

LIFE HISTORIES OF SOME NORTH AMERICAN MOTHS.

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The following early stages of some North American Lepidoptera have been recently observed. With a few exceptions the full life history of each is given.

CAUTETHIA GROTEI Henry Edwards.

Egg.—Slightly elliptical, well rounded, not flattened, resting on the leaf only narrowly; shining bright green, minutely shagreened, but also with obscure, linear, rather small reticulations. Size 1.2 by 1.1 by 0.9 mm. Laid singly on the back of leaf.

Stage I.—Head rounded, clypeus reaching to the middle of the front; pale ochraceous greenish, mouth darker; not shining; width 0.5 mm. Body cylindrical, normal, joint 12 squarish with a long (1.5 mm.) erect horn, bearing setæ i on the vertex and finely setose. Segments finely, weakly 8-annulate, shining, punctate with pale dots. Translucent yellowish, green from the food. Horn brown-black, stained with red around the base. Tubercle i is on the third annulet, ii on the sixth, iii on the fourth, iv a little posteriorly, on the fourth, substigmatically, v very anterior on the first annulet and higher than tubercle iv; two setæ on the leg shield. Setæ fine, stiff, straight, not swollen, i to iii dark brown, iv and v pale. Shields and plates concolorous, uncornified.

Stage II.—Head round, soft green, ocelli black; width 0.8 mm. Body same soft green, covered with fine, secondary, pale granules; obscurely 8-annulate. A faint, pale, subdorsal line. Horn long, brown-black, setose, stained with red around the base, this color running a little up the dorsal line. Body pilose; feet pale, thoracic feet reddish at tips.

Stage III.—Head squarish, rounded, clypeus broad, not reaching the middle of the front; soft green with secondary white granules;

width 1.2 mm. Body cylindrical, segments 8-annulate, uniform; anal feet large, the foot plates pointed behind. Horn long, luteous, reddish at base and tip, pilose and with large apical setæ (tubercles i). Body densely pale granular, without lines, light green. Spiracles concolorous.

Stage IV.—Head as before; width 1.7 mm. Horn green, reddish at tip and with a brown streak above at base, with sparse, short, black hairs. Apical setæ still distinguishable. Body light green, pale granular, minutely pilose. Spiracle of joint 5 black, the rest pale brown. Feet green; no lines, no shields. Horn 4 mm. long. Segments uniform, all of equal thickness; subventral fold rather distinct; 8 annulate.

Stage V.—Described by me some years ago in another place.¹

Food plant.—The larvae were occasionally met with on the *Chiococca racemosa* at Palm Beach, Florida.

AMPHONYX ANTÆUS Drury.

A newly hatched larva of this fine Sphinx occurred to me at Palm Beach, Florida, in February, on the custard apple (*Anona laurifolia*). It was bred in Washington, D. C., the food plant being supplied to me by Mr. F. Kinzel. The moth emerged in July.

Egg.—Elliptical, slightly flattened above and below, rounded, normal; shell white, thin, densely granular shagreened; probably green before hatching; size .4 by 2 by 1.8 mm.

Stage I.—Head round, free from joint 2, slightly bilobed; clypeus small, weakly shield shaped; yellowish green, ocelli black, labrum white; width 1 mm. Body cylindrical, equal, incisures not depressed, joint 12 a little enlarged, with a long (3.7 mm.), stout, nutant horn, straight, directed obliquely backward; anal plate large, triangular, with a stout, erect horn (0.5 mm.) each side of the middle, between which the horn of joint 12 fits when depressed. Segments very finely annulate, horn subsegmented, shortly furcate, pilose, but minutely so. Pale green, the folded incisures more yellowish; horn black, reddish about the base. Setæ slender, rather long, with minutely enlarged tips, pale and obscure, normal, i dorsad to ii, v above iv and anterior, a seta on the leg base. Tubercles imperceptible.

Stage II.—Head flat before, highly conical, the lobes produced into short cones which are closely approximate and contiguous, pointing obliquely forward; clypeus small. Pale green, shagreened, not granular, a faint brown line on the face of the lobe, more distinct as it reaches the vertical cone; mouth whitish, ocelli partly black; a dark shade on the median suture behind the vertex where the head rises above joint 2; width 1.6 mm. Body cylindrical, 8-annulate, minutely pilose, granular; horn long (5.5 mm.) and thick, with furcate tip,

¹ Psyche, VII, p. 385.

irregular, rather sparsely spinose. Yellow green, greener dorsally; horn pale red brown toward the base, especially at the sides and at tip; a black line outwardly on thoracic feet; anal flap triangular, nearly reaching the end of the anal foot plates, which are rounded triangular; spiracles pale ochereous. Subdorsal horns of anal plate, short cones; horn depressed obliquely and touching the leaf stem far behind the larva. Later the sides are obliquely shaded, but the only true lines that appear are the oblique on 12 to 10 and the longitudinal subdorsal on the thorax. The body fills out posteriorly, joints 2 to 4 being smaller than the rest and tapering to the large head.

Stage III.—Head highly triangular, the doubly pointed apex curving in front, making the flattened face look concave; green, sides a shade darker, a pale line from the ocelli to vertex. Sparsely granular, subspinose in front before the apex, tips of lobes yellowish, with a faint line down the back of each, of same color; width 2.5, height 4.5 mm. Body robust, small before; horn large (8 mm.) and very thick, slightly arcuate backward, extended nearly longitudinally. Green, with distinct elevated pale-yellow granules; faint subdorsal and subventral yellow lines on thorax and an oblique on joints 12 to 10. Shaded faintly with whitish, leaving a darker dorsal and faint oblique shades on joints 5 to 11. Spiracles brown, paler at top and bottom. Horn densely spinose, with thick, conical, irregular tubercles, black on the dorsal (anterior) half, greenish yellow below, but the tips of the spines black. Abdominal feet green; thoracic ones black outwardly. Anal shields green, black punctured, a slight, pale tubercle representing the former subdorsal horn. Anal flap rounded triangular.

Stage IV.—Head shaped as before, held obliquely so that the vertex points forward and the back of the head is level with the dorsum; green, sparsely granular, subspinulose toward the horn-like apex; two whitish lines on the side of each lobe and one on the back, running to the vertex; width 4 mm. Body robust, smaller before, annulate, sparsely yellow granular, the granules pilose and also considerable pile between them without basal granules. Green, dorsal line darker, olivaceous, without granules; an oblique yellow stripe from the horn to joint 10, the faint whitish lateral clouding shaded obliquely darker on joints 5 to 9. Anal plates triangular, smooth, punctate with dull ochereous. Spiracles brown, yellow at top and bottom and in a narrow vertical central line. Horn very large and thick, coarsely, densely, conically spinose, olivaceous yellowish below. Abdominal feet green; thoracic ones black, with coarse pale granules, the basal joint black only in an outward stripe. Later the dorsal band becomes purplish, especially on joints 5 to 11, edged with paler.

Stage V.—Head highly conical, but without the points of the previous stage; vertex rounded, median suture impressed, clypeus very small, about one-fourth the height of head, vertical membranous triangle visible on the back, not reaching halfway to the conical apex;

finely shagreened, also with minute, sparse, smooth granules and a very few secondary hairs toward vertex; green, slightly shining, a very obscure paler band up the anterior angles from ocelli to vertex and a fainter one on occiput from base of vertical triangle; apices of lobes slightly yellowish; jaws black; labrum furcate, brownish; antennæ mostly pale; ocelli brown shaded except the upper and lower ones; width 7 mm. Body large, robust, smaller before; anal plates large and thick; joint 12 enlarged dorsally with an enormous thick club-like horn, studded thickly with cones, the end rounded, not pointed. Segments 8-annulate, the ordinary granules minute, but the sparse ones distinct and pale with rather long and distinct brown secondary hairs, perfectly visible without a lens. Green, a dorsal vascular line shading into purple, bordered with yellowish posteriorly (joints 6 to 10), the lateral obliques very faint dark shades, lighter edged, except the one on joints 12-10, which is a very distinct, broad, white line edged with dark green before. Horn olivaceous lilac above, the studding cones pale ochereous with brown tips. The three anal plates are rounded triangular, green, covered with large slightly elevated yellowish brown granules, faintly circled with yellow. Other abdominal feet green, the claspers black; thoracic ones yellowish white, streaked and spotted with black, with a few small whitish granules. Spiracles large, dark brown, shading paler above and below, with a central vertical white line. Later the horn became dark violet above, the dorsal stripe violet, broad and distinct, narrowing anteriorly to obsolescence. The larva entered ground and formed a cell in the earth.

EUPSEUDOSOMA INVOLUTUM Sepp.

Phalæna involuta SEPP, Surin. Vlinders, III, 1852, pl. cxv.

Charidea (?) *nivea* HERRICH-SCHÄFFER, Ausser. Schmett., fig. 279, 1855.

Halisidota nivea WALKER, Cat. Brit. Mus., XXXI, 1864, p. 308.

Eupseudosoma niveum GROTE, Proc. Ent. Soc. Phil., V, 1865, p. 240.

Eupseudosoma involutum KIRBY, Cat. Lep. Het., I, 1892, p. 205.—DRUCE, Biol. Cent.-Am., Lep. Het., II, 1897, p. 391.

Variety FLORIDUM Grote.

Eupseudosoma floridum GROTE, Can. Ent., XIV, 1882, p. 187.—SMITH, List. Lep. Bor. Am., XXVI, 1891.—KIRBY, Cat. Lep. Het., I, 1892, p. 205.—NEUMOGEN and DYAR, Journ. N. Y. Ent. Soc., I, 1893, p. 174.

Euchætes immaculata GRAEF, Ent. Amer., III, 1887, p. 42.

The variety *floridum* lacks the blackish bars that occur on the discal and submedian folds of the fore wings of the typical form. It occurs exclusively in southern Florida. The larva resembles that described and figured by Sepp, but the food plants which I observed were different. Sepp states that his larvæ were found on guava (*Psidium pyrififerum*); mine were found only on the wild species of *Eugenia*.

The moth has been placed in the Arctiidae, and Sir George Hampson, in his recent monograph of the Syntomidae, omits the genus, thereby

confirming the reference. However, the larva is an unequivocal Syntomid, showing the typical structure. The moths of the Syntomidæ and Arctiidæ are separated only by the absence of vein 8 of the hind wings in the former. Hampson does not use this character absolutely, for he includes Eucereon in the Syntomidæ, though some of the species have a rudimentary vein 8 present, and he excludes Halisidota, though some species have vein 8 nearly absent. The larval characters confirm both of these references, but not so with Eupseudosoma. In the latter genus the female has vein 8 entirely absent; the male has a short vein, not reaching the costa. Even on these characters Eupseudosoma might well be included in the Syntomidæ; but when we consider that the subcostal vein in the male is probably secondary, merely a brace for the large costal lobe, it renders the reference more likely.

The larva presents during ontogeny the usual gradual appearance and disappearance of characters adapted to its habits at its different stages. But there is one very unusual feature, which is worthy of special mention. The head is immaculate in all stages but one—the penultimate. Then it assumes a large and peculiar marking. This would not be remarkable if it appeared in the last stage, but to suddenly appear for one stage only and then completely disappear is unique in my experience. It may be noted that the mark is normal in the Syntomidæ, being present in all stages of *Lymire edwardsi*, showing in *Ctnucha virginica* and indicated in *Scepsis fulvicollis*; but the cause of its sudden appearance in one stage of *Eupseudosoma floridum* is far from clear. The general appearance of the rest of the larva does not change while the head is undergoing its transformation, and the head is not conspicuous, being more or less concealed by the hair. The mark was constant in all my 20 larvæ.

Egg.—Slightly more than hemispherical, base flat, apex very slightly produced, suggesting the conoidal shape; clear yellowish green with amber lights about the edges, later opaque whitish green; reticulations small, regular, rounded hexagonal, slightly raised, smaller just around the micropyle, forming a ring of small cells with one central one; micropyle eccentric, a little to one side of the vertex of the egg; diameter, 1.1 mm.; height, 0.5 mm. Laid several together or in a mass on the back of a leaf, not touching, often rather remote and scattering.

Stage I.—Head rounded squarish, slightly bilobed, clypeus high, the paraclypeal pieces nearly reaching the vertex; free from prothorax; antennæ moderate; primary setæ short, black, distinct; i and ii rather near the vertex, iii at the middle of the lobe, iv close to ocelli, three behind the circle of ocelli (one inclosed), two below, rather approximate above the antenna. Colorless, a yellow patch showing from within by transparency; jaws, brown; ocelli, black; width, 0.45 mm. Body arctiiform with large tubercles and thick

spinulose white hairs. Segments short, contracted, the incisures distinct; no shields. Tubercles ia+ib+iaa on joints 3 and 4, distinctly united on a flattened, somewhat fan-shaped wart; iib small, remote, posterior; iv large; vi dark. On the abdomen tubercle i small, dark; iv stigmatal, posterior, rather small; v larger. Setæ single, no subprimaries. Body a little flattened, the lateral tubercles, especially of joints 3 and 4, a little prominent. Translucent whitish, tubercles ii and iii on joints 11, 12, and 13 anteriorly dark ocherous. Hairs white; legs colorless; the anal feet divergent. On eating, the larvæ became green from the food, the ocherous tubercles faded to a dull color, joint 2 became contracted, and joints 3 and 4 hunched up.

Stage II.—Head flat before, rather strongly bilobed, colorless, mouth brown; width, 0.65 mm. Body a little flattened, joints 3 to 5 largest, joint 2 retracted and weak, joint 13 small. Warts moderate, spherical, with rather dense, white, stiff, spinulose hairs, those of joints 3 and 4 the longest, very few on joint 2, the shield obsolete; prespiracular and subventral warts present, slender, produced. On joints 3 and 4 one wart above the stigmatal wart, discrete, round, produced. On the abdomen wart i small, ii large, iii small, iv about the same size, v small, vi larger on the somewhat produced subventral fold. No anal plate, but warts on the flap. Feet rather slender, pale, with colorless plates. Luteous whitish, the sides washed with pale vinous; deeper vinous about the subdorsal tubercles of joints 3 and 4 and below ii and iii of joints 5, 6, and 10; on 11 to 13 this color is more distinct, forming streaks running downward and forward from wart ii, on joints 12 and 13 changing from vinous to dull orange red. Skin smooth, not shining.

Stage III.—Head squarish bilobed, clypeus rather high, faintly luteous, a vinous spot within at apex of paraclypeal pieces; ocelli black, jaws only faintly brown; width, 0.9 mm. Warts rounded, produced, colorless, except the subdorsal ones of joints 3 and 4, which are vinous tinged, and ii of 12 and 13, which are orange. Wart i small, ii and iii large, iv and v small, vi large, produced. Color as before, but the vinous shading covers the dorsum on joints 3 to 10.

Stage IV.—Head rounded, slightly bilobed, clypeus reaching half way to vertex; pale testaceous, jaws black at tip; ocelli black, five in a semicircle and one below behind the antenna. Body short and thick, pale testaceous, vinous tinged, especially in dark, oblique streaks over warts ii and iii on joints 11 to 13. Warts rounded, elevated, colorless. Hair dense, stiff, flesh colored with black tips, barbuled. A diffuse black dorsal patch on joint 5, the hair from tubercle i and part of ii short and black. A slight similar shade on joint 10. Later rusty brown, the green food showing only dorsally on joints 10 to 12. Black patches diffuse.

Stage V.—Head as before, the antennæ rather long; width, 2 mm. Body the same, nearly colorless, only faintly brown or vinous tinged, the posterior dorsal marks nearly obsolete. Marks replaced by very dense hair, but the large, diffuse black dorsal patches are present on joints 4 to 6 and 9 to 10. Hair bright brown with short black tips, all even, only a few long pale ones overhanging the head. A slight, black, crested tuft on the upper side of tubercle i on joint 5, as long as the other hair. Hairs brightest, most reddish centrally, the end and subventral ones without black tips. Feet all pale. Hairs rather long, barbed, the tips formed by three or four black barbules in a terminal group; the barbules on the shaft concolorous with the hair. The larva looks like a brown hairy gall on the back of the leaf.

Stage VI.—Head rounded, scarcely bilobed, pale whitish, a large, thick, inverted U-shaped black mark bordering the clypeus and throwing out a short spur at the side below. Antennæ rather long, pale; labrum whitish; width, 2.5 mm. Body flattened ventrally, rounded, thickest at joint 5 and a little depressed at the ends, entirely covered by the dense, brush-like hair. Pale yellowish, scarcely translucent, warts concolorous, no marks whatever. Hair dense, even, and regular, pale yellow, spinulose, the ends slightly brown tufted. On the subdorsal wart of joints 3 and 4 a long, slender, white pencil of two or three hairs, rather densely feathered, spinulose. Warts i to vi all large and rather contiguous, rounded, hemispherical, the single subdorsals of joints 3 and 4 a little elongated transversely. No trace of the tuft on joint 5 of former stage. During the stage the hair becomes dark yellow.

Stage VII.—Head pale yellow, a diffuse reddish shade over the face of each lobe, the paraclypeal pieces grayish and some gray dots on clypeus; labrum, epistoma, and antenna white; ocelli brown, jaws black at tip; the black U-shaped band entirely absent; width, 3.5 mm. Body as before, thickly covered with a brush of yellow hair, even, spinulose, the ends pointed, not tufted; four slight and slender pencils of white hairs arise from the subdorsal warts of thorax. Body and warts pale yellow like the hairs, without marks. Later the head becomes dark orange red. Other larvæ, alike till this stage, came out with variously colored hair—bright yellow, mouse gray, chocolate brown, and orange red, the color always residing in the distal third of the hair in the spinulose part, the heads and bodies not affected, being all alike in color. All the thoracic pencils were white. Later the color dulls so that there are only two forms, yellow and chocolate brown, which continue distinct till maturity.

Cocoons composed of the hair felted in a delicate web of silk. Pupa dark brown, concealed by the cocoon.

Food plants.—*Eugenia buxifolia*, *E. procera*.

EUCEREON CONFINE Herrich-Schäffer.

Charidea confinis HERRICH-SCHÄFFER, Ausser. Schmett., fig. 277, 1855.

Galethalea confinis BUTLER, Journ. Linn. Soc. Lond., XII, 1876, p. 424.—DRUCE, Biol. Cent.-Am., Lep. Het., I, 1884, p. 80.

Nelphe confinis KIRBY, Cat. Lep. Het., I, 1892, p. 172.

Eucereon confine HAMPSON, Cat. Lep. Phal. Brit. Mus., I, 1898, p. 508.

Variety CAROLINA Edwards.

Nelphe carolina HY. EDWARDS, Ent. Amer., II, 1887, p. 166.—SMITH, List. Lep. Bor. Am., 1891, p. 27.—KIRBY, Cat. Lep. Het., I, 1892, p. 172.

Eucereon carolina NEUMOEGER and DYAR, Journ. N. Y. Ent. Soc., I, 1893, p. 173.

The variety *carolina* from southern Florida differs from the type form in that all the brown spots of the fore wings are smaller and narrower. I have *confine* from Mexico and Venezuela, and they constantly differ from the Floridian specimens by the larger, more rounded spots, contrasted on the more whitish, less uniformly ochereous-tinted ground color. The larva of the stem form has not been described, so no comparisons can be made. Our larva is a true Syntomid.

Egg.—Shape of two-thirds of a sphere, rounded, smooth; white, translucent, with a pale green tint, not shining. Reticulations small, irregularly hexagonal, slightly raised, about alike all over, distinct; diameter, 0.9 mm. Laid singly on or adjoining the food plant.

Stage I.—Head slightly bilobed, whitish testaceous, clypeus high, ocelli black, mouth brown; width, 0.4 mm. Body all white, the shields concolorous, tubercles large, arctiiform, faintly slaty. Feet normal, arctiiform. Setæ long, stiff, pale, ii black as well as iii, but posteriorly the long black hairs have pale tips. Warts i to v present, single haired, no subprimaries; leg shields pale slaty like the tubercles; i and iv small. On the thorax ia+ib+iaa, large, iib separate, posterior, small. Cervical shield small, reduced, concolorous. Setæ ia and ib of joints 3 and 4 are black, iia white, but all on a single wart with a projection behind. Later the larva is pale yellowish, the food faintly green; tubercles pale, a little darker on the rims. Joint 2 retracted and with very weak shield; no anal plate.

Stage II.—Head rounded, slightly bilobed, pale greenish yellow, ocelli narrowly black; width, 0.5 mm. Body arctiiform, normal, pale yellow, a dark shade from the food. Warts large, perfectly concolorous; hairs long, straight, and rather stiff, deep black and pure white mixed, black predominating dorsally, white subventrally. Joint 2 small and retracted; joints 3 and 4 rather large. Feet all pale, no shields. Only one subdorsal wart on joints 3 and 4; wart i of abdomen small, as also iv and v, but all several haired. Toward the end of the stage traces of a double white dorsal line appear.

Stage III.—Head broad, round, bilobed; clypeus reaching about

two-thirds to vertex; ocelli black, 5 in a semicircle and one below; jaws with 5 cusps, the upper and lower ones short, the middle one the longest; width 1 mm. Body pale yellow with a black dorsal line on joints 3 to 12, broken at the ends, dotted and not definitely edged. Feet large, pale. Warts moderate, concolorous; hair abundant, long, but of irregular lengths, longer at the ends, joints 3 to 5 and 12, 13; coarsely gray, from a nearly even mixture of black and white; rather stiff, spinulose, the long ones finely pointed. Food greenish; joint 12 at the sides a little more yellowish than elsewhere. Later the black dorsal line cuts a series of white, irregularly diamond-shaped dorsal spots on joints 5 to 11, two on each segment, the anterior one smaller, confluent; also a narrow yellow subdorsal line on joints 5 to 11 below wart ii.

Stage IV.—Head pale yellow, ocelli and jaws black, labrum white at tip; broad, rounded, held out flat; width 1.8 mm. Body and warts colorless, slightly yellowish, especially at the sides of thorax and joint 12, sordid green from the food. A broad olivaceous black dorsal stripe, reaching tubercle ii, widened in the centers of the segments, reaching joints 3 and 12, replacing the former white; a yellow subdorsal line below wart ii on joints 5 to 11, broken in the incisures. Hair irregular, stiff, straight, abundant, black and white, the white much predominating; a number of hairs at the ends much longer; barbed. Warts i to iii and vi large, almost contiguous; i a little smaller; iv and v minute. Joint 2 retracted, hairless dorsally; joints 3 and 4 with one large subdorsal wart. Superficially the larva resembles *Hyphantria cunea*. Later the dorsal black becomes again partly white, forming a dorsal white band narrowing at wart i, widening to ii, and containing dorsal and addorsal, somewhat pulverulent, black lines, except posteriorly where the band remains all black.

Stage V.—Head round, not bilobed, black, slightly shining, the sutures of the moderate shield-shaped clypeus and median suture narrowly olive green as also epistoma and antennæ, including basal joint; tip of labrum, palpi, and ocelli also pale; width 2.9 mm. Body a little flattened ventrally, arched, a little narrowed at the ends; joint 2 retracted and nearly without hairs; anal flap with warts. Warts large, rounded or elliptical, one subdorsal on joints 3 and 4, a pale space indicating seta iib; on abdomen i to iii and vi large, iv and v small, but distinct warts. Body black dorsally and on centers of segments down to the feet; pale greenish ventrally and in incisures up to the level of wart iv where is a trace of a white stigmatal line, only intersegmentally. Warts dull flesh color, contrasting with the body. Hair mostly black, but mixed with gray and white, especially subventrally, the long hairs at the ends of the body white on the apical third. Hair long, rather even, coarse, spinulose, the long ones at the ends

numerous. Feet all pale, as also the incisures narrowly, seen when the body is bent. Spiracles white; joint 2 all pale greenish. A slight black dorsal tuft on joint 12.

Cocoon spun on a leaf, elliptical, flattened below, made of hairs and silk, the hairs forming a point at one end, all as in *Lymire edwardsi*. Pupa concealed, brown, normal.

Food plants.—*Philibertia viminalis*, *Vincetoxicum palustre*.

SCEPSIS FULVICOLLIS Hübner.

The larva of this common moth has been briefly described by Coquillett. The following life history was obtained from eggs from New York City, handed me by Mr. L. H. Joutel.

Egg.—Low conoidal, the base flat; more than hemispherical; shining pale yellow; surface very finely, nearly hexagonally, reticulate, the lines narrow; diameter, 0.7 mm. Laid in rows on a grass blade.

Stage I.—Head rounded, slightly bilobed, pale whitish, shading to brown on the apices of the lobes, a large, rounded, black spot on the face of each lobe and a much smaller one over ocelli; width, 0.4 mm. Body whitish, cervical shield brown, the tubercles and anal plate slaty black. Hair long, spinulose, black. Hairs all single, no subprimaries; on thorax ia, ib, and iia on a single wart, iib small, remote, posterior; on abdomen i smaller than ii, iv and v small, iv behind the spiracle, normal.

Stage II.—Head rounded, bilobed, full, pale transparent luteous, a large, black patch on the front of each lobe above; ocelli black, mouth dark brown; a narrow, dark line on vertical suture; width, 0.6 mm. Cervical shield small, transverse; warts i and iv single haired, the latter very small; ii, iii, and vi many haired, vi large; a group of hairs on the leg shield. Body translucent, faintly luteous, a broad, shaded brown, dorsal stripe, widening irregularly in the incisures, and a narrower, irregular, lateral shading forming broad rings about warts iii. Warts large, colorless, but with small black tubercles for each hair. Hairs black and pale, slightly spinulose, pointed, rather short. On joints 3 and 4 only one large subdorsal wart; tubercle v a large wart, but single haired.

Stage III.—Head rounded, slightly bilobed, shining sordid whitish, a black patch on the face of each lobe above, a small one over ocelli, and very small one in apex of clypeus; mouth brown; width, 0.75 mm. Body cylindrical, arctiiform, with distinct warts and normal feet. Scarcely any hair on joint 2, the hair of joints 3, 4, 12, and 13 much longer than on the rest of the body. Hair thin, fine, spinulose, black, paler subventrally. Body dorsally dull reddish, a darker dorsal line, a pale subdorsal one just below wart ii, and traces of a lateral one above iii; below iii, including the subventral region and feet, pale

whitish, sharply marked from the dorsal color. Warts black, ii, iii, v, and vi large, i small, all many haired except i and v, which have only two or three hairs, iv a tiny rudiment behind the spiracle, just perceptible. Joint 2 much contracted, the cervical shield indistinct; joint 3 a little elevated above 2. Thoracic warts as before; iib quite visible.

Stage IV.—Head bilobed, full, shining pale luteous, a black spot on each lobe before, one in clypeus, a streak in the vertical suture, and ocelli narrowly black; mouth only slightly brown; width, 1.2 mm. Body nearly black, a faint, pale luteous subdorsal and subventral band, straight and even, the subventral the broader, both obscure. Joint 2 much contracted, the long hairs of 3 overhanging the head. Other hair moderate, black and white. Warts large, arctiiform, many haired except iv, which is obsolete. Wart i large, smaller than ii; iii largest of all. Warts dark gray, with black hair-tubercles. All feet black.

Stage V.—Head full and rounded, scarcely at all bilobed, very pale luteous brown, the small clypeus and a transverse band adjoining it and nearly covering ocelli as well as vertical suture narrowly and posterior edge of occiput, black; labrum, antennæ, and mouth pale; width, 1.8 mm. Body black, venter gray, as also joint 2, which is nearly without hairs except subventrally; cervical shield shining, small. Lines all obsolete, subventral fold a little pale; thoracic feet partly black, abdominal ones pale. Warts large, black; hairs black and white, moderate, a group of longer ones overhanging the head. Another had the head pale, a tiny brown spot on the face of each lobe and apex of clypeus; the two groups of ocelli narrowly black and a line in the vertical suture. The warts are large, except iv, which is a nearly hairless rudiment. Later black, subdorsal line faintly traceable, pale brownish, subventral line whitish in a broad pale gray area that extends from wart iv to venter. As the body pales further with growth, a dark dorsal line appears and shades below the subdorsal and above the subventral stripes.

Stage VI.—Head round, full, rather large, not bilobed; clypeus small, shining reddish luteous, marked with black as before; paraclypeal pieces pale; width 2.6 mm. Body arctiiform, joint 2 contracted; warts large, low, black, iv obsolete. Dorsum dark gray, with shaded black dorsal line; subdorsal line distinct, bright orange shaded, especially posteriorly on the segments, sides black; substigmatal line pale yellow, a little transversely streaked, like the subdorsal one; venter gray; feet very pale. The long hairs of joints 3 and 4 (from the large warts ia+ib+ia and iv+v) and joints 12 (from wart ii) and 13 (from warts i, ii, and anal plate warts) are black; those from the rest of the body paler, from i to iii slightly penciled;

subventral hairs diffusely spreading. On thorax warts iib and iii are present as single hairs. Warts all surrounded by whitish rings. Joint 2 is so shrunk up as to be concealed; no hairs arising from it.

Cocoon spun on the cover of the jar, very thin, mostly of hair, the pupa visible; a tuft of hair in front, as in *Lymire edwardsi*.

Pupa.—Cylindrical, slightly tapering, head prominent, the thorax sloping; flesh colored, nearly white; traces of the reddish subdorsal line of the larva and rather numerous black marks in double segmental, subdorsal, and stigmatal spots and ventral stripe reaching over cases and all, and the edges of cases, especially the costa of fore wings. Eggs hatched September 15, imago October 19. The species seems to breed continuously until stopped by the cold, unlike *Ctnucha virginica*, which has a definite hibernating period and is single brooded.

Food plants.—Species of grass.

CISTHENE SUBJECTA Walker.

Cisthene subjecta WALKER, Cat. Brit. Mus., II, 1854, p. 534.—STRETCH, Zyg. Bomb. N. A., 1872, p. 155.—NEUMOEGEN and DYAR, Journ. N. Y. Ent. Soc., I, 1893, p. 115.

Hypoprepia packardii GROTE, Proc. Ent. Soc. Phil., II, 1863, p. 31.—MURTFELDT, Psyche, III, 1881, p. 243.

Miss Murtfeldt has described the mature larva. She found three molts after hibernation. My larvæ reached stage V before hibernation, and so would probably not have had but one molt in the spring, perhaps not any. They failed, however, to pass the winter. The following, with Miss Murtfeldt's description of the mature form, will give the full life history of the little species.

The larva is somewhat anomalous. Like lichen feeders in general, the warts are practically single haired. This reduction, affecting the wart characters of the Lithosiidæ, is interesting, though it naturally tends to somewhat confuse the phylogenetic arrangement characteristic of the family. However, we see tubercles ia and ib of the thorax still in line antero-posteriorly, which seems to be the essential point, although they do not become multiple haired and are somewhat crowded together.

Egg.—Rounded conoidal, the base flat and concave centrally, not quite so wide as the egg itself; surface polyhedral, the cell areas flattened, rounded hexagonal, reticulations scarcely raised, rather small, surface slightly shagreened; diameter 0.7 mm. The eggs are laid in a line, separated from each other and each tipped at an angle so that they rest on only one corner of the base. This gives it, at first sight, the appearance of having an odd, unusual shape.

Stage I.—Head rounded, bilobed, clypeus moderately high; colorless, transparent, a black patch on the face of each lobe above, another over ocelli; labrum black; vertex faintly brown shaded; width, 0.3 mm. Body cylindrical, arctiiform, segments well marked; feet normal, with

slender, club-shaped, protuded planta bearing few crochets; colorless, transparent, glassy. Tubercles small, conic, concolorous; shields obscure, not colored. Hairs of various lengths, spinulose, arctiiform, the strong ones dark brown, the weak ones colorless. Hairs of joint 2 small. On thorax, warts ia and ib in line anterio-posteriorly, iib weak; hairs all single, no subprimaries. On abdomen i absent on joints 5 to 9, a trace on joint 10, a small seta on joints 11 and 12; ii and iii distinct, iv behind the spiracle, v subventral; ii and iii of joints 12 and 13 are very long, six times the width of the body or more. Head setae rather short, pale, spinulose. Ocelli six, in a rectangle.

Stage II.—Head rounded, bilobed, mouth squarely produced; translucent, whitish; labrum, spot below vertex of each lobe, back part of the side, and a spot covering the eyes black; width, 0.4 mm. Body squarish, a little flattened, whitish, translucent, all the dorsum appearing grayish from the food. Legs slender, normal. Warts rather large, pale; i a single hair curved forward, ii single, curved backward; iii with two hairs, iv and v single, vi with two hairs; leg shield with short hairs. On thorax ia, ib, and iia gathered together a little, but not on a true wart; iii, iv, and v likewise approximate. The thoracic hairs are almost exactly as in stage i, except for the addition of setae iii and v. Hairs dusky, the ones at the ends long. Anal plate and cervical shield reddish; also paired spots of this color on joint 5 over tubercle ii and on joint 9 over i.

Stage III.—Head rounded, full above, scarcely bilobed, not higher than joint 2; translucent, whitish, shining, a black patch on vertex of each lobe, one on face of lobe above, over ocelli, and on jaws; a dark shade in vertical suture; width, 0.55 mm. Body rather flattened; feet large, spreading; translucent, whitish; a faint, broken, white dorsal, subdorsal, and subventral stripe and a row of subdorsal brown-gray spots on tubercle iii, with a large reddish one on joint 5, very faintly also on joint 11; the subdorsal spot of joint 12 large. Warts concolorous, hairs pale, fine; setae i and ii single, short, black, spinulose; iii with two hairs, one of them long; iv and v single, pale; vi with two hairs, pale. Hairs all as before on the thorax. The dorsal white stripe is composed of a series of squarish patches on the segments posteriorly; the others are narrower, broken lines. Joint 12 slightly enlarged. Cervical shield, anal plate, and a series of ventral patches obscurely gray-brown. Later the dorsum is greenish, the patch on joint 9 large, single, dorsal, the whole larva closely resembling bark. Length at end of stage, 5.5 mm.

Stage IV.—Head rounded, slightly bilobed, the clypeus two-thirds its height; labrum quadrate, large; ocelli distinctly projecting; translucent whitish; a large black patch on the face of each lobe, irregularly shaped, running back to the occiput; a rounded patch over eyes;

black triangular mottlings in the vertical suture; jaws black; setae pale, rather long; width, 0.8 mm. Body flattened, thorax a little largest, joint 2 distinct and as large as the others, joint 13 rather small; translucent gray, finely black dotted, a white dorsal band, composed of intrasegmental blotches, each of three transverse, confluent streaks, distinct only on joints 5 to 11; a waved, black lateral line forming three strong segmental loops on the thorax, then at joint 5 running high and covering tubercle ii, on joints 6 to 10 forming a series of oblique lines from before subdorsally to behind subventrally, on joints 11 to 13 confused blotches. A series of black streaks below wart v. Warts i, ii, v, and vi dull orange. Pale yellow, black edged dots most distinct dorsally on the thorax and on joint 12 and laterally below the black band. Hairs sparse, moderate; blackish dorsally and pale subventrally. Warts iii and vi two-haired, the rest single. Thorax as before.

Stage V.—Head round, wider than high, very full in front, the clypeus not depressed, high; labrum projecting; marked as before, but the clypeus all pale; width 1.15 mm. Body exactly as before. On the thorax the white dorsal line is nearly obsolete and the subdorsal black line is more lateral than on the body, making the dorsal space broadly pale; it looks depressed (though not really so) and different from the rest of the larva. Feet pale. The arrangement of the thoracic warts is: ia and ib closely approximate, in line antero-posteriorly; iia below, separate; iib small, remote, posterior; iii distinct, posterior; iv and v closely approximate, anterior; vi subventral, all single-haired.

Food plant.—The scurfy bark and tiny lichens growing on the stems of oak trees. Larvæ from Bellport, Long Island, New York. Eggs August 9. Larvæ hibernating October 15.

CALIDOTA STRIGOSA Walker.

Arctia strigosa WALKER, Cat. Brit. Mus., III, 1855, p. 615.

Halisidota strigosa WALKER, Cat. Brit. Mus., III, 1855, p. 736.—MÖSCHLER, Abh. Senck. Ges., XIV, 1886, p. 34.—NEUMOEGEN and DYAR, Journ. N. Y. Ent. Soc., I, 1893, p. 168.

Halisidota cubensis GROTE, Proc. Ent. Soc. Phil., V, 1865, p. 243.

Halisidota laqueata HY. EDWARDS, Ent. Amer., II, 1887, p. 166.—SMITH, List Lep. Bor. Am., p. 27, 1891, no. 1144.

Theages strigosa KIRBY, Cat. Lep. Het., I, 1892, p. 202.—DYAR, Can. Ent., XXIX, 1897, p. 217.

I have placed this species in *Theages* Walker, following Kirby; but Hampson has shown that *Theages* is a synonym of *Eucereon*. Therefore a new generic term seems required for this moth, which I propose as above. The genus has been limited by me¹ as *Theages*. It differs from *Halisidota* by the presence of the accessory cell.

¹Canadian Entomologist., XXIX, 1897, p. 216.

The larva occurred to me at Palm Beach, Florida. It is a true Arctian, resembling *Halisidota*, but lacking the hair pencils. It persistently hides by day in leaves, apparently on the ground near its tree, and is consequently difficult to find.

Stage I.—Head round, slightly bilobed; lobes full; clypeus moderate; pale brown, shining, mouth blackish; width, 0.6 mm. Body ochraceous, orange brown in the incisures; a broad white dorsal stripe on joints 5 to 10, edged by a subdorsal brown stripe that occupies all of the dorsum of joint 11; joints 3 and 4 dorsally pinkish brown. No cervical shield nor anal plate; setæ in groups of five subdorsally on joint 2. Legs normal, arctiiform; shields elongate, dusky; tubercles colorless, i to iii of joint 5 black, iii to vi of joints 5 to 11 dusky. On thorax ia+ib, iia separate, iib weak, remote, posterior, vi 2-haired, iii and v absent. On abdomen iv behind the spiracle, vi present, elongate, without hairs. Hairs black, spinulose, ib of joints 3 and 4, iii of 12, and the subventral ones white.

A still younger larva was diffusely whitish lead color centrally on joints 6 to 10, orange at the ends, all the tubercles dusky blackish.

Stage II.—Head rounded, bilobed, full; clypeus moderate; testaceous brown, shining; ocelli black; width, 0.9 mm. Joint 2 retracted and with lateral warts only; joints 3 and 4 large, with long hair overhanging the head; two warts above the stigmatal wart, the upper one the larger. On the abdomen warts i to vi present, about alike, moderate, wart i a trace smaller, iv stigmatically posterior. Joints 2 to 4 and 12 to 13 orange, 12 the lightest; dorsum of joints 5 and 11 dull vinous; dorsum of joints 6 to 10 and subventral region (tubercle iv to the feet) opaquely whitish. Thoracic and anal feet orange tinted; abdominal ones of joints 7 to 10 pale, with concolorous shields. Warts black; hair black dorsally, white subventrally, not very abundant, longer at the ends. Later all vinous except joint 12, joints 2 to 4 lighter than the central part; subventer whitish, the white stripe reduced to dots along wart v.

Stage III.—Head rounded, orange testaceous, ocelli black, four in a semicircle, two below; jaws brown, mouth area pale; width, 1.36 mm. Joint 2 much retracted, no cervical shield, as before. Dark vinous dorsally; subventer and feet pale, nearly colorless. Joint 2 dorsally luteous; 3 dark reddish orange; 6 to 10 white in a broad dorsal area reaching wart ii; 12 orange, 13 paler except a narrow purplish dorsal band on joints 12 and 13. Warts colorless; anal feet pale, extended. Hair abundant, black and white mixed, spinulose, longest at the ends. The black hairs are slightly more pointed dorsally on joints 5 and 12, but not forming tufts. A white stigmatal line on joints 5 to 11. The larva looks purple, marked with white; the head, joints 4 and 12 red.

Stage IV.—Head shining dark red brown, a little blackish lined about the sutures, epistoma white; width 2.1 mm. Body as before,

the dorsum of joints 6 to 10 broadly gray white, cut by a slender dusky dorsal line; joints 4 and 12, except dorsally on joint 12, dull orange. All the rest blackish purple with narrow white line on the subventral fold; feet and venter pale, nearly colorless. A short black tuft from the upper side of wart ii on joints 5 and 12, forming a paired tuft on joint 5, single on joint 12. Other hair moderately dense, not concealing the body, fine, sordid reddish and blackish mixed, with some long white ones at the ends. The general tint of the hair is a reddish brown. Warts pale, slightly flesh-colored, moderate, round. With growth the color becomes more sordid, the white suffused with dull red, the dark purple parts lighter and more purplish, only joint 5 remaining dark. Warts surrounded by white rings; feet reddish.

Stage V.—Head broad, not high, full and round, scarcely bilobed; clypeus reaching nearly to the top of the front; shining black, epistoma narrowly and the base of antennæ white; width 2.5 mm. Body sordid gray; subdorsally on joints 6 to 10 and 12, the ground color is lighter and pale salmon tinted; warts all pale salmon color. Hair rather uniform, moderately dense, reddish, much the color of dead leaves, but lighter and somewhat salmon colored like the warts. The long hairs anteriorly and posteriorly are whitish. A narrow whitish stripe along the stigmatal fold of joints 5 to 12. Feet pale, slightly reddish. Warts large, round, i, iv, and v a trifle smaller, all well alternating, aretiiform. Joint 2 much retracted, with slight warts; two subdorsal warts on joints 3 and 4, ib and iii present as distinct rudiments. Hair spinulose, sharp pointed. No tufts, the dorsal hair not even keeled. Spiracles black rimmed. Later the larva is uniformly sordid grayish with a dusky dorsal line, the hair pinkish brown, slightly darker dorsally on joints 5 and 12. White substigmatal band obsolete except intersegmentally.

Stage VI.—Head shining black, basal joint of antennæ reddish, epistoma slightly paler at the sides, mostly black; width 4 mm. Body fleshy brown with a vascular dorsal blackish stripe; warts and hair light pinkish brown. Hair regular, dense, with numerous longer concolorous ones at the ends. White subventral band (above wart v) present in the incisures only, obscure. Feet reddish. The hair is densely spinulose; seen at right angles it is pale pinkish brown; seen obliquely it is much darker and more reddish brown.

Cocoon elliptical, rather thin, composed of hair and silk, spun among leaves, not entirely concealing the pupa.

Pupa dark mahogany brown, shaped as in *Halisidota*.

Food plant.—*Guettarda elliptica*.

INGURA BURSERÆ Dyar.

Stage I.—Head greenish luteous, ocelli black, mouth brown; width, 0.3 mm. Body thickest anteriorly, feet normal; translucent yellow, green tinted. Tubercles small, all neatly black, i to v present; no shields, the leg plates dusky.

Stage II.—Head 0.5 mm. Green, no marks, four black tubercles on the cervical shield. Shape as in the next stage. Tubercles obsolete, setæ pale, short. Skin translucent, the dorsal vessel showing darker.

Stage III.—Head slightly squarish, bilobed, green, the jaws brown; clypeus reaching about half way to vertex; width, 0.8 mm. Body cylindrical, thickest in front on joints 2 to 5, tapering posteriorly, especially on joint 13. Feet normal, the anal pair divergent. Green, a yellow subdorsal line on joints 5 to 13 anteriorly. Shields not cornified; four black tubercles on the anterior edge of the cervical shield; all else colorless; tubercle iv substigmatal posteriorly; setæ pale.

Stage IV.—Head as before, ocelli black, clypeus reaching less than half way to vertex; width, 1.3 mm., small in proportion to the body. Green, the food showing darker; subdorsal line yellow, on joints 3 to 13 anteriorly, with irregular yellow specks in front on joints 2 and 3. No shields, the black tubercles on the anterior edge of joint 2 are white edged. A yellow stigmatal line on joints 2 to 12. Feet normal, with long claspers.

Stage V.—Head rounded, soft green, the ocelli black, five in a semi-circle and one below behind the antenna, the third the largest; jaws brown; width, 1.8 mm. Translucent green, the food darker; subdorsal line from joint 3 to anal plate, stigmatal from 2 to 12 anteriorly, narrow, yellow. Rather numerous, irregular yellow dots scattered over the body and on the anal feet. Spiracles reddish; tubercles small, concolorous, setæ pale. Six tubercles on the cervical shield, the two upper anterior ones black; no cornified shields. Tubercle iv below the spiracle on joints 7 to 10, in line with tubercle v on joint 11, below the spiracle on joint 12.

Stage VI.—Head 2.4 mm. As before, but the black dots on joint 2 are minute and inconspicuous. Yellow subdorsal and stigmatal lines distinct, the irregular spots numerous. Slight, dull, reddish, mottlings about tubercles iii and v.

Cocoon in the sand or between leaves on the ground, the leaves partly bitten up.

Food plant.—"Gumbo-limbo" (*Bursera gummiifera*); larvæ from Palm Beach, Florida.

GONODONTA UNICA Neumoegen.

Egg.—Shape of two-thirds of a sphere; reticulations small, irregularly pentagonal, linear, pale; no ribs; diameter, 0.65 mm. Laid scatteringly over the leaves singly or in groups, numerous, a very large proportion being destroyed by parasitic Hymenoptera.

Stage II.—Head round and broad, thin, especially above, scarcely bilobed; sooty black, labrum narrowly white. Body cylindrical, thickened at joints 5 to 7 and 12, which is well humped, the sides of joints 6 and 7 folded and projecting; abdominal feet on joints 9, 10, and 13. Sooty black, joints 9 and 10 a little greenish, with black dorsal line; a pure white subdorsal fleck on joint 2; four lateral ones on joint 8, the two upper ones large and joined by a bar, the second centered by a black tubercle (iii); a bright orange, oblique, subdorsal spot on joints 5 and 6, and a rounded one on joint 12. Setæ short, black. Segments annulate near the incisures.

Stage III.—Head round, bilobed, sooty black, the labrum white; width, 1 mm. Body greatly hunched at joints 3 to 7, forming a rounded, thick loop, the bases of feet of joint 4 touching the venter of joint 8; joint 12 enlarged triangularly. Abdominal feet short and small, none on joint 7, a small pair on 8, distinct feet on 9, 10, and 13. Purplish black, annulate, spotted with orange and white. The white spots are a large lateral one on joint 2, a small one on edge of cervical shield, a lateral patch on joint 8 in part; the orange spots are oblique subdorsals on joints 5 and 6, lateral patch on joint 8 in part, subventral spots on joints 8 to 10, and a rounded subdorsal spot on joint 12. Later fine transverse white lines appear between the obscure annulets.

Stage IV.—Head bilobed, free from the prothorax; sooty black, bases of antennæ and labrum whitish; clypeus not reaching half way to the vertex; width, 1.8 mm. Body cylindrical, nearly uniform, but well looped up at joints 5 to 8; joint 12 enlarged dorsally. Feet of joint 8 small, functionless, normal on 9, 10, and 13. Body marked in the pattern of the genus *Alypia*. Black, finely transversely lined with white, 15 to 20 lines per segment, some continuous, some confused and broken, subreticulate. Those below the slight subventral fold run longitudinally and are more reticulate; cervical shield obsolete, concolorous, a white spot on each side. Subdorsal orange spots, partly white bordered, on joints 5, 6, 8, to 12; also small ones on 9 to 11. Similar spots on the subventral fold on joints 7 to 12, largest on joints 8 to 10. Anal flap and bases of feet concolorous, white reticulate. Thoracic feet black.

Stage V.—Head rounded bilobed, full, clypeus shield-shaped, reaching less than half way to vertex; width, 2.7 mm.; sooty black, epistoma white. Body as before, the cervical shield black, white-lined, with dorsal, subdorsal, and lateral large white spots. Body black,

finely white lined as before. Subdorsal and subventral spots creamy orange, white edged, the subdorsal ones on joints 5, 6, 8 to 12, the subventral ones on joints 6 to 13. Thoracic feet black.

Cocoon composed of large pieces of leaf, bitten off by the larva and united by silk, the ends roughly projecting, resembling a nest of a leaf-cutting bee.

Food plant.—*Anona laurifolia*. Larvæ from Palm Beach, Florida.

PERIDROMA INCIVIS Guenée.

I have given the life history of this species previously¹ from notes made ten years ago; but the present notes contain so many additional points that I have concluded to reproduce them. The later larvæ passed one more molt than the former, the former omitting the normal Stage II, as appears from the measurements. The width of head for Stage I, as given in my first description, should be corrected to 0.3 mm.

Egg.—Spheroidal, the base flattened; about 40 vertical ribs, diminishing alternately in number to about 15 about the vertex, which is coarsely reticulate; cross striæ distinct lines; dark purplish when found; diameter, 0.6 mm. The eggs were laid in a large mass on the leaf of a tree; the larvæ fed on the grass beneath.

Stage I.—Head rounded, bilobed, clypeus two-thirds to vertex; sordid luteus with brown flecks; ocelli black; width 0.3 mm. Cervical shield nearly semicircular, brown dotted, cornified, bisected by a broad, pale, dorsal line; anal plate small, smoky. Thoracic feet black; abdominal on joints 7 to 10 and 13 with smoky shields, the feet of joints 7 and 8 small. Body cylindrical, joint 12 a little enlarged; colorless, food green; tubercles small, round, black. Faint subdorsal (i and ii), lateral, broader stigmal (iii and iv) and subventral broken brown lines. Tubercles normal, no subprimaries, iv behind the spiracle. On thorax tubercles i and ii separate.

Stage II.—Head rounded, bilobed, erect; whitish, faintly washed with brown, especially in two obscure, vertical bands; ocelli black; width 0.45 mm. Body green, four side stripes of purplish brown, a white substigmal band between the last two, the subventral one somewhat broken. Dorsum rather broadly green; feet and venter pale; feet on joints 7 and 8 very short. Setae black; tubercles small and obscure. Joint 12 humped.

Stage III.—Head whitish, ocelli black, mouth brown; a faint brown band, curved, parallel to sutures, and one back from ocelli, below which are some distinct dark brown reticulations; width 0.6 mm. Green, uniform in size, joint 12 a little enlarged. Cervical shield faintly luteous, scarcely cornified. Dorsal line white, narrow; subdor-

¹ Canadian Entomologist, XXVI, p. 18.

sal, lateral, and stigmatal lines dark brown, with two white lines filling up the space between them; below a distinct white line on subventral fold; a brown subventral band over tubercle vi. Tubercles and setae small, black. Leg shields dusky.

Stage IV.—Head as before, width 0.8 mm. Body green, dorsal line white, green edged; subdorsal and lateral lines light brown; suprastigmatal broader, darker purplish brown; substigmatal white, broad; traces of a brown subventral band; no shields; tubercles and setae minute, black.

Stage V.—*Green form.* Head rounded, green, shining, a blackish line parallel to clypeus and sutures, one back from ocelli and a fainter one between over face of lobe, all somewhat reticulate. Width 1.3 mm. Body noctuiform, joint 12 slightly enlarged, no shields, feet equal. Green, finely whitish and brown mottled. Geminate dorsal and four side lines below tubercle ii greenish black. Substigmatal band broad, red centered, reaching from joint 2 anteriorly to the anal foot, dark edged above. Feet pale. Tubercles and setae small, black.

Brown form.—The same, but the head luteous and the body brownish tinged; lines brown, not blackish green.

Stage VI.—Head luteous, the lines as before, blackish, reticulate; width 2.1 mm. Body brown, like dead grass, with a broad white sub stigmatal band from joint 2 to the anal foot, broadly filled in with red, slightly cut by the spiracles except on joints 2 and 12, where it passes below them. Skin marked with red-brown, faintly lined. Geminate dorsal and broken subdorsal black powderings appear as dorsal inter-segmental and subdorsal segmental black specks; a double obscure brown lateral band. Subventer red mottled, dark brown shaded below the substigmatal band, which is sharp edged on both sides; feet pale. Cervical shield pale, trilineate with whitish; anal plate slightly greenish, otherwise like the body. Tubercle iv of joint 5 is at the middle of the spiracle, on joint 6 below the lower corner, on joints 7 to 10 below the middle, on joint 11 below the spiracle, on joint 12 above the middle. Leg shields transparent, with three black tubercles in a triangle.

Stage VII.—The same; width of head 2.7 mm. Substigmatal band broadly reddish centered, mottled, brown spotted, leaving a sharp-edged white line above and below. Other lines as before, a lighter, more yellowish brown space in the middle of the side. Spiracles white, black edged.

Pupa in the ground, light brown.

Food plant.—Grass (*Cenchrus*).

CAPNODES PUNCTIVENA Smith.

Egg.—Low domed, the base flat; circular from top view, one-third of a circle from the side. Reticulations distinct, finely linear, hexag-

onal, a little elongate vertically and seeming to be slightly arranged in vertical lines; a slight obsolescence at vertical micropyle. No ribs, but faintly indicated vertical groovings, a suggestion rather than any tangible structure, seen only in certain lights. Color translucent green. Diameter 1.2 mm., height 0.3 mm. (The egg was accidentally destroyed, so that there is a possibility of its being wrongly determined.)

Stage III.—Head round and full, the sutures obscure, free from joint 2; mouth not projecting; pale green, ocelli black, tubercles brown, making it look speckled; mouth brownish; width 0.6 mm. Body slender, the incisures well marked, anal feet stretched out posteriorly. Abdominal feet on joints 7 to 10, very small on 7, small on 8, normal on 9 and 10. Pale green, smooth, translucent, incisures a little shining, tubercles small, brown, i and iii the largest, iv substigmatal posteriorly. Setæ long, dusky, rather coarse. No shields, the corresponding tubercles brown as on the body. Tubercle vi pale, without brown coloration.

Stage IV.—Head slightly bilobed; ocelli black, four above in a curved row, two below in line posteriorly with the antennæ; clypeus reaching half way to vertex; width 0.8 mm. Pale green, tubercles brown, setæ black. Body as before, the tubercles brown, ib of thorax and ii of abdomen in a large spot, the others small.

Stage V.—Head 1.4 mm. Soft green, tubercles all roundedly red brown, ii large. Body slender, feet of joint 7 somewhat small. Tubercle iv fully to the middle of the spiracle on joint 5, below the spiracle on 6, becoming higher posteriorly, at 10 nearly opposite the middle, on 11 lower but only substigmatal, on 12 below the lower corner. Setæ long, dark dorsally, pale subventrally. A faint broken reddish lateral line below tubercle ii.

Stage VI.—The same; head 1.8 mm. The reddish lateral line is faint and broken, with some similar spots below, irregular, avoiding the tubercles. The merest trace of a similar narrow subdorsal line along tubercles i and ii. Otherwise no change from the previous stage, green, the tubercles brown. The color is soft and translucent, but the food not visible, not shining.

Stage VII.—Head 2.2 mm. Green, the tubercles on head and body brownish red; traces of a broken subdorsal (tubercles i and ii), lateral, suprastigmatal (iii) lines and very faint subventral mottlings. Spiracle of joint 12 three times as large as the others. Tubercle iv below the lower corner of spiracle as before. Claspers of feet very large, the anal feet divergent. Rather slender and a little flattened, narrower posteriorly. Setæ distinct, black.

Pupa in a slight web in the ground.

Food plant a species of *Eugenia*, probably *E. buxifolia*. Larva from Palm Beach, Florida.

REMIGIA LATIPES Guenée.

The mature larva has been briefly described by Mrs. Swainson,¹ who mentions the peculiar habit it has of folding itself up with the thoracic feet touching the abdominal ones of joints 9 and 10 and an angle in the body at joint 5. The larva feeds at night, living concealed in the grass.

Egg.—Spheroidal, very slightly flattened above and below, symmetrical; about 24 low, sharp, vertical ribs, not diminishing in number till toward vertex, where all end; cross lines fine and obscure, those with the vertical reticulations invisible to the lens, but seen under a half-inch objective. Diameter 0.7 mm. Slightly greenish-gray, not shining. Later a vertical dull-red blotch and irregular lateral ring.

Stage I.—Head bilobed, rounded, full, free from joint 2, clypeus small; shining testaceous, brown tinted; ocelli black; width 0.3 mm. Body slender, thread-like; feet on joints 9, 10, and 13. Colorless transparent, food green; shields all concolorous and inconspicuous. Tubercles small, round, black. A subdorsal (over tubercles i and ii), lateral (above iii) and stigmatal (tubercle iv), faintly brown lines. Central segments long drawn out, the tubercles remote. Thoracic segments and joints 9 to 13 normal, not elongate. Cervical shield with two detached setæ on the posterior corners, four on the shield; greenish, concolorous. Head setæ normal, clypeal and paraclypeal ones small. Anal feet directed posteriorly, blackish outwardly. Tubercle i of joint 11 very small, the segment therefore weak. Other tubercles normal, i and ii in line, iv behind the spiracle; on thorax ia and ib approximate, iia and iib remote, iv anterior; no subprimaries. Later the narrow brown lines are more distinct, covering joints 2 to 13 with a line on the anal foot.

Stage II.—Head round, bilobed, full, cheeks below squarish, clypeus reaching above middle of front; whitish, green tinted, four vertical brown stripes on each lobe; the two next median suture join above, diverge below, one to the jaw, the other to antenna; this joins the third at antenna, which then runs to back of head laterally. The fourth, on lower edge of cheek behind ocelli, is double, the ends approximate, forming a pointed ellipse; width 0.5 mm. Body slender, uniform, a little flat; abdominal feet on joints 9, 10, and 13, the latter directed posteriorly. Three brown stripes on each side, reaching joints 2 and 13, the shields invisible and uncornified. The lines are subdorsal (over tubercles i and ii), lateral and stigmatal (covering iii and iv), with two fainter subventral lines on vi and vii, respectively, situated below the subventral fold and ventrally opposed. Tubercles small, black, well

¹ Journ. N. Y. Ent. Soc., VIII, p. 33.

separated on the central segments, iv above the spiracle, nearly in line with iii. Setæ dusky, feet pale.

Stage III.—Head round, large, free from joint 2, slightly bilobed, clypeus rather small; whitish, with five nearly parallel brown bands on each lobe, continuous with the lines on the body. They are a little irregular and lighter brown in the center of each. Width 0.8 mm. Body slender but uniform, a little flattened ventrally; abdominal feet on joints 9, 10, and 13. Pale greenish yellow, with dark-brown lines about as wide as the intervening spaces. These are single, narrow, broken dorsal, double subdorsal, lateral, substigmatal, subventral, and pedal lines. The pairs are approximate, filled in between with yellowish brown, or might be called single lines, paler centrally. The pedal line is only obscurely geminate. Tubercles and setæ black, the former minute. Abdominal feet pale, brown spotted, the anal pair lined. Thoracic feet reddish.

Stage IV.—Head large for the body, round, full, scarcely bilobed; white, with geminate, brown, pale-brown filled lines as before, the central white space over the suture the widest. Abdominal feet as before, lines the same; also a single medio-ventral line. A geminate blackish dot in the subdorsal band in the incisure 5 to 6. The single dorsal line is nearly obsolete.

Stage V.—Head rounded, full, very large, one and a half times as wide as the body, projecting well above joint 2, smooth, not bilobed; pale yellowish, with many brown lines reaching from the mouth to occiput, parallel, curved, eleven on each side, obscurely in pairs; clypeus pale, as also the median suture somewhat broadly, and antennæ; width 1.5 mm. Body slender; no feet on joints 7 and 8; pale yellow, finely lined with brown; three lines and a broader median one below the subventral fold; fold yellowish, eight lines above it, namely, geminate dorsal, three subdorsal, united by a dark shade into a broad subdorsal band, double lateral, and double superstigmatal. The substigmatal pale interval is the subventral fold, and is yellower than the rest. No shields nor plates; legs brown lined. Black dots in the incisure 5 to 6; tubercles obsolete; setæ rather large.

Stage VI.—No change. The antennæ are long, twice the length of the mouth. The head is large, making the larva club-shaped, joint 2 widening to meet it; width 2.2 to 2.5 mm. Lines very fine, brown, crinkly, some breaking down; dorsal line fine, geminate; subdorsal of four lines filled in with an olivaceous shade, black dotted in the incisure 5 to 6; double lateral, single superstigmatal, single stigmatal, single substigmatal lines; broad subventral of four lines filled in with brown like the subdorsal; dark-brown medio-ventral with three lines between it and the subventral line, alternating reddish and brown. All on a pale yellow field, a little whitish in the dorsal space. Feet pale, brown

spotted. Spiracles black ringed. Tubercles black, minute; setæ rather long.

Stage VII.—Head subspherical, large, a little elongate, thick, and free from joint 2, not bilobed; clypeus low, narrowly triangular; fifth ocellus close below antenna, large. Broadly white over clypeus and median suture, this color a little more than covering the paraclypeal pieces and reaching the antennæ, with a faint, double, reddish line in the clypeus and another on the paraclypeal suture. Sides whitish, with many mottled brown lines extending upward, parallel to each other, to the occiput, joining the lines on the body. There are about eighteen on each lobe, each obscurely geminate, mottled with pale dots; on the inner half of each lobe the lines are washed and connected by olivaceous. Clypeal and paraclypeal tubercles black, the others blackish ringed. Width 3 to 3.4 mm. Body slender, uniform; abdominal feet on joints 9, 10, and 13; smooth, nearly cylindrical. Yellowish white, with many brown or black geminate, mottled lines. Dorsal line red-brown, double, in a clear space of the ground color; subdorsal of six black lines with a large black patch in the incisure of joints 5 and 6; four lateral reddish lines; a nearly black suprastigmatal pair; a reddish stigmatal and substigmatal pair; six irregular and broken subventral lines, black, inclosed by a dark shade, forming a dark subventral band; next a reddish, then blackish, then two reddish, and finally a broader, nearly black, medio-ventral band. No shields; feet pale, marked with mottled lines. Spiracles black rimmed. Tubercles and setæ small, black; tubercle iv of joint 5 a little above the middle of the spiracle, on joints 6 to 10 between the middle and lower corner, on joint 11 opposite the lower edge, on joint 12 likewise, but the spiracle is one line higher than on joint 11. When disturbed, the larva curls up in a curious shape and is quiet, the black marks, ordinarily concealed in the incisure, exposed. Cocoon an elliptical silky net in grass.

Food plants.—Species of grass. My larvæ were fed on *Cenchrus* sp. Larvae from Palm Beach, Florida, from eggs laid by a captured female moth. The species seems to breed continuously.

CHYTOLITA MORBIDALIS Guenée.

The mature larva has been described by Mr. Coquillett.¹ His description coincides with my observations, but his statements about the habits are somewhat diverse. He gives as food plants certain fresh leaves, whereas my larvæ fed entirely on dead and dry oak leaves. However, after hibernation a few of them nibbled at grass and dandelion, so that it is probable that they may eat fresh leaves in the spring. The two dates given—April 1–May 5 and June 1–July 20—

¹ Canadian Entomologist, XII., p. 44.

seem to imply two broods, but Mr. Coquillett tells me that this may mean only two larvæ, representing the dates at which they were found and spun, respectively. If so, both may have been hibernated examples, though the latter date is very late. My larvæ pupated immediately after hibernation, early in May. The species is single brooded both in my observations and by the dates given in Professor J. B. Smith's monograph of the Deltoids.

Egg.—Hemispherical, the edges a little rounded under, smooth, shining, regularly reticulate, the reticulations small and not conspicuous. Transparent, resembling water, a little yellowish, the yolk granules distinct and giving a somewhat opaque look. No ribs. Diameter, 0.6 mm. Laid singly on the backs of leaves of oaks and other trees, at some distance above the ground.

Stage I.—Little colorless semiloopers. Head slightly bilobed, colorless, mouth brown; ocelli black; width, 0.2 mm.; ocelli, 6; 4 in a semicircle above and a pair below. Setæ colorless, simple. Body whitish, colorless, shining, the feet on joints 7 and 8 a little smaller than those on 9 and 10; thoracic feet large. Setæ long, rather coarse, very minutely bulbous tipped, normal, the subprimaries absent. Tubercles conic, somewhat prominent, but concolorous and obscure. Part of the hairs curve forward. No shields visible. The larvæ ate the egg shells and afterwards dead leaves, refusing fresh ones. Each spun a fine web about itself. Later the tubercles appeared round, brownish black, small; head, cervical shield, and anal plate brown, slightly cornified. Body colorless, transparent.

Stage II.—Head about 0.4 mm., sordid brownish white, not shining, ocelli dark, setæ pale. Body slightly flattened, translucent, sordid white, joint 12 a little enlarged. Tubercles small, brown, normal. Feet of joints 7 and 8 small. Shields not cornified, concolorous with the body, their tubercles also brown. Feet pale. Segmental incisures slightly folded. Tubercle iv below the spiracle.

Stage III.—Head about 0.6 mm., round, pale yellowish brown, dotted reticulate with dark brown. Body dark sordid yellowish brown, finely dotted reticulate with red brown, forming faintly a dorsal line and leaving spaces around the small blackish tubercles. Shields not cornified, feet equal, setæ pale and small.

Stage IV.—Head 1 mm., pale brown, smoky, very obscurely finely reticulate. Body all leaf brown, a yellow ground finely reticulate with dark red brown, uniformly and neatly, the only mark a faint brown dorsal line. Tubercles small, black, setæ inconspicuous, vi and vii white and coarser than the others. Another brood were similar, but rather heavily smoky, obscuring the markings.

Stage V.—Head about 1.4 mm., pale brown, finely dotted reticulate, an inverted V mark above the clypeus and a vertical mark, forming indistinct lines. Body somewhat flattened by being retracted in

the subventral region, the shields not cornified. Marks as before. The reticulations on the sides indicate a waved subdorsal line. The larva sits among the dead leaves on the ground, sluggish, covered by a soft web.

Stage VI.—Head 1.55 mm., small, rounded, pale brown, faintly reticulate with dark red brown; ocelli black; setæ short, pale, from small black tubercles. Body narrow at joint 2, otherwise thick and robust, flattened ventrally, feet short, joint 13 small. Pale brown, marbled reticulate with dark red brown, an obscure and partly broken dorsal line of reticulations. Tubercles and spiracles black, tubercle iv of joints 5 to 8 below the spiracle, of 9 and 10 opposite the lower angle, of 11 nearly in line with tubercle v, only a little above it, of 12 below the lower angle of the spiracle. Shields scarcely cornified, the anal plate more so than the cervical shield, both nearly unmarked and more luteous than the body, but not contrasting. Setæ obsolete except subventrally.

Stage VII.—Head 1.8 mm. As in the former stage exactly.

Stage VIII.—Head 2.1 mm., rounded, not bilobed, pale dull ocher, neatly reticulate with red brown, paler on the vertex, the clypeal sutures and ocelli darker. Body yellow, ochraceous, reticulate with red; a dorsal red brown line not crossing the cervical shield or anal plate, diffuse, but narrow and distinct. An irregular waved lateral line, caused by the reticulations being darker brown, in an arc of which tubercle iii is the approximate center on each segment. Tubercles distinct, luteous black, setæ obsolete, except subventrally. Spiracles black; shields and plate not cornified, colored like the body, but not distinctly reticulate, their tubercles luteous brown. Body moderately robust, a little flattened ventrally, of equal width, not tapering. Feet equal, short.

Eggs from Bellport, New York, laid June 12, hatched June 17; last larval molt September 15, with hibernation in the last stage; pupation May 1.

The number of stages is probably subject to some variation. Some of the full-grown larvæ after hibernation had the width of head only 1.8 mm., but they did not molt again, pupating in this stage.

RENIA SOBRIALIS Walker.

Eggs were obtained from moths of *Renia larvalis* early in June, and moths of *R. sobrialis* emerged in August. The two so-called species are thus seen to be seasonal forms of one, as suggested by Prof. John B. Smith in his monograph of the Deltoids.¹ The specimens were from Washington, D. C., and the larvæ fed on dry leaves, lying concealed under them, but not forming a web, as *Chytolita morbidalis* does.

¹ Bull. 48, U. S. Nat. Museum, p. 72.

Egg.—Shape of two-thirds of a sphere, base flat but rounded under, neatly regularly reticulate, the reticulations well raised, irregularly hexagonal, elongated vertically, a little clearer than the egg itself, about alike all over; no ribs. Color white like ground glass. Later with irregular brown spots, more or less in a ring. Diameter .6 mm., height .4 mm.

Stage I.—Head moderate, rounded, bilobed, free, held vertically, pale luteous brownish, translucent, the rim and the sutures darker, ocelli black; clypeus two-thirds to vertex; width .3 mm. Cervical shield gray, darker than the head; anal plate paler, gray before, darker posteriorly. Body ground-glass white, tubercles normal, distinct, large, black. Thoracic feet and leg shields grayish. Feet of joint 7 very small, those of 8 larger, only those of 9, 10, and 13 functional. Setæ dusky, distinct, moderate, equal. Shape cylindrical, moderate or rather robust, joint 12 very slightly enlarged.

Stage II.—Head slightly bilobed, erect, vertex notched behind by the membranous triangle; smoky brown, setæ pale; width about .35 mm. Body transparent, shaded and spotted with vinous, dark, almost blackish from the food. Tubercles elevated, brownish; setæ short, pale. Slightly flattened ventrally, joint 12 somewhat enlarged dorsally. Cervical shield brownish, widely bisected, obscure. Thoracic feet dusky, abdominal ones pale, the pair of joint 7 short.

Stage III.—Head pale brownish, slightly vertically darker streaked, setæ pale, ocelli dark; width about .45 mm. Body as before, more opaque, the vinous shading dull, forming traces of a dorsal line. Body short and rather robust; tubercles brownish, moderate, a little elevated; setæ pale, glandular tipped.

Stage IV.—Head as before; width .6 mm. Body thick, slightly flattened ventrally, largest posteriorly, especially at joint 12, incisures distinct, segments subannulate. Cervical shield brownish, bisected, notched on the posterior lower corner, anal plate obscure. Whitish, washed and obscurely spotted with vinous, especially broadly on the dorsum. Food dark. Tubercles rather large, elevated, circular, brownish; setæ pale, glandular, iv behind the spiracle and larger than it, on joint 11 down in line with tubercle v. Thoracic feet smoky shaded; abdominal ones pale, all functional, those of joints 7 and 8 only a trace smaller.

Stage V.—Head rounded, erect, pale brown, mottled and clouded with darker; setæ coarse, short, pale brownish; width .8 mm. Body robust, joint 12 scarcely enlarged, a little flattened ventrally. Blackish gray in appearance, with a series of lateral quadrate yellowish patches anteriorly on the central segments. Skin sordid translucent, heavily blackish shaded over the dorsum to spiracles, the yellowish patches below and behind tubercle i on joints 6 to 11. Subventer mottled with dull brown, avoiding the tubercles. Tubercles mod-

erate, blackish; setæ short, coarse, pale brownish, contrasting, i and iii bent forward, ii backward, all glandular tipped. Feet normal short; shields concolorous. Spiracles blackish. Another was nearly black, distinctly flattened ventrally, joint 12 slightly enlarged; head paler, contrasting. No conspicuous marks.

Stage VI.—Head round, not bilobed, but the vertical triangle distinct; erect, lower than and free from joint 2; coarsely shagreened; pale brown with large mottled confluent patches of dark brown, sordid; width 1.4 mm. Body flattened ventrally, robust and thick, joint 12 somewhat enlarged; segments irregularly 4-annulate. Tubercles large, roundedly elevated but dull, not shining, nearly concolorous with the body, black with pale circles at the base. Setæ pale, club-shaped, thick, directed forward and backward. Velvety brown-black, a pale dash below and behind tubercle ii on the two posterior annulent or a continuous pale subdorsal band. Cervical shield with pale mesial line and pale mottlings behind. Feet short, somewhat pale. Venter pale grayish. All the marks obscure. The larvæ look the color of dead bark, nearly black, though some are lighter, brownish, and the color generally pales decidedly during the stage, being darkest soon after the molt.

Pupa in a slight cocoon in dirt, shining, light brown.

TEPHROCLYSTIS NEBULOSA Hulst.

One of the bred specimens was named as above by the Rev. Dr. Hulst.

Stage I.—Head rounded, full, not bilobed, dark brown, sutures and ocelli darker; clypeus high; width 0.3 mm. Body moderate, pale yellow, smooth; cervical shield rectangular, anal plate and anal leg shields cornified; segments finely annulate; tubercles and setæ obscure; tubercles brownish, setæ with enlarged clear tips, short, pale.

Stage II.—Head rounded, vertex under joint 2, yellowish, brown shaded on the sides; width 0.4 mm. Body translucent sordid yellowish, a distinct brown dorsal stripe the whole length, and a shaded subventral band. Thoracic feet dark; anal shields dusky; cervical shield obscure. Setæ short, glandular, pale; tubercles small, brown. Later the marks fade and the body becomes all sordid luteous with pale brown dorsal stripe only. Shields weakly cornified, darker luteous.

Stage III.—Head rounded, slightly bilobed, pale brownish, eyes black; width 0.6 mm. Body moderate, rather robust, cylindrical, segments a little moniliform; not shining, pale fleshy yellow, a series of segmental, narrow, brown dorsal dashes. Traces of a subventral line on joints 5 and 6. Thoracic feet pale testaceous. Tubercles obsolete, setæ short, stiff, dark, with enlarged tips. Shields not cornified, concolorous, but not marked by lines.

Stage IV.—Head rounded, slightly bilobed, clypeus high; pale tes-

taceous, eyes black, mouth brown; width 0.9 mm. Body smooth, moderate, minutely conically granular, setæ distinct, short, stiff, black with enlarged tips. Pale yellow, slightly green tinted, a narrow, brown, broken dorsal line, widening on joints 5 to 9 into arrow-shaped marks (the point anteriorly); a short subdorsal band on the thorax, and traces of a subventral band on the anterior half. Venter clear, subventral fold slightly whitish. Feet pale. Other examples have a faint or distinct brown dorsal and subdorsal lines, joining the arrow-shaped marks. On one example the marks were all large and a brown subventral shaded band was present, the brown color predominating over the yellow ground.

Pupa.—In a slight web; length 6.5 mm.; dull yellowish green, somewhat translucent, the rings of the abdomen luteous, the anal segment and cremaster brown; dorsal line dull green; sutures of cases finely lined in dark brown. The anal segment has a low rounded process laterally; cremaster slender, rather long, wide and flat, with a terminal row of long hooks. The shape is normal, much as in *Chlorochlamys chloroleucaria*.

Food plant.—Flowers of golden rod (*Solidago* sp.) from Bellport, Long Island, New York. A bouquet of these flowers was found alive with little Geometrids, consisting of the species here described, *C. chloroleucaria*, and *Deptalia insularia*.

STRICTA INCRUSTALIS Hulst.

One of the bred specimens was named by the Rev. Dr. Hulst. The larva is not uncommon in Southern Florida, solitary usually, in an inconspicuous web among the leaves of its food plant. The web is loose and open, suggesting a spider's web, but the larva lies concealed among the leaves. The moths have a curious habit of placing the eggs by preference in an old web of a former larva, where the leaves have not been too closely stripped. This usually happens where the former larva has been parasitized. There are probably six larval stages; I have not determined exactly.

Egg.—Flat, like a Cochlidian, singly or as many as six, laid overlapping like shingles. Elliptical, 1.8 by 1.2 mm.; surface neatly irregularly reticulate; dark ocher with a colorless rim, the shell white after the larva has emerged. Embryo visible, as in the Cochlidians.

Stage II (or I?).—In an old nest between two leaves stitched together. Head luteous, sutures and a faint line back from the ocelli brown; width about 0.4 mm. Body greenish, uniform, no shields, faintly brown lined to the subventral fold. (Incompletely observed.)

Stage IV.—Resting out straight in the center of a loose open web among the leaves. Head held out flat, flattened, clypeus rather high; face luteous, sutures brown, but on the sides of the lobes are three black lines with four alternating white ones from the mouth back-

ward, continuing the lines on the body in the normal position of the head. A whitish vertical line parallel to the median suture; width about 0.8 mm. Thoracic feet large, black, pale ringed. Body slender, nearly cylindrical; feet small normal. Segmental incisures not strongly marked. Venter dull green, dorsum lined with brown-black and white, the lines of both colors of equal width. Pale lines yellowish white except on the subventral fold, which is the last one and greenish. Brown lines are dorsal, subdorsal (tubercles i and ii), lateral, suprastigmatal (iii), and substigmatal. Tubercles small, black; setæ moderate, fine. Tubercles iv and v separate but approximate, v dorsad to iv and smaller, vi normal, vii of three setæ on the leg base. Two wavy brown subventral lines below tubercles iv+v and across vi, respectively. Subventer of thorax dark.

Stage V.—Head the same, but there are brown mottlings on the sides of the lobes above the black bars; width 1.5 mm. Body neatly lined with yellowish green and brownish black, as before, but the three lateral brown stripes are much wider than the pale intervals, which have become linear. The two brown lines below the substigmatal fold are present.

Stage VI.—Head rounded, the vertex under joint 2, the clypeus reaching two-thirds or more to the vertex; held out flat; lobes quite full; pale yellow, checkered with angular spots of very pale brown, also shaded with this color over the clypeus and along the median suture; ocelli white, black centered, surrounded by a black shade; mouth brown; antennæ moderate; tubercles minutely brownish; width 2.1 mm. Body slender, slightly flattened as before, lined. Dorsally three pale yellow lines alternating with two brown ones, becoming black and white on the cervical shield; subdorsally three broad dingy brown bands, alternating with two very narrow pale yellow ones; stigmatal line pale yellow, narrow, inclosing the white, black-rimmed spiracles; a yellowish line along tubercles iv+v with a faint brown one above; venter pale, nearly colorless. Tubercles small, black, i and ii in line or ii slightly dorsad, iv and v separate, iv directly below the spiracle, v a little dorsad and anterior, vi not much below iv, but well posterior, vii on the leg base of three setæ in a triangle. Shields perfectly concolorous, the anal plate and anal feet a little shaded with purplish. Crochets of feet in a whole circle. Later the ground color is whitish on the thorax, yellowish green centrally and shaded with brownish posteriorly.

The larvæ pupate in a slight web in the sand or between leaves on the ground. Pupa shining mahogany brown, thick and robust; cremaster sessile, with a tuft of long stout hooks.

Food plant.—*Nectandra willdenoviana*; also apparently the same larva on *Persea carolinensis*. Larvæ from Palm Beach, Florida.



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