

tinct as the tree grows older; and that the fibres of the wood of some are very singularly disposed, appearing to have been collected into bundles; or to have undergone some peculiar inflexions as the tree advanced in age. We know that, here, roses do not bloom in January, that apples do not ripen so early as April, nor cherries so late as October; and we also know, that some forest trees bring their fruit to maturity annually, and others only biennially; that some trees are of the *monœcia* class, having the male and female organs on the same tree, and that others are of different sexes, or of the *diœcia* class, having the males and females in distinct trees. These peculiarities, and the periodical fructification of trees being known, as in the case of the known terms of the incubation and gestation of animals, the law respects and confidently relies upon such a known regular course of nature. But no series of observations, by botanists or cultivators, have as yet demonstrated that any portion of the wood of a tree, as visible to the naked eye on dissection, was, like its fruit, the result of successive periodical formations, known to have been made within certain spaces of time; nor have philosophers, with the aid of chemistry or the microscope, been as yet able, in this and a multitude of other particulars, to detect the latent operations of the vital principle in vegetation; leaving all questions as to its gradual or periodical progress, still covered up in the most impenetrable obscurity. (a)

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(a) Thompson's Chem. b. 4, c. 3; 11 Westm. Revw. art. 8, p. 97; Vegetable Physiology and Arboriculture; Roget Anim. and Veget. Physi. pt. 1, c. 1, s. 2 and 3, pt. 2, c. 1.

• We know the substances received by plants, and those which they reject; we determine by analysis the nature and the composition of the products which they form; but this is the utmost extent of our knowledge. All that passes within the plant is still a mystery, and belongs to the laws of vitality, which modify by their action those physical laws that are known to us.—*Chaptal's Chemistry applied to Agriculture*, c. 5, art. 6.

• Plants may be considered as a set of machines by which the common elements of nature are worked up into such a form as to be fit for the sustenance of animal life. We have already examined the structure of this machine; we will now direct our attention to the way in which it operates. In this department of the science, the difficulties which the philosopher has to overcome are of a very different character from those which may have embarrassed him in merely determining the organization of the plant. In the latter case, good microscopes, manual dexterity in preparing the parts for examination, and sufficient patience for his task, are sure to bring the observer to conclusions, the general truth of which is often susceptible of exact demonstration; but when we come to consider the causes of vital phenomena, and the manner in which they are brought about, we have obstacles of quite another kind to overcome. There is not a function of vegetable life