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WILLIAM COUPER, Editor.

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CAUSES OF RARITY IN SOME SPECIES OF INSECTS.

Entomologists know that some species of insects are generally few in individuals, while others are numerous. Those which are useful to man, and have been, so to speak, domesticated by him, are, of course, kept up in as large numbers as possible, by the care and protection bestowed upon them. But the rest are left to the care of nature, and in the balancing of the great system of life, are subject to various influences, which affect them injuriously or otherwise. An enquiry into the causes which act in reducing their numbers would be both interesting and instructive, particularly in the case of those species which are *always* rare. Of course, some of these causes are easily discovered, but others, which may still be important, are obscure and difficult to trace out. For instance, a species may be rare, owing to the scarcity of its food plant. We cannot expect to find an insect, which may be confined to a single food plant, abundant where that plant is scarce. And an abundant species may be rendered rare in a given locality by the diminution of its food plant, say by the increase of cultivated ground, or by fire, &c. The following illustrates the point: The Gomin swamp, a well known collecting ground, close to the city of Quebec, is, or was, a breeding place of *Chionobas julia*, a Labrador butterfly, which is not found in any other place within twenty miles of that locality. During the past fifteen years the swamp has been largely trenched and drained, and the butterflies have become scarce, no doubt owing to the loss of the food plant, which is probably some lichen or moss growing there. Another cause of the scarcity of some insects is their liability to parasitic attacks. The beautiful moth, *Samia Columbia*, might be given as an instance of this. Mr. S. I. Smith, the describer of the species, says in his paper, "This spe-

cies seems to be infested by an unusually large number of parasites, since, out of more than twenty cocoons, I have succeeded in raising but three, nearly all the rest having been destroyed by ichneumonids and other parasites. Its remarkable rarity is, perhaps, due to this fact." I may add that collectors in Canada have had a similar experience with this moth. Another case is that of *Pieris rape*, which threatened to be a real scourge to the country, but has been reduced within reasonable bounds by the assistance of the insect parasites preying upon it. A third cause, particularly in the case of noxious insects, is the efforts made by man to extirpate those which destroy his crops or injure him in other ways. These efforts sometimes make an injurious insect rare, but no insect has become extinct from this cause, as far as we know, nor is it probable that such will ever be the case. Among causes more remote than the above mentioned, and more difficult to trace, are variations in climate, and in the seasons, as compared with one another. The way in which insects are affected by different conditions of the atmosphere, and by hot and cold seasons, has not been thoroughly studied as yet. In some years, for example, the Lepidoptera are much more numerous than in other years. Their abundance, or the opposite, is no doubt dependent in a great measure on the weather of the preceding summer and winter, as well as on that of the passing season. And what may be favorable weather for the Lepidoptera may be unfavorable for insects of other Orders. The knowledge of what constitutes favorable conditions for the increase of noxious insects would be of practical value to the agriculturist, and is a subject worthy of the study of our entomologists. Another cause of the intermittent abundance and scarcity of some species is to be found in their migratory habits. In the case of the locust, this is evident to all. Some of the butterflies, belonging to the families PIERIDÆ, NYMPHALIDÆ and DANADÆ also have this habit. Some years *Pyrausta cardui* or *Vanessa Talbum* will be plentiful about Montreal, and then for a series of years will be exceedingly rare. The explanation of the mystery probably is that a large number of the insects have migrated to the locality during