

destroy the resting spore—that the haulms of the diseased plant might be plunged into boiling water, kept there for some minutes, and then allowed to rot, yet if that material was dried up and then made up into powder, and, in the following year thrown broadcast over a plot of potatoes, at a favourable time the disease would develop itself in the new haulms, and apparently in consequence of the growth of the resting spores which remained in the rotten but dried powder of the old haulms, provided it had been kept out of the reach of sunlight during the preceding season. This experiment taught me much of the habits of such diseases as small-pox and diphtheria. I learnt that it was not enough to remove smell and to disinfect the morbid matter, but that you must destroy the resting spores by some agent which could alter their constituent parts. You might destroy the growing germ, you might destroy the hatched or sprouting seed; but if you did not also destroy the unhatched ovum, or the undeveloped seed, you did not prevent the recurrence of the disease. We have the analogy afforded by natural history before us, displaying numerous instances in which insects and other living organisms exist in many different forms, all tending to come round sooner or later to the same point again. I conclude from results that the lower forms of life are more multiform than even the better known classes of insects.

There is another way of looking at it. If we examine a few specimens of cell-life, such as the protoplasm, which goes to form nerve-cell, or muscle-cell, or the cellular tissue of any other organ, they are utterly undistinguishable to our finite powers in their earlier development. It is probable that many kinds of disease germs

are positively similar as to form as far as we can see, and yet are capable of developing distinct diseases. It is also certain that a careful study does reveal certain differences, so that the expert is able to differentiate the diphtheria micro-organism from that which sets up anthrax, or from that which produces the chicken cholera. It may be that some of the forms may be easily capable of destruction at one time and not at another, because they are passing through a different kind of change, and are then fully able to resist the action of the agent which is supposed to be capable of acting as a germicide, so that now and again the vaunted agent fails and goes out of favour. If you are to deal successfully with the eradication of disease germs out of the land you must know something of their life-history, and the pertinacity with which they resist the influences of chemical re-agents and other disinfecting powers, which are sometimes thought to be beyond doubt. This fact will explain to you why your chloride acid has not prevented the recurrence of disease, why ventilation has not been enough; and, in the minds of some sanitarians, nothing remained to be done but to destroy the offending matter by fire. Such is the conclusion which many sanitarians have come to; but it is not a satisfactory one. It seems to me to be a wicked waste to destroy a commodity which may be valuable if it be transferred to its proper place.

VEGETATION AS A DISINFECTANT.

There is a means by which security against evil consequences is provided viz. the powerful aid of vegetation. The vegetable kingdom has been placed on the earth to counteract the influence of animal life by taking the daily poison of CO out of the air; the stomata, or