returned aboard ship as early as possible. In the meantime the vessel has been treated by the disinfectant wetting in every part and every particle of the atmosphere heretofore contained in her has been displaced by the sulphurous acid gas.

Vessels, together with their cargoes, officers, passengers and crew, coming from ports infected with yellow fever, are compelled to remain in quarantine a period of five days from moment of arrival, for observation, in order to give a reasonable assurance against the presence of the disease in its incubatory stages.

"The entire treatment of a vessel to prevent the introduction of cholera, yellow fever or small-pox is so exacting and so rigorous as to occasion no little grumbling on the part of those who must undergo it. This is particularly the case with officers and others aboard Mexican, Spanish and Italian vessels. These persons resent any effort at sanitary treatment as a personal affront while, in fact, they most require it. They are utterly without feeling and indifferent as to whether they convey to our port cholera, yellow fever or the plague. The Americans, English, French and Germans are reasonable in this matter. I mention this as a simple matter of experience in regard to nationalities, as we have to deal with them in quarantine.

"Our quarantine methods represent the introduction of a system of maritime sanitation which has already suggested many particulars of improvement and has opened to our view a broad field of sanitary enterprise far wider in its possibilities of good—first in giving the highest attainable quarantine against the introduction of pestilential diseases, and, secondly, in removing foolish and untrustworthy restriction, destructive of international commerce and travel. We have demonstrated by practical experience that the entire plan of treating ships in quarantine, or maritime sanitation, can be operated at a very moderate cost in ports doing a small business in shipping."

The following passages from the letter referred to are of special interest:

In using the bi-chloride of mercury, we know that we have one of the most powerful of all the germicidal agents. Practical test in municipal disinfection and in quarantine has demonstrated its absolute freedom from injury to those having to do with it. In the operation of maritime sanitation, our employés have been wet with the solution from head to heels and for hours at a time, without having as yet shown the slightest evidence of mercurialization. The clothing and other baggage of passengers and crew have been soaked in it without the slightest injury to persons or fabrics. Injury to the latter has always been due to the water and not to the chemical. The decks, cabins, bunks and every available part of the vessels have been freely drenched with the solution without injury.

The sulphurous-acid gas, used as the displacing agent of the atmosphere below deck, has long since proved itself the most reliable gaseous disinfectant and the least injurious to cargo of any yet tried. As applied in our quarantine, it is like turning loose a volcano into the hold of a ship. The amount of sulphur used on any one vessel varies from one hundred and fifty to nearly three hundred pounds, so applied as to displace with immense force every particle of air contained in the bilge, between the planking, or skin, and ceiling, in all parts of the cargo and dunnage. So searching are these fumes under the operation of the law of the diffusion of gases, favored by high pressure and rapid motion of currents, that a bowl of rain water, buried in the heart of a cargo of coffee, seventy-five feet distant from the conveying hose, was found distinctly impregnated with sulphurous acid. The effect upon the coffee itself, when dry and in good condition, was not observable. By getting the hose well into the dunnage, we can now treat a cargo of coffee with a thoroughness never before contemplated, and without the extra expense to shippers or consignees of a dollar, as against from five hundred to eighteen hundred dollars in times past, when quarantine treatment involved discharging and reloading cargo, and the employment of a great gang of stevedores, barges, tugs, etc., and even then the disinfection was utterly worthless, as proven by the subsequent appearance of yellow fever on the ship in port. If recent observations on the destructive influence of mineral acids, even greatly diluted, on the cholera virus are true, then we have in this agent the most efficient adjunct to the mercuric solution.

As an instance of unexpected difficulties met with in practice, the amalgamating powers of the mercury salt on pumps, fittings of hose, nozzles, spray roses, etc., presented