

Smith (W^m M.)

STATE BOARD OF HEALTH OF NEW YORK.

MARITIME SANITATION

AT THE

POR^T OF NEW YORK.

BY

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With Compliments of the Author



MARITIME SANITATION AT THE PORT OF NEW YORK

Maritime sanitary regulations at the port of New York have necessarily two important subjects for consideration.

First, the protection of the public health ; second, the preservation of its financial interests by the least possible embarrassment of its commercial enterprises.

A superficial view of the measures for the security of the one, and the conditions which appear to be desirable for the prosperity of the other, discovers an apparent antagonism between them. But sanitary regulations wisely enacted, and judiciously executed by the health authorities that guard the approaches of disease from the sea, or those who seek to restrain its development among the crowded populations of seaboard or interior communities, tend to promote the highest prosperity of every enterprise and industry.

That system of maritime sanitary regulations is most perfect that protects the public health with the least injury to vested interests and commercial enterprises. Sanitary laws, enacted by the State or general government, or ordinances and regulations established through powers delegated to municipal organizations which impose such restrictions on the commerce of a port as to practically prohibit intercourse with infected ports, can scarcely be considered as among the triumphs of modern sanitary science.

A knowledge of the laws which govern the development and progress of infectious and contagious diseases, and of the measures which observation and experience have shown to be necessary to insure the safety of the public health in the past, it is believed can be so systematized and administered that disease will be excluded without serious embarrassment to commercial interests.

The port of New York and its contiguous cities have a commerce that extends to all the ports of the world, and by interior lines of communication is connected with millions of people scattered over a vast territorial area. It has a population that exceeds any other

on the western continent, and a geographical position that renders it liable to the introduction of various forms of contagions in their latent condition. These combine to make the port of New York the most exposed to, and for the same reasons the most important to protect from, the diseases that approach by the sea.

Early in the history of the State, these facts did not escape the observation of those whose duty it was to make provision for the protection of the public health. Liberal appropriations have been made by the State Legislature from time to time to secure advantages for a successful administration of quarantine at this port, until they exceed in completeness any others in the world. The authorities upon whom such provision depended rightly judged that the preservation of the public health was secondary to no other consideration, and that, independently of the sacrifice of the human life and the suffering of the sick, the financial loss which would result to the commercial communities at the port of New York by the admission of a contagious or infectious disease which should become epidemic, would exceed the total cost and maintenance of the New York quarantine from the beginning.

The opportunity for experience and observation afforded by the conditions referred to, furnishes evidence of the efficiency or imperfection of whatever measures have been adopted for the protection of the public from such disease.

The defects which exist in the laws which govern the quarantine in this State, and consequently in its measures, are such as to render it impossible for the health officer to prevent certain forms of contagious disease from entering the port.

The axiom in physics that the strength of a chain is equal only to that of its weakest link, is equally true of maritime sanitation, more familiarly known as "quarantine."

A system of "maritime sanitation" which admits of the introduction of the infectious or contagious diseases it is designed to protect the public from, is imperfect, and should be considered with reference to its improvement. The assumption that a system is complete affords a considerable degree of certainty that its deficiencies, if they exist, will not receive the consideration necessary for its improvement.

Therefore, a frank statement and full exposure of difficulties and obstacles which prevent a desirably successful administration of quarantine, it is believed, are best calculated to secure such changes as will contribute to render it most efficient.

IMMIGRATION.

The surplus populations of Europe annually invade our country to an extent hitherto unknown in the history of the world. Within a few weeks after immigrants land on our shores, they are scattered from the Atlantic to the Pacific oceans. They come in great degree from those classes and conditions in the old world most liable to diseases of a contagious character, and they too often come subjected to such conditions in the steerage of steamers as tend to develop the worst type of the disease to which they have been exposed.

From April 1, 1880, to January 1, 1885, nearly two millions of emigrants have passed into this country through the port of New York:

1880.....	327,371
1881.....	455,681
1882.....	476,086
1883.....	405,909
1884.....	321,231
Total.....	1,986,278



The crowded condition of the old world populations, and their political and economic status, is not likely to change materially in the near future; while the inducements for them to seek homes in this country is likely to be as numerous and strong for many years to come as they have been in time past. Sanitary reforms influence tardily that portion of the European population from which great numbers of the immigration is drawn. To a great extent they are the same people in manners, customs and habits who landed on our shores half a century ago. The same diseases are found hand in hand with them on their arrival at our ports as when the tide of immigration first began to reach the western hemisphere, modified, however, by the rapid transit and the improved hygiene of transatlantic passenger steamers.

Immigrants once safely disembarked at our ports, are merged in the population of the great cities or scattered through every State and Territory of the Union.

QUARANTINABLE, INFECTIOUS AND CONTAGIOUS DISEASES.

The infectious and contagious diseases which are latent among immigrants when they pass our quarantines develop along the great

highways of travel in the cities or villages where they seek a temporary refuge, or perhaps in remote hamlets in the west or northwest. In this way the forces of these insidious enemies of human life are recruited from their most prolific source—the overcrowded populations of European communities.

Of that class of diseases known as contagious or infectious, smallpox, cholera, typhus and yellow fever are alone designated as quarantinable by the laws of the State of New York. The Health Officer has no power under the law to remove other forms of disease from vessels entering the port.

Scarlatina, Diphtheria and Measles

pass on to Castle Garden with the crowd of immigrants. The seriously sick are there sent to the Immigrants' Hospital at Ward's Island, and those suffering from the milder forms of the diseases are often allowed to proceed to their destination. It will be evident that the hospitals, or quarters occupied by the sick, cannot be disinfected without removal of the sick from the vessel.

The fact that such diseases are not considered of sufficient importance to be placed within the jurisdiction of the Health Officer tends to encourage neglect in the isolation of the sick and indifference to the exposure of the well on the part of the medical officers of steamships.

The Sanitary Code of the city of New York declares "that no person shall * * * without a permit from the health department, carry or remove from one building to any other, or from any vessel to the shore, any person sick of *any contagious disease*. Nor shall any person by any exposure of any individual sick of any contagious disease, or of the body of such person, or by any negligent act connected therewith, or in respect of the care or custody thereof, contribute, or by needless exposure of himself cause or contribute to or promote the spread of disease from any such person or from any dead body thereof."

Stimulated by the advice of the State Board of Health the greater number of the local health authorities in the State have adopted measures to secure the immediate and complete isolation of the sick of diphtheria and scarlatina by their removal to contagious hospitals, or absolute quarantine within their own domicile, and the prohibition of public funerals, or exposure of the bodies of those who die of these diseases. But with singular inconsistency the laws of the State of New York, which are the sole authority of the Health

Officer at its great commercial *entrepot*, give him no authority to remove these diseases from vessels entering the port.

Sanitary authorities are not ignorant of the fact that these diseases cause a greater mortality in the United States every year than all other forms of contagious diseases.

In 1881 there were 3,410 deaths from diphtheria alone in the cities of New York and Brooklyn. It has been estimated that six per cent of the mortality from all causes arise from these diseases, and in many localities where hygienic and sanitary conditions are much better than in the cities mentioned, the fatality has been greatly in excess of this proportion.

The following table gives the number of cases of and deaths from diphtheria and scarlatina in the city of New York during the years 1883 and 1884:

	SCARLATINA.		DIPHTHERIA.	
	1883.	1884.	1883.	1884.
Cases.....	3,825	3,262	2,906	2,221
Deaths.....	744	608	1,009	1,117
Total.....	4,569	3,870	3,915	3,338

The prevalence of these diseases throughout the country, and the great mortality which attends them, call for the most energetic measures to prevent their development by excluding all known sources of contagion. That they are frequently imported with the immigrant, and scattered as far and wide as his journey extends, there is no reason to doubt.

During the past year 154 cases of contagious disease, not subject to quarantine, passed through the New York quarantine.

Authority should be given by law to arrest cases of this character at quarantine, and to disinfect not only the vessel, but all baggage liable to have been infected.

Vaccination of Immigrants.

The incubative period of contagious diseases, and the comparatively short time occupied in the passage from European ports to New York by many of the steamers that now cross the ocean will compel the sanitary authorities to police the halting places on the immigrant's

highway of travel, and lodging-houses at ports of embarkation, if complete immunity is to be realized from the contagions which they now bring to our people.

Since sanitary laws enacted by the State or National Government in respect to vessels and passengers from foreign ports are not operative until the vessel enters within the jurisdiction of the State or General Government, the punishment for neglect to obey these laws, whether it be for not properly ventilating, cleansing and disinfecting passenger vessels, for failure to provide sufficient and suitable food and water for passengers, or the still more culpable neglect to provide necessary accommodations for the sick, and protection of the well from contagion, can be inflicted only at our ports, and for violations which exist or are apparent only on arrival.

It became evident to the present Health Officer at the port of New York, early in his administration, that if our maritime quarantines would effectually prevent the importation of the contagion of that most disgusting, if not most fatal, of the quarantinable diseases, small-pox, the soil wherein it germinates, and from which it propagates, must be sterilized by *vaccinia*.

A brief history of the effort to secure that result was given in the "Report of the Standing Committee on Quarantine," in the third annual report of the New York State Board of Health.

The language of that report is so pertinent to this subject, that the repetition of a portion of it will not be improper. "It has become evident that the remedy must go beyond the quarantine of arrival and reach the immigrant at the port of departure. No law can be made by the authorities of this country which will be recognized there. It is only by imposing restrictions and penalties at quarantines in the United States, in case of the omission to take such measures for the protection of immigrants at the port of embarkation or during the voyage, as will protect the well from disease, that a remedy can be secured." The effort to protect the immigrant as well as the people of our own country by the vaccination by ship's surgeons of immigrants insufficiently protected from small-pox, has been pursued with as much energy and success as could be expected, considering the difficulties attending it.

The co-operation of the transatlantic steamship lines in securing the vaccination of immigrants at the port of departure, or soon after embarking, with the expectation of preventing the development of the contagion among those recently infected, as many are at the crowded resorts or lodging-houses at such ports, has been cheerful

and productive of good results, but not to the extent that could be desired.

As will be seen by the statistics of small-pox on vessels entering the port during 1883 and 1884, on a subsequent page, the disease has been very infrequent in view of the number of immigrants and the extent of its prevalence at some of the ports of departure.

Under existing circumstances it is impossible for the Health Officer at the New York quarantine to protect the people adjacent to the port, or along the great interior lines of intercourse from the contagion which is latent on arrival at quarantine, to a greater extent than during the past three years.

There is no law or regulation either National, State or municipal, which prescribes the interval of time at which re-vaccination shall be made. The vaccination of all "insufficiently protected" is capable of an interpretation as various as the judgment or inclination of ships' surgeons. Some have conscientiously acted upon the presumption that re-vaccination was necessary after ten years; others, when vaccination had been effected in childhood, acted upon the presumption that it should be renewed at the adult period; others, and by far the greater number, choose to believe that "once vaccinated always protected." In consequence of this, immigrants in whom the conditions are favorable in a greater or less degree, to the reception of the contagion of small-pox, upon their arrival have that disease already developed in a modified form, or it being latent, they pass into the country and it develops where it endangers the lives and health of great numbers of persons.

The prejudice created by the anti-vaccinationists in some parts of Europe is so great that many immigrant passengers object and a few persistently refuse to be vaccinated by the ship's surgeon. At quarantine they are turned over to the Health Officer with the expectation that he will punish the refractory by detention or other means. There is no law or regulation since the expiration of the tenure of power of the National Board of Health, which will authorize that officer to support the ship's surgeon in this effort to discharge an important duty, *except* in those cases where there has been exposure to small-pox on board the vessel. The consequence, as might be expected, is to subvert the discipline and influence of the medical officer among the passengers and discourage him in the attempt to examine, much more to vaccinate, the insufficiently protected.

If this system of preventing the admission of small-pox through the port is to be continued with desirable efficiency, the authority

must be given to the maritime sanitary officer to decide, or the law should definitely determine what constitutes sufficient protection from the contagion of small-pox. And the power must be given to him to arrest and detain persons not sufficiently protected who refuse to be examined and protected, until the full incubative period of the disease has expired, from the time of the last possible exposure, with just and proper compensation for expenses incident to the detention.

The time has come when every legitimate effort and measure should be employed by sanitarians, whether it be through legislation, or the cultivation among the people of an intelligent appreciation of the measures necessary to prevent the importation and lodgment of contagions which recruit the forces of those diseases that annually decimate our population.

The observation and experience obtained at this quarantine during nearly five years past afford conclusive evidence that, if the contagious diseases which now accompany immigrants are effectually prevented from passing into the country, the supervision must begin a step nearer the source, while the inspection at the gateways of ocean commerce shall continue to be vigilant in its review of the measures taken at the port of departure, and the detection of developed cases of contagious diseases.

A law which should require all immigrant passengers to be vaccinated within a prescribed period not exceeding ten years previous to departure, and providing for an inspection of intending immigrants by a medical officer attached to the staff of the United States consul would do much to aid the health authorities at our maritime ports. The inspection by such medical officer would contribute to secure compliance with the regulations of our authorities, and the report of neglect to do so, accompanying the bill of health, would enable the Health Officer at quarantine to adopt such measures as the law would authorize or the protection of the public health require.

BILLS OF HEALTH

issued by the representatives of the United States at foreign ports are as necessary to the maritime sanitary authorities at our ports of entry, as "references" or "letters of credit" in business transactions. They are certificates of character in relation to the health of a port — good or bad, according to the extent which diseases subject to the supervision of the health authorities, prevail at the port of departure.

There are few matters subject to the jurisdiction of the Health Officer in charge of our maritime quarantines that afford him greater satisfaction, or that contribute more to the intelligent discharge of responsible duties, than the faithful report of our representatives, as to the condition of health or disease at foreign ports, particularly those subject to epidemics of contagious or infectious disease.

The commercial community, particularly that portion of it engaged in shipping, or the importation and exportation of merchandise, are greatly interested in the health authorities knowing the whole truth in respect to the sanitary condition of foreign ports, since it enables those authorities to exercise greater care in the exclusion of those diseases which, given a lodgment in our sea-ports, would paralyze commercial interests and enterprise for the time being.

The facts in relation to the sanitary condition of the ports with which a great commercial emporium like that of New York is in frequent communication, enables the Health Officer to exercise intelligent discretion in the measures necessary for the exclusion of disease, which lightens or removes the burdens which a quarantine without such information would be likely to impose.

The intelligence which bills of health afford to the maritime sanitary officer in relation to the infectious and contagious diseases at foreign ports, and the communities adjacent, is in the nature of the inspections in the public health service of towns and cities, which are indispensably necessary to secure proper measures to prevent the development, or arrest the extension of disease.

Notwithstanding that "public health is public wealth" and the confession of those best acquainted from association and observation with the commerce of the port, that bills of health are necessary for the intelligent policing of ships, of passengers, and of cargoes, the Health Officer is frequently compelled to antagonize parties interested in ships, or their cargoes, whose masters have neglected or refused to bring bills of health, although the lightest penalty is imposed for the neglect. The penalty visited upon vessels from ports subject to yellow fever, and upon all vessels from European ports since their threatened invasion by cholera, has been detention for a time sufficient to disinfect them, without removing cargoes—usually but a few hours.

The authority to do this has been seriously questioned during the past year, and was the occasion of an appeal to the honorable Secretary of State. The following correspondence will illustrate to some

extent, the embarrassment attending the present situation of this department in this matter, and the necessity for such legislation as will authorize it to require the information which consular bills of health can best supply.

DEPARTMENT OF STATE,
WASHINGTON, June 4, 1884. }

His Excellency GROVER CLEVELAND,

Governor of New York, Albany:

SIR—Inclosed herewith a copy of a note of the 2d inst., from Count Lewenhaupt, the Swedish minister at this capital, in reference to the inspection and fumigation of two Norwegian vessels, the bark "Christopher Columbus" and the bark "Henrich Ibsen," by order of the Health Officer of the port of New York in pursuance of a circular issued by that officer on the 10th of March, 1882, a copy of which I also inclose.

With a view to answering the minister's note, I will thank you to inform me whether these quarantine proceedings are now had in pursuance of any law of the State of New York, or rest entirely on the act of Congress of the 2d of June, 1879.

There is no doubt that the act of Congress in question expired by limitation on the 3d of June, 1883.

I have the honor to be, sir,

Your obedient servant,

FRED'K T. FRELINGHUYSEN.

LEGATION OF SWEDEN AND NORWAY,
WASHINGTON, June 2, 1884. }

SIR—I have been informed that two Norwegian vessels, bark "Christopher Columbus" arrived April 17, from Maryport, England, and bark "Henrick Ibsen" arrived May 2d from Bergen, Norway, have been fumigated in New York by order of the Health Officer, not on the ground that the Health Officer had any special reason to suspect the sanitary condition of these ports, but because the said vessels had neglected to provide themselves with the bill of health, which according to the circular issued by the Health Officer's department March 10, 1882, all vessels arriving in New York from a foreign port are obliged to carry.

As the only law mentioned in the circular is the act of Congress of June 2, 1879, called an act to prevent the introduction of con-

tagious and infectious diseases, and as I have reason to believe that this act according to section 10, expired on the 2d of June, last year, I suppose that the circular, which is still the regulation in force in the State of New York, concerning this subject, must be considered as founded on some law of the State of New York, but I should like very much to have on this point some official information, which I could communicate to my government for the benefit of Swedish and Norwegian vessels sailing for the United States.

In consequence, I beg to ask, whether there is any law of the United States prescribing that all vessels arriving in the United States from foreign ports shall on all occasions carry a bill of health, and if not, I should also feel very much obliged if your Excellency could inform me whether the above circular, of which a copy is herewith inclosed, is founded on some law of the State of New York. At the same time I beg your Excellency to accept the renewed assurance of my highest consideration.

C. LEWENHAUPT.

His Excellency Mr. FRELINGHUYSEN,
Secretary of State, etc.

The Maritime Association of the Port of New York calls attention to the following :

QUARANTINE NOTICE.

HEALTH OFFICER'S DEPARTMENT, STATE OF NEW YORK, }
QUARANTINE, S. I., March 10, 1882. }

The attention of passenger steamship companies and shipping merchants at the port of New York is respectfully called to the following law of the United States :

" All merchant ships and vessels sailing from a foreign port where contagious and infectious disease exists, for any port of the United States, must obtain from the consul, vice-consul, or other consular agent of the United States, at the port of departure, or from the medical officer, where such officer has been detailed by the President for that purpose, a bill of health in duplicate, which shall set forth the sanitary history of said vessel, and that it has in all respect complied with these rules and regulations.

" 2. And any such vessel which shall enter, or attempt to enter, a port of the United States in violation thereof shall forfeit to the United States a sum to be awarded, in the discretion of the court, not exceeding \$1,000, which shall be lien upon said vessel, to be

recovered by proceeding in the proper district court of the United States."

The information given to the health authorities at the port of New York, through bills of health from foreign ports, is essential to the intelligent and efficient discharge of their duties.

The temporary detention of vessels that do not bring bills of health, and their treatment as vessels which are suspected of being infected with contagious or infectious disease, are considered necessary for the correction of the frequent *neglect of obedience to the law*, and the security of the port from the admission of disease. The necessity of obtaining an American consular bill of health, when there is an accredited representative of the United States at the port of departure, is particularly enjoined.

WM. M. SMITH,

Health Officer, Port of New York.

QUARANTINE, S. I., June 11 1884.

"Hon. GROVER CLEVELAND, Governor of the State of New York,
Albany, N. Y.:

SIR—I am in receipt of a communication from the Hon. Daniel S. Lamont, Private Secretary of your Excellency, requesting me to make answer through your office to a communication from the Hon. Frederick T. Frelinghuysen, Secretary of State of the United States, a copy of which I have the honor to acknowledge the receipt of, and also a copy of a communication of Count Lewenhaupt, the Swedish minister resident at Washington, to the Hon. Secretary of State, desiring to be informed if the regulation in force to bring U. S. consular bills of health is founded on some law of the State of New York.

The Honorable Secretary of State also desires to be informed "whether these quarantine proceedings are now had in pursuance of any law of the State of New York, or rest entirely on the act of Congress of the 2d of June, 1879."

In reply I would say that the circular issued by the undersigned under date of March 10, 1882, referred to in the communication of the Secretary of State, was based upon the regulation of the National Board of Health, approved by the President of the United States November 14, 1881. The language of that "Regulation" was

quoted in the circular because it supplied the *most* explicit authority for the enforcement of a rule necessary for the protection of the public health. But it was not the only authority, as will be more fully shown.

Bills of health have been considered necessary and required by the health authorities of this port for many years, to aid in preventing the introduction of infectious and contagious diseases from foreign ports. The communities that environ the port of New York are more exposed to the infectious and contagious diseases that approach by the sea than any others in the United States, owing to its great commerce and thereby frequent communication with all parts of the world, the vast immigration that flows through it, and its situation within the "yellow fever zone." That a bill of health is considered essential to the efficient discharge of the duties of the Health Officer of the port of New York is evident from the language of the statute of New York passed April 29, 1863. The second subdivision of section 27 of that act declares, that it shall be the duty of the Health Officer "to board every vessel subject to quarantine or visitation by him, as soon as practicable after her arrival between sunrise and sunset, to inquire as to the health of those on board, and the condition of the vessel and cargo, *by inspection of the bill of health*," etc. Section 16 of the act mentioned declares that, "If in the judgment of the Health Officer a vessel require it, he may order the following sanitary measures." Among the measures enumerated are "the complete purification of the vessel in all her parts, by the use of steam, fumigation," etc., etc.

Section 37 of the law passed April 29, 1863, declares "It shall be the *duty* of the Health Officer, in the presence of immediate danger, to take the responsibility of applying such additional measures as may be deemed indispensable for the protection of the public health."

Early in the year 1882 in upwards of two hundred localities in the Western and North-Western States, small-pox had developed within a few preceding months, which was directly traced to contagion disseminated by immigrants who, in most instances, had passed our maritime quarantines before the disease developed.

At the present time, and for many months past, the contagion of cholera has stood on the threshold of European communities as it has done in every instance in time past before it invaded our country. These conditions were considered sufficient warrant for the Health Officer at the port of New York "to take the responsibility of ap-

plying such additional measures for the protection of the public health as bills of health may be able to afford."

It is *essential* to the intelligent discharge of the duties devolving on the health authorities at the port of New York, that they should have such information as to the health of *all* foreign ports as the consuls of the United States can give.

The Hon. Secretary of State of the United States in the communication which I have the honor to acknowledge informs your Excellency that "there is no doubt that the act of Congress in question expired by limitation on the 3d of June, 1883." I beg leave to say that I do not understand that there has been, or is any question that the power of the National Board of Health to *make* rules and regulations in relation to sanitary matters which, when approved by the President of the United States, has the force of law, expired by limitation June 3, 1883. But that the ordinances created by the board during the tenure of their power were repealed by the expiration of the time to which the power to make such ordinances or "*regulations*" was limited, was not the understanding or the belief of the undersigned. The question arose in the early part of the present year as to the present legal force of the regulations created by the National Board of Health. The counsel sought by the undersigned to determine whether he should consider that the rules promulgated by the National Board were repealed by expiration of the time to which its powers were limited, was conflicting. In this condition of uncertainty as to the legality of the regulation of the National Board of Health quoted by this department in a circular dated March 10, 1882, a communication, of which the following is a copy, was forwarded to the Solicitor of the United States Treasury :

QUARANTINE, S. I., *March 24, 1884.*

Solicitor of the Treasury :

DEAR SIR— There is a question with the shipping merchants of the port of New York as to the right of the Health Officer to require of vessels from foreign ports United States consular bills of health.

Will you have the kindness to inform me if there is any law making this obligatory on masters of vessels since the expiration of the "act of June 2, 1879, in relation to the National Board of Health."

If the regulation requiring masters to bring consular bills of health *is not a law*, and there is no other provision in the national

statutes whereby they can be secured, it is very much to be regretted. An early reply will much oblige

Yours truly,

WM. M. SMITH,

Health Officer, Port of New York.

After waiting some time for an answer and receiving none, the following communication was addressed to the Attorney-General of the United States.

QUARANTINE, S. I., April 7, 1884.

BENJAMIN H. BREWSTER, *Attorney-General, Washington, D. C.:*

SIR — Messrs. Henderson Brothers, agents at the port of New York of the "Anchor Line S. S. Co.," object to the regulation at this port requiring merchant vessels to bring U. S. consular bills of health from foreign ports.

The regulation referred to is based upon the act of Congress of June 2, 1879, enlarging the powers and duties of the National Board of Health, established by act of March 3, 1879.

The agents referred to claim that the expiration of the four years to which the enlarged powers and duties of the board were limited, and which expired June 3, 1883, repealed the law which required "merchant vessels from foreign ports where contagious and infectious diseases exist" to bring U. S. consular bills of health.

Please inform me at the earliest time possible whether the regulation requiring such bills of health is still in force, or was repealed by the limitation of the powers of the National Board of Health expressed in the last section of the act of June 2, 1879.

I wrote some time since to the Solicitor of the Treasury, but have received no reply.

Very respectfully,

WM. M. SMITH,

Health Officer, Port of New York.

The following reply was received :

WASHINGTON, D. C., April 15, 1884.

SIR — The law creating the office of Attorney-General makes it his duty to answer questions of law only when propounded to him

[Sen. Doc. No. 47.]

47

by the President, or the head of some executive department. It would be inconsistent with my duty to reply to the numerous inquiries which come from other sources. To say nothing of the expenditure of time, it would be committing me beforehand upon points which might afterward arise in the regular course of administration. When you take this simple view of the subject, I am sure you will excuse my not giving an opinion upon the subject to which you refer in your note.

Very respectfully,
BREWSTER,
Attorney-General.

To Dr. Wm. M. SMITH,
Health Officer, Port of New York.

Soon after the above letter from the Attorney-General was received a communication was addressed to the Hon. Charles F. Elwell, president of the Maritime Exchange of New York, as one of the most influential of the representatives of the commercial interests at this port, requesting him to secure from an authoritative source an opinion concerning the present legality of the regulation of the National Board of Health in respect to bills of health.

The failure of the undersigned to secure an authoritative opinion as to the present legal status of the "regulation" established by the National Board of Health is for obvious reasons to be regretted; but the necessity for bills of health under present circumstances will be apparent to every impartial person; and I desire to assure your Excellency that if there had been no authority under the General Government to require bills of health, the necessity would have been so apparent to the undersigned that such bills would have been required of vessels "entering foreign" at this port, under the discretionary power given the Health Officer of the port by the laws of the State of New York, "to take the responsibility of applying such additional measures as may be deemed indispensable for the protection of the public health."

The importance of bills of health at this port is frequently illustrated by occurrences like the following: The steamship "Moravia" arrived at New York, March 27, 1884, from Hamburg, at which port the steamer took immigrant passengers. The day after the

arrival of the steamer one of the passengers was taken sick with the contagious disease known as typhus fever; many other cases rapidly developed among the immigrants from the "Moravia," who had stopped in New York, or were directly traceable to the contagion brought by them. The resident physician of the hospital to which the patients were taken was one of the victims of the disease. The United States consular bill of health from Hamburg showed that typhus fever existed in that city. The managers of the line were informed by the Health Officer at this port that measures should be immediately taken to police the lodging-houses and other places of resort for immigrants where the contagion of this disease was most likely to exist, or, failing to do this, vessels from Hamburg would be likely to be quarantined on arrival at this port, for observation and disinfection. This information was given to the German consul at New York, and by him transmitted to the authorities at Hamburg. Without bills of health from Hamburg it would have been impossible to discover the source of the contagion in this instance with any certainty, or to have contributed to its destruction.

The bark "Golden Fleece" arrived at this port from Demerara September 2, 1881, without a bill of health; this port is subject to epidemics of yellow fever at certain seasons; and although no evidence of its existence at that time had been received, the Health Officer, acting under the discretionary power referred to, ordered the vessel to be discharged of its cargo "in quarantine," believing that the public health was better protected by treating the vessel as if it was infected, than to give *pratique* upon an uncertainty. It was subsequently ascertained, by confession of the master of the vessel that yellow fever prevailed in Demerara when the bark left that port, and he preferred to try his chances to pass the New York quarantine without a bill of health to taking one that was not clean.

The authority conferred by the laws of New York in respect to sanitary measures is largely discretionary with the Health Officer. Rather than prosecute in the Federal courts, and oppress the masters of vessels with the fine provided by the law for those who fail to comply with its requirements, vessels that have not brought bills of health have been treated as those are that come from infected ports, to-wit: by "fumigation." As in the case of the vessel from Demerara referred to, it is assumed that the failure of the master to bring an official representation from the port of departure of the existence, extent of prevalence, or non-existence of infectious and

contagious diseases affords reason for suspicion that such diseases exist. It will be apparent that to require bills of health only when diseases of the character named are *known* to exist, would in most instances be to exercise the vigilance too late for protection of the public health. The financial interests involved in the commerce of a port invariably prompt the concealment of the existence of quarantinable diseases. Nor would it be possible to discriminate intelligently at all times in favor of certain ports, though they are usually healthy. The community that at one time is quite free from diseases of an infectious or contagious character is liable at another to epidemics of that class of diseases.

It is the aim of modern sanitary science to trace disease to its origin, and destroy its source. And it is by the aid of bills of health, that vigilant health officials at our maritime quarantines are able to contribute in an important degree to secure that result, by protecting the seaboard and interior communities from infectious and contagious diseases that approach by the sea.

I have the honor to remain

Your obedient servant,

WM. M. SMITH,

Health Officer, Port of New York."

The total number of foreign vessels that entered the port of New York, and were inspected by the Health Officer or his deputies in 1884 was 6,035.

The number of vessels that arrived from southern ports during the season vessels from such ports are subject to inspection was 2,051.

The total number inspected during the year was 8,086.

There were 184 cases of contagious and infectious diseases found on board vessels on arrival at quarantine.

The number of deaths from all causes on board of vessels that entered the port was 260.

The number of births in transit was 143.

The following table will show the number of passengers that arrived at the port of New York on each of the steamship lines, the number of deaths, and the ratio of deaths per 1,000:

NAME OF STEAMSHIP LINE.	Total number of immigrants.	Number of deaths.	Ratio of deaths in 1000.
North German Lloyd.....	65, 558	66	1.01
Hamburg American Packet Company.....	56, 181	58	1.03
Red Star Line.....	22, 542	12	.54
White Star Line.....	22, 287	10	.49
Inman Steamship Company.....	20, 162	6	.30
Caar Line.....	14, 508	26	1.79
Anchor Line.....	21, 815	13	.60
Liverpool and Great Western S. S. Com- pany.....	13, 890	2	.14
National Line.....	15, 516	5	.32
Cunard Line.....	11, 909	7	.59
State Steamship Company.....	9, 215	5	.54
Thingvalla Line.....	7, 498	3	.40
Netherlands American Steam Navigation Co., Rotterdam.....	5, 153	3	.58
Netherlands American Steam Navigation Co., Amsterdam.....	5, 065	15	2.96
Bordeaux Steam Navigation Company.....	1, 010	..	.....
White Cross Line.....	551	1	1.81
Monarch Line.....	3, 450	1	2.9
I. and V. Florio Steamship Company.....	2, 710	3	1.10
Fabre Line.....	2, 695	1	.371
Great Western Steamship Co.....	320	..	.....
General Transatlantic Company.....	17, 154	7	.41
Miscellaneous.....	1, 618	3	.19

Small-Pox

has been the one above all others of the quarantinable diseases that has been the most frequent and most difficult to prevent developing after the immigrant has mingled with our population. A disease so loathsome in its effects and so fatal in its result, and yet so certainly preventable by the use of means not difficult to secure, or dangerous to the life or health of those who avail themselves of it, warrants the most energetic efforts to arrest it, and, if necessary, coercive measures to secure the employment of necessary preventative treatment.

The time has come when the teachings of experience and observation are so plain to the people in respect to the causes and prevention of this disease, that they are willing to submit to any measure which sanitary authorities concur in recommending for the extinction of this scourge.

During the past four years the sanitary authorities of the port of New York have given their best efforts to the means for preventing the infection of passengers from European ports, with the contagion of this disease.

At some one or more of the great focal points of departure for immigrants the disease has been very prevalent during the whole period mentioned; considering this fact and the large immigration that has entered the port, the result is very gratifying. But that result is less satisfactory than it should be. It cannot, however, be more satisfactory without the aid of such sanitary legislation as suggested on a previous page.

The objections, and sometimes resistance to vaccination which are met with among immigrant passengers indicate a considerable skepticism in European communities, more particularly among English people, as to the protection afforded by it; or else a fear that constitutional diseases will be introduced by that means. The groundless character of the fear that disease will be communicated by vaccination, when proper care is used in the selection of the vaccine virus, has been too often demonstrated to require any argument in this place. The result of the teachings and influence of the anti-vaccinationists is well illustrated by the fact, that in the hospitals of the city of New York, not a single case of small-pox exists at this time, while in the city of London, the reports have shown for months past an average of upward of eleven hundred cases in hospital. In New York city, where a "from house-to-house" inspection and search among the tenement population for the unvaccinated is practiced every year, not a case of small-pox has occurred for a year past, except as it was imported and developed by persons from other localities; in London, the weekly average of new cases as indicated by bills of health and the number in hospitals has been from four to five hundred.

The number of cases of small-pox on vessels that entered the port in 1883 and 1884 was twenty-five.

Among the cases of small-pox that developed on ship-board during the passage to this port during the years 1883 and 1884 the following are considered deserving of a brief record in this place, as illustrating some of the many peculiarities of the disease, and the difficulty of preventing the extension of the disease on a passenger steamer and among the people with whom the immigrant mingles after he enters the country.

February 9, 1883, the steamship *Elbe* arrived with 682 immigrants. One case of small-pox, a child of one year, was found in hospital. Assurance was given by the ship's surgeon that the patient had been isolated from the beginning, in a room in an unoccupied steerage. The father, mother and three other children, all of whom had satisfactory evidence of previous vaccination, it was said, had been kept in the room with the patient, or a room adjacent to and communicating with the sick room. All the parties referred to, with their clothing and bedding, except what was burned in the steamer's furnaces, were removed to the contagious hospital. The passengers and crew were vaccinated, except ninety-one who had been vaccinated successfully by the ship's surgeon during the voyage, the hospitals disinfected and the steamer allowed to proceed.

On the 19th of the same month, Frederick Kaat a steerage passenger on the *Elbe* who had been lodged in Raymond Street jail (Brooklyn) was taken sick with small pox.

The period between the arrival of *Elbe* and the development of the disease in Kaat was too short to allow the belief that he contracted it after landing. The only reasonable conclusion is that the man contracted the disease by his visit to the hospital, or more likely, by some of the friends of the patient being allowed to leave the room in which they were isolated with the sick, conveying the contagion to him in their clothing. In those instances in which the isolation of the patient has not been as early or complete as it should have been, the temptation to conceal the fact from the quarantine officer is exceedingly great, as the medical officer generally loses his position, when the detention of the vessel, or any considerable expense, is the consequence of the discovery of his neglect.

The steamship *Ptolemy* from Rio Janeiro, February 4th, arrived at quarantine the 28th of the same month. One of the crew was sick of small-pox in an advanced stage of development. The surgeon declared the case was immediately isolated, in the apology for a hospital near the forecastle, and separated from it by the forward bulk-head where the patient was found when the steamer arrived.

A day or two after the development of this case, two other men of the crew were taken ill and were put into the same room with the patient, under the apprehension that they were suffering from the initial stages of small-pox. After several days' detention in the same room with the case of small-pox, their ailment was found to be of a trifling character, and the captain of the steamer ordered them to duty without reference or deference to the medical officer.

When the Health Officer at quarantine reproved the surgeon for allowing the men to return to their quarters, and mingle with other portions of the crew before their clothing had been disinfected, he was told that the captain would not be advised by him, but peremptorily ordered them to immediate duty. Two days after the arrival of the *Ptolemy* another of the crew developed small-pox, and on the third day, two others were removed to hospital with the same disease. It is evident that the men who were put into hospital under the mistaken impression that they were ill with small-pox, and who had been ordered to duty without the disinfection of their clothing, had conveyed the contagion in their clothing from the hospital to other members of the crew. A lesson was in this instance taught the master of the *Ptolemy*, though it was expensive to the owners of the vessel, to-wit: That though the medical officer of a steamer may not know as much of navigation as he, he nevertheless has a duty scarcely less responsible, and which should be quite as independently exercised as his own.

The steamship *Nemesis* arrived the 10th of June, 1883, having one case of small-pox of a mild type. The patient, aged twenty-five years, had been vaccinated successfully seven years previously. The case was peculiar only in the fact that the man was susceptible to the contagion of small-pox in so short a time subsequent to vaccination.

June 15, 1883, the steamer *Celtic* arrived with 850 steerage passengers, among whom were the following cases:

Gustave Morson, aged 23 years, was ill with small-pox. The eruption was in the second day of its development. Carl J. Swenson, aged 32 years, had varioloid. He was vaccinated when twenty-four years of age, but the vaccination had produced only a slight change in the color of the skin, leaving no evidence of a depression or proper cicatrix. Hebena Swensen, aged seven years, developed varioloid on the 11th. The eruption was slight when examined at quarantine on the 15th, with an abortive tendency evident in the character of the pustules. Christina Swensen, aged six years, had scarcely more than a dozen varioloid pustules; the same abortive or premature tendency in the development of the eruption was evident in each of the cases of this family.

These children were vaccinated when infants, but the evidence of the vaccination was to be found only in a slight change in the color of the skin where the vaccination was supposed to have been effected. An extensive experience and observation similar to the

above afford very good ground for the suspicion that a vaccination which does not produce some "pitting" a (cicatrix), has not destroyed the entire susceptibility of the system to the contagion of small-pox.

The Cunard steamer *Scythia* arrived October 31 with 346 steerage passengers and 171 in the saloon. Lorenzo Ruyz, a saloon passenger, fifty-five years of age, had small-pox (*variola discreta*). The surgeon of the steamer reported that the eruption appeared the 29th inst. The patient was not isolated until the 30th. At the latter date the patient was removed from state-room No. 53, situated near the foot of the companion-way leading from the promenade deck to the dining saloon, to a hospital situated on the main deck forward, on the starboard side, and immediately aft of the sally port.

The fact that the eruption on the patient's face was noticed by some of his fellow passengers in the smoking-room the day previous to his isolation affords presumptive evidence that more or less of the passengers were exposed to the contagion of the disease.

All the saloon passengers were examined with reference to their protection by vaccination. Children under ten years with satisfactory evidence of protection, and adults who had been successfully vaccinated within ten years were passed; all others were vaccinated, believing that the exposure to the contagion was so recent that a successful vaccination would prevent the development of the contagion in those who had been infected.

Subsequently information was received from the Boston board of health that a cabin passenger on the *Scythia* had developed small-pox in that city two weeks after his arrival at this port. Inquiry was made of this man, after his recovery, to ascertain if he had been vaccinated at quarantine, or was one of those exempted from vaccination on account of his declaration that he had been successfully vaccinated within the ten years previous. No reply was elicited; for this reason and the fact that the threatened suit against the Cunard Steamship Company for \$25,000 damages was not pressed after the inquiry, there is a suspicion that, in order to escape the vaccination at quarantine, the time since his successful vaccination was greater than he represented.

Experience and observation of the comparative rapidity of the action on the human system of the contagion of small-pox and *vaccinia* have established the conviction in the mind of the writer that the introduction of the latter a day or two subsequent to the reception of the former will arrest its development; while the ef-

fect of vaccination in modifying the severity of small-pox is evident far into the incubative period of the disease.

The Italian bark *Giovannia* from Seville (Spain), twenty-seven days, passed quarantine January 5, 1884, all hands well and on duty, On the 11th the health commissioner of Brooklyn reported that a sailor from the *Giovannia* was admitted the day previous to the Long Island College Hospital with a disease which, the day following the admission, was discovered to be small-pox.

It was evident that a case of small-pox had occurred on the bark during the passage. At an interview with the master of the vessel, he evinced so much hesitation, apology and confusion, that there was no longer a doubt that not only had there been a case of the disease on board which had recovered since leaving Seville, but that he had sought to conceal the fact from the boarding officer at quarantine.

The vessel was ordered back and put in quarantine, where it was cleansed and disinfected. One of the sailors admitted he had been ill, and an examination of the man gave evidence of recent pustular disease of the skin. The captain was arrested and brought before the police court of the city of Brooklyn to answer to the charge of bringing a case of contagious disease into the city, but escaped punishment under the plea that he did not know it was small-pox, but supposed it was syphilitic disease of the skin.

Two questions are asked the master of every vessel by the medical officer at quarantine before the permit is given. "Are you all well on board?" "Have you had any sickness during the voyage?" The desire to escape the detention and expense which may be necessary to cleanse clothing, baggage and vessel affords a temptation to conceal the occurrence, or the existence of disease of an infectious or contagious character on board of vessels entering our ports, that in some instances is not resisted, and which the utmost vigilance of the Health Officer is sometimes unable to detect.

The same day that the patient from the *Giovannia* was admitted to the Long Island College Hospital, a sailor from the same vessel entered the surgical ward of the hospital, and was treated for syphilis. Three patients in the ward to which he was admitted contracted small-pox from the contagion conveyed from his clothing.

The wisdom of the law is vindicated by such instances as the above, which declares that "Any person, except a pilot, who shall go on board of, or have any communication or dealing with, any vessel hereinbefore declared subject to quarantine, before she shall be boarded and examined by the Health Officer, or while she is being

examined by him * * * shall be guilty of a misdemeanor." § 36 of chap. 358, Laws of 1863.

The steamer *Polaris* of the Carr line from Hamburg May 4, arrived at quarantine May 23 with 1,085 passengers in the steerage. The surgeon reported one case of small-pox discovered the 17th. The case was properly isolated when the vessel was examined at quarantine. But a careful inquiry among the fellow passengers of the patient revealed the fact that the disease was in the eruptive stage when discovered on the occasion of the surgeon's visit to a patient lying in the same bunk, ill of some other ailment.

The evidence of exposure of other passengers to the contagion was sufficient to warrant the detention of all on board for a time sufficient to develop the latent contagion among them, or to secure the protective influence of vaccination.

The choice was given the parties interested in the steamer to remove the passengers to, and subsist them at, Hoffman Island, or to let them remain under observation and treatment on board the steamer. They elected to do the latter. All persons on board were immediately vaccinated, and every fourth day were examined and such as gave no evidence of a successful result were re-vaccinated. After three vaccinations and failures it was assumed that the failure was on account of the protection established by previous vaccination if a cicatrix gave evidence of it. From the date of the arrival of the steamer, the 23d, to the time of her clearance, June 8th, seven cases of small-pox were removed to the contagious hospital.

The latent contagion with which immigrants not infrequently pass our maritime quarantines is very well illustrated by the following case :

The steamship *Weser*, of the North German Lloyd line, arrived June 4th from Bremen, May 22d, with 802 immigrant passengers. The surgeon of the steamer had vaccinated 762 of the passengers. Two children were reported to have died on the passage of "tabes mesenterica," and one of "measles." One case of measles was discovered on "passing" the immigrants; other than this, all were well.

Under date of July 2, 1884, Dr. H. B. Baker, secretary of the Michigan State Board of Health, wrote as follows: "Henry Stonehouse left Bremen by the steamer *Weser* May 22d and landed in New York June 4th; started for Michigan the 5th; was taken sick *en route* June 8th—had been feeling bad a day or two; reached Le Roy June 9th; called a physician June 10th." The case was

discovered to be small-pox. The day the eruption appeared is not stated; the omission of that important part of the record, and the fact that the patient "had been feeling bad a day or two" previous to the 8th, gives reason for the presumption that the disease was contracted in Bremen, and the same day that he embarked.

The only alternative is that there was a case of the disease already developed among the emigrants when the steamer sailed, from which the man was infected. Against this hypothesis is the affidavit of the captain and surgeon of the *Weser*, made at quarantine, "that no case of sickness or death from small-pox, cholera, yellow fever, ship fever, or any other contagious or infectious disease has occurred on board of his vessel while in any port or on the passage." The statements of immigrant passengers in relation to the character of the sickness that occurs among their fellow passengers have been often found to be unreliable, and in some instances where sensational stories have been told by them, they have been found to be without the least foundation in fact.

The great probability is that the case affords another illustration of contagion received by the immigrant at the port of departure, and during the incubative period he crossed the Atlantic and reached a far interior community.

The steamer *Fulda*, of the North German Lloyd line, arrived at quarantine the 4th of October, 1884, from Bremen the 25th of September, with 673 passengers in the steerage. A child, aged fourteen months, was taken sick with small-pox the day after leaving Bremen, and died the morning of the day the *Fulda* arrived at quarantine.

The surgeon of the steamer declared that the child was isolated the first day of its illness, and the day previous to the appearance of the eruption; and this was corroborated by the relatives of the child, who were also isolated in the ship's hospital with the patient, one of the stewards being detailed to wait upon the inmates of the hospital, without taking any precaution against conveying contagion by change of clothing. When the surgeon was sharply admonished for allowing such exposure of the passengers and crew, he stoutly maintained, as did the steward, that it was the only instance of its occurrence.

The passengers and crew were vaccinated; the mattresses and clothing remaining after the transfer of the occupants of the hospital were burned, the hospital disinfected and the steamer given *pratique*.

The sequel of this case is found in the following extract from a communication from the secretary of the State Board of Health of

Minnesota, under date of November 14, 1884: "A family by the name of Pile landed in New York October 4th from the Bremen steamer *Fulda*, reaching Dassel, Minn., October 9th;" * * * "one child, Fanny Pile by name, developed mild varioloid about October 15th."

This statement furnishes pretty conclusive evidence that the contagion was contracted on the *Fulda*; and if the isolation of the patient and the other occupants of the hospital was as complete as represented, the contagion was probably communicated from contagion conveyed in the clothing of the steward who was detailed to attend to the ship's hospital.

The cases above referred to in some measure illustrate the difficulties with which the maritime quarantinist must contend. The neglect, and sometimes ignorance, of medical officers of passenger steamers often contribute in a considerable measure to increase the opportunity for the importation of the contagion of quarantinable diseases.

Typhus Fever,

in the days when a transatlantic voyage occupied several weeks, and emigrants were packed like sardines in a box in the unventilated holds of sailing packets, was the most frequent and fatal of the diseases to which immigrants are subject. The rapid transit and improved hygiene of the transatlantic passenger steamers of the present day have made typhus a comparatively infrequent disease.

During the enormous immigration of the past five years, when steerages were crowded, and cases of typhus were discovered among immigrants, the source of the disease has been generally traced to crowded lodging-houses in cities at the ports of departure.

The steamer *Moravia* from Hamburg, the 14th of March, 1884, arrived at the New York quarantine the 27th of the same month with 1,466 passengers in the steerage. One child was reported by the surgeon to have died of convulsions. Nine cases of measles were found on inspecting the passengers. With this exception all on board were well. April 4, Wolf Alterman, a steerage passenger on the *Moravia*, was found by the health authorities in a tenement-house sick with typhus fever; from the statement of the patient and his condition it was evident he had been ill several days when the case was reported to the authorities. April 5, another immigrant by the same steamer was sent to the contagious hospital; this man claimed he had been sick four days; and on the 7th still another was

discovered suffering from the same disease, who had been sick seven days. Subsequently eleven other cases were discovered among those who were passengers by the *Moravia*. Eight of these immigrants had stopped at the lodging-house of one Jarmulowski in Hamburg, and three others were found to have stayed at the house of Rafael Mendel, No. 42 Muhlenstrasse. June 7, 1884, Daniel Pearlstein, a passenger by the steamer *Bohemia*, from Hamburg, May 14, was removed to the contagious hospital with well-marked symptoms of typhus. This immigrant arrived May 26, and was not taken sick until June 1; he had lodged for several days previous to sailing at the house of Rafael Mendel.

Notwithstanding the denial by the agents of the line to which these vessels belonged that typhus fever existed in Hamburg, the evidence was so conclusive from the United States consul's bills of health and the history of the above cases that these immigrants had been infected at the lodging-houses in Hamburg, that the Health Officer of the port addressed the following note to the agents of the steam-ship company :

QUARANTINE, S. I., April 24, 1884.

Messrs. KUNHARDT & Co., Agents, *Hamburg-American Packet Co.*:

GENTLEMEN — There has been much complaint to me by the health authorities of New York city concerning cases of typhus fever in the city originating among passengers by the steamship *Moravia* on her last arrival at this port, the 26th ult. I believe. It is believed that the contagion was taken by them in the lodging-houses in Hamburg.

The description the victims of the disease give of the condition of the lodging-houses referred to warrants the belief that they took the disease there. If the condition of other vessels of your line from Hamburg, or of the passengers from the steamers from that port, should develop the disease mentioned, it will compel the authorities at this port to quarantine against Hamburg so far as to detain and disinfect vessels from that port with steerage passengers.

To prevent immigrants from being infected at the port of departure, I would suggest the necessity of the owners and managers of the line at Hamburg policing the cheap lodging houses at that port, to secure cleanliness and prevent overcrowding. The supervision of these lodging-houses by the managers of passenger lines is important to their interests as well as to the life and health of im-

migrants and the people of this country with whom, to a greater or less extent, they will soon mingle.

Inclosed is a list of the *Moravia's* passengers now in the contagious hospital who are sick with typhus fever and whose lodging places while in Hamburg have been ascertained; the names of the proprietors of these houses are added, to facilitate your endeavor to prevent other passengers from being infected.

Very respectfully yours,

WM. M. SMITH,
Health Officer, Port of New York.

A copy of this communication was forwarded to the German consul at New York city, and by him transmitted to the civil authorities at Hamburg.

* *Yellow Fever,*

during the two years last past has been much less prevalent and milder in type in those localities where it prevails every year to a certain extent and with more or less severity.

At the port of New York it has made its appearance every season on vessels from ports in the West Indies or the Mexican coast from time beyond the memory of the oldest living person.

The number of cases arriving at the port of New York has differed as widely as in the localities where it is indigenous — not always in the same ratio, though, as might be expected, more or less according to its prevalence in its accustomed haunts. Climatic conditions, which at certain seasons and during some years combine to render yellow fever peculiarly virulent and much more extensive than in others, does not extend even in a minor degree to localities in more northern latitudes, although they are situated within what has often been called the "yellow fever zone." Long continued heat, exceeding an average temperature of 75°, accompanied by considerable humidity, prevails every summer in the West Indies and on the Gulf coast of the United States. These conditions suffice to secure the rapid propagation of this disease when once the infection has obtained a lodgment. The same thermometric and hygrometric conditions, even proportionately to the difference in latitude, may not prevail on the more northern coasts of the Atlantic. The influence of conditions which prevail in the higher latitudes of the north, or which bring to the Atlantic sea-board the comparatively dry winds which have swept over the vast areas of the west and

north-west, may modify or arrest the development of this subtle exotic infection. Hence, perhaps, its less frequent appearance and less virulent type some years than others.

The exemption from this scourge which northern cities situated on or near the sea-coast have enjoyed for more than a quarter of a century, at whose ports yellow fever is more or less a visitor every year, is not wholly dependent on climatic conditions. New York and its adjacent communities have suffered from no less than seventeen epidemics of yellow fever, in each of which it has numbered its victims never less than by hundreds, and sometimes by thousands.

Better sanitary conditions on vessels and in our sea-board cities, and more than these, the improved quarantine regulations, which, while not increasing, but essentially lessening the burdens of commerce, have sought and discovered the lurking places of the disease on ships, and by measures no more mysterious than the art of cleansing, or more difficult than the use of agents which destroy the infection, have contributed for more than a quarter of a century to secure the dense population that surround the port of New York from an epidemic visitation of this scourge of tropical latitudes.

The infection once given a lodgment at any of the sea-port towns on the Atlantic coast during the season when there is a mean temperature of 75° during the day, will doubtless develop and extend its area, but with a rapidity and intensity proportionate to other favoring circumstances, such as humidity and general unsanitary conditions.

When high cool winds prevail for a few days in the latitudes where the disease habitually exists, there is a noticeable decrease in the number of its victims. The history of yellow fever in this and other countries justifies the opinion that the extension of the disease to interior localities, whose altitude is five hundred feet above the sea, is prevented by the fact that the atmosphere is cooler and drier than that which prevails on the borders of the ocean or near the mouth of its great tributaries.

The exemption from yellow fever which climatic influences have afforded during the past year on the Atlantic sea-board may be so essentially changed the ensuing, or any future season, as to supply all that is necessary for a development of the disease to epidemic proportions, if the infection once obtains a lodgement. Measures that are uniformly efficient, and vigilance that is unceasing in discovering the necessity for their application, is the price of success in preventing the introduction of yellow fever at the maritime quarantines

within the "yellow fever zone." The following table will show the number of vessels from ports liable to yellow fever, and which to secure more complete isolation are first examined in the lower bay.

REPORT of Lower Quarantine for 1884 (from July 3 to October 8).

INFECTED PORTS.	Number of vessels arriving during the period of infection.	Number of vessels with sickness.	NUMBER OF SICK.			NO. OF DEATHS.		
			In port of departure.	On the passage.	In quarantine.	In port of departure.	On the passage.	In quarantine.
Havana	44	3	1	.....	2	.....	.....	.....
Rio Janeiro	127	1	.....	.....	4	.....	.....	2
Georgetown, S. C	1	2	.....	3	3	.....	3	.....
Aspinwall	1	1	.....	.....	1	.....	.....	1
Chilipec	1	1	.....	.....	1	.....	.....	1
Santiago de Cuba	7	2	3	2	1	2	3	1
Nuevitas	1	1	.....	.....	1	.....	.....	1
Calcutta	1	1	.....	38	.....	.....	31	.....
Jacmel	1	1	.....	.....	1	.....	.....	1
Port Limon	1	1	.....	.....	1	.....	.....	1
St. Kitts	1	1	.....	.....	1	.....	.....	1
Porto Bello	1	1	.....	.....	1	.....	.....	1
Bocas del Toro, U. S. C.	1	1	1	.....	2	.....	.....	1
Savanna La Mar	1	1	.....	2	1	.....	1	.....
Bathurst, Africa	1	1	.....	5	.....	.....	.....	1
	99	18	5	50	19	2	38	4

Cholera,

commenced its deadly march from its home in India three years ago.

When it made its first halt at Aden on the Red sea in 1882, it was apparent to many observers, that one of those mysterious cycles in the development of its forces had been completed, and thenceforth it would move steadily forward until the great centers of population in Europe and America had been reached. So impressed was the New York State Board of Health with this probability that at one of its regular meetings of that year a warning cry was raised by an appeal to the National Board of Health.

It was evident that the enemy had determined to try conclusions with the new generation that had arisen in the countries it had formerly invaded. In June, 1883, it invaded Egypt finding in the extremely unsanitary condition of *Damietta* an opportunity to recruit its forces, and commence its march.

Its progress in Egypt need not be recited. It is asserted that the first victim at Toulon, July 4th, was not reported. *It is certain* that the fourteenth day of June, 1884, it had already landed upon

the Mediterranean coast of France and secured its first victims at Toulon. Thenceforward its march through the devoted city was one of destruction.

June 28th it was officially announced that the dreaded scourge had reached Marseilles, and six deaths were scored at noon of that day. The worst that had been feared, when the disease was recognized at Toulon, speedily came, and the scene was such as only an epidemic rapid in its development, and fatal in its results, can produce. The prefect estimated on the 16th of July, that 70,000 people had fled from the city. Commerce and industry were at a standstill, and want and misery stared in the face those who remained, because they had no employment, and no refuge to flee to. The suburban population and the towns and villages throughout the greater part of the south of France were invaded before the beginning of August.

A rigid *cordon sanitaire* was drawn by the Italian authorities on the boundary of Italy contiguous to Switzerland and France. Notwithstanding, in ten or twelve of the communes of Rome cholera was reported the 1st of August, and August 5th it was known to have appeared in several towns in the interior of Italy. At Naples the unwelcome visitor was announced the 26th of August; and although great numbers of the people fled from the plague-stricken city, reducing the population many thousands, yet in the twenty-four hours preceding the 10th of September there were 365 deaths, and 937 fresh cases of cholera in the city.

No city in Europe was better prepared by the presence of filth at the wharves and docks, filth in the streets, and filth in the houses of the lower classes of the people, to revive the waning vigor and virulence of the disease than Naples. One-third of all that were seized with cholera died.

The exhausted energies of the disease in France seemed to revive when it appeared in Paris in the early part of November of last year. November 11th ninety-seven new cases were reported. But the disease was confined to the lower and more filthy portions of the city, and did not at any time assume the virulent and fatal type that it had in many other localities.

The question which has been most frequently asked during the past year, of those whose professional intelligence entitled their opinion to consideration, is, "will cholera reach this country the ensuing spring or summer?" A question which it has been difficult to answer with satisfaction to the querist or the queried. If "like causes

produce like effects" in every instance, there is good reason for the belief that cholera will reach the Western Continent at some point on its extended sea-board, where commercial intercourse with the countries already infected shall afford the opportunity.

In the five invasions of Europe by this disease during the present century, it has succeeded in every instance in reaching our shores and developing into epidemic proportions.

If the epidemic of this disease which has prevailed in Europe during the past year is to be an exception to the experience of the past, in respect to its invasion of our country, it must be through the use of means more effectual than those employed on other occasions, or the exercise of greater vigilance, or both.

Modern sanitary science is in some measure on its trial in the effort to arrest the progress, and, if it cannot do that, modify the severity of this disease, which has already extended over a considerable portion of Continental Europe.

The development of cholera at the French ports of Toulon and Marseilles required the immediate adoption of increased vigilance at our maritime quarantines.

Accordingly at the port of New York all French mails, baggage and merchandise, whether by French or English steamers, were disinfected with sulphurous acid gas. When the epidemic reached Italy, the regulation was applied to the same articles from Italian ports.

The following circular was issued and distributed among the transatlantic passenger steamship lines trading at this port :

CIRCULAR.

To Owners, Agents, Masters and Medical Officers of Passenger Steamers :—

The apprehension which exists in relation to the approach of Asiatic cholera to the ports of the United States, and the well-grounded fear of its introduction among the people of this country, have determined the undersigned to again appeal to those interested in and in charge of transatlantic passenger steamers, to exercise unusual vigilance in the detection and management of cases of the disease should they develop among the passengers or crews under their supervision, and in securing the best possible sanitary condition of the passengers and vessel during the voyage.

In the five epidemics of this disease which have invaded this country, its introduction has been heralded by the approach of the sick of cholera to some port or ports of the North American continent.

It is believed that the conditions upon which the propagation of this disease depends, and the measures necessary for the destruction of the contagion which attends it, are sufficiently understood to arrest the one, and secure the other, by the exercise of proper vigilance and intelligence. Modern sanitary science is in some measure on its trial in the effort to prevent the introduction of cholera, and its speedy destruction should it secure a lodgment.

The surgeons of passenger steamers are earnestly desired to contribute by every necessary effort to the successful result of this trial. The lives and health of many under their charge will depend on prompt and intelligent action should cholera develop on the vessels of which they are medical officers, and the line that has intrusted important interests to their care, will be served or jeopardized according as they are more or less vigilant.

To the end of preventing the development of cholera during the voyage, or its spread among passengers and crew should it develop among them, it is important that the following precautions should be observed:

QUARANTINE OF INTENDING IMMIGRANTS.

First. That all immigrant passengers from a cholera-infected port, or district of country, be required to remain at a quarantine of observation for eight days before embarking on their journey from such infected place inclusive, and their baggage in the mean time subjected to proper disinfection.

MEDICAL INSPECTION.

Second. The inspection of all steerage passengers twice in each twenty-four hours by a medical officer of the ship.

ISOLATION OF THE SICK.

Third. The immediate removal to well isolated hospitals of all persons having *choleraic symptoms*.

Fourth—a. The disinfection of rooms or quarters vacated by the sick, by the combustion of two pounds of sulphur to every ten cubic feet.

b. The ejecta and dejecta of the patient should be received into vessels containing either of the following disinfecting solutions :

Bichloride of mercury 1 to 1000—(1 oz. to 8 gallons of water); Sulphate of iron, 2 lbs. to 1 gallon of water; or sulphate of zinc, 1 oz. to the gallon.

c. The daily use of one of these disinfecting solutions in cleansing all closets and lavatories.

d. The destruction of all clothing used by the sick, or disinfection of it by prolonged immersion in boiling water, or one of the above-mentioned solutions.

WATER AND FOOD SUPPLY.

Fifth. The water used for drinking should be free from the suspicion of pollution; fruits and vegetables should be used only when cooked, and all food should be freshly prepared and well cooked.

VENTILATION AND CLEANLINESS.

Sixth. Crowd-poison in the atmosphere of the steerage, and uncleanliness of its occupants, are conditions which favor the development, and increase the severity of all forms of contagious and infectious diseases. Therefore, the port-lights should not be closed except during very heavy weather, the passengers should be compelled to vacate the steerage frequently, and take the fresh air upon the main deck, thus affording opportunity for thorough ventilation, while frequent baths or ablutions should be urged upon all.

Very respectfully,

W M. M. SMITH, M. D.,
Health Officer, Port of New York, U. S. A.

Jan. 6, 1885.

DISINFECTION OF OLD RAGS.

The disinfection of old rags from cholera-infected ports, or those gathered in countries infected by the disease, and the subsequent extension of the order by the United States government, for the disinfection of *all* rags entering the ports of the United States, have become of so much interest as to warrant a brief notice in this article.

Early in June, 1883, the suspicious disease that had made its appearance at Damietta (Egypt) the preceding month reached Cairo and Alexandria, and was clearly recognized as Asiatic cholera. The apprehension that the contagion would reach New York through infected merchandise, particularly in old rags, of which upward of five thousand tons were annually imported, a considerable portion of which passed into the country through this port, induced the Health Officer at the New York quarantine to issue the following circular :

"To prevent unnecessary loss or detention of cargoes of rag which may be shipped to this port from European ports, or from ports in the British Isles, and to enable the health authorities to discriminate between cargoes or portions of cargoes of this kind that are suspicious of being carriers of the contagion of cholera and those which are not, the Health Officer at the New York quarantine will require of all consignees or owners of rags an affidavit made by the shippers before the United States consul, vice-consul or commercial agent at the port of shipment, that each and every bale in all invoices are "domestic rags" and are not reshipments; or, in case such cargo is a reshipment, the affidavit must explicitly state the port from which they were originally shipped.

It is respectfully suggested to whom it may concern that much embarrassment and perhaps loss may be prevented by the immediate communication of this regulation to correspondents at the ports referred to."

WM. M. SMITH,
Health Officer, Port of New York.

The above circular was practically an embargo on the admission of old rags from Egypt, at the port of New York. The accumulation of this article in the warehouses at Cairo and Alexandria came to be so considerable, and the anxiety so great on the part of the owners and consignees to bring them forward, that a plan for their disinfection at the warehouses in Egypt was formulated by the Health Officer at New York in September, 1883, and submitted to other quarantine authorities; the plan embraced the following requirements.

"1. Before baling the rags, thoroughly separate and distribute them upon racks not more than four inches thick, each tier of racks to be two or more feet apart. Disinfect by burning not less than two pounds of roll sulphur in a close shut room 10x10 feet and ten feet high; or in that proportion. The room should be closed for six to ten hours; or,

"2. Subject the rags to boiling water for at least two hours under a pressure of fifty to sixty pounds; then dry on racks as when prepared for disinfection. A rotary boiler may be used for this purpose, in which several thousand pounds of rags may be put at one time."

"The latter method is believed to be free from some of the objections to which the disinfection by sulphur is open; for instance, the liability not to separate the rags thoroughly when put on the racks, but leaving them matted together, while this method will be equally efficient in securing the destruction of any infection which may exist in the rags."

"To give confidence to sanitary authorities in this country, a capable and conscientious inspector, who shall be indicated by some sanitary official or body, should be appointed to superintend the disinfection of rags at Alexandria and Cairo. The certification of such an inspector should accompany each and all invoices, that they have been properly disinfected, and every bale should be stamped "inspected by (name of inspector)."

Subsequently it was decided that the Secretary of State of the United States should be requested to appoint an inspector who should be a citizen of the United States, and whose invoice should be indorsed by the Consul-General at Alexandria.

In compliance with the request, an inspector was appointed by the Secretary of State who proceeded to Egypt, where the Seymour Paper Company had already made a plant costing several thousand dollars.

The adjournment of the Forty-eighth Congress without making an appropriation for the maintenance of a Consul General in Egypt induced the Secretary of the Treasury to issue the following circular:

TREASURY DEPARTMENT,
WASHINGTON, D. C., July 19, 1884. }

To Collectors of Customs and others whom it may concern:

The following letter to this department from the Secretary of State, dated July 19, 1884, is published for your information and guidance:

On the 16th of April last I had the honor to inform you that a method of disinfection for rags had been agreed upon by the health authorities of New York, New Haven, and Boston, and that an inspector had been appointed who was to act under the Consul-General at Cairo, who was also to authenticate the certificate of inspection.

Congress having failed to provide for a Consul-General at Cairo, such certificates cannot at present be furnished.

The Consul-General was officially charged with the duty of seeing that the rags were disinfected, and as his office no longer exists, the want of satisfactory evidence of the fact of disinfection makes it necessary to abandon, for the present, the plan agreed upon. I have, therefore, revoked the appointment of the inspector, Mr. McNally, and any others designated as inspectors.

Because of the condition of things thus presented, you will, until further orders, prevent the unloading of rags from infected foreign ports, and of rags which are suspected on good grounds of being infected from any foreign port.

CHAS. J. FOLGER,
Secretary.

Under date of August 30, 1884, the acting Secretary of State, Charles E. Coon, notified "officers of the customs and others inter-

ested, that the unloading of old rags arriving at ports of the United States from foreign ports, on and after the first *proximo*, is prohibited for three months after date."

This order found many cargoes, probably not less than \$100,000 in value, afloat *en route* to the port of New York.

The order was subsequently "modified" by allowing the admission of rags "afloat" at the date of the order; and under date of October 31st, it was further modified by Secretary Gresham "so as to limit it to infected ports only; and all Mediterranean ports are deemed infected ports within the meaning of this order; provided, however, that no old rags shall be landed at any port of the United States except on a certificate of the United States consular officer at the port of departure, that such rags were not gathered or baled at or shipped from any infected place or any region contiguous thereto."

The Secretary of the Treasury, in the above order, formulated substantially the same regulations for the admission of rags at ports of the United States, that were issued by the Health Officer of the port of New York, in the circular published August 1, 1883.

At the conference of the representatives of State Boards of Health, and the municipal Health Organizations held at Washington the 10th and 11th of December, 1884, the disinfection and admission of old rags from foreign countries became a subject of considerable discussion.

The committee on Federal Legislation appointed by the conference was invited by the Secretary of State, and the Secretary of the Treasury, to confer with them in relation to regulations for the admission of old rags from foreign countries into ports of the United States. The public apprehension had become very great, that the contagion of cholera would reach our people through their admission without disinfection. This apprehension was unnecessarily increased by sensational articles in the press which dilated upon the danger in terms which were well calculated to inspire a fear to have even rags from non-infected ports admitted at the warehouses of the city, or disinfected in their neighborhood.

On the other hand, an influential class of merchants in New York and the adjacent cities urged that the record of sickness among "rag sorters," and those who handled them at the paper mills, was not greater than among workmen engaged in many other occupations.

At the meeting of the committee of the conference with the Secretary of State it transpired that at a cabinet meeting the previous

day, the discussion of the disinfection and admission of rags had developed a difference of opinion in respect to their admission before or after disinfection.

The interview with the Secretary of the Treasury terminated with his request that a communication should be made to him by the committee, in which their views on the subject should be fully expressed.

In compliance with the request of the Secretary the following was submitted as the judgment of the committee :

WASHINGTON, D. C., December 11, 1884.

To the Honorable HUGH McCULLOCH, *Secretary of the Treasury*:

SIR—The committee appointed by the Conference of State Boards of Health, to consider the subject of national action relating to health, which committee had the honor of an interview with you this day, hereby respectfully submits the view of the committee respecting the particular source of danger to health upon which you have expressed a wish to receive the opinion of the committee, namely, from imported rags. Members of this committee believe that contagious diseases dangerous to the public health occur in the homes of the people in every country, that old rags are collected mainly from among cast-off material from the homes of the people, and that old rags, in whatever country collected, are not free from danger, and that it would tend to prevent the introduction into this country of more than one contagious disease if all old rags imported into the country should be disinfected before, or on entrance at the port of entry.

This committee are of the opinion that disinfection of old rags can be effected by boiling them thoroughly, by exposing them to superheated steam so as to assure a temperature equal to or exceeding 212 degrees, by the use of sulphurous acid gas — the rags being fully exposed to the action of such gas in the ratio resulting from the burning of 22 pounds of sulphur to each 1,000 cubic feet of air, or by the use of the latter agent in any other form or manner which shall secure the subjection of the rags to that agent in an effectual manner.

This committee further express the opinion that the disinfection of rags should be allowed to be effected in any country when a proper inspection of the process of disinfection can be secured, and such disinfection certified to by a representative of the United States.

Very respectfully yours,

H. P. WALCOTT, *Chairman.*

S. S. HERRICK, *Secretary.*

Lastly, in this series of circulars from the Treasury Department, regulating the management of the local quarantines, through orders given to the collectors of customs, appeared the following:

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY, }
WASHINGTON, D. C., December 22, 1884. }

To Collectors of Customs and others:

All circulars of the department concerning the importation of old rags are modified as follows:

No old rags except those afloat on or before January 1, 1885, on vessels bound directly to the United States, shall be landed in the United States from any vessel, nor come into the United States by land, from any foreign country, except upon disinfection, at the expense of the importers, as provided in this circular, or as may hereafter be provided.

Either of the following processes will be considered a satisfactory method of disinfection of old rags, and will entitle them to entry and to be landed in the United States upon the usual permit of the local health officer, viz:

1. Boiling in water for two hours under a pressure of fifty pounds per square inch.
2. Boiling in water for four hours without pressure.
3. Subjection to the action of confined sulphurous-acid gas for six hours, burning one and a half or two pounds roll brimstone in each 1,000 cubic feet of space, with the rags well scattered upon racks.
4. Disinfection in the bale by means of perforated screws or tubes through which sulphur dioxide, or superheated steam at a temperature of not less than 330 degrees, shall be forced under a pressure of four atmospheres for a period sufficient to insure thorough disinfection.

Old rags may be landed and stored at such places as may be approved by this department for the purpose of undergoing any of the processes of disinfection before named, and upon the completion of such process to the satisfaction of an inspector of customs and the local health officer, the rags may be delivered to the importer or consignee.

Old rags may be subjected to disinfection by either of said processes in any other country where this department may appoint an inspector to superintend the same, whose certificate of such disinfection shall be authenticated by a United States consular officer according to Department Circular No. 61, of April 22, 1884.

H. McCULLOCH,
Secretary.

The public apprehension in relation to the contagion which is imported with old rags has been referred to; this, in connection with the extent of this commercial industry at the port of New York, affords an explanation of the consideration given to their importation and disinfection.

For the eleven months preceding the 30th of December, 1884, rags were imported from thirty-nine foreign ports. The annual importation exceeds 150,000 ^{bales} tons, of an estimated value of \$15,000,000. An article of commerce enlisting capital and industry to this extent should be neither excluded nor oppressed by quarantine regulations except when it is demanded by well-founded apprehension of danger from it, as an importer of contagion or infection.

The provision made in the circular of the Treasury Department, which allowed rags to be subjected to disinfection by either of the processes mentioned "in any other country where the department may appoint an inspector to superintend the same," was wisely conceived but can be of little practical benefit to the shippers, from the fact that but few ports in the world ship enough rags to this country to make it an object to incur the expense of disinfection and supervision before shipment. The same objections will limit the disinfection of rags to a few of the larger ports of the United States.

The difficulty which has hitherto met quarantine officials at our sea-ports has been to secure efficient disinfection of rags in the bale. To open the bales and boil, dry and re-bale them, or to distribute and disinfect with sulphurous acid gas would involve an expense in the preparation of buildings, machinery and labor, that would greatly increase their cost at the manufactures, without in the least increasing their value. This difficulty has been overcome by an ingenious invention by which superheated steam is introduced into the bale in the following manner: A wooden box lined with zinc, large enough to admit a bale of rags, is used as a receptacle for the bale; the front of the box is closed when the bale has been introduced, by a door which is hung by its upper end; the bale is inserted in the box by placing it on a hand truck in contact with the ends of five pointed hollow screws perforated throughout their length, each about one and one-half inches in diameter and four feet in length, and projecting from the end of the box opposite the door, and connected with pipes through which the superheated steam is admitted; the pipes are arranged so as to divide the long diameter of the bale into nearly equal parts; when the bale touches the end of the screws, the machinery is set in motion, the screws revolve from left

to right, penetrate the bale nearly its whole length, and the bale is drawn within the box by the movement of the screws; when the bale is fully within the box the lid, or door, falls to its place and steam, heated to 300 degrees and upward, is forced into the bale through the screws; after five minutes the bale is withdrawn from the box by a reverse motion of the screws; a thermometer introduced into any part of the bale immediately after it is removed from the steam chest will indicate a temperature of 250 to 280 degrees.

The order of the Treasury Department, dated December 22, 1884, forbidding the landing of "old rags from any foreign country" that were not afloat January 1, 1885, compelled importers of that article to choose one of the methods indicated in the foregoing circular. And the accumulation of old rags at ports recently infected by cholera, that were waiting shipment to this country, was so considerable, that owners and consignees became exceedingly anxious for some arrangement by which their disinfection could be effected.

With the desire to secure a practical demonstration of the value of the two agents, superheated steam and S. O², one of which was proposed to be used by the Paper Stock Disinfecting Co., in the disinfection of old rags in the bale, Dr. George M. Sternberg, surgeon U. S. A., was employed for the purpose of making biological tests designed to ascertain whether these agents could be used by the apparatus hitherto described to effectually disinfect rags in the bale.

Preliminarily it should be stated, that during the summer and fall of 1884, a supply of sulphurous acid gas under a pressure of six atmospheres was obtained from time to time of W. J. Pollock, a manufacturing chemist of New York, for use in disinfecting the steerage of passenger steamers, and the baggage of immigrants.

This agent, as produced by the combustion of sulphur in the air of a room, has long occupied a first rank among health authorities as a disinfectant of the contagion arising from many forms of disease. There is no disinfecting agent known that has been more extensively used from immemorial time.

The rooms occupied by small-pox patients, and the clothing worn by them, are disinfected by the combustion of at least two pounds of sulphur in 1,000 cubic feet of space, with great certainty as proved in thousands of cases. The same is true of rooms and clothing infected by cases of scarlatina and diphtheria. The evidence of this is more conclusive in the contagion of small-pox than most other

contagions, because the contagion is more certain in its effect on the person exposed.

The confidence which experience and observation have given sanitary authorities in the gas produced by burning sulphur, as a destroyer of contagion has contributed to the desire to lessen the difficulties and dangers attending its production, and increase the facilities for its use. The extent of the combustion of sulphur, and consequently the production of S. O²., depends on the supply of oxygen in the atmosphere. In the ill-ventilated steerages and hospitals of immigrant steamers, it is often difficult to burn sufficient sulphur to destroy insect life. In the presence of a contagion like cholera, whose resistance to the action of germicides is undetermined, and the failure to destroy which might be followed by the most unfortunate results, it is desirable to increase its efficiency, and thus the confidence of sanitarians in this agent by ability to supply it to any extent and under all circumstances when necessary.

The use of S. O²., under compression in copper tanks of any desired size, with stop-cock by which the supply can be regulated *ad libitum*, such as might be carried by the person engaged in disinfecting rooms or the steerages of steamers, or in much larger reservoirs for the disinfection of large quantities of baggage, clothing or goods of any kind, seemed to supply the means for securing the desired result.

Under these circumstances, and with a desire to make the application of the tests as practical as possible Dr. Sternberg came to New York and at the Baltic stores in Brooklyn, in the presence of several gentlemen of note, among whom may be mentioned Assistant Secretary, H. F. French, of the Treasury Department; William H. Robertson, Collector of the port of New York, the Health Officer of the port of Boston, the Secretary of the State Board of Health of Massachusetts, Dr. Lindsay of the New Haven Board of Health, and Dr. J. H. Raymond, Health Commissioner of Brooklyn, a series of experiments were undertaken, which will be best illustrated in the language of Dr. Sternberg as published in the "Medical News," page 346, vol. XLVI.

"I visited New York for the purpose of applying biological tests in an experiment designed to ascertain whether it is practicable to disinfect rags in the bale. A manufacturing chemist of New York proposed to accomplish this by injecting sulphur dioxide into the interior of the bales through hollow tubes. The S. O²., had been compressed to the liquid form in copper cylinders, and being under the pressure of six atmospheres was expected to permeate the bale thoroughly

when the valve was opened leading to the hollow and perforated screws introduced into it. The bale was to be placed in a closed chest of moderate dimensions, and disinfection was to be accomplished.

The experiment was made at the Baltic stores, Brooklyn, in the presence of Dr. Smith, Health Officer of New York, Dr Raymond, Commissioner of Health of the city of Brooklyn, and several other gentlemen belonging to the health department of New York and of Massachusetts.

The following material which I had brought in sterilized tubes from the biological laboratory of Johns-Hopkins University, Baltimore, was introduced into the bale through openings made with a pocket-knife. The depth of these openings was from two to four inches. The material to be disinfected was upon pledges of cotton previously sterilized, which had been saturated with pure cultures of the various test organisms. Some of these pledges had been subsequently dried at a low temperature, others remained moist. The aperatures in the bale were closed, after introducing these bits of cotton, by tamping in strips of old muslin. When these preparations had been made the bale of rags was placed in the disinfection chamber and the gas turned on. The time during which the gas was allowed to flow was three minutes and a half. The pressure, as shown by a gauge in connection with the copper cylinder, wa^s eighty pounds at the commencement and seventy-five at the close of the experiment. The disinfection chamber was not tight, and all those in the vicinity were obliged to retire to a respectful distance to windward while the gas was flowing and for a considerable time afterward, owing to the abundant escape and stifling effect of the S. O². It was only after an interval of twenty or thirty minutes that the disinfection chamber could be approached to withdraw the bale, and after it had remained in the open air for some time, I was almost suffocated while removing the pledges of cotton containing the test organisms. These were at once placed, with sterilized forceps, in sterilized glass tubes, and each glass tube was at once plugged with sterilized cotton. In this way they were taken back to the laboratory in Baltimore, where the test of disinfection was completed by culture and inoculation experiments. The nature of the material and the result of the experiments are given in the accompanying table.

Other pledges of cotton had been exposed in the bale, which had been saturated with tuberculous sputum, but this part of the experiment was not followed up, owing to the scarcity of rabbits for inoculation."

No. of tube containing cotton pledge.	NATURE OF MATERIAL.	Test by cultivation.	Result.	Test by inoculation.	Result.
No. 1.....	<i>Bacillus anthracis</i> containing spores (dry).	One culture tube.	Abundant development of anthrax filaments in twenty-four hours.	One rabbit inoculated subcutaneously.	Died of anthrax on third day.
No. 2.....	<i>Bacillus anthracis</i> containing spores (dry).	One culture tube.	Abundant development of anthrax filaments in twenty-four hours.	One rabbit inoculated subcutaneously.	Died of anthrax on third day.
No. 3.....	<i>Bacillus anthracis</i> containing spores (moist).	Two culture tubes.	Abundant development in both.	One rabbit inoculated.	Survived the inoculation.
No. 4.....	<i>Bacillus subtilis</i> spores (dry).	Two culture tubes.	Abundant development of <i>bacillus subtilis</i> in both.		
No. 5.....	<i>Bacillus subtilis</i> spores (moist).	Three culture tubes.	Abundant development of <i>bacillus subtilis</i> in each.		

At the time of the experiments referred to the apparatus at the Baltic stores was by no means as perfect as it should have been. The chest or box in which the bale was inclosed was not close, and in consequence much of the gas escaped as soon as it was delivered into the bale, while the material to be disinfected was not exposed to exceed thirty minutes. For the efficient disinfection of rooms or clothing supposed to be infected with the contagion of small-pox, diphtheria, scarlatina and yellow fever, it is considered necessary to expose them to the gas for several hours in a tight room or vessel.

Subsequent experiments by Dr. Sternberg demonstrated that *micrococci* obtained from the following pure cultures, to-wit: vaccine vesicle, vaccinal erysipelas, from blood from a fatal case of pureperal septicaemia, and *micrococcus urea* (culture in beef tea) when exposed under a bell jar having a capacity of one gallon, to liquid S. O.² sufficient to make when volatilized twenty volumes per cent, resulted in complete disinfection after an exposure of eighteen hours, "as was proved by attempts to start cultures from the exposed organisms." Both moist and dry pledges of sterilized cotton previously saturated with the culture were used in the experiments.

It will be observed that the report of the tests at the Baltic stores relates only to the *bacillus anthracis* and *bacillus subtilis*. Other organisms were subjected to the same tests, but no report of the result has been made.

The fact that S. O.² fails to destroy the spores of the *anthrax bacillus* does not afford sufficient reason for rejecting an agent that has given sanitarians greater satisfaction from its efficiency in the destruction of contagion than any hitherto known to them.

If the contagion of small-pox, scarlatina and diphtheria, and the infection of yellow fever, is destroyed by sulphurous acid gas, as the experience of thousands who have used it for that purpose attests, health authorities should not discard it until a more efficient and convenient agent is discovered.

The *anthrax bacillus* is known to be the most resisting to the action of germicides of any of the organisms discovered. Vallen, Gattier, Pasteur, Koch, Sternberg and others, have contributed to establish by their investigations the probability that micro-organisms are the cause of the contagious and infectious diseases. And if it be true that the contagious character of the diseases mentioned depends upon germ-life, we may conclude that it does not have the resisting power which the spores of the *anthrax bacillus* possess. Since it is impossible to say from demonstrated facts that these diseases are

attended by micro-organisms with spores, or micro-organisms without them, is it wise, in the face of the experience of its efficiency under the observation of innumerable witnesses, to exclude from our list of germicides an agent because it fails to destroy the most resisting of the forms of germ life?

During the past five years more than a hundred hospitals or rooms, on passenger steamers, occupied by small-pox patients on arrival at the New York quarantine have been disinfected with S. O.² as produced by the combustion of sulphur in the room to be disinfected. In most cases the bed clothing (except mattresses and pillows, which were invariably burned) and such personal clothing of the patient and attendant as were not sent to the hospital with the former, were hung up on lines or hooks in the room occupied by the patient, and were submitted to this agent for at least ten or twelve hours. There has not been an instance in this experience, in which the reproduction of the disease could be traced to insufficient disinfection.

In the article of Dr. Sternberg previously referred to, he says: "My experiments show most conclusively that S. O.² does destroy the specific infecting power of vaccine virus dried upon ivory points, when present in the air of a disinfecting chamber in the proportion of one volume per cent."

It is reasonable to suppose that there should be a correspondence in the effect of sulphurous acid gas upon the contagion of small-pox, if, as is probable, its development is dependent on organisms. As before stated, experience confirms this theory.

"Admitting," says Dr. Sternberg, "that, in the absence of spores, micro-organism suspended in the atmosphere, or attached to the surface of objects, may be destroyed by sulphur dioxide, when generated in sufficient quantity in a well-closed apartment, and in the presence of moisture, the question remains whether the same object may not be as well accomplished by thorough ventilation, and by washing all surfaces, walls, ceilings, floors, furniture, etc., with a 1: 1000 solution of mercuric chloride."

Theoretically, this suggestion is correct; but practically, it is wrong, because there are often conditions which will prevent its adoption. The hospital on a passenger steamer, "for instance, when located between decks, cannot be thoroughly ventilated" while the passengers are on board, except by opening the doors of the hospital, which would be likely to expose the many persons to the contagion in the room.

Those familiar with the construction of sea-going steamers are aware that the ventilation afforded by the "port light" is often very inadequate, even for the well passengers. And when cases of contagious disease are found in the steerage, as is not unfrequently the case, it would be impossible to wash all its "surfaces, walls, floors and ceilings" before the removal of the passengers. Whatever needs to be done in disinfecting a vessel must be done while it is "in quarantine"—as a rule it will not be thoroughly done elsewhere.

The disinfection of rags in bale by the use of superheated steam was also tested at the Baltic stores on the occasion of Dr. Sternberg's visit.

Organisms of the same class, and introduced into the bale in the same manner, were employed to test the germ-destroying power of moist heat, and proved to be eminently practical and successful.

Inoculations from the *anthrax bacillus* exposed on this occasion failed in every instance. Subsequent experiments by Dr. Sternberg have afforded conclusive evidence that the most resisting spores are destroyed by a temperature of 230° F. "A temperature of 221° maintained for two minutes destroys the spores of anthrax, and all micrococci and bacilli not containing spores are quickly destroyed by a temperature much below the boiling point of water." *Sternberg's Report.*

The conclusions to be drawn and the benefits to be derived from the investigation thus far in relation to S. O.² may be briefly summarized as follows:

This agent fails to destroy the spores of the *bacillus anthrax*, or of *B. subtilis* with any degree of certainty.

It destroys micrococci and bacilli without spores, in the presence of moisture, after prolonged exposure.

The known organisms without spores are destroyed by exposure of several hours to a proportion of gas of five per cent and upward per 100 volumes of air.

The rapid escape of this agent when employed as a disinfectant in well-closed apartments or vessels requires a considerable supply beyond the amount actually necessary for disinfection. To effectually disinfect personal clothing, bed clothes, and baggage of every description, the articles should be suspended singly in the disinfecting room. Mattresses, pillows and such articles as cannot be put into water of a temperature not less than 212°, or a solution of bichlorate of mercury of one in 1,000, should be destroyed by fire.

Rooms or clothing in which there is moisture will be more efficiently disinfected, other conditions being equal.

In respect to the use of moist heat it may be said, that when a temperature of 212° F. can be secured, either by immersion in water, or by steam, it is one of the most effectual of the disinfectants which the sanitarians can employ.

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