

simple that beyond the observations of their various attitudes and the way in which they lay their eggs and provide for their young there is not much to be said about them. The sun is the powerful motor for the butterflies, which, during very dark days or during an eclipse, become sluggish and behave as at nightfall. The moths, per contra, are most active during cloudy nights, loving the darkness and avoiding the moonlight. The habits of the caterpillars are varied by the situation in which they are found. Well deserving of close study are the aquatic larvæ of *Arzama*, *Sphida* among the *Noctuidæ* and *Hydro-campa* among the *Pyrilids*, the latter furnished with thread-like gills for water breathing. The enthusiasm with which entomology is pursued when we are young carries with it a success in our observations which is not counterbalanced by the experience that comes with time. *Quant'è bella giovinezza*—Lured to be up at five in the morning to catch the moths in their first sleep in the dawn on tree trunks and palings before the birds had disturbed them, finding thus early many freshly disclosed rarities and being amply rewarded for my rising. Caterpillars are also easier found at dawn, before or soon after sunrise. Everything that is beautiful passes with youth, before we have learned to remember, and our experiences are all new and unblunted.

The necessity of exercising our discriminative faculties makes the study of the habits and structure of these insects a useful one to the mind by enlarging its faculties and, if properly guided, helps one to a kindly philosophy and the enjoyment of unselfish pleasures. But entomology, like every other pursuit, is only the frame upon which our moral character is extended and displayed.

Most interesting is the study of *Variation* in the butterflies and moths. We have first to consider the seasonal varieties, where a difference in the different, spring, summer, broods is shown. Then the sexual varieties, peculiar to one sex, as in *Ennomos alniaria*, where, according to Dr. Packard, we have two kinds of males, etc. Then dimorphic varieties, as for instance *Hemaris uniformis*, which is, on the authority of Mr. Hulst, apparently a constantly recurring form in both sexes of *H. Thysbe*. It is not always possible to decide of any two forms which is the variety and which the parent, or original form of the species. The practice of considering the first form that was described as the original form and the latter the variety, is too unscientific to merit consideration. We have then *Aberrations*, mostly individual in character, in which by suffusion of color, or substitution of one tint for another, also by a change from the normal markings, a departure from the usual form is signalized. The cause of variation is evidently complex. Edwards, Dorfmeister, Weismann, have all shown the influence of cold and temperature in producing varieties. Warmth and light, the geological formation, food-plants, in fact, all the physical environments are, in truth, the factors, but it is not always easy to say which is the determining force. While varieties are considered to be nascent species it is probable that this is only relatively true and that a species may produce, under certain conditions, a variety which has insufficient character to become a species. Light and heat are supposed to produce brighter colours. Natural selection fixes the specific character, hardening it into constancy. The butterflies are gaudier than the moths and most brilliant at the Tropics. The day-flying moths are higher colored, as a rule, than the strictly nocturnal species, which are as dusky as the night during which they range. An objection to this is, that the circumstances under which the caterpillar exists can alone be determining upon the colours of the moth. It is thought that the food-plant influences colour, and that the pigments are made by the chemical processes within the body itself. But the colours of the moth are also directly affected, as I have long shown. I am inclined to believe that the moths are a survival of the oldest form of the *Lepidoptera*. That their colours are inherited, and that formerly all the *Lepidoptera* were dusky and active in the night or when, during the whole twenty-four hours, the light was less powerful on the surface of the globe than it is now. The influence of the surroundings of a moth upon its color may be witnessed in the case of *Hemileuca tricolor*, a pallid, desert-inhabiting form of a black genus of *Bombyces*. This moth is, as I have shown, a true *Hemileuca*, differing only in colour from other species of the genus. I have alluded elsewhere to the method of variation by which the under surface of the wings in the moths which are concealed from the light are the least affected. The fact that the under surface of primaries often corresponds with upper

surface of secondaries, is a fact deserving of deeper study.

Among the *Lepidoptera*, Darwin, play a part protected by variation in color. The protected the *Lepidoptera* insects and the bark of trees, that any variety would think out the nature of general resemblance of the leaves of their usual surroundings to the eye. The wasps has been our Fauna, carried to a state in which an *Okra*, which *Tetracha Vir* well ascertain

The mass of original features of *Neuroptera*, in of genera with researches are the *Phryganeæ* nearest to the *Hepialus* have each other. years ago I read (like *Arzama Cossus*, not be but as more derived. the world with itself, perishing certainly not lations as to It is a condition, fact, ends even our poetical answer the unpoetical apothecary aside, the miscompany! 19th century consolation needed, Christ last century the sheet is waiting Entomology, of using it me