

again obtained and probably will never do so. The first conditions, then, for the presence of a species of Lepidoptera are those of warmth and food—a minimum of cold to be supported, a sufficiently extended time of warmth during which the insect can provide for its metamorphoses. The summers running too short, will prevent the existence of species, even where the food is abundant; while a few kinds of Arctic butterflies seem to take two years in which to perform their life changes, an acquired habit with the other phenomena of hibernation. In this respect there is a difference of hardiness between the species; it is probable that the *average* temperature is not of so much consequence as the point of its absolute lowness at given times, exposure to which, in certain of its states, the insect cannot survive. The same amount of cold might be innocuous to the egg, which would kill the chrysalis. That food itself is not sufficient for the presence of the species to which it is adapted, is a fact well known to collectors. While there are a good many accidental causes to account for this, in any one region, it is found also that the range of the plant is not necessarily co-extensive with the range of the species feeding upon it; here the climate (humidity, degree of cold) is one of the determining causes. After warmth and food we must next consider enemies, parasites, competing species. This is a vast field for observation. The number of ichneumon flies is apparently influenced by special causes, so that in some years they do not destroy so many caterpillars; in shifting their ground the lepidopterous hosts sometimes evade their guests for a season. The birds destroy yearly a large percentage of these insects, but they, as well, are more or less plentiful from causes which are independent of the supply of insect food.

There is then to be considered the physical geography and the geology of the country. What are called by Entomologists "Chalk insects," are those species which inhabit by preference this formation, the geology of a district influencing its flora, and this in turn its insects. Forests are also protective to some considerable extent, less from depredators and enemies than from high winds, which tear our frail friends to pieces; and from sudden changes of temperature at an awkward moment, such as the change of dress from the caterpillar to the chrysalis state, or the previous and various steppings out of the larval skin, which, like getting out of one's trousers, is always a risky undertaking. The forest itself may seem to be bare of insects as compared with the open fields, where the broad bits of color of a butterfly's wings come into quick notice. But, in