

"That's a true bill, sir," said the superintendent assentingly, "The chap has been in the thick of more rows at fair and market than any bad character of these parts. It's as likely as not that he has been in liquor, and fighting or doing damage to property, and so got himself locked up for disorderly conduct. I'll inquire about him at the borough police-station before I go up the hill-side."

Having said this, Superintendent Whistler saluted and withdrew. Dr. Leader remained behind, musing over the strange revelation which Crouch had made, and on its probable results.

An English magistrate differs very much from a French one, in that his duties are strictly, for the most part, judicial. He sits to try cases, but he seldom occupies himself in hunting up cases for trial. All that restless activity which French procureurs and substitutes and judges of instruction display in ferreting out hidden crime, is left in England to the police, and that novel institution, the Public Prosecutor. But none the less did the medical magistrate feel that it was incumbent on him to do his duty in this matter, even although it might be uncongenial to his nature and his habits.

The August day burned itself out at last with a red sunset, like the embers of a dying fire; and Dr. Leader, who was a bachelor and dined late, had finished his solitary meal, and was sitting alone and thoughtfully sipping his claret, when the police-officer returned.

"I'm afraid, sir, I've not much that is satisfactory to report," said Superintendent Whistler, with rather a crestfallen air, "since I have not succeeded in getting speech of the party. A long walk it is, and a wildish one, to the chap's lonely little place among the high moors, where, if a fog came on, there is always a chance of floundering into some bog that it's not so easy to get out of again. And the house, or hut—for it's a shame to call the tumble-down shanty a regular house—is hard to find. Most of Crouch's neighbours seem to be mortally afraid of 'old Robinson Crusoe,' as they call him behind his back, with his savage temper, and his dogs, and his gun; and when I got a boy to guide me, he wouldn't come a step further once we sighted the

roof, for fear, as he said, 'old Crusoe' should rattle his bones for bringing the bobbies upon him. A nice name he's got in the country, that Crouch."

"I gather, from what you tell me, superintendent," said the doctor, "that you were refused admittance, or that you found the bird had flown."

"I found the hut, sir," answered the superintendent, "fastened up more strongly than you'd believe likely in such a miserable place, for I pushed the door hard, besides knocking and calling loud enough to wake the dead. But I got no sort of answer, nothing but the barking and howling of the dogs—the fellow keeps a lot of 'em, chained up outside—and they, I reckon, poor brutes, were more hungry than fierce, for they were as gaunt as greyhounds, and whined when I went away, as if they had hoped I'd brought them food, and were nigh clemmed" (*starved*) "for the want of victuals. I dropped in, on my way back, for a second time at the borough police-station, sir, in Daneborough here; but my brother-officer, Superintendent Swann, could only tell me that Crouch had not been run in for any offence, and that no constable had set eyes on him lately."

"You have had a long walk, and a fruitless one, Mr. Whistler," said the doctor, considerably filling a large glass, which the chief officer of county constabulary emptied with much satisfaction; "and I need not to-night trouble you any further on this subject. The man's absence may, after all, have been caused by some unexpected circumstance, and he may have honestly meant to keep tryst, and have been prevented from doing so. I shall see Mr. Sturt again about this matter, and will send word round to the station when I require the assistance of the police."

"Good night, then, sir; yours to command," said the superintendent, as he stiffly made his martial salute, and retired.

Dr. Leader sat for some time in deep thought. "The man meant to come," he said to himself. "Something must have caused him to change his purpose. I wonder if his captain, that old Obadiah Jedson, the jet-hunter, knows what it is. If Crouch delays much longer, I must try to find him through that channel."

END OF CHAPTER THE FORTIETH.

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## A WORD ABOUT DISINFECTANTS.

BY AN ANALYTICAL CHEMIST.



WHEN epidemics threaten our islands, and may at any time break out among us, every reasonable precaution should be undertaken for the purpose of "setting one's house in order." More especially in the case of cholera does the important task of preventing the spread of the disease depend upon individual exertion; for quarantines have by experience been proved unequal to the end for which they were instituted, and

at such times the medical faculty wisely trust less to their ordinary restorative weapons than to the more powerful preventive ones which sanitary science has taught us, and with which they bravely fight the enemy face to face, nip the disease in the bud, cut the ground from beneath its feet, and ultimately destroy and exterminate the hydra-headed monster.

Our maritime situation and extensive commercial relations expose us more openly than perhaps any other nation to attacks of infectious diseases, which



originate or are prevalent in countries with which we are commercially connected. At present we are not protected by any system of quarantine, which, besides being ineffectual, is injurious to trade, and on that account it is the more necessary that every one should be acquainted with the best means by which the spread of the disease can be prevented, and so be ready when the time comes to strike an effectual blow. It has been proved by experience that the best means of checking the progress of cholera and other such diseases is by the proper use of disinfectants, and on that account a few words about them will not be inopportune.

The use of disinfectants has of late years greatly extended; few private houses are without them: in fact, none should be. Their value as a means of preventing the extension of infectious diseases is attested by the fact that the municipal authorities of many large towns made arrangements, when cholera was last threatening us, for distributing to every householder in the district a free supply of disinfectants if the disease should appear therein.

This plan was adopted in Bristol during the last outbreak of cholera, and was attended with most satisfactory results—results which were certainly no less due to the energy and promptitude of those whose duty it was to prevent the disease spreading than to the efficacy of the disinfectants. Indeed, by the free and proper use of disinfectants cholera has been reduced from the very terrible position it had attained in the eyes of our forefathers, to a much lower—to a reachable—level.

There are many kinds of disinfectants known, and sold to the public at varying prices, some valuable, others entirely worthless, as disinfectants. Every one is familiar with bleaching-powder, which was formerly (and is still to a considerable extent) so much used. It is very effectual, owing to the chlorine gas which it freely gives off when exposed to the atmosphere, or moistened with dilute acids, such as vinegar. Charcoal, too, is well known as a disinfectant, and as a powerful deodorant. We may here remark that a deodorant simply disguises the bad smell without destroying the poison which it may contain, and in this respect differs from a true disinfectant. Of all known disinfectants, carbolic acid is now generally admitted to be the most efficacious, and it is the basis of most of the disinfecting agents now sold. The acid is too powerful to be used alone, and is therefore generally mixed with eighty or ninety per cent. of some other substance not possessed of disinfecting properties. Sometimes the bisulphites of lime and magnesia are added, and these substances are themselves possessed of disinfecting properties; but more generally chalk or sand is used; or the acid is simply diluted with water. A small portion of the mixture sprinkled in water-closets and other places where decomposing matter is allowed to remain will diminish, if not entirely remove, the chances of contagion, and sweeten and purify the atmosphere.

Although carbolic acid is so efficacious, there are some who object to its use. It smells rather strongly, and many persons are thereby prevented from using it.

It is a pity on this account to be robbed of its advantages; and such persons would do well to try and educate themselves to the smell. Moreover, it is better to breathe an unpleasant and pure atmosphere than a pleasant but unhealthy and dangerous one. The smell of pure carbolic is much more easily borne than that of crude carbolic; and we would recommend the use of the purest carbolic procurable, diluted with eighty or ninety per cent. of water, or mixed with the same percentage of precipitated chalk. It is difficult for the chemist, trained and accustomed to the offensive and unwholesome smells in the laboratory, to understand how any person can retain a strong dislike to the comparatively sweet smell of carbolic acid.

There are some reasonable objections to the use of carbolic acid as a disinfectant in a concentrated form. In the first place, it is a powerful poison, and if taken internally, is almost certainly fatal. The liquid carbolic acid varies in colour, as the crudeness of the product increases, from pale straw to dark brown, approaching almost to black in the very impure kinds. This darkening is due to the presence of tarry substances, which add considerably to the offensiveness of the smell. This changing colour renders it liable to be mistaken for other liquids. On more than one occasion it has been mistaken for the black draught usually sold by chemists as a common purgative. A very melancholy case occurred in Ireland a few years ago. A young gentleman had gone from Dublin to Limerick to take part in a cricket match. Not feeling well on his arrival at the latter place the night previous to the match, he crossed from the hotel at which he lodged to a chemist's shop opposite, and asked for a dose of black draught, which was supplied him from the bottle usually containing this preparation. Unfortunately, the porter had been allowed to re-fill this bottle the same morning, and in ignorance drew the supply from the stock of carbolic acid. The cricketer, to avoid as much as possible the nauseous taste of the draught, hurriedly swallowed it; but had scarcely reached his hotel, when a violent burning sensation within him convinced him of some error, and although medical aid was immediately obtained, he died the same night in the most terrible agony. A similar case occurred in the Midland counties of England a few months ago.

Notwithstanding its general use, these are the only fatal cases reported, and it has been stated that no instance is known where carbolic acid kept solely for disinfecting purposes has caused the death of any human being. In the form of powders, the chances of such mistakes occurring are few, if any; and if kept in the diluted form the danger is very greatly diminished.

The smell of carbolic acid is very characteristic, and can readily be distinguished.

When it has been accidentally taken internally, castor-oil and sweet-oil should be freely administered, and a doctor obtained without delay.

It is very painful when externally applied, as it rapidly cauterises the fleshy tissues. In the concentrated form it should be very cautiously handled. Oil or carbonate of soda rubbed on the parts are the best



remedies for external injury and pain. Water may be applied externally, but should not be taken internally.

Another objection to the use of carbolic acid in the concentrated form is that it is apt to be wasted, for many persons are ignorant of or incredulous as to its powerfully destructive effects on animal life, and are sometimes so forgetful of principles of economy in this matter as to use carbolic acid in an undiluted form, and in quantities far in excess of what is required.

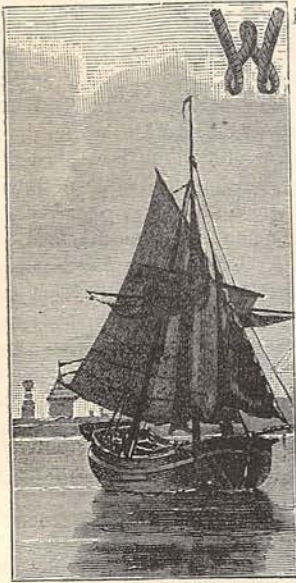
To prevent waste, the acid is used to form the basis of what are known as "carbolic disinfecting powders," which consist simply of chalk, or some other cheap substance, in a finely divided state, to which from ten to twenty per cent. of carbolic acid has been added, and sometimes from five to twenty per cent. of the bisulphites of lime and magnesia, together with some colouring matter, to give a pleasing effect to the eye.

Powders are an expensive form of disinfecting by carbolic acid; and a considerable saving might be effected by persons who use it largely if the mixing were done by themselves instead of by the manufacturers, and the same tins used over again, while the article so made would have many advantages. It could, in the first place, be made as strong as the necessities of any particular occasion might require, and in the next place, the pure acid may be used for house disinfection, and so lessen the disagreeableness of the smell, while the commoner kinds may be em-

ployed for yards, stables, fowl-houses, &c. The method of making powders is very simple. About four ounces of the acid, by weight or measure, should be added to one pound of precipitated chalk, or fine sand, or mould, or any other harmless substance in a finely subdivided state, and thoroughly mixed in a large bowl. This powder will be suitable for all ordinary purposes, and will be far superior to many of the disinfecting powders sold at twice the cost.

Why, it may be asked, cannot our chemists discover some pleasant and non-poisonous disinfectant? Why are we under the necessity of substituting an intolerable smell for a bad one? The answer is that nothing but poisonous substances can be good general disinfectants, as the dangerous matter which it is the aim of disinfectants to destroy is chiefly organic, of which too, though of course in a far higher degree, the vital parts of the human being consist. Of disinfectants, charcoal is perhaps the least objectionable; it is neither dangerous nor mal-odorous; but though extremely valuable as a deodorant, its usefulness as a disinfectant is very limited. A disinfectant must be capable of destroying the lower forms of organic life, some of which constitute disease; and the province of the chemist is to find out that substance which is most destructive to these lower organisms, and least dangerous and objectionable to man. Carbolic acid best answers these requirements, and on this account has recently come into extensive use.

## OUR SAILORS AND SHIPS.



lars of the numbers of ships and sailors. Recently some of these particulars have been presented to Parliament in very elaborate tables, and some of the

WITHOUT venturing to decide where doctors disagree, let us look if possible to some of the indications of changes that have of late taken place in our ships and our sailors. It may be premised that during the past few years Government has supervised sailors as it has no other class, defining where they shall be engaged, the space they shall have to live and sleep in, the food they shall eat, how and when they shall be paid, and other particulars; and from the knowledge thus obtained, we gather authentic particu-

figures may be given. The merchant navy of the United Kingdom was in the year 1850 composed of vessels the tonnage of which was 3,504,944, and only 167,000 tons of that was "steam tonnage." Since that time the proportionate number of sailing vessels has been dying off, and the steam tonnage has been growing, and last year we had a merchant navy including 7,196,401 tons, of which more than half—or 3,725,229 tons—was that of steamships. For years we have been building from 200,000 tons of vessels up to 900,000 tons annually, and increasingly these have been of iron, until wood as a material for vessels is almost extinct. But we have not added to the number of the sailors in the same ratio in the same time, for a reason that will be shortly stated. In all in 1851 there were 141,937 seamen employed (captains or masters being excluded), and out of that number only 5,793 were foreigners. In the last year, 1883, 200,727 seamen were serving, and the number of foreigners was 28,313—or, in other words, rather over *four* per cent. of the seamen employed were foreigners in 1851, and over *sixteen* per cent. were foreigners last year. The cause just referred to, as that which has prevented the number of seamen increasing concurrently with the increase of tonnage, is that thirty years ago the sailing vessels em-