clothing or running water, and in a variety of ways incompatible with the behavior of gases. For these reasons, and many others unnecessary to adduce here, it seems clear that the disease must be communicated by the agency of solid, non-volatile particles.

"The specific disease-producing particle must, moreover, he organized, and possess vitality; they must partake of the nature of virus rather than of poison. (The words virus and poison are generally regarded as synonymous. It would be more con-venient, and would tend to promote accuracy of thought, were the distinction here made generally adopted.) No poison yet known to chemists can approach, even in a faint degree, the tremendous energy of the active agent of infectious diseases. A poison may be organic, but it is not organized. It may kill with far greater rapidity than the virus of infection, but, unlike this virus, it cannot multiply itself in the animal economy to such an extent as to endow within a few hours every portion of its juices with the power of producing similar results. A virus, on the contrary, renders the liquids of an infected animal as virulent as the original germ. Strychnine may be regarded as the type of a poison, and vaccine matter as the type of a virus.

"Many considerations tend to show that the virus of cattle plague is a body similar to vaccine lymph, and consists of germinal matter, or living cells, possessing physiological individuality, which, if not exposed to extremes of heat, cold, or dryness, are capable of preserving their activity for a certain time outside the living organism, of adhering to material object, and of being carried from one place to another by currents of air; each, when introduced into the blood, requires a certain time (known as the period of incubation) during which, the septic germs devolve and multiply, until they have so far poisoned the blood that the ordinary symptoms of disease become manifest. "The blood poisoning thus set up may legiti-

"The blood poisoning thus set up may legitimately be called 'fermentation;' it is a decomposition caused by the act of nutrition of the living cell, whereby it reproduces in incalculable numbers the specific septic germs which have given it birth. These gradually infest the blood and other animal liquids, and, as the disease progresses, are discharged from the skin, throat, glands, etc., the breath, perspiration, and excreta of the animals forming vehicles for the distribution of the virus. By 'living' cells, is not not meant living, in the sense in which an animal, or even a low form of infusoria, lives, but living as a seed, or as vaccine matter, even when dried, may be living, inasmuch as it still possesses reproductive vitality.

"It is by no means certain that the multiplication of the individual cells is the immediate cause of the blood poisoning. The analogy of the action of virus on the blood, to that of yeast on sugar, renders it more probable that this is not the fact. In the case of the best-known ferment—yeast—its cells multiply by feeding upon the sugar in the liquid; alcohol and carbonic acid being their excretions. It is therefore probable that during the multiplication of the virus cells, they, in a similar manner, impoverish and weaken the blood, by feeding upon some element in it, while at the same time they excrete a poison to which the symptoms of the disease may be immediately due."

## CARBOLIC ACID AS A DISINFECTANT.

Carbolic acid has lately come to be a great favourite as a disinfectant. Where its virtues are best known it is more relied on than anything else as a preventive of cholera. There are those who think that if it were liberally used wherever there is unhealthy organic decomposition, miasmatic diseases would soon become unknown. Our very efficient board of Health, we observe, have added it to their list of disinfectants, and are using it on a large scale. At the next cholera senson we predict that it will be better known and be more valued than any other disinfectant.

The reasons why carbolic acid is such an admirable disinfectant are easily to be understood. Miasmatic matter, and almost everything contained in the air which is offensive to the senses, are the products of the fermentation or putrefaction of organic matter. Now, it has been found that carbolic acid is the sovereign and never failing antiputrescent and antiseptic. The power of carbolic acid is wonderful for its promptness and its persistence. Putrefaction can neither go on nor be commenced in its presence; it preserves everything in statu quo. It is certain that several organic poisons act like a ferment, or are matter in the state of decomposition. Mr. Crookes has shown that the virus of serpents and of contagious diseases belong to the same category. In all these cases, wherever carbolic acid can be applied, it may prove to be a specific.

Chloride of lime acts very promptly as a deodorizer of the air, and to this fact it owes its high reputation. It destroys noxious matter by bringing about a chemical change in it. It enters into chemical union with some part of it, and no longer exists in a state to do more useful work; it is exhausted in doing its work; it is wholly used up. Moreover, chlorine acts by reason of its affinity for hydrogen; and as hydrogen is an element of inceuous matter, it wastes much of its energy where it is not needed. It deodorizes promptly, but where is the evidence that the virus has a foul odor? How do we know that anything beyond the odor is destroyed?

Carbolic acid, on the other hand, goes to the root of the matter. It acts as a preventive. It destroys our enemy in the egg. No noxious effluvia can come from the matter with which it is in contact. It mixes kindly with everything. A very remarkable fact about it is, that in doing its work, there is no chemical change. It remains always free carbolic acid, and the matter with which it is surrounded continues the same as at the first instant of contact. Thus the carbolic acid is never consumed, and may continue forever its office of restraining the demon.

Two simple experiments illustrate the peculiarities of chlorine and carbolic acid. Bring a piece of putrid meat into an atmosphere of chlorine and it comes out sweet. But wait. Observe that it is only the fetid atmosphere about the meat which was effected; let this be blown away, and a new one takes its place. Let the meat be now dipped in a weak solution of carbolic acid and exposed to a current of air. The foul odor is soon blown away, and the meat may continue sweet forever.

Carbolic acid is cheap, and is applicable under