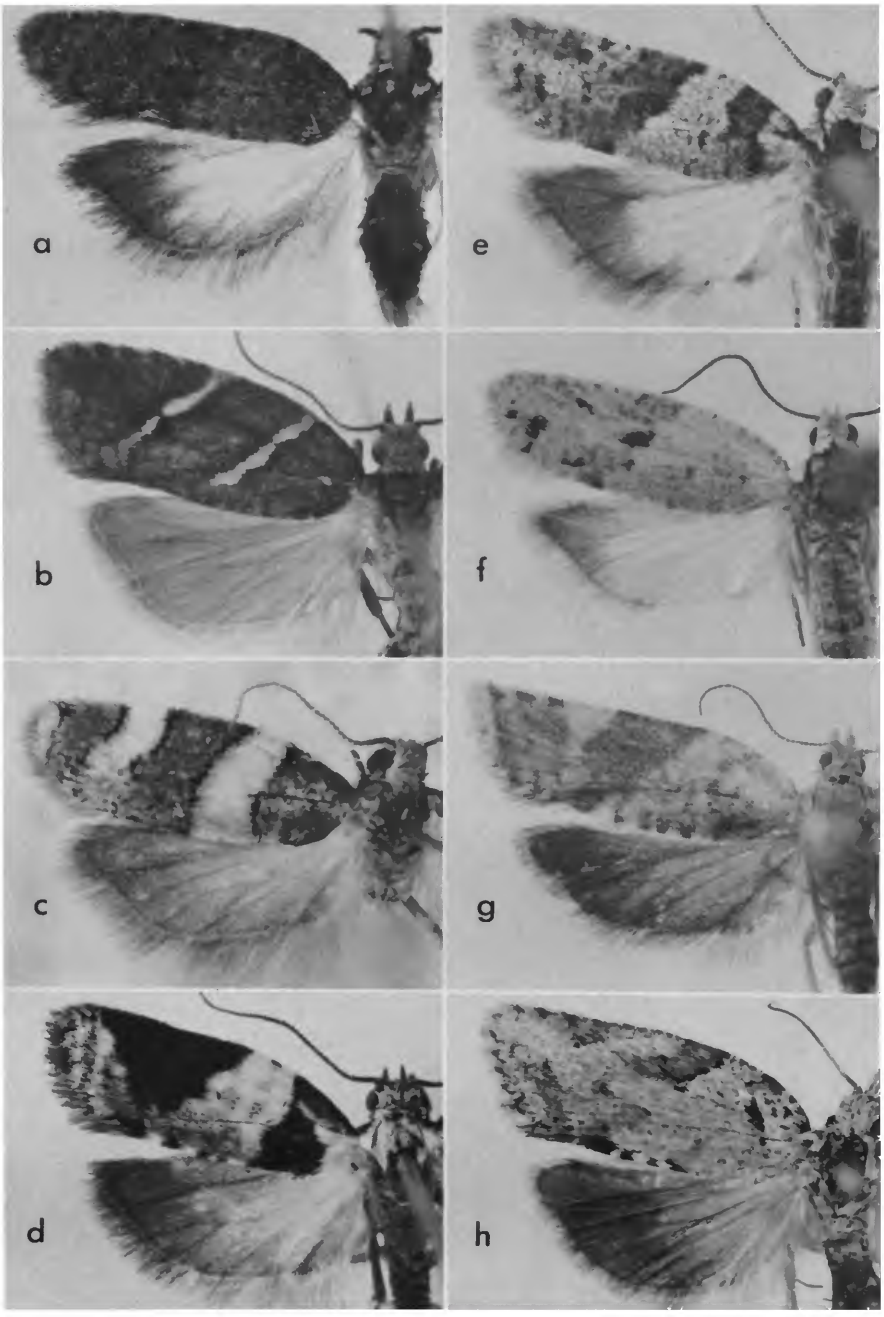

PLATE 15.—*a, Dichelopa rhodographa,* new species, ♂ holotype; *b, D. iochorda* Meyrick, ♂; *c, D. honoranda* Meyrick, ♂; *d, D. anthracodelta,* new species, ♂ holotype; *e, D. vaccinii,* new species, ♂ holotype; *f, D. vaccinii,* new species, ♀ paratype; *g, D. argyrospiloides,* new species, ♀ holotype; *h, D. exulcerata* Meyrick, ♂.

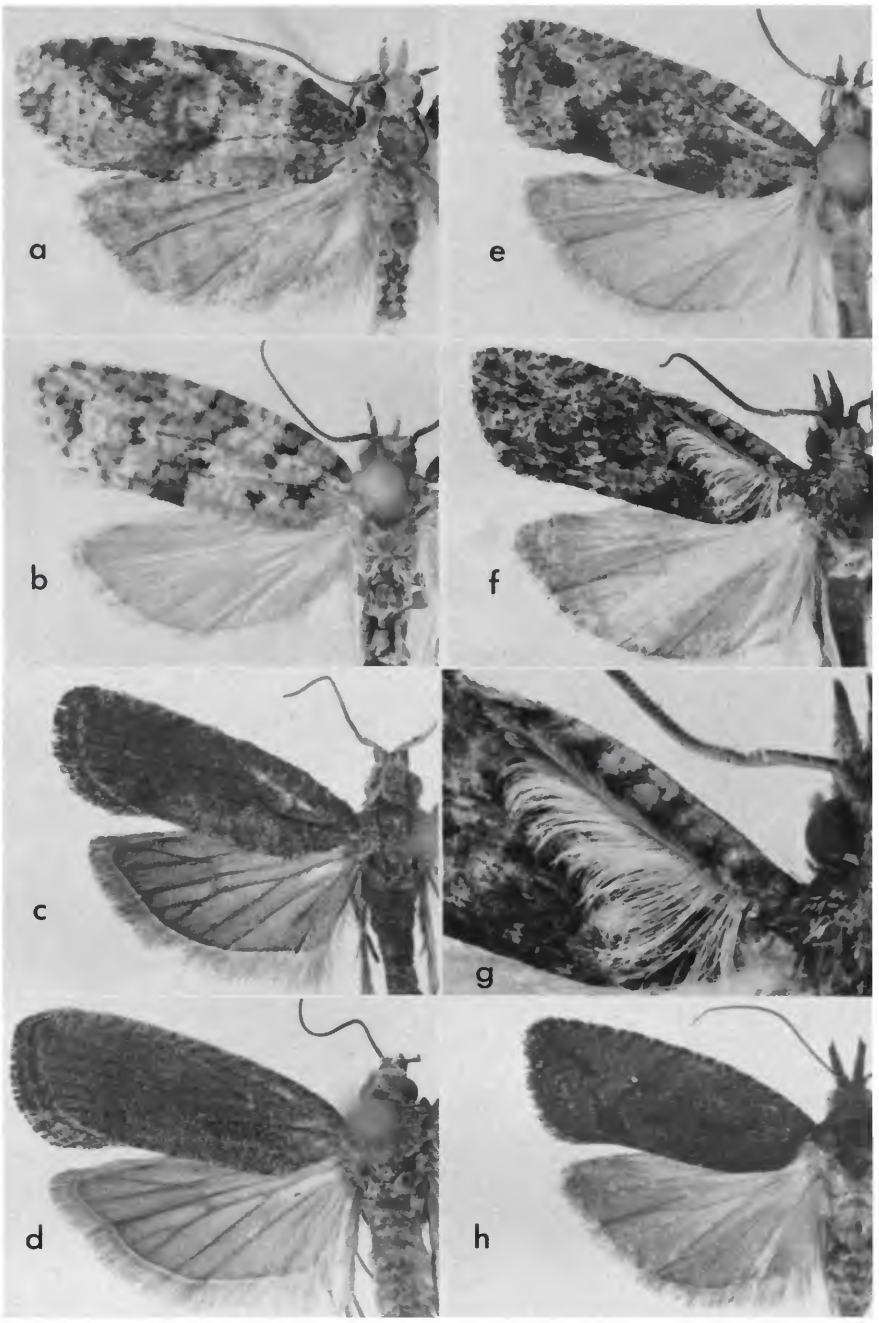

PLATE 16.—*a, Dichelopa pulcheria,* new species, ♂ holotype; *b, Nesoscopa exsors* Meyrick, ♂; *c, Strepsicrates holotephras* (Meyrick), ♂; *d, S. holotephras* (Meyrick), ♀; *e, S. thyellopis* (Meyrick), ♂; *f, S. thyellopis* (Meyrick), ♂, with costal hair penil expanded; *g, S. thyellopis* (Meyrick), ♂, same as above, enlarged; *h, S. thyellopsis* (Meyrick), ♀.

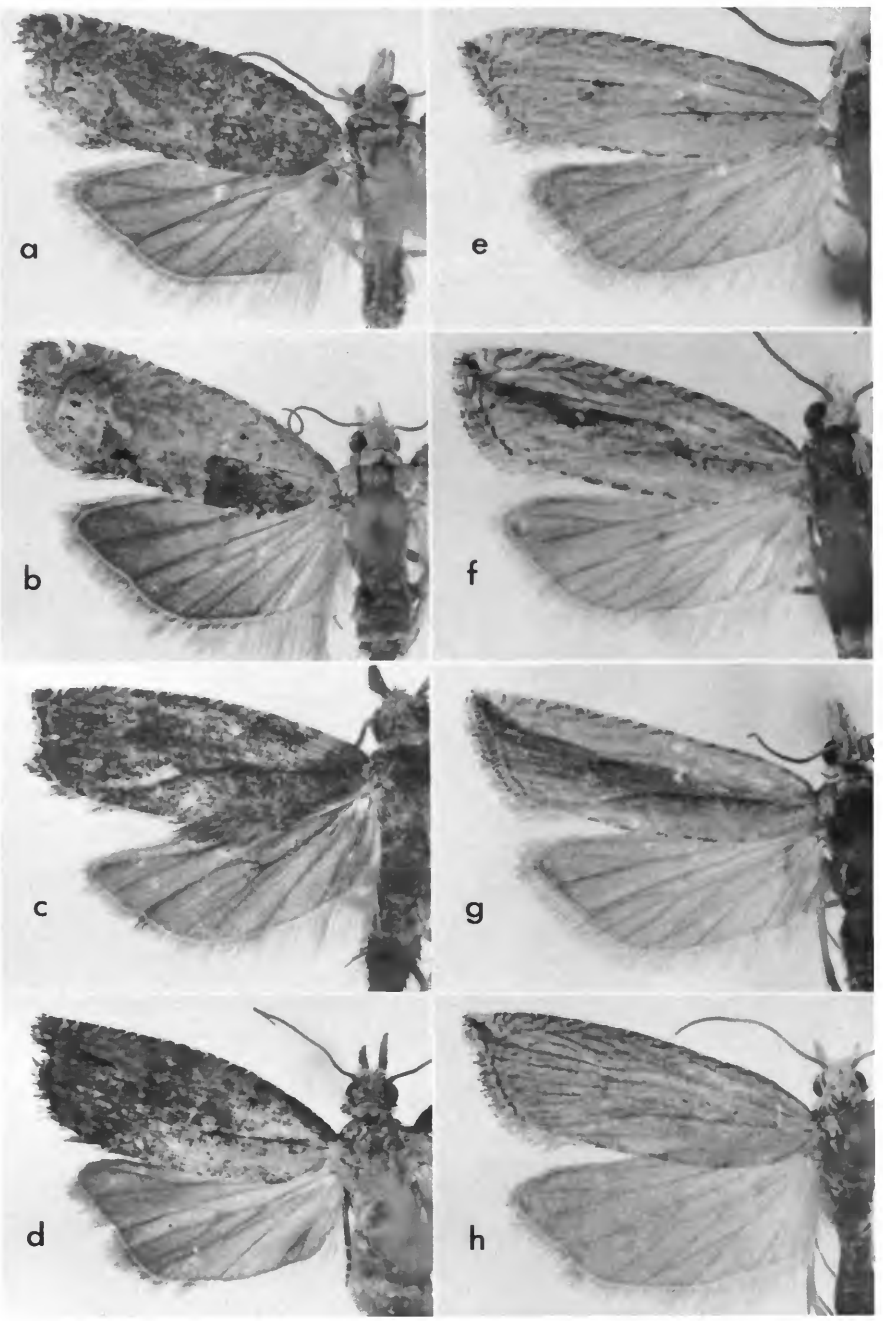

PLATE 17.—*a, Crocidosema plebejana* Zeller, ♂; *b, C. plebejana* Zeller, ♀; *c, Tritopterna galena,* new species, ♂ holotype; *d, T. galena,* new species, ♀ paratype; *e, Bactra litigatrix* Meyrick, ♂; *f, B. litigatrix* Meyrick, ♂; *g, B. litigatrix,* Mayrick, ♀; *h, B. litigatrix* Meyrick, ♂. (The four photographs illustrate the variation in this species.)

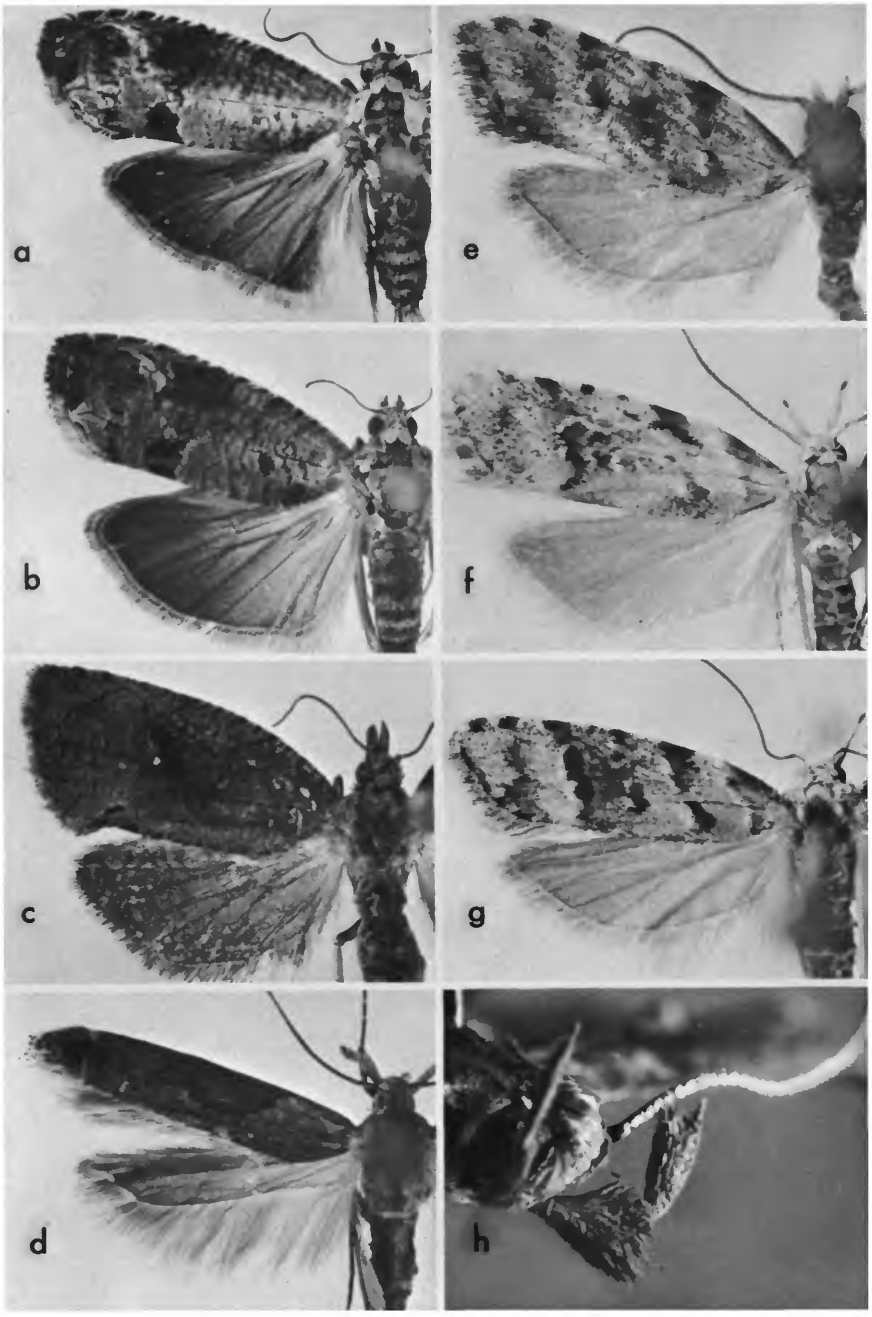

PLATE 18.—*a, Platypeplus aprobola* (Meyrick), ♂; *b, P. aprobola* (Meyrick), ♀; *c, Cryptophlebia nythobia,* new species, ♀ holotype; *d, Palintropa peregrina,* new species, ♀ paratype; *e, Carposina paracrinifera,* new species, ♂ holotype; *f, C. apousia,* new species, ♀ holotype; *g, C. paracrinifera,* new species, ♀ paratype; *h, Palintropa peregrina,* new species, lateral aspect of head showing labial palpus.

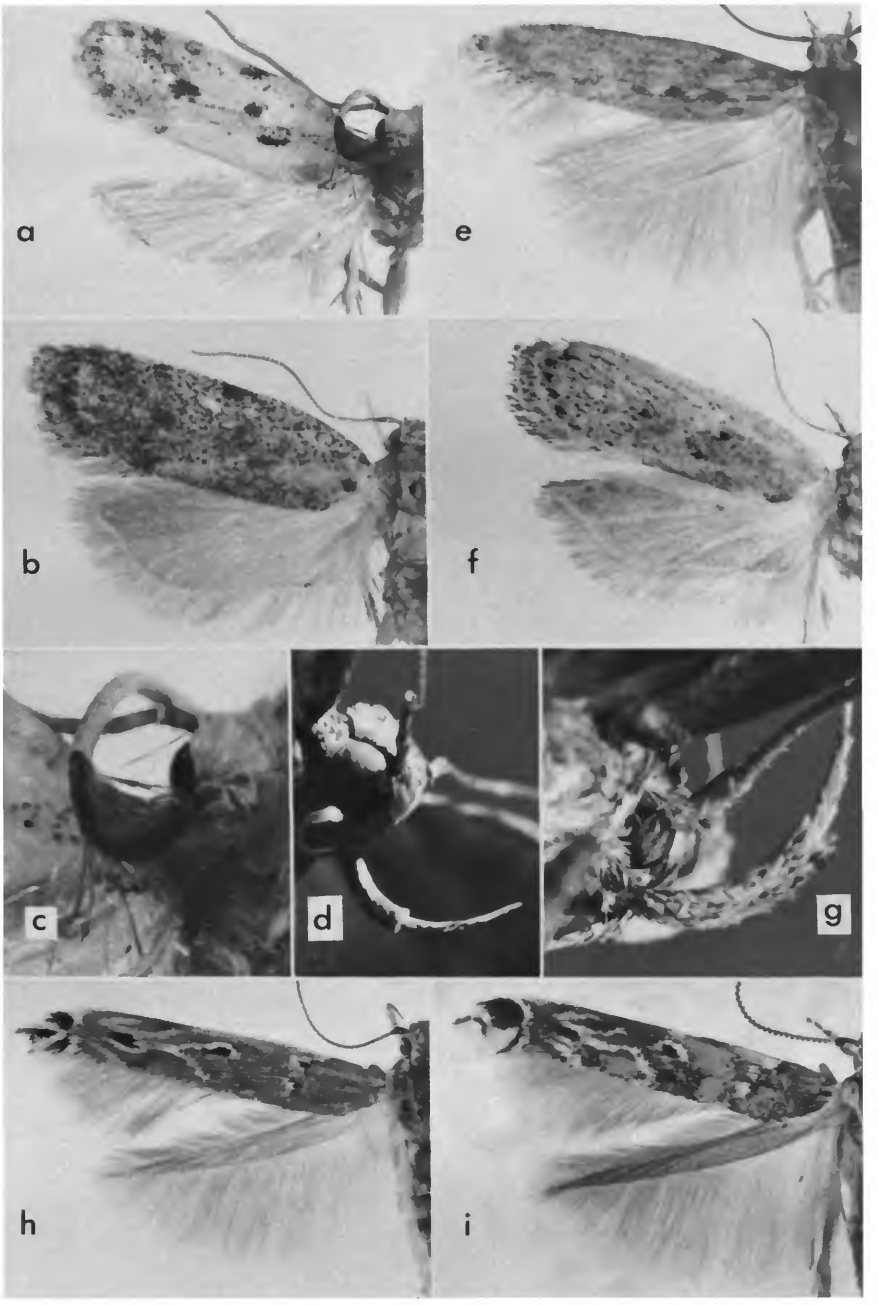

PLATE 19.—*a, Stoeberhinus testaceus* Butler, ♂; *b, S. testaceus* Butler, ♀; *c, S. testaceus* Butler, dorsal view of plumose male labial palpus; *d, S. testaceus* Butler, lateral aspect of normal female labial palpus; *e, Phthorimaea operculella* (Zeller), ♂; *f, Autosticha merista,* new species; ♀ holotype; *g, A. merista,* new species, lateral aspect of head showing labial palpus; *h, Anatrachyntis incertulella* (Walker), ♀; *i, A. megacentra* (Meyrick), ♂.

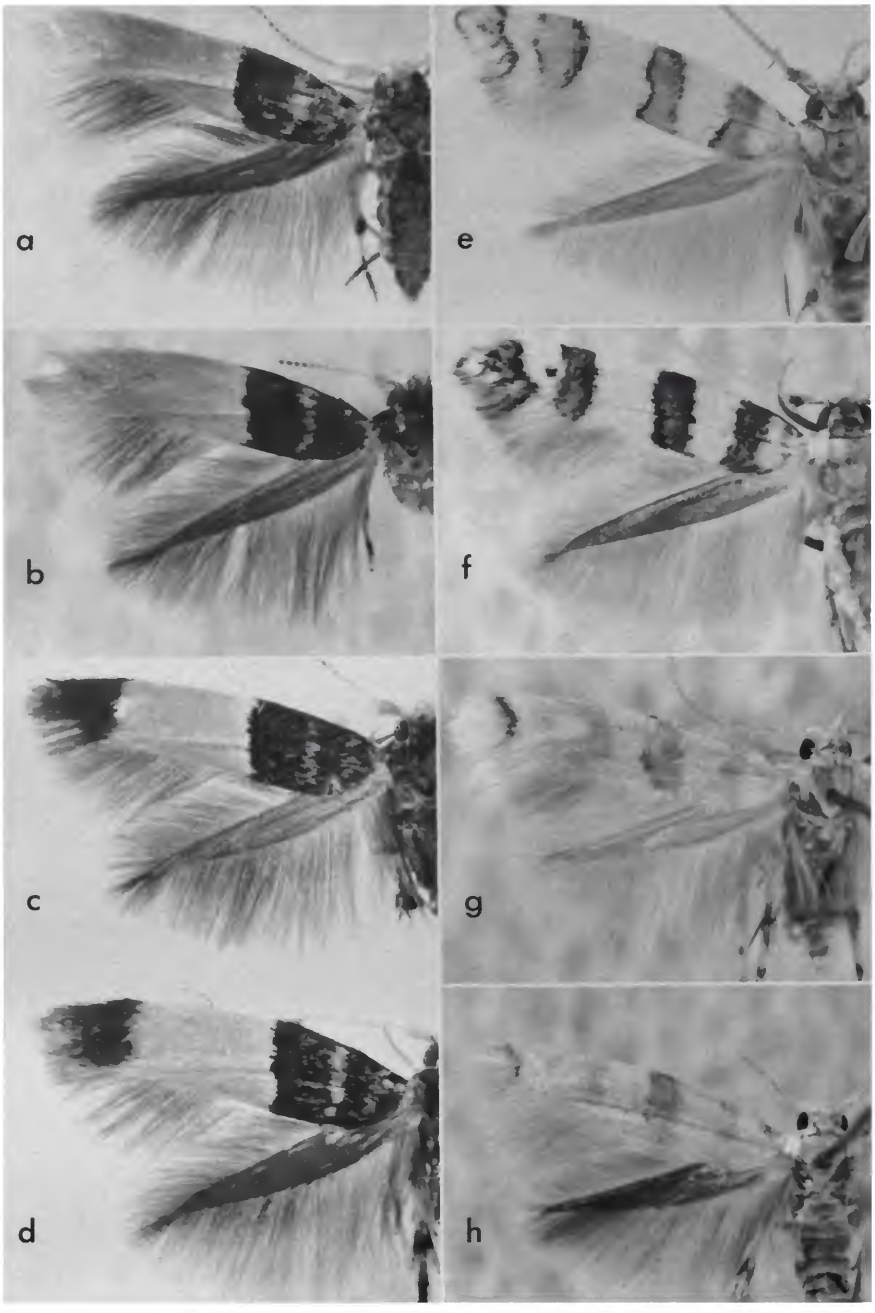

PLATE 20.—*a, Echinoscelis hemithia* Meyrick, ♂, typical; *b. E. hemithia* Meyrick, ♀, typical; *c. E. hemithia* Meyrick, ♂, black tipped form; *d. E. hemithia* Meyrick, ♀, black tipped form; *e. Trissodoris honorariella* (Walsingham), ♂; *f. T. honorariella* (Walsingham), ♀; *g. T. thelmae,* new species, ♂ paratype; *h, T. thelmae,* new species, ♀ paratype.

382-271 O—71——18

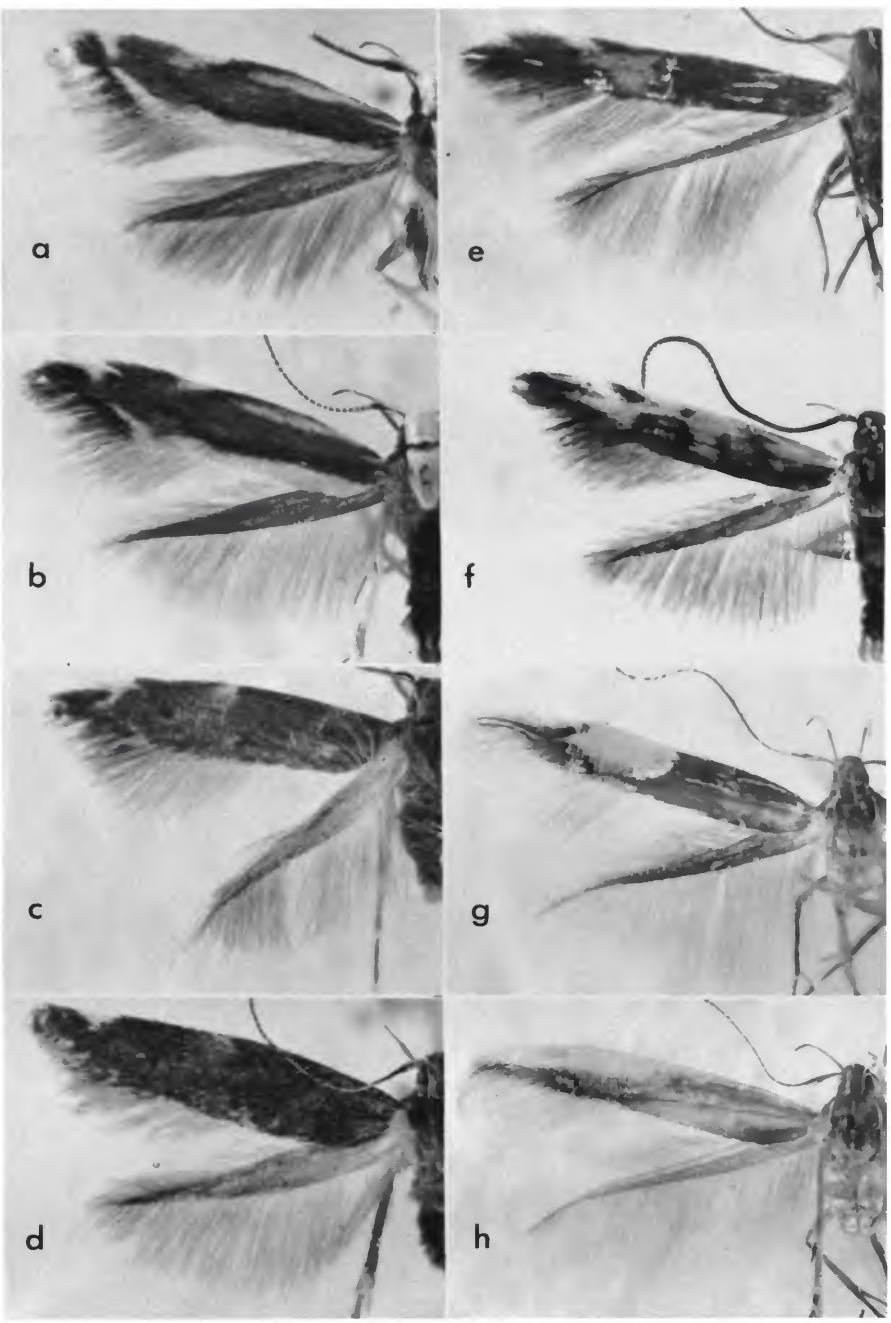

PLATE 21.—*a, Iressa neoleuca,* new species, ♂ paratype; *b, I. neoleuca,* new species, ♀ paratype; *c, Semolina leucotricha,* new species, ♂ holotype; *d, S. leucotricha,* new species, ♀ paratype; *e, Cosmopterix melanarches* Meyrick, ♂; *f, Labdia dicyanitis* Meyrick, ♂; *g, Cosmopterix aphranassa* Meyrick, ♀; *h, C. aphranassa* Meyrick, ♀, light form.

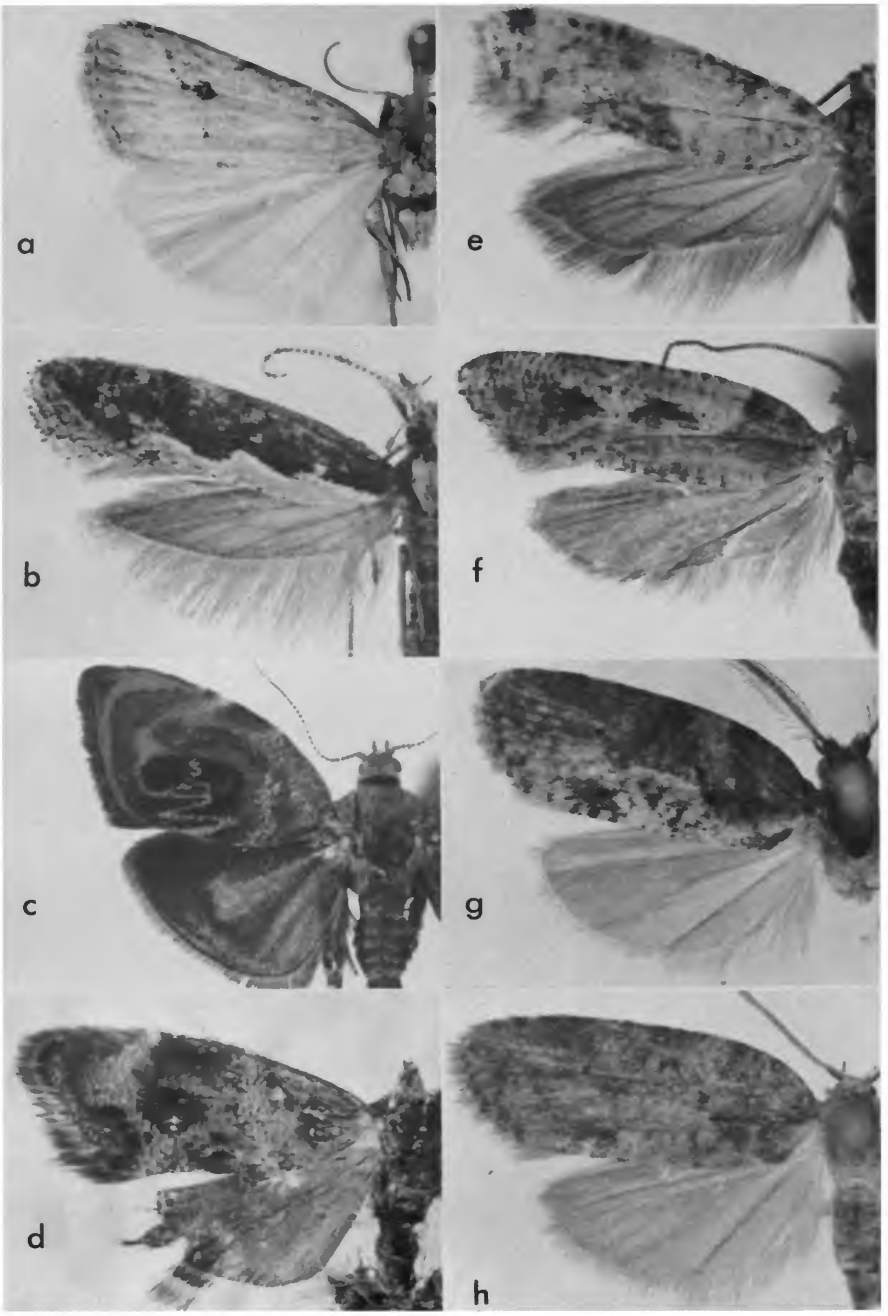

PLATE 22.—*a, Luceria ocularis* (Moore), ♂ ; *b, Plutella xylostella* (Linnaeus), ♂ ; *c, Anthophila chalcotoxa* (Meyrick), ♀ ; *d, Tebenna bradleyi,* new species, ♂ paratype; *e, Pseudorinympha laeta,* new species, ♀ holotype; *f, Terthroptera eremosesia,* new species, ♂ holotype; *g, Tanaoctena indubitata,* new species, ♂ holotype; *h, T. indubitata,* new species, ♀ paratype.

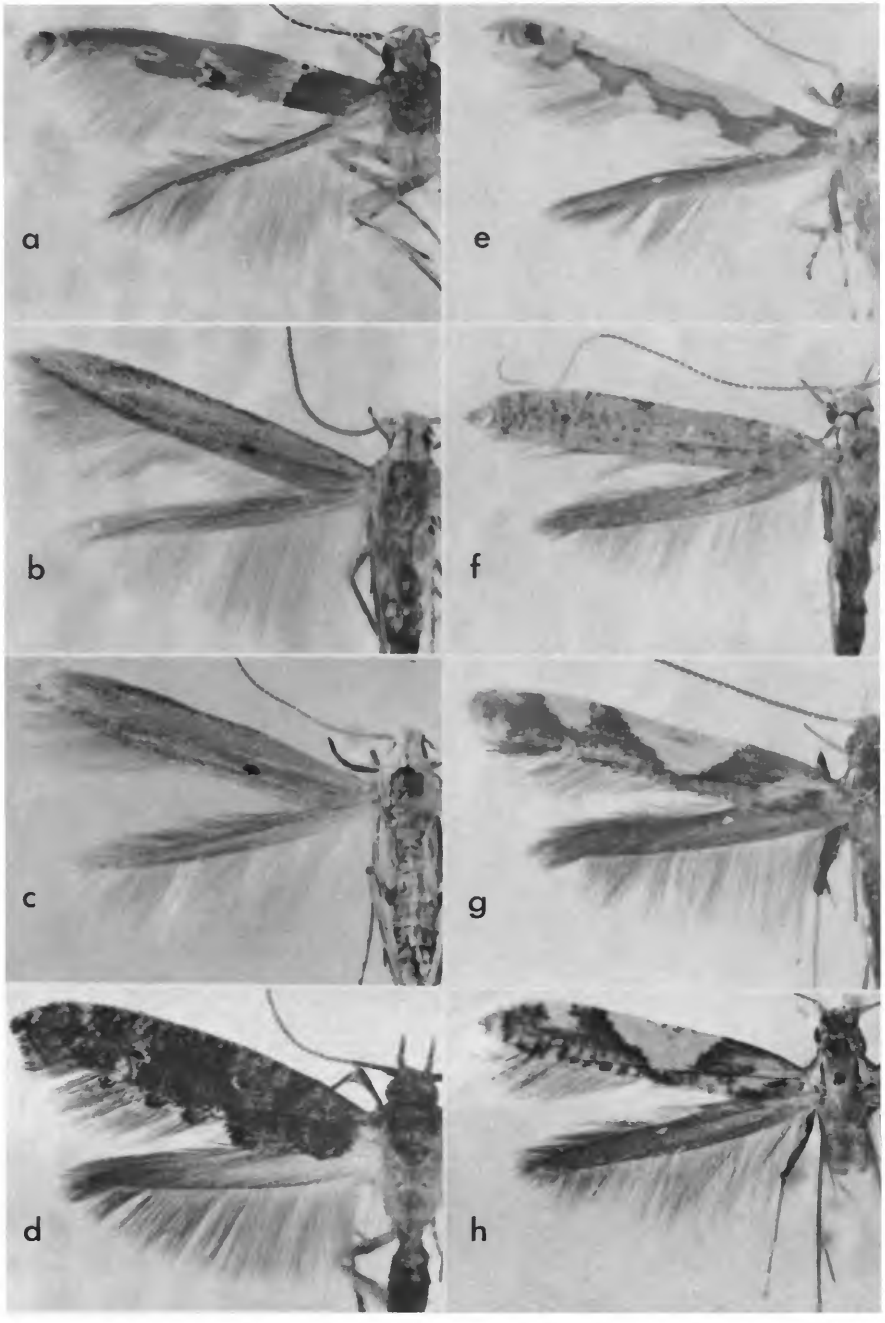

PLATE 23.—*a, Anatrachyntis similis* (Bradley), ♂ ; *b, Batrachedra monophthalma,* new species, ♂ paratype; *c, B. monophthalma,* new species, ♀ paratype; *d, Ochromolopis incrassa,* new species, ♂ paratype; *e, Parectopa pontificalis* Meyrick, ♀ ; *f, Gracillaria verina,* new species, ♀ holotype; *g, G. hilaropis* Meyrick, ♂ ; *h, G. hilaropis* Meyrick, ♀.

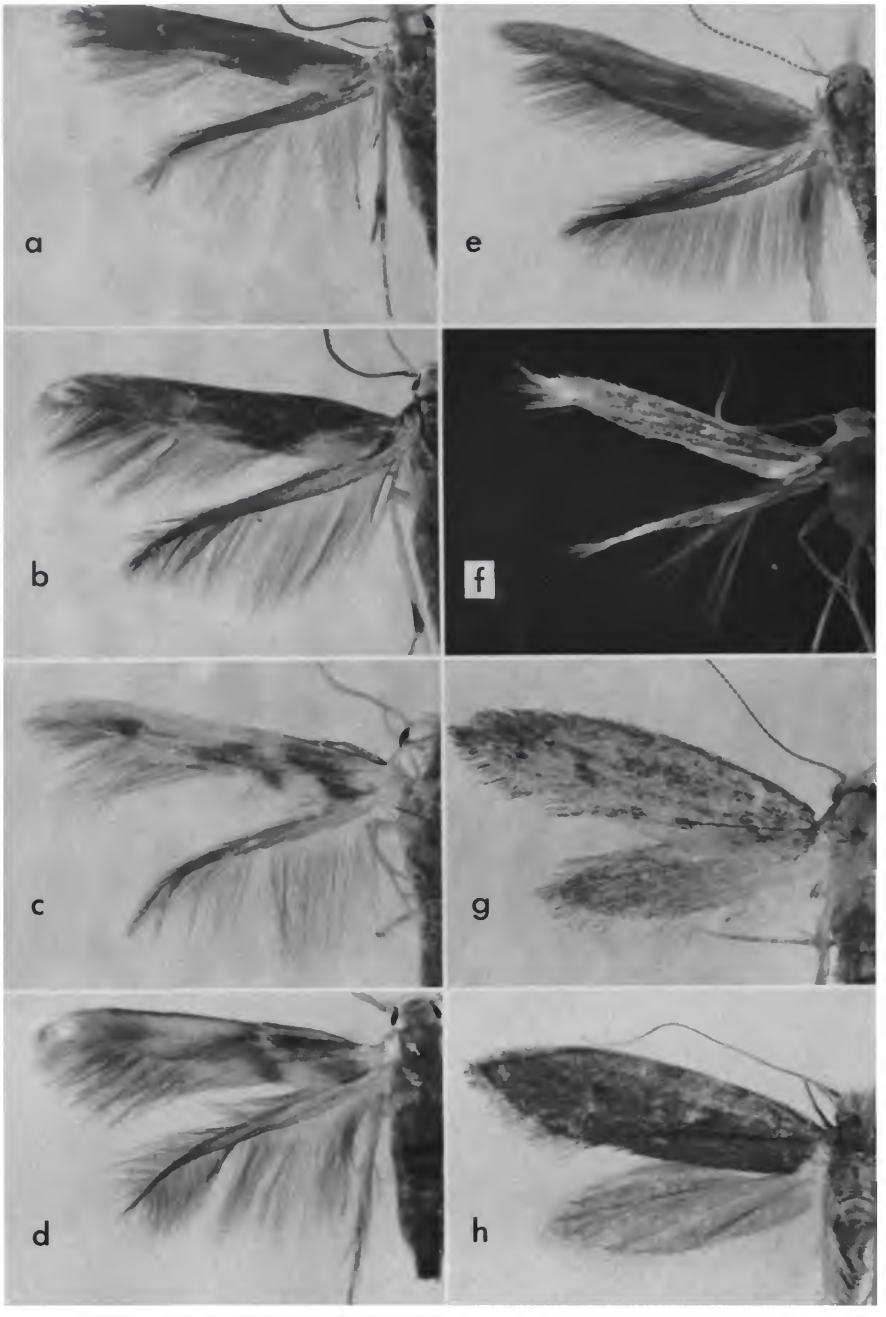

PLATE 24.—*a, Stathmopoda percnophthalma,* new species, ♂ paratype; *b, S. percnophthalma,* new species, ♀ paratype; *c, S. argyrosticha,* new species, ♂ holotype; *d, S. argyrosticha,* new species, ♀ paratype; *e, S. perfuga* (Meyrick), ♂; *f, Lissocnemitis argolyca* Meyrick, ♀; *g, Petula phalarata,* new species, ♀ paratype; *h, Decadarchis phaeoptera,* new species, ♀ holotype.

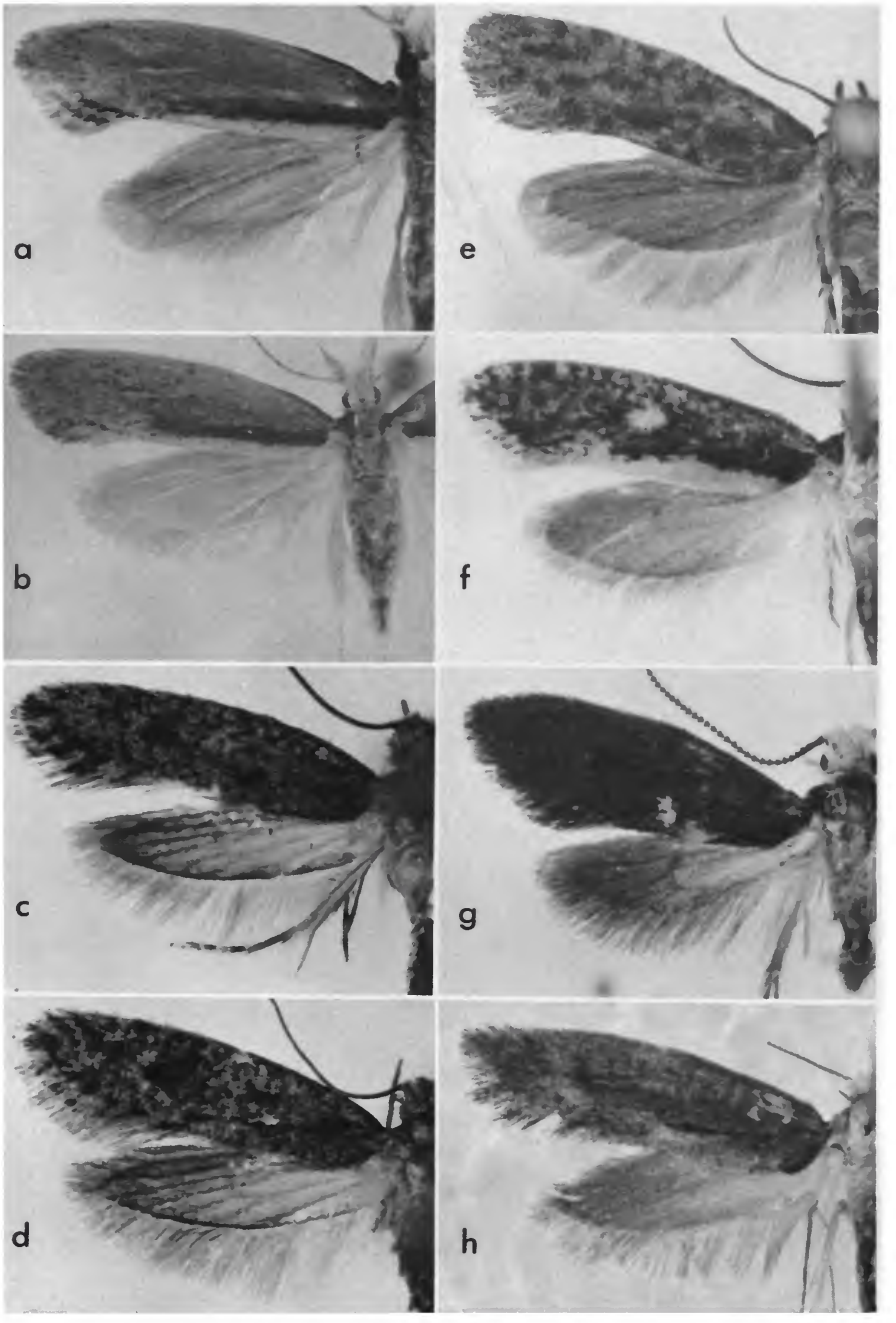

PLATE 25.—*a, Nesoxena pandani,* new species, ♂ paratype; *b, N. pandani,* new species, ♀ paratype; *c, Praeacedes thecophora* (Walsingham), ♂; *d, P. thecophora* (Walsingham), ♀; *e, Setomorpha rutella* (Walsingham), ♂; *f, Monopis crocicapitella* (Clemens), ♂; *g, Petula phalarata,* new species, ♂ paratype; *h, P. phalarata,* new species, ♀ paratype.

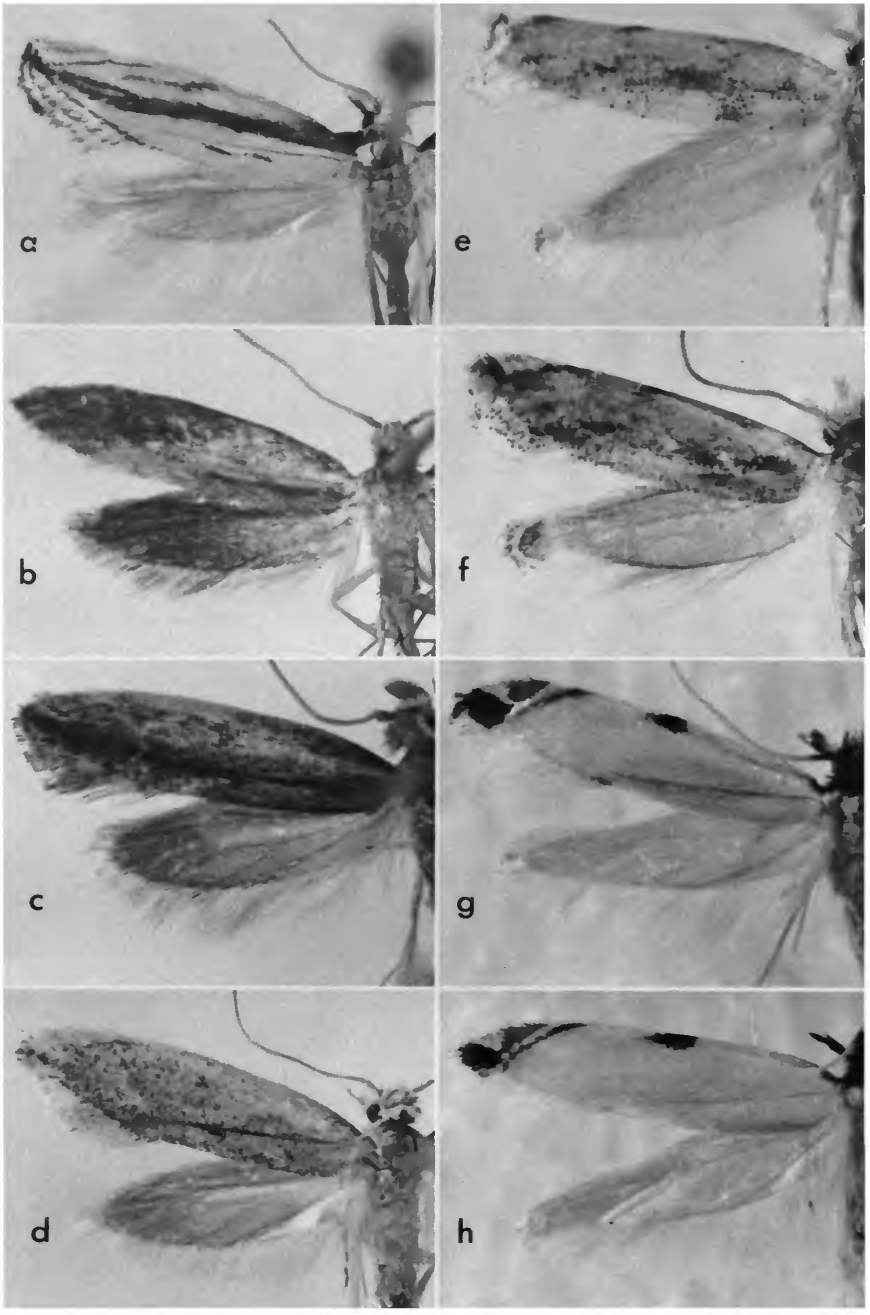

PLATE 26.—*a, Decadarchis pagophila,* new species, ♂ holotype; *b, D. cirrhogramma,* new species, ♂ holotype; *c, D. coprosoma,* new species, ♂ paratype; *d, D. coprosoma,* new species, ♀ paratype; *e, D. minuscula* (Walsingham), ♂; *f, D. minuscula* (Walsingham), ♀; *g, D. melanospila,* new species, ♂ holotype; *h, D. melanospila,* new species, ♀ paratype.

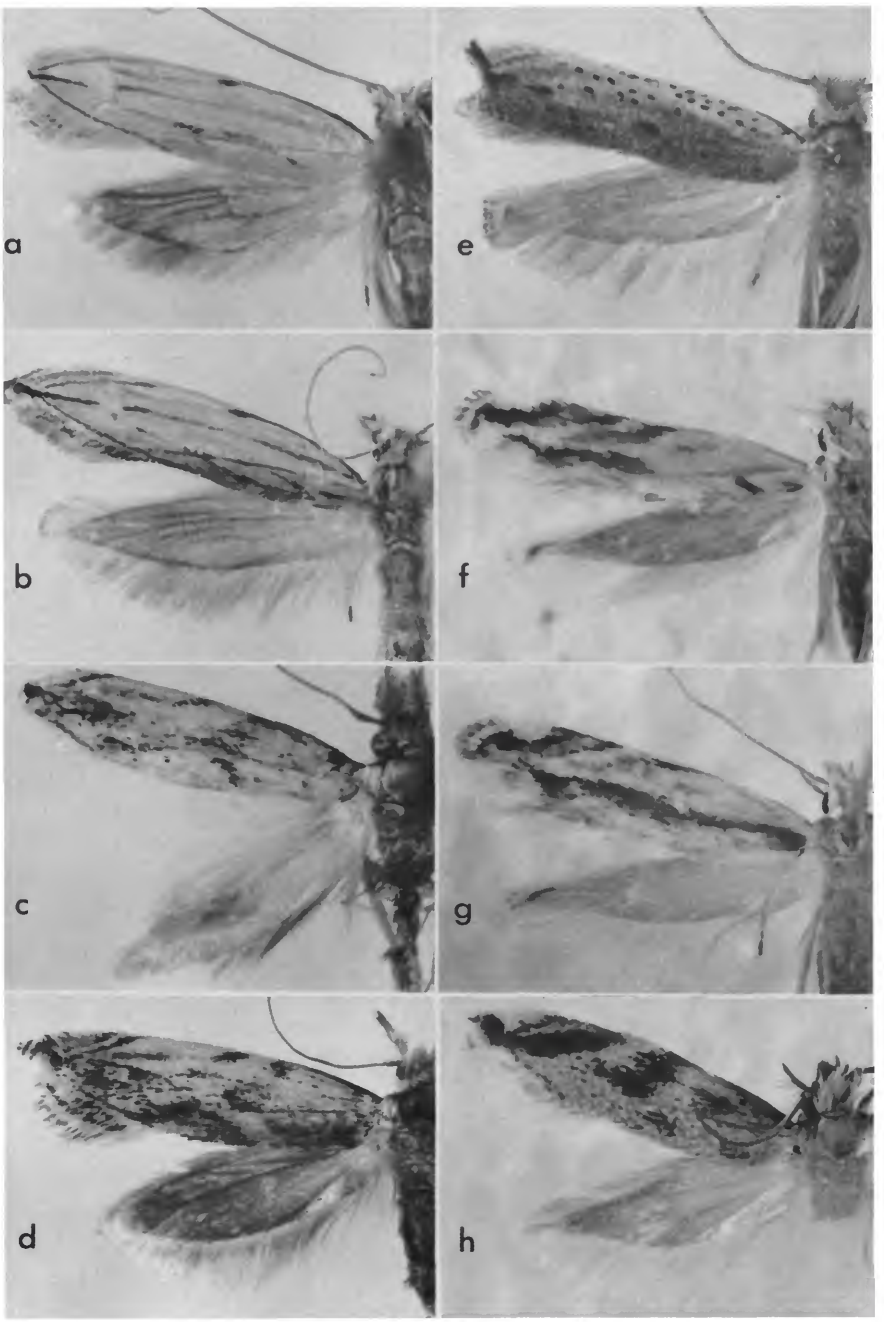

PLATE 27.—*a, Decadarchis sphenacma* Meyrick, ♂ ; *b, D. sphenacma* Meyrick, ♀ ; *c, D. pelotricha* Meyrick, ♂ showing expanded scale tuft of hind wing; *d, D. pelotricha* Meyrick, ♀ ; *e, D. flavistriata* (Walsingham), ♂ ; *f, Biastolemma coarctata,* new species, ♂ paratype; *g, B. coarctata,* new species, ♀ paratype; *h, Erechthias zebrina* (Butler), ♂.

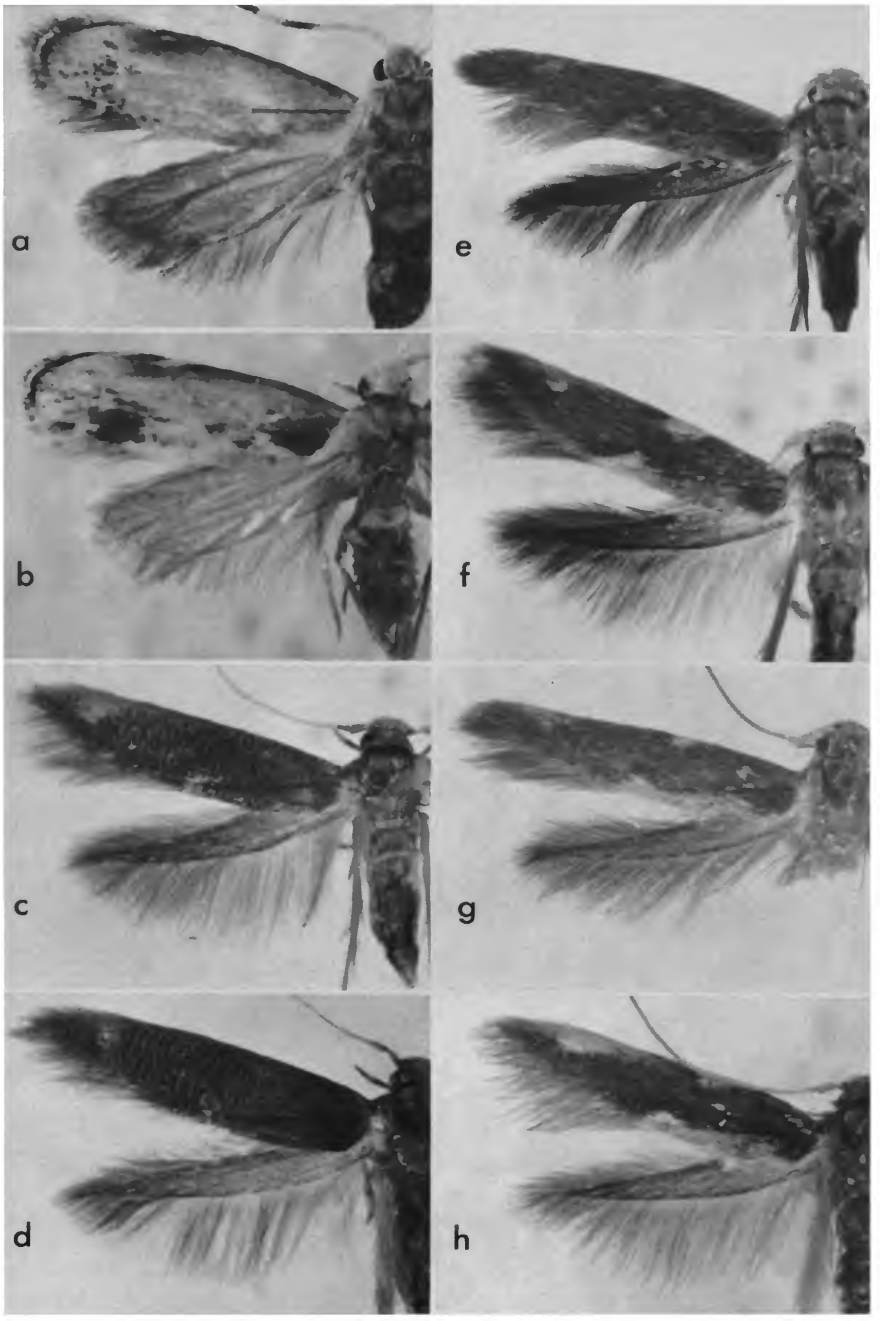

PLATE 28.—*a, Choropleca terpsichorella* (Busck), ♂; *b, C. terpsichorella* (Busck), ♀; *c, Opogona aurisquamosa* (Butler), ♂; *d, O. aurisquamosa* (Butler), ♀; *e, O. allaini,* new species, ♂ paratype; *f, O. allaini,* new species, ♂ holotype; *g, O. allaini,* new species, ♂ paratype; *h, O. allaini,* new species, ♀ paratype.

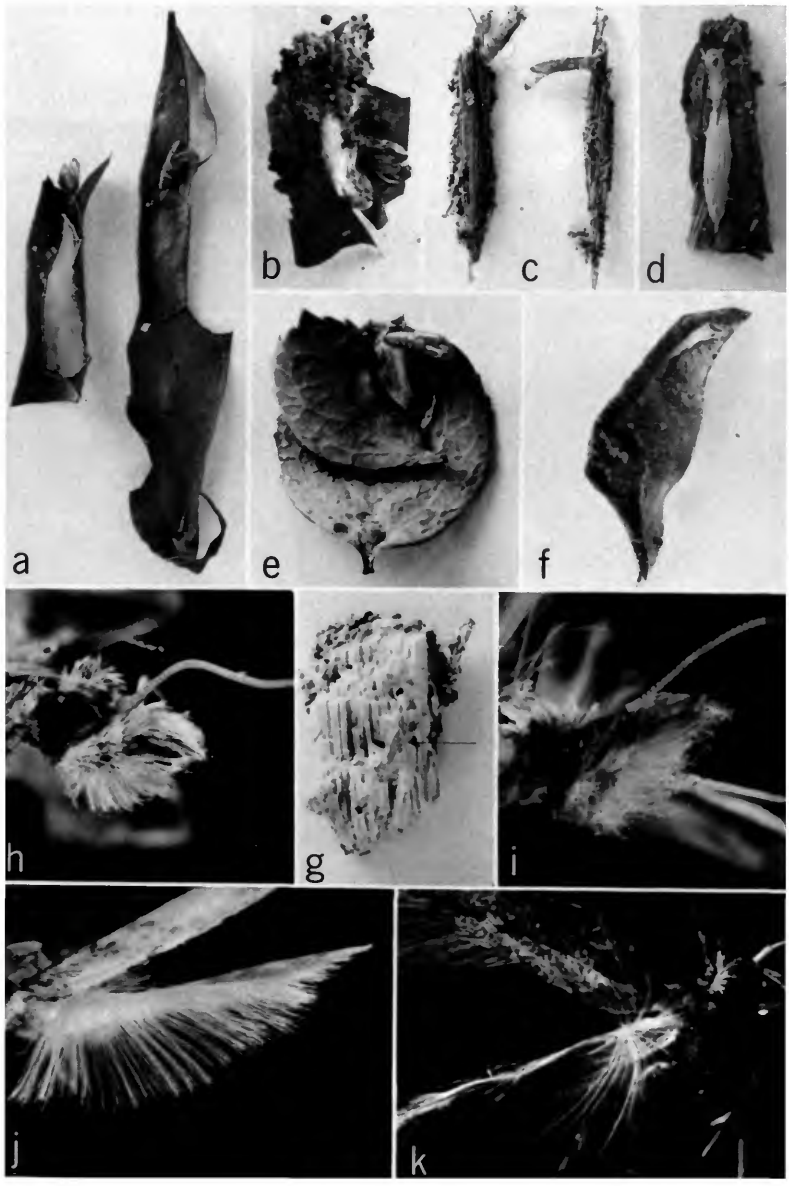

PLATE 29.—*a,* typical folds of leaves of *Eugenia jambos* Linnaeus, made by larvae of *Platypeplus aprobola* (Meyrick), extruded pupa cases shown; *b,* cocoon and extruded pupa cases of *Decadarchis sphenacma* Meyrick from *Pandanus* fruit stalk; *c,* cocoons and extruded pupae cases of *Nesoxena pandani,* new species; *d,* cocoon and extruded pupa case of *Decadarchis flavistriata* (Walsingham) on *Pandanus; e,* tied leaves of *Vaccinium rapae* Skottsberg and extruded pupa case of *Dichelopa vaccinii,* new species; *f,* folded edge of *Metrosideros collina* (Forster) A. Gray, var., and pupa case of *Parectopa pontificalis* Meyrick; *g,* extruded pupa case of *Decadarchis pelotricha* Meyrick in wood of *Pandanus; h,* head of *Decadarchis pelotricha* Meyrick, ♀; *i,* head of *Decadarchis pelotricha* Meyrick, ♂; *j,* expanded scale tuft on hind wing of *Decadarchis pelotricha* Meyrick, ♂; *k,* expanded hair pencil from costa of hind wing of *Semolina leucotricha,* new species.

Index

Principal species references are entered in boldface.

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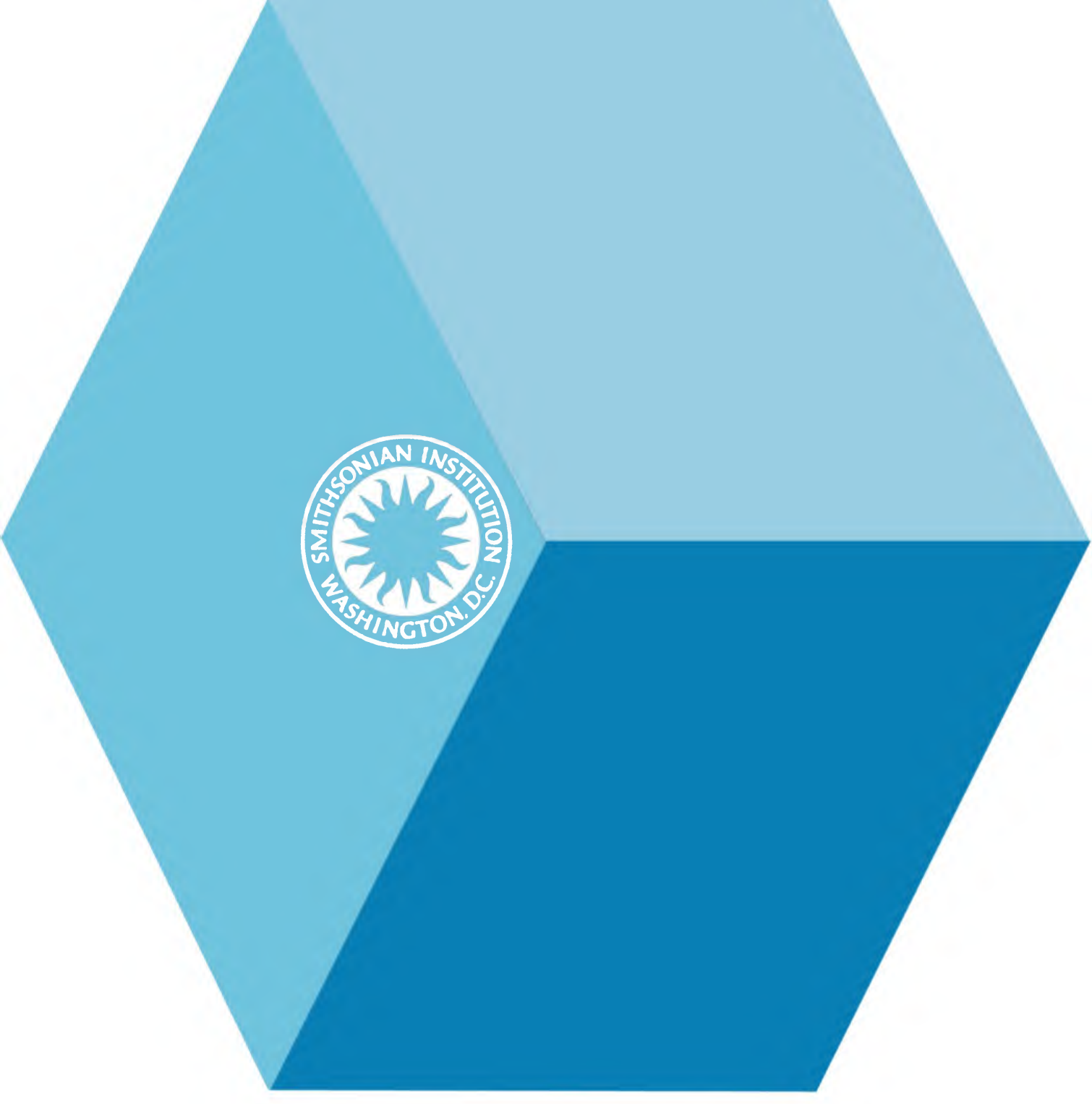
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