

—Dr. Gill mentioned the resemblance of certain coleopterous larvæ to certain Trilobites, especially among the Staphylinidæ. He said he had been struck by this resemblance in a figure of a *Silpha* larva, even the antennæ resembling the antennæ of Trilobites as recently discovered by Beecher. He mentioned the figure of *Fluvicola*, mistaken for an Isopod crustacean, in De Kay's volume on the "Crustacea of New York," and Le Conte's conclusion that it was the larva of *Psephenus*, and asked for further information as to this resemblance.

Mr. Schwarz said that this wonderful resemblance extends through several families of coleopterous larvæ. He instanced *Micropeplus* among the Staphylinidæ, various genera of *Endomychidæ*, groups of species in the old genus *Silpha*, *Psephenus*, and *Helichus* among the *Parnidæ*, and various genera of the *Dasyllidæ* and *Lampyridæ*. The resemblance is largely caused by the exfoliation of the sides of the body. What its function is he did not know, some of the larvæ possessing it being aquatic, some subaquatic, and some terrestrial.

Dr. Howard jocularly suggested that certain naturalists might consider it to be a case of protective mimicry, since fossil Trilobites are obviously protected from the attacks of birds.

The first paper of the evening, by Dr. Dyar, was entitled :

ON THE FLUCTUATIONS OF THE POST-SPIRACULAR TUBERCLE IN NOCTUID LARVÆ.

By HARRISON G. DYAR.

At the last meeting of this Society, Prof. J. B. Smith presented a paper giving a classification of the Noctuidæ, in which he recognized a number of tribes based on imaginal characters. While it is true that the larvæ of these moths are very uniform and do not present any marked structural differences, I have been attracted by the variations in the position of tubercle iv, or the post-spiracular tubercle, both in different species and on the different segments of the same larva, and I propose to trace out some of the characters of the movement of this tubercle in connection with Prof. Smith's classification.

In the more generalized Lepidopterous larvæ, tubercle iv is situated well below the spiracle, in line with tubercle v. All the Noctuidæ have departed from this condition, and are characterized by having tubercle iv moved up more or less behind the spiracle

above the line of tubercle v. It is evident that the more this tubercle is moved up the greater is the departure from the primitive condition, and hence the greater the specialization. In the Noctuids there is a considerable range of position, varying from a position below the spiracle near tubercle v to one above it, near tubercle iii. It appears, however, on going over a number of species, that the exact position is a fluctuating one. None of the groups as defined by Prof. Smith are absolutely constant, several generalized larvæ appearing in nearly every otherwise specialized group and specialized larvæ occasionally appearing in the generalized groups, so that the character is not of fixed importance. However, an average of the species of a group shows the general tendency of that group and compares very interestingly with Prof. Smith's results, as I will show. First, to refer to some of the details of arrangement.

I have mentioned that tubercle iv is not the same on the several segments of the same larva. The differences follow a general rule. Considering the eight abdominal segments with spiracles, on the first segment iv is generally a little higher than on the rest; on the second, usually lower; on the third to sixth, usually higher, gradually more and more so posteriorly, till on the sixth segment it is often the highest of all; on the seventh segment, suddenly lower, often very markedly so, the difference becoming more pronounced in highly specialized larvæ where this tubercle seems even to recede while the others advance, so that it may, at the extreme, fuse with tubercle v. On the eighth segment iv is moderate or low, somewhat as on segment 2. The generalized condition of tubercle iv on the seventh abdominal segment (joint 11) is specially interesting in connection with Dr. Chapman's discussion of this segment in *Acronycta* larvæ, since it shows that his "weak segment" is not confined to this group, but extends throughout the Noctuids. Indeed, it extends through the Noto-dontians as well. A few species have specialized this segment, as much so as the others; I have seen two or three cases, but in one at least of them I can trace a definite cause. I shall refer to this elsewhere. (*Hydræcia purpurifascia*.)

I stated above that the Noctuid larvæ do not present marked structural characters. To this the *Acronyctæ* and *Pantheids* are exceptions, as they possess variously modified many-haired tubercles or warts. It will be remembered that we have generally associated these groups as possessing this larval character in common, though Prof. Smith's classification separates them rather widely. It is therefore interesting to note that on the character of tubercle iv they are not closely allied, the *Acronyctini* being all highly specialized, while the *Pantheinæ* contain a large proportion of very generalized species and have none that resemble the *Acronyctids* in the fusion of tubercles iv and v on the seventh

abdominal segment. This would seem to prove that wart formation has taken place twice independently in the Noctuidæ, and it agrees with the indication of the moth structure.

It will be remembered that Prof. Smith began his phylogenetic tree with the Erebiini and Homopyralini as one branch, which terminates, and the Poaphilini, Catocalini, and Phoherini as a second branch. All these have generalized larvæ without exception, so far as my material goes, though in a few species of Catocalini and Phoherini, the terminal twigs, a slight tendency toward specialization shows in that tubercle iv on the sixth abdominal segment has risen as high as the middle of the spiracle. The Phoherini give rise to the rest of the groups in two main stems. The first throws off the Eucalypterini and Cillini, of which I only know one larvæ, which shows partial specialization, being intermediate. Next the Acontiini and Erastrini; of these I have five larvæ, two generalized, one intermediate, and two specialized. Finally the branch ends in the Anomiini, Plusiini, Stirriini, Eudryini, and Heliothini. All of these have generalized larvæ except the terminal Heliothini, which are specialized, though not very strongly so. The other main stem from the Phoherini gives two branches, the Orthosiids and Hadenids. The Orthosiids branch into the Mamestrini, of which I have 19 larvæ, 16 specialized, 3 generalized; the Orthosiini, 8 specialized, 1 generalized; the Xylini, 5 generalized, 3 specialized. The Orthosiini give rise again to the Cosmiini and Noctuiini, of which I have 27 larvæ, three only being generalized. The Orthosiids are thus decidedly specialized with the exception of the Xylini. This group is given by Prof. Smith as a side branch from near the base of the main stem. The Hadenids branch into the Caradrini with three generalized, one intermediate, and two specialized species, and the Hadenini with three generalized and ten specialized species before me, as one furcate branch. The other branch gives in succession the Bryophilini and Acronyctini all fully specialized, without exception, in my material.

Thus we see a generally advancing tendency for the majority of the species to become specialized as we advance up Prof. Smith's phylogenetic tree, and in no case do the larvæ essentially contradict Prof. Smith's results.

The following list will show just which genera and how many species in each have been examined in the larva. G for generalized, S for specialized.

- Erebiini.*
 Eubolina, 1, G.
 Pheocyma, 1, G.
 Homoptera, 1, G.
 Ypsia, 1, G.
- Homopyralini.*
 Spargaloma, 1, G.
- Poaphilini.*
- Catocalini.*
 Catocala, 4, G.
 Euclidia, 1, G.
 Drasteria, 1, G.
- Phoberiini.*
 Panopoda, 1, G.
 Harveya, 1, G.
 Paralleliia, 1, G.
 Hypsoropa, 1, G.
 Phoberia, 1, G.
- Eucalypterini.*
 Scolecocampa, 1, Int.
- Cillini.*
- Acontiini.*
 Exyra, 1, G.
 Chamyris, 1, G.
 Acontia, 2, S.
- Erastrini.*
 Thalpochara, 1, Int
- Anomiini.*
 Aletia, 1, G.
 Anomis, 1, G.
- Plusiini.*
 Plusia, 2, G.
 Ogdoconta, 1, G.
 Plusiodonta, 1, G.
 Ingura, 1, G.
 Calpe, 1, G.
- Heliothini.*
 Heliotheris, 1, S.
 Alaria, 1, S.
- Stiriini.*
- Eudryini.*
 Eudryas, 3 G.
 Copidryas, 1, G.
- Bryophilini.*
 Bryophila 4 (Eur.), S.
- Acronyctini.*
 Acronycta, 27, S.
 Arsilonche, 1, S.
 Harrisimemna, 1, S.
- Hadenini.*
 Macronoctua, 1, S.
 Hyppa, 1, G.
 Homohadena, 1, S.
 Oligia, 1, S.
 Hadena, 2, 1S 1G.
 Ferialia, 1, S.
 Pyrophila, 1, G.
- Caradrini.*
 Catabena, 1, G.
 Caradrina, 2, S.
 Crambodes, 1, G.
 Laphygma, 1, Int.
 Prodenia, 1, G.
- Xylinini.*
 Xylina, 2, 1S 1G.
 Scopelosoma, 2, 1S 1G.
 Glaea, 2, 1S 1G.
 Calocampa, 1, G.
 Cucullia, 1, G.
- Orthosiini.*
 Orthosia, 2, S.
 Trigonophora, 1, S.
 Hydræcia, 2, S.
 Nonagria, 1, S.
 Bellura, 1, G-modified.
 Jodia, 1, S.
 Achatodes, 1, S.
- Noctuini.*
 Agrotis (sens. lat.), 26 3G, 23S.
 Ufeus, 1, S.
- Cosmiini.*
- Mamestrini.*
 Morrisonia, 1, S.
 Taeniocampa, 2, S.
 Eupsephopæctes, 1, S.
 Nephelodes, 1, G.
 Orthodes, 1, S.
 Leucania, 1, S.
 Xylomiges, 2, S.
 Mamestra: 10, 8S 2G.

—The second paper included a continuation of Mr. Hubbard's letters from the Southwest. Mr. Schwarz, in presenting these letters, said that although the first of them did not contain any entomological matter, he had no hesitation in recommending its publication in the PROCEEDINGS on account of the fascinating way in which the author had depicted his impressions while transversing this interesting and little-known region of the Southwest.