NEW LIFE HISTORIES AND NOTES IN PAPAPEMA SM.
(LEPIDOPTERA).

BY HENRY BIRD, RYE, N. Y.

(Continued from Vol. XLVII, p. 151).

Papaipema nelita Strk.

A recent examination of Strecker's type reaffirms our early determination of this species which was made from scanty material, and we can report the larvæ were found at favourable stations in the environs of Chicago, the type locality, in July of the current year. Its association was with the previously recorded food-plant, *Rudbeckia laciniata* L., so far the only known choice. Our larval note in this magazine, Vol. XXXIX, p. 313, where it is assumed from the penultimate stage the young larvæ belong the group showing a continuous dorsal line, needs correction. A summary for stages III, IV, V may reflect, viz.:

These instars correspond to the normal features of the group; head polished, darkened at ocelli, but without the prominent side line; tubercles not large, blackish, IVa does not appear on joint ten; the white dorsal and subdorsal lines are broken at the middle, where the mahogany brown body colour prevails as an encircling ring on the posterior portion of joint three, on four, five, six and seven, becoming paler with each molt; lengths, 15, 18, 21 mm.; May 20-June 15, Chicago (larvæ per A. Kwiat).

At Wilmington, Del., Mr F. M. Jones has encountered *nelita* at various stations, and his rearings of the moth show a small percentage which have the stigmata white marked, in contradistinction to the type form. If such happen to be of well-developed size, a superficial likeness is very strong with the white marked *P. frigida* var. *thalictri* Lyman, in instances of small specimens of that form. Under an adverse criticism, which would countenance no difference between these truly similar moths, all niceties of larval differentiation and departures of male structures would be swept away. So it appears best to give permanent attention to this departure with the Strecker species, characterizing it as variety *linda*.

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Papaipema nelita linda, new variety.

Typical in the greyish brown ground colour, with golden brown irrorations medially, the purplish basal and postmedial areas; also in maculation; basal spots vague, not white marked, the orbicular and claviform are two rounded white spots, the reniform is a collection of dots around a central curved line, the outermost opposite the cell yellow, the rest usually white; ordinarily the conventional pattern for the white markings except the reniform is proportionately a little short. Expanse 36 mm.

A male type is with the author, a paratype with Mr Jones, and a specimen was forwarded to the British Museum for comparison with the type of *P. limpida* Gn. from which it is reported to be distinct by Sir Geo. F. Hampson. This new variety is dedicated to Mrs. F. M. Jones, whose efforts in behalf of entomological research warrant much more than this slight recognition.

Papaipema cerina Grt.

The apprehension of this larva is due to the efforts of Mr. Chas. Rummel of Newark, N. J., who encounters it occasionally in his locality. We were indebted to his liberality for early staged larvæ the current season, as well as for the privilege of bringing out this note. That this well-known eastern species had escaped larval notice seems due in part to its close resemblance to *P. cataphracta*, that its seemingly preferred food-plant, *Lilium superbum* L., is very generally bored also by the latter, and while it appears certain other plants than *Lilium* are involved, the similarity to this prototype, whose individuality was considered unique, has allowed it to escape notice. Thus in future generic groupings, the species should be associated with *cataphracta* and *duovata*, a position not assigned it heretofore and which is of some import since on "first species" rule it became Smith's type of the genus.

The larval habit doubtless follows the usual course, the overwintering egg hatching the last week of May. Larval stages IV and V are identical with *cataphracta* except that they are a fortnight in advance of the latter. Characteristics are fully typical, tubercles not large; colour livid purple-brown on which the white dorsal and subdorsal lines are contrastingly drawn without break.

Penultimate stage: Paler and more pinkish, the lines yellowish; tubercle 1 on joints four, five and six the same as on other joints, whereas the ally has them enlarged at this point.

Maturity: Head and plates typical; colour yellowish translucent, with lines entirely obliterated; tubercles mostly minute, I and II, except on twelve are only discernable as the merest dots under a lens, IV alone retains its usual size, and in comparison to microscopic I, II, III and IIIa, seems proportionately large, though it does not exceed the spiracle, on joint ten IVa shows same size as IV, a trifle high, but of similar prominence in bearing seta; length 42 mm.; leaves plant for pupation July 31.

The pupa shows no departure from the usual form, and is less cylindrical than its ally, which normally changes in its gallery and is effected by the confined quarters. Emergence data are not at hand, but from that of flown specimens must centre around the first ten days of September, whereas the near congener is a month later.

***Papaipema nepheleptena* Dyar.**

A recent re-examination of the unique type of this species, coupled with the wider acquaintance by the more extended breeding of *P. mæseri* Bird, (1911) furnishes conviction there is but one species involved, and that the Dyar name has precedence, being proposed in 1908. The type, a flown and rather worn specimen, is from New York, and regrets over our error of determination are now tempered by the establishment of the larval history for this local but heretofore elusive *nepheleptena*. Thus it will appear our larval notes for the Turtle-head borer, Can. Ent., Vol. XLV, p. 120, are to be associated with the latter name. A brief addenda to these may be made for:

Stage I—Cephalic and anal shields well developed, also the the setæ; the first four abdominal segments show as a dark girdle, the extremities semi-translucent.

Stage II—Head is without side line, nor is its continuation on the lower edge of shield yet manifest; the dark girdle not crossed by the white longitudinal lines; tubercles concolorous.

Stage III—Similar, with the generic features now well evident; the dorsal line alone crosses the girdle, showing as the merest white

thread; tubercle IVa on joint ten seems always absent in this species, ten larval preparations at least have it unindicated; lengths, 2.5, 6.5, 11 mm.; May 25-June 18; Buffalo, N. Y. (larvæ per H. Baumann).

***Papaipema circumlucens* Smith.**

When the late Dr. J. B. Smith advanced this specific name at the "Revision of *Hydroecia*," 1899, Trans. Am. Ent. Soc., Vol. XXVI, the knowledge of larval stages was not of avail, and the material for study scanty, and of inferior quality for the most part. Though his efforts for fullness were well directed, and the co-operation of museums and collectors very general, a misconception in regard to the individuality of *circumlucens* has been recognized for some time, in that more than one species was associated among his types. The writer had arrived at a conclusion as to what form Dr. Smith intended his name should apply, but it was not until 1914 that the larval history became positively known in the particular instance it was necessary to cite. Of his "types" and "co-types" we have recently had the advantage of comparing those in the U. S. National Museum, the Barnes and Rutgers collection, while a female co-type was in the possession of the writer. Three species are found to be involved—the Hop-stem borer, one whose chief foodplant is Dogbane; the true *circumlucens*, and *ochropenta* Dyar, a western species with the larva unknown. The Hop-stem borer has already been differentiated as *P. humuli* Bird, Can. Ent., Vol. XLVII, p. 113. We herewith restrict the type of *circumlucens* Smith to the female type specimen of the United States National Museum, which was without doubt a feeder in *Apocynum*, Dogbane, in its larval state, and for the following reasons. Of the six "types" or "co-types," this form predominates; in our own collection a perfect specimen of the Hop-stem borer was labeled merely "*circumlucens*," while a much-worn Dogbane feeder was ticketed "*circumlucens* Sm. female co-type"; *ochropenta* occurs in but one specimen. The other male "type" Washington is *humuli*.

It is needless to add that from the conventional pattern in the group and the nearness of coloration of the forms involved, the oversight at the time of commission is easily understood.

Regarding the life-history, Mr. A. F. Winn, of Montreal, was the first to call our attention to the fact that *Apocynum* was bored by some *Papaipema*, but his observations were made after the larval period, and were without further or specific verification. Several seasons later, in 1914, Messrs. A. Kwiat and E. Beer at Chicago discovered *Apocynum androsæmifolium* L. to be profusely bored there, and kindly forwarded larvæ which seemed different from any previously seen. At emergence there was surprise that the browner and larger specimens matched our co-type of *circumlucens*, while the smaller, yellower ones ran indistinguishably to *baptisiæ* Bird.

The current year the writer had advantage of personal studies of the prairie flora in the vicinity of Chicago, under direction of the local entomologists, and observed *circumlucens* extensively at work. The larva is a gross feeder, tunnelling out the lower stem and a considerable portion of the running rootstock when possible. By the middle of July the wilted or browned foliage is very noticeable, and it becomes one of the easiest species to apprehend. Pupation occurs in the burrow and emergence by the orifice, which has served for frass disposal, and without its further enlargement. A network of silk and fragments chewed from the woody stem encloses the gallery directly above the pupa, through which the moth easily breaks, but such details are somewhat dependent on the kind of food-plant occupied. As is usual where a species is super-abundant, dispersal to other plants may be noticed, and in *Mesadenia tuberosa* Nutt. (E. Beer) frequently, and in *Vernonia fasciculata* Michx. (A. Kwiat) rarely, larvæ were found at work, the former being apparently a true alternative food-plant. Quite a noticeable difference exists superficially between the *Apocynum* larva and that boring *Baptisia tinctoria* L. productive of *P. baptisiæ* Bird, Can. Ent., Vol. XXXIV, p. 109, but the moths intergrade so completely there seems no warrant for the retention of this name even in a varietal sense. Hence *P. baptisiæ* Bird, 1902, falls to *P. circumlucens*, Smith 1899.

The typical, *Apocynum* feeding larva is larger, more cylindric and pink than that we had characterized from *Baptisia*, but it is believed to be due to food-plant conditions entirely. The principal larval features are generically normal.

Stage V—Head without side line, colour dull pink, lines yellowish, the dorsal narrow and alone continuous; tubercles appear dim from being nearly concolorous, IV most prominent, and IVa always defined on joint ten.

Stage VI—Very cylindric, paler, otherwise no change.

Stage VII—Now more robust, tubercles conspicuous by reason of the semi-translucence; IVa has continued on ten, but has never equalled IV. Length, 33, 39, 43 mm. July 15-Aug. 12.

A chief parasite with the species is a Tachina fly, to which attention has been previously called with other species, as being a general check in the genus. Our reference to it as *Ceromasia myoidæa* we learn through the kindness of Dr. C. H. T. Townsend is in need of revision, and on this occasion we may deal with yet another correction. Our understanding of the matter is that the above name refers to a European, or an assumed cosmopolitan insect, but inferentially we would not expect such to be critically involved in the economy of a large American genus, a genus so thoroughly American that a selection of widely differing food-plants in many cases exists with plant genera found only in America. From our limited knowledge of the life history, it appears this fly may be associated only with *Papaipema*, or such similar boring larvæ as flourish at about the same date. Over-wintering puparia do not give up imagos until July, when the borers are of sufficient size to answer their purpose. There appears to be two broods of the flies, though it may be that those over-wintering are merely tardy larvæ in pupating, or possibly to having an unusually large food supply. A fortnight's difference in pupation seems sufficient to cause the later ones to overwinter. Ovi- or larviposition may be merely within the gallery opening, there being opportunity for attachment to the host, as it has frequently to come to the orifice to dispose of frass. Some of the *Ichneumonidæ* have been encountered 20 cm. down in these galleries, but on such occasions it was the pupa which was sought. While the fly larvæ must subsist internally, when about mature they may be found outside the decaying shrunken host from which they move a slight distance to pupate. The pupa is cylindric, with ends rounded, unattached and unprotected in the gallery, colour brown.

This fly is now to be known as *Andrina radialis* Townsend.

Dr. Townsend has been good enough to prepare a characterization which is appended, over his signature.

***Andrina radialis* Townsend, new name.**

Andrina radialis Townsend, new name for *Masicera myoidæa* Coquillett, 1897, Rev. Tach. 114 (nec. *Lydella myoidæa* RD., 1830, Myod. 114)—Holotype labeled by Coquillett as above, loc. District of Columbia, May 16, 1882 (Coll. C. V. Riley).

Holotype, No. 19601 U. S. N. M., female. Allotype, male, Rye N. Y. (H. Bird). Paratypes include six specimens reared by Mr. Bird from several lepidopterous larvæ boring the roots of plants underground; numerous specimens reared by the Bureau of Entomology from several hosts; specimen reared by Mr. W. R. Walton from *Nonagria oblonga* at Harrisburg, Pa.; and TD4468, female, Beverly, Mass., July 1, 1875 (Edward Burgess). The last was relaxed and dissected, being the only specimen available that had been collected, not reared. It was found to contain several hundred eggs and maggots. The egg is elongate and bowed. The maggot is without hairs, but with spine-rows encircling the body.

The species differs from *Andrina* (*Paraphorocera* BB. syn.) *senilis* Meigen as follows:—Arista thickened on only basal half; third antennal joint of male sharply angular on upper apical corner, that of female less so; male vertex about equal to eye-width, that of female but little broader; frontal bristles not descending lower than base of arista; face less receding, the vibrissal axis of head nearly three-fourths of antennal axis; microscopic hairs of facialia do not extend one-third way up in male, and less than one-fourth way in female; eyes faintly and thinly hairy. The cheeks are from little over to less than one-fourth eye-height. The species may stand as type of subgenus B of *Andrina*.

Two specimens from England, labeled by Brunetti *Masicera myoidæa*, are apparently *senilis* Meigen (*tincta* BB. syn.). The front and cheeks are much broader in *senilis* than in *radialis*. The female from England was relaxed and dissected, and found to contain the same eggs and maggots in a rather long coiled uterus (TD4469).—CHARLES H. T. TOWNSEND.