year (1881) Mr. Brabandt reared the larvae of *Stauropus fagi* (called the crab-caterpillar on account of its shape) which larvae, as is well-known, always quarrel with each other and are fond of biting off each other's front-legs. Under such circumstances Mr. Brabandt obtained a larva which had lost one of its long fore-legs in a contest, but this appeared to disturb the insect little; and it continued feeding unconcernedly and pupated; and, on 5 June of this year, the moth emerged. The moth showed only the single defect of not possessing the leg corresponding to the one which the larva had lost.

The following may serve as a contribution to the subject of the fertility of lepidoptera. Mr. Brabandt obtained from a chrysalis, this spring, a female *Lasiocampa quercifolia*. As it was crippled he decided to set it out of doors in order perchance to attract a male, or in other words to secure a fertilization. Luck favored him; the next morning he found the female, only a few steps distant, in copulation with a male. The latter, in fine condition, was spread, but the female was imprisoned for the purpose of obtaining eggs. Behold! she did her duty in the most thorough way, for during the first night she laid no less than 510 eggs, and during the second night 70 more, — a total of 580 eggs, a fecundity on the part of a lepidopteron which is remarkable, and very rarely recorded. Not a single egg was abortive, and each one hatched its young larva.

Leipzig, 10 Aug. 1882.

ON A LARVA BORING THE LEAF-STALKS OF THE BUCKEYE (*AESCULUS GLABRA*) IN OHIO.

BY EDWARD WALLER CLAYPOLE, NEW BLOOMFIELD, PERRY CO., PA.

Several years ago, soon after going to reside at Yellow Springs, Ohio, I noticed, in the early part of May, that many of the leaves of the Ohio buckeye, *Aesculus glabra*, drooped and withered very soon after they had unfolded from the bud. For two or three years these drooping leaves caught my attention. On gathering them I uniformly found a small hole in the leaf-stalk, from which a tunnel, sometimes twelve millimetres in length, ran along the stalk. Above this hole the leaf was dying, below it the stalk was still alive. In some few instances I found in the tunnel a small yellowish caterpillar, evidently the author of the mischief. Wherever the hole in the stalk was closed with droppings the caterpillar was present, but whenever the hole was open the caterpillar was gone, leading to the inference that it had escaped through the opening.

After having made these preliminary notes I attempted, in May 1878, to trace out the life-history of this insect, but, being very much pressed with work, the experiment was a failure. The leaves were overlooked for a few days of warm weather, became mouldy, and the caterpillars died.

In 1879 I made a second attempt with rather better success, but still without result

of moment. The main difficulty lay in the fact that the early stage, during which the insect could be found in the leaf-stalk, was of very short duration, and if, in the pressure of other occupations, I forgot to note the unfolding of the buckeye leaves, or had not time to walk to the place where they grew, the chance for that year was gone. The buckeye unfolds very suddenly and very quickly in the spring; consequently there are but a few days during which the caterpillar can be found.

However, I have succeeded in obtaining some every year since, and in the two years 1880 and 1881 I reared a few to maturity.

In the early part of May, usually about the second or third, I found the drooping leaves of the buckeye in great numbers. I gathered, 8 May, a quantity of the leaves, and, among them, a single specimen in which the caterpillar was in the main stem of the young shoot and not in the leaf-stalk — the only instance of the kind that I have met with. Taking the specimens home I placed them under a bell-glass in order to determine the first point in doubt, the destination of the caterpillars after leaving the leaf-stalk! Two days afterwards, on 10 May, I found that the leaf-stalks were all empty and the caterpillars hidden in the faded leaf at the top of the stem in which they had previously burrowed. On 15 May, five days later, the caterpillars were still in the dead leaves, and I went to the trees to try and find some more specimens, but was unsuccessful. However, on 21 May, I found a few rolled-up leaves containing caterpillars, brought them home and placed them with the others.

On 23 May the surviving caterpillars were still feeding, but there were many dead ones.

On 25 May I found the first chrysalis among the leaves. It was light red in color, with eight rings on the abdomen. The rolled-up leaf was lined inside with silk. These facts show nothing in any way peculiar, and the same description would apply to thousands of other chrysalids.

A caterpillar, examined on 13 May 1881, was one centimetre long, semi-transparent, yellowish in color with a yellow head, and this appearance was retained, except that the caterpillar became a little darker, until it went into the pupal state about 20 May.

It was difficult to see what the caterpillars lived upon, as the fresh leaves that I put with them were not attacked. I have noted this point for several years and have come to the conclusion that the food of the larva is the dead, dry leaf in which it is rolled up. I have looked carefully on the trees and can find no eaten or nibbled leaves near those containing the caterpillars, so, apparently, its habit is the same, in this respect, both in captivity and in its native habitat.

On 9 June, fifteen days after entering the pupal state, the first moth emerged. It was small, with a peculiar hopping flight, the fore wing mottled black and white, and the hind wing more uniform in color, dusky, and slightly spotted with black near the tip.

It appears as if the second stage in the life of this insect is that in which it most frequently falls a prey to its foes. During its earliest existence it is sheltered in the tunnel it has bored in the stalk, and there seems no cause but the want of room to

prevent its remaining there and burrowing down the whole length of the stem. But these quarters soon become too small for it, it leaves the tunnel by the hole at which it entered and betakes itself to the dead and curled leaf. Here it is easily found by other insects, and, from the difficulty of obtaining specimens in this stage, I infer that a very large number are destroyed by their enemies.

In examining the chrysalids which I had obtained, I noticed that two or three were much larger than the rest, and I suspected that, in collecting nibbled leaves from the buckeye, I had introduced the larvae of some different species. This suspicion was changed to certainty when the moths emerged. Beside the genuine imago of the buckeye stem-borer, with which, by this time, I was quite familiar, I had two or three specimens of double its size, with cinnamon-colored wings having the costal edge in the form of a double curve. Not knowing the name of either species, I pinned them for future examination. Most entomologists know the tedious and hopeless nature of the search through scattered publications for the figure or description of some unknown insect, but, casually looking over the report of the Entomological Society of Ontario for 1873, I found the larger of the two species figured and described by Mr. Saunders in an article on insects injurious to the raspberry (*Rubus*), and found that it was the banded raspberry leaf-roller, *Loxotaenia* (wrongly written *Lozotaenia*) *rosaceana*, Harris. It follows, therefore, that in Ohio this insect lives on the buckeye as well as on the raspberry.

Though I have given the life-history of this insect so far as I have been able to trace it, yet other parts still remain to be worked out. I have not been able to determine where and when the egg is laid, whether in early spring before the buds open, or later, after the buds for the next year have been formed. In the former case the moth must be very long-lived, lasting through the summer and then hibernating until spring, or the species must be double-brooded in this district. In the latter case the eggs must remain on or in the bud all winter until it unfolds in spring, which seems unlikely. Moreover, if the egg is laid in the bud, the young caterpillar must find its own way to the stalk of the leaf. On the whole it seems more probable that the eggs are laid in spring and upon the stem of the leaf into which the larva can at once bore.

Specimens of the perfect insect were sent to Dr. C. V. Riley and were referred by him to Prof. C. H. Fernald. Though the specimens were somewhat rubbed and the peculiar markings consequently faint, both these entomologists inclined to refer them to *Proteoteras aesculanum*, a new genus and species described by Dr. Riley in 1881,[1] though at first there was a suspicion that the insect was *Sericoris instrutana*,[2] Clem., the larval state of which was not then fully known. Specimens, however, raised during the present season from larvae obtained in Ohio[3] have thrown doubt on this identification, but no specimen has

[1] *See* Trans. Acad. Science St. Louis, v. 4.

[2] *See* Proc. Amer. Assoc. Advanc. Sci., 1881.

[3] It is perhaps worthy of notice that, among these few specimens (in 1882), a single *Loxotaenia rosaceana*, Harris, made its appearance. Also that although the buckeye is commonly planted at my present residence, in Perry county, Penn., yet I have never seen a sign of the presence of this insect upon it.

been obtained sufficiently perfect to decide the question. Dr. Riley, however, informs me that the study of a specimen bred, in 1873, from the *blossom* of the buckeye, which specimen he finds specifically identical with mine, renders it certain that the insect is not *Proteoteras aesculanum*.

Dr. Riley has very kindly allowed me to see his notes on, and figures of *P. aesculanum*. which show several points in which that species markedly differs from the species which I reared. These points are as follows:—

1. The larva here described bores the leaf-stalk of the buckeye and only once have I found a specimen in the terminal twig. *P. aesculanum* bores the terminal twig as well as the leaf-stalk.

2. *P. aesculanum* bores the terminal twigs of maple (*Acer dasycarpum*). I have never seen a specimen of the insect here described on a maple nor have I seen a maple twig or leaf showing indications of its presence.

3. *P. aesculanum* often forms a swelling or pseudogall on the stem. The species here alluded to never forms a gall.

4. *P. aesculanum* lives in the gall apparently through almost its whole larval stage. The insect here described, however, quits the leaf-stalk at the end of two or three days and lives in a rolled-up leaf.

5. *P. aesculanum* bores the stem to a depth of from 13 to 50 mm. The insect here alluded to seldom or never exceeds 13 mm. in its boring.

I may add here a few words from a recent letter from Dr. Riley. He writes:

"You are safe in changing the determination of your species, for it certainly is not *Sericoris instrutana*, Clem. You are safe in saying the species is close to *P. aesculana* but nevertheless different, not only in structure and in some of the details of its markings but more particularly in having shorter and more acuminate front-wings. But it is impossible to characterize it either generically or specifically until you get absolutely perfect specimens."

In conclusion I must express my indebtedness to Prof. Fernald and Dr. Riley for the trouble they have taken and the help they have given me. It is only right, also, to add, as an excuse for the imperfect state of this paper, that the doubt concerning the identity of the insect did not arise until the greater part of the paper was in type. This doubt cannot be removed until the brood for 1883 is obtained. In the meanwhile Prof. Fernald has referred the insect, provisionally, to the genus *Steganoptycha*, Stephens (1834), under the name *S. claypoleana*.

NOTES ON *SPHINGIDAE*.

BY LAFAYETTE WASHINGTON GOODELL, AMHERST, MASS.

Deilephila lineata is the most common of all the *sphingidae* here. I have never found the larvae on anything but purslane, *Portulaca oleracea*, one of the worst of our weeds, and on the cultivated species, *P. grandiflora*; and on these they are found, in all stages of growth, from June to November. I have seen the half-grown larvae crawling about on the ground as late as 10 Nov., in search of their food-plant which had been destroyed by early frosts. It is not uncommon to see the moths on wing in midday, and often in the full sunshine. The moths are particularly