

A NEW NAME FOR *CALOSATURNIA MERIDIONALIS*  
(SATURNIIDÆ)

by CHARLES L. HOGUE and JOHN W. JOHNSON

The name *Calosaturnia meridionalis* Johnson is here changed to *Saturnia* (*Calosaturnia*) *walterorum* Hogue & Johnson, *nomen novum*. This is necessary because of a case of secondary homonymy developing from MICHENER's combination of *Calosaturnia*, *Agapema*, and several other Palearctic genera of the Saturniidæ under *Saturnia* (*Bull. Amer. Mus. Nat. Hist.* 98: 477, 1952), a move with which we are in accord, which changed the name *Calosaturnia meridionalis* Johnson (*Bull. Brooklyn Ent. Soc.* 35: 100, 1940) to *Saturnia meridionalis*. We have found that *meridionalis* has had prior usage in the genus *Saturnia* by CALBERLA for a subspecies of *S. pavonia* (*Correspondenzblatt Ent. Vereins "Iris."* 1: 157, 1887). JOHNSON's *meridionalis*, the junior homonym, is now invalid and must be replaced by a new name, since the forms in question, after MICHENER and in our opinion, are congeneric. At the suggestion of the junior author, we propose *walterorum* as the *nomen novum*, in commemoration of Mr. CARL WALTER and his son ERICH, who were the discoverers of this species and pioneers in the collecting and rearing of southern California moths.

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DESCRIPTIONS OF THE EARLY STAGES AND MALE IMAGO  
AND NOTES ON THE LIFE HISTORY OF  
*SATURNIA WALTERORUM* (SATURNIIDÆ)

by FRANK P. SALA and CHARLES L. HOGUE

INTRODUCTION

*Saturnia walterorum* Hogue & Johnson (formerly *Calosaturnia meridionalis* Johnson, see Hogue and Johnson, "A new name for *Calosaturnia meridionalis*," this issue) is a little known, seldom collected diurnal saturniid. One of the haunts of this species is the 3,000-4,000 foot elevation of the upper Arroyo Seco Canyon near Pasadena, Los Angeles County, California. The Angeles Crest Highway (California No. 2) passes through the dense chaparral wilderness on the west slope of the Canyon and several trails connect it to the stream bed below, affording passable areas where one can collect. Over

a period of years we have frequented this area and occasionally have seen an adult *walterorum* pursuing its erratic, very rapid flight over the steep, rugged and densely vegetated slopes, but we could never succeed in capturing one because of the rough terrain. However, on June 8, 1954, along one of the trails mentioned above, the Oswald Trail, one of us (HOGUE) fortuitously collected an immature larva of *walterorum* in the branches of a shrub of *Arctostaphylos* sp. ("Manzanita"). This larva was brought to the laboratory and reared to maturity on a different host, *Rhus laurina* Nuttall. It spun a cocoon on June 25 and pupated shortly thereafter. The following March 26 a female imago emerged.

This imago was kept inactive in the refrigerator for two days and then, on a warm, sultry day, taken back to the locality where the larva had been collected. Here she attracted several wild males and mated with one of them. She later deposited over fifty eggs, which served to establish an insectary colony. This material has provided the basis for the descriptions and life history data to follow.

All descriptions, except that of the male, are composites based on more than one specimen. Except for structure of genitalia the description of the male is based on a single specimen which has been designated as a plesiotype and deposited in the collection of the Los Angeles County Museum. It bears the following data: "F<sub>3</sub> — female from Arroyo Seco Cn. San Gabriel Mts. So. Cal. Emdg. Feb. 10-28 1957 Sala & Hogue."

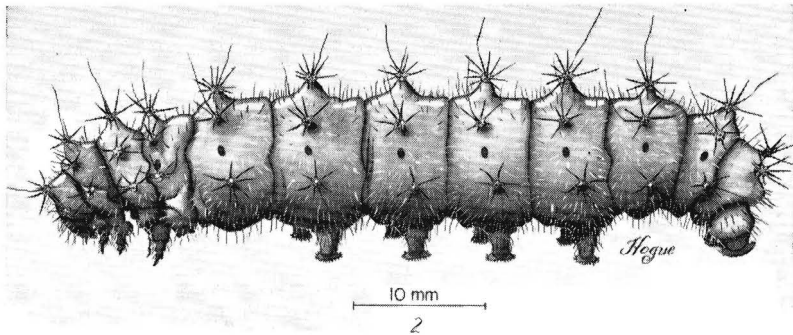
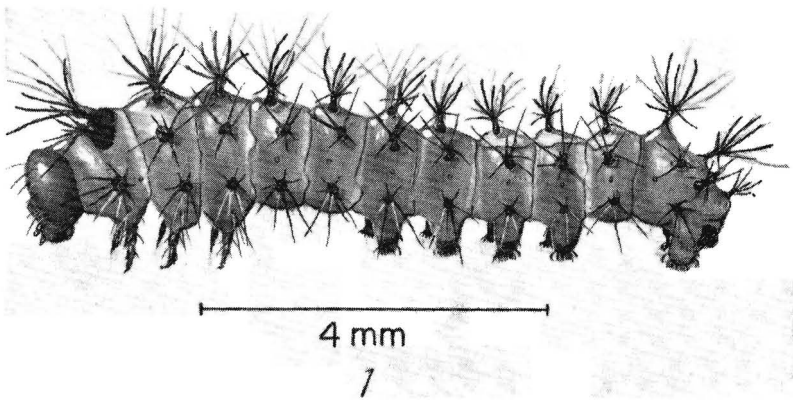
The exact genetic relationship of *S. walterorum* (as yet known only from Los Angeles, Orange and San Diego Counties of southern California) (figs. 11, 12, 15, 16) to *S. mendocino* Behrens, the closely similar species from northern California (figs. 13, 14, 17, 18), remains to be determined. The two forms are alike in general facies, size, and genitalic structure. Yet typical specimens of *mendocino* from Lake and Lassen Counties have a wing pattern quite distinct from that of *walterorum*. Unfortunately, the paucity of available collections from intermediate localities precludes a study of possible intergrading variation in this pattern. In the present paper we choose not to enter into a discussion of the taxonomic status of *walterorum* and *mendocino*, but to treat them here as separate species until more material is known and further study made. It is hoped that in describing the early stages and making known some of the habits of *walterorum* we will enable lepidopterists to find and collect it more easily and hence widen the knowledge of its distribution and variation. The intermediate larval instars are not described here. Further study of their variation is necessary.

We wish to thank Dr. JOHN N. BELKIN of the Department of Entomology of the University of California at Los Angeles for his suggestions and criticisms concerning this paper.

#### DESCRIPTIONS

EGG (fig. 7): Approximately 2 mm. long, ovoid, depressed; anterior end slightly enlarged. Ground color white, flecked irregularly with grey-black splotches in the chorion (visible at 5x) and discolored with brownish attaching gum over much of the surface, usually as dorsal spot and lateral infuscations. Chorion smooth.

FIRST INSTAR LARVA (fig. 1): 3-4 mm. long at eclosion, 6-9 mm. at maturity. Ground color black; dorsum yellow orange between dorsal scoli on meso- and meta-thorax, on abdominal segments 5-7 (extending cephalad slightly onto segment 4), and anterior to dorsal scoli on abdominal segment 9. Head and thoracic legs black, setae white. Venter and abdominal legs tan-grey. Scoli elongate, black, subequal in size (slightly larger on thorax and posterior 3 segments of abdomen, supranals reduced); each situated on conical prominence except prothoracic dorsal four which arise from a pair of medially fused black sclerotized plates or basal tubercles; each bearing at tip 6-13 long (most 2-3 times length of scoli, central one usually longest), curved filamentous black spines together giving the whole larva a hairy appearance; arranged as figured (one-half complement shown only).



*Saturnia walterorum*. Fig. 1. First instar larva. Fig. 2. Mature larva.

MATURE LARVA (fig. 2): 45-60 mm. long at maturity. Ground color variable: apple green, salmon and yellow; prothorax may be green dorsally regardless of ground color. Entire venter dark chocolate or dark mahogany brown. Head and its appendages and thoracic legs dark brown. Spiracles large and brown (prothoracic centered with yellow). Light subspiracular lateral folded ridge extends entire length of body. Scoli wider than long, subequal in size (supraanals absent, spines only present); bright orange; apical spines straight, long (2.5-3 times length of scoli, central one often very long); arrangement as illustrated. Numerous secondary setae white.

**PUPA** (figs. 4-6); Female approximately 25-30 mm. long  $\times$  9-11 mm. maximum diameter; male 20-25 mm. long  $\times$  8-10 mm. maximum diameter. Color dark dull wood brown throughout. Surface deeply rugose except for smooth caudal articulating surfaces of abdominal segments 4-7. Frons cream colored. Cremaster as figured. Seven abdominal spiracles visible.

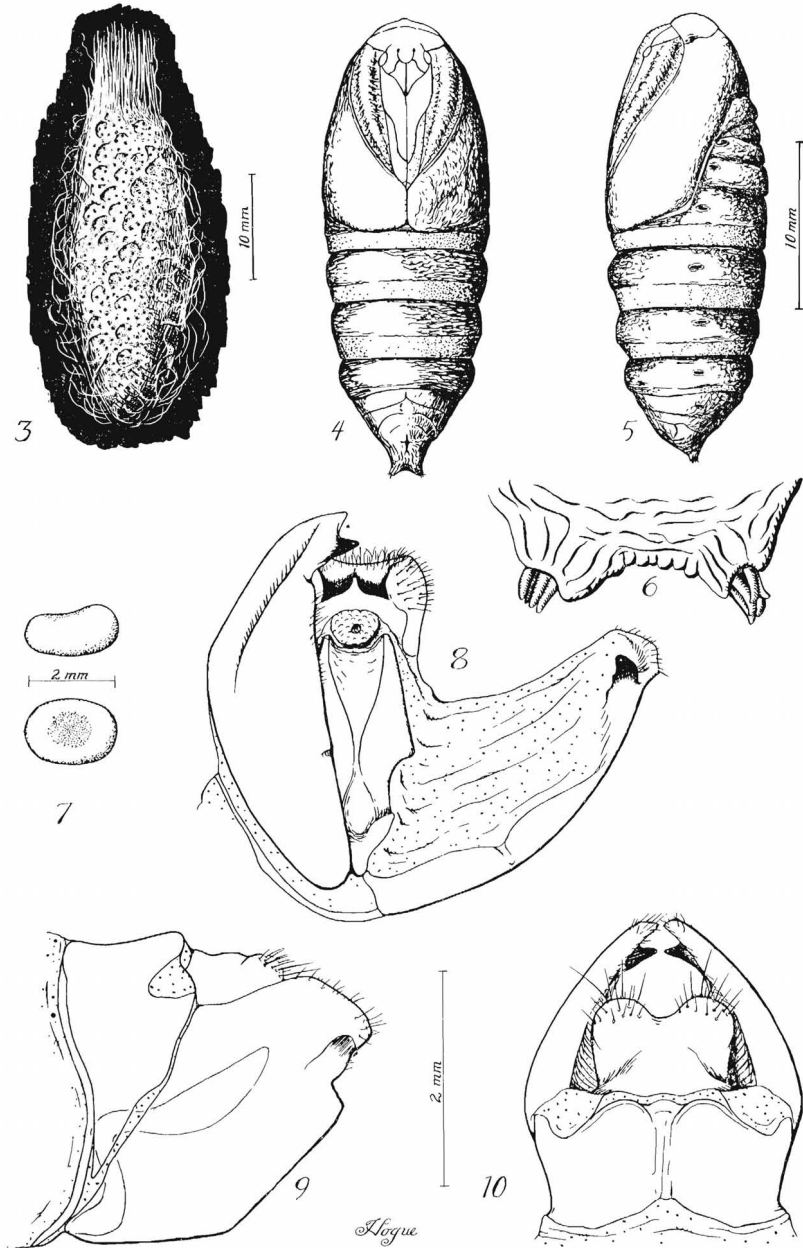
**COCOON** (fig. 3): 30-40 mm. long. Ovoid, elongate. Exterior and interior sac, ruddy tan in color. Exterior sac thin-walled; threads spun in cord-like groups, forming a loose network (not unlike coarse bobbinet netting). Internal sac more uniform and compact with small perforations. Total unit translucent to light. Emergence end with drawstring-type of closure.

**MALE** (figs. 8-12, 15, 16): Since *S. walterorum* is a sexually dimorphic species and so far only the female (holotype) has been described, we have undertaken a full description of the male here. *Measurements*, plesiotype male (figs. 11, 15): Length (tip of head to end of abdomen) — 20.0 mm.; fore wing length (base to apex) — 28.0 mm. Antennal length — 8.0 mm. *Wings*: Upper surfaces of primaries mostly evenly clothed with mahogany brown scales diffusing to mouse-grey along inner margin, outer margin, apex and distal one-half of costal margin, and rust-red over subcostal areas. Apical marking with the following scale pattern: sub-central almost pure white (flecked with stray scales from surrounding color fields) spot bounded cephalad by field of evenly intermixed light blue and black scales, this field in turn gives way gradually distad to bronzy, deep rust-red and abruptly proximad to a field of black which extends proximal to the white and which is itself flecked proximad first by a few light blue, then rust-red scales; same sub-central white spot bounded immediately caudad by small light mouse-grey spot and nearly "X"-shaped field of rust-red overlying a central black field (a few of the black and rust-red scales stray farther caudad). Eye spot round with central hyaline area surrounded by distally offset concentric circles of scales colored (moving periferad) black, yellow, black (few rust-red intermingled), blue (absent around distal half of spot), black, and rust-red (also absent around distal half of spot); distal half of eye spot overshadowed by mouse grey. Eye spot flanked proximad by wide white crescent and cephalodistad by a few white scales.

Upper surfaces of secondaries mostly bright burnt orange. Submarginal black band (weak at extremities) extending from costal to anal margins. Basal one-third of wing black, invaded by orange scales distally and heavily overgrown with orange hairs. Eye spot round, same size as that of primaries; central hyaline area surrounded by concentric circles of scales colored (moving periferad) black (wide distad, very narrow proximad), yellow (weak proximad), light blue (absent distad), and black. Fringe on outer and inner margins mouse-grey and short, becoming longer and orange on anal margin.

Under surfaces of primaries mostly bright golden orange, apices mouse-grey bearing apical markings with complex of scale colors exactly as on upper surfaces except for fewer straying red and black scales caudad of the subcentral white area. Transition zone between mouse grey apices and bright golden orange area flecked with red orange scales which are scattered, few, small, wide, inconspicuously dentate and recumbent toward inner margin; denser, extensive, longer and conspicuously dentate, but less recumbent, toward costal margin. Costa mouse-grey to  $R_1$  distad but only over immediate area of costa proximad where area to  $R_1$  is "salt-pepper" black and white scaled. Eye spot with central hyaline area surrounded by distally offset concentric circles of scales colored (moving periferad) black, yellow, black (very thin), light blue (weak), and black; a few red orange scales fleck the cephalodistal quadrant of outermost black circle; no proximal white crescent as on upper surface; entire spot distinct and not overshadowed with scales as on upper surface.

Under surfaces of secondaries almost completely evenly mouse-grey with a tint of shiny red intermixed; scales placoid distad, hairlike proximad. Costal margins "salt-pepper" black and white scaled proximad, becoming pure white at extreme base. Intermixed orange and black scales spread in proximad from anal margins. Eye spot almost



*Saturnia walterorum*. Fig. 3. Cocoon. Fig. 4. Pupa (♀), ventral. Fig. 5. Pupa (♀), lateral. Fig. 6. Caudal end of pupa (♀), showing cremaster. Fig. 7. Egg. Top, lateral; bottom, dorsal. Fig. 8. ♂ genitalia, left valve in closed position, right valve open; ventral. Fig. 9. ♂ genitalia, lateral. Fig. 10. ♂ genitalia, dorsal.

completely overshadowed by mouse-grey scales except for a few yellow, blue, black and red scales showing through cephalad to the hyaline area.

*Head*: Clothed with black hairs over frontoclypeus, red-brown tufts over bases of antennæ. Antennæ lanceolate in outline; flagellar stalk and pectinations light orange; sensory hairs black.

*Thorax*: Dorsum heavily clothed with long mahogany-brown hairs which diffuse to a more reddish hue cephalad up to black cephalolateral black shoulder bands; anterior collar of white hairs extending transversely behind head between wing bases. Venter and sides densely clothed with brown and grey hairs.

*Legs*: Femora with long fine white hairs and long hair-like red and orange scales. Tibiæ with long dense red and red-orange hairs; femoral and tibial vestiture most dense on extensor surfaces and most vivid on prothoracic legs. Tarsi as tibiæ on pro- and mesothoracic legs (hair more scale-like); metathoracic tarsi with yellow-brown small scales on flexor surface in addition to orange and red-orange extensor scale tufts.

*Abdomen*: Dorsum clothed entirely with black scales (lighter area cephalomesad) sparsely overlain with long fine orange hairs. Venter with dense vestiture of wiry, mouse-grey hairs.

*Genitalia* (figs. 8-10): Tegumen black-scaled, overlain (especially caudad) with pink-orange and white hairs. Valves heavily clothed with long white wiry hairs. Structure as figured.

### LIFE HISTORY NOTES

Unless otherwise indicated, all data apply to the insectary colony (maintained in screen wire cages in open insectary at Burbank, California).

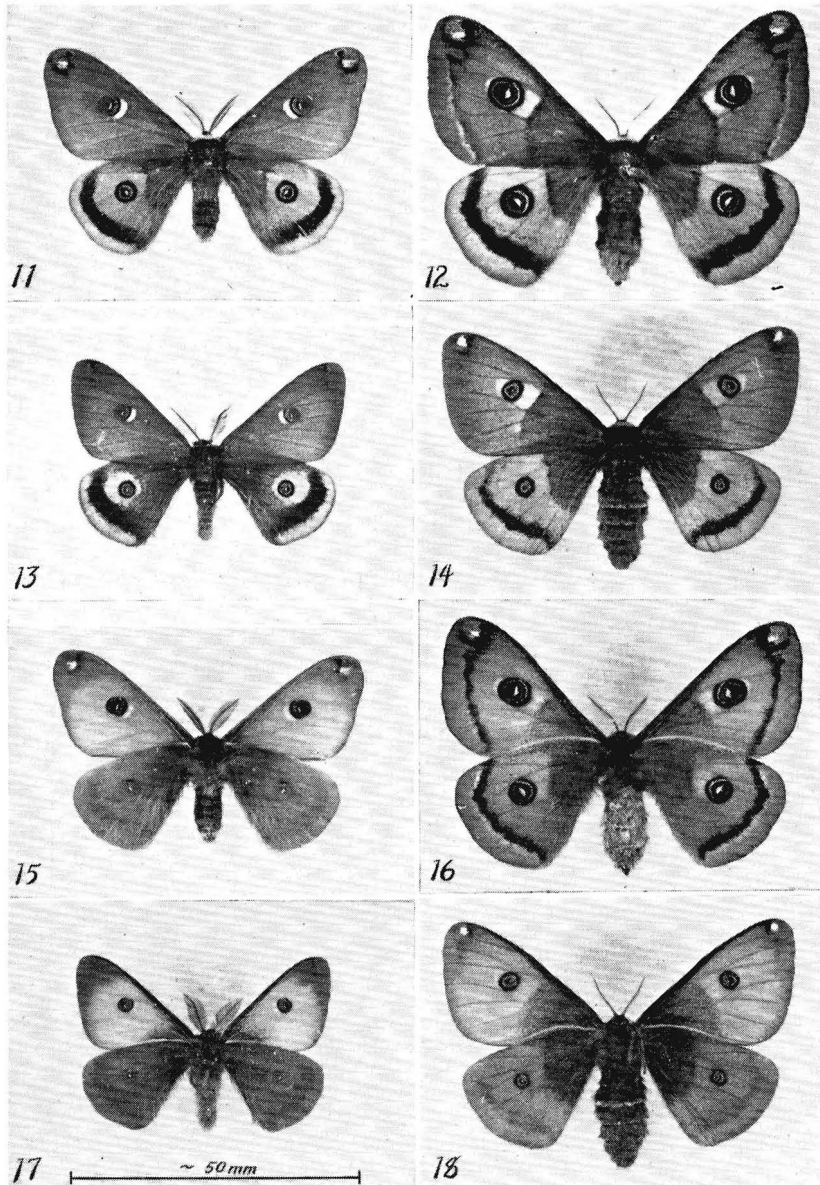
*Copulation*. The force of sexual attraction of the females must be very strong if the single mating noted in the introduction is any indication of general tendencies. No sooner was the caged female placed out in the open when a male was attracted. Copulation was immediate after the male was allowed to enter the cage. After a period of about 15 minutes *in copula*, the male terminated his hold and flew away unhesitatingly, any further attraction of the female seemingly lost.

Similar mating behavior was exhibited in the laboratory by many subsequently reared pairs. Sometimes, however, a male which emerged in company with several females was reluctant to mate with any of them. Yet it was noted that, if the male was first isolated and quieted for an hour or two in the refrigerator and then placed with the females, he sought to mate without hesitation.

The time period *in copula* was observed to be highly variable, anywhere from 5 minutes to 1 hour. The average was about 15 to 20 minutes.

*Oviposition*. The females, *post copula*, commence laying eggs usually within the hour. Oviposition is heaviest, and commonly complete, the day of copulation, frequently the afternoon after a mid-morning mating. The females are very active during egg-laying in contrast to their docile nature before mating, fluttering incessantly except when actually in the act of oviposition. They become thoroughly exhausted after depositing their complement of eggs and generally die within 1 or 2 days. This short imaginal span may be typical of the species under natural conditions as well.

The female glues her eggs a few (usually 2-7) at a time in groups or rows to about any surface available, showing no preference for a provided food plant. The number of eggs ranges from 30 to 100 per female.



Figs. 11-12, 15-16: *Saturnia walterorum*. Fig. 11. ♂, upper surface. Fig. 12. ♀, upper surface. Fig. 15. ♂, lower surface. Fig. 16. ♀, lower surface. Figs. 13-14, 17-18: *Saturnia mendocino*. Fig. 13. ♂, upper surface. Fig. 14. ♀, upper surface. Fig. 17. ♂, lower surface. Fig. 18. ♀, lower surface.

*Hatching of the eggs.* The eggs hatch from 10 to 20 days after being laid. The hatching process is accomplished by the larva simply eating a hole in the anterior end of the shell just large enough for exit. Many first instar larvæ perish at this time as a result of injudicious egg placement on the part of the female. Sometimes she places eggs in two or more contiguous rows so that the anterior ends of eggs in one row adjoin the posterior ends of those of another row. When the larvæ of the row behind attempt to hatch and crawl out of their egg shells their exit is blocked by the row in front. Imprisoned within the egg shell, they die unless the obstacle is removed.

*Larval habits.* During the first three instars the larvæ are quite gregarious and territorial, remaining on the terminal branches of the provided host plant and moving only if the immediate food supply is consumed. However, greater activity is shown during later instars and additional plants may be sought regardless of whether or not the food supply is depleted. Upon maturity and final intestinal evacuation the larvæ turn a "dirty" hue of their ground color, become extremely active for the following 24 to 48 hours, and leave the host in search of a pupation site. The corner of the rearing cage or the branches of another plant may be selected as the site and the cocoon is constructed. Cocoon formation and pupation rarely take place on the ground except under abnormal circumstances.

We have reared *walterorum* only on *Arctostaphylus* spp. and *Rhus laurina*. It may be possible that the larvæ will feed on other shrubs of the chaparral and coastal sage communities as well, such as *Ceanothus* spp., *Cercocarpus* spp., *Adenostoma* spp., and *Photinia arbutifolia* Lindley. JOHNSON (personal communication) reports the species, empty cocoons and adults, in association with "Lemonade Berry," (*Rhus integrifolia* Bentham & Hooker) near the coast in Orange County.

The apical spines of the scoli are extremely toxic to touch, raising persistent welts and producing an intense itching sensation.

*Pupation.* Pupation occurs from 4 to 6 days after completion of the cocoon. The pupal period lasts 9 to 10 months and is of two phases. From the time of the shedding of the prepupal larval skin until the beginning of autumn the first phase is exhibited. During this phase the pupa is quite active and all adult structures within the pupal cuticula are non-definable externally. The abdomen is not distended. In early autumn a change occurs wherein the activity of the pupa is decreased and the body structures (wings, legs and antennæ) become definable. The eye spots are clearly outlined as are other wing markings. Abdominal distension is now maximal. The pupa remains in this second stage until the time of emergence in February or March. In no case has *walterorum* remained viable in the pupal stage longer than one year.

*Emergence.* Emergence of the imagos is normally between the hours of 9 A.M. to noon, especially around 10 A.M. (standart time). Wing expansion is completed in approximately 30 minutes. The males are active almost immediately thereafter, and must be carefully watched and killed at this time if perfect specimens are desired. They are strong fliers and will fly vigorously 10-15 minutes or longer before copulating. Unmated females remain quiet.



It is of interest that emergence is a group phenomenon and periodic, heavy one day and perhaps lacking for several days to follow. Also of interest is that, of approximately 500 specimens thus far reared, nearly 80% have been males. The reason for this marked sexual imbalance is not known.

*Chronology of the life cycle.* The different stages in the life cycle followed approximately the following time schedule:

Middle February - early April: adults emerging and active; eggs laid.

Late April: eggs hatching.

Late April - late June: larvæ active, feeding.

Late June - early July: cocoons constructed; pupation.

Early July - middle February: pupal period.

The whole schedule is probably modified in nature where conditions are usually more variable than in the insectary. Limited field observations do, however, indicate that the pattern in nature coincides fairly closely with that above.

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#### CAPTURE OF A *EUNICA TATILA* (NYMPHALIDÆ) IN KANSAS

The morning of October 19, 1955, I went over to the nearby timbers to get some hickory nuts. I thought that with the lateness of the season I would not need my net so I left it at home (which was a mistake!), and while picking up some pecans near the entrance of the timbers I decided to go farther in the woods to the hickory trees. Hardly had I gone ten feet when I noticed a "Buckeye" (*Precis cænia* Hbn.) fly past me, or at least I *thought* it was that until it flew into a patch of bright sunlight and I saw a glint of bright purple on its wings. As it lit on the grass and outstretched its wings I could not believe my eyes at first. It had evidently traveled a considerable distance, for I noticed that its beautiful wings were frayed and torn at the edges. I didn't know how I was going to catch it, for it flew up each time I approached it. I also realized that it couldn't fly very far at a time but quickly settled again. Suddenly, I made one last effort to catch it. I took off my sweater (the October air was cool), crept up to the gorgeous creature, and threw my sweater over it. Then by carefully peeking under its edges I saw my Purple Winged butterfly; it started to crawl out from the opening I gave it and I gently grasped the butterfly between thumb and index finger, not damaging it at all beyond its originally frayed wings. I rushed home with my newly captured prize forgetting all about hickory nuts. I managed to identify it in the Klots *Field Guide*; it turned out to be a Purple Wing, *Eunica tatila* (Herrich-Schaeffer), confirming my original suspicion that it was a tropical butterfly. From where did it come? Florida? Possibly Mexico. This butterfly has never been taken in Kansas before. The specimen is a female, and I have mounted it for future reference. This was one of the most striking experiences I have ever had during my years of butterfly and moth collecting, — and I didn't have my net that day!

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