THE PROPER AND EFFICIENT DISINFECTION OF A HOUSE

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THE word "proper" is defined as "being particularly suited to, appropriate to, correct, that which is set apart to special or individual use." The word "efficient" as "producing outward effects of a nature to produce a result, active, causative, able to act with due effect, adequate in performance, capable, competent."

The proper and efficient disinfection of a house must, therefore, be both corrective and active. It must be capable of accomplishing something. And, whatever it does, it must do that which it does so as to be capable of proof of its doing, or it fails in meeting an answerable definition of the proposition laid down in the title of this paper, as it was imposed upon me.

Now, disinfection to be proper and efficient, must be so in point of time as well as in activity. For, what may once have been proper and efficient, when in the state of our knowledge there appeared to be a capable performance, may now no longer be of a nature to produce the desired effect, because the increasing number of our observations may have taught us that our former facts led to erroneous conclusions. And, there-

fore, what may have been proper and efficient in the past is not so in the present.

Thus, if we are to do the proper and efficient disinfection of a house, we are to disinfect properly and efficiently, and not improperly and inefficiently. Returning again to definition as a proof of knowledge—not the writer's knowledge, because the writer disclaims any and all knowledge how properly and efficiently to disinfect a house—he begs leave to attempt to show both by definition and present-day practice, that there can be no such thing as "the proper and efficient disinfection of a house" by any so-called practicable means, and that the disinfection of a house is improper and inefficient, a fraud, sham, delusion, snare; that it is a useless, stale, flat and unprofitable procedure, devoid of sense, without justification, reason or excuse, both impracticable and impossible.

Now to return for a moment to the dictionary and definition: A disinfectant is defined as an agent used for destroying the germs of infectious disease. As the preliminary report of the Committee on Disinfectants of the A. P. H. A., of which Surgeon-General George N. Sternberg was chairman, says: "There can be no partial disinfection of such material (*i. e.*, infected material); either infecting material is destroyed or it is not. In the latter case there is a failure to disinfect. Nor can there be any disinfection in the absence of infectious material." Written thirty years ago, these facts are as true today as when they were committed to paper.

It appears to the writer that there are two practical questions before us relating to disinfection; why did we attempt to disinfect, and why do we still attempt to disinfect. Let us, if we

can, try to find a reason for these practices from the meager material that has come down to us from the historian. In doing so, and in endeavoring to interpret the curious practices of making smokes and smells to drive away disease, let us try to get the mental attitude of the ancients who believed to some extent in the curious practices of fumigation. They lived in an age of superstition—a period when magic, alchemy and astrology, the mysterious conjugation of planets and various electrical phenomena were believed to combine in the formation of some hidden and noxious vapors to cause disease, for the prevention of which, so-called disinfection and fumigation was designed.

Chiefly among the Jews was the value of cleanliness in the prevention of disease clearly recognized. In Leviticus there is only one mention of disinfection, but there are many references to bathing and washing the clothes of the infected. "He shall wash his clothes and be clean." "His clothes shall be rent and he shall dwell alone." "He is unclean. He that is to be cleaned shall wash his clothes and shave off all his hair and wash himself in water that he may be clean." In the case of infected persons, that is, those infected with leprosy,—and the word leprosy was used as a generic term for several forms of infection—it is related in the book of Leviticus, that "the plaster and other material be removed from the house and deposited in an unclean place without the camp."

In the Odyssey of Homer, after the slaughter of the suitors, and probably recognizing the need of a general cleansing, Ulysses calls, "Quickly, oh nurse, bring fire that I may burn sulphur, the cure of ills." This practice was, of course, an

example of ceremonial fumigation or disinfection, like references which are to be found in Pliny, Ovid and some of the other early classical writers. Similar references are found to early attempts at ceremonial disinfection by the burning of sweet-odored woods, spices and gums, and these ceremonies were practiced for the purpose of covering up the bad smells that were nearly always associated with disease in the olden time.

In the fourteenth century after plague had visited Italy for the sixteenth recorded time, it was ordered in Milan and other cities, that infected houses be ventilated for at least eight or ten days and purified by fire and fumigations of aromatic substances. Bedsteads were to be aired for at least four days, so that the noxious vapors, which were presumed to cause the plague, might be destroyed. In the sixteenth century plague was considered contagious and Haas says, "Isolation and disinfection came into use without any measurable effect against the plague. Horn, gun powder, sulphur, straw were burned in the streets, so that the statement, 'they are burning horn' signifies the plague is there and we can do nothing against it: a condition which we now express euphemistically by the odor of carbolic acid." Orders very similar to these were published by the Lord Mayor and Council in the London plague of 1665. We may even come down to the English cholera epidemic of 1832, when the mud in the gutters of the streets of London were a mixture of filth, refuse and chloride of lime.

From what has been said it appears evident that gaseous or aerial disinfection was, up to recent times, at least, a kind of ceremonial insti-

tution or superstitious practice designed either to placate or exorcise the demons of disease. Facts failing, we are, therefore, left to the delightful alternative of speculation, an act not entirely unknown to the practice of medicine of the present day. It is more probable that the early attempts at house disinfecting were due to practices which arose after the cave man or his later descendants saw the effect of sulphur fumes issuing from the rocks upon the insects, beasts, even man himself, when they came in close contact with these things. To the cave man accident or disease was the work of demons and the demons came out of the air. What could be plainer. The cave man was burned by the sun, wet by the rain, and the snow and the hail made him cold. Night and its shadows frightened him. The wind and its noises among the trees and hills made strange sounds, and under the canopy of the stars or in the black of night strange noises and shapes appeared to attack him. Everything that harmed him, even the missiles of his enemies, came out of the air, and what more reasonable than that the demons of disease came out of the air.

As man grew more civilized this conception of the relation of disease to the air seems to have had a kind of origin among all the peoples, especially those about marsh land or along rivers or about the coasts. Did they not know that it was the night air that brought disease to them? What could be plainer than this? If man shut himself up he sometimes escaped disease or he escaped often enough to make that escape a basis for an argument in favor of the danger of night air. At any rate, there was a mysterious something that appeared to man to come out of the air and attack him, and if it didn't come out

of the air it was, as he was able later to prove to his own satisfaction, due to miasma that came reeking out of the ground and worked him ill. So the will-o'-the-wisps of the early air-born conception of disease continued from that time of our primitive ancestors, and to some extent still possesses the minds of many of the people and their medical advisers.

But man has usually been a being willing to compromise. In his primitive as well as in his more or less civilized state he has been willing to propitiate gods or demons when he could not exorcise them. What could have been more human than that he should strive to placate the demons of disease by offering to them incense that would please them. Disease came from demons; demons were associated with the devil; the devil was associated with sulphur; sulphur ought to be agreeable or disagreeable to the demons; therefore, they might appease the demons of disease by burning sulphur in their honor. Later, when the germ theory of disease became known, sulphur and like substances were used, not to propitiate but to exorcise the demons of disease. Doubtless the use of sulphur as a disinfectant arose in some such way as this, and when later sulphur was shown to be more or less useless as a disinfectant, other aromatic substances came into use, because more money could be got for them and they were lauded by the makers as useful in preventing the dissemination of disease.

At the present time disinfection and disinfectants would die were they not promoted by manufacturers and advertisers. Is there any other reason why a health officer uses a gaseous disinfectant, than because some manufacturer

writes into his advertisement that disinfecting is a desirable thing to do? Certainly there is no evidence on good bacteriological ground that room disinfection ever accomplished anything. Well-known experiments undertaken in rooms occupied by patients with diphtheria where the observers examined swabs from various articles of furniture in the room, including bedding, only revealed diphtheria bacilli present in 3 or 4 per cent of several hundred observations. It is, therefore, the manufacturer of proprietary disinfectants who, for the purposes of selling his disinfectant, strives to tell the physician what to do with the particular disinfectant that he manufactures. And the manufacturer of proprietaries does the same thing with phylacogens, somnos and other like material from the ragbag of quackery. If a man uses a disinfectant, ought he not also to get his hair singed, wear an iron ring for rheumatism and a health belt; suspend a bag of camphor about his neck and revert to the customs of the sixteenth century doctors, by carrying a Pomander box or gold-headed cane with perfume or disinfectant in the hollow head of the cane? He doubtless feels in the same position as the old doctor desired the woman might feel who threw away his medicine. Between the doctor and patient the following dialogue took place:

Doctor—"So you never took my medicine, Mrs. Jones. 'No.' You made a mistake, Mrs. Jones, a very grave mistake; because now you are well, Mrs. Jones, and you will never know what cured you."

To show what has happened in recent years, let me speak of the changes in practice in my home city. Twenty-five years ago it was the

custom to disinfect vaults. Now we abolish vaults and screen them. Twenty-five years ago we disinfected school buildings. Not for twenty-five years have we disinfected a school building, but we now pay more attention to the cleanliness of our school buildings.

Five years ago we stopped all routine disinfection, although we occasionally disinfected. Now, for three years we have not disinfected any of the premises in the city after infectious disease and scarlet fever and diphtheria have in the past two years fallen off 30 to 40 per cent. In the Municipal Hospital during the past five years we have had more than 1,600 cases of infectious diseases. Frequently we have had scarlet fever, whooping cough or measles and diphtheria in the same wards, cared for by the same nurses. No disinfectant of any kind has been used in the hospital, not even on the hands of nurses or physicians. We keep the hospital and its belongings clean; the nurses have learned simply to wash their hands in soap and water and wipe them on paper towels. In these five years to there has been less than 2 per cent of cross infection.

From these facts and these results, we know that disinfection is useless and expensive. We have learned much of the uselessness of disinfection from one of the foremost sanitarians in this country, Chapin of Providence. Through his teaching and the teaching of others, we have learned not to waste our money in buying useless disinfectants and our effort in applying them. We have learned, too, that there is no such thing as the "proper and efficient disinfection of a house."

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