

field. These factors probably cause a disturbance in the power of assimilation, under which the plants experience a slackening or temporary stop. . . . " If light and moisture and necessary summer heat enable the plant to grow quickly and luxuriantly, the rust is arrested in its progress, or, as some writers express it, "the plant outgrows the rust."

Numerous observations show an improvement or restoration of the constitution of the plants by mechanical means, if they have grown to such a depth that the roots have reached impenetrable clay or rocks. In an orchard growing on London clay, with about four feet of suitable top soil, young apple and pear trees were planted, and thrived well, till suddenly, one year, a remarkable change became noticeable. The leaves fell earlier than usual, and the quality of the fruit was much impaired, though they ripened. Heavy manuring was carried out in the next few years, with some slight improvement, but after a short period the trees were in as bad a state as ever. When digging up the trees it was found that the roots had reached a thick bed of clay and could not penetrate it. In consequence no food was absorbed, and the trees suffered from starvation. The fruits were much blemished with pear and apple scab. The owner then had all the trees lifted, the roots cut, the ground ploughed, and the trees replanted. In a year or two the trees had outgrown their disturbance and bore fruit as good as ever.

A very similar case in cultivation of grapes came under my observation recently. I received in the first instance some grapes which were very shrivelled in appearance. Several fungi like *Cladosporium*, *Botrytis*, *Aspergillus*, and a *Tubercularia* were present, but were not the cause of the condition of the grapes. I ascertained that the vines were old plants, too heavily cropped, and the roots had grown too low to benefit from the usual top-dressing as practised in vine borders. In another nursery exactly the same occurred, the grapes shrivelled and various fungi grew on them. The gardener lifted the vines and replanted them near the surface, and now has a healthy crop. In this case of what use would spraying with fungicides have been? *Cladosporium viticolum*, *Botrytis cinerea*, etc., have been reported as serious pests in grape culture, but here they were the result and not the cause of the malady.

Some examples from the territory of forestry are worth recording. Some months ago—in February—I received at the laboratory a young larch tree, being one of a large number which had died from some cause or other. The tree was about twelve years old, and had failed in health the year before, and