

At this stage many died from a disease which killed also many of my *excoecatus* and all my *promethea* larvae, and many of Miss Eliot's hybrids in Nonquitt.

The "*promethea* form" spun after the fourth moult, but most of the "*cynthia* form" moulted a fifth time.

After this moult they were like the last stage, but much greener and with much less bloom.

In this stage more died from the same disease, though each was given a tin by itself.

It is not possible to give in writing any adequate idea of the variety or the

beauty of this "*cynthia* form." Both forms came from eggs laid by the same moth and kept separate from other eggs laid after similar mating.

I think that anyone can obtain fertile eggs of hybrids of Attacine moths by following my plan of arranging the cages for mating, although every coition may not result in fertile eggs.

Eggs laid by a female *cynthia* which I found out of doors mated with a male *A. cecropia* failed to give larvae, as did eggs laid by *cynthia* females mated with *promethea* males.

## GROUP CHARACTERISTICS OF SOME NORTH AMERICAN BUTTERFLIES — V.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

### *Apostrophia* Hübner.

*Caterpillar at birth*: All the tubercles rounded conical, one to a segment in each row but the infrastigmatal where there are two, three rows on each side besides a supralateral series with appendages less than half as long as the others.

*Mature caterpillar*: Head covered with a pair of slender, tapering, slightly recurved spines. Each side of body with three rows of very long and slender straight, very scantily bristled spines, those of the upper rows equal and half as long again as the segments. *Chrysalis*: Body with strong laminate protuberances, the frontal pair excessively

elongate, widely divergent, ribbon-like and serrate; antennal joints conspicuously spined; third abdominal segment and the adjoining segments to some extent with it with a laminate laterodorsal flange crowned as the other abdominal tubercles with slender aciculate spines.

*Apostrophia charithonia* L. (*Heliconia charithonia* Auct.). *Butterfly*: Wings rich blackish brown above, a little paler below. Fore wings crossed by three narrow yellow stripes, the middle one running obliquely from costa, past the tip of cell toward the middle of the outer border; another subparallel to it midway to the tip of wing; the third following the black median vein to its first fork and here bent abruptly parallel to the others. Hind wings with a rather narrow

straight yellow band from base of abdomen toward outer angle, striking (on under surface) a couple of pale pink lunules on subcostal nervules; and midway to margin a parallel maculate slender band curving upward outwardly (and beneath enclosing the pinkish lunules). A few dark carneous dots at base of wings and on inner margin beneath. Expanse 80 mm. *Egg*: Broadly truncated at base, narrowly at summit with sides scarcely convex except above and fourteen vertical ribs and few transversals; color yellow. Height 1.3 mm. *Caterpillar at birth*: Body uniform pale reddish brown, the head slightly paler, without appendages, the tubercles a little darker, the hairs black. Length 2 mm. *Mature caterpillar*: Head greenish white with a pair of frontal black spots and long black coronal spines. Body dead white distantly spotted with black or brown, naked but for the exceedingly long piceous spines. Length 35 mm. Feeds on *Passiflora*. *Chrysalis*: Brown in various shades and streaked with gray and blackish; pronotum and dorsal surface of first three abdominal segments each with a pair of large subdorsal burnished gold spots; sides of abdomen with a web of light colored strigae. Length excluding frontal tubercles 24 mm.—Southernmost United States and southward (Beaufort, N. C., L. R. Gibbes). The male butterflies collect around the female chrysalis for some time previous to eclosion.

#### *Colaenis* Hübner.

*Butterfly*: Palpi slender, rather thinly haired; antennae nearly as long as the body, with short pyriform club. Fore wings more than twice as long as broad, with rounded tip, the cell more than half the length of the wing; cell of hind wings open, anal angle angulate. Fore tarsus of ♂ not much shorter than tibia; paronychial and pulvilli present. *Egg*:

Imperfectly known. *Caterpillar at birth*. Imperfectly known. Habits similar to *Basilarchia*. *Mature caterpillar*: Head with coronal tapering spines; each side of body with three rows of moderately slender not very scantily bristled straight spines, the uppermost about as long as the segments in the middle of the body but not longer at the ends. *Chrysalis*: Frontal tubercles similar to *Agraulis* but not apically verrucose; third to seventh abdominal segments with large subquadrate laterodorsal laminate flanges, the anterior somewhat larger than the others.

*Colaenis julia* Fabr. (*Pap. alcionea* Cram.). *Butterfly*: Wings bright reddish fulvous above, saffron-brown beneath, both wings margined above with blackish brown in very varying widths, broadest on fore wings at the upper apex, on the hind wings in middle of outer border; fore wings with a strongly oblique blackish stripe, broadest above, running from the subcostal vein across the apical edge of the cell to the middle of the outer margin. Beneath, at both extremities of the outer margin of hind wings and outer angle of fore wings one or two divided inconspicuous gray-white spots. Expanse of wings 85 mm. *Egg*: Yellow, laid in long rows. *Caterpillar at birth*: Head dark. Body yellow, alternate abdominal segments spotted with white, the bristles black. *Mature caterpillar*: Head black with white sutures and lateral stripes. Body dark brown transversely and narrowly banded above with lighter colors particularly on the thoracic segments; and on the sides broadly dashed with still lighter colors in oblique masses pointed toward the spiracles; spines dark but often light at base. Length 38 mm. Feeds on *Passiflora*. *Chrysalis*: Dark brown and pale yellowish brown, the former principally on the abdomen, the latter on the thorax and

appendages, but the abdomen is longitudinally streaked with the lighter color and the prominences of the thorax marked with the darker. Length—mm.—Southern Florida and Texas and southward.

*Colaenis delila* Fabr. (*Pap. cillene* Cram.).  
*Butterfly*: [unfinished].

### *Agraulis* Boisduval.

*Butterfly*: Palpi with swollen second joint, densely clothed and rather thickly haired; antennae much shorter than the body with obtuse short subspatulate club. Fore wings not more than twice as long as broad with bluntly angulate tip, the cell less than half the length of the wing; cell of hind wing open. Fore tarsus of ♂ nearly as long as tibia; paronychial and pulvilli absent. *Egg*: Subconoidal, tapering distinctly from near the base upward, the lateral cells twice as broad as high. Laid singly. *Caterpillar at birth*: All the tubercles supporting the longest appendages elevated conical and one to a segment in each row; of which there are three on each side besides a supralateral series with appendages not more than a tenth as long as the others. *Mature caterpillar*: Head crowned with a pair of stout scarcely tapering recurved spines. Each side of body with three rows of rather slender, scantily bristled spines, those of the upper row equal and a little longer than the segments. *Chrysalis*: Frontal tubercles not elongate, a little divergent, compressed laminate, the edge verrucose; joints of antennae with slight but unarmed tubercles; third abdominal segment with a laterodorsal flange like

but smaller than that of *Colaenis*, the laterodorsal prominences on the succeeding segments conical and not pronounced.

*Agraulis passiflorae* Fabr. (*Pap. vanillae* L., *Dione vanillae* Hübn.). *Butterfly*: Wings brilliant orange-red above, the fore wings with black veins thickened apically and six or seven small roundish black spots, those in the cell white-pupilled; hind wings with three black discal spots and a submarginal row of interspatial round orange-red spots set in a black border of the wing. Beneath, the hind wings and apex of fore wing are cinnamon-brown heavily blotched with great elongate dashes of black-edged nacreous silver spots, of which one in the upper subcostal interspace of hind wings is deeply notched. Scales of stink-pad bristle-shaped, arcuate, deeply 2-4 cleft. Expanse 75 mm. *Egg*: Yellow, broadly truncated at base, rounded at summit, with full sides having fourteen vertical ribs and few transversals; height 1.35 mm. *Caterpillar at birth*: Head brown without spines. Body glossy brownish orange, the hairs and tubercles black. Length 3.5 mm. *Mature caterpillar*: Head black with vertical orange stripes and black coronal spines. Body glossy red-orange, longitudinally striped with black and sometimes an infrastigmatal gray or white stripe; spines piceous. Length 37 mm. Feeds on *Passiflora* and not, as Madame Merian asserted, on *Vanilla*—whence the incorrect name given by Linné. *Chrysalis*: Very variable in coloration, from buff with greenish markings to black mottled with lighter or darker tints, but in all appear two pink spots at the base of the head, a buff suprastigmatal stripe, and a black sinuate linear depression representing the apex of the cell of the fore wings. Length 30 mm.—Southern portions of the United States and southward (rarely in West Virginia, Pennsylvania, and New Jersey). At least 2-brooded.

## Subfamily NYMPHALINAE.

## Tribe ARGYNNINI.

*Butterfly*: Club of antennae very short and abruptly incrassated, subspatulate with no inferior carination or a single one; palpi large and bushy, the terminal joint extremely short; cell of hind wings closed; tibiae and tarsi clothed with spines above. *Egg*: Sides with vertical ribs from base to summit, the whole egg rapidly narrowing in upper half. *Caterpillar at birth*: Hairs of body much longer than the segments, spiculiferous, apically enlarged, aligned throughout. *Mature caterpillar*: Body covered with ranged corneous sparsely aculiferous spines (none of which are mediodorsal) crowned by an independent needle. *Chrysalis*: Abdomen without ridges; head independently swollen; base of wings with a pair of tubercles; cremaster short, stout, and equal.

## Tribe VANESSINI.

*Butterfly*: Club of antennae moderately long, more or less abruptly incrassated, with three inferior carinations; palpi stout with rather coarse and bristling vestiture, the last joint moderately long; second superior subcostal nervule of fore wings arising before the tip of the wing; two (rarely four) rows of spines on under side of last tarsal joint; terminal appendages of male abdomen closely concealed by the last segment. *Egg*: Sides with strongly compressed vertical ribs from base to summit, much

higher on upper than on lower half. *Caterpillar at birth*: Hairs of body much longer than the segments, not spiculiferous, distinctly disaligned between thoracic and abdominal segments. *Mature caterpillar*: Body covered with ranged corneous sparsely aculiferous spines (some of which are mediodorsal) crowned by an independent needle. *Chrysalis*: Abdomen without ridges; head independently swollen; base of wings with a pair of tubercles; cremaster long, slender, and tapering.

## Tribe NYMPHALINI.

*Butterfly*: Club of antennae long and very gradually incrassated with four inferior carinations; palpi slender with compact vestiture and very short terminal joint; precostal nervule of hind wings arising opposite the parting of the costal and subcostal nervures; under surface of last tarsal joints with four rows of spines. *Egg*: Sides reticulate with filamentous projections. *Caterpillar at birth*: Hairs of body not longer or scarcely longer than the segments, the ranged papillae dissimilar in size. *Mature caterpillar*: Body furnished irregularly with denticulate or stellate tubercles. *Chrysalis*: Abdomen without ridges; head independently swollen; base of wings with only a single tubercle; mesonotum with a striking median prominence.

## Tribe APATURINI.

*Butterfly*: Club of antennae long and gradually incrassated with three inferior

carinations; palpi with compact vestiture, the terminal joint very short; pre-costal nervure of hind wings arising beyond the parting of the costal and subcostal nervures; under surface of last tarsal joints with two rows of spines. *Egg*: Sides with vertical ribs from base to summit of nearly equal height throughout, or with vertical series of raised points in the upper part of the egg only. *Caterpillar at birth*: Hairs of body not longer or scarcely longer than the segments, the ranged papillae of similar size. *Mature caterpillar*: Body pilose without spines or tubercles. *Chrysalis*: Dorsum of abdomen either longitudinally conspicuously keeled or transversely ridged.

#### Subfamily SATYRINAE.

*Butterfly*: Palpi slender, strongly compressed, heavily fringed with long scale-hairs. Antennae clothed, arcuate, with drooping club never abrupt. Fore legs of both sexes excessively atrophied, very small and furred. Some of the nervures of the fore wings swollen at the base (except in some tropical forms); discal cell of hind wings closed by a strong vein (except in some tropical forms). Texture of wings delicate. Generally of somber coloring with ocellated markings. *Egg*: Subspheroidal, broadest below the middle, either delicately reticulate or with numerous slight vertical ribs. *Caterpillar at birth*: Head much larger than segments following. Abdominal segments tapering slightly from in front backward, longitudinally striped; ranged appendages usually clubbed; if not, then

arcuate and (always?) larger in the middle than next the base. *Mature caterpillar*: Head with simple\* or no coronal protuberances. Body cylindrical, pilose, longitudinally striped, the last segment bifurcate (except in a few tropical forms). *Chrysalis*: With no conspicuous prominences, whole body well rounded. Abdomen not deeply separated from thorax, with no transverse ridges and no medio-dorsal carina; margin of wings generally carinate from basal wing tubercle backward. Ventral surface nearly straight. Only a single tribe, Satyrini, occurs within our district.

#### Tribe SATYRINI.

*Butterfly*: Of moderate or small size. Some of the veins of the fore wing swollen at the base; hind wings with discal cell closed and only a slight or no pre-costal cell. *Egg*: (Distinction from other tribes unknown.†) *Caterpillar at birth*: (Distinction from other tribes unknown.‡) *Mature caterpillar*: Simply pilose, without fasciated hairs and without lateral spines on the head; forks of last body segment always present and rarely of excessive length. Solitary in life, and mostly nocturnal in habit. *Chrysalis*: No distinction from other tribes noted.

\* In *Dynastor* only (one of the tropical *Brassolini*) they appear to be spiniferous.

† The only egg of the other tribes known is that of *Brassolis* which is very much shorter than in any Satyrini known.

‡ The only caterpillars just from the egg of the other tribes yet published are two of *Brassolini* known only by insufficient figures.

## Subfamily LIBYTHEINAE.

*Butterfly*: Palpi of excessive length, even exceeding that of the thorax (except in some exotic forms), the fringe short. Antennae clothed, gently arcuate, the club gradual. Fore legs of ♂ atrophied, of ♀ nearly normal but abbreviated. None of the nervures of the fore wings swollen at the base; discal cell of hind wings closed by a feeble vein. Generally of a dark color with obliquely transverse broad dashes or blotches of white or orange. *Egg*: Elliptic, much higher than broad, more or less produced at apex and truncate at base with high vertical ribs, highest above. *Caterpillar at birth*: Head much larger than the segment following. Body cylindrical, minutely and briefly pilose. *Mature caterpillar*: Head unarmed, no larger than segments following. Body cylindrical, slightly enlarged at the end of the thoracic segments, pilose, longitudinally striped on the sides, the last segment abruptly curved, not furcate. Feeds on Urticaceae and so far as known only on Celtis. *Chrysalis*: Ovate, compressed, with no conspicuous prominences and everywhere well rounded; with no transverse ridges; abdomen mediodorally carinate. Ventral surface nearly straight.

Contains but a single tribe, Libytheini.

## Subfamily LEMONIINAE.

*Butterfly*: Labial palpi minute, only the minute apical joint surpassing the

face. Fore wings with a distinct internal nervure; hind wings scarcely channeled to receive the abdomen, furnished with a precostal nervure, the costal nervure running only to the middle of the costal margin. Fore tarsi of male, with rare exceptions, without spines or claws. Generally (in our species always) spotted or barred above. *Egg*: Foveolae furnished with septae converging from the walls toward the center. *Caterpillar at birth*: Body with chitinous shields, both dorsal and substigmatal, on every segment, to which the piliferous papillae are confined; chitinous annuli only in the subdorsal region. *Mature caterpillar*: Body scarcely onisciform though not greatly elongated, the head relatively large, being at least half as broad as the middle of the body, and at most only partially retractile within the succeeding segment. *Chrysalis*: More or less elongate and more or less angulate, the abdomen more or less conical with protuberant cremaster, the body sparsely clothed with long hairs.

Only a single tribe, Lemoniini, occurs within our district.

## Tribe LEMONIINI.

*Butterfly*: Hind wing provided with a well developed basomarginal nervure. *Egg*: Deeply reticulate and filamentous. *Caterpillar at birth*: (Distinction from other tribe unknown.) *Mature caterpillar*: Clothed with longer or shorter hairs or bristles of equal length in all parts of the body and sometimes fasciated. *Chry-*

*salis*: (No distinction noted from the other tribe, Nemeobiini.)

#### Subfamily LYCAENINAE.

*Butterfly*: Labial palpi well developed, porrect, half or more of the middle joint surpassing the face. Fore wings with excessively brief, hardly perceptible internal nervure; hind wings channeled on basal half to receive the abdomen, without precostal nervure, the costal nervure running nearly to the end of costal margin. Fore tarsi of ♂ armed abundantly beneath and at tip with spines. Generally unspotted and without bars above. *Egg*: No converging septae in the foveolae. *Caterpillar at birth*: Body with chitinous dorsal shields

of greater or less extent and distinctness only on the first thoracic and last dorsal segments; no substigmatal indurated shields; series of chitinous annuli on the sides of the body. *Mature caterpillar*: Body with rare exceptions (Feniseca) distinctly onisciform; head relatively small, being less, generally far less, than half as broad as the middle of the body, usually completely, always at least partially retractile within the segment behind it. *Chrysalis*: Short, plump, rounded, and nowhere (except in Feniseca) angulate, the abdomen rounded and falling rapidly behind, (excepting in Feniseca) without protuberant cremaster; body sparsely or densely clothed with short hairs or other dermal appendages.

### LIFE HISTORIES OF NORTH AMERICAN GEOMETRIDAE.—XXXVII.

BY HARRISON G. DYAR, WASHINGTON, D. C.

*Deilinia carnearia* Hulst. The ♀ type is in the National Museum. A female before me from which eggs were obtained, is not like the type, the ground color of fore wings being ashen, the lines thicker and more diffuse, the one through the discal dot wanting; terminal gray space more angularly bent and edged within with blackish and carneous. An exact mate to it (♀) is in the Museum, bred on *Ceanothus* in California by Mr. A. Koebele. Others of Koebele's specimens, of which hardly two are alike, are nearer Hulst's type and one ♂ matches it, except that the terminal gray shade is obsolete. I collected an equally variable series of moths with the ♀ that laid the eggs. *D. falcataria* Pack. and *D. perpallidaria* Grote are probably

only varieties of this species; if so, the species must be called *falcataria*. But I have not examined the other types.

*Egg*.—Elliptical, one end strongly depressed, wedge shaped, the sides narrow but not flattened; micropylar end roundly truncate. About 18 longitudinal, parallel lines, stopping sharply at the edge of the truncation, a little confused at the other end; slightly waved, narrow, raised, joined by neat cross lines, similar, forming transversely elongate parallelograms, alternating in successive rows. Fine pores at the joinings of these reticulations. Green, turning sordid crimson. Size .8 × .6 × .4 mm. Hatched in six days.

*Stage I*.—Head round, not bilobed, mouth



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