

fungus (*Plasmidiophora brassicae*, Wor.), although by many it is thought that it is caused by the attacks of a small beetle. Another injury caused by a fungus, but which has very much the appearance of an injury by insects is the Plum-leaf Fungus (*Septoria cerasina*, Pk.) which has the effect of making small holes in the leaves of plum trees as if they had been perforated by shots from a gun. This has been sent to me during the past summer for information as to the "insect" which was supposed to be the depredator. Again, the curious disease called "bumble-foot," to which some breeds of poultry are liable, is occasionally supposed to be due to the attacks of insects. It is probable, however, that the large swellings on the feet of chickens so named, are really abscesses, due to aggravated bruises caused by high perches and a hard floor to the poultry house.

These few instances, however, are sufficient to illustrate the advantage of any investigator being familiar with at any rate the first principles of other branches of study besides his own specialty, for he will frequently be applied to for information, and, indeed, will require for his own work knowledge of allied subjects.

Perhaps one of the greatest surprises to one who begins to devote a portion of his time to the study of Natural History, is the discovery, which soon forces itself upon him, that instead of there being a large number of different sciences, these are merely several branches, all of which are so intimately related, nay, even dependent upon each other, that they are merely component parts of one great whole. Nor does any one branch very much surpass the others in importance, for each one is necessary to the rest. And the special value of any one study over the others is only in the eyes of those students who devote to it their particular attention. All are links in one great chain of knowledge, engrossing to the highest degree to all who are happy and lucky enough to feel its charms, and of enormous importance to the world at large.

In a consideration of this theme we can begin at any one of the links, and, perhaps, to-day it is more fitting to begin at our own special subject—Entomology. Most nearly related to Entomology is Botany, the branch of science which treats of the vegetable kingdom from which so large a proportion of the insect world derives its sustenance. An intimate knowledge of the different species and families of plants is of great importance to the Entomologist. It frequently occurs that in his studies he requires to breed through all its stages some insect which feeds naturally upon a plant not to be obtained in his neighborhood; with a knowledge of the different orders and classes of plants, he is able to make use of a nearly related species, sometimes even of a different, but closely allied genus. There are many instances on record where this has been done; but by far a larger number where, for want of this knowledge, valuable insects have been starved from only having improper food offered them. The economic entomologist is much helped in his investigations by this knowledge. Many of the injurious insects which attack our cultivated crops, especially those of which there are two or three annual broods, subsist during one or more of these on wild plants allied to those cultivated. By a removal of the wild plants many of these pests are naturally kept very much in check, for it must never be lost sight of that the great factor which influences the amount of insect-presence is the amount of food-supply. Then the important offices performed by insects in their relations with plants render them objects of very great interest to the botanist; he recognizes in them nature's pruners, which remove or prevent a too great exuberance of growth; and they perform such a conspicuous part in the fertilization of the seeds as to have been designated "the marriage priests of plants," ushering the young seedling into existence; they also remove it from the face of nature directly its usefulness and beauty are gone, so that its place may be taken by others. The fact that insects and seeds form the greater part of the food of so many birds, naturally connects the studies of the ornithologist with the two preceding. By the dissection and examination of the stomachs of birds, many useful assistants of the farmer and fruit grower have regained a good character of which ignorance had robbed them. How many thousand of woodpeckers and owls and hawks, which were nobly doing man's works for him, have fallen victims to this spirit of ignorance.

These remarks will apply equally to several other branches of Zoology.

The next step is to the laboratory of the chemist. Here the entomologist finds the materials for alluring and preserving the specimens for his cabinet, or is provided with

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