

Kershner (E.)

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YELLOW FEVER PROPHYLAXIS  
IN INFECTED PORTS.

BY

EDWARD KERSHNER, M.D.,

Medical Inspector U. S. N.; Professor of Naval, Military, and  
State Hygiene at the POST-GRADUATE MEDICAL SCHOOL and  
HOSPITAL; Fleet Surgeon N. A. Station, etc., etc.

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Editor American Medico-Surgical Bulletin.

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By **EDWARD KERSHNER, M.D.,**

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**T**HE presentation of the following correspondence to the readers of the AMERICAN MEDICO-SURGICAL BULLETIN in the form of an original communication is made to demonstrate what can be accomplished even under unfavorable circumstances by following well directed hygienic rules.

It shows that epidemics of all kinds, both upon land and in ships at sea, can be very largely, if not absolutely, prevented, provided the proper hygienic rules and regulations are accurately enforced.

The recollection of the enormous mortality, that often follows upon the outbreak of an epidemic, has stimulated me to emphasize the necessity for greater attention to this important subject by all medical men.

Our passage into, and prolonged stay in, the infected port of Rio de Janeiro with one of the largest naval vessels in the world, as illustrated by the following report, is a good example of what can be accomplished in this direction :

{ U. S. S. "New York,"  
} June 27, 1894.

SIR :

In reply to the letter of the Honorable Secretary of the Navy, referred to me regarding the measures used to avoid yellow

fever at Rio de Janeiro during the rebellion there, I submit the following statement :

Fleet rules were as follows : They were issued Dec. 29, 1893, and were probably not intended to cover the cases of actual epidemic of yellow fever, as they were issued before the arrival of the flagship on the station.

All water for drinking or cooking purposes must be distilled when practicable.

The men will wear flannel or merino next to the skin.

Men must be prevented from sleeping in places where they are exposed to dew or damp winds or directly under wind-sails or ventilators.

Steam fans will be kept running at full speed from 8 p. m. until 6 a. m.

The crew will be exposed as little as possible to the heat of the sun, and boats will spread awnings from 8 a. m. to 4 p. m.

Particular attention must be paid to the circulation of air throughout the ship by means of blowers, wind-sails, ventilators, etc.

Wind-sails must be kept trimmed day and night.

There are a few other rules that were not carried out, and therefore not inserted here.

A general order was issued, Jan. 15, that a boat was to go to the wharf three times a day and to remain at the wharf half an hour each time for the diplomatic mail.

An order to suspend drills and use the time in instruction, was issued Jan. 14.

These are the orders regarding the prevention of fever that I find on file.

When this ship was near Rio, I drew up the following suggestions, which Captain PHILIP had typewritten, posted up, and ordered the crew to obey :

ORDER : The following rules must be carried out for the preservation of the health of the ship's company, viz :

- 1) Avoid unnecessary exposure to the sun.

2) Avoid rain, if possible ; but if you do get wet, change your clothes at once. Do not let them dry on your body.

3) Always keep your clothes dry.

4) As the night dew is very dangerous do not sleep on deck or in any uncovered place.

5) Always wear a woolen undershirt, and *never* expose the bare abdomen to the air either day or night.

6) Do not lie on the damp deck at any time ; or in an active current of air.

One thing always remember as individuals : if you get sick in this climate, you are liable to cause or give the sickness to your shipmate ; therefore, though you think you are proof against disease of any kind, some shipmate may not be as fortunate ; consequently do *not* expose him by any unnecessary act of yours.

(Signed) J. W. PHILIP,  
Captain U. S. Navy,  
Commanding.

The "New York" arrived at Rio de Janeiro harbor on Jan. 16, 1894, and we learned on our way that yellow fever was increasing in the city. I expected to find some sanitary rules regarding the every day work of the fleet, but none were sent to me.

I learned that liberty was not given to the men, but that intercourse with the city was in other respects free. That is, officers went on shore, the boat lay at the wharf an hour and a half every day for intercourse with the minister, and a market boat went every morning from all the ships. These boats left the ships at 6:30 a. m., returning at about 9:30—about two hours on shore. At this time there were about ten deaths a day from yellow fever reported. This was less than really occurred.

After waiting a few days for sanitary instructions from the flagship, I communicated with Medical Inspector BRIGHT, of the "Newark," who was the regularly appointed

fleet surgeon. Dr. BRIGHT informed me that he had not been consulted about sanitary matters and was not doing the duty of fleet surgeon. I therefore concluded to act myself as far as the "New York" was concerned, rather than trust to so many uncertainties, and, in order to do the best to save the ship from the fever which was now rapidly increasing on shore.

It will be seen that the stewards were spending about two hours on shore every day. I held a consultation with Capt. PHILIP, who was quick to perceive the necessity for more stringent rules if we wished to escape. I recommended, and it was agreed upon: That *our* market boat should be run only once a week, and all intercourse with the shore, except what was absolutely necessary, should be stopped; that no clothes be allowed on shore to be laundered; no water to come on board from shore; no visitors from shore to come on board; no water from the bay to be used in the ship or on the outside; no man to be allowed to sleep in the open air on deck at night, or to be outside the cover of the awnings at night. Captain PHILIP and the Executive Lt.-Com. HEALD at once carried out these rules in the strictest way.

In a short time orders were issued that the steam launches of all the ships were to take turns in sending in the diplomatic boat and towing the market boats from all the ships. Therefore our boat had to go as diplomatic boat every fifth day, and remain at the infected wharf one and a half hours, and go as tow-boat to market every fifth morning. Complaint was now made that our boat took others to market but was not allowed to get provisions for our own men.



The order was therefore modified to permit articles to come on board every fifth day. It had been ordered, too, that clothes could go on shore to be laundried. This shows how very difficult it is to carry out the simplest rules of hygiene on board ship.

It was now a time of great anxiety as the epidemic rapidly increased in the city.

The market boats from all the ships carried into the city every morning about twenty-five stewards and yeomen to gather provisions; and these rambled at will about the city for two hours every day. Each of these boats, too, carried a crew that was more or less exposed.

The quantities of stores received on board the ships were enormous, often appearing like a small cargo. In all this lurked much danger, in my opinion, for I consider the merchandise the most common mode of conveying the infection; the danger of carrying the poison by the person being much less.

As we were unable to prohibit the merchandise, in order to reduce the danger to a minimum, it was recommended that all articles should be divested of their wrappings before going into the ship and the wrappings at once thrown overboard. Captain PHILIP ordered this to be done, and this rule was followed while we remained at Rio. No wrappings, bale, box, or bag, paper, etc., was allowed to go into the ship. Barrels, cans, etc., that could not be opened on deck were coated with lime-wash as soon as received on board.

The head was flushed all the time, and to its utmost capacity every half hour, and well scrubbed continually. Urinals fully flushed all the time. No fruits, vegetables,

wet towels or clothes of any kind were allowed below the gun deck. The ship was kept as dry and clean as it possibly could be.

The bottom of the ship and the cables were covered with small shell-fish and barnacles, and when the cable was stored in the locker many of these marine shell-fish and mud from the bottom separated from the chain, remained in the locker and decomposed. For this reason as well as the well known fact that the waters of the harbor were infected, the chain lockers were purified by turning live steam into them after securely closing all openings. I will say here that it is much to be regretted that a small steam disinfecting chamber was not provided on deck where small articles, clothing, etc., could be purified. The need of such a chamber was severely felt while at Rio, and may be again if the ship remains in the West Indies.

The men's bedding was aired every morning from one to four hours, and hammocks frequently scrubbed and kept clean. The clothing was frequently scrubbed, well aired, and dried, and the men required to be clean and neat in dress and habits.

Scrupulous neatness and cleanliness were required in all parts of the ship. All the decks were kept dry and the berth-deck shellaced. All parts of the ship were regularly inspected, and close attention paid to all hygienic rules. The holds, tanks, double bottoms, and store-rooms were all kept as clean and pure as the main deck, and every part of them examined once a week. Notwithstanding all the care, it did not seem that we could avoid the disease, as the mortality went up rapidly, approaching a hundred a day, and one ship after another on all

sides of us was losing officers and crew, and even the foreign men-of-war were becoming infected.

The admiral engaged hospital accommodations on shore for the use of the American fleet. He also hired a small steamer, the "Tiridentes", to do the boat duty and thus avoid the exposure of the men on shore. This was a very great step in advance and one that had been already taken by the British navy fleet.

The "Tiridentes" took orders from all the stewards and delivered the goods at the gangway every morning. This diminished the danger of personal contagion, but the danger of the merchandise remained.

This arrangement began on February 1, and strict orders were given that no one should go on board, but the goods were to be placed on the gangway by her men and then brought on board by our crew, the wrappings removed, and the goods sent below.

The first week in February the disease appeared on a Portuguese man-of-war, the surgeon being the first victim. Soon after this the Captain of the Austrian man-of-war died, and the disease extended to the merchantmen in the harbor. There were about twenty-five foreign men-of-war and two hundred merchantmen in the harbor.

As the poison of the fever appeared to be everywhere, Captain PHILIP, at my suggestion, prohibited all merchandise from coming on board except fresh meat, eggs, and canned goods.

Although we had no yellow fever on board, we had many sick with malarial fever and the health of the crew was in a very

low state, new cases of malarial fever appearing at the rate of several a day.

The disease now appearing on the "Newark" and other men-of-war, I sent the following letter to Captain PHILIP :

{ U. S. S. "New York," 1st Rate,  
Rio de Janeiro, Brazil,  
February 15, 1894.

SIR :

In compliance with Articles 645, 646, and 647, Navy Regulations, I regret to inform you that the epidemic of yellow fever in Rio de Janeiro is rapidly extending and becoming more virulent, and the danger of its extending to our ships in the harbor is becoming more imminent. One case has appeared on the U. S. S. "Newark." To-day I am informed that the Captain, one officer and several men on the Austrian man-of-war were attacked and the vessel left the harbor for a place of safety, and the English and French vessels are about to leave to avoid the disease. The epidemic is liable to invade this ship at any time, and should it do so it would be almost impossible to eradicate it, for the reason that the ship is very poorly ventilated and is intensely hot, the many decks and compartments preventing any proper circulation of the air. Therefore the mortality would be very great in so large a crew. To avoid this great suffering and loss of life, as well as pecuniary loss and the disabling of the ship for a long time, I would most respectfully but urgently recommend that the ship be taken away from the harbor of Rio de Janeiro to a healthier point during the epidemic.

Very respectfully,

(Signed) E. KERSHNER,

Medical Inspector, U. S. Navy.

Captain J. W. PHILIP, U. S. Navy, Commanding.

On the 16th of February, Captain PHILIP took this letter to the admiral, had an interview with him, and urged a change. The admiral at once ordered the ship to Taipu Point, outside the harbor entrance and about five miles from the city of Rio, and we arrived there the next day, February 17.

The ship was thoroughly cleansed, which could not be done in the harbor as we were short of fresh water and the water of the harbor was interdicted as dangerous.

The occurrence of yellow fever on the "Newark" showed that the precautions there taken were not sufficient, but I am unable to state what was done on that ship. She was at once sent to Montevideo and was of no further use to the fleet at Rio.

We did not cruise at sea, but remained at Taipu Point one week, which greatly benefited the men, as could be plainly seen by any one.

On our return inside the harbor we learned that the disease had spread to nearly all the foreign men-of-war in the harbor and about a hundred deaths occurred daily at Rio. It was said to be the worst epidemic that ever visited Rio, as the large number of strange troops in the city furnished susceptible material for the disease. It invaded every man-of-war in the harbor except four U. S. ships, and nearly every merchantman, about two hundred in number. I have not been able to ascertain the number of deaths on these ships, but many ships lost their entire crew, and many others were so far disabled that they could not work the ships. In view of the rapidly increasing danger the following letter was written to Captain PHILIP :

{ U. S. S. "New York," 1st Rate,  
{ Rio de Janeiro, Brazil, February 25, 1894.

SIR :

In compliance with Article 645, Navy Regulations, I have to call your attention to the danger of yellow fever infection from the tug "Tiridentes."

I would respectfully recommend that the "Tiridentes" be not allowed to come alongside the ship or be fastened to the boom, but that she be an-

chored off at some distance and all communication held with her by means of a ship's boat.

Very respectfully,  
(Signed) E. KERSHNER, Med. Insp.

Capt. J. W. PHILIP, Commanding.

At the time this letter was written, the suggestion was not carried out on board this ship. But at the end of a week my request was carried out prohibiting anything whatever from being brought on board from Rio on the "Tiridentes," and from that time officers and crew lived on ship provisions, not even having potatoes. Everything was excluded, fearing contagion in the vehicle carrying them or in the wrappings enclosing them.

On March 4, we again went out to Taipu Point, and there remained until the 13th, the day of the surrender of Admiral DA GAMA's ships to the Brazilian Government. Orders were given that the "New York" should receive any insurgents who might apply for refuge. This I opposed to the utmost as it would surely carry fever on board.

Most fortunately none applied, but had they done so, we would probably have had the bitter experience that the "Portuguese" men-of-war so seriously regret. These ships were over-run and over-crowded with the refugees, from whom they took both yellow fever and beri-beri.

March 14, the "New York" left the harbor and again went to Taipu, returning on the 17th. I have no doubt that these trips to Taipu had much influence on the health of the ship's company.

Short cruises at sea and a short stay at Cape Frio or other nearby places were suggested. It was thought by many that one

ship at a time could attend to affairs in Rio harbor. After DA GAMA gave in and the "Aquidaban" left, only a weak force of insurgents remained. Taipu is only five miles from the city, and ships could have speedily returned from there. If these cruises had been made and supplies obtained at these places, it would have reduced the danger to air infection alone which is comparative safety.

Coaling ship is always a source of danger where yellow fever prevails. We had to coal in Rio, but were fortunate enough to get coal from a ship just arrived from England, and it was brought alongside in lighters and native laborers threw it into the coal ports while our own men handled it within the ship. No intercourse whatever was allowed with the lighters or laborers in them.

On the 18th of March, the flagship left the station. I therefore became senior Medical Officer, Captain PHILIP was senior officer in command, and I, at once, wrote him the following letter :

} U. S. S. "New York," 1st Rate,  
} Rio de Janeiro, Brazil, March 18, 1894.

SIR :

In compliance with Navy Regulations, Art. 645, 646, and 647, I have to report that the epidemic of yellow fever still prevails with great severity in the city of Rio de Janeiro and towns around. The average daily mortality is about fifty.

There is also great prevalence of the disease in the harbor among the shipping, and the bay is thought to be greatly infected through the water. It is reported that nearly all the ships in port have been or are now infected. All the foreign men-of-war have gone except those of the United States and most of them had fever on board. In view of those facts I consider it very dangerous for "New York" and "Charleston" to remain in this port;

and therefore earnestly recommend that they leave Rio at the very earliest moment.

Very respectfully,

(Signed) F. KERSHNER,  
Medical Insp., U. S. Navy.

Capt. J. W. PHILIP, U. S. N., Commanding  
"New York," and Senior Officer, Present.

Captain PHILIP at once cabled to the Navy Department of the danger and recommended that the ships leave Rio, and on March 20 orders were received to go to St. Lucia, W. I., and we left Rio on the 23d, and the "Charleston" left two days later. The epidemic in the city had now decreased from one hundred and fifty deaths a day to about fifty, but there was still great mortality in the harbor where nearly every ship was infected, and boats were busy carrying patients from the ships into the hospitals; even dead bodies were seen floating in the waters of the harbor.

The health of the fleet was very good. The "New York" was the only ship that had a sick-list of over about five to seven. The list on the "New York" averaged thirteen and a half. This was partly caused by the epidemic of influenza which invaded the ship about the first of December, and from which it is only now becoming free. Many of the cases of fever showed some influenza symptoms.

There was more fever proportionately in this ship than in any of the others, largely due, I think, to the almost unendurable heat of the ship below the gun deck. Parts of the berth deck rarely had a temperature below 90° and in the fire room, bunkers, after-store-rooms, and dynamo-room it ranged from 95° to 170°. In my own stateroom it has not been below 80° since we came into the tropics.



These high temperatures must surely be productive of fever as well as other diseases by preventing sleep at night and undermining the general health.

The daily average of sick while at Rio was 13.54, and the average for the whole quarter was exactly the same. The percentage of sick was 2.62. Number of cases attributable to climatic surroundings, 62.

This shows that Rio is a remarkably healthy port excepting yellow fever, and proper sanitary measures if enforced in the city would very soon banish that disease. It is a reproach to the city that it has not long ago been done.

From my observation of indifference to sanitary laws in the fleet, I took the impression that the authorities had little faith in them, and this made it difficult to execute them, and often impossible to do so. I am, therefore, fully of the opinion that a code of sanitary laws should be embraced in the navy regulations and officers in command should be forced to obey them. I think that, as a rule, medical officers are well informed on this subject, but have no authority to enforce anything that the commanding officer does not believe in. As the latter, as a rule, is not a hygienist, the medical officer is powerless in many cases where there is the greatest need for sanitary action.

This I make as a general suggestion without reference to this ship, as Captain PHILIP, of the "New York," on all occasions promptly and fully recognized the necessity of enforcing all sanitary laws and to his wisdom and efficiency in the execution of these laws the immunity of this ship from yellow fever is largely to be attributed, and I am of the opinion that the strict observ-

ance of these laws on the "New York" did much to favor their enforcement on other ships of the fleet.

I am not aware that an American fleet ever before remained in port through an epidemic of yellow fever without infection, and therefore feel that this is in some measure a triumph of American sanitary science.

I was ably assisted in consultation and in the details of sanitation by P. A. Surgeon J. F. URIC, who had valuable experience in yellow fever countries. Assistant Surgeon D. H. WILSON also did good work.

Very respectfully,

E. KERSHNER,

Medical Insp., U. S. Navy.

Capt. J. W. PHILIP, U. S. Navy,

Commanding "New York."

[There were five U. S. men-of-war at Rio de Janeiro during the rebellion there : The "Charleston," 300 men; "Newark," 350 men; "San Francisco," 350 men; "Detroit," 200 men; "New York," 550 men.

The latter is a double-deck steamship, and while at Rio lay under banked fires ready to move at any moment ]

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