

dence in support of this contention. Probably the most interesting section of Mr. Hiley's volume is that in which he supports and elaborates the view that in the great majority of cases the stem of a larch is infected by the mycelium of *D. calycina* which is living saprophytically on the dead branches. This theory is not new, but it has never before been subjected to so critical an examination. It is a matter of common observation that a branch springs from the centre of a canker, and it had generally been assumed that death of the branch followed invasion of the stem. But Mr. Hiley now produces evidence which seems to prove beyond reasonable doubt that the branch has always died before the canker has originated, and, in fact, that the dead branch, serving as food for the fungus living saprophytically, has been the vehicle of infection. Such infection always takes place between the end of one growing season and the beginning of the next, consequently the last wood ring in the centre of a canker spot on a stem is always completely formed.

Another parasite of the larch which receives exhaustive treatment in the volume is *Fomes annosus*, the common cause of heart-rot. Unlike *D. calycina*, it is equally common on other conifers, and in the aggregate does a great deal of damage. The same may be said about *Armillaria mellea*, perhaps the most destructive single fungus species with which the forester has to contend.

The more important leaf and seedling parasites are also reviewed, the volume finishing with an interesting general summary and with a useful bibliography. More than seventy illustrations add greatly to the value of the treatise, which is indispensable alike to the mycologist and the forester.

The Absorption of Light by Organic Compounds.

Etudes de Photochimie. By Dr. Victor Henri. Pp. vii + 218. (Paris: Gauthier-Villars et Cie, 1919.)

THIS monograph is the first instalment of a series in which are to be presented the results of several years of work of the author and his collaborators. From 1908 to the outbreak of war Dr. Henri devoted his attention to the experimental study of various chemical aspects of the interaction between radiation and matter, dealing chiefly with the absorption of light in the infra-red and ultra-violet regions, with dispersion in the ultra-violet, with chemical reactions brought about by light, and with certain technical and biological aspects of the subject. In

1915 he went to Russia to help in scientific work in connection with the war, and towards the end of 1917 began to work up the mass of data accumulated in preceding years. Very few of his results had been published separately—papers by Bielecki, Boll, and Wurmser will, however, be familiar to workers in this field.

The present volume essentially contains the results of the author's work on absorption and dispersion, and is of considerable interest. Employing a photographic method, carefully checked, and using a powerful source of ultra-violet light, worked out by himself and giving a continuous spectrum, he was able to measure *quantitatively* the exact form of the absorption curve in the ultra-violet for about 240 organic compounds. As he points out, this represents a very considerable advance, previous work being confined to the mere investigation of the positions of the bands. To these measurements are added a series of determinations of dispersion in the ultra-violet, employing a specially designed apparatus, and a number of absorption measurements in the infra-red. The application of formulæ developed by Helmholtz and Ketteler, Drude, Lorentz, etc., has enabled him to draw conclusions as to the nature of the oscillators responsible for the absorption of light of different wave-lengths, the damping (usually very great) to which such oscillators are subjected, etc.

The more important results are as follows: (a) The oscillators absorbing in the infra-red are of molecular size, are atoms or fractions of atoms in the mean ultra-violet, and electrons in the extreme ultra-violet. (b) These different oscillator systems are closely bound up with one another, and there exist simple numerical relations between the infra-red frequency due to a chromophore and the ultra-violet frequencies in molecules containing such a chromophore. This, of course, was previously discovered by Baly, to whose work adequate reference is not made by the author. (c) By the application of simple rules, the absorption spectrum of a compound can be calculated with considerable accuracy from its constitution and the characteristic infra-red frequencies of the chromophores, two simple constants for each infra-red absorption band being necessary. (d) The structure of a molecule is essentially *mobile*. The existence of ultra-violet absorption bands is an index of a labile and reactive state. This, again, is in agreement with Baly's views.

Other more speculative conclusions are perhaps less justified. The experimental work appears to be of a high order, and the other volumes promised will be looked for with interest.