V. *Description of the Larva and Pupa of Raphidia Ophiopsis.* By G. R. WATERHOUSE, Esq., Curator of the Entomological Society.

[Read January 6, 1834.]

RAPHIDIA OPHIOPSIS Schumel?.

Larva and Pupa. Plate III. fig. 1.

ABOVE light brown, with longitudinal stripes of a deeper colour; beneath yellowish white, with longitudinal brown stripes. Head and prothorax glossy black. Body 12-jointed.

Length 6—7 lines.

Head elongate, depressed, smooth, with two stemmata in the anterior angles near the base of the antennæ. *Antennæ* 4-jointed, the basal joint short and stout; second elongate, cylindrical; third equal to the second in length, growing gradually thicker, but suddenly narrowed towards the apex; terminal joint slender, elongate, growing gradually thicker to the apex, which is furnished with short bristly hairs, and a small protuberance. *Labrum* transverse, quadrangular, indistinctly rounded anteriorly. *Clypeus* transverse, quadrangular. *Labium* minute. *Palpiger* triangular. *Labial palpus* 4-jointed, terminal joint slender; basal short and cylindrical. *Mandibles* moderate, armed with a large acute tooth, not far from the apex, which is rather elongate and acute. *Maxillæ* elongate, soft and fleshy; blade simple. *Maxillary palpus* 4-jointed, the basal joint short; second and third moderate, equal; terminal conic, with minute bristles at the apex.

Body elongate, soft, pubescent, dilated in the middle, and furnished with six equal and moderately long legs, each with a bifid claw at the apex. *Prothorax* corneous, elongate, rounded anteriorly and posteriorly, the disc depressed.

1 a. The larva, magnified.	1 b. The under side of the head.	1 c. Antenna.
1 d. Labrum.	1 e. Clypeus.	1 f. Palpiger. (Newm.)
1 h. Maxillæ.	1 i. Fore leg.	1 g. Mandible.
	1 l. Claw of ditto.	

It may seem rather unnecessary to add one more to the several accounts already published of the larva and pupa of *Raphidia*, especially since a figure and description of them has very recently appeared in the 'Magazin de Zoologie' by M. Percheron; but I was fear-

ful that the confident manner in which he speaks might put a stop to further inquiry in a matter which I think not fully investigated. M. Percheron seems rather hastily to have set aside two of the greatest authorities, viz. Linnæus and Latreille, who were both acquainted with the larva and pupa of this insect: the latter, who reared it, states that the remarks of the former are correct, and the observations which I have made induce me to be of the same opinion.

I insert, for the purpose of comparison, a translation of the description of M. Percheron. It will be seen, on comparing his description, and that in which Linnæus, Latreille and myself concur, that much difference existed in the specimens. It is extraordinary that such a difference should exist, even though they may have been larvæ of different species.

M. Percheron's account is as follows:—"The larva lives under the bark of trees, where it is sometimes found, but not very commonly; it is carnivorous, and probably feeds upon other small larvæ of *Arachnides* and *Onisci*, which prefer that situation; it does not walk very quickly, but the movements of its body are performed with so much violence, and with such a degree of undulation, as to give it the appearance of a serpent, to which it has been compared. The larva is oblong; the head is nearly square, rounded posteriorly; the mouth is formed as in the perfect insect; the maxillary palpi are four-jointed; the labial three; the mandibles are unidentate anteriorly; the eyes are composed of seven little black points, disposed as follows, viz. six in a circle, and a seventh a little in advance; the antennæ are three-jointed, diminishing progressively in length; the legs are as usual; the femora, tibiæ and tarsi of a single joint each, and are almost equal in length, a double claw terminates the last; the anterior legs are double the size of the four posterior. The head and the prothorax which forms its only thorax, are of a shining brown; the body is of a greenish black, with two yellow bands upon the segments; the legs, the antennæ and the labrum yellowish.

"After remaining more or less time in the larva state, which it often does during the whole of the winter (in consequence of the eggs being hatched late in the season), the insect changes into the imago in the same place in which it has lived, without making any cocoon, but at this moment there is a delicate operation to be performed. * * * * *

"This pupa is a true chrysalis, not like that of the *Lepidoptera*, but like that of the *Coleoptera*: all the parts of the body, without being attached to each other, are covered with a membrane which hinders the action, yet the whole body has the same faculty of con-

“ torsion and leaping, which the larva practises in so great a degree.
“ Linnaeus had said that this pupa was active, but this is a mistake;
“ but it is more astonishing that Latreille, who says he has reared
“ it, has not mentioned this larva, and has continued, in his subsequent works, to refer this matter to the observation of Linnaeus,
“ which has been followed by all the other entomologists. The larva
“ changes to its perfect state at about the end of fifteen days.”

The description M. Percheron gives of the movements of the larva which he observed very well, agrees with what I have observed in mine; but, although I have found about a dozen specimens, I never detected one *under*, but always *in*, the bark: this is of some little consequence; for if the animal eats its way *into* the bark of the tree, and there remains, it is unlikely that it feeds upon the *Onisci* and *Arachnides*. Of the fact of the insect's eating its way into the bark, I have had an opportunity of being well satisfied, having discovered six or seven specimens in one tree: they had invariably formed chambers for themselves, close to the outer surface of the bark; the tree was sound, and tolerably smooth outside. I found no wood-feeding larvæ in the tree, nor any traces of them. The holes made by the *Raphidia* were so large as to induce me to think that they had not been elsewhere since leaving the egg. The grains of wood filling up the parts of the cell not occupied by the insect had the appearance of having been digested. Upon reaching home with the larvæ, I put one into a pill-box, with a small piece of wood, which it immediately began to bite vehemently, and continued to do so until I was convinced of its intention. The wood being very hard, I put the larva into a box with a piece of bark: it crawled to the under side, and in the course of a day or two had constructed itself a cell resembling those which I found in the tree.

At the time that I reared the insect (which was some years ago), thinking that the larva was carnivorous, I put several larvæ of *Scolytus* and other insects in the jar with that of *Raphidia*, but not one of them was touched. Lately I have tried the experiment in various ways. I put two specimens of *Raphidia* larva into a pill-box, with several wounded larvæ; the result was the same. But with all these circumstances, which seem to disprove that this animal is carnivorous, I must confess that I am too reluctant to give up theory to be convinced to the contrary, until I have ascertained that the insect may be reared upon bark alone*.

M. Latreille's description of the larva differs from that of M.

* In support of the opinion that the insect in question is not lignivorous, it will be recollected that the larva is extremely active, that it is provided with long antennæ, and that its jaws are not so short and strong as those of insects which are

Percheron, in the number of joints of the maxillary palpi and antennæ, a difference very easily accounted for in larvæ; for one person might consider the peduncle at the base of the antennæ as a joint, whilst another would consider it as a part of the head. Again, the process at the apex of the antennæ, and that at the base of the third joint, might be considered by some as distinct joints, whilst others would not be of this opinion. In these cases one may generally determine by the examination of allied species in which those parts become most developed. I have considered the peduncle in this case as a distinct joint, because it is flexible, like the other joints of the antennæ, and of the same substance; the other parts being very indistinct, and the antennæ being usually four-jointed in larvæ, I have not considered them as joints. But in the number of eyes there is a considerable difference, the insect observed by Latreille and myself having two; whilst that by M. Percheron has seven. In the pupa there is, however, the greatest difference, the one described by the latter being *quiescent*, that by the former *active*, or possessing the power of locomotion. At the time of rearing the insect, which was in the year 1827, I did not see the pupa, but found its case attached to the gauze covering of the jar in which the larva was kept: from this circumstance, and knowing that the larva could not have changed in that situation, I was induced to form the conjecture that the pupa was an active one. Having, however, lately reared more specimens, and carefully observed their metamorphosis, I have discovered that this pupa in some respects approaches the active pupæ, although it cannot be strictly considered as such, until immediately before assuming the *imago* state, when the insect having gained sufficient strength is

ascertained to be lignivorous. The form, also, of the insect of which we are speaking is different from that of the generality of wood-feeding larvæ.

However different the form of insects may be in their perfect state, their larvæ, if their habits be alike, are also similar in general appearance; and this applies even where they may be of different orders. Compare the larva of *Cossus ligniperda* with that of a *Cerambyx*; again, the larva of *Trichiosoma* with those of the *Lepidoptera*. Indeed, the shape of the perfect insect seems to be very little influenced by that of the larva. It is a curious fact, however, that in the larvæ which I possess, of two allied genera of the *Cerambycidae*, the antennæ vary in inverse proportion to those of the perfect insects. In *Lamia nubila* there are distinct rudimentary antennæ; in *Acanthocinus ædilis* the rudiments of antennæ can scarcely be traced, while in the perfect state the latter has the longest antennæ of any Coleopterous insect found in England. It may also be observed, that although the larva does not influence the shape of the perfect insect, yet the form of the larva is a very good guide to the natural situation of the perfect insect, as regards its arrangement, (that is when they are of the same order,) for the larvæ of various groups vary but little among each other.

enabled to walk, although inclosed within the pupa-case, which, by the by, is extremely thin. Upon exposing the pupa to the light, it would immediately commence biting the bits of wood beneath it, and make considerable exertions to conceal itself; upon which occasions it sometimes used the two fore legs slightly. It must be observed, however, that although the other parts of the pupa are comparatively weak, the jaws are strong, and of a dark colour, showing that they are not meant to be idle during this state.

I am of opinion that the pupa in its natural state makes its way out of the bark of the tree, just before it turns to the perfect insect, which would account for its being able to walk at that time; for if the pupa were to change within the bark, the perfect insect, with its delicate gauze wings, would be much troubled to get out without damaging them. Hence the accounts of this little animal put us in mind of the story of the Cameleon, where all are right, and all are wrong.

1 k. The pupa of the male, magnified. 1 l. Part of the abdomen of the female, showing the position of the ovipositor.

VI. *Descriptions of the Larvæ and Pupæ of various species of Coleopterous Insects.* By G. R. WATERHOUSE, Esq., Curator of the Entomological Society.

[Read January 6, 1834.]

ERYX (Stephens) NIGER, De Geer.

Larva. Plate IV. fig. 1.

YELLOWISH white. Head ochreous, corneous. Body elongate, cylindrical, subcoriaceous, 12-jointed.

Length 10 lines.

Head rotundate, slightly depressed, smooth with a V-shaped groove commencing at the base of the clypeus and converging towards, but not quite reaching, the prothorax. *Antennæ* 4-jointed, basal joint short; two intermediate joints cylindrical; terminal joint minute, and placed in a cup-like cavity at the apex of the third joint. *Labrum* transverse, rounded at the sides, and truncated anteriorly, the exterior margins furnished with bristly hairs. *Ligula* minute and conical. *Palpiger* short, divided anteriorly into two lobes, to which are attached the *labial palpi*, which are 2-jointed; basal joint short and cylindrical; terminal joint