

Agricultural.

VEGETABLE PATHOLOGY.

The science of vegetable pathology explains the natural causes, and symptoms of diseases in plants; a subject with which the horticulturist especially should be well conversant. All plants are more or less liable to diseases, and, unlike animals so generally possessed of locomotion, they are fixed to the soil, and are compelled to endure, unprotected, the frequently injurious influence of external circumstances, such as the variations of temperature, the attacks of the lightning, the hurricane, and the storm. Disease is also engendered from the ravages of insects and birds, from the bad soil in which they may be placed, and too often from the improper treatment of man himself. When we consider these and other extensive causes for diseases in plants, we should no longer be surprised at their weak state or sudden decay, but rather wonder that they should have flourished at all under such a complication of evils. These evils will be found to arise from one of the following causes:—

All diseases of plants affect, directly or indirectly, either the root, the leaf, or the stem.

From the important relation which the root bears to the rest of the plant, anything which tends to destroy its functions must in a great measure injure its health, and, in cases of extensive injury, even cause death. Roots may be wounded by instruments used in working the ground and from the attack of subterranean animals, such as moles, rabbits, mice, and a whole host of insects, the last of which injure roots chiefly when in the larva state, by devouring the minute rootlets; and when these larvae occur in great numbers, the fibrils often suffer in a great degree, being either broken by those which undermine for shelter, or eaten by others, and the plants are in a great measure deprived of their wonted supply of nourishment. When the roots have been thus attacked by insects, the most approved remedy is a solution of lime-water and tobacco water, poured upon the ground over the affected parts: even unslaked lime has been dug in with great advantage. To entrap the wire-worm, Sir Joseph Banks recommends slices of potatoes to be buried where they abound, frequently examining the baits and destroying such as have collected on them. When a plant happens to have its roots lacerated, these ought to be protected from extremes of heat and cold; the ground in the neighbourhood should be kept moderately moist; if possible, the plant itself shaded; and whatever else may be found conducive to its health should be resorted to, to induce the formation of new roots. Gangrene, is another disease of the roots which often occurs, and is of two kinds—wet and dry gangrene. An example of this kind occurs frequently from too much moisture, accompanied with cold weather and a bad soil. It is often found in "house-plants," when these have been officiously indulged in too much water. Dry gangrene in roots is similar to that in stems, and will be noticed under that head.

Another disease to which plants are liable, is that affecting the leaf. Plants frequently become striped of their foliage in a short time by the ravages of the caterpillars of butterflies and moths, although generally these are more sparing in their attacks. These, with many others, prey upon most plants fit for the food of man. Various methods have been had recourse to for the destruction of caterpillars, such as washing with tobacco water and soap, lime-water, &c., boiling-water has also been tried with success; and, for these insects which seek the ground at particular seasons, unslaked lime laid on and dug in is highly efficacious. Besides these remedies, however, there is what may be termed an approach to a natural cure for this infection, in the larvæ of an aphidivorous fly; the same animal also destroys the caterpillars in great numbers. Some insects lay their eggs close to each other on the backs of the leaves of certain plants. After a time, these become hatchful, and the larvæ, each for itself, pierces a small hole immediately above the attachment of the egg from which it came, and, passing through the leaf, arrives at the upper surface, when it commences its mining, covered only with the cuticle. The leaves of apple and pear-trees are very subject to this affection. But, besides the ravages of insects, leaves are liable to become attacked by various cryptogamic plants, from circumstances not well ascertained. The most familiar of these is known by the name of "mildew," which is at once observable by the white appearance it bears on the leaves. Certain circumstances seem favourable to its appearance, as cold dry weather and particular exposures—plants under the shade of others, or otherwise shaded, apparently suffering more than those fully exposed. From microscopic observations this parasitical plant seems to be composed of globular semi-transparent masses, apparently sometimes attached to hairs on the plant, or collected into heaps on the surface of leaves and stems. The leaves of several plants belonging to the kitchen-garden—such as horse radish, cabbage, &c.—are sometimes attacked by a parasitical plant (*Uredo cardida*) in appearance not much unlike the "mildew" to the naked eye, which has been found, from experience, to be highly infectious. There is likewise a curious parasitical disease (*Ecidium grosularia*) to which the leaves of

gooseberry trees are liable. Amongst the remedies proposed for these diseases, perhaps the best is thinning round the affected parts. Parasitical plants, apparently of a somewhat similar structure, occur of different colours. There is the red, termed "rubigo," or rust (*Uredo salicis*), occurs on the leaves and stems of many plants. There is also a black kind, termed "smut" (*Uredo sciptum*.) it is most destructive to wheat oats, &c., which are also very often affected with the red kind. According to several experiments on this subject, it appears that the best and simplest method for the prevention of these parasitical diseases in corn, is to steep the seeds of affected plants in lime-water for twenty-four hours. When either the black or red parasite appears on their plants, treat them as for mildew. Delicate and rare plants may have their leaves washed with water. Lime-water has been found of service on apple-trees. In hardy plants slightly affected, remove all the diseased leaves or shoots. An apple tree annually affected was perfectly cured by a free washing of what is termed the "cream of lime" during the winter, and the tree appeared very little the worse, having next spring thrown out healthy shoots in abundance, except at the termination of one branch, which passed partly through a currant-bush next to it on the wall, and which suffered the usual attack from mildew. From this case it may be inferred that the seeds of the parasite remain about the buds and stems until a fit period for their evolution.

TO BE CONTINUED.

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