

spores. But as Dr. Sternberg says it is doubtful whether the result is as good as would be produced by thorough ventilation, and by washing all surfaces with a solution of bi-chloride of mercury.

The best method of using sulphur in practice is as follows. Sprinkled with alcohol it should be placed in an iron vessel, supported over a pail or tub of water and burned there. The room must not be opened for twelve hours, and then it should be opened and the air allowed to enter freely. Four pounds of sulphur to the 1000 cubic feet of space should be used, and the floor, walls and all articles of furniture freely sprinkled with water.

A much more reliable disinfectant is chlorine gas. This also requires the presence of moisture. Having a strong affinity for hydrogen, it unites with the hydrogen of the water, setting free nascent oxygen, which is a powerful oxidizer and destroyer of organic matter. The objections to chlorine are the difficulty of production and its destructive properties.

Practically, its use is limited to the amount of chlorine which is set free from chlorinated lime. Commercial chlorinated lime contains from 20% to 40% of free chlorine, when kept in an air-tight receptacle. It loses chlorine rapidly when exposed to air.

Experiments have shown chlorine gas in the proportion of 1 in 100 is an efficient germicide, being destructive to the life of spores. Even 1 in 400 is effectual against spores, but requires longer time.

Chlorinated lime is the best substance to use in disinfecting excreta, the most practical application being in typhoid. Four ounces of the best chlorinated lime is dissolved in a gallon of water, and one pint of this solution must be used to disinfect each passage. It should be mixed well, allowed to remain in the vessel at least ten minutes before emptying into the closet.

Corrosive sublimate in various strengths has always been considered one of our most reliable disinfectants. Many think that this salt is overrated, but that it is an effective agent is shown by its results in surgery. The objections to it are, 1st, that it is irritating; and 2nd, that it enters into chemical combination with the albumen of the tissues and of bacteria, an albuminate of mercury being formed, and thus its germicidal qualities are destroyed. The answer to these objections is that chloride of mercury is not irri-

tating in weak solutions, and that any disinfectant is irritating in strong solutions.

And, again, that because albuminate of mercury is formed, the germicidal qualities of the salt are not destroyed thereby. To quote from the address of Dr. White, of Philadelphia, given in Toronto two years ago, "This precipitate (the albuminate of mercury), it was discovered by Sir Joseph Lister, possessed powerful antiseptic properties, with much less power of producing irritation; he, therefore, devised a form of antiseptic dressing called 'the sero-sublimate gauze,' which consisted of gauze charged with a solution of corrosive sublimate in the serum of the blood. This, however, was difficult to manufacture, and produced a harsh and non-absorbent dressing, which was mechanically irritating. It was succeeded by the salalembroth." These facts show us, on the authority of Sir Joseph Lister himself, that the precipitation of mercury by the albumin of the tissues does not destroy its germicidal qualities.

The Committee on Disinfectants of the American Public Health Association, after their investigations, concluded that for ordinary bacterial life 1 in 10,000 is sufficient, but that 1 in 1,000 is needed when spores are present.

It is generally accepted that bi-chloride acts as a disinfectant by entering into chemical combination with albumin. The proofs of this are, 1st, that heat is produced by the chemical action; 2nd, that the mercury can be precipitated from this combination by a solution of sulphide of ammonium. Geffert has demonstrated this re-action. If, then, this be true, why should a stronger solution be required to kill spores than to kill ordinary bacterial life? Why should the mercury in a 1 in 10,000 solution not enter into chemical combination with the albumin of a bacterial spore as well as with the albumin of bacteria? There appears to be an inconsistency here, of which I have seen no explanation.

Again, we must remember in the use of sublimate that its action is not selective. It will combine, not only with bacteria, but with any protoplasmic material which may be present. Therefore, it is scarcely a suitable disinfectant for some purposes. For instance, if used in typhoid stools or tubercular sputa, large quantities or strong solutions must be used, as chemical combination will take place with all the albuminous